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Wilbur Smith Associates

MEMO

SALT LAKE CITY OFFICE
March 21, 2005 **Project Number:** 516620

TO: Griffin Harris, J-U-B Engineers

FROM: Vikram Kalyani

SUBJECT: North Logan-Hyde Park Corridor Travel Demand Modeling

This memo describes the travel demand forecast modeling process and results for the North Logan-Hyde Park Corridor Environmental Impact Statement (EIS). The process section of the memo explains adjustments that were made to the land use data within the model, while the results describes traffic volumes and measures of effectiveness for the various options.

Land Use Update

The existing Cache Metropolitan Planning Organization (CMPO) travel demand forecasting model was utilized in performing the analysis for this project. The model was developed in 1997 as part of the Cache Valley Corridor Study and was used in developing the CMPO Long Range Plan. The model was developed with a horizon year of 2020. The model is currently be updated to a horizon year of 2030, which task is not yet complete. Therefore this analysis was performed using the 2020 model. However some land uses contained within the model were updated to more accurately reflect future conditions, particularly within the EIS study area. Wilbur Smith Associates (WSA) has recently completed similar analysis work in the south Logan area, which included an update of future land use in that study area. This data was also used in the analysis for this project.

The CMPO travel demand forecasting utilizes estimated future population and employment data in projecting future traffic volumes on the roadway network. The following sections describe the changes that were made to the population and employment figures.

North Logan-Hyde Park Corridor Study Area

WSA was provided with estimated 2025 population data for the eight Traffic Analysis Zones (TAZ) in the corridor study area by JUB. These TAZs are relatively small pieces of the model for which estimated employment and population data are entered. These new population values were input into the travel demand model. Table 1 illustrates the original values in the model and the adjustments made in population and households. With respect to population, the adjusted model reflects a decrease in population of approximately 1,100 and a decrease of approximately 170 in the total number of households.

JUB also provided WSA with a zoning map of the corridor study area. From this map an estimate of acreage per TAZ was calculated along with a percentage of commercial acreage within each zone. From this estimate a figure of approximate retail and other employment figures were calculated. For each acre of general commercial area it was assumed that there would be five retail jobs and two other jobs, while for each acre of professional office area it was assumed that there would be six other jobs and one retail job. Employment estimates for the two zones between 1400 and 1800 North were left unchanged from the original model. Table 1 shows the original and adjusted retail and other employment figures for the eight study area TAZs. As shown in the table, the adjusted model reflects an increase of over 1,000 retail jobs and over 450 other jobs.

Table1
Study Area Travel Demand Model Adjustments

Traffic Analysis Zone	Population				Employment			
	Original Model		Adjusted Model		Original Model		Adjusted Model	
	Pop.	HH	Pop.	HH	Retail	Other	Retail	Other
1020	37	12	35	8	18	60	484	194
1021	32	10	20	5	0	0	0	0
1025	0	0	522	150	74	48	368	147
1026	772	240	1213	355	0	2	0	0
1031	0	0	3	1	358	294	605	242
1035	4,484	1,256	2,170	730	0	9	50	298
1040	345	106	371	108	1,183	401	1,183	401
1041	578	158	801	252	51	891	51	891
Total	**6,248**	**1,782**	**5,135**	**1,609**	**1,684**	**1,705**	**2,740**	**2,172**

South Logan Area

As mentioned previously, WSA has recently performed a similar model adjustment to employment data in the south Logan area. That adjustment resulted in an increase of nearly 3,800 jobs.

Analysis Methodology and Results

Using the updated land use information described in the previous sections, the travel demand forecasting model was run for various alternatives. Five model runs are described in this memo. The first model run represents the Future Base Network, which is future traffic on the existing roadway network. Figure 1 shows the estimated average daily traffic (ADT) volumes. As shown in the figure, Main Street north of 2500 North is expected to have an ADT of approximately 43,000 vehicles.

The second set of runs reflects conditions associated with Alternatives #5 and 6A that were two of the three final selected alternatives. These two alternatives were modeled together since there is relatively little difference in their geometry. This alternative was modeled twice to reflect a difference in vehicle speeds on the proposed facility. Figure 2 shows the estimated ADT for a facility having a speed limit of approximately 35 mph, while Figure 3 shows the ADT for a facility with a speed limit of approximately 45 mph.

