



Chapter 5

Transportation Impacts

5.0 TRANSPORTATION IMPACTS

The recent growth in Lincoln, combined with business investment on the edge of the City, has resulted in higher traffic volumes. These volumes are expected to continue to increase, thereby increasing traveler delays. More traffic to and from downtown increasingly uses streets that go *through* neighborhoods and the University of Nebraska-Lincoln (UNL) because there are few alternatives *around* these areas. In addition, missing connections in the street system and a lack of alternatives often cause “through” drivers to use neighborhood streets.

The Amended Draft Single Package is expected to result in overall transportation benefits and satisfy the purposes and needs of the Antelope Valley Major Investment Study (AV MIS). Particularly, traffic operations would be improved, pedestrian safety enhanced, neighborhood through traffic reduced, roadway continuity improved, and at-grade rail crossings eliminated. The No-Action Alternative reflects the future without AV MIS roadway improvements and is expected to result in an increase in traffic relative to existing conditions. Plans of the Amended Draft Single Package are provided in Appendix I.¹

5.1 Highway

Regional traffic is forecast to increase in the future, (approximately 20 years, based on Comprehensive Plan “Build-Out Scenario,” discussed below) with an overall 44 percent increase in trips with the growth forecast in the *Lincoln-Lancaster County Comprehensive Plan* (Lincoln-Lancaster County Planning Department, 1994). This is expected to result in a 70 percent increase in vehicle kilometers traveled in the region.

5.1.1 Regional Traffic

This section provides a brief summary of existing travel demand. Regional traffic is expected to increase in the future. This section illustrates the projected increase in future travel demand- presenting a generalized view of existing and future travel demand. A review of “where” additional trips are expected in the future helped determine the need for transportation infrastructure improvements to accommodate forecast growth in travel demand.

The analysis of regional person trip data indicates a growth of 44 percent. Much of the growth is in areas outside the core of Lincoln. In particular, the area to the north is expected to attract over 230 percent more trips in the future with the Build-Out Scenario compared to 1995 travel demands. This relates to land use changes has the potential in the area along North 27th and 33rd Streets. The “Build-Out Scenario” is based on a future “built out” land use and a future street network consistent with the *Lincoln-Lancaster County Comprehensive Plan*. The “Build-Out Scenario” is interpreted as the No-Action Alternative in this Draft Environmental Impact Statement

¹ Technical reports, which are identified in this EIS, are all incorporated by reference in this EIS. Appendix A provides a complete list of referenced reports. Copies of this EIS and the Antelope Valley Study Team reports are available for public viewing from the City of Lincoln-Lancaster County Planning Department, Suite 213, 555 South 10th Street, Lincoln, Nebraska, 68508. Copies of this EIS and Study Team reports are also available for viewing at city public libraries and available for purchase at Kinko’s Copies, 1201 Q Street, Lincoln, Nebraska, 68508.

(DEIS). No specific future year is assigned in the Comprehensive Plan for when the “Build-Out” condition would be achieved. However, it is generally assumed to be approximately 20-25 years from 1994.

The Lincoln/Lancaster County Planning Department maintains a travel demand model to reflect current travel behavior in the Lincoln area. The model uses a transportation network and socioeconomic and land-use data for traffic analysis zones (TAZs). Trip generation is modeled based on land uses in each TAZ. Trips “attracted to” and “produced in” each zone are then distributed to other TAZs using a gravity model. A gravity model distributes trips based on the size of the attraction zone and the distance (or travel time) between the production and attraction zones.

The result is a matrix of person trips (a trip table) indicating the number of trips to and from each zone-to-zone pair. Later, these person “trips” are assigned to routes (paths) that serve these zone-to-zone pairs.

Trips to and from districts based on the Lincoln-Lancaster County Planning Department zone-to-zone person trips (trip tables) are compared for two scenarios. The two scenarios include the 1995 person trips based on the present street network and 1995 land use, and the No-Action Alternative.

For the purposes of summarizing data, the AV MIS study team developed a set of “districts” composed of several TAZs. Districts 1 through 14 are shown on Figures 5.1 through 5.3 and are listed below. District 15 includes zones beyond the area shown on the maps, and is excluded from the tabulations.

- | | |
|-----------------------------------|----------------------|
| 1 Downtown Lincoln | 9 East Northeast |
| 2 UNL City Campus | 10 North of O Street |
| 3 “Built Environment” - Northwest | 11 South of O Street |
| 4 “Built Environment” - Northeast | 12 Southeast |
| 5 “Built Environment” - Southeast | 13 South |
| 6 “Built Environment” - Southwest | 14 Southwest |
| 7 Northwest Lincoln | 15 External |
| 8 North Lincoln | |

The two trip tables (1995 existing and the No-Action Alternative) were aggregated into “district” tables. Note that, based on current growth, the No-Action Alternative is equivalent to approximately 24 years of growth at a rate of 1.3 percent per year. The overall increase of trips forecast for the No-Action Alternative is a 44 percent increase over the person trips in 1995. Most increases are expected in Districts 7 through 15, which represent the areas beyond the “built environment.” The increase of trips originating in Districts 7 through 14 is as follows:

Increase in trips in the No-Action Alternative Compared to 1995

7 Northwest Lincoln	46,400	11 South of O Street	26,300
8 North Lincoln	61,400	12 Southeast	40,400
9 East Northeast	3,700	13 South	62,700
10 North of O Street	35,200	14 Southwest	25,100

Figures 5.1 through 5.4 illustrate district to district trip patterns. The text that follows further explains the depicted travel patterns.

