

Economic Impact Forecast System (EIFS) Model and Outputs

Socioeconomic Impact Assessment

Socioeconomic impacts are linked through cause-and-effect relationships. Military payrolls and local procurement contribute to the economic base for the region of influence (ROI). Constructing on-post housing at Fort Belvoir will have a multiplier effect on the local and regional economy. During the construction period, direct jobs will be created, generating new income and increasing personal spending. This spending generally creates secondary jobs, increases business volume, and increases revenues for schools and other social services.

The Economic Impact Forecast System

The US Army, with the assistance of many academic and professional economists and regional scientists, developed the Economic Impact Forecast System (EIFS) to address the economic impacts of actions requiring NEPA and to measure their significance. As a result of its designed applicability, and in the interest of uniformity, EIFS should be used in NEPA assessments for RCI. The entire system is designed for the scrutiny of a populace affected by the actions being studied. The algorithms in EIFS are simple and easy to understand, but still have firm, defensible bases in regional economic theory.

EIFS is implemented as an on-line system supported by the Mobile District Corps of Engineers and U.S. Army Environmental Policy Institute (AEPI), through the Computer and Information Science Department of Clark Atlanta University. The system is available on the Internet to anyone with an approved user ID and password. The databases in EIFS are national in scope and cover the approximately 3,700 counties, parishes, and independent cities that are recognized as reporting units by federal agencies. EIFS allows the user to "define" an economic region of influence (ROI) by simply identifying the counties to be analyzed. Once the ROI is defined, the system aggregates the data, calculates "multipliers" and other variables used in the various models in EIFS, and prompts the user for input data.

The EIFS Impact Model

The basis of the EIFS analytical capabilities is the calculation of multipliers that are used to estimate the impacts resulting from Army-related changes in local expenditures and/or employment. In calculating the multipliers, EIFS uses the economic base model approach, which relies on the ratio of total economic activity to "basic" economic activity. Basic, in this context, is defined as the production or employment engaged to supply goods and services outside the ROI or by federal activities (such as military installations and their employees). According to economic base theory, the ratio of total income to basic income is measurable (as the multiplier) and sufficiently stable so that future changes in economic activity can be forecast. This technique is especially appropriate for estimating "aggregate" impacts and makes the economic base model ideal for the EA/EIS process.

The multiplier is interpreted as the total impact on the economy of the region resulting from a unit change in its basic sector; for example, a dollar increase in local expenditures due to an expansion of its military installation. EIFS estimates its multipliers using a

"location quotient" approach based on the concentration of industries within the region relative to the industrial concentrations for the nation.

After selecting the ROI, the user inputs into the model those data elements which describe the Army action: dollar volume of the construction project, changes in civilian employment, the average income of affected civilian personnel, the number of military families to move on-post, and the average income of affected military personnel. Once these are entered into the system, a projection of changes in the local economy is provided. These are projected changes in sales volume, employment, income, and population. These four "indicator" variables are used to measure and evaluate socioeconomic impacts.

The Significance of Socioeconomic Impacts

Once model projections are obtained, the Rational Threshold Value (RTV) profile allows the user to evaluate the "significance" of the impacts. This analytical tool reviews the historical trends for the defined region and develops measures of local historical fluctuations in sales volume, employment, income, and population. These evaluations identify the positive and negative changes within which a project can affect the local economy without creating a significant impact. The greatest historical changes define the boundaries that provide a basis for comparing an action's impact on the historical fluctuation in a particular area. Specifically, EIFS sets the boundaries by multiplying the maximum historical deviation of the following variables:

	Increase	Decrease
Business Volume	x	100%
Personal Income	x	100%
Total Employment	x	100%
Total Population	x	100%
		50%

These boundaries determine the amount of change that will affect an area. The percentage allowances are arbitrary, but sensible. The maximum positive historical fluctuation is allowed with expansion because economic growth is beneficial. While cases of damaging economic growth have been cited, and although the zero-growth concept is being accepted by many local planning groups, military base reductions and closures generally are more injurious to local economies than are expansions.

The major strengths of the RTV are its specificity to the region under analysis and its basis on actual historical data for the region. The EIFS impact models, in combination with the RTV, have proven successful in addressing perceived socioeconomic impacts. The EIFS model and the RTV technique for measuring the intensity of impacts have been reviewed by economic experts and have been deemed theoretically sound.

