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FINAL ENVIRONMENTAL IMPACT STATEMENT
AND
FINAL SECTION 4(F) STATEMENT

SOUTH AND EAST BELTWAYS
LINCOLN, NEBRASKA
PROJECT NO. DPU-3300(1)

12 June 2002

Submitted Pursuant to 42 U.S.C. 4332 (2) (c) and 49 U.S.C. 303

U.S. Department of Transportation, Federal Highway Administration
Nebraska Department of Roads
Lancaster County
City of Lincoln

6/12/02
Date — For City of Lincoln

6-12-02
Date — For Lancaster County

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Date — For Nebraska Department of Roads

6/18/02
Date of Approval — For Federal Highway Administration

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ABSTRACT: This Environmental Impact Statement (EIS) document identifies and evaluates preferred beltway alignments on the south and east fringes of the City of Lincoln. The beltways would complete a circumferential transportation system by linking with Interstate 80 (I-80) on the north and U.S. Highway 77 (US 77) on the west. The approximately 13 km (8 mi) long south beltway would connect US 77 with Nebraska Highway 2 (N-2), while the 21 km (13 mi) long east beltway would connect N-2 with I-80.

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FINAL
ENVIRONMENTAL IMPACT STATEMENT
for
South and East Beltways
Lincoln, Nebraska

SUMMARY

Background. The City of Lincoln, Lancaster County and the Nebraska Department of Roads, in cooperation with the Federal Highway Administration, are studying the possibility of constructing a beltway around the south and east sides of the City of Lincoln. The purpose of the project is to complete the circumferential (encircling) transportation network around Lincoln which currently exists only on the north and west sides. The project would move through traffic around Lincoln's congested urban area, and improve traffic flow on the existing urban street system.

The south beltway would provide an alternative connection between US Highway 77 (US 77) in the southwest and Nebraska Highway 2 (N-2) at the southeast edge of Lincoln. Access points are proposed at 27th, 68th and 84th Streets. The study area for the south beltway is bounded on the north by Yankee Hill Road, on the south by the half-section line 0.8 km (0.5 mi) south of Bennett Road, on the east by the half-section line 0.8 km (0.5 mi) east of 148th Street, and on the west by US 77.

The east beltway would connect N-2 at the southeast edge of Lincoln with Interstate 80 (I-80) in the northeast. Access points are proposed at Pine Lake Road, Pioneers Boulevard, US 34 (O Street), Adams Street, Fletcher Avenue and US 6 (Cornhusker Highway). The study area for the east beltway is bounded on the west by 98th Street, on the east by the half-section line 0.8 km (0.5 mi) east of 148th Street, on the north by I-80, and on the south by N-2.

The beltways could be constructed together, completing the loop around the City, or separately as stand alone projects with independent utility (*i.*e., they would be usable and a reasonable expense even if only one is built without the other).

NEPA. This Final Environmental Impact Statement (FEIS) has been prepared to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969. All federally funded projects must comply with NEPA which requires that social, environmental and economic considerations be incorporated in project planning, and that public involvement be incorporated into the decision making process. The intent of the law is to find a balance between population needs and use of resources–with the idea that there can be a productive harmony between advancing development and preservation of our nation's resources for future generations.

Purpose and Need. Traffic data, regional growth trends and previous studies have all indicated a need for south and east beltways. Some of the highest rates of growth have been on the south and east fringes of Lincoln thereby requiring a long-range plan to develop early identification of bypass corridors and potential purchase of right-of-way. Existing high volumes of local traffic on arterials such as US 6 and N-2 is made worse by high volumes of through traffic which originates outside Lincoln and travels to destinations beyond the City. In addition, internal to external trips and external to internal trips are currently made using arterial roadways with signalized intersections and, in some areas, direct access to adjacent properties. This results in excessive delay and congestion along these roadways.

Alternatives Analysis. The document contains an evaluation of project alternatives based on the results of six years of data collection, analysis, and public and agency review. Although the document includes the step by step evaluation process, the final evaluation represents an analysis of all that is known at this time.

The study considered a wide range of alternatives, including non-beltway and no build alternatives. These alternatives were evaluated and those considered most practical and with the least environmental impact were carried forward to more detailed levels of analysis. The planning process included four levels of analysis, each representing a more comprehensive evaluation. The overall process was envisioned as a funnel, with the alternatives continually being reduced in number until the best candidates remained to be carried forward in the DEIS analysis. These were identified as the four finalist alternatives, and included one south beltway alternative (SM-4) and three east beltway alternatives: close, mid and far (EC-1, EM-1 and EF-1). The no build alternative was carried forward throughout the entire evaluation process.

Proposed Action. The proposed action was assumed to involve construction of a 4-lane roadway designed to freeway standards, similar to Interstate 80 (I-80). A freeway design would have (1) complete access control (no at-grade crossings), (2) 75 to 90 m (250 to 300 ft) wide right-of-way, and (3) design speed of 110 km/h (70 mph) and posted speed of 105 km/h (65 mph). Beltway interchanges would be spaced approximately 3.2 km (2 mi) apart along the existing grid network. Roadways which cross the beltway may or may not be improved as part of the federal project. However for cost estimating purposes of this study, it was assumed that ultimately all unpaved county roads at beltway interchanges would be upgraded to 4-lane paved roadways. County roads which cross the beltway overpasses were assumed to be upgraded to 2-lane paved roadways.

Assessment of Transportation Benefits. Comparison of the four finalist beltway alternatives indicates that all of the alternatives served the project purpose and need, and all of the alternatives are considered feasible and cost-effective solutions. The location of the east beltway in terms of the close, mid or far alignment does not seem to have a significant effect on the amount of traffic it is expected to carry or the benefits obtained. The east beltway provides relief to traffic coming into or through Lincoln from the northeast (Omaha) and the southeast (Nebraska City). This traffic will use the east beltway regardless of which alternative is selected. The major differences between the east alternatives involve the interchanges at I-80, N-2 and the south beltway. The EC-1 and EF-1 requires diagonal routing to connect to an interchange at I-80, and requires two separate interchanges for N-2 and the south beltway. EM-1 requires a single, but more complicated interchange at N-2 and the south beltway. These differences are best reflected in the construction cost estimates and right-of-way impacts; however, they have little effect on system performance.

Assessment of Environmental Impacts. This FEIS contains an assessment of environmental, social and economic impacts, and includes proposed mitigation to avoid, minimize or compensate for project impacts to the extent possible. Comparison of the project impacts indicates that all of the finalist alternatives have relatively low impact considering the length of the segments. This is due to the primarily rural setting and the great effort made to minimize impacts throughout the beltway planning process. However, all of the east routes have impacts to Section 4(f) resources. **Table S.1** is a summary of beltway benefits and impacts for the four finalist alternatives.

Table S.1

SUMMARY OF BELTWAY BENEFITS AND IMPACTS

IMPACTS	UNITS	ALTERNATIVES			
		SM-4	EC-1	EM-1	EF-1
TRANSPORTATION BENEFITS (End to End Beltway Analysis: South and East Combined)					
Total Daily Beltway Usage	Vehicle Kilometers (Miles) Traveled	–	762 800 (474,000)	721 000 (448,000)	696 800 433,000
Average Daily Time Savings	Hours	–	9,400	10,250	8,450
Average Annual Accident Savings[1]	$	–	$8,691,000	$7,430,000	$4,712,000
ECONOMIC IMPACTS					
Construction Cost (partial beltway)	$ (1996)	$107,000,000	$147,000,000	$157,000,000	$128,000,000
Construction Cost (end-to-end beltway with SM-4)	$ (1996)	–	$249,000,000	$252,000,000	$231,000,000
Payoff Period[2] (end-to-end beltway with SM-4)	Years	-	14	13	19
Cost Effectiveness	Payoff Period less than Design Life of Project	–	Yes	Yes	Yes
SOCIOECONOMIC IMPACTS					
Total Right-of-Way	ha (ac)	295 (730)	451 (1114)	389 (960)	449 (1110)
Residential Relocations	No. of houses	3	7	4	7
Business Relocations	No. of businesses	1	0	0	1
Railroad Crossings[3]	No. of crossing	3	2	0	0
Airfield Impacts	Impacts	none	none	none	none
Cropland Impacts	ha (ac)	206 (508)	296 (731)	282 (698)	316 (780)
Total Farmland Impacts	ha (ac)	238 (587)	367 (906)	329 (813)	375 (926)
Prime and Unique Farmland Impacts (end-to-end beltway with SM-4)	Impact Rating Points (0-260)	–	140 (minor)	143.5 (minor)	142 (minor)
Estimate of Bisected Farms	No. of owners	16	33	29	23
LAND USE IMPACTS					
Distance from 2000 City Limit	km (mi)	0.8-2.4 (0.5-1.5)	0.8-3.2 (0.5-2.0)	2.4-4.8 (1.5-3.0)	2.4-6.4 (1.5-4.0)
Residential Impact	ha (ac)	9.5 (23.4)	12.3 (30.3)	4.0 (10.0)	7.8 (19.3)
Commercial/Industrial Impact	ha (ac)	4.2 (10.3)	1.6 (3.9)	0.6 (1.4)	1.1 (2.7)
Trail Impacts	No. of crossings ha (ac)	0 0	2 0.6 (1.5)	1 0.3 (0.8)	1 0.3 (0.7)
Modification of Proposed LPSNRD Farm Ponds	No. of ponds	0	2	1	2

IMPACTS	UNITS	ALTERNATIVES			
		SM-4	EC-1	EM-1	EF-1
ENVIRONMENTAL IMPACTS					
Air Quality	NAAQS impacts	no impact	no impact	no impact	no impact
Noise[4]	No. of impacted receptors[4]	4	9	5	7
Water Quality	Impacts	minor and temporary	minor and temporary	minor and temporary	minor and temporary
Major Stream Crossings	No. of crossings	2	2	1	0
Total Streams	No. of crossings	8	9	6	4
100-Year Floodplains	No. of crossings	4	4	6	5
Floodways	No. of crossings	0	2	1	0
Wetlands	ha (ac)	7.3 (18.0)	16.9 (41.8)	8.9 (21.9)	8.3 (20.4)
Prairie Grasslands	ha (ac)	0	0.4 (1.1)	1.3 (3.2)	2.7 (6.6)
Endangered & Threatened Species	Impacts	none	none	none	none
NRHP Archeological Sites Adversely Affected under Section 106	No. of sites	0	1	0	0
NRHP Standing Structures Adversely Affected under Section 106	No. of sites	1	0	1	3
Section 4(f) Impacts-Recreation	No. of resources	0	2	1	1
Section 4(f) Impacts-Historic	No. of sites	0	0	1	1
Potential Environmental Risk Sites	No. sites along route	9	4	4	4
Visual Impacts to Residences	No. w/in 0.4 km (0.25 mi)	27	58	31	41

[1] Average Annual Accident Savings is based on end-to-end beltway analyses performed with the BOS land use plan. The BOS II land use plan is expected to provide even greater accident cost savings.

[2] An analysis of the time savings with the BOS II model comparing the end-to-end beltway alternatives and no build alternative indicates the investment to construct the beltway would be paid off through time savings in 13 to 19 years (**Section 2.4.5**),. The conclusions of this comparison are that all end-to-end beltway alternatives for all the east alignments are economically feasible.

[3] If SM-4 and EC-1 are constructed, two crossings of the OPPD line will be required. EC-1 alone does not require any railroad crossing.

[4] These are receptors for which noise abatement measures were not considered reasonable.

Overall differences between the east alternatives are relatively minor. EC-1 and EF-1 have greater right-of-way requirements than EM-1; and therefore, have greater land use impacts. EC-1 has slightly more impact to suburban type land uses such as residential and commercial acreage and impacts to trails due to its closer proximity to Lincoln. In contrast, EF-1, which is 4.0 km (2.5 mi) more distant from the city than EC-1, has slightly more impact to rural uses such as farmland, prairie, historic structures, and actual number of residences. EM-1 and EC-1 have slightly more impact to natural resources such as streams, floodplains and floodways, and wetlands due to their closer proximity to Stevens Creek, where as EF-1 has slightly less impact to natural resources due to its general location along the ridgeline.

There are some differentiating impacts between the routes that were carefully considered in selecting a preferred alternative.

1. For EC-1, *noise and visual impacts* to nearby residences are greater than with other alternatives because it extends across a more developed landscape closer to the city.

2. For EF-1, impacts to *historic structures* are greater due to the greater presence of resources with increasing distance from the city and urbanization.

3. The *higher costs* of EC-1 and EM-1 compared to EF-1 are due to the major bridge structure at Stevens Creek.

4. The diagonal segment at the north end of EC-1 creates a less desirable *circuitous route* (with backtracking for westbound traffic) and has greater impact to farming operations.

5. The EC-1 connection at N-2 and the south beltway requires two interchanges which creates an undesirable triangle of land and *access problems* for several residences.

6. There are *cost savings* with the SM-4/EM-1end-to-end beltway due to the common interchange at N-2. This savings partially offset the cost of the larger bridge across Stevens Creek.

Although all of the alternatives meet the project purpose and need, there are benefits and trade-offs with any of the three east alternatives.

Project Costs. Construction costs for end-to-end beltways ranged from $231 million with SM-4/EF-1, $249 million with SM-4/EC-1, and $252 million with SM-4/EM-1. Costs are within 8 percent of each other for the end-to-end beltways. This is within the 20 percent contingency contained in all cost estimates.

Areas of Controversy. Four main areas of controversy were identified during the beltways study. These were:

a. Wilderness Park. Concerns were raised about six south beltway alternatives which crossed Wilderness Park–a public park afforded certain protection under Section 4(f) of the Department of Transportation Act. Wilderness Park is an approximately 12.9 km (8.0 mi) long park encompassing over 728 ha (1,800 ac) and located along Salt Creek. The park is a favorite among local residents. Urban expansion and

protection of the park have been critical issues affecting Wilderness Park in recent years. Based on the Level III alternatives analysis, it was shown that there were reasonable and prudent alternatives which did not require use of land from the park; therefore, all south beltway alternatives through Wilderness Park were eliminated from further consideration.

b. Historic Resources. Concerns have been raised regarding the impact of the beltway on historic resources. As a result, the beltway study has gone to extensive effort to identify and evaluate potential effects to historic standing structures and archeological resources in the study area. In compliance with Section 106 of the Historic Preservation Act, all studies and evaluations have been prepared in consultation with the Nebraska State Historic Preservation Office. Wherever possible, site specific shifts in alignments were made to avoid impacts to historic properties. Despite this effort, historic resources would be adversely affected, amounting to one site along SM-4, one site along EC–1, two sites along EM-1 and three sites along EF-1.

   In compliance with Section 4(f), impacts to historic sites were also evaluated to determine if proximity impacts were so severe that the activities, features or attributes that make the site significant, and of value to the public, would be substantially impaired. Based on this evaluation, only one site (a road sign) was determined to impacted under Section 4(f) (with EM-1 and EF-1).

c. Social Concerns. In June 1997, elected officials indicated that impacts to residences and developed areas were of primary importance to their constituents. This community value was defined in a vote by the Supercommons (consisting of the City Council, County Commission and City-County Planning Commission) resulting in a directive to eliminate the EC-1 alternative from further consideration. The City Council and County Board further voted in December 1998 to eliminate the EM-1 alternative based on the general impression that the EF-1 would have the least socioeconomic impact. However, in order to comply with NEPA, all reasonable alternatives were included in the preparation of the Environmental Impact Statement, including EC-1 and EM-1.

d. Urban Sprawl. Concerns have been raised that the east beltway will encourage urban sprawl along the beltway route, where urban sprawl is considered to be any non-farm development not contiguous to the Lincoln City limits. The implication is a far location will create non-contiguous growth, and a close location will continue compact growth.

   The City of Lincoln has a tradition of planning which dates back to the 1950s. One of the most long held policies has been to develop "a compact and generally contiguous urban form" around its confines with the goal to "protect existing rural areas from urban sprawl through planned development". The current *1994 Lincoln-Lancaster County Comprehensive Plan* embraces the concept of "managed contiguous growth" and the phasing of infrastructure expenditures based on this policy. However, the plan also encourages a unified planning approach between urban and rural interests and encourages "services to meet a range of urban and rural lifestyles".

Considering that there already exists a proliferation of non-farm residential acreages and acreage subdivisions in the beltway area, the development of a beltway will likely result in more pressure for urbanization in the area; however, this does not necessarily equate to urban sprawl when it follows a locally approved plan based on contiguous managed growth.

Selection of the Preferred Alternative. Following receipt and consideration of comments on the DEIS, the SM-4/EM-1 alternative was selected as the preferred alternative.

SM-4 was selected because:

1. Transportation Functions. A south beltway would aid in completing a circumferential roadway in the Lincoln area. The route is within 0.8 km (0.5 mi) of the future service limit and would reduce the amount of through traffic that otherwise would be on N-2. The route has potential as a multi-use corridor for future trails, open space, utilities and other transportation alternatives.

2. Environmental Impact. SM-4 minimizes impact on natural resources in that it has relatively little impact on wetlands, no impact on native prairie, does not cross the existing boundaries of Wilderness Park, and could be built in a manner to minimize the floodplain impact on Salt Creek. While the route does impact some homes and businesses, these impacts have been minimized to the extent possible.

EM-1 was considered the best east alternative compared to EC-1 and EF-1 because:

1. Transportation Functions. The EM-1 route would aid in completing a circumferential roadway and provide a new truck route without the less efficient "backtracking" found in the EC-1 and EF-1 options.

2. Environmental Impacts. EM-1 minimizes environmental impacts to those resources that are considered most valuable by the local community. In comparison to EC-1, the EM-1 route minimizes impacts to rural and urban neighborhoods, including noise and visual impacts to residences. It also has the least number of relocations of any of the east alternatives. While EM-1 and EF-1 are similar in environmental impact; EM-1 minimizes impacts to historic properties. At the same time, EM-1 has less impact to prairies (versus EF-1), relatively low impact to wetlands (versus EC-1), and requires 150 ac less in right-of-way than the other alternatives. While the EM-1 crossing of Stevens Creek is the longest of the three east alternatives, it could be built to minimize impacts to the floodplain. In consideration of these resources, the EM-1 route protects and preserves the environment to the greatest extent, and is considered the most compatible with the goals, objectives and values of *Lincoln/Lancaster County Comprehensive Plan.*

3. Multi-Use Corridor Potential. The EM-1 route has the greatest potential as a multi-use corridor for trails, open space, utilities and other transportation alternatives. It could be integrated well with a possible trail in Stevens Creek and then tie into possible trails along the South Beltway route to Wilderness Park trails. The potential as an open space corridor is high given that it is within 0.8 km (0.5 mi) of Stevens Creek for over a 10-km (6-mi) stretch. EM-1 also parallels an existing LES

transmission line with a 46 m (150-ft) easement which would allow some overlap of a joint utility and road corridor for over 13 km (8 mi).

4. Travel Time. EM-1 has greater travel savings than EF-1.

5. Cost. While EM-1 is more expensive than EF-1 or EC-1, EM-1 may provide future cost savings as a multi-use corridor, and it uses less land than the other two routes.

The selection of the preferred alternative was unanimously approved on 15 June 2001 by the Beltway Management Committee representing the four project sponsors–the City of Lincoln, Lancaster County, NDOR and FHWA.

Local Preference Decision. The SM-4 and EM-1 alternatives were approved by the Lincoln City Council and the Lancaster County Board of Supervisors, in separate actions, on 22 August 2001 for amendment to the *Lincoln/Lancaster Comprehensive Plan*. With the Mayor of Lincoln's signature on 30 August 2001, the alternatives were officially adopted into the plan.