The figures show the new facility can be expected to attract approximately 16,000 vehicles per day (vpd) just north of 1800 North and approximately 12,000 vpd near 3700 North. The effect of different speed limits on the corridor is modeled in figure 6. Generally the actual travel speeds on a road are more dependent upon the design speed and geometry of the road than the posted speed limit. Good traffic engineering practice bases the speed limit of the road on the 85th percentile speed of the actual roadway traffic. Even though the CMPO model is not capable of modeling driver behavior on a corridor with different speed limits, the impedance experienced by traffic under varying speed limit conditions can be appropriately modeled by increasing or decreasing the friction factors associated with those roads. Thus the link characteristics on the 200 East corridor were appropriately modified to reflect the varying speed limit: 35 mph from 1400 North to 2500 North, 25 mph from 2500 North to 2700 North and 45 mph from 2700 North to 3700 North. The figure 6 shows that the variable speed alternative is not attractive when compared to the 35 mph or 45 mph versions of the #5 and #6A. This can be attributed to the sudden drop in the speed limit from 35 mph to 25 mph, which increases travel time and delay for the commuting traffic and as such traffic is expected to reroute to Main Street from 2500 North. The figure shows that volumes will reduce by 50% when the speed limit is decreased from 35 mph to 25 mph. Even though it may be argued that in real world conditions such a rapid volume reductions may not be observed, it is anticipated that a rigorous enforcement of the speed limits could produce a close approximation of the model results. Hence it can be reasonably expected that there will be a difference of approximately 1,000 vehicles per day along the new facility due to the different speeds.

The third set of runs illustrates conditions associated with Alternative #3, which shifts the new roadway towards the west near what would be 100 West between about 1900 North and 2900 North. As with the prior alternative, the model was run two times to reflect a difference in vehicle speeds along the new facility. Figure 4 shows the estimated ADT for a facility having a speed limit of about 35 mph, Figure 5 shows the ADT for a roadway with a speed limit of approximately 45 mph, while Figure 6 shows the ADT under varying speed limit conditions.

As shown in the figures, traffic volumes on the new facility can be expected to be lower north of 2500 North by approximately 2,000 vpd with this alternative. The model shows that without a larger separation between Main Street and the new facility at 2500 North some traffic shifts from the new facility to US-91 at that location.