The following are the EIFS input and output data for construction and the RTV values for the ROI. These data form the basis for the socioeconomic impact analysis presented in Section 4.0.

EIFS REPORT

PROJECT NAME: Fort Belvoir RCI - OPERATIONS - IDP YEAR 1

STUDY AREA

11001 District of Columbia

24017 Charles, MD

24031 Montgomery, MD

24033 Prince George's, MD

24009 Calvert, MD

24021 Frederick, MD

51013 Arlington, VA

51059 Fairfax, VA

51061 Fauquier, VA

51107 Loudoun, VA

51153 Prince William, VA

51179 Stafford, VA

51510 Alexandria, VA

51600 Fairfax, VA

51610 Falls Church, VA

51683 Manassas, VA

51685 Manassas Park, VA

FORECAST INPUT

Change In Local Expenditures	\$0
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Change In Civilian Employment	31
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Average Income of Affected Civilian	\$51,470
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Percent Expected to Relocate	0
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Change In Military Employment	0
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Average Income of Affected Military	\$0
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Percent of Military Living On-post	0
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FORECAST OUTPUT % Change

Employment Multiplier	2.5
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Income Multiplier	2.5
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Sales Volume - Direct	\$1,282,838
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Sales Volume - Induced	\$1,924,258
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Sales Volume - Total	\$3,207,096	0%
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Income - Direct	\$1,595,570
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Income - Induced)	\$422,767
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Income - Total (place of work)	\$2,018,337	0%
Employment - Direct	37	
Employment - Induced	8	
Employment - Total	45	0%
Local Population	0	
Local Off-base Population	0	0%

RTV SUMMARY

	Sales Volume	Income	Employment	Population
Positive RTV	11.74	11.51	3.55	1.38
Negative RTV	-4.44	-3.71	-2.76	-0.79

RTV DETAILED

SALES VOLUME

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	11051963	48297077	0	0	0
1970	12197455	50375491	2078414	-588226	-1.17
1971	13492228	53429223	3053733	387093	0.72
1972	14816392	56746780	3317557	650917	1.15
1973	16212791	58528174	1781394	-885246	-1.51
1974	17776622	57774022	-754152	-3420792	-5.92
1975	19612061	58443942	669921	-1996719	-3.42
1976	21676759	61128459	2684517	17877	0.03
1977	23988367	63329291	2200832	-465808	-0.74
1978	26476670	65132609	1803318	-863322	-1.33
1979	29395247	64963497	-169112	-2835752	-4.37
1980	32928069	63880456	-1083041	-3749681	-5.87
1981	36459772	64169198	288743	-2377897	-3.71
1982	39536963	65631357	1462159	-1204481	-1.84
1983	43020226	69262564	3631207	964567	1.39
1984	48340205	74443914	5181349	2514709	3.38
1985	53212742	79286986	4843072	2176432	2.75
1986	58162148	84916738	5629752	2963112	3.49
1987	64024057	99237285	14320547	11653907	11.74

1988	70991437	96548355	-2688930	-5355570	-5.55
1989	76691639	98932211	2383856	-282784	-0.29
1990	80673696	99228648	296436	-2370204	-2.39
1991	83643152	98698915	-529733	-3196373	-3.24
1992	88843632	101281739	2582824	-83816	-0.08
1993	93285668	103547093	2265354	-401286	-0.39
1994	97163888	104937003	1389910	-1276730	-1.22
1995	100697282	105732141	795138	-1871502	-1.77
1996	104767724	106863076	1130935	-1535705	-1.44
1997	110925566	110925566	4062490	1395850	1.26
1998	119624475	117231988	6306422	3639782	3.1
1999	130412779	125196265	7964277	5297637	4.23
2000	143687709	133629570	8433305	5766665	4.32