Contact Information. The following individuals may be contacted for additional information on the project.

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FINAL
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Chapter 1
PURPOSE AND NEED FOR THE PROJECT

FINAL
ENVIRONMENTAL IMPACT STATEMENT
for
South and East Beltways
Lincoln, Nebraska

1. PURPOSE AND NEED FOR THE PROJECT

1.1 BACKGROUND

The concept of a complete circumferential roadway system around the City of Lincoln has been discussed formally for about 40 years. The 1961 *Lincoln-Lancaster County Comprehensive Plan* identified Interstate 80 (I-80), located north of the City, as the most important link in the circumferential route, supplemented by a loop system around the urban area. The 1966 *Lincoln Metropolitan Area Transportation Study* depicted an "East Side Freeway" and a "U.S. 77 West Bypass" in the Major Street Plan. In 1971, a comprehensive study was undertaken of the east and west bypasses that identified several alternate corridors and their associated costs and impacts. The following year, the State Highway Commission designated the U.S. Highway 77 (US 77) west bypass as the top priority for funding. Since then, efforts and resources of the community, Nebraska Department of Roads (NDOR) and various political entities have been focused on completion of the US 77 west bypass, the K and L Street connection between the west bypass and downtown area, and the Nebraska Highway 2 (N-2) connection to the west bypass along Van Dorn Street. As these projects approached completion, attention became focused on the need to complete the loop road network with south and east beltways.

1.2 PROJECT PURPOSE

The purpose of the South and East Beltways Study has been to conduct a feasibility study and alternatives evaluation for preferred beltway alignments on the south and east fringes of the City of Lincoln to complete a circumferential transportation system (**Figure 1.1**). The south beltway would connect US 77 with N-2, while the east beltway would connect N-2 with I-80.

The ultimate goal of the South and East Beltways Study was to determine if south and/or east transportation corridors are needed and feasible, and if so, to identify preferred alignments to guide the preservation of right-of-way and allow for eventual construction of the beltways and related facilities.

In addition to the feasibility study, the project included concurrent traffic and economic modeling to determine project benefits and costs under future scenarios. Other considerations included evaluation of the potential for (1) coordination with existing and planned drainageways and utility corridors; (2) consolidation of railway corridors in the south beltway corridor; (3) development of a linear park and hiker/biker/equestrian trails along both the south and east corridors; and (4) preservation of a corridor for wildlife habitat and/or an ecologically sensitive wilderness park.

The study included preparation of this Environmental Impact Statement (EIS) to satisfy requirements of the National Environmental Policy Act (NEPA). All federally funded projects must comply with NEPA which requires that social, environmental and economic considerations be incorporated in project planning, and that public involvement be incorporated into the decision making process. The intent of the law is to find a balance between population needs and use of resources–with the idea that there can be a productive harmony between advancing development and preservation of our nation's resources for future generations.

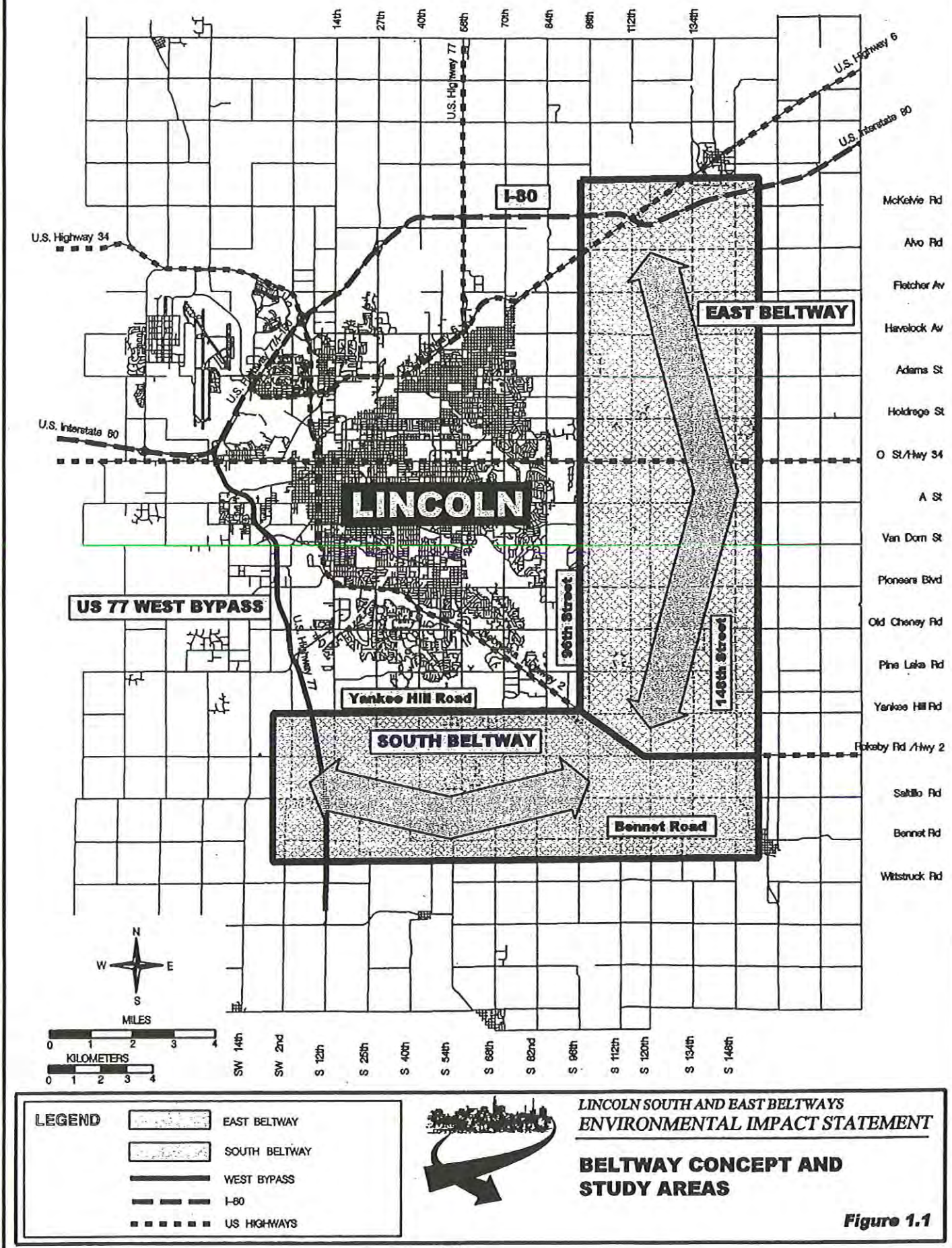
1.3 PROJECT NEED

Traffic data, regional growth trends and previous studies have all indicated a need for south and east beltways.

Regional Growth. The City of Lincoln and Lancaster County have had a long, sustained history of population expansion, with an average increase of around one percent per year over the past several decades. Much of this growth has taken place in the City of Lincoln, where population has been increasing at an annualized rate 1.37 for the past two decades, partially due to annexation (and an annualized rate of 1.63 over the past 10 years) (Lincoln/Lancaster County Planning Department, 2001). Some of the highest rates of growth have been on the south and east fringes of the City. This continued growth in both population and area necessitates planning ahead for future major transportation corridors.

Long-Range Regional Transportation Plan. The *Lincoln-Lancaster County Comprehensive Plan* serves as the Lincoln Metropolitan Planning Organization's Long-Range Regional Transportation Plan, and includes projects encompassing 20 years. The Community Congress, a citizen's advisory group involved in the update of the 1994 *Lincoln City-Lancaster County Comprehensive Plan*, clearly established the desire of the community to complete the loop around the City. One of the goals suggested by the Community Congress and adopted by City and County officials was "to provide for a long-range plan to develop early identification of bypass corridors and right-of-way retention". The south and east beltway corridor study is being conducted for this purpose. The beltway system is viewed as an essential component of the regional transportation network that would move through traffic around congested urban areas, as well as reduce delay and improve traffic flow on the existing urban street system.

In addition to accommodating through traffic, a beltway system will also facilitate trips that have an origin within the metropolitan area and a destination outside of the area, or vice versa. Currently, these trips are primarily made using arterial roadways with signalized intersections and, in some cases, direct access to adjacent properties. This results in excessive delay and increased exposure to accidents due to abrupt stopping, turning, and lane changing. While it is unlikely that internal trips (trips with an origin and destination within the metropolitan area) will use the beltway system to as great as extent as those with an external origin or destination, these trips will also benefit. A significant amount of through traffic on the current major routes (N-2, US 34 (O Street), US 6 (Cornhusker Highway) and 84th Street) will be relocated to the beltway system providing additional capacity and reduced congestion for internal trip traffic.



LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

BELTWAY CONCEPT AND STUDY AREAS

Figure 1.1

The South Beltway. The south beltway would provide an alternative connection between US 77 in the southwest and N-2 at the southeast edge of Lincoln. N-2 is not only the most direct route between Kansas City (via Interstate 29) and I-80 West, but it also serves as the City's primary arterial from growth areas in the south and east of the City into downtown. A beltway could divert through traffic from the urbanized portions of N-2, and improve the flow of interstate travel around the City. It could also reduce congestion on the urban street system and improve safety by reducing the number of heavy trucks that share the roadway with passenger vehicles with local destinations.

The study area for the south beltway is bounded on the north by Yankee Hill Road, on the south by the half-section line 0.8 km (0.5 mi) south of Bennett Road, on the east by the half-section line 0.8 km (0.5 mi) east of 148th Street, and on the west by US 77 (**Figure 1.1**).

The East Beltway. The east beltway would connect N-2 at the southeast edge of Lincoln with I-80 in the northeast, with access points to US 34 and US 6. This corridor could serve many trips between the south and east portions of Lincoln and I-80 East, including Omaha. It would relieve traffic on the existing urban street system and serve as a truck route.

The study area for the east beltway is bounded on the west by 98th Street, on the east by the half-section line 0.8 km (0.5 mi) east of 148th Street, on the north by I-80, and on the south by N-2 (**Figure 1.1**).

Truck Routes. The 1993 *Lincoln Truck Route Study*, a comprehensive study of long-range and interim truck routes in the Lincoln area, strongly supports the need for south and east beltways to divert through truck traffic around the urban area. The need for these truck routes has become increasingly evident following the completion of the upgrade of N-2 between Lincoln and Nebraska City to an expressway facility. The improved roadway has resulted in increased traffic volumes on the urbanized portions of N-2.

Traffic Studies. The Lincoln-Lancaster County Planning Department maintains a travel demand forecasting model in order to model the amount of traffic that would use the beltway system if it were constructed. It can also model the effect these roadways would have on existing major streets within the metropolitan area. The most current travel demand model uses the Build Out Scenario II (BOS II) land use plan and the 1- to 25-year roadway improvements in the Comprehensive Plan as the base for evaluating potential roadway improvements. This plan includes the assumptions of a projected County population of 374,630 to occur within a 25 to 30 year planning horizon, and an accompanying expansion of the future urban service area to incorporate amendments to the 1994 Comprehensive Plan. These increases have a direct effect on the amount of traffic projected to use the beltways.

Using this model, the south beltway is expected to carry 14,000 to 19,000 vehicles per day and the east beltway is expected to carry 14,000 to 30,000 vehicles per day depending on the segment examined and its relative distance from the center of Lincoln. This shift of traffic from the arterial street system to the beltways results in a 10 to 30 percent reduction in traffic on segments of major arterials such as N-2, US 6, and 84th Street. This reduction preserves capacity and defers future widening on existing arterial streets. Since these roadways are currently situated within developed areas, widening to 6-lanes would be very expensive and have substantial negative impacts to adjacent properties.

In addition to reducing through traffic on internal urban roadways within the existing metropolitan area, a significant benefit is expected by reducing truck traffic on rural roadways on the fringe of the metropolitan area. The most reduction is expected on Saltillo Road between South 84th Street and US 77 and on North 148th Street between N-2 and Waverly. These roadways are expected to experience a 40 to 80 percent and 30 to 90 percent reduction in total traffic, respectively.

Need for Advance Planning. The need for the south and east beltways is expected to increase as the City grows, and as state highways leading to Lincoln become more congested. However, if the planning process is delayed until the need becomes urgent, acquisition of right-of-way will become increasingly costly and disruptive to the community. Completion of the South and East Beltways Study provides for early identification of potential corridors. If implemented, this will allow growth of the City to occur around these corridors, rather than forcing a transportation corridor through otherwise developed areas.

Other benefits from early identification of the corridors include more pro-active public participation and agency involvement; enhanced positive environmental impacts and reduced negative impacts; reduced impacts on developed properties; reduced costs for right-of-way acquisition and roadway construction; fewer compromises in design; accelerated relief for other area roadways; and coordination with future land uses.

Concurrence. Following the Nebraska Local Operating Procedures for Integrating NEPA/404, the Purpose and Need Statement for the beltway project EIS was reviewed by five agencies in June 1996. Concurrence was received from the US Army Corps of Engineers, US Environmental Protection Agency, US Fish and Wildlife Service, Nebraska Department of Environmental Quality and Nebraska Game and Parks Commission (**Appendix A**) indicating that the statement was satisfactory and the information provided was adequate to advance to the next stage of project development.

The same five agencies reviewed the Preliminary Draft Environmental Impact Statement (PDEIS, dated 13 November 2000) and concurred that it was satisfactory (**Appendix A**). Specific comments were received from the US Army Corps of Engineers and the US Environmental Protection Agency and have been addressed in this document (see **Section 6.15**). The PDEIS was also reviewed by the Nebraska State Historic Preservation Office which concurred with the findings of the PDEIS and the findings of the appendices as the relate to Section 106 consultation (**Appendix E**).

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Chapter 2
ALTERNATIVES ANALYSIS

2. ALTERNATIVES ANALYSIS

Process Overview. A wide range of alternatives has been considered as part of the south and east beltways study. These alternatives were evaluated and those considered most practical and with the least environmental impact were carried forward to more detailed levels of analysis. The planning process included four levels of analysis, each representing a more comprehensive and rigorous evaluation. The overall process was envisioned as a funnel, with the alternatives continually being reduced in number until the best candidates remained. Specifically, the study design called for four levels of analysis or study tasks. These were:

1. Development of all reasonable alternatives,
2. Identification of five to ten candidate alternatives most worthy of further evaluation,
3. Identification of two to four finalist alternatives, and
4. Analysis and selection of a preferred alternative.

Selection of the preferred alternative was completed after receipt and consideration of comments on the Draft EIS. Discussion of the final considerations is included in this Final EIS document.

Public Input. Due to the significance of the south and east beltways study, the project sponsors decided at the onset of the project that anyone and everyone should be given ample opportunity to participate in the study planning process. Toward this end an extensive Public Participation Program was developed (**see Chapter 6**), including creation of three advisory committees–the Management Committee, Technical Advisory Committee and Citizen's Advisory Committee. Development and analysis of the alternatives involved the participation of these three committees as well as public comments received at over 275 meetings (including public meetings, group meetings, and meetings with individual landowners) as well as from written comments and telephone calls. The entire process has taken more than five years to complete--with the original scope often being expanded to incorporate additional investigations requested by elected officials, reviewing agencies and the public (*Interim Report No. 1* (WSA, 1996a), *Interim Report No. 2* (WSA, 1996b) and *Interim Report No. 3* (WSA, 1999)).

In general, alternatives were developed by the consulting team and then presented to the three advisory committees. Following refinement, the options were then presented to the public. Public input was used to further refine and evaluate the alternatives considered.

Levels of Analysis. The alternatives evaluation involved four levels of analysis with each level representing a more detailed evaluation. A summary of the steps involved in the process is provided in **Table 2.1**.

Table 2.1

SUMMARY OF THE ALTERNATIVES ANALYSIS PROCESS

LEVEL I	
1.	Consideration of seven types of transportation alternatives, resulting in the elimination of all but the no build (planned roadway improvements), non-beltway (further improvement of existing arterials) and beltway (freeway or expressway facility) alternatives.
2.	Development of hundreds of combinations of south and east beltway corridors ("Universe of Alternatives") incorporating location suggestions from the three advisory committees and general public.
LEVEL II	
3.	Evaluation of the Universe of Alternatives using geographic strategy sets (close, mid, far) to identify the best alignments within each strategy based on certain evaluation criteria (developed by the three advisory committees and consulting team) and environmental, land use and logistical constraints. No single strategy set was considered better than another. Based on these results, further evaluation was recommended of seven 0.4 km (0.25 mi) wide corridors (four on the south, three on the east) along locations identified as south close-1 (SC-1), south close-4 (SC-4), south mid-4 (SM-4), south far-1 (SF-1), east close-1 (EC-1), east mid-1 (EM-1) and east far-1 (EF-1), as well as various diagonals to connect the south and east segments. In total, this resulted in 20 combinations of south and east beltway corridors that were carried forward.
4.	Development of three non-beltway alternatives through evaluation of various combinations of section line roads based on comparison of estimated future traffic volumes with available roadway capacity.
LEVEL III	
5.	Evaluation and screening of the 20 beltway alternatives (combinations of south and east beltway corridors) and three non-beltway alternatives, resulting in the elimination of 11 beltway alternatives and one non-beltway option based on further traffic, cost, socioeconomic and environmental considerations. This step was required to maintain the intended project design which called for the Level III analysis to be conducted on five to ten candidate alternatives.
6.	Evaluation of nine end-to-end beltway corridors and two non-beltway alternatives, resulting in the elimination of four end-to-end beltway alternatives and the remaining two non-beltway alternatives based on a preliminary cost-benefit analysis. The five remaining end-to-end alternatives were split into their four separate south and east components, and these four finalist beltway alternatives were carried forward for the Level IV analysis. These alternatives were SM-4, EC-1, EM-1 and EF-1.
LEVEL IV	
7.	Development of detailed alignments and evaluation of four finalist beltway alternatives based on updated traffic projections, measures of effectiveness, roadway capacity and level of service, right-of-way requirements, and construction costs. Level IV also included a comprehensive assessment of environmental impacts (see Chapter 3).

2.1 LEVEL I: OVERVIEW OF TRANSPORTATION ALTERNATIVES

The scope of the beltway study involved evaluation of the widest range of transportation alternatives from beltway to non-beltway options, and even to non-roadway alternatives. Some of the alternatives included costly versus inexpensive improvements, construction versus non-construction options, automobile versus transit vehicles, consolidation of transportation and utilities corridors, and incorporation of enhancement features. These alternatives were described and evaluated in detail in *Interim Report No. 1* (WSA, 1996a), *Interim Report No. 2* (WSA, 1996b) and *Interim Report No. 3* (WSA, 1999), and are listed in **Table 2.2.** Previous study reports are available at the offices of the City Public Works and Utilities Department, City-County Planning Department, Nebraska Department of Roads and Federal Highway Administration.

Table 2.2

LEVEL I TRANSPORTATION ALTERNATIVES

1	No Build Alternative (Planned Roadway Improvements)
2	Non-Beltway Alternatives (Further Improvement of Existing Arterials)
3	Beltway Alternatives (New Highway Facility)
4	Transportation Demand Management (TDM)/Transportation System Management (TSM) Improvements
5	Other Modes of Transportation
6	Joint Use Opportunities
7	Land Use Scenarios

2.1.1 No Build Alternative (Planned Road Improvements)

The no build alternative involved improving the regional street and highway system, as needed, without seeking a highway beltway. The concept involved maintaining the existing road system, but making those improvements already identified in the City and County 20-year plans such as surfacing some roads, widening some roads to four-lanes, and building some new roads. This alternative represented the lowest cost "base case" option against which other, more expensive, alternatives were compared.