Trips to Downtown Lincoln (District 1). Figure 5.1 illustrates trips to downtown Lincoln. The band widths indicate the number of trips from other districts to downtown Lincoln. Overall, the model indicates 75,700 trips destined for downtown Lincoln in 1995 and about 89,700 in the No-Action Alternative at full build out, or a growth of approximately 18 percent.

District 5 has the most trips (20,700 in 1995) to downtown Lincoln, followed by District 4 with 11,900. Overall, an 18 percent increase in person trips to downtown Lincoln is expected with the No-Action Alternative.

Trips to Areas South of Capitol Parkway (District 13). In 1995, the model indicates 66,900 trips to the south district, and 129,600 with the No-Action Alternative. This is an increase of 62,700 or 94 percent. Much of this growth (26,600 trips) is attributable to District 12, which accounts for over 40 percent of the “new” person trips to District 13 (see Figure 5.2).

Trips to North Areas (District 8). Trips to the north area are forecast to have an increase in person trips of over 230 percent for the No-Action Alternative compared to the 1995 person trips, as illustrated in Figure 5.3. Trips from Districts 4 and 5 (which include parts of the study area) to District 8 are forecast to increase by over 120 percent. This is more than double the current travel demand from Districts 4 and 5 to District 8.

Trips to Areas North of O Street and Trips to Areas South of O Street (Districts 4 and 5). According to the model, 212,700 daily person trips are destined for District 4 and 231,300 daily person trips are destined for District 5 in 1995. This compares to 221,000 and 241,500 modeled to Districts 4 and 5 in the No-Action Alternative, an increase of about 4 percent. This low rate of growth is because Districts 4 and 5 are within the “built environment”; the majority of growth in Lincoln is forecast in areas beyond today’s “built environment” (i.e., Districts 7 through 15).

Trips to Northwest Areas and Trips to Southwest Areas (Districts 3 and 6). Districts 3 and 6 (similar to Districts 4 and 5) are located within the “built environment” and are expected to experience an increase of person trips of 18 percent in District 3 and 28 percent in District 6. For the northwest area (District 3), an increase of 3,600 daily person trips from northwest Lincoln (District 7) and 5,300 from north Lincoln (District 8) are expected with the No-Action Alternative.

Vehicle Kilometers (Miles) Traveled and Vehicle Hours Traveled.

Computations of vehicle-kilometers traveled (VKmT), or vehicle-miles traveled (VMT), and vehicle-hours traveled (VHT) also characterize the growth of traffic throughout Lincoln in the future. Region-wide VKmT and VHT from the travel demand forecasting model output were computed and are presented in Table 5.1. Daily travel is expected to increase from 6.6 million VKmT (4.1 million VMT) under existing (1995) conditions to 11.1 million VKmT (6.9 million VMT) in the future, an increase of approximately 68 percent. Daily VHT are also expected to increase from 140,800 under existing conditions to 223,400 in the future with the Amended Draft Single Package and

Figure 5.1

Figure 5.2

Figure 5.3

Figure 5.4

223,800 in the future with the No-Action Alternative. While the overall results of the No-Action Alternative and the Amended Draft Single Package are similar, the daily travel time savings of 400 hours is considered a benefit of the transportation improvements. Examining the dollar value of annual vehicle hours saved, the Amended Draft Single Package saves approximately \$1.7 million annually relative to the No-Action Alternative.

Table 5.1
DAILY VEHICLE KILOMETERS (MILES) TRAVELED AND
VEHICLE HOURS TRAVELED

	VKmT	VMT	VHT
Existing Conditions	6,580,800	4,089,100	140,800
Amended Draft Single Package	11,150,800	6,928,800	223,400
No-Action Alternative	11,138,900	6,921,400	223,800

Source: AV Study Team, 1998.

Travel Time. A zone-to-zone analysis was performed for each alternative. The travel times to downtown Lincoln from all other zones in the network were calculated using the travel demand forecasting tools. The output was plotted in a Geographic Information System (GIS) to show visually the estimated travel times of a vehicle traveling to downtown from elsewhere in the Lincoln urban area. Figure 5.4 shows the existing (1995) travel time from throughout the region to downtown Lincoln. Most of the people living or working in the study area can get to downtown Lincoln within 20 minutes according to the modeled traffic. The areas on the northeast and southeast corners of the map have the longest travel time to downtown Lincoln at 21 to 28 minutes.

Screenlines. Figure 5.5 shows screenlines used for analysis purposes and Table 5.2 summarizes the capacity, average daily traffic (ADT) and the volume-to-capacity ratio for the existing conditions, Amended Draft Single Package, and the No-Action Alternative. The volume-to-capacity ratios are a measure of the transportation supply and demand of the various alternatives. A volume-to-capacity (v/c) ratio less than 1.0 means there is more capacity than volume present. A v/c ratio greater than 1.0 indicates there is more demand than capacity. Capacity in this model is coded at Level of Service (LOS) C; therefore a v/c ratio over 1.0 may be interpreted as a screenline where roadways may operate below LOS C (or at worse conditions).

Under existing conditions, three of the screenlines have v/c greater than 1.0. This includes Screenline 3 (Adams, Huntington, Holdrege, Vine and O Streets east of 40th Street), Screenline 9 (Capitol Parkway and 27th Street, north of A Street), and Screenline 10 (33rd and 27th Streets north of Holdrege Street).

With the forecast increase in traffic, every screenline is expected to have a higher average daily traffic in the future. The Amended Draft Single Package traffic analysis

Figure 5.5

indicates that six of the screenlines are expected to have a v/c greater than 1.0, including Screenlines 3, 5, 6, 8, 9, and 10.

