

Expo Light Rail Benefit - Cost Analysis
Annual Values and Calculations Used to Support Summary Tables

Year-of-Expenditure Project Costs, by Category (\$ in million)	Real Dollars (Adjusted for Inflation)in millions - Construction										Real Discount Rate (Assuming other Public Uses of Funds)		Rehabilitation/ Replacement	
	Construction	Operations	Rehabilitation/Re placement	LA CPI	Inflation Discount Rate	Construction	Operations	Rehabilitation/ Replacement	Construction	Operations	Construction	Operations	Construction	Operations
FY04/Prior	9.6				1	9.6				1	9.6			
FY 05	8.1				1	8.1				1	8.1			
FY 06	20.2				1	20.2				1	20.2			
FY 07	64.9				1	64.9				1	64.9			
FY 08	85.3				1	85.3				1	85.3			
FY 09	196.2			2.80%	1.028	196.2				1	190.8			
FY 10	194.3			1.96%	1.048	194.3				1	185.4			
FY 11	154			2.56%	1.075	154.0				1	143.2			
FY 12	166.2	39.8		2.28%	1.100	166.2	36.2			1.070	141.3		33.9	
FY 13		40.9		1.99%	1.122		36.5			1.145			31.9	
FY 14		42.7		2.00%	1.144		37.3			1.225			30.4	
FY 15		42.8		1.99%	1.167		36.7			1.311			28.0	
FY 16		43.7	0.0	2.02%	1.190		36.7	0.0		1.403			26.1	0.0
FY 17		45.7	1.9	1.95%	1.214		37.7	1.5		1.501			25.1	1.0
FY 18		46.7	3.3	2.03%	1.238		37.7	2.6		1.606			23.5	1.6
FY 19		47.6	5.3	2.00%	1.263		37.7	4.2		1.718			21.9	2.4
FY 20		48.6	4.9	1.91%	1.287		37.8	3.8		1.838			20.6	2.1
FY 21		49.4	6.7	1.91%	1.312		37.7	5.1		1.967			19.2	2.6
FY 22		50.3	6.1	1.74%	1.335		37.7	4.6		2.105			17.9	2.2
FY 23		51.1	10.5	1.64%	1.356		37.7	7.8		2.252			16.7	3.5
FY 24		52.0	8.8	1.38%	1.375		37.8	6.4		2.410			15.7	2.7
FY 25		52.6	8.9	1.43%	1.395		37.7	6.4		2.579			14.6	2.5
FY 26		53.3	10.4	1.47%	1.415		37.7	7.4		2.759			13.7	2.7
FY 27		54.2	11.3	1.61%	1.438		37.7	7.8		2.952			12.8	2.6
FY 28		55.3	11.4	1.78%	1.464		37.8	7.8		3.159			12.0	2.5
FY 29		56.2	6.1	1.92%	1.492		37.7	4.1		3.380			11.1	1.2
FY 30		57.3	5.4	1.90%	1.520		37.7	3.6		3.617			10.4	1.0
FY 31		58.3	65.1	1.84%	1.548		37.7	42.1		3.870			9.7	10.9
FY 32		59.6	65.5	1.84%	1.577		37.8	41.5		4.141			9.1	10.0
FY 33		60.5	66.5	1.89%	1.606		37.7	41.4		4.430			8.5	9.3
FY 34		61.7	5.1	1.92%	1.637		37.7	3.1		4.741			7.9	0.7
FY 35		62.9	11.2	1.94%	1.669		37.7	6.7		5.072			7.4	1.3

Expo Light Rail Benefit-Cost Analysis

Project Costs (\$ in millions)		FY9/Prior	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	
Construction	848.8	378.9	185.4	143.2	141.3											
Operations	428.2				33.9	31.9	30.4	28.0	26.1	25.1	23.5	21.9	20.6	19.2	17.9	
Rehabilitation/Replacement	62.8								0.0	1.0	1.6	2.5	2.1	2.6	2.2	
Subtotal Costs	1,339.7	378.9	185.4	143.2	175.1	31.9	30.4	28.0	26.2	26.1	25.1	24.4	22.6	21.7	20.1	
Less Allowance for Residual Value After 2035	(16.2)															
Total Discounted Cost	1,323.5	378.9	185.4	143.2	175.1	31.9	30.4	28.0	26.2	26.1	25.1	24.4	22.6	21.7	20.1	
Project Benefits		Total	FY9/Prior	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Annual Jobs	50,696				1,284	1,265	1,324	1,400	1,496	1,598	1,707	1,813	1,909	2,000	2,083	
Sum of Annual Increases in Gross Domestic Product (\$ Millions)	4,812.6				159.9	173.1	188.5	201.2	212.4	220.4	226.4	229.0	230.3	229.7	227.5	
Benefit-Cost Ratio	3.6 : 1															

Notes:

Costs were discounted at a 7% rate. The year-of-expenditure cost of the project is \$898.8 Million. The residual value is projected to be 10% of the project cost discounted from 2035.