2.1.2 Non-Beltway Alternative (Further Improvement of Existing Arterials)

The non-beltway alternative involved assessment of whether future travel demands and desired system performance could be satisfied by improving arterial roadways within and/or adjacent to the beltways study areas. Improvements included widening existing roads to 4 or 6 lanes, and constructing new arterial type facilities on the existing alignments. The non-beltway alternative would have signalized intersections, 60 km/h (40 mph) posted speeds, and allow some direct access to commercial property.

2.1.3 Beltway Alternative (New Highway Facility)

This alternative was the principal investment alternative evaluated in the study, and involved building a beltway on the south, east, or both south and east sides of Lincoln. The intent of the beltway was to provide a level of service (roadway operating conditions) greater than that found with a typical arterial street. The primary factors involved with level of service are the number of lanes in each direction, design speed, and type of access provided.

For this study the beltway type was considered to be a four-lane roadway designed to either freeway or expressway design standards. A freeway is a multi-lane roadway built to highway standards such as for Interstate 80. A freeway design would have (1) complete access control (no at-grade crossings), (2) 75 to 90 m (250 to 300 ft) wide right-of-way, and (3) design speed of 110 km/h (70 mph) and a posted speed limit of 105 km/h (65 mph). An expressway is a multi-lane roadway built to slightly lower design standards such as for US 77. An expressway design would have (1) grade separated interchanges at major roads (I-80, US 77, N-2, US 34) while other crossings could be at grade, (2) possible traffic signals, (3) 45 to 75 m (150 to 250 ft) wide right-of-way, and (4) locally determined speed limits.

For the beltway study evaluations, it was assumed that the concept would involve the freeway design because it is the maximum traffic carrying alternative and requires the most extensive right-of-way width. However, it was recognized that the beltway could be constructed in phases representing two-lane, or expressway facilities which could be upgraded within a right-of-way reserved to freeway standards.

Beltway interchanges would be spaced approximately 3.2 km (2 mi) apart along the existing grid network. For cost estimating purposes, it was assumed that ultimately all unpaved county roads providing access to beltway interchanges would be upgraded to four-lane paved roads, and that section line roads that cross the beltway with overpasses would be upgraded to two-lane paved roads.

2.1.4 Transportation Demand Management (TDM)/Transportation System Management (TSM) Improvements

This alternative involves attempting to influence trip making (TDM) or making inexpensive traffic engineering and traffic operational improvements (TSM) on the existing road system without making major road investments.

TDM programs include car pooling, van pooling, flex time, compressed work weeks, telecommuting, and improved transit, and are often implemented by public transportation agencies with support and incentives provided by local businesses. TDM techniques are appropriate in certain areas of the country where congestion and delay are significant, parking is limited, and businesses have a strong desire not to relocate. None of these conditions exist in Lincoln where congestion is relatively minor and confined to peak travel periods only; parking is abundant and generally free outside of the central business district; and businesses are inclined to move to suburban locations rather than have employees, clients, and customers be inconvenienced (WSA, 1996a).

The use of private automobiles in lieu of other modes of transportation is considered to be a positive benefit of living in Lincoln. As a result, local planning and zoning has reinforced this lifestyle. Even a doubling or tripling of transit usage, car pooling or adjusted work schedules will

not significantly affect traffic congestion. More specifically, it would accomplish little within the south and east beltways study area (WSA, 1996a). *Therefore, TDM techniques were not investigated in further detail as a means of eliminating or reducing the need for the beltways.*

TSM programs tend to be traffic operations oriented activities implemented by public transportation agencies, and include improved traffic signal timing, addition of auxiliary lanes at congested intersections, signing and marking improvements, parking restrictions, one-way street systems, and reversible lanes.

The City of Lincoln Public Works and Utilities Department has a program to continuously monitor its roadway network to looking for opportunities to implement TSM improvements. As TSM is already an on-going activity, it is already included in the base case conditions. Further TSM programs are not expected to be gainful, would not affect the beltway corridor areas, and are not likely to affect the need for a beltway (WSA, 1996a). *Therefore TSM techniques were not investigated further as a means of eliminating or reducing the need for the beltways.*

2.1.5 Other Modes of Transportation

This alternative involved introducing new modes or systems of transportation to Lincoln, including expanded bus transit into the beltway corridors; rail transit; park and ride lots, and services; and High Occupancy Vehicle (HOV) lanes and facilities. These systems would either take the place of a beltway, or would be complementary to the beltway.

Certain modes which do not have an impact on travel demand within the beltway corridors should be eliminated from further consideration. Other modes which may not eliminate the need for a beltway, could be pursued as a way of enhancing a beltway or improving traffic flow in other areas of the City.

Bus Transit. The City of Lincoln has an extensive network of bus routes serving the majority of the City. The local StarTran is a public service which is funded and supported in consideration of the needs of the residents and businesses of Lincoln. In FY 2000-2001, StarTran carried approximately 1.60 million passengers. Consistent with national trends, the overall use of bus transit in Lincoln declined from a high in the mid 1980's (2.05 million passengers in FY 1987-1988) to a low in the mid 1990's (1.47 million in FY1993-1994) when fares were increased and services were substantially reduced. Since that time ridership has fluctuated between 1.6 and 1.8 million. The decline of bus service is due to many factors, including:

1. With the exception of the gasoline price hikes in 2000, gasoline prices had steadily declined relative to average income.
2. As Lincoln continues to grow, employment centers are spread throughout the community making them difficult to serve by transit.
3. City ordinances require new development to have sufficient parking to handle projected demand.
4. Current lifestyles require multiple trips to and from work including stops for purchases, day care or recreational activities. The multi-purpose work trip is not well-served by transit.
5. According to the 1990 Census, private car availability averages 2.1 cars per household in Lancaster County, and only 7.8 percent of households reported having no car available.

Bus transit is non-existent in the beltway corridors because the areas are outside of the City of Lincoln and because the low density does not support transit services. Although this may change over the next 20 years, it is unlikely that bus service will increase significantly in these outlying areas. Consequently, improved transit services within the beltway corridors is not a viable alternative to a beltway. *Therefore, the alternative was eliminated from further evaluation.*

Park and Ride Lots and Services. Park and ride lots, which provide parking facilities for car pooling or bus stops, could be located at major roadway intersections. Although they would not take the place of a beltway, they could be built in conjunction with the beltway. *Incorporation of these types of facilities will be considered during final design.*

Rail Transit. Currently, there is no rail transit in Nebraska. Chicago and St. Louis, the closest cities with rail transit facilities, both have large populations and large downtowns which are more conducive to rail transit than that in Lincoln. Even in these cases, rail transit is not utilized to the extent that significantly reduces congestion on either city's fringe freeway beltways during morning and evening rush hours.

Opportunities for rail transit within Lincoln is not considered feasible in the foreseeable future. With a projected metropolitan population of only 374,630 by the year 2025, the passenger vehicle is expected to remain the mode of choice due to travel time factors. *As a result, the development of rail transit as a means of reducing or eliminating the need for a beltway was not considered for further analysis, nor was it considered as a potential enhancement to the beltways since neither the south or east beltway leads to downtown Lincoln.*

High Occupancy Vehicle Lanes and Facilities. HOV lanes have been a popular way of developing more capacity for moving people through a corridor in many of America's larger cities. HOV lanes are generally located on the inside lane of limited access freeways where the lanes can extend for several miles without interruption due to interchanges or intersections. Their use is limited to vehicles with more than one passenger, and they generally have less congestion than other lanes. They provide an incentive for people to car pool and use public transit, thereby reducing single occupant vehicle trips, and reducing the number of cars on the highway especially in peak periods of travel.

Implementation of HOV lanes in Lincoln would be difficult because the city does not have any existing freeways or expressways that lend themselves to successful HOV design. HOV lanes on arterial streets such as O Street (US 34), Cornhusker Highway (US 6) or N-2 would not work well because of the need to travel back and forth into left and right turn lanes.

Because of the lack of appropriate locations, HOV lanes were not studied as a means to eliminate or reduce the need for beltways. In addition, they are not considered necessary as an enhancement to a beltway since HOV lanes only offer incentives in transportation systems that are over capacity where they can provide drivers with a significant savings in time.

2.1.6 Joint Use Opportunities

This alternative involved evaluation of other types of investments which may be incorporated into the beltway corridor in order to enhance (but not replace) the concept. Options considered included features that could fit into a 90 m (300 ft) right-of-way such as bicycle and pedestrian paths; linear parks; rail freight line consolidations; and utility lines.

Bicycle Facilities. The use of bicycles has been increasing in the United States over the past 20 years. In Lincoln, bicycle use is generally oriented to recreational purposes and the City has an extensive and successful system of hiker/biker trails linking residential and recreational areas. With Wilderness Park at the west end of the south beltway and the MoPac Trail bisecting the east beltway, additional trail connections could provide enhanced connectivity to the regional trail system. Therefore, it was recommended that potential beltway trail connections be evaluated as part of this study.

Although the potential exists for acquiring additional land to provide pedestrian and bicycle trails within the beltway right-of-way, other options through the city have been considered more desirable. Such options are already being considered with the ultimate effect of connecting the Wilderness Park Trail to the MoPac Trail, and the MoPac Trail to the Murdock Trail. *Therefore, incorporation of bicycle facilities are not being considered within the freeway right-of-way; however, overpasses or underpasses at trail crossings of the beltway will be provided for. These could include a Wilderness Park Trail extension, David Murdock Trail, MoPac East Trail and Stevens Creek Connector.*

Linear Parks. It was also recommended that the beltway study include evaluation of provisions for linear park sites. These areas could take advantage of unique environmental areas adjacent to the beltway corridor, provide linkages to other park and recreation areas, and/or serve as buffers to other land uses. The areas could also be developed in conjunction with mitigation requirements for the beltway, or with locally funded recreation or preservation initiatives. For example, it was thought that portions of the Stevens or Salt Creek areas prone to flooding could be purchased and developed for passive recreational use.

LPSNRD has developed a plan for addressing flood reduction in the Stevens Creek watershed which encompasses most of the east beltway study area. The LPSNRD's approved Stevens Creek Watershed Plan (which has been incorporated into the *Lincoln-Lancaster County Comprehensive Plan*) includes an open space component to acquire conservation easements over the 100-year floodplain between the MoPac East and David Murdock Trails, and ultimately to Salt Creek. The plan includes constructing a connector trail within this easement between the MoPac East and David Murdock Trails. The connector would follow the west bank of Stevens Creek from the MoPac East Trail to 112th Street. After crossing the 112th Street bridge, the connector would then follow the east bank of the creek to the David Murdock Trail and on to Salt Creek. No additional land was included in the project because of landowner opposition south of the MoPac East Trail.

The same concept could be implemented along Salt Creek with the effect of extending Wilderness Park to the south. In fact, extension of the park south to Hickman Road has been identified as a goal in the *Lincoln-Lancaster County Comprehensive Plan* and subsequent amendments to the plan. *If mitigation is required for park or recreation lands for the beltway project, incorporation of linear park land, including sufficient right-of-way for landscape treatment, will be considered at that time.*

Railroad Transportation Line Consolidation. For many years, the Railroad Transportation Safety District (RTSD) has been investigating opportunities to consolidate rail lines and relocate lines outside of central areas of the city to provide better safety for rail crossings and reduced delay for overall traffic. Due to the presence of an east-west rail line across the south side of the City just south of N-2, consideration was given to consolidating this line with the south beltway. This railroad line belongs to Omaha Public Power District and serves their Nebraska City coal-fired power plant. The line extends south from downtown and then east to Bennet with at-grade crossings near several major intersections of N-2 at South 14th, South 27th, South 40th, South 48th and South 56th Streets. A concept was considered involving combining the line with existing tracks though Wilderness Park and then constructing a new corridor east to Bennet along the south beltway.

Unfortunately, rail consolidation often only serves to relocate the problems. Train track adjacent to roadways can be a safety problem, and in at-grade situations requires minimal distance standards between the roadway and tracks to insure sufficient vehicle storage space exists. Because trains have limited ability to curve in and out between existing roadway intersections, a wider right-of-way would be required along the south beltway. In addition, local rail customers must be served (such as the Redi-Mix plant at N-2 and South 48th Street); therefore, spur lines within the existing rail corridor may need to be kept in service regardless of a consolidation. With all these problems and an estimated $0.62 million per km ($1 million per mi) for new track construction for an approximate distance of 16 km (10 mi), this alternative was not studied in further detail.

Utilities. Consideration of joint use opportunities with utilities focused on consolidating a future beltway with an existing utility corridor, as opposed to joint development of a new utility corridor within the beltway right-of-way. A number of utilities exist within the beltway corridors, including Lincoln Electric System (LES) overhead transmission lines, above and below ground telephone lines, underground fuel lines, and underground lines for rural water districts and cable communications. Although most of these facilities are considered as project constraints, special attention was given to the LES 345-kilovolt line generally located along North 127th Street from I-80 to US 34, south toward N-2, and then diagonally west to Saltillo Road.

Construction of a beltway along the LES easement was considered as a possible way to reduce the amount of right-of-way required for the beltway, or to minimize impacts to adjacent landowners. While a small amount of overlap (perhaps 7 to 9 m (25 to 30 ft)) of the rights-of-way may be possible in some locations, the required minimum distance between the transmission line and roadway (necessary for safety requirements and maintenance of the utility corridor) results in very little reduction in right-of-way overall.

In 1999, a newly proposed LES 345-kilovolt transmission line extension from North 127th and Adams Streets northward to Waverly was given public review by LES. After careful coordination between the beltway project team, private landowners, public interests, and other constraints, the LES engineers concluded that it would be wise to not co-locate this new transmission route with any of the alternative beltway routes, and to avoid the beltway interchange area at I-80.

2.1.7 Future Land Use Scenarios

The City of Lincoln and Lancaster County are expected to grow significantly in the next 25 to 30 years. Although some of this growth is destined for areas within the existing built-up area of Lincoln, growth will also occur in the beltway study area. The location and density of such growth will be dictated by the availability of infrastructure such as water, sewer and roads. In order to determine the impacts of growth and development on the beltway, it was necessary to evaluate future land use scenarios.

Future land use scenarios were developed by the Lancaster County/City of Lincoln Planning Department and were based on trends, City and County plans and policies, planned infrastructure expansions and capacity improvements, and community goals, objectives and desires. Future traffic was modeled for the various land use scenarios to determine impacts on the roadway system. During the Level III analysis, traffic was modeled using the Build Out Scenario (BOS) which represented a County population of 271,600 by the year 2015 as described in the approved 1994 *Lincoln-Lancaster County Comprehensive Plan* (this document is available at the offices of the City-County Planning Department). During the Level IV analysis, traffic was modeled again, using BOS II which includes subsequent land use revisions (amendments) to the Comprehensive Plan. For purposes of this study, BOS II assumed a County population of 374,630 within a 25 to 30 year period. This is in comparison to the 1999 County population of 237,657.

2.1.8 Transportation Alternatives Carried Forward

Of the seven transportation alternatives considered, four were eliminated from further consideration because they would not increase the capacity of the transportation network, or reduce or eliminate the need for a beltway. These were the TDM/TSM improvements, other modes of transportation, joint use opportunities, and land use scenarios. Although not investigated further, some aspect of these alternatives, such as park and ride lots, linear parks or natural areas, or bicycle paths might be incorporated as enhancements into a future roadway plan. The decision to focus on roadway alternatives was made during the Partnering Meeting of the project's Management Committee, Technical Advisory Committee, Citizen's Advisory Committee and consultant team in December 1995.

Three alternatives were carried forward for further analysis. These were the no build, non-beltway and beltway alternatives. The no build alternative is a required consideration under the National Environmental Policy Act (NEPA), and represents a base case comparison for all build alternatives. The non-beltway and beltway alternatives were carried forward because they are the only alternatives that would increase substantially the capacity of the transportation network.

2.2 LEVEL II: DEVELOPMENT AND PRELIMINARY SCREENING OF BELTWAY AND NON-BELTWAY ALTERNATIVES

2.2.1 Existing Constraints

One of the initial project tasks was to develop a map of environmental constraints, existing land uses and other features within the beltway study area that may affect location of a roadway. The original constraints map was developed from existing resources, databases, aerial photography, consultations and site visits as described in *Interim Report No. 1* (WSA, 1996a).

Over the five years of the study, the map has been periodically updated as new photography has become available and new information has been collected by or provided to the project team. The most recent version of the constraints map of the beltway study area (based on the most recent 1997 aerial photography) is presented in **Figure 2.1**.

Some of the more important constraints and considerations in the study area include:

1. Park and recreation areas including Wilderness Park, Jensen Park, MoPac East and David Murdock Trails, numerous golf courses
2. Rural residences, acreages and farms
3. Floodplains along Salt Creek and Stevens Creek
4. Wetlands, prairies and other natural areas
5. Historic and archeological sites
6. Communities of Roca, Bennet, Cheney, Walton, Prairie Home and Waverly
7. Infrastructure such as utility lines, electrical substations, wells, pumpstations, water towers, radio towers, railroad lines, and existing roadways

2.2.2 Development of the Universe of Beltway Alternatives

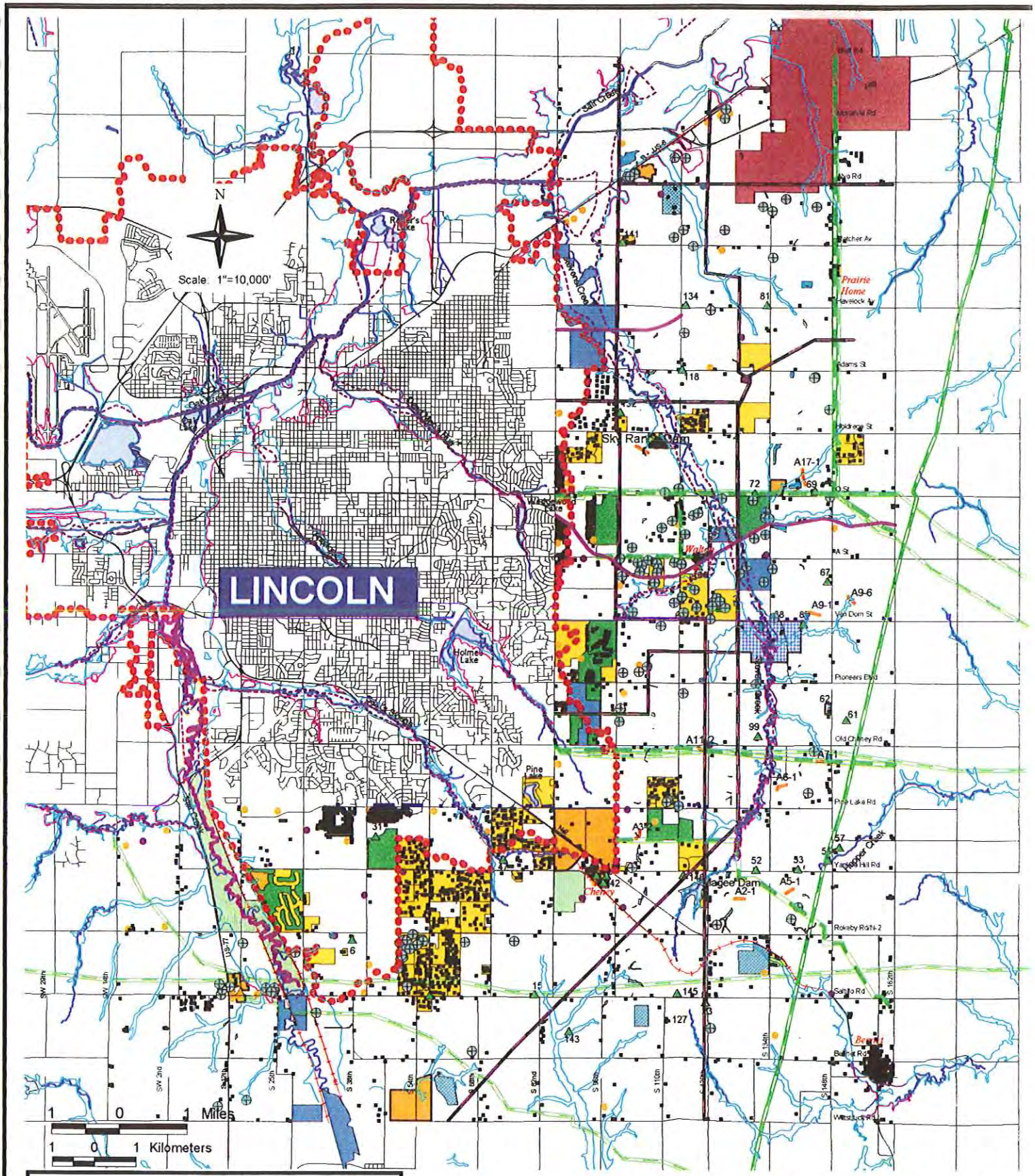
As described in **Chapter 6**, the south and east beltways study included a wide range of public involvement activities. Starting with the first Public Meeting in November 1995, the study team began requesting information on existing constraints in the study area and soliciting recommendations for possible beltway locations. In December 1995, a partnering meeting was conducted with the Management Committee, Technical Committee, Citizen's Advisory Committee and consultant team to review suggested alignments and to develop new alignments. The resulting map of Beltway alignment options was defined as the "Universe of Beltway Location Alternatives" (**Figure 2.2**).