Figure 1
North Logan-Hyde Park EIS
Future Base Network ADT Volumes

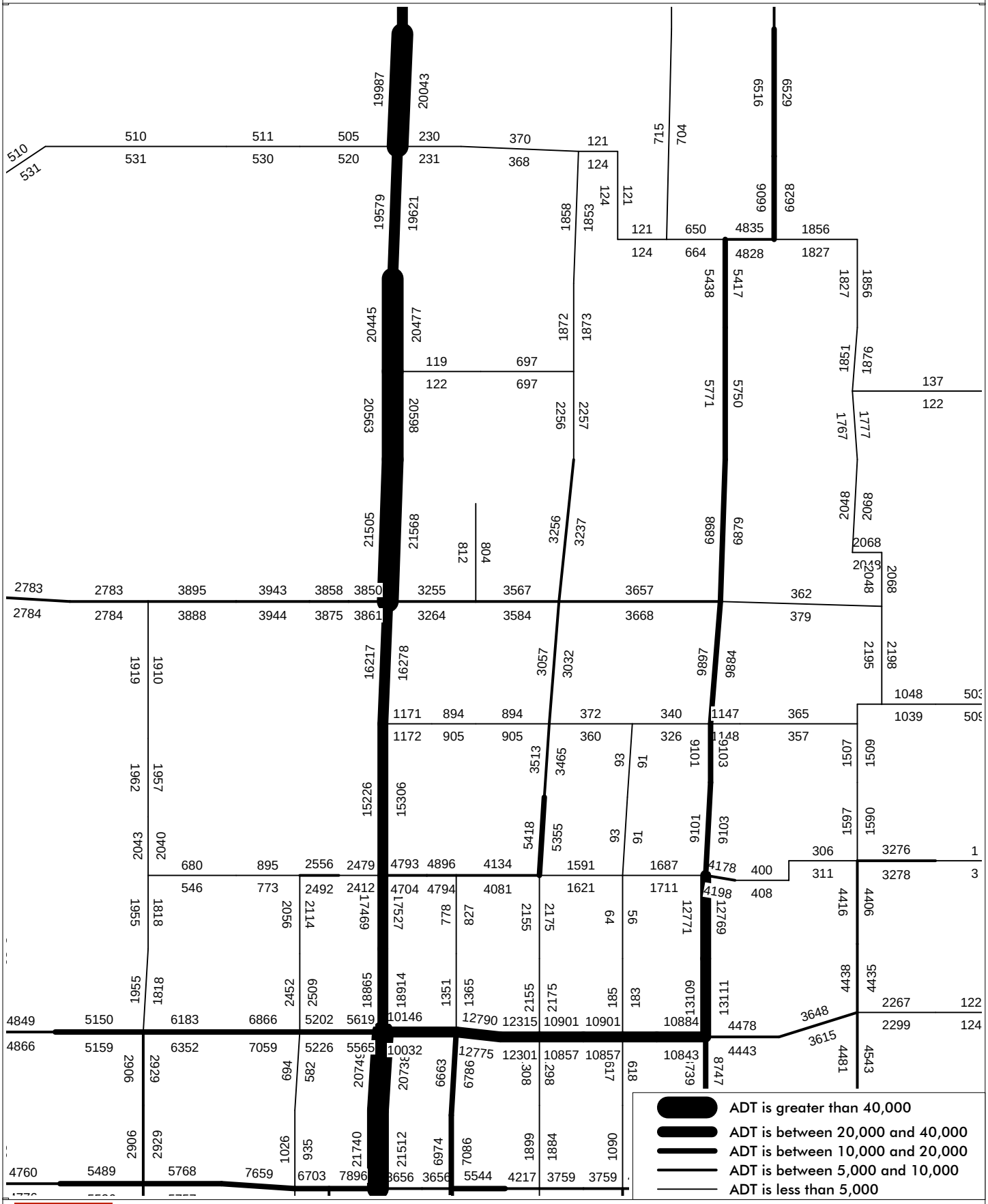

Figure 2
North Logan-Hyde Park EIS
Future Alternatives #5 & 6A Network ADT Volumes
35 mph Speed