INCOME

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	11355369	49622961	0	0	0
1970	12637790	52194074	2571113	-439236	-0.84
1971	13973993	55337013	3142939	132590	0.24
1972	15344757	58770418	3433405	423056	0.72
1973	16850317	60829643	2059224	-951125	-1.56
1974	18613496	60493862	-335781	-3346130	-5.53
1975	20486775	61050590	556728	-2453621	-4.02
1976	22586858	63694938	2644348	-366001	-0.57
1977	24921427	65792570	2097632	-912717	-1.39
1978	27573007	67829598	2037028	-973321	-1.43
1979	30753844	67965996	136398	-2873951	-4.23
1980	34835245	67580377	-385619	-3395968	-5.03
1981	39274743	69123547	1543170	-1467179	-2.12
1982	42961200	71315591	2192043	-818306	-1.15
1983	46664568	75129955	3814365	804016	1.07
1984	52677624	81123539	5993584	2983235	3.68
1985	57907898	86282769	5159230	2148881	2.49
1986	62975034	91943552	5660783	2650434	2.88
1987	69232566	107310474	15366922	12356573	11.51
1988	76864362	104535533	-2774941	-5785290	-5.53

1989	83824257	108133288	3597755	587406	0.54
1990	88982717	109448744	1315455	-1694894	-1.55
1991	92804912	109509791	61048	-2949301	-2.69
1992	97884978	111588874	2079082	-931267	-0.83
1993	103203054	114555391	2966518	-43831	-0.04
1994	108188832	116843943	2288552	-721797	-0.62
1995	112251643	117864220	1020277	-1990072	-1.69
1996	117533618	119884288	2020068	-990281	-0.83
1997	124088389	124088389	4204101	1193752	0.96
1998	134312327	131626083	7537694	4527345	3.44
1999	144100904	138336865	6710782	3700433	2.67
2000	156939929	145954135	7617270	4606921	3.16

EMPLOYMENT

Year	Value	Change	Deviation	%Deviation
1969	1333975	0	0	0
1970	1357871	23896	-22422	-1.65
1971	1386631	28760	-17558	-1.27
1972	1422602	35971	-10347	-0.73
1973	1465959	43357	-2961	-0.2
1974	1496357	30398	-15920	-1.06
1975	1516249	19892	-26426	-1.74
1976	1542457	26208	-20110	-1.3
1977	1585099	42642	-3676	-0.23
1978	1646797	61698	15380	0.93
1979	1701766	54969	8651	0.51
1980	1731357	29591	-16727	-0.97
1981	1752664	21307	-25011	-1.43
1982	1761198	8534	-37784	-2.15
1983	1814486	53288	6970	0.38
1984	1929358	114872	68554	3.55
1985	2035960	106602	60284	2.96
1986	2143326	107366	61048	2.85
1987	2252410	109084	62766	2.79
1988	2340496	88086	41768	1.78
1989	2402235	61739	15421	0.64

1990	2420606	18371	-27947	-1.15
1991	2369336	-51270	-97588	-4.12
1992	2361252	-8084	-54402	-2.3
1993	2400591	39339	-6979	-0.29
1994	2424492	23901	-22417	-0.92
1995	2469011	44519	-1799	-0.07
1996	2495400	26389	-19929	-0.8
1997	2545420	50020	3702	0.15
1998	2604149	58729	12411	0.48
1999	2691937	87788	41470	1.54
2000	2816140	124203	77885	2.77

POPULATION

Year	Value	Change	Deviation	%Deviation
1969	2275032	0	0	0
1970	2311061	36029	-4257	-0.18
1971	2336958	25897	-14389	-0.62
1972	2389587	52629	12343	0.52
1973	2406649	17062	-23224	-0.96
1974	2413551	6902	-33384	-1.38
1975	2437740	24189	-16097	-0.66
1976	2452201	14461	-25825	-1.05
1977	2453756	1555	-38731	-1.58
1978	2476224	22468	-17818	-0.72
1979	2479131	2907	-37379	-1.51
1980	2495922	16791	-23495	-0.94
1981	2543500	47578	7292	0.29
1982	2580537	37037	-3249	-0.13
1983	2626173	45636	5350	0.2
1984	2690860	64687	24401	0.91
1985	2759737	68877	28591	1.04
1986	2837785	78048	37762	1.33
1987	2918222	80437	40151	1.38
1988	2990223	72001	31715	1.06
1989	3040972	50749	10463	0.34
1990	3065040	24068	-16218	-0.53

1991	3104655	39615	-671	-0.02
1992	3151863	47208	6922	0.22
1993	3195956	44093	3807	0.12
1994	3234199	38243	-2043	-0.06
1995	3267645	33446	-6840	-0.21
1996	3308993	41348	1062	0.03
1997	3361721	52728	12442	0.37
1998	3414741	53020	12734	0.37
1999	3488275	73534	33248	0.95
2000	3564195	75920	35634	1