The lines on the map indicate general corridors in which a roadway could be located, allowing some flexibility to move the roadway within the corridor to avoid environmental constraints, existing land uses and other features that may affect location of a roadway. For the purpose of this level of analysis, the corridors were considered to be at least 180 m (600 ft) wide.

2.2.3 Alignment Strategies and Strategy Sets

Once the Universe of Alternatives was developed, it became necessary to evaluate the options so that, ultimately, one preferred alternative could be selected. A method was required to eliminate some alternatives, since it was too complicated to compare the hundreds of combinations available. As a way of reducing the number of alternative alignments considered at one time, alignments were grouped in series of sets which were considered to have similar advantages and disadvantages based on a defined geographic area (Alignment Strategies). As described in *Interim Report No. 2* (WSA, 1996b), each strategy set was evaluated to determine which the best alignment in each set. At this point, no single strategy set was considered better than another. Rather it was acknowledged that there would be trade-offs between the sets that would be evaluated later in more detailed analyses.

The strategy sets were defined relative to their distance to the City of Lincoln (close, mid and far) in both the south and east study areas. With three sets in the south and three sets in the east, there could be nine possible combinations of the sets. The six strategy sets are shown in **Figure 2.3** and described more thoroughly in *Interim Report No. 2* (WSA, 1996b).



EXISTING FEATURES

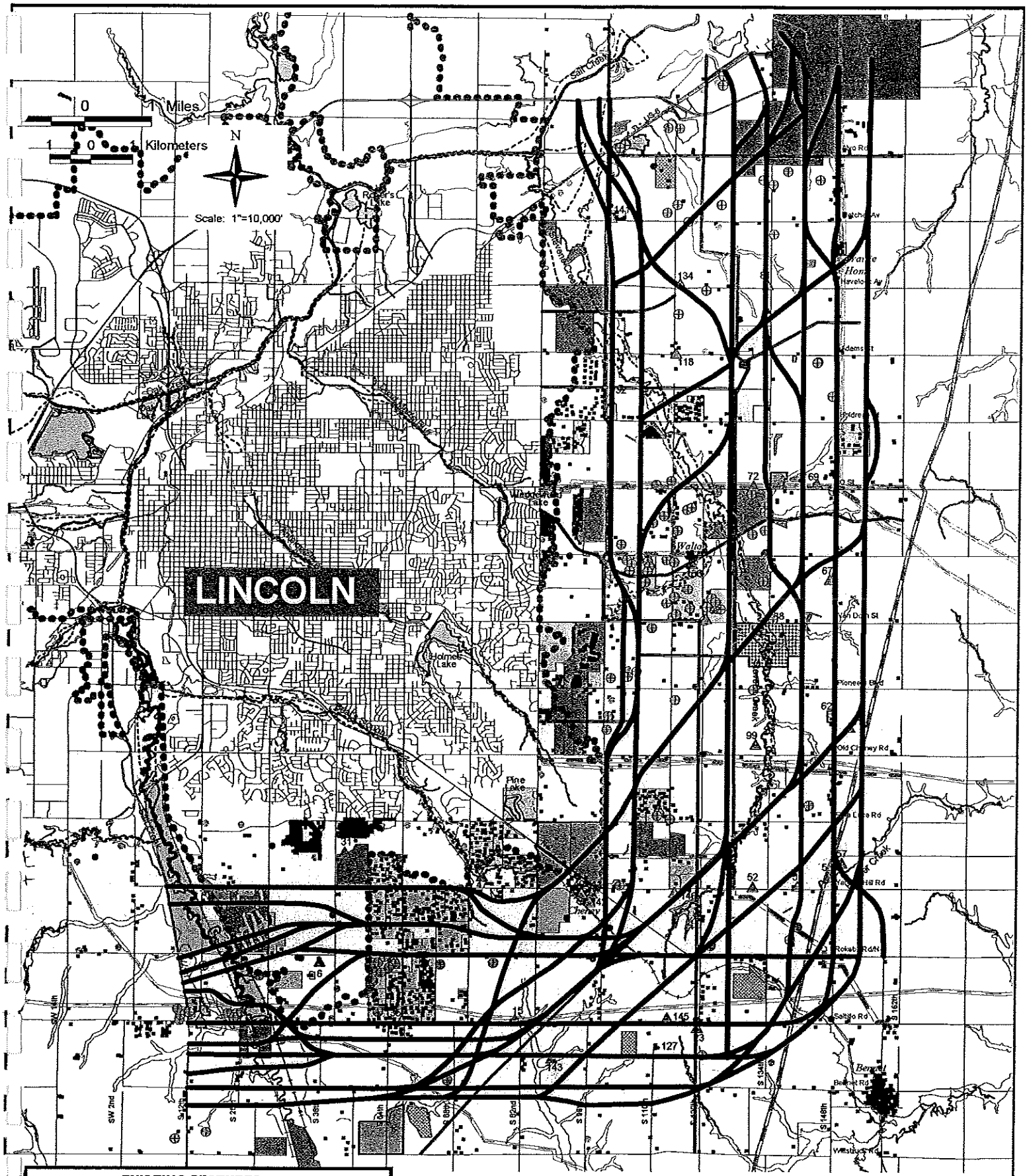
- Residential Structures
- Residential/Subdivisions
- Public Utilities
- Public Utilities
- Commercial/Industrial
- Commercial/Industrial
- Towns
- Other Constraints
- Cemeteries
- Golf Courses
- Registered Wells
- Streams
- 100 Year Flood
- Floodway
- 500 Year Flood
- Dam Sites
- Parks
- Native Prairie
- Lakes
- Wellhead Protection
- Wetlands
- Surface Water Permits
- Overhead Power Lines
- Natural Gas Lines
- Railroads
- Trails
- Service Limits
- Super Fund Sites
- NRHP Sites
- NRHP Eligible

ENVIRONMENTAL IMPACT STATEMENT
LINCOLN SOUTH AND EAST BELTWAYS

Constraints Map

May 2nd, 2002

Figure 2.1

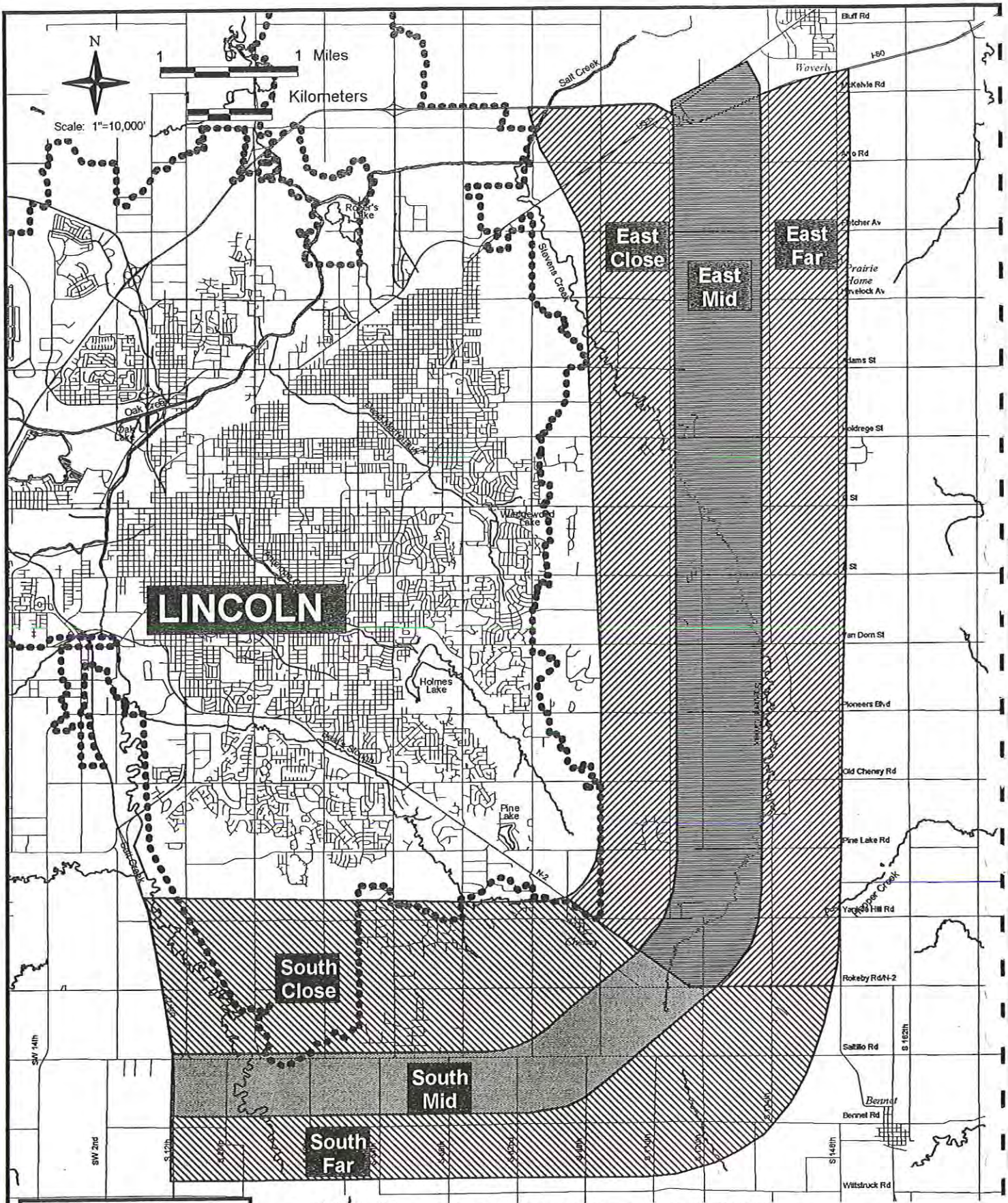


LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

May 2nd, 2002

Universe Of Beltway Location Alternatives

Figure 2.2



LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

Beltway Strategy Sets

June 9, 2000

Figure 2.3

2.2.4 General Evaluation Guidelines

To be objective and fair, all alternatives needed to be considered on an equal basis. Yet, there were too many alignment options to be able to evaluate every one in detail. To handle this situation, the study team developed general evaluation guidelines based on existing City and County policies, adopted plans, sound engineering practices, an awareness of potential environmental impacts of a roadway, and certain evaluation criteria identified at the Partnering Workshop. The guidelines are summarized in **Table 2.3** and described in detail in *Interim Report No. 2* (WSA, 1996b).

2.2.5 Screening Process for the Strategy Sets and Elimination of Some Alternatives

Key Reasons for Eliminating Some Alternatives. Because many of the guidelines required detailed levels of analyses (e.g., number of houses taken, farms crossed, traffic volumes, detailed environmental consequences), they could not all be applied in screening the Universe of Alternatives/Strategy Sets. Therefore, the alternatives were compared and contrasted in terms of criteria that could be applied at this more generalized level of analysis. From this evaluation, three key reasons for eliminating some routes were identified. These were:

1. Use of section line roads for beltway purposes would be difficult due to the large number of existing rural residences in close proximity to the section line roads.
2. Diagonal alignments, especially in the east study area, would offer little advantage, but would create a number of problems involving (a) severed parcels, (b) longer bridges over county roads, and (c) angled county road intersections requiring modification and additional right-of-way to meet the design standard for 90-degree intersections.
3. Passing too close to the planned regional shopping center (at N-2 between 84th Street and 98th Street) would not be a good idea due to potential stacking of vehicles between the interchanges and the shopping area.

Although simplified, the three key reasons actually apply to many of the guideline issues (diagonal crossings of farmland, number of houses impacted, road system continuity, intersection angles, utility and railroad conflicts, compatibility with the Comprehensive Plan, crossing of creeks and drainage basins, sensitive areas, and many others). The process of eliminating some alternatives based on the three key reasons is described in greater detail in *Interim Report No. 2* (WSA, 1996b). Following this screening, 10 alternatives remained on the south and four on the east (see Exhibits 5-4 and 5-5, *Interim Report No. 2*, WSA, 1996b).

Table 2.3

GENERAL EVALUATION GUIDELINES FOR SCREENING ALTERNATIVES

PLANS, POLICIES AND GENERAL GUIDELINES:	
1.	Maintain at least one alignment option within each strategy set.
2.	Maintain the integrity of the established grid network.
3.	Maintain the integrity of the study area boundary.
4.	Recognize Comprehensive Plan goals, objectives and policies.
5.	Be aware of existing and planned utility lines in the study corridor and evaluate desirability to link the beltway to those lines.
6.	Be aware of the desires of the City of Waverly as expressed in the City's Comprehensive Plan.
TRAFFIC/ENGINEERING GUIDELINES	
7.	Avoid the creation of skewed intersections due to the angle of beltway crossing of existing roads, highways, and railroad corridors.
8.	Recognize that two trip purposes need to be served: the long distance trip (i.e., Lincoln to Omaha) and the intra-city trip (within the Lincoln Metropolitan Area).
9.	Avoid alignments that are redundant to existing State Highways.
10.	Avoid creating adverse traffic condition, misdirection of flow and circuitous routing of traffic.
11.	Be cognizant of interchange spacing needs.
ENVIRONMENTAL GUIDELINES	
12.	Avoid the use of existing section line roads.
13.	Where parklands, creeks, historic sites and other known environmental features need to be crossed, keep the length of the crossing as short as possible.
14.	Alignments that follow half-section lines are preferred.
15.	Avoid crossings of drainage basins by following ridge lines to the extent possible.
16.	Avoid fatal flaws such as historic/cultural sites, parks, etc. unless other feasible routes do not exist.
17.	Avoid diagonal crossings of farmland where possible.
18.	Existing and/or planned utility or transportation corridors should be examined as potential beltway corridors.
19.	Avoid existing residences and subdivisions where possible.
20.	Avoid platted subdivisions where possible.
21.	Avoid farm residences and farm infrastructure where possible.
22.	Recognize existing infrastructure investment in the Study Area.

Selection of the Best Alignment within Each Strategy Set. By comparing and contrasting alignments within each strategy set, several more alternatives were eliminated with the goal of having one alignment within each strategy set. Specific reasons for elimination included:

1. Minimizing the width of the Wilderness Park crossing of the SC routes
2. Minimizing wetland and creek impacts of the south routes
3. Minimizing interchange spacing problems
4. Minimizing crossing impacts at Saltillo Road for the SM and SF routes
5. Minimizing impacts to platted subdivisions, residences, farmyards and cemeteries
6. Minimizing severance of farmland
7. Avoiding routes that extend outside of the study area for the EF routes

Screening of the strategy sets resulted in the recommendation of four candidate alternatives in the south and three in the east to be carried forward to the Level III analysis (**Figure 2.4**). These were SC-1, SC-4, SM-4, SF-1, EC-1, EM-1 and EF-1. Two south close alternatives were carried forward because they were considered to have fairly different advantages and disadvantages. The Level III beltway alternatives are described in **Table 2.4.**

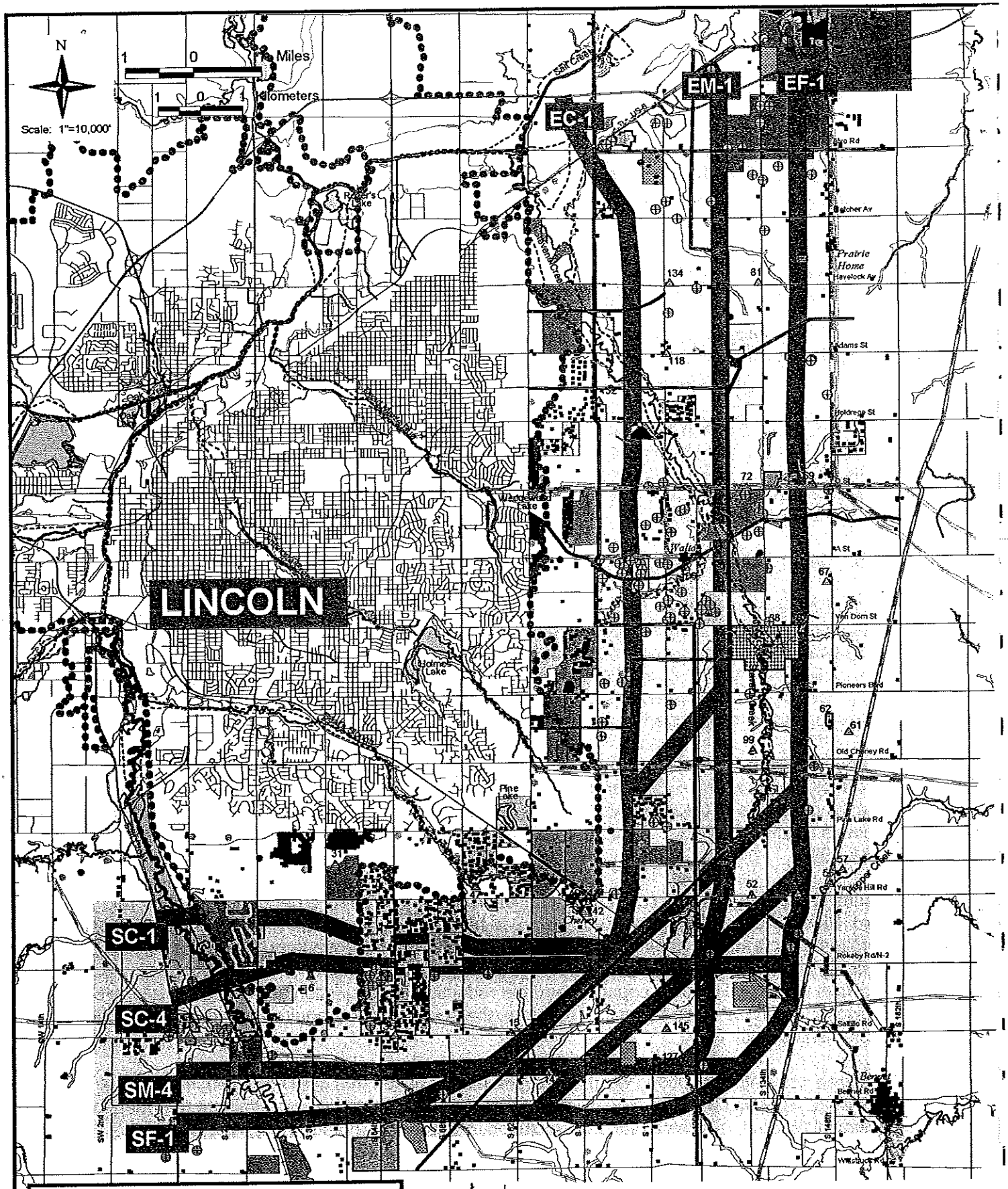
2.2.6 Development of Non-Beltway Alternatives

The non-beltway alternative involved assessment of whether future travel demands and desired system performance could be satisfied by improving arterial roadways within and/or adjacent to the beltways study areas. Improvements included widening existing roads to 4 or 6 lanes, and constructing new arterial type facilities on the existing alignments. The non-beltway alternative would have signalized intersections, 60 km/h (40 mph) posted speeds, and allow some direct access to commercial property.