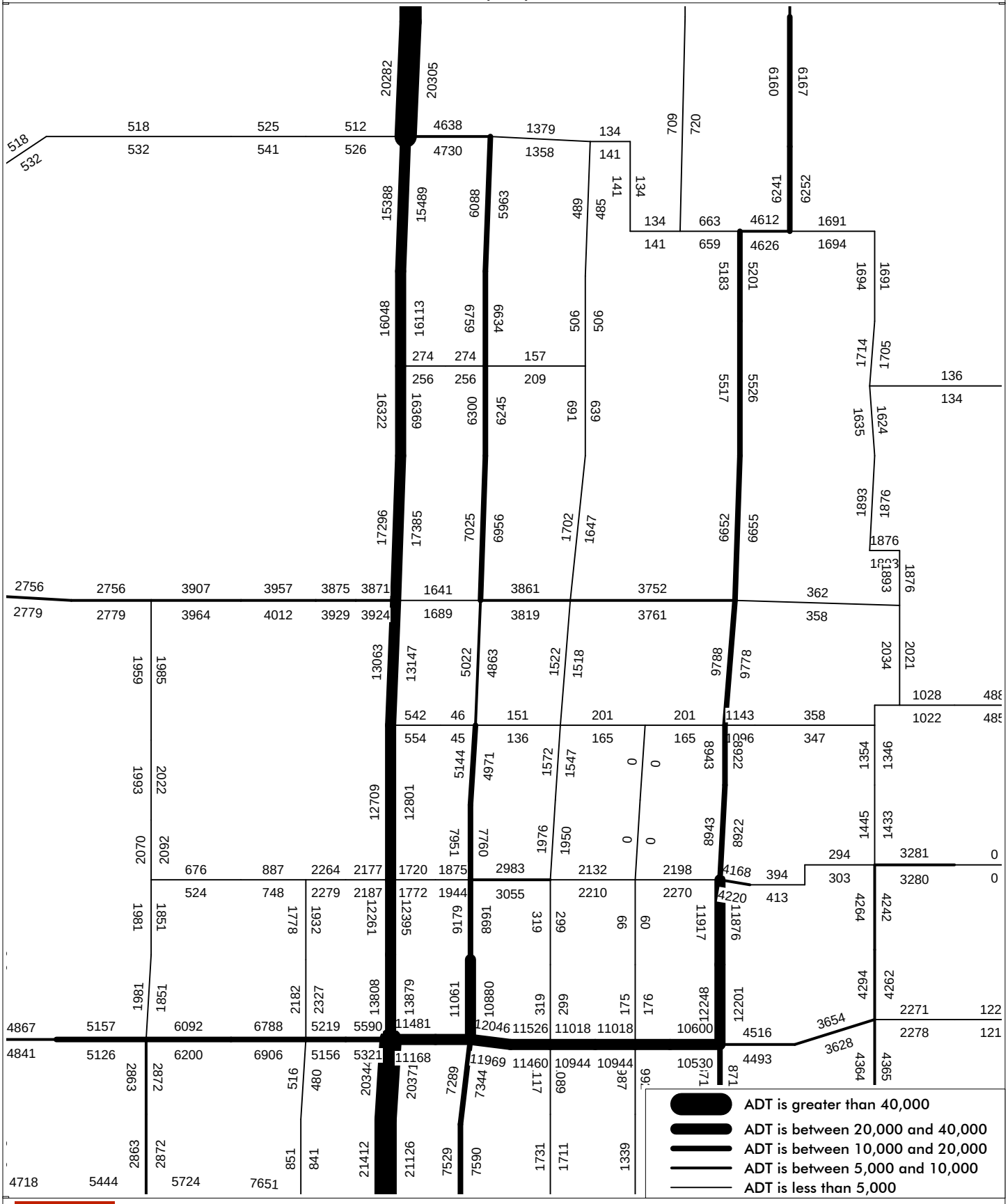

Figure 3
North Logan-Hyde Park EIS
Future Alternatives #5 & 6A Network ADT Volumes
45 mph