Benefits were calculated using REMI TranSight software with inputs from MTA's travel demand model. The GDP benefits were discounted at a 7% rate.

Expo Light Rail Benefit-Cost Analysis

Project Costs (\$ in millions)		FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	
Construction	848.8														
Operations	428.2	16.7	15.7	14.6	13.7	12.8	12.0	11.1	10.4	9.7	9.1	8.5	7.9	7.4	
Rehabilitation/Replacement	62.8	3.4	2.7	2.5	2.7	2.7	2.5	1.2	1.0	10.9	10.0	9.3	0.7	1.3	
Subtotal Costs	1,339.7	20.2	18.4	17.1	16.3	15.4	14.4	12.4	11.4	20.6	19.2	17.8	8.6	8.7	
Less Allowance for Residual Value After 2035	(16.2)													(16.2)	
Total Discounted Cost	1,323.5	20.2	18.4	17.1	16.3	15.4	14.4	12.4	11.4	20.6	19.2	17.8	8.6	(7.5)	
Project Benefits		Total	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35
Annual Jobs	50,696	2,160	2,233	2,300	2,364	2,424	2,483	2,540	2,595	2,631	2,687	2,743	2,800	2,857	
Sum of Annual Increases in Gross Domestic Product (\$ Millions)	4,812.6	224.7	220.6	215.6	210.8	205.2	199.5	194.0	188.4	181.6	176.3	171.2	166.0	160.7	
Benefit-Cost Ratio	3.6 : 1														

Notes:

Costs were discounted at a 7% rate. The year-of-expenditure cost of the project is \$898.8 Million. The residual value is projected to be 10% of the project cost discounted from 2035.

Benefits were calculated using REMI TranSight software with inputs from MTA's travel demand model. The GDP benefits were discounted at a 7% rate.

Exposition Light Rail Benefit-Cost Analysis

TRAVEL DEMAND INPUTS

		FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Baseline	VMT	2,897,463	5,794,925	8,692,388	11,589,850	14,487,313	17,384,776	20,282,238	23,179,701	26,077,164	28,974,626	31,872,089	34,769,551	37,667,014
	VHT	121,901	243,801	365,702	487,603	609,503	731,404	853,305	975,206	1,097,106	1,219,007	1,340,908	1,462,808	1,584,709
	Trips	345,568	691,135	1,036,703	1,382,271	1,727,839	2,073,406	2,418,974	2,764,542	3,110,109	3,455,677	3,801,245	4,146,813	4,492,380
	Tmiles	59,539	119,078	178,617	238,156	297,695	357,234	416,773	476,312	535,851	595,390	654,929	714,468	774,007
	Thours	4,962	9,923	14,884,743	19,846	24,808	29,769	34,731	39,693	44,654	49,616	54,577	59,539	64,501
	Ttrips	19,846	39,693	59,539	79,385	99,232	119,078	138,924	158,771	178,617	198,463	218,310	238,156	258,002
Build	VMT	2,896,506	5,793,012	8,689,518	11,586,024	14,482,530	17,379,036	20,275,543	23,172,049	26,068,555	28,965,061	31,861,567	34,758,073	37,654,579
	VHT	121,801	243,603	365,404	487,205	609,006	730,808	852,609	974,410	1,096,211	1,218,013	1,339,814	1,461,615	1,583,417
	Trips	345,490	690,981	1,036,471	1,381,962	1,727,452	2,072,943	2,418,433	2,763,924	3,109,414	3,454,905	3,800,395	4,145,885	4,491,376
	Tmiles	59,936	119,871	179,807	239,742	299,678	359,613	419,549	479,485	539,420	599,356	659,291	719,227	779,163
	Thours	4,995	9,989	14,984	19,979	24,973	29,968	34,962	39,957	44,952	49,946	54,941	59,936	64,930
	Ttrips	19,979	39,957	59,936	79,914	99,893	119,871	139,850	159,828	179,807	199,785	219,764	239,742	259,721
Delta	VMT	-957	-1,913	-2,870	-3,826	-4,783	-5,739	-6,696	-7,652	-8,609	-9,565	-10,522	-11,478	-12,435
	VHT	-99	-199	-298	-398	-497	-596	-696	-795	-895	-994	-1,094	-1,193	-1,292
	Trips	-77	-155	-232	-309	-386	-464	-541	-618	-695	-773	-850	-927	-1,004
	Tmiles	397	793	1,190	1,586	1,983	2,380	2,776	3,173	3,569	3,966	4,363	4,759	5,156
	Thours	33	66	99	132	165	198	231	264	297	331	364	397	430
	Ttrips	132	264	397	529	661	793	925	1,058	1,190	1,322	1,454	1,586	1,719
		0.042	0.083	0.125	0.167	0.208	0.250	0.292	0.333	0.375	0.417	0.458	0.500	0.542