Locations for non-beltway alternatives were developed by determining where potential deficiencies exist with the 20-year transportation improvement program. This was done by examining Volume to Capacity (V/C) Ratios and comparing estimated future traffic volumes to available roadway capacity. This analysis is described in detail in *Interim Report No. 3* (WSA,1999).

Results showed that on the south additional improvements would be needed at Yankee Hill Road, Pine Lake Road, Rokeby Road or N-2 to handle projected traffic. On the east, additional improvements would be needed at 70th, 84th or 98th Street. No advantage was gained by leapfrogging an arterial (i.e. improving Rokeby and skipping Yankee Hill). The skipped roadways would still be over capacity, and the reduction in congestion along already improved roadways (i.e., N-2) would be less. Therefore, the south corridor required a non-beltway option through Wilderness Park.

The three non-beltway options were developed as test cases that could be used in the Level III analysis to establish whether a non-beltway alternative would reduce or eliminate the need for a beltway alternative. These options are included in **Table 2.4** and shown in **Figure 2.5.**



LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

Candidate Beltway Alternatives

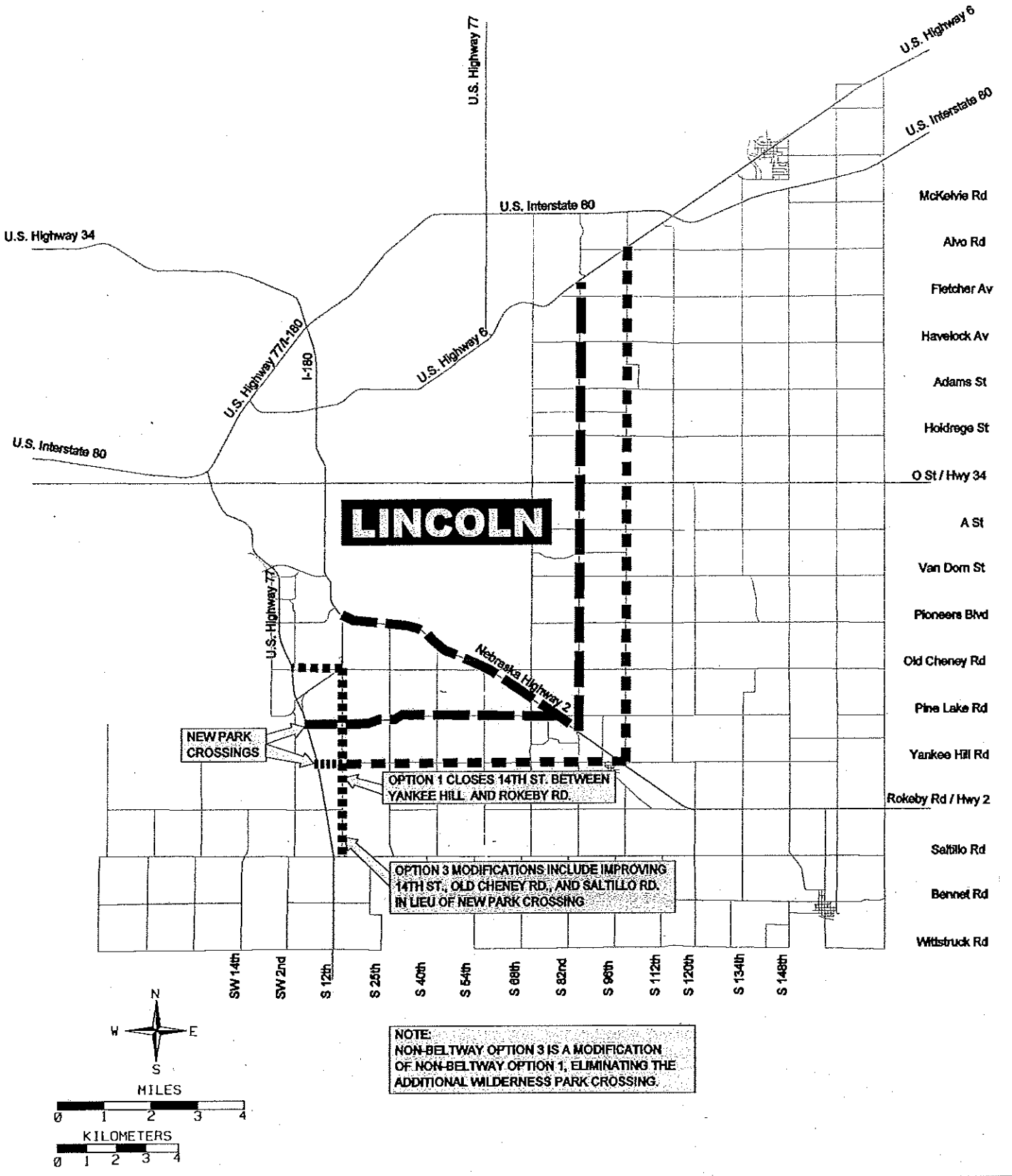
May 2nd, 2002

Figure 2.

Table 2.4

LEVEL III ALTERNATIVES
(Candidate Beltway Alternatives and Non-Beltway Options)

ALTERNATIVE	DESCRIPTION
South Close-1 Beltway (SC-1)	This alignment is generally south of and parallel to Yankee Hill Road. It bisects the Yankee Hill subdivision along a half section line and swings south of the Town of Cheney, intersecting Highway 2 approximately 0.8 km (0.5mi) south of the Yankee Hill Road intersection with N-2. This alignment includes a crossing of Wilderness Park.
South Close-4 Beltway (SC-4)	This alignment intersects US 77 approximately 0.4 km (0.25 mi) south of Rokeby Road and angles northeast to the half section line (Rokeby Road). This alignment generally follows Rokeby Road/N-2 through the rest of the corridor. This alignment includes a crossing of Wilderness Park.
South Mid-4 Beltway (SM-4)	This alignment is located approximately 0.8 km (0.5 mi) south of Saltillo Road and generally follows the half section line before transitioning to a northeasterly direction as it approaches N-2. This alignment intersects US 77 south of Wilderness Park and does not require a park crossing.
South Far-1 Beltway (SF-1)	This alignment is located approximately 0.2 km (0.125 mi) south of Bennet Road through the entire corridor until it angles northeast to intersect N-2. This alignment also intersects US 77 south of Wilderness Park and does not require a park crossing.
East Close-1 Beltway (EC-1)	This alignment is generally located on the half section line between 98th Street and 112th Street and runs in a north/south direction from N-2 on the south to I-80 on the north. This alignment angles northwest at the north end and connects to I-80 and US 6 west of the Waverly Interchange.
East Mid-1 Beltway (EM-1)	This alignment is approximately located on the half section line between 120th Street and 134th Street and runs in a generally north/south direction from N-2 on the south to I-80 on the north. This alignment connects to I-80 and US 6 east of the Waverly Interchange. This alignment is able to utilize the existing LES transmission line corridor from Pine Lake Road to Adams Street.
East Far-1 Beltway (EF-1)	This alignment is generally located on the half section line between 134th Street and 148th Street and runs in a north/south direction from N-2 on the south to I-80 on the north. This alignment also connects to I-80 and US 6 east of the Waverly Interchange.
Non-Beltway Option 1	This option involves improving Yankee Hill Road on the south and 98th Street on the east to 4-lane divided roadways, including turn lanes at all signalized intersections and a segment through Wilderness Park. In conjunction with this option, 14th Street between Yankee Hill and Rokeby Roads would be closed (through Wilderness Park).
Non-Beltway Option 2	This option involves improving Pine Lake Road on the south and 84th Street on the east to 6-lane divided roadways, including turn lanes at all signalized intersections and a segment through Wilderness Park. This option also includes widening N-2 to a 6-lane roadway between 14th and 84th Streets. In conjunction with this option, 14th Street between Yankee Hill and Rokeby Roads would be closed (through Wilderness Park).
Non-Beltway Option 3	This option involves improving Yankee Hill Road on the south and 98th Street on the east to 4-lane divided roadways, including turn lanes at all signalized intersections, *but no segment through Wilderness Park*. In conjunction with this option, 14th Street would be improved to a 4-lane facility from Old Cheney Road to Saltillo Road, including the segment through Wilderness Park. In addition, Old Cheney would be improved to a 4-lane facility between 14th Street and US 77, including the segment through Wilderness Park.



LEGEND

- NON-BELTWAY OPTION 1 (4-LANE)
- NON-BELTWAY OPTION 2 (6-LANE)
- NON-BELTWAY OPTION 3 (4-LANE)
- NON-BELTWAY OPTION 1 & 3 (4-LANE)

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

NON-BELTWAY OPTIONS

Figure 2.5

Non-Beltway Option 1. This option involves improving Yankee Hill Road on the south and 98th Street on the east to four-lane divided roadways, including turn lanes at all signalized intersections and a segment through Wilderness Park. In conjunction with this option, 14th Street between Yankee Hill Road and Rokeby would be closed (through Wilderness Park).

Non-Beltway Option 2. This option involves improving Pine Lake Road on the south and 84th Street on the east to six-lane divided roadways, including turn lanes at all signalized intersections and a segment through Wilderness Park. This option also includes widening N-2 to a six-lane roadway between 14th and 84th Streets. In conjunction with this option, 14th Street between Yankee Hill and Rokeby Roads would be closed (through Wilderness Park).

Non-Beltway Option 3. This option involves improving Yankee Hill Road on the south and 98th Street on the east to four-lane divided roadways, including turn lanes at all signalized intersections, *but no segment through Wilderness Park.* In conjunction with this option, 14th Street would be improved to a four-lane facility from Old Cheney Road to Saltillo Road, including the segment through Wilderness Park. In addition, Old Cheney would be improved to a four-lane facility between 14th Street and US 77, including the segment through Wilderness Park.

In addition to these test cases, a fourth non-beltway option, along 148th Street, was developed after the Level III analysis. This alternative is addressed in **Section 2.3.8.**

2.2.7 Candidate Alternatives Carried Forward

Preliminary screening of the strategy sets resulted in the recommendation of seven candidate Beltway alternatives to be carried forward for further evaluation in the Level III analysis. These were SC-1, SC-4, SM-4, SF-1, EC-1, EM-1 and EF-1. In total, this resulted in 20 combinations of south and east beltway corridors that were carried forward (**Figure 2.6**). Preliminary screening of non-beltway alternatives resulted in the development of three non-beltway options which were also carried forward in the Level III analysis.

2.3 LEVEL III: ANALYSIS OF THE CANDIDATE BELTWAY ALTERNATIVES AND NON-BELTWAY OPTIONS

The Level III analysis involved more detailed evaluations of the seven candidate beltway alternatives and three non-beltway options using new analyses and data. The goal of the Level III analysis was to identify two to four Finalist Alternatives for further evaluation. The steps involved in the Level III analysis are summarized in **Table 2.5.**

The various Level III steps were considered preliminary in the sense that a different set of steps, analyses and criteria were anticipated to be developed in Level IV to evaluate the remaining alternatives.

Table 2.5

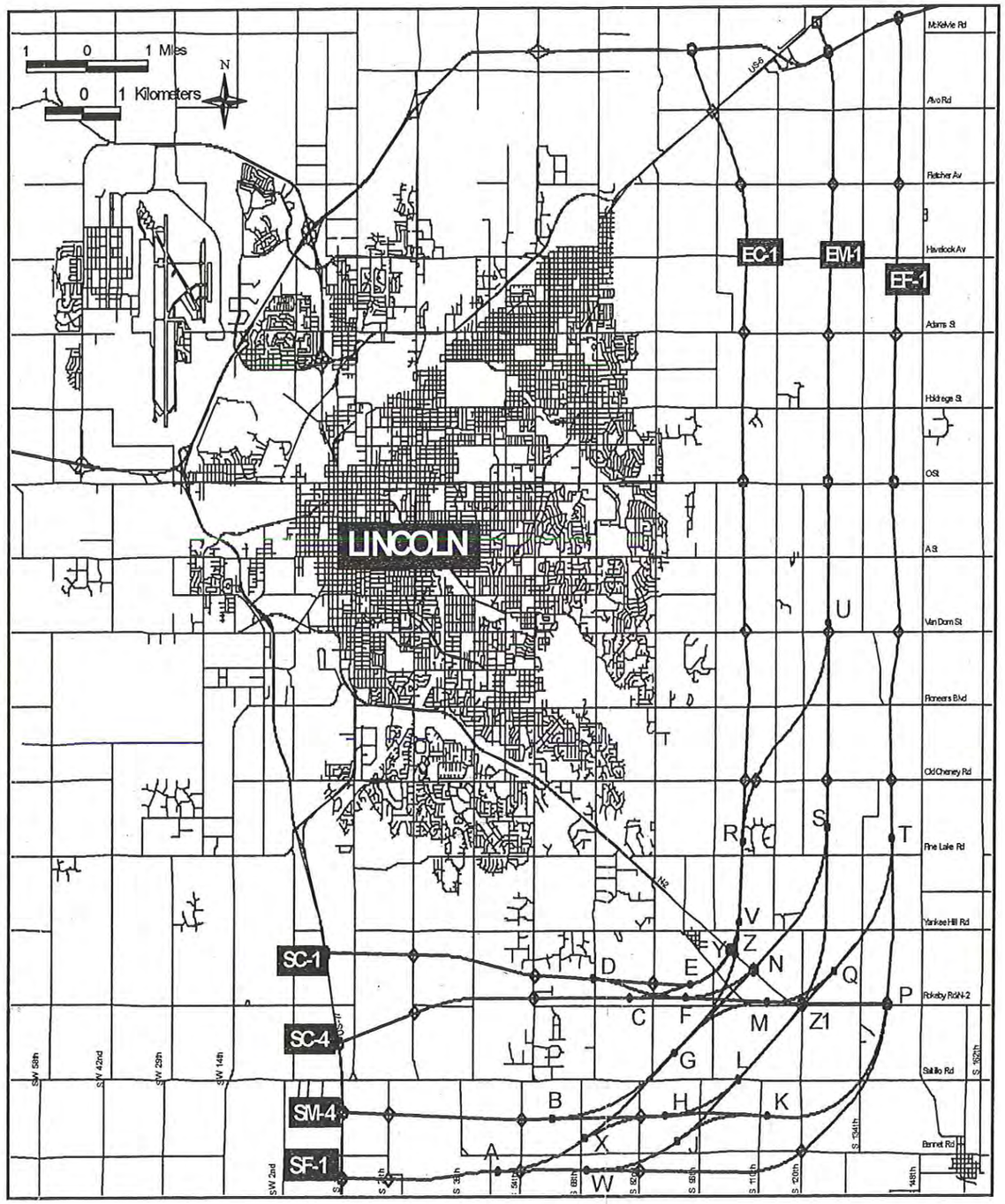
SUMMARY OF LEVEL III ANALYSIS PROCESS

PRELIMINARY EVALUATION CRITERIA	
1.	Development of 33 Criteria for evaluating traffic, cost, socioeconomic, land use, and environmental impacts for the purpose of evaluating 20 end-to-end beltway alternatives and 3 non-beltway alternatives.
PRELIMINARY TRANSPORTATION ANALYSIS	
2.	End to End Beltway Analysis. Complete south and east beltways connecting US 77 to I-80 were analyzed to determine the affects of a complete circumferential roadway on internal traffic, as well as to determine the affect of distance from Lincoln on traffic volumes for close, mid and far beltway alignments.
3.	Partial Beltway Analysis. Separate south and east alignments were analyzed (for close, mid and far strategies) as stand alone improvements to determine the affect of the south and east beltways on each other, and to the determine if a beltway on the south or the east would be feasible on its own.
4.	Non-Beltway Analysis. Non-beltway options were analyzed to determine the impacts of each alternative on traffic within the City of Lincoln
PRELIMINARY ROUTE DEVELOPMENT	
5.	Development of the 20 Beltway Alignments (based on 90 m (300 ft) wide sections) which minimized impacts to socioeconmic and environmental constraints, and which could be used to estimate cost and environmental impacts.
6.	Development of the 3 Non-Beltway Alignments (based on 30-37 m (100-120 ft) typical sections) which could be used to estimate cost and environmental impacts.
7.	Development of Preliminary Cost Estimates.
PRELIMINARY ENVIRONMENTAL ANALYSIS	
8.	Data Collection for 31 measured parameters for socioeconomic, land use and environmental impacts based on existing resources and field checks for 20 beltway and 3 non-beltway alternatives.
9.	Preliminary Categorization of Alternatives into high, medium and low impact routes.
INITIAL TASK SCREENING	
10.	Initial Task Screening resulting in elimination of 11 end-to-end beltway alternatives which had relatively higher impacts than other alternatives including longer crossings through Wilderness Park, longer diagonal segments for the east far alternatives, or which included the south far alternatives which carried less traffic and cost more. In addition, 1 non-beltway alternative was eliminated which required 45 residential relocations. Nine end-to-end beltway and 2 non-beltway alternatives were carried forward for further analysis. This step was required to maintain the intended project design which called for the Level III analysis to be conducted on 5 to 10 candidate alternatives.
PRELIMINARY ECONOMIC ANALYSIS	
11.	Economic Efficiency Evaluation was conducted to determine relative benefits and costs of alternatives, including travel time savings, vehicle operating cost savings, accident reduction cost savings and total transportation efficiency benefits.
12.	Economic Feasibility Evaluation was conducted to determine benefit-cost ratios of alternatives.
IDENTIFICATION OF FINALIST ALTERNATIVES	
13.	Consideration of 148th Street Scenarios. Two additional scenarios were evaluated for a beltway and a non-beltway alternative along 148th Street. Since these scenarios did little to relieve traffic congestion, had greater impacts to residences and historic structures, and had comparable costs, they were eliminated from further consideration.
14.	Elimination of Routes through Wilderness Park. The remaining 4 south close alternatives and 2 non-beltway alternatives were eliminated based on cost-benefit analysis which showed economically feasible alternatives to impacting this 4(f) resource. The 5 remaining end-to-end alternatives were split into their 4 separate south and east components, and these 4 finalist beltway corridors were carried forward for the Level IV analysis. These were SM-4, EC-1, EM-1 and EF-1.