The No-Action Alternative's traffic analysis indicates that 8 of the 11 screenlines are expected to have a v/c greater than 1.0. Therefore, the Amended Draft Single Package's screenline analysis predicts better v/c when compared to the No-Action Alternative.

Comparing the Amended Draft Single Package to the No-Action Alternative, most screenlines have a lower v/c ratio in the Amended Draft Single Package relative to the No-Action Alternative. This indicates that the Amended Draft Single Package does a superior job of providing adequate roadway capacity.

**Table 5.2
SCREENLINE ANALYSIS**

	Existing Conditions			Amended Draft Single Package			No-Action Alternative		
	Capacity	Average Daily Traffic	Volume/ Capacity (v/c)	Capacity	Average Daily Traffic	Volume/ Capacity (v/c)	Capacity	Average Daily Traffic	Volume/ Capacity (v/c)
Screenline 1	40,000	34,900	0.87	82,000	68,200	0.83	54,000	74,100	1.37
Screenline 2	68,000	42,100	0.62	104,000	71,400	0.69	68,000	72,600	1.07
Screenline 3	90,000	101,200	1.12	102,000	115,600	1.13	94,000	117,000	1.24
Screenline 4	44,000	37,800	0.86	78,000	73,600	0.94	44,000	44,600	1.01
Screenline 5	76,000	67,400	0.89	88,000	89,900	1.02	76,000	98,600	1.30
Screenline 6	88,000	76,800	0.87	102,000	104,000	1.02	92,000	94,400	1.03
Screenline 7	231,000	171,700	0.74	252,000	216,600	0.86	231,000	209,500	0.91
Screenline 8	64,000	45,700	0.71	42,000	45,600	1.08	64,000	57,600	0.90
Screenline 9	48,000	52,500	1.09	52,000	65,600	1.26	52,000	62,100	1.19
Screenline 10	42,000	44,100	1.05	42,000	49,700	1.18	42,000	57,400	1.37
Screenline 11	66,000	43,000	0.65	66,000	62,600	0.95	66,000	60,400	0.92

Source: AV Study Team, 1998.

5.1.2 Study Area Traffic Analyses

Further traffic operations analyses were conducted for existing conditions, the Amended Draft Single Package and the No-Action Alternative. The primary purpose of the analyses was to document existing and future No-Action traffic conditions at key study area intersections and to determine roadway and intersection lane needs along the new roadways included in the Amended Draft Single Package. Superior Street generally bounded the study area for the traffic analysis on the north, K Street on the south, 33rd Street on the east, and 9th Street on the west. Analyses were conducted for both a.m. and p.m. peak hour traffic conditions for selected major intersections within this study area. Traffic analysis results are documented more fully in the *Traffic Analysis Summary Report* (AV Study Team, November 1998).

Existing Average Daily Traffic. Existing ADT volumes for key study area roadways are illustrated in Figure 5.6. Portions of many study area roadways, including 9th Street, 10th Street, 16th Street, 17th Street, 27th Street, Capitol Parkway, O Street, Vine Street, Holdrege Street, Cornhusker Highway, and Superior Street currently carry daily traffic volumes in excess of 20,000 vehicles per day (vpd). Several of these roadways carry daily traffic volumes approaching or exceeding 30,000 vpd. Existing ADT volumes on several roadways, including O Street, Vine Street, Holdrege Street, and Cornhusker Highway, exceed recommended daily traffic volume criteria established by the City of Lincoln for the particular size and type of roadway.

Amended Draft Single Package Average Daily Traffic. Projected daily traffic volumes for key study area roadways under the Amended Draft Single Package are illustrated in Figure 5.7. Traffic volume projections for the North-South Roadway range from approximately 30,000 to 40,000 vpd near the East-West Roadway to 60,000 vpd south of O Street. Traffic volumes for the East-West Roadway range from under 10,000 vpd north of Cornhusker Highway to 45,000 vpd near the North-South Roadway. Traffic volume projections for Military Road between 10th and 14th Streets approach 11,600 vpd while projections for the Adams Street/Huntington Avenue connection range from 13,000 to 24,000 vpd.

No-Action Alternative Average Daily Traffic. Projected daily traffic volumes for key study area roadways under the No-Action Alternative are illustrated in Figure 5.8. Daily traffic volumes in the study area are expected to increase 10 to 20 percent (0.5 percent to 1.0 percent annually) over existing traffic conditions. Estimated traffic growth on several roadways, including 9th and 10th Streets south of O Street, 14th Street north of Military Road, 33rd Street north of Holdrege Street and Superior Street east and west of 27th Street would increase more than 50 percent over existing conditions. Substantial traffic volume increases are also projected for 16th Street, 17th Street, Holdrege Street, and Vine Street. Traffic volumes are also expected to increase somewhat on “residential/ industrial-type” roadways such as Y Street. Capacity deficiencies would increase as portions of several major roadways, including 27th Street, O Street, Cornhusker Highway, and Superior Street are estimated to have ADT volumes approaching or exceeding 40,000 vpd.

Comparative Analysis of Amended Draft Single Package and No-Action Alternative. For many roadways, traffic volume projections under the Amended Draft Single Package are similar to those under the No-Action Alternative. The list below summarizes key findings of the traffic analysis.

- Amended Draft Single Package traffic volumes are higher compared to the No-Action Alternative on Vine Street east and west of the new roadway. This indicates that the new North-South Roadway functions as a more important entrance into the UNL City Campus.