Exposition Light Rail Benefit-Cost Analysis

TRAVEL DEMAND INPUTS

		FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35
Baseline	VMT	40,564,477	43,461,939	46,359,402	49,256,865	52,154,327	55,051,790	57,949,252	60,846,715	63,744,178	66,641,640	69,539,103
	VHT	1,706,610	1,828,510	1,950,411	2,072,312	2,194,212	2,316,113	2,438,014	2,559,915	2,681,815	2,803,716	2,925,617
	Trips	4,837,948	5,183,516	5,529,083	5,874,651	6,220,219	6,565,787	6,911,354	7,256,922	7,602,490	7,948,057	8,293,625
	Tmiles	833,546	893,085	952,624	1,012,163	1,071,701	1,131,240	1,190,779	1,250,318	1,309,857	1,369,396	1,428,935
	Thours	69,462	74,424	79,385	84,347	89,308	94,270	99,232	104,193	109,155	114,116	119,078
	Ttrips	277,849	297,695	317,541	337,388	357,234	377,080	396,926	416,773	436,619	456,465	476,312
Build	VMT	40,551,085	43,447,591	46,344,097	49,240,603	52,137,109	55,033,616	57,930,122	60,826,628	63,723,134	66,619,640	69,516,146
	VHT	1,705,218	1,827,019	1,948,820	2,070,622	2,192,423	2,314,224	2,436,026	2,557,827	2,679,628	2,801,429	2,923,231
	Trips	836,866	5,182,357	5,527,847	5,873,338	6,218,828	6,564,319	6,909,809	7,255,300	7,600,790	7,946,280	8,291,771
	Tmiles	839,098	899,034	958,969	1,018,905	1,078,840	1,138,776	1,198,712	1,258,647	1,318,583	1,378,518	1,438,454
	Thours	69,925	74,919	79,914	84,909	89,903	94,898	99,893	104,887	109,882	114,877	119,871
	Ttrips	279,699	299,678	319,656	339,635	359,613	379,592	399,571	419,549	439,528	459,506	479,485
Delta	VMT	-13,392	-14,348	-15,305	-16,261	-17,218	-18,174	-19,131	-20,087	-21,044	-22,000	-22,957
	VHT	-1,392	-1,491	-1,591	-1,690	-1,789	-1,889	-1,988	-2,088	-2,187	-2,287	-2,386
	Trips	-1,082	-1,159	-1,236	-1,313	-1,391	-1,468	-1,545	-1,622	-1,700	-1,777	-1,854
	Tmiles	5,553	5,949	6,346	6,742	7,139	7,536	7,932	8,329	8,725	9,122	9,519
	Thours	463	496	53	562	595	628	661	694	727	760	793
	Ttrips	1,851	1,983	2,115	2,247	2,380	2,512	2,644	2,776	2,908	3,041	3,173
		0.583	0.625	0.667	0.708	0.750	0.792	0.833	0.875	0.917	0.958	1.000

Exposition Light Rail Benefit-Cost Analysis

Vehicles Miles Travel

Regional VHT			
	No Build	Build	Difference
AM	5,480,638	5,476,159	4,479
MD	4,050,306	4,063,038	-12,732
PM	9,085,569	9,091,919	-6,350
NT	1,539,892	1,539,945	-53
Daily	20,156,405	20,171,061	-14,656

Regional VMT			
	No Build	Build	Difference
AM	99,313,956	99,286,444	27,512
MD	127,899,323	127,912,331	-13,008
PM	154,704,517	154,685,336	19,181
NT	72,436,532	72,381,009	55,523
Daily	454,354,328	454,265,120	89,208

Regional Speed		
	No Build	Build
AM	18.1	18.1
MD	31.6	31.5
PM	17.0	17.0
NT	47.0	47.0

LA VHT			
	No Build	Build	Difference
AM	2,733,239	2,728,583	4,656
MD	1,741,801	1,741,360	441
PM	4,134,275	4,132,713	1,562
NT	737,703	736,739	964
Daily	9,347,018	9,339,395	7,623

LA VMT			
	No Build	Build	Difference
AM	49,937,155	49,900,472	36,683
MD	62,270,524	62,253,578	16,946
PM	75,126,518	75,128,711	-2,193
NT	34,835,461	34,813,552	21,909
Daily	222,169,658	222,096,313	73,345