Route 1	Route 2	Route 3	Route 4
EC1	EC1	EC1	EC1
R	R	R	R
V	V	V	V
Y	Y	Z	Z
E	E	G	G
D	C	B	X
SC1	SC4	SM4	A
			SF1

Route 5	Route 6	Route 7	Route 8	Route 9	Route 10	Route 11	Route 12	Route 13	Route 14
EM1	EM1	EM1	EM1	EM1	EM1	EM1	EM1	EM1	EM1
U	U	U	U	U	U	U	U	U	U
S	S	R	S	R	S	S	S	R	R
Z1	N	V	N	V	N	Z1	N	V	V
L	F	Y	F	Y	G	L	G	Z	Z
J	D	E	C	E	B	H	X	G	G
W	SC1	D	SC4	C	SM4	B	A	X	B
A		SC1		SC4		SM4	SF1	A	SM4
SF1								SF1	

Route 15	Route 16	Route 17	Route 18	Route 19	Route 20
EF1	EF1	EF1	EF1	EF1	EF1
T	T	T	T	T	T
Q	Q	Q	P	Q	P
Z2	Z2	Z1	K	Z1	W
M	M	L	H	L	A
F	F	H	B	J	SF1
D	C	B	SM4	W	
SC1	SC4	SM4		A	
				SF1	



Candidate Beltway Routes

Preliminary Environmental Impact Matrix

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

Figure 2.6

2.3.1 Preliminary Evaluation Criteria

A list of evaluation criteria was developed with input from the study sponsors, the Management Committee, Technical Advisory Committee, Citizens Advisory Committee and public. After refinement by the consultant team, the evaluation criteria were presented to the three advisory committees to determine the relative importance of socioeconomic, land-use, environmental, cost and traffic impacts. At this time, the determination was made to develop an evaluation matrix based on the cost effectiveness technique where all relevant data is collected and presented without any attempt to put benefits into common units (such as cost) and without any attempt to have the data select the best alternative.

Table 2.6 is the list of the preliminary evaluation criteria along with a discussion of what the criteria involve and how they were to be measured. Most of the evaluation criteria were measurable (for example, future traffic flow and congestion). In these cases, parameters were developed to provide a measurable comparison of the relative impacts of the alternatives (for the above example, the measured parameter is average annual time saved in hours). In some cases, more than one parameter was used for assessing a particular evaluation criterion. It should be noted that there were a few criteria that the committees felt were important but a direct measurement was not readily available at that time (as noted by N/A in **Table 2.6**).

2.3.2 Preliminary Transportation Analysis

Three traffic analyses were conducted for the beltway study. First, end-to-end south and east beltways connecting from US 77 to I-80 were analyzed to determine the affects of a complete circumferential roadway on internal traffic, as well as to determine the affect of distance from Lincoln on traffic volumes for each of the beltway alignments. Second, separate south and east alignments were analyzed as stand alone improvements to determine the affect of the south and east beltways on each other, and to determine if a beltway on the south or the east would be feasible on its own. Third, non-beltway options were analyzed to determine the impacts of each alternative on traffic within the City of Lincoln and for use in comparing the benefits of a beltway versus other roadway improvements.

The Level III preliminary traffic analysis was performed using the Build Out Land Use Plan (BOS) provided by the City of Lincoln Planning Department. During the course of the beltway study, a second Build Out Land Use Plan (BOS II) was developed by the City of Lincoln. This land use plan was used for more detailed analyses in the Level IV analysis.

End-to-End Beltway Analysis. The results of the end to end beltway traffic modeling indicated that the distance of a future beltway from the existing urbanized area of Lincoln had a greater affect on traffic volumes in the south corridor than in the east corridor. The south beltway alternatives located north of Saltillo Road carry over 50 percent more traffic than the alternatives located south of Saltillo Road. This is largely due to the fact that the northern alternatives carry a significant amount of internal traffic. As a result, the close beltway alternatives provide some congestion relief on several parallel east/west streets (Pine Lake Road, Yankee Hill Road) in the urban area. However, the traffic on a south beltway increases congestion on the north/south streets (14th, 27th and 56th Streets) connecting to Lincoln's urbanized area. The south far alignment carried primarily external to external traffic between US 77 and N-2.

TABLE 2.6
PRELIMINARY SOUTH AND EAST BELTWAY EVALUATION CRITERIA

ID#	ISSUES	DISCUSSION	METHOD OF MEASUREMENT
T.0	TRAFFIC OPERATION FACTORS		
T.1	Traffic Flow and Congestion	Improving traffic flow and relieving congestion are objectives of any proposed transportation improvement. The extent to which this occurs can be estimated by determining relative improvements in daily vehicle hours traveled (VHT) which is an output of the transportation model.	Average annual time savings in hours from Economic Analysis using computer model.
T.2	Through Traffic Around Lincoln	This criterion relates to the need to accommodate through traffic movements around the built-up area of the City. This would in turn relieve congestion on urban streets caused by existing and/or future traffic.	Volume of External to External trips in vehicle miles traveled using beltway from computer model.
T.3	Future Traffic Demand	Sufficient infrastructure should be in place or planned to satisfy new traffic demand as a result of growth. This can be measured by determining the number and length of streets that would otherwise have an unacceptable Level of Service (LOS).	Not measured. Data not available.
T.4	Future Freight & Truck Transportation	Improving freight and truck transportation to reduce automobile and truck conflicts is a concern in the community. This criterion would provide a measure of the extent to which truck traffic can be relocated.	Not measured. No separate truck data available.
T.5	Congestion on Existing Arterials Within Developed Areas.	This criterion relates to impacts of a transportation improvement within the existing developed area of Lincoln. It is a measure of how much congestion is relieved by relocating internal traffic from the existing street system to outlying areas.	Not evaluated. Preliminary computer model results show little difference between alternatives
T.6	Effective Life of Facility	This criterion relates to the amount of time that it would take for beltway or non-beltway improvement alternatives to become obsolete due to the facility reaching its theoretical capacity.	Not measured. All beltway alternatives should have excess capacity with future model runs.
T.7	Number of Accidents	The reduction in Vehicle Miles Traveled (VMT) on the existing arterial street system should relate to a proportional reduction in traffic accidents. Accident rates for arterial streets are higher than accident rates for facilities like the beltway. Therefore, transferring traffic from the arterial streets to the beltway should result in an overall reduction in number of accidents.	Dollar value of annual accident savings from economic model.
T.8	Disruption of Existing Street Network	Lancaster County and the City of Lincoln is built upon grid type street system with major streets every mile. This criterion identifies the extent to which the existing street system is impacted.	Not measured in Task 3, but measured in Task 4. Lane miles of existing section line roads eliminated or relocated.
C.0	PROJECT COSTS		
C.1	Construction Cost	This criterion relates to only the cost of construction of the improvement in 1997 dollars and does not include cost for right-of- way	Estimated cost of Construction in 1996 dollars.
C.2	Right-of-Way Costs	Right-of-way costs are estimated by assuming generalized costs per hectare (acre) of residential property versus farm property as well as costs for homes, businesses, and miscellaneous structures.	Estimated R/W costs based on cost/structure, measured from aerial photos and G.I. Surveys.
C.3	Maintenance Costs	The cost of maintaining a new facility is an important consideration. Cost is determined by looking at historical maintenance costs involved in snow removal, pavement repair, landscaping and mowing, deicing and periodic inspection.	Cost per linear kilometer (mile) based on average maintenance costs in Nebraska for Freeway and principle arterials.
C.4	Project Funding	This criterion refers to the ability of an alternative to qualify for new sources of funds over and above existing state/local resources. Revenue could be locally generated or earmarked from future state and federal resources. Use of existing state/federal resources could upset existing priorities.	Not measured in Task 3, but may be measured in Task 4. Likelihood of obtaining new revenue. 1 = Good 5 = Poor

Table 2.6 (cont)

ID#	ISSUES	DISCUSSION	METHOD OF MEASUREMENT
S.0	SOCIO ECONOMIC		
S.1	Impacts to Residences	This parameter included structures located within the 91 m (300 ft) ROW plus additional ROW for the interchanges. It was measured from the GIS layer of structures which contained structures present on the April 1995 aerial photography along with new houses observed from driving study area in April 1996. This was updated using 1997 photography and additional drive throughs.	Number of structures within ROW (takings).
S.2	Impacts to Businesses	This parameter included commercial businesses in the study area as identified on the April 1995 blueline aerial photography. Farm and other home businesses were not included in the sum. This includes commercial businesses within 0.4 km (0.25 mi) either side of the centerline minus the area of the ROW. Source of the information is as described for the previous parameter	Number of businesses within ROW (takings) Number of businesses within 0.4 km (0.25 mi).
S.3	Impacts to Agricultural Land	This parameter was estimated based on interpretation of the April 1995 aerial photography.	Hectares (acres) of cropland within ROW
S.4	Economic Development Opportunities	(not available at this time)	(to be determined)
S.5	Impacts to Existing School District Lines	This is the estimated ROW requirement for the entire route which corresponds approximately to the property removed from the tax rolls. The beltway study area includes portions of Districts 145 (Waverly), 153 (Cheney), 152 (Rokeby), OR-1 (Otoe), 160 (Norris) and 1 (Lincoln). This parameter was measured using School Attendance Area maps and estimates of the distribution of student populations provided by the school districts. Assuming that a beltway would divide portions of the districts, the area of the districts on the opposite side of the beltway from the school was measured and taken as a percentage of the total school attendance areas.	Hectares (acres) removed from the tax base.
S.6	Impacts to non-tillable land	This parameter was estimated based on interpretation of the April 1995 aerial photography and spot checking fields to verify the interpretation.	Hectares (acres) of pasture, hayland and CRP land within ROW.
L.0	LAND USE		
L.1	Impacts to Platted Subdivisions	Calculated from the GIS Constraints Map, this parameter was the number of platted subdivisions crossed by a beltway route. Information in the GIS included platted subdivisions on record in the County Assessors office as of April 1996. Calculated from the GIS Constraints Map, this parameter was the number of hectares (acres) taken from platted subdivisions as described above.	Number of platted subdivisions crossed Hectares (acres) of platted subdivisions within ROW
L.2	Impacts to Parks and Recreation Areas	Calculated from the GIS Constraints Map which included the City's Parks and Rec layer, this parameter was the number of hectares (acres) taken from Wilderness Park. No other parks are affected by the remaining beltway routes.	Hectares (acres) of parkland within ROW
L.3	Impacts to Golf Courses	Calculated from the GIS Constraints Map, golf course locations had been identified from maps provided by the City.	Hectares (acres) of golf courses within ROW
L.4	Compatibility with future Land Use Plan	(to be determined)	(not available at this time)
L.5	Minimize Barrier Effect	This parameter was the average distance between the beltway and the edge of the built up area as defined in the Comprehensive Plan/city limits. Average distance was determined based on measurements at Havelock, Adams, Holdrege, O, A, Van Dorn and Pioneers Streets on the east, and at Old Cheney, 70th, 56th, 40th, 27th Street on the south.	Average distance from built up area
L.6	Trail System Enhancements	Calculated from the GIS Constraints Map, these trail locations had been identified from the City's Trails layer and maps	Number of hiker/biker trail crossings

Table 2.6 (cont)

ID#	ISSUES	DISCUSSION	METHOD OF MEASUREMENT
		provided by the City Parks and Recreation Department.	
E.0	ENVIRONMENTAL		
E.1	Water Quality Impacts	Calculated from the GIS Constraints Map, these zone locations had been identified from maps provided by the Lincoln/Lancaster County Health Department.	Hectares (acres) of wellhead protection zones within ROW
E.2	Air Quality Impacts	(to be determined)	(not available at this time)
E.3	Drainage and Hydrology Impacts	Calculated from the GIS Constraints Map, streams had been identified from the City's Streams layer.	Number of stream crossings
		Calculated from the GIS Constraints Map, floodways had been identified from FEMA and FIRM maps. Calculated from the GIS Constraints Map, the 100-year floodplain had been identified from FEMA and FIRM maps.	Hectares (acres) of floodway within ROW Hectares (acres) of 100-year floodplain within ROW
E.4	Noise Impacts	This parameter was measured from the GIS layer of structures which contained structures present on the April 1995 aerial photography along with new houses observed from driving study area in April 1996. It includes 0.4 km (0.25 mi) on either side of the centerline minus the beltway ROW.	Number of structures within 0.4 km (0.25 mi)
E.5	Riparian Corridors Impacts	Calculated from the GIS Constraints Map, streams had been identified from the City's Streams layer.	Number of stream crossings
		This parameter was estimated based on interpretation of the April 1995 aerial photography. Riparian areas were defined as wooded and non-wooded areas along streams and smaller drainages	Hectares (acres) of riparian corridor within ROW
E.6	Wetlands Impacts	Calculated from the GIS Constraints Map, wetlands had been identified from the City's Wetlands layer which was developed from the USFWS National Wetlands Inventory Maps.	Number of Mapped Wetlands within ROW.
E.7	Natural Habitat Impacts	This parameter was determined by assigning quality weightings of 0 to 5 to parkland, stream crossings, riparian corridor, and wetlands factors. High quality was assigned based on the extent of woodlands along the stream crossings, the width of the park crossing, and the number of wetlands	Impacts to natural habitats within ROW (0-5)
E.8	Cultural Resources Impacts	This factor applied to the three NRHP sites within the study area. Although none of the 23 routes do take NRHP property, SF1 runs along the Schrader site, and EF1 runs along the Stock Farm site. None of the routes abut the Ehler Round Barn.	Number of National Register sites within ROW
		This parameter was the number of other known cultural resources within the ROW that have not been assessed for eligibility of the NRHP, including all recorded sites listed in the Phase I Archeological/Cultural Resources Survey conducted for the project.	Number of known cultural resources within ROW
		This parameter was the number of other potential cultural resources within the ROW, including all cemeteries, NSHS owned property in the study area, and some other older structures.	Number of potential resources within ROW
		This parameter was the number of NRHP and other known cultural resources within 0.4 km (0.25 mi) of a beltway centerline, including all recorded sites listed in the Phase I Archeological/Cultural Resources Survey conducted for the project.	Number of know resources within 0.4 km (0.25 mi)
		This parameter was the number of other potential cultural resources within 0.4 km (0.25 mi) of a beltway centerline, including all cemeteries, NSHS owned property in the study area, and some other older structures.	Number of potential resources within 0.4 km (0.25 mi)

Table 2.6 (cont)

ID#	ISSUES	DISCUSSION	METHOD OF MEASUREMENT
E.9	Visual Impacts	This parameter was measured from the GIS layer of structures which contained structures present on the April 1995 aerial photography along with new houses observed from driving study area in April 1996. It includes 0.4 km (0.25 mi) on either side of the centerline minus the beltway ROW.	Number of structures within 0.4 km (0.25 mi)
		Calculated from the GIS Constraints Map, this parameter was the number of platted subdivisions within 0.4 km (0.25 mi) of either side of a beltway centerline. Information in the GIS included platted subdivisions on record in the County Assessors office as of April 1996.	Number of platted subdivisions within 0.4 km (0.25 mi)
		Calculated from the GIS Constraints Map which included the City's Parks and Rec layer, this parameter was the number of parks within 0.4 km (0.25 mi) of a beltway centerline.	Number of parks within 0.4 km (0.25 mi)
		Calculated from the GIS Constraints Map, this parameter was the number of golf courses within 0.4 km (0.25 mi) of either side of a beltway centerline. Information on golf course locations was identified from maps provided by the City.	Number of golf courses within 0.4 km (0.25 mi)
		Calculated from the GIS Constraints Map, this parameter was the number of trails within 0.4 km (0.25 mi) of either side of a beltway centerline. Information on trail locations had been identified from the City's Trails layer and maps provided by the City Parks and Recreation Department.	Number of hiker/biker trails within 0.4 km (0.25 mi)

In the east corridor, distance from Lincoln has a lesser affect on traffic volumes. The east beltway alternatives principally provide access from N-2 and I-80 to the eastern portions of Lincoln. The close alternative provides some relief to 84th Street but increases traffic on the east/west streets (Van Dorn Street, Old Cheney Road, and O Street).

Partial Beltway Analysis. Traffic volumes were generally lower for the partial beltways than for the end-to-end beltways, with the south far and south mid alignments being affected the most by the absence of an east beltway. Aside from this, the conclusions of the partial beltway analysis were similar to those for the end-to-end beltways. The close alignments had a greater affect on reducing congestion within the urbanized area and the far alignments carried primarily external traffic.

Non-Beltway Analysis. Non-beltway options 1 and 3 each provided similar benefits to the street network within the urbanized area. Non-beltway option 1 provided the greatest benefit to N-2 and 84th Street. Overall Level of Service was improved in both corridors; however, the non-beltway improvements did not result in acceptable Levels of Service on the congested roadways on the fringes of the city.

Non-beltway option 2 did not mitigate future traffic congestion as much as expected. The addition of capacity on N-2 also draws additional traffic and does not provide an acceptable Level of Service. The widening of 84th Street does not relieve congestion on 84th Street or the major north/south streets in the east corridor. In 1996 when the evaluation was conducted, this non-beltway option would have required the acquisition of approximately 45 homes and other structures. Since that time, there has been substantially more development along N-2, 84th Street and Pine Lake Road. Since option 2 had major impacts and yet did not provide significant congestion relief, it was not recommended for further analysis.

2.3.3 Preliminary Route Development

Preliminary route development of the beltway improvement alternatives established a 91 m (300 ft) wide band within each of the remaining seven beltway corridors in order to develop cost estimates and estimate environmental impacts. These bands attempted to avoid or minimize impacts to known natural and socioeconomic constraints, including natural areas, floodplains, streams, wetlands, historic sites, cemeteries, and park and recreation areas. The taking of and disruption to existing homes and farmsteads was also minimized while attempting to maintain a relatively straight alignment meeting a 110 km/h (70 mph) design speed.

The beltway alternatives were assumed to be built to freeway standards with all minor roadway intersections being grade separated and full access interchanges spaced approximately 3 km (2 mi) apart. In order for a proposed beltway to be most efficiently used, additional improvements will be required along the connecting roadways in the south and east corridors. Currently most of the roads that intersect a possible beltway are two-lane unpaved county roads. These would be upgraded to four-lane paved roads for roads that provide access to the beltway interchanges; those that cross the beltway with overpasses would be upgraded to two-lane paved roads.

Typical sections were chosen for both the beltway and non-beltway alternatives through discussions with NDOR and the City of Lincoln. The NDOR Standard Section for a Rural Expressway was used for all beltway alignments. A rural expressway typical section is shown in **Figure 2.7** and has the following features:

1. Approximately 76 to 91 m (250 to 300 ft) right-of-way; right-of-way needs vary with topography
2. Two 3.7 m (12 ft) driving lanes in each direction
3. 2.4 m (8 ft) paved outside shoulders
4. 0.9 m (3 ft) paved inside shoulders
5. 12 m (40 ft) unpaved depressed median (includes inside shoulders)
6. Drainage ditches on either side as needed

Alignments were also developed for the non-beltway alternatives for the purpose of developing cost estimates and determining possible environmental impacts. The non-beltway alignments attempted to utilize the centerline of existing section line roads with access limited as much as is reasonable in order to provide a safe and efficient roadway. Intersections along the non-beltway alternatives would be at grade with stop sign control at minor intersections and traffic signals at major intersections with minimum signal spacing of 0.4 km (0.25 mi). The non-beltway alternatives would have a design speed of 60 to 70 km/h (40 to 45 mph).