Figure 5.6

Figure 5.7

Figure 5.8

- Traffic volumes on Q Street, east of the North-South Roadway, are higher with the Amended Draft Single Package compared to the No-Action Alternative because Q Street serves as a major entrance to downtown Lincoln in the Amended Draft Single Package.
- Traffic volumes are higher for the Amended Draft Single Package compared to the No-Action Alternative on Huntington Avenue because in the Amended Draft Single Package, Huntington Avenue serves as a convenient connection to east Lincoln.
- Volumes on O Street are similar in the Amended Draft Single Package and No-Action Alternative through the downtown area (9th to 17th Streets) and east of 21st Street. Amended Draft Single Package traffic volumes are higher relative to the No-Action Alternative on O Street between 17th and 21st Streets indicating the attractiveness of the new roadway.
- Amended Draft Single Package traffic volumes are similar to or less than the No-Action Alternative traffic volumes on Holdrege Street east of 27th Street, Adams Street east of Cornhusker Highway, and 14th Street north of Adams Street.
- Volumes are 60 to 70 percent lower in the Amended Draft Single Package compared to the No-Action Alternative on 16th and 17th Streets which is consistent with one of the primary purposes and needs of the AV MIS.
- Amended Draft Single Package traffic volumes are lower compared to the No-Action Alternative on Holdrege and Y Streets between 17th and 27th Streets, 33rd Street north of Holdrege Street, and Cornhusker Highway between 10th Street and the new East-West Roadway.
- The Amended Draft Single Package ADT is lower compared to the No-Action Alternative on 27th Street between Capitol Parkway and Cornhusker Highway, 9th and 10th Streets north of downtown, and Superior Street east and west of 27th Street.

Intersection and Roadway Geometrics. Existing intersection and roadway geometrics were an input to level of service (LOS) analyses. Level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, LOS criteria for signalized intersections are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The criteria are given in Table 5.3.

In addition, preliminary intersection and roadway geometrics for the new roadways were analyzed for appropriateness. Existing intersection geometrics are illustrated in Figure 5.9.

Intersection and roadway geometrics identified for the Amended Draft Single Package are illustrated in Figure 5.10. These lane configurations were developed to represent a conservative scenario for purposes of determining environmental impacts. Consistent with the ultimate build out of the Amended Draft Single Package, the new North-South and new East-West Roadways were shown as six-lane divided facilities with up to two left-turn lanes and exclusive right-turn lanes at many key intersections. The initial

Table 5.3
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS

Level of Service	Stopped Delay per Vehicle
A	≤ 5 seconds
B	> 5 and ≤ 15 seconds
C	>15 and ≤ 25 seconds
D	>25 and ≤ 40 seconds
E	>40 and ≤ 60 seconds
F	>60 seconds

Source: Transportation Research Board, *Highway Capacity Manual*, 1994.

construction of the North-South Roadway is shown as four lanes in some downtown areas. P Street is shown as a one-way street consistent with the “Market Place” redevelopment concept (see Section 3.2.2). Q Street is one-way westbound in the study area. This is consistent with City plans. Military Road and the Huntington Avenue connection are shown as four-lane roadways. Adams and 33rd Streets are shown as three-lane roads.

All major intersections along the Amended Draft Single Package roadways were evaluated as part of the traffic analysis. Intersection LOS was the primary criteria used to evaluate intersection geometric needs.

Intersection geometrics used for the No-Action Alternative analyses are based on existing intersection geometrics plus intersection and/or roadway improvements included in the current *Comprehensive Plan*. Initial lane needs would be lower than eventual needs in several locations and would be part of phased construction concepts.

Intersection Level of Service Analyses Methodology. Peak hour intersection turning movements are used to determine intersection levels of service. Existing peak hour intersection turning-movement volumes were obtained from the City of Lincoln. Counts were generally conducted in the last five years (1993 - 1998) although some of the counts were not that recent.

Typically, the most recent counts were available in higher growth areas such as the north 27th Street corridor while the older counts tended to be in more stable areas like downtown Lincoln. Modeling data and historic ADT volume data throughout the study area were reviewed to establish growth factors to adjust all existing turning-movement volumes to a common 1997 base year. Annual growth factors developed ranged from two percent in the downtown area, to three percent in the developed non-downtown areas, and up to six percent in the high growth areas such as the intersection of 27th Street and Cornhusker Highway.

Figure 5.9

Figure 5.10A

Figure 5.10B

Peak hour (a.m. and p.m.) turning-movement volumes were developed for the Amended Draft Single Package and the No-Action Alternative using adjusted 24-hour traffic volume forecasts. Working with City staff, manual refinements to the model data were made in several areas to better reflect anticipated traffic volumes. These areas include the 27th Street and Cornhusker Highway area and the new North-South Roadway and 21st Street between K and O Streets. Additional adjustments were made to the Amended Draft Single Package and No-Action Alternative forecasts by comparing 1995 model data and actual 1995 ADT. Using existing turning-movement and ADT volume data, the peak hour percentage of daily traffic (*k* factor) and peak hour directional splits (*d* factor) were determined for each intersection approach of each study area intersection evaluated. Turning-movement forecasts were then developed using an iterative turning-movement distribution process based on the peak hour percentages, directional splits, and existing turning-movement volumes for each intersection. Peak hour percentages and directional splits for new intersections along the roadways were developed based on average data from similar and/or adjacent intersections.

Existing Intersection Levels of Service. To analyze existing conditions, 29 intersections were analyzed. Existing intersection levels of service are depicted in Figures 5.11 and 5.12. Operations are generally LOS C or better in the downtown area and along 14th, 16th, and 17th Streets.