***** End of Report *****

EIFS REPORT

PROJECT NAME: Fort Belvoir - CONSTRUCTION EXPENDITURES - IDP YEAR TWO (PEAK)

STUDY AREA

11001 District of Columbia

24017 Charles, MD

24031 Montgomery, MD

24033 Prince George's, MD

24009 Calvert, MD

24021 Frederick, MD

51013 Arlington, VA

51059 Fairfax, VA

51061 Fauquier, VA

51107 Loudoun, VA

51153 Prince William, VA

51179 Stafford, VA

51510 Alexandria, VA

51600 Fairfax, VA

51610 Falls Church, VA

51683 Manassas, VA

51685 Manassas Park, VA

FORECAST INPUT

Change In Local Expenditures \$63,275,970

Change In Civilian Employment 0

Average Income of Affected Civilian \$0

Percent Expected to Relocate 0

Change In Military Employment 0

Average Income of Affected Military \$0

Percent of Military Living On-post 0

FORECAST OUTPUT % Change

Employment Multiplier 2.5

Income Multiplier 2.5

Sales Volume - Direct \$37,965,580

Sales Volume - Induced \$56,948,370

Sales Volume - Total \$94,913,940 0.06%

Income - Direct \$8,341,194

Income - Induced)	\$12,511,790	
Income - Total(place of work)	\$20,852,980	0.02%
Employment - Direct	167	
Employment - Induced	250	
Employment - Total	416	0.02%
Local Population	0	
Local Off-base Population	0	0%

RTV SUMMARY

	Sales Volume	Income	Employment	Population
Positive RTV	11.74	11.51	3.55	1.38
Negative RTV	-4.44	-3.71	-2.76	-0.79

RTV DETAILED

SALES VOLUME

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	11051963	48297077	0	0	0
1970	12197455	50375491	2078414	-588226	-1.17
1971	13492228	53429223	3053733	387093	0.72
1972	14816392	56746780	3317557	650917	1.15
1973	16212791	58528174	1781394	-885246	-1.51
1974	17776622	57774022	-754152	-3420792	-5.92
1975	19612061	58443942	669921	-1996719	-3.42
1976	21676759	61128459	2684517	17877	0.03
1977	23988367	63329291	2200832	-465808	-0.74
1978	26476670	65132609	1803318	-863322	-1.33
1979	29395247	64963497	-169112	-2835752	-4.37
1980	32928069	63880456	-1083041	-3749681	-5.87
1981	36459772	64169198	288743	-2377897	-3.71
1982	39536963	65631357	1462159	-1204481	-1.84
1983	43020226	69262564	3631207	964567	1.39
1984	48340205	74443914	5181349	2514709	3.38
1985	53212742	79286986	4843072	2176432	2.75
1986	58162148	84916738	5629752	2963112	3.49
1987	64024057	99237285	14320547	11653907	11.74
1988	70991437	96548355	-2688930	-5355570	-5.55
1989	76691639	98932211	2383856	-282784	-0.29

1990	80673696	99228648	296436	-2370204	-2.39
1991	83643152	98698915	-529733	-3196373	-3.24
1992	88843632	101281739	2582824	-83816	-0.08
1993	93285668	103547093	2265354	-401286	-0.39
1994	97163888	104937003	1389910	-1276730	-1.22
1995	100697282	105732141	795138	-1871502	-1.77
1996	104767724	106863076	1130935	-1535705	-1.44
1997	110925566	110925566	4062490	1395850	1.26
1998	119624475	117231988	6306422	3639782	3.1
1999	130412779	125196265	7964277	5297637	4.23
2000	143687709	133629570	8433305	5766665	4.32