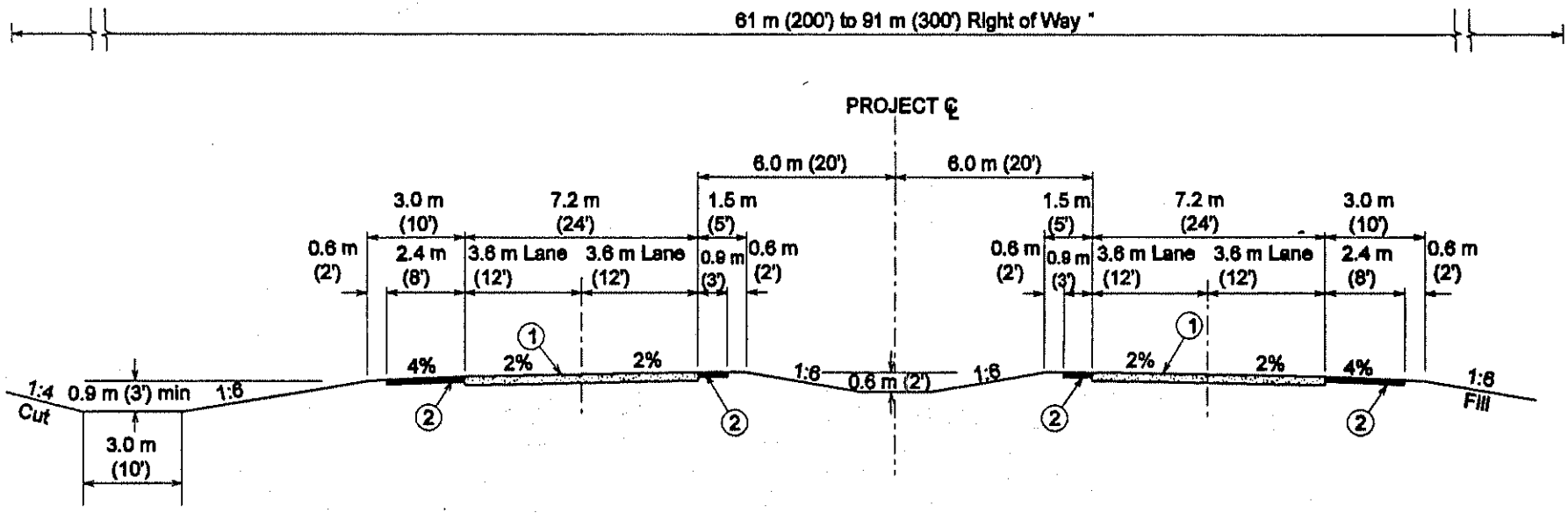
City of Lincoln fringe roadway standards were used on all four-lane non-beltway alignments. A typical fringe roadway section is shown in **Figure 2.8** and has the following features:

1. 30 m (100 ft) right-of-way, increasing to 37 m (120-ft) at major intersections to allow for auxiliary turn lanes
2. Two 3.7 m (12 ft) driving lanes in each direction with 0.3 m (1 ft) curb and gutter on the inside and outside driving lanes
3. 6 m (20 ft) landscaped raised center median
4. 1.2 m (4 ft) sidewalk separated from the driving lanes by an 2.4 m (8 ft) landscaped area

A 46 m (150 ft) right-of-way was assumed for six -lane sections.

2.3.4 Preliminary Environmental Analysis

The Level III environmental analysis involved determination of key socioeconomic, land use and environmental issues. This was accomplished through the development of the evaluation criteria (**Table 2.6**). Using the associated measured parameters, specific impacts were calculated for each of the remaining 20 beltway and 3 non-beltway routes. This information was presented and compared in a preliminary matrix of environmental impacts of the alternatives. The environmental analysis in conjunction with the previous work with traffic projections, engineering and cost estimates were used to conduct initial task screening.



* R/W width depends on terrain; wider @ interchanges

LEGEND

(1) 250 mm (10") CONCRETE PAVEMENT

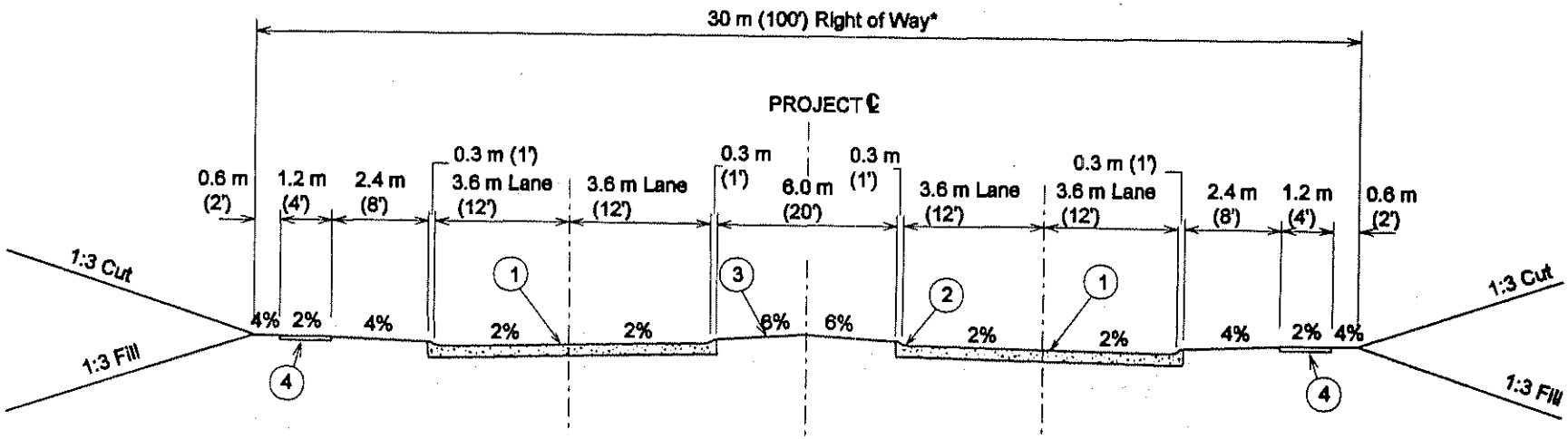
(2) 150 mm (6") ASPHALT SHOULDER

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

BELTWAY TYPICAL SECTION

Figure 2.7

Figure 2.7



* R/W wider @ major intersections, typically 37 m (120').

LEGEND

1. 250 mm (10") CONCRETE PAVEMENT
2. 150 mm (6") INTEGRAL CURB (typical)
3. LANDSCAPE MEDIAN
4. 100 mm (4") CONCRETE SIDEWALK

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

NON-BELTWAY TYPICAL SECTION

Figure 2.8

Figure 2.8

Data Collection. Data for the Level III environmental analysis was collected from existing sources of information, including the project GIS constraints map (**Figure 2.1**) and April 1995 City aerial photography (more recent aerial photography flown in March and April 1997 was available for for the Level IV analysis). Additional field checks were made by driving through the study area at different points during the study, and most recently in June 2000. The 91 m (300 ft) wide beltway right-of-way was used to define the area of direct project impacts 37 m (120 ft) for the non-beltway. Beyond this a 0.4 km (0.25 mi) area was defined which could be affected by indirect or secondary impacts.

Of the 34 parameters, numerical data was collected for all but three--economic development opportunities, compatibility with future land use, and air quality. For economic development, it was assumed that all of the routes will provide similar opportunities. Regarding compatibility with future land use, the City of Lincoln took the position that future land use plans will be evaluated following the completion of the beltway study. Certainly, many scenarios are possible based on the City's vision for the sequence and location of future growth. Regarding air quality, differences between the routes will be extremely minor due to the similarity of the rural character of all the routes, and the magnitude of the values will have no impact on the attainment status for the City; therefore, this time consuming model was not run until the Level IV analysis. Considering that no weighting factors were applied to the evaluation criteria, it was unlikely that the addition of data for these three parameters would substantially change the findings of the environmental evaluation.

Environmental Comparison. The preliminary matrix of environmental impacts of the 20 beltway and 3 non-beltway alternatives is presented in **Table 2.7.** In all cases, higher measured values represent higher impacts. It should be noted that all values are relative, and even the highest values for a given parameter may not represent a significant impact. For example, for all the alternatives, the maximum number of commercial businesses within 0.4 km (0.25 mi) of the alignment ranges is one business. Although this may be an inconvenience to the one property owner (or it may be an improvement in access), one commercial business along a 27 to 34 km (17 to 21 mi) long alignment would not be considered a significant project impact. On the other hand, the number of structures within 0.4 km (0.25 mi) ranges from 73 with beltway Route 10 to over 492 with non-beltway option 2. This parameter gives an indication of the number of residences that could be affected by noise and visual impacts, as well as changes in access. In this case, the difference in magnitude between the high and low measured values would be considered a significant difference.

The measured parameters were preliminarily reviewed, and values in the upper half of the measured range were identified as having higher impacts. For each route, the number of parameters occurring in the upper half of the range was summed, and the distribution of the routes was plotted to find natural breaks. Routes were categorized based on the number of parameters that occurred in the upper half of the range. This method was used to categorize beltway routes as high, medium and low environmental impact, and to compare various combinations of similar routes to determine which had higher or lower environmental impact (**Table 2.8**).

TABLE 2.7
LEVEL III PRELIMINARY ENVIRONMENTAL IMPACT MATRIX
MEASURED VALUES

			East Close Combinations				East Mid Combinations										East Far Combinations						Non Beltway		
			EC1 to SC1	EC1 to SC4	EC1 to SM4	EC1 to SF1	EM1 to SF1	EM1 to SC1	EM1 to SC1	EM1 to SC4	EM1 to SC4	EM1 to SM4	EM1 to SM4	EM1 to SF1	EM1 to SF1	EM1 to SM4	EF1 to SC1	EF1 to SC4	EF1 to SM4	EF1 to SM4	EF1 to SF1	EF1 to SF1	98th & Yankee Hill	84th & Pine Lake	98th & Yankee Hill
ID #	Evaluation Criteria	Measured Parameter	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8	Route 9	Route 10	Route 11	Route 12	Route 13	Route 14	Route 15	Route 16	Route 17	Route 18	Route 19	Route 20	Non-Belt Option 1	Non-Belt Option 2	Non-Belt Option 3
S.1	Impacts to Residences	*Number of structures within ROW (takings)*	25	22	16	16	10	16	21	15	18	7	14	7	12	12	25	24	17	20	13	16	1	45	8
S.2	Impacts to Commercial Businesses	*Number of businesses within ROW (takings)*	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0		9
		Number of businesses within 0.4 km (0.25 mi)	2	2	2	2	3	6	5	6	5	4	3	4	5	5	2	2	0	1	1	1	1		1
S.3	Impacts to Agriculture	*Hectares (acres) of cropland within ROW*	183 (452)	197 (488)	227 (562)	226 (558)	249 (615)	250 (617)	237 (585)	263 (649)	251 (620)	286 (706)	241 (596)	284 (702)	280 (691)	281 (694)	261 (645)	274 (677)	289 (713)	303 (749)	296 (732)	325 (803)	73 (181)	0	83 (205)
S.4	Economic Development Opportunities	*Economic development opportunities*																							
S.5	Impacts to Existing School Districts	*Hectares (acres) removed from tax base*	1,170	1,159	1,197	1,208	1,315	1,229	1,208	1,229	1,186	1,251	1,297	1,251	1,251	1,229	1,315	1,294	1,315	1,402	1,337	1,423	110	127	133
		Percent of total district acres severed	4.6	5.7	4.3	4.6	6.1	7.9	8.7	8.4	8.7	6.9	7.3	7.1	7.8	5.8	7.9	9.6	9.6	9.9	9.9	8.9	2.0	0.5	2.5
S.6	Impacts to Non-Tillable Land	*Hectares (acres) of pasture, hayland, and CRP land within ROW*	473 (1,170)	469 (1,159)	484 (1,197)	489 (1,208)	532 (1,315)	497 (1,229)	489 (1,208)	497 (1,229)	480 (1,186)	506 (1,251)	525 (1,297)	506 (1,251)	506 (1,251)	497 (1,229)	532 (1,315)	524 (1,294)	532 (1,315)	567 (1,402)	541 (1,337)	576 (1,423)	45 (110)	51 (127)	54 (133)
L.1	Impacts to Platted Subdivisions	*Number of platted subdivisions crossed*	7	4	1	1	2	9	9	6	6	3	2	3	3	3	6	3	0	1	0	0	2		2
		Hectares (acres) of platted subdivisions within ROW (takings)	15 (37)	14 (35)	0	0	8 (19)	27 (67)	23 (56)	26 (65)	22 (54)	12 (31)	8 (19)	12 (31)	8 (20)	8 (20)	15 (37)	14 (35)	0	0	0	0	0.4 (1)	0	0.4 (1)
L.2	Impacts to Parks and Recreation Areas	*Hectares (acres) of parkland within ROW (takings)*	11 (27)	4 (11)	0	0	0	11 (27)	11 (27)	4 (11)	4 (11)	0	0	0	0	0	11 (27)	4 (11)	0	0	0	0	3 (8)	2 (5)	5 (13)
L.3	Impacts to Golf Courses	*Hectares (acres) of golf course property within ROW (takings)*	0	0	0	0	0.4 (1)	0.4 (1)	0.4 (1)	0.4 (1)	0.4 (1)	0.4 (1)	0.4 (1)	0.4 (1)	0.4 (1)	0.4 (1)	0	0	0	0	0	0	4 (11)	0	4 (11)
L.4	Compatibility with Future Land Use Plan	*Compatibility with future land use*																							
L.5	Minimize Barrier Effect	*Average distance from built up area in km (mi)*	3.7 (2.3)	4.0 (2.5)	5.1 (3.2)	5.8 (3.6)	7.1 (4.4)	5.1 (3.2)	5.1 (3.2)	5.3 (3.3)	5.3 (3.3)	6.4 (4.0)	6.4 (4.0)	7.1 (4.4)	7.1 (4.4)	6.4 (4.0)	6.1 (3.8)	6.4 (4.0)	7.6 (4.7)	7.6 (4.7)	8.0 (5.0)	8.0 (5.0)	0	0	0
L.6	Trail System Enhancements	*Number of hiker/biker trail crossings*	4	4	2	2	1	3	3	3	3	1	1	1	1	1	3	3	1	1	1	1	4	4 +	4
E.1	Water Quality Impacts	*Hectares (acres) of wellhead protection zones within ROW*	92 (227)	88 (218)	69 (170)	69 (170)	65 (161)	88 (218)	88 (218)	85 (209)	85 (209)	65 (161)	65 (161)	65 (161)	65 (161)	65 (161)	81 (200)	77 (191)	58 (143)	58 (143)	58 (143)	58 (143)	46 (113)	43 (107)	46 (113)
E.2	Air Quality Impacts (1)	*Air quality*																							
E.3	Drainage and Hydrology Impacts	*Number of stream crossings*	2	2	2	2	3	2	2	2	2	2	3	2	2	2	2	2	1	2	1	2	4	3 +	4
		Hectares (acres) of floodway within ROW	29 (71)	29 (71)	29 (71)	29 (71)	11 (27)	10 (26)	10 (26)	10 (26)	10 (26)	10 (26)	11 (27)	10 (26)	10 (26)	10 (26)	0	0	0	0	0	0	4 (10)	3 (8)	6 (15)
		Hectares (acres) of 100-year floodplain within ROW	28 (69)	19 (48)	30 (73)	18 (45)	23 (58)	31 (77)	33 (82)	23 (56)	25 (61)	33 (82)	36 (89)	22 (54)	24 (58)	35 (86)	34 (83)	25 (62)	37 (92)	38 (93)	24 (60)	28 (68)	6 (15)	8 (19)	16 (40)
E.4	Noise Impacts	*Number of structures within 0.4 km (0.25 mi)*	245	222	157	172	77	144	188	122	165	58	68	73	115	100	169	148	85	92	94	97	262	492 +	298
E.5	Riparian Corridors Impacts	*Number of stream crossings*	2	2	2	2	3	2	2	2	2	2	3	2	2	2	2	2	1	2	1	2	4	3 +	4
		Hectares (acres) of riparian corridor within ROW	29 (72)	32 (79)	24 (60)	24 (58)	18 (44)	18 (45)	27 (68)	21 (52)	31 (75)	13 (33)	22 (54)	13 (31)	22 (54)	23 (56)	30 (74)	33 (81)	34 (84)	31 (77)	30 (74)	25 (61)	10 (25)	0	13 (31)
E.6	Wetlands Impacts	*Number of mapped wetlands within ROW*	15	10	13	17	14	6	11	3	6	4	12	8	13	9	15	12	16	5	18	12	2	1 +	4
E.7	Natural Habitat Impacts	*Impact to natural habitats within ROW (0 - 5)*	5	4	3	3	3	4	4	3	4	2	3	2	3	3	5	4	3	2	3	3	3	3	3
E.8	Cultural Resources Impacts	*Number of National Register sites within ROW*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
		Number of known cultural resources within ROW	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0		0
		Number of potential resources within ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
		Number of known resources within 0.4 km (0.25 mi)	2	2	2	2	2	2	3	2	3	2	2	2	3	3	1	1	1	3	1	2	2		2
		Number of potential resources within 0.4 km (0.25 mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
E.9	Visual Impacts	*Number of structures within 0.4 km (0.25 mi)*	245	222	157	172	77	144	188	122	165	58	68	73	115	100	169	148	85	92	94	97	262	492 +	298
		Number of platted subdivisions within 0.4 km (0.25 mi)	8	11	6	6	1	3	5	6	8	1	1	1	3	3	2	5	0	0	0	1	4		4
		Number of parks within 0.4 km (0.25 mi)	1	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1		1
		Number of golf courses within 0.4 km (0.25 mi)	1	1	1	1	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0

(1) Differences between routes will be extremely minor. Magnitude of values will have no impact on attainment area status for city.

Table 2.8

RELATIVE ENVIRONMENTAL IMPACT OF BELTWAY ALTERNATIVES[1]

HIGH IMPACT	MEDIUM IMPACT	LOW IMPACT
Route 1 (20) EC-1 - SC-1	Route 3 (11) EC-1 - SM-4	Route 5 (9) EM-1 - SF-1
Route 2 (17) EC-1 - SC-4	Route 4 (12) EC-1 - SF-1	Route 10 (8) EM-1 - SM-4
Route 6 (14) EM-1 - SC-1	Route 8 (12) EM-1 - SC-4	Route 11 (9) EM-1 - SM-4
Route 7 (19) EM-1 - SC-1	Route 13 (11) EM-1 - SF-1	Route 12 (8) EM-1 - SF-1
Route 9 (15) EM-1 - SC-4	Route 18 (11) EF-1 - SM-4	Route 14 (8) EM-1 - SM-4
Route 15 (17) EF-1 - SC-1	Route 20 (12) EF-1 - SF-1	Route 17 (7) EF-1 - SM-4
Route 16 (14) EF-1 - SC-4		Route 19 (8) EF-1 - SF-1

[1] The number of high impact parameters is shown in parentheses.

Based on the categorization of the routes, the highest impact routes are generally the south close routes (with the exception of Route 8, a variation of EM1-SC4, which was considered medium impact). These routes generally have high impact on residences, subdivisions, park land, trails and non-tillable land, but have relatively small right-of-way requirements and low impact on cropland.