The 27th and 33rd Street corridors show LOS D or worse at six locations in the a.m. peak hour and five locations in the p.m. peak hour (10 intersections were studied in the corridor). The intersections of 33rd and Holdrege Streets and 27th and O Streets operate at LOS E during the a.m. peak hour. The intersections of 17th Street with K Street and O Street operate at LOS D in the a.m. peak hour. The intersection of 27th Street with Cornhusker Highway operates at LOS D in the a.m. and p.m. peak hours.

Amended Draft Single Package Intersection Levels of Service. For the Amended Draft Single Package a total of 40 intersections were analyzed (23 existing and 17 future). Amended Draft Single Package LOS are shown at Lincoln's build-out date in Figures 5.13 and 5.14.

Traffic operations in the 16th and 17th Street corridors are better in the Amended Draft Single Package relative to the No-Action Alternative. Vine and Holdrege Streets are also better in the Amended Draft Single Package relative to the No-Action Alternative, as are the 27th and 33rd Street corridors. The better traffic operation with the Amended Draft Single Package in these areas is primarily because of the new North-South Roadway, which is expected to operate at LOS C, D or E at intersections analyzed.

The new East-West Roadway is also expected to have some congestion with intersection operations ranging from LOS B to E. The intersection of 27th Street with Cornhusker Highway is expected to operate better with the Amended Draft Single Package (LOS E in the p.m. peak hour) compared to the No-Action Alternative (LOS F in the p.m. peak hour). The intersections of 33rd Street and Cornhusker Highway and 27th Street and O Street are the only study area intersections expected to operate at LOS F during one or both peak hours of analysis under the Amended Draft Single Package.

Figure 5.11

Figure 5.12

Figure 5.13

Figure 5.14

There are 10 more intersections that would operate at LOS E, five of which are new intersections. Three of the five new intersections that are forecast to operate at LOS E are one or two seconds from being considered LOS D. So, of the existing intersections, six of 23 (26 percent) are expected to operate at LOS E or F with the Amended Draft Single Package. Also, accounting for all intersections analyzed in the Amended Draft Single Package, the ratio is 12 of 40 (30 percent) for intersections operating at LOS E or F. This shows an overall reduction in the number of over-capacity intersections with the Amended Draft Single Package versus the No-Action Alternative. As described in the next section, the No-Action Alternative is expected to have 62 percent of the intersections operating at LOS E or F.

For each intersection analyzed, various geometric configurations were investigated to determine the corresponding forecast level of service. The intersection configurations presented in Figure 5.10A and Figure 5.10B are expected to result in the levels of service presented in this section. In most locations, dual left-turn lanes, multiple through lanes, or even three through lanes and exclusive right-turn lanes have been evaluated. In most locations they are included in the proposed geometric configurations when forecast traffic volumes warrant them. In other locations, there are right-of-way constraints, or building constraints where additional widening is not possible. Therefore additional geometric improvements are unreasonable.

No-Action Alternative Intersection Levels of Service. For the No-Action Alternative, the 29 intersections analyzed in the existing condition analysis were considered. Generally, intersections from the existing condition by about one LOS throughout the study area. Some corridors were impacted more than others. The 16th and 17th Streets intersections generally operate at LOS D, E, and F. The O Street, 27th Street and 33rd Street corridors have several over-capacity intersections. The list of intersections that operate at LOS F during one or both peak hours of analysis includes:

- 14th and Holdrege Streets
- 14th and Adams Streets
- 17th and O Streets
- 17th and P Streets
- 27th and O Streets
- 27th and Vine Streets
- 27th and Holdrege Streets
- 27th Street and Cornhusker Highway
- 27th and Superior Streets
- 33rd and Holdrege Streets
- 33rd and Huntington Streets
- 33rd Street and Cornhusker Highway

Thus, a total of 12 intersections are expected to operate at LOS F. There are six more intersections that operate at LOS E. So, 18 of 29 (62 percent) intersections operate at LOS E or F in the No-Action Alternative (and 30 percent in the Amended Draft Single Package).

Figures 5.15 and 5.16 present a.m. and p.m. peak hour intersection levels of service for the No-Action Alternative.

Figure 5.15

Figure 5.16

5.1.3 Access

The angled railroad tracks of the Burlington Northern Santa Fe (BNSF) Railroad in the study area create problems for traffic operations. The tracks block some streets from connecting over them, and more and longer trains can block traffic for several hours every day on the streets that *do* cross the tracks. Future traffic (approximately 75,000 vehicles per day) is subject to delays at railroad crossings at 14th, 17th, 33rd, and Adams Streets. In addition, drivers avoiding train-related delays at 14th and 17th Streets often use the 27th Street bridge over the railroad. Motorists then continue to use Holdrege, Vine, and O Streets to downtown, thus increasing traffic on these streets.

Amended Draft Single Package. The Amended Draft Single Package would result in vehicular access changes at several locations. Considerable coordination with City staff, neighborhoods, businesses and interested citizens have addressed particular access concerns, and these discussions would continue if the Amended Draft Single Package is advanced. Some areas of particular concern regarding access and how access would be accomplished with the Amended Draft Single Package are described below.

UNL Area and Bob Devaney Center. Consistent with the Amended Draft Single Package and the UNL's Master Plan, changes to the street network in the UNL City Campus area would result in access changes for motorists. North of Q Street, 16th and 17th Streets would change from a one-way pair to two-way streets serving as intra-campus circulation and access roadways. Sixteenth Street would no longer be connected to Holdrege Street, and its northern terminus would be near the northbound approach structure where the new North-South and East-West Roadways intersect. Seventeenth Street would connect to the new North-South Roadway at Y Street.