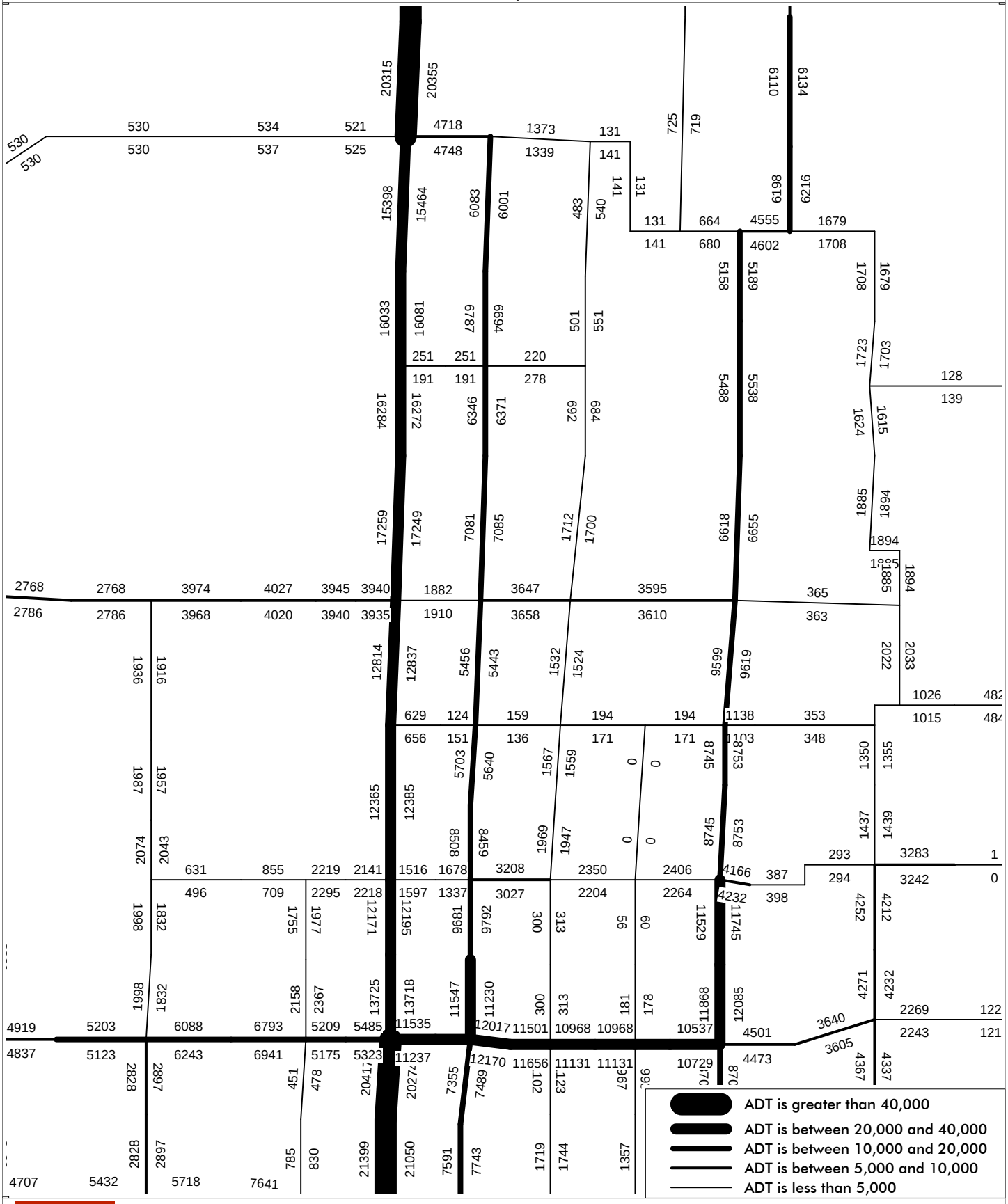

Figure 4
North Logan-Hyde Park EIS
Future Alternative #3 Network ADT Volumes
35 mph Speed

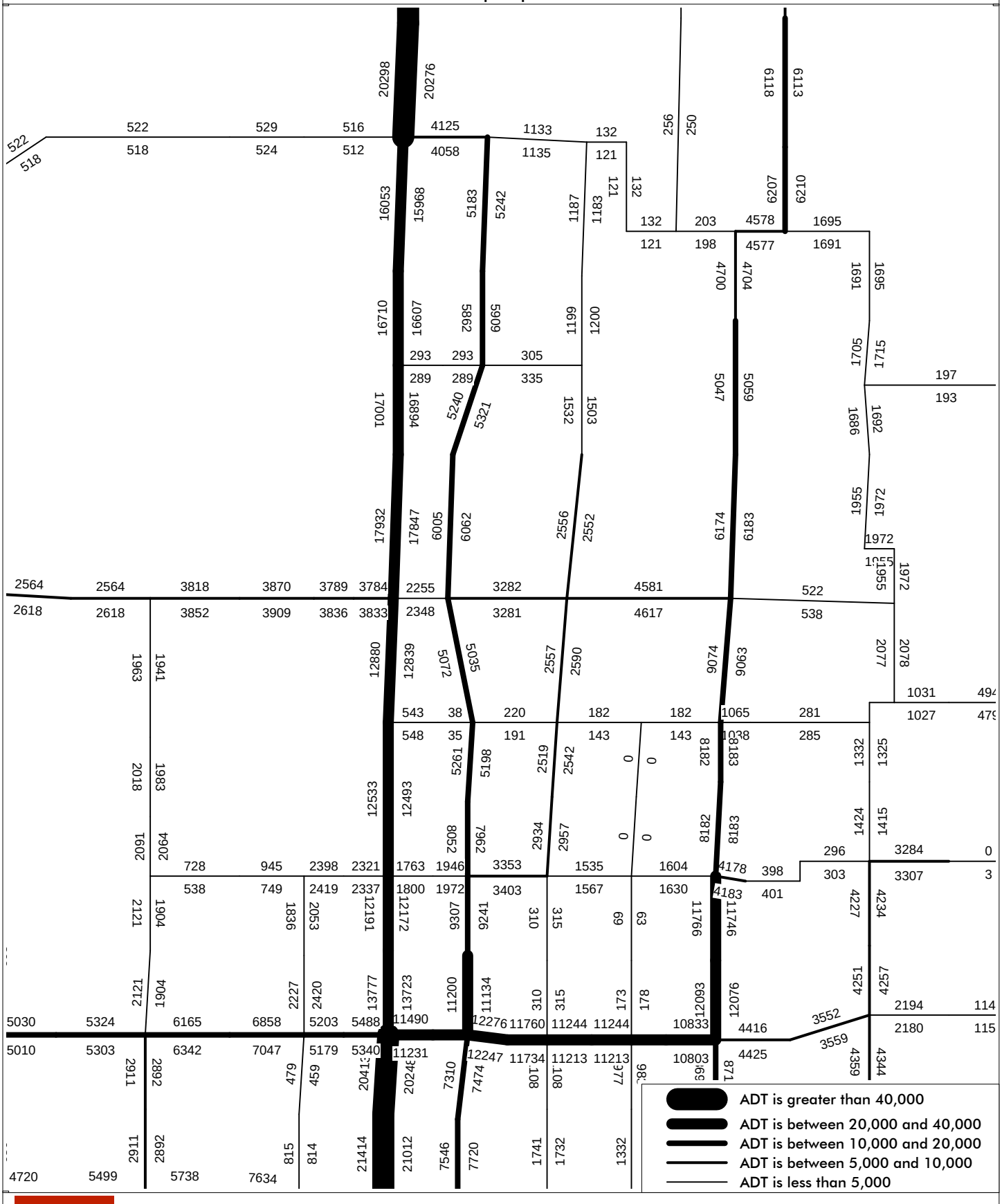

Figure 5
North Logan-Hyde Park EIS
Future Alternative #3 Network ADT Volumes
45 mph Speed