INCOME

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	11355369	49622961	0	0	0
1970	12637790	52194074	2571113	-439236	-0.84
1971	13973993	55337013	3142939	132590	0.24
1972	15344757	58770418	3433405	423056	0.72
1973	16850317	60829643	2059224	-951125	-1.56
1974	18613496	60493862	-335781	-3346130	-5.53
1975	20486775	61050590	556728	-2453621	-4.02
1976	22586858	63694938	2644348	-366001	-0.57
1977	24921427	65792570	2097632	-912717	-1.39
1978	27573007	67829598	2037028	-973321	-1.43
1979	30753844	67965996	136398	-2873951	-4.23
1980	34835245	67580377	-385619	-3395968	-5.03
1981	39274743	69123547	1543170	-1467179	-2.12
1982	42961200	71315591	2192043	-818306	-1.15
1983	46664568	75129955	3814365	804016	1.07
1984	52677624	81123539	5993584	2983235	3.68
1985	57907898	86282769	5159230	2148881	2.49
1986	62975034	91943552	5660783	2650434	2.88
1987	69232566	107310474	15366922	12356573	11.51
1988	76864362	104535533	-2774941	-5785290	-5.53
1989	83824257	108133288	3597755	587406	0.54
1990	88982717	109448744	1315455	-1694894	-1.55

1991	92804912	109509791	61048	-2949301	-2.69
1992	97884978	111588874	2079082	-931267	-0.83
1993	103203054	114555391	2966518	-43831	-0.04
1994	108188832	116843943	2288552	-721797	-0.62
1995	112251643	117864220	1020277	-1990072	-1.69
1996	117533618	119884288	2020068	-990281	-0.83
1997	124088389	124088389	4204101	1193752	0.96
1998	134312327	131626083	7537694	4527345	3.44
1999	144100904	138336865	6710782	3700433	2.67
2000	156939929	145954135	7617270	4606921	3.16

EMPLOYMENT

Year	Value	Change	Deviation	%Deviation
1969	1333975	0	0	0
1970	1357871	23896	-22422	-1.65
1971	1386631	28760	-17558	-1.27
1972	1422602	35971	-10347	-0.73
1973	1465959	43357	-2961	-0.2
1974	1496357	30398	-15920	-1.06
1975	1516249	19892	-26426	-1.74
1976	1542457	26208	-20110	-1.3
1977	1585099	42642	-3676	-0.23
1978	1646797	61698	15380	0.93
1979	1701766	54969	8651	0.51
1980	1731357	29591	-16727	-0.97
1981	1752664	21307	-25011	-1.43
1982	1761198	8534	-37784	-2.15
1983	1814486	53288	6970	0.38
1984	1929358	114872	68554	3.55
1985	2035960	106602	60284	2.96
1986	2143326	107366	61048	2.85
1987	2252410	109084	62766	2.79
1988	2340496	88086	41768	1.78
1989	2402235	61739	15421	0.64
1990	2420606	18371	-27947	-1.15
1991	2369336	-51270	-97588	-4.12

1992	2361252	-8084	-54402	-2.3
1993	2400591	39339	-6979	-0.29
1994	2424492	23901	-22417	-0.92
1995	2469011	44519	-1799	-0.07
1996	2495400	26389	-19929	-0.8
1997	2545420	50020	3702	0.15
1998	2604149	58729	12411	0.48
1999	2691937	87788	41470	1.54
2000	2816140	124203	77885	2.77

POPULATION

Year	Value	Change	Deviation	%Deviation
1969	2275032	0	0	0
1970	2311061	36029	-4257	-0.18
1971	2336958	25897	-14389	-0.62
1972	2389587	52629	12343	0.52
1973	2406649	17062	-23224	-0.96
1974	2413551	6902	-33384	-1.38
1975	2437740	24189	-16097	-0.66
1976	2452201	14461	-25825	-1.05
1977	2453756	1555	-38731	-1.58
1978	2476224	22468	-17818	-0.72
1979	2479131	2907	-37379	-1.51
1980	2495922	16791	-23495	-0.94
1981	2543500	47578	7292	0.29
1982	2580537	37037	-3249	-0.13
1983	2626173	45636	5350	0.2
1984	2690860	64687	24401	0.91
1985	2759737	68877	28591	1.04
1986	2837785	78048	37762	1.33
1987	2918222	80437	40151	1.38
1988	2990223	72001	31715	1.06
1989	3040972	50749	10463	0.34
1990	3065040	24068	-16218	-0.53
1991	3104655	39615	-671	-0.02
1992	3151863	47208	6922	0.22

1993	3195956	44093	3807	0.12
1994	3234199	38243	-2043	-0.06
1995	3267645	33446	-6840	-0.21
1996	3308993	41348	1062	0.03
1997	3361721	52728	12442	0.37
1998	3414741	53020	12734	0.37
1999	3488275	73534	33248	0.95
2000	3564195	75920	35634	1

***** End of Report *****