The two grade crossings to be eliminated (14th Street and 17th Street) over the BNSF mainline would require motorists to change driving patterns from the UNL City Campus to areas north such as the Bob Devaney Center. Access north of the railroad tracks would be available via the new North-South Roadway. To access the Bob Devaney Center, motorists would continue north on the North-South Roadway and turn east on Military Road to access the Devaney Center from the north. Alternatively, motorists from downtown Lincoln and the campus area would turn east on the East-West Roadway and turn north just east of the Devaney Center. Further, motorists from downtown Lincoln would have the option (as they do today) to take 10th Street north to Military Road, and to travel east on Military Road, which would be improved as part of the roadway improvements.

In the western part of the Clinton neighborhood, 17th Street would become two-way, and connect to Y Street. Y Street would no longer continue west to 16th Street; instead, Y Street would connect to a new roadway that would intersect with the North-South Roadway, then align with X Street and connect to 16th Street. Nineteenth Street would no longer connect with Holdrege Street in the

Amended Draft Single Package. Residents on 19th Street who wish to access Holdrege Street would use 20th Street instead.

Access to and through the UNL City Campus and to the Devaney Center would be maintained, although there would be some changes to the traffic access patterns. In particular, the elimination of the at-grade crossings of 14th Street and 17th Street would require some motorists to use a different path. Similarly, access to and from the western part of the Clinton neighborhood would be changed while all homes and businesses would maintain access to City streets.

33rd Street Area. Two BNSF at-grade railroad crossings would be eliminated in this area, specifically, the 33rd Street grade crossing and the Adams Street grade crossing. This, in turn, would result in access changes for some motorists. A new underpass would replace the 33rd Street grade crossing so the road would pass beneath the BNSF Railroad mainline. Adams Street, although closed at the BNSF Railroad tracks, would be extended in a southwesterly direction in the Amended Draft Single Package. It would continue to a new underpass of the BNSF Railroad near 30th Street and connect to the new East-West Roadway.

Generally, driveways to individual businesses would be retained on 33rd Street. On the south side of the BNSF Railroad mainline two homes (at the northeast corner of 33rd Street and Madison Avenue) and one business on the west side of 33rd Street would have changes in access. Madison Street grade would change to align with the 33rd Street underpass approach. As a result, access to the corner properties on Madison Street would change.

North of the BNSF mainline, four businesses would have modified access. Two businesses on the south side of Cornhusker Highway east of 33rd Street would consolidate their entrances to reduce the number of curb cuts along this roadway. One business immediately north of the BNSF and east of 33rd Street would no longer have its driveway on 33rd Street because 33rd Street would have a lowered profile at this location. This is because 33rd Street would be climbing to grade from the underpass to its at-grade intersection with Cornhusker Highway. Access would be via Cornhusker Highway and distribution roads south of Cornhusker Highway. One business immediately north of the BNSF mainline and west of 33rd Street would no longer have its entryway along 33rd Street. Instead, access would be via Cornhusker Highway and distribution roads south of Cornhusker Highway.

State Fair Park. The elimination of grade crossings at 14th and 17th Streets would change the access patterns for State Fair Park. Access would be provided along the East-West Roadway similar to the entrance that exists today on State Fair Park Drive. Access from the north to State Fair Park would remain unchanged. Access from downtown Lincoln and UNL City Campus would be accommodated via the North-South and the East-West Roadways.

Downtown Businesses. The introduction of the North-South Roadway and the related changes in east-west streets in the eastern end of downtown would result in access changes at several locations. Access to individual businesses and residents would be maintained, although the access routes would change for some destinations. Table 5.4 highlights some of the differences, particularly for the east-west roadways across the new North-South Roadway between K and R Streets, essentially the segment where the new North-South Roadway would align with the existing 19th Street corridor.

No-Action Alternative. There are no changes to current street patterns.

5.1.4 Safety

One of the Purposes and Needs identified early in the AV MIS was the need to provide safety improvements, particularly at the grade crossings of the BNSF Railroad. These crossings create safety hazards for motorists and pedestrians, as well as for the railroads.

**Table 5.4
ACCESS CHANGES FOR ROADWAYS THAT
INTERSECT WITH THE NEW NORTH-SOUTH ROADWAY**

	Change in the Amended Draft Single Package compared to existing at the North-South Roadway	Change in the Amended Draft Single Package compared to existing at the Channel
K Street	No change.	N/A
L Street	No change.	N/A
M Street	Right-in, right-out only.	N/A
N Street	No change.	New bridge over the channel.
O Street	No change.	New bridge over the channel.
P Street	No change initially, ultimately right-in, right-out only.	New bridge over the channel.
Q Street	No change.	New bridge over the channel.
R Street	Closed.	Closed at Trago Park.

Source: AV Study Team

Amended Draft Single Package. The Amended Draft Single Package eliminates four at-grade crossings of the BNSF Railroad tracks at 14th Street, 17th Street, 33rd Street and Adams Street. The grade crossings are eliminated, and a new bridge at 16th Street and two roadway underpasses at an extension of Huntington Avenue and at 33rd Street accommodate traffic. These improvements greatly reduce the potential for auto/train accidents by physically separating motorists and train movements. In addition, a pedestrian underpass and trail connection is provided under the railroad tracks at 16th Street.

The Amended Draft Single Package also includes trail connections that provide a safety benefit to bicyclists. The pedestrian and bicycle trail along the new open stream

provides an off-street connection to the existing trail along Antelope Creek and the UNL City Campus. This reduces the need for bicyclists to use city streets, and reduces the hazard of bicyclists mixing with automobile traffic. See Section 4.7 for

more discussion of pedestrian and bicycle trail system improvements and benefits.