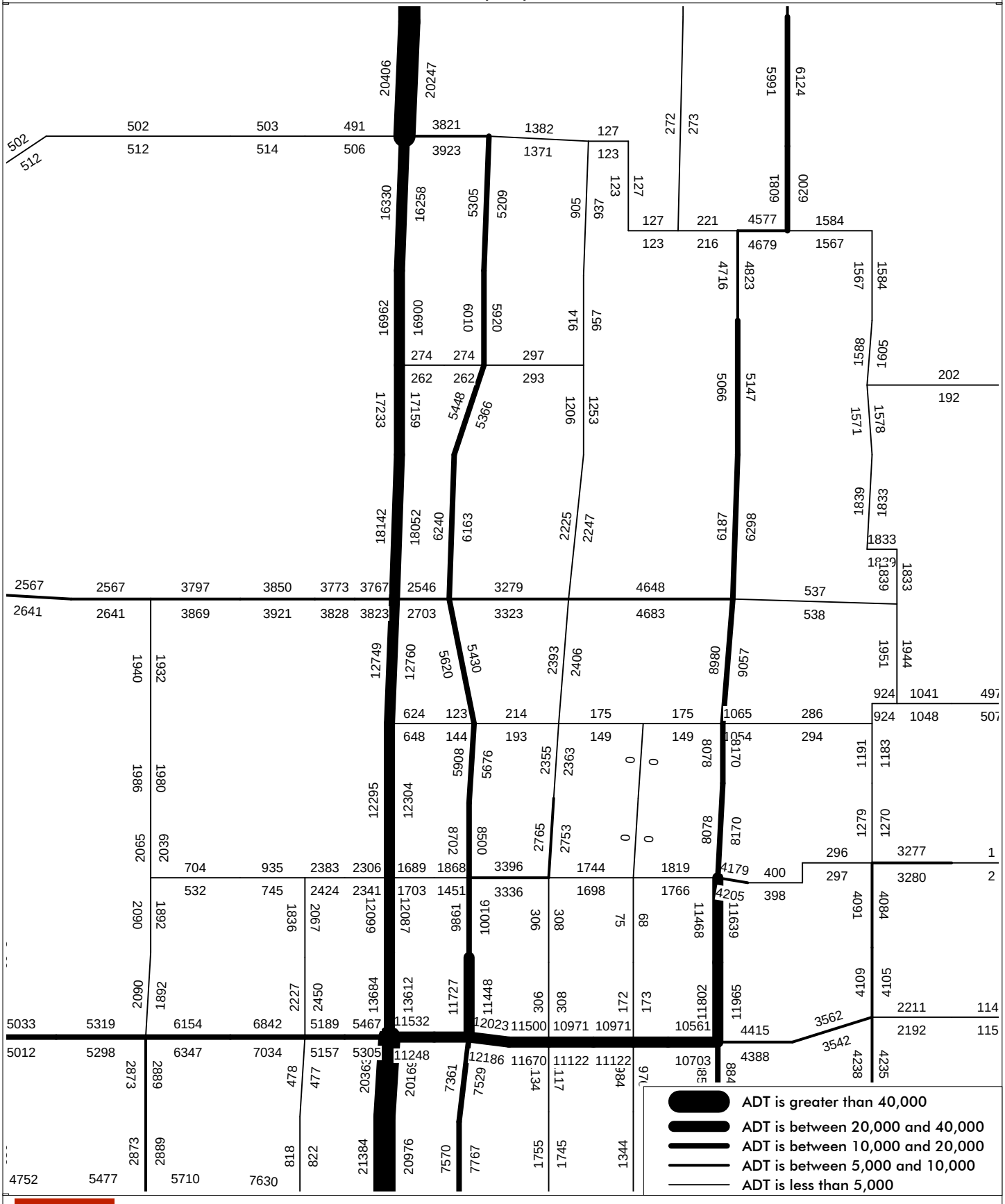

Figure 6
North Logan-Hyde Park Corridor EIS
Future Alternatives #5 & 6A Network ADT Volumes
Variable Speed (35 mph: 1400 N to 2500 N; 25 mph: 2500 N to 2700 N; 45 mph: 2700 N to 3700 N)