LA Speed (VMT/VHT)		
	No Build	Build
AM	18.3	18.3
MD	35.8	35.7
PM	18.2	18.2
NT	47.2	47.3

	Base	Build	Difference
VMT	69539.10295	69516.14597	23 -22.95698
VHT	2925.616634	2923.230635	2.39 -2.385999
Trips	8293.625165	8291.770953	-1.854212
Transit	476.3117658	479.4846468	3.172881

Exposition Light Rail Benefit-Cost Analysis

Vehicle Trips

No Build L.A. Vehicle Trips =				26,497,205
O \ D	L.A.County	Other County	External	
L.A.County	23,153,072	1,585,504	86,026	
Other County	1,587,375	22,020,372	240,971	
External	85,228	231,926	45,442	

Build L.A. Vehicle Trips =				26,491,281
O \ D	L.A.County	Other County	External	
L.A.County	23,146,954	1,585,675	86,026	
Other County	1,587,398	22,020,288	240,971	
External	85,228	231,926	45,442	

Expo Light Rail Benefit-Cost Analysis

REMI Outputs		Jobs	Gross Domestic Product (Billions of Fixed 2000 Dollars)	Gross Domestic Product (Millions of Fixed 2011 Dollars)	Discount Rate (7% used for private fund benefits)	Discounted Benefits	Jobs	Gross Domestic Product (Billions of Fixed 2000 Dollars)	Gross Domestic Product (Millions of Fixed 2011 Dollars)	Discount Rate (7% used for private fund benefits)	Discounted Benefits	
FY 12	1.332		2.664	0.184	245.1	1.000	245.1	1.284	0.120	159.9	1.00	159.858
FY 13			6.342	0.409	544.8	1.070	509.2	1.265	0.139	185.2	1.07	173.1
FY 14			10.928	0.667	888.5	1.145	776.1	1.324	0.162	215.8	1.14	188.5
FY 15			16.494	0.964	1284.2	1.225	1048.3	1.400	0.185	246.4	1.23	201.2
FY 16			23.209	1.316	1753.1	1.311	1337.4	1.496	0.209	278.4	1.31	212.4
FY 17			30.814	1.705	2271.3	1.403	1619.4	1.598	0.232	309.1	1.40	220.4
FY 18			39.710	2.173	2894.8	1.501	1928.9	1.707	0.255	339.7	1.50	226.4
FY 19			49.714	2.710	3610.1	1.606	2248.2	1.813	0.276	367.7	1.61	229.0
FY 20			60.643	3.317	4418.7	1.718	2571.7	1.909	0.297	395.6	1.72	230.3
FY 21			73.003	4.042	5384.5	1.838	2928.8	2.000	0.317	422.3	1.84	229.7
FY 22			86.845	4.898	6524.9	1.967	3316.9	2.083	0.336	447.6	1.97	227.5
FY 23			101.471	5.832	7769.1	2.105	3691.0	2.160	0.355	472.9	2.10	224.7
FY 24			117.439	6.903	9195.8	2.252	4083.1	2.233	0.373	496.9	2.25	220.6
FY 25			133.366	7.984	10635.9	2.410	4413.5	2.300	0.390	519.5	2.41	215.6
FY 26			150.536	9.208	12266.4	2.579	4757.1	2.364	0.408	543.5	2.58	210.8
FY 27			168.376	10.524	14019.5	2.759	5081.3	2.424	0.425	566.2	2.76	205.2
FY 28			186.801	11.925	15885.9	2.952	5381.1	2.483	0.442	588.8	2.95	199.5
FY 29			206.007	13.44	17904.1	3.159	5668.0	2.540	0.460	612.8	3.16	194.0
FY 30			225.367	15.011	19996.9	3.380	5916.4	2.595	0.478	636.8	3.38	188.4
FY 31			245.395	16.689	22232.2	3.617	6147.4	2.631	0.493	656.7	3.62	181.6
FY 32			266.157	18.491	24632.8	3.870	6365.6	2.687	0.512	682.1	3.87	176.3
FY 33			286.913	20.344	27101.2	4.141	6545.3	2.743	0.532	708.7	4.14	171.2
FY 34			308.093	22.303	29710.9	4.430	6706.1	2.800	0.552	735.3	4.43	166.0
FY 35			329.110	24.305	32377.9	4.741	6830.0	2.857	0.572	762.0	4.74	160.7

Exposition Light Rail Benefit-Cost Analysis

Transit Person Trips

	No Build	Build	Difference
HBW	903,667	910,348	6,680
HBO	476,265	478,839	2,574
NHB	141,830	142,713	883
Total	1,521,763	1,531,900	10,137