No-Action Alternative. Under the No-Action Alternative, the at-grade railroad crossings would remain and the safety benefits to motorists and pedestrians of new facilities would not be realized.

5.1.5 Parking

The availability of parking in downtown Lincoln is generally adequate for current parking demand, although anecdotal evidence indicates on-street parking may occasionally be at or near capacity in the heart of downtown Lincoln.

In the Central study section, the UNL City Campus has approximately 10,100 spaces in 75 parking locations. Parking is spread throughout the City Campus, with many larger lots on the campus's perimeter. In the future, UNL's new Master Plan aims to consolidate parking in parking structures on the edge of campus.

Amended Draft Single Package. The UNL Master Plan includes roadways shown in the Amended Draft Single Package. The Master Plan identifies locations for future parking structures to replace surface parking lots as UNL development plans progress and require displacement of parking.

The Amended Draft Single Package is expected to result in the relocation of parking spaces, including off-street parking lots on the UNL City Campus and on-street parking spaces in selected locations. In the downtown area, 14.5 block faces (a "face" is each side of a street) of on-street parallel parking are expected to be eliminated or restricted to non-peak hours. This includes four block faces on O Street from 18th to 20th Street and 10.5 block faces on 19th Street between K and R Streets. Table 5.5 illustrates locations where parking impacts are expected. The loss of parking would result in higher utilization of existing nearby off-street lots and streets with on-street parking.

On the UNL City Campus, impacts are expected at nine lots, for a total of approximately 1,215 spaces. At two additional locations, UNL land uses would be relocated, including the adjacent parking. Table 5.5 identifies specific locations with expected parking impacts. UNL plans include parking development in expanded surface parking lots and in parking structures on the City Campus perimeter. This program will provide University replacement of all spaces impacted by Antelope Valley improvements and is part of their Antelope Valley mitigation efforts.

In addition, five lots totaling 545 spaces would no longer be within the unified campus, which becomes better defined with the new North-South and East-West Roadways. Some community UNL and discussion of reuse of these areas for community revitalization is expected.

**Table 5.5
PARKING IMPACTS WITH AMENDED DRAFT SINGLE PACKAGE**

BLOCKS OF ON-STREET PARKING ELIMINATED OR TIME OF DAY RESTRICTED WITH AMENDED DRAFT SINGLE PACKAGE				
Roadway	From Street	To Street	Current Parking Configuration and Rules	
19 th Street	K	L	No parking anytime on west side of street, parallel parking on the east side	
	L	M	Parallel parking on both sides, although only half of a block on the east side	
	M	N	No parking on west side of street, 15-min. metered parking on the east side	
	N	O	1-2 hour metered parallel parking (both sides), no parking 9 p.m. to 6 a.m.	
	O	P	2 hour metered parallel parking (both sides), no parking 9 p.m. to 6 a.m.	
	P	Q	Parallel parking on east side of street, no parking on west side of the street	
	Q	R	Parallel parking on both sides of the street	
O Street	18 th	19 th	2-hour metered parallel parking, no parking 2 a.m. to 6 a.m., south side bus stop	
	19 th	20 th	2-hour metered parallel parking, no parking 9 p.m. to 6 a.m., north side bus stop	
UNL PARKING SPACES ELIMINATED OR RELOCATED WITH AMENDED DRAFT SINGLE PACKAGE				
UNL Lot #	Description		Total spaces	Estimate of Spaces Eliminated
10 and 27	14 th and Avery, Areas 3 and 20		1,216	135
29	HHS, Area 3 Rock		617	330
42 and 47	19 th and Q, Area 3/20		1,034	60
50	Sandoz; Areas 8C, 3 and Visitor		389	25
53, 55, and 57	Nebraska Hall; Area 10, Visitor, and Other		462	300
54	GE Building, Area 10		76	65
60	Stormies, Perimeter		155	60
61	Jacobs, Perimeter and Other		410	130
75	Beadle, Area 10, Area 20/21, and Other		370	110
Total Spaces Eliminated				1,215

Source: AV Study Team, UNL

No-Action Alternative. Under the No-Action Alternative, no net loss in on-street parking is expected as a result of UNL City Campus changes.

UNL plans include reducing surface parking at several sites for development of structured parking, athletic development, recreation development, engineering development, and a new visitor center.

5.2 Freight Movements

5.2.1 Regional Freight Movements

The BNSF; the Union Pacific; and the Omaha, Lincoln & Beatrice Railroads, provide railroad freight transportation in the study area.

Key commodities using rail transport include coal, farm products, food products, mixed freight and chemicals. Coal is the dominant commodity for products shipped by rail that end their trip at Nebraska receiving points. This coal is largely carried in unit

trains from the Powder River Basin in Wyoming to coal-burning utility power plants throughout Nebraska and the upper Midwest. Coal accounts for 55 percent of the rail tonnage terminated in Nebraska, followed by mixed freight (22 percent), chemicals (11 percent), transportation equipment (seven percent), and food products (five percent) according to the Association of American Railroads, 1993.

Nebraska ranks first in rail-tons of farm products originated in any state. Of all the rail tonnage originated in Nebraska, almost 70 percent are farm products. Main routes of the two primary railroads in the west serve Nebraska.

Burlington Northern Santa Fe. BNSF stretches from western Canada to Alabama in the southeast and has key lines to California. Powder River (Wyoming) low sulfur coal is a major part of its traffic mix. Otherwise traffic is quite similar to Union Pacific Railroad traffic, including much double stack intermodal container movement. BNSF is the largest railroad in the western United States. BNSF Rail traffic from Colorado, Wyoming and South Dakota traverses through Lincoln, and continues either east to Omaha or southeast towards Kansas City.

Union Pacific Railroad. West of Chicago, Union Pacific (UP) Railroad stretches to Los Angeles, Oakland, Seattle, New Orleans, and Texas, and connects to Mexico. UP has heavy traffic in grain, chemicals, automobiles and parts, lumber and low sulfur western coal. (*Nebraska Statewide Rail Plan*, 1996)

The Omaha Lincoln & Beatrice. The Omaha Lincoln & Beatrice (OL&B) Railway is a shortline railroad that operates only in Lincoln. It owns approximately six kilometers (four miles) of track and provides local switching service in the study area for grain and cement.

5.2.2 Study Area Freight Traffic Analysis

Amended Draft Single Package. A key purpose and need identified early in the AV MIS was to eliminate the traffic and pedestrian hazards associated with the at-grade crossings of the BNSF Railroad mainline by major streets. The removal of the at-grade crossings has the potential to improve freight operations by eliminating the potential hazard of the pedestrian and motorist crossings. This, in turn, would reduce the railroad liability, and enable the railroad to operate with fewer stops through this section of Lincoln. Eliminating the at-grade crossing would also eliminate the need for trains to sound their horns; thus reducing noise levels at adjacent residential areas.

Freight and delivery access plans in the area of 33rd Street, Cornhusker Highway, and the East-West Roadway, has been coordinated with local business. Access to all business would be maintained, although some access routes would change. Truck access to the grain elevators would be maintained.

No-Action Alternative. Freight rail operations in the X Street Corridor would change. Trains that use the X Street corridor through the UNL City Campus will be re-routed to avoid the high pedestrian locations. Under a separate Railroad Transportation Safety District project, a new track is being constructed along the BNSF Railroad right-of-way. The new track will accommodate UP's unit grain trains traveling

to and from the grain elevators served by the OL&B. No major changes to truck freight traffic are expected under the No-Action Alternative.

5.3 Public Transportation

5.3.1 Regional Public Transportation

Antelope Valley improvements will not affect regional public transportation such as Greyhound or Amtrak.

5.3.2 Study Area Public Transportation

StarTran operates bus transit service in the City of Lincoln. Six StarTran routes operate in the study area as follows: 2 Bethany, 4 University Place, 7 Belmont, 10 East Vine, 20X Northeast Limited Express, and 24 Holdrege. The Holdrege route, with almost 222,000 passengers per year, has the highest ridership of all the City's routes. This is followed by the Havelock routes and University Place with 135,000 and 132,000 riders in 1995 according to a *StarTran Transit Surveillance Report, 1994/1995*. These three routes serve areas to the north and east of the downtown area, and are the top three StarTran routes. All exceed StarTran's system goal of 18 passengers per hour. The 24 Holdrege route connects the UNL City and East Campuses.

Amended Draft Single Package. The roadway changes in the Amended Draft Single Package were reviewed to determine the potential impact to current StarTran routes. Few bus routing changes would result from roadway changes. The North-South Roadway would require only minor re-routing, if any, of five of the six routes in the study area. The sixth route would benefit because of an opportunity to reduce travel times. The bus route changes could reduce accessibility of the service to some current patrons as shown in Table 5.6. Conversely, some patrons would benefit from the changes because bus route stops shift closer to their home or destination. Riders of the Northeast Limited Express (20), would benefit because travel times through the area would be improved.

The North-South Roadway would afford an opportunity for new express transit service from downtown Lincoln and the currently unserved residential area to the commercial area north of Superior Street, between 7th and 27th Streets. Although no specific plans for a new route are in place, such new service would also improve current route services by providing opportunities for non-downtown transfers between routes.

No-Action Alternative. Bus routes in the study area and the City of Lincoln would not be affected by the No-Action Alternative. Current route configurations and service levels would be maintained.

Since 1990-1991, no major StarTran service expansions have been implemented, other than UNL directly subsidized public transit services between downtown Lincoln and the two UNL campuses. While StarTran services have remained the same, Lincoln has continued to grow both in population and in area.

Table 5.6
TRANSIT SERVICE IMPACTS

Route	Service Impact
7 Belmont	The elimination of the 14 th Street grade crossing of the BNSF Railroad mainline necessitates relocating the route from 14 th Street to the east onto the new North-South Roadway between Salt Creek and Court Street. This results in patrons boarding and exiting the bus one block east from the current location.
4 University Place	No impact. Route operates on Vine Street, which is maintained as a through roadway across the new North-South Roadway.
2 Bethany	The planned closing of R Street at 19 th and 21 st Streets would result in the route being relocated to Q Street from 17 th to 23 rd Streets. Patrons would board and exit one block south from the current location between 17 th and 23 rd Streets.
10 East Vine	No impact. Route operates on P and Q Streets, which are maintained as through roadways across the new North-South Roadway and channel.
24 Holdrege	The revisions to 16 th and 17 th Streets between Holdrege and Q Streets would necessitate this route to utilize the new North-South Roadway. For bus riders to and from the UNL City Campus, this would result in an additional one-block walk to board and exit the bus.
20X Northeast Limited Express	The change in 16 th and 17 th Streets would require this route to be moved to the new North-South Roadway from Holdrege to Q Streets. While the route would not stop for passengers along this segment, the route travel time would be reduced, improving service for passengers.

Source: StarTran, 1998