Lowest impact routes were generally the east mid routes that did not involve park crossings (with the exception of Route 13, which followed the north diagonal and was considered medium impact) and the east far routes that followed the short diagonal (Routes 17 and 19). These routes typically have relatively low impact to residences, park land and a variety of parameters typical of the more developed areas of the study area. The routes have relatively large right-of-way requirements, and high impacts to cropland, floodplains, wetlands, and school districts.

2.3.5. Initial Task Screening of Alternatives

Initial task screening was required to maintain the intended project design which called for the Level III analysis to be conducted on 5 to 10 candidate alternatives. For this purpose, matrix data was used to compare and contrast beltway and non-beltway options as described above. By direction of the Management Committee (April 28, 1997), no weighting factors were applied to the data although some parameters will certainly be considered more significant than others. Information on traffic operations and project cost was used to supplement the environmental comparisons.

Similar pairs of routes were compared to identify those with lower impact. In particular, the method was used to compare (1) the two Wilderness Park crossings, (2) the two diagonal combinations for the east far alternatives, (3) the south far combinations, and (4) the non-beltway options. Based on these findings, recommendations were made to eliminate the less desirable routes.

Wilderness Park Crossings. Review of the matrix data showed that of the two south close alternatives, SC-1 (the north park crossing) has greater overall negative impact than SC-4 (the south park crossing), including:

1. More hectares (acres) taken from Wilderness Park (10.9 vs. 4.5 ha (27 vs. 11 ac) with the south crossing)
2. More hectares (acres) taken of pasture, hayland, and CRP land
3. More hectares (acres) taken from the school district tax base
4. More crossings of platted subdivisions
5. More hectares (acres) taken from platted subdivisions
6. More hectares (acres) of wellhead protection areas within the right-of-way
7. More hectares (acres) of 100-year floodplain within the right-of-way
8. More structures within the 0.4 km (0.25 mi) secondary impact area
9. More mapped wetlands within the right-of-way
10. Greater impact to natural habitats

The south park crossing has greater negative impact than the north park crossing for the following parameters:

1. Hectares (acres) taken of cropland
2. Percent of the school district attendance areas on the opposite side of the beltway from the schools
3. Distance from the built up area
4. Hectares (acres) of riparian corridor within the right-of-way
5. Number of platted subdivisions within the 0.4 km (0.25 mi) secondary impact area

In addition, Route SC-1 would cost approximately $5.4 million more to construct due to the longer bridge over Wilderness Park. Future traffic estimates show that SC-4 would carry approximately 14 percent less traffic than SC-1. However, overall network savings would be the same. There is also little difference in traffic on parallel streets. For example, traffic on Pine Lake Road between Highway 2 and 14th Street increases only 3 to 4 percent with the SC-4 alignment as compared to the SC-1 alignment.

Considering that the two south close alternatives provide a comparable traffic solution, have fairly close costs, and have similar impacts for many measured parameters, it is recommended that routes with the north park crossings (Routes 1, 6, 7, and 15), be eliminated from further consideration because of the overall greater negative socioeconomic, land use and environmental impacts and especially because of the greater impact to Wilderness Park.

Diagonal Combinations for the East Far Alternatives. Review of the matrix data showed that of the two diagonal combinations for the east far alternatives, the far southeast corner routes (Routes 18 and 20) have greater overall negative impact than shorter diagonal routes (Routes 17 and 19), including:

1. More hectares (acres) taken of pasture, hayland, and CRP land
2. More hectares (acres) taken of cropland
3. More hectares (acres) taken from the school district tax base
4. An additional stream crossing
5. More hectares (acres) of 100-year floodplain within the right-of-way
6. More structures within the 0.4 km (0.25-mi) secondary impact area
7. More known cultural resources within the 0.4 km (0.25-mi) secondary impact area

The shorter diagonal had greater negative impact than the far southeast diagonal for the following parameters, including:

1. Hectares (acres) of riparian corridor within the right-of-way
2. More mapped wetlands within the right-of-way

Considering that the two diagonal combinations provide a comparable traffic solution and have similar impacts for many measured parameters, it is recommended that far southeast diagonal routes (Routes 18 and 20) be eliminated from further consideration because of the overall greater negative socioeconomic, land use and environmental impacts.

South Far Alternatives. Any alternatives involving the south far alignments were less desirable from a traffic and cost standpoint. Traffic projections show that the south far option would carry very little traffic and would mainly serve the US 77 South and N-2 East movements. The cost of the south far beltway is approximately $11.8 million more than the south mid alignment primarily due to the additional length.

Considering that the south far alternatives provide less traffic benefits and had greater impacts (Routes 4, 13 and 20) or at least comparable impacts (Routes 5, 12 and 19) than the south mid alternatives for many measured parameters, it was recommended that all south far routes (Routes 4, 5, 12, 13, 19, and 20) be eliminated from further consideration. This recommendation also applies to Route 18 which is the far south east diagonal connecting the east far alignment to the south mid alignment.

Non-Beltway Option 2. The model shows that even by maximizing capacity with non-beltway option 2, congestion and reduced capacity would remain on arterial streets even with N-2, 84th Street and Pine Lake Roads widened to six lanes. In addition, non-beltway option 2 would impact significantly more residences and other structures than either of the other two non-beltway alternatives. At the time of the 1996 analysis this included taking an estimated 45 structures, with potential secondary noise, visual and access impacts to over 1,000 residences and other structures within the defined 0.4 km (0.25 mi) secondary impact area.

Because of these impacts to residences, it was recommended that non-beltway option 2 be eliminated from further consideration.

Summary of Alternatives Carried Forward. Initial task screening resulted in elimination of 11 end-to-end beltway alternatives which had relatively higher impacts than other alternatives including longer crossings through Wilderness Park, longer diagonal segments for the east far alternatives, or which included the south far alternatives which carried less traffic and cost more. In addition, one non-beltway alternative was eliminated which required 45 residential relocations. This was approved by the Management Committee on April 28, 1997. Nine end-to-end beltway and 2 non-beltway alternatives were carried forward for further analysis. These were beltway routes 2, 3, 8, 9, 10, 11, 14, 16, and 17, and non-beltway options 1 and 3.

2.3.6 Preliminary Economic Analysis

An indicator of the relative merit of a major transportation investment is the extent to which the community is or is not better off with the new roadway. It is almost without question that any well planned transportation investment will provide its users with benefits. The economic feasibility process examines these benefits and compares them with the costs of building and operating the roadway improvement. Theoretically, the value of the benefits should be greater than the cost of the improvements, but this is not always a reality. Many transportation projects are constructed without an economic analysis or determination of economic feasibility.

An economic analysis was conducted for the south and east beltways study that is consistent with the guidelines and procedures established by the Federal Highway Administration for major transportation projects. The objective of this analysis was to determine the relative economic feasibility of the various beltway and non-beltway alternatives.

2.3.6.1 Overview of the Economic Evaluation Process

The economic approach used to evaluate the investment in various beltway and non-beltway alternatives in Lincoln, while being tailored to the study, is one which has been used on other corridor studies, and one which has evolved over the years. The methodology is reasonably comprehensive and credible, and it is one that utilizes accepted economic principles. This approach includes the following steps:

1. A base case, No Build Alternative, is developed (existing roadway system plus committed improvements). The economic benefits of the various improvement alternatives are calculated by comparing the improved case with the base case. The feasibility of each alternative can then be determined.
2. A generalized estimate of the beltway and non-beltway life cycle costs is developed. Costs are tabulated in constant dollars (inflation is not factored in) by "discounting back" to the base year.
3. Use of the new or improved roadways is estimated.
4. Estimated travel efficiency economic benefits attributable to the potential roadway investments are quantified. As with costs, benefits are also tabulated in constant dollars (inflation is not factored in) by "discounting back" to the base year.
5. A comparison is made of the economic costs and economic benefits attributable to each investment alternative.
6. Conclusions are drawn with respect to the economic impact and feasibility of investing in a beltway or non-beltway alternative.

Indicators of Economic Feasibility. The comparison of costs and benefits of a Lincoln roadway investment alternative yields three indicators of "economic feasibility".

> Net Present Value. All costs and benefits in future years are discounted back to the base year. When the sum of the discounted benefits is greater than the sum of the discounted costs, the "net present value" is positive and the roadway investment alternative is deemed to be "economically feasible".

Discounted Benefit/Cost Ratio. This ratio is calculated as the sum of the discounted benefits divided by the sum of the discounted costs. When the result is 1.0 or greater, the roadway is considered to be "economically feasible".

Internal Rate of Return. This calculation determines that discount rate at which the net present value is zero (the sum of the discounted benefits is equal to the sum of the discounted costs). If the rate of return is greater or equal to the discount rate, then the investment is deemed to be "economically feasible."

All of these indicators utilize the discount rate either directly to "discount" benefits and costs or indirectly as a comparison for the Internal Rate of Return. The discount rate reflects the constant value of money without the affects of inflation. A constant dollar discount rate of seven (7) percent was used in this study, as required by the US Office of Management and Budget (OMB).

Included in the above economic feasibility calculations are all quantifiable direct economic costs attributable to the roadway project (cost of planning, designing, building, maintaining and operating the roadway) and all quantifiable economic benefits relating to efficiency (operating cost savings, value of time savings, accident cost savings). Excluded from the economic cost-benefit calculations are economic development impacts on the corridor, as well as those impacts that cannot reasonably be tabulated in monetary terms (environmental or social implications, impacts on other modes of transportation, etc.). As a result, the economic feasibility calculation is important to the beltway and non-beltway investment decision, but should not be viewed as the only criterion.

2.3.6.2 Economic Efficiency Evaluation

In the assessment of economic feasibility, a life cycle approach is used. The costs of planning, designing, building, and maintaining a new freeway-type beltway or non-beltway improvement are estimated over a 33-year period. Then, the transportation efficiency gains (or loss) over that period are estimated. Efficiency benefits are finally compared with the costs to determine economic feasibility. The assumption of constructing the facility in three years and having its full use for the next 30 years is not realistic. The preferred alternative will likely be phased in over many years and may not be completed within the next 20 years. Phased or delayed construction would improve the economic feasibility of all the alternatives, therefore the results of this analysis should be considered conservative.

Assumptions used in the benefit/cost evaluation were recommended by the study consultants and approved by the Beltway Management Committee.

Economic Costs. The cost side of the benefit/cost evaluation includes two costs: (1) the cost of constructing a beltway or the costs of improving an existing roadway, and (2) the cost of operating and maintaining a new freeway- type beltway in Lincoln or the incremental cost of operating and maintaining an improved roadway for the non-beltway alternatives. These costs are summarized for the various alternatives in **Table 2.9**.

Table 2.9

ECONOMIC COSTS ($1,000's)

ROUTE	ALTERNATIVE	CONSTRUCTION COSTS[1]	RESIDUAL VALUE	ANNUAL[2] MAINTENANCE
2	EC-1 to SC-4	$171,578	$78,063	$115
3	EC-1 to SM-4	154,770	73,803	117
8	EM-1 to SC-4 (west of Magee Lake)	168,593	74,675	119
9	EM-1 to SC-4 (via north diagonal)	165,362	72,485	119
10	EM-1 to SM-4 (west of Magee Lake)	155,538	71,357	123
11	EM-1 to SM-4 (east of Magee Lake)	162,941	74,160	128
14	EM-1 to SM-4 (via north diagonal)	155,738	71,362	127
16	EF-1 to SC-4	172,886	71,487	127
17	EF-1 to SM-4 (via short diagonal)	156,996	64,876	129
	Non-Beltway Option 1	86,994	19,879	100
	Non-Beltway Option 3	91,131	15,711	122

[1] 1996 Dollars.
[2] Highway Statistics, U.S. Department of Transportation, Federal Highway Administration, 1995

Construction Costs. These costs include right-of-way acquisition, planning, design and construction. The construction costs of the various alternatives were estimated to range from $87 to $173 millions. For benefit/cost purposes only, the construction costs were assumed to be spent in 3 years. **Tables 2.10-M** (metric) and **2.10-E** (English) provide a breakdown of the beltway estimated construction costs by route designation. The beltway costs include connecting link improvements. Non-beltway costs can be found on **Table 2.11.**

Residual Value. A 33-year period (30 years of operation following 3 years of construction) was used to analyze the economic feasibility of beltway and non-beltway options. However, some components of the roadway investment can be expected to last longer than 30 years. To recognize this, portions of the cost of the beltway and non-beltway elements that will last longer than 30 years following construction are added as economic benefits at the end of the last study year. After 30 years of operation the residual values for the various options range from $15 to $78 million based on the useful lives of the various construction cost elements exclusive of engineering, administration and contingencies costs.

Operations and Maintenance Costs were obtained from average historical costs for various types of roadway on a per route mile or lane mile basis. Incremental annual operating and maintenance costs range from $100 to $129 thousand.

TABLE 2.10 - E
BELTWAY PRELIMINARY COST ESTIMATES - ENGLISH UNITS
1996 DOLLARS

ITEM	ROUTE 2				ROUTE 3				ROUTE 8				ROUTE 9				ROUTE 10				ROUTE 11				ROUTE 14				ROUTE 16				ROUTE 17			
	QUANTITY	UNIT	UNIT PRICE	AMOUNT	QUANTITY	UNIT	UNIT PRICE	AMOUNT	QUANTITY	UNIT	UNIT PRICE	AMOUNT	QUANTITY	UNIT	UNIT PRICE	AMOUNT	QUANTITY	UNIT	UNIT PRICE	AMOUNT	QUANTITY	UNIT	UNIT PRICE	AMOUNT	QUANTITY	UNIT	UNIT PRICE	AMOUNT	QUANTITY	UNIT	UNIT PRICE	AMOUNT	QUANTITY	UNIT	UNIT PRICE	AMOUNT
WILDERNESS PARK GRADE SEPARATION																																				
structure	*136,800*	*sq ft**	*$90*	*$12,312,000*	*0*	*sq ft*	*$90*	*$0*	*136,800*	*sq ft**	*$90*	*$12,312,000*	*136,800*	*sq ft**	*$90*	*$12,312,000*	*0*	*sq ft*	*$90*	*$0*	*0*	*sq ft*	*$90*	*$0*	*0*	*sq ft*	*$90*	*$0*	*136,800*	*sq ft**	*$90*	*$12,312,000*	*0*	*sq ft*	*$90*	*$0*
embankment	*162,000*	*cu yd*	*$2*	*$324,000*	*0*	*cu yd*	*$2*	*$0*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*162,000*	*cu yd*	*$2*	*$324,000*	*0*	*cu yd*	*$2*	*$0*
mitigation				*$1,000,000*				*$0*				*$1,000,000*				*$1,000,000*				*$0*				*$0*				*$0*				*$1,000,000*				*$0*
total				$13,636,000				$0				$13,636,000				$13,636,000				$0				$0				$0				$13,636,000				$0
HALF CLOVERLEAF INTERCHANGE	2	ea	$3,550,000	$7,100,000	2	ea	$3,550,000	$7,100,000	1	ea	$3,550,000	$3,550,000	1	ea	$3,550,000	$3,550,000	1	ea	$3,550,000	$3,550,000	1	ea	$3,550,000	$3,550,000	1	ea	$3,550,000	$3,550,000	2	ea	$3,550,000	$7,100,000	2	ea	$3,550,000	$7,100,000
structure	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*
embankment	*550,000*	*cu yd*	*$2*	*$1,100,000*	*550,000*	*cu yd*	*$2*	*$1,100,000*	*550,000*	*cu yd*	*$2*	*$1,100,000*	*550,000*	*cu yd*	*$2*	*$1,100,000*	*550,000*	*cu yd*	*$2*	*$1,100,000*	*550,000*	*cu yd*	*$2*	*$1,100,000*	*550,000*	*cu yd*	*$2*	*$1,100,000*	*550,000*	*cu yd*	*$2*	*$1,100,000*	*550,000*	*cu yd*	*$2*	*$1,100,000*
ramps	*16,000*	*sq yd*	*$35*	*$560,000*	*16,000*	*sq yd*	*$35*	*$560,000*	*16,000*	*sq yd*	*$35*	*$560,000*	*16,000*	*sq yd*	*$35*	*$560,000*	*16,000*	*sq yd*	*$35*	*$560,000*	*16,000*	*sq yd*	*$35*	*$560,000*	*16,000*	*sq yd*	*$35*	*$560,000*	*16,000*	*sq yd*	*$35*	*$560,000*	*16,000*	*sq yd*	*$35*	*$560,000*
total each		*total each*		*$3,550,000*				$3,550,000		*total each*		*$3,550,000*		*total each*		*$3,550,000*				$3,550,000				$3,550,000				$3,550,000				$3,550,000				$3,550,000
CLOVERLEAF INTERCHANGE	2	ea	$4,530,000	$9,060,000	2	ea	$4,530,000	$9,060,000	3	ea	$4,530,000	$13,590,000	3	ea	$4,530,000	$13,590,000	3	ea	$4,530,000	$13,590,000	3	ea	$4,530,000	$13,590,000	3	ea	$4,530,000	$13,590,000	2	ea	$4,530,000	$9,060,000	2	ea	$4,530,000	$9,060,000
structure	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*
embankment	*760,000*	*cu yd*	*$2*	*$1,520,000*	*760,000*	*cu yd*	*$2*	*$1,520,000*	*760,000*	*cu yd*	*$2*	*$1,520,000*	*760,000*	*cu yd*	*$2*	*$1,520,000*	*760,000*	*cu yd*	*$2*	*$1,520,000*	*760,000*	*cu yd*	*$2*	*$1,520,000*	*760,000*	*cu yd*	*$2*	*$1,520,000*	*760,000*	*cu yd*	*$2*	*$1,520,000*	*760,000*	*cu yd*	*$2*	*$1,520,000*
ramps	*32,000*	*sq yd*	*$35*	*$1,120,000*	*32,000*	*sq yd*	*$35*	*$1,120,000*	*32,000*	*sq yd*	*$35*	*$1,120,000*	*32,000*	*sq yd*	*$35*	*$1,120,000*	*32,000*	*sq yd*	*$35*	*$1,120,000*	*32,000*	*sq yd*	*$35*	*$1,120,000*	*32,000*	*sq yd*	*$35*	*$1,120,000*	*32,000*	*sq yd*	*$35*	*$1,120,000*	*32,000*	*sq yd*	*$35*	*$1,120,000*
total each		*total each*		*$4,530,000*				$4,530,000		*total each*		*$4,530,000*		*total each*		*$4,530,000*				$4,530,000				$4,530,000				$4,530,000				$4,530,000				$4,530,000
DIAMOND INTERCHANGE	8	ea	$3,079,500	$24,636,000	8	ea	$3,079,500	$24,636,000	7	ea	$3,079,500	$21,556,500	7	ea	$3,079,500	$21,556,500	7	ea	$3,079,500	$21,556,500	7	ea	$3,079,500	$21,556,500	7	ea	$3,079,500	$21,556,500	7	ea	$3,079,500	$21,556,500	7	ea	$3,079,500	$21,556,500
structure	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*
embankment	*390,000*	*cu yd*	*$2*	*$780,000*	*390,000*	*cu yd*	*$2*	*$780,000*	*390,000*	*cu yd*	*$2*	*$780,000*	*390,000*	*cu yd*	*$2*	*$780,000*	*390,000*	*cu yd*	*$2*	*$780,000*	*390,000*	*cu yd*	*$2*	*$780,000*	*390,000*	*cu yd*	*$2*	*$780,000*	*390,000*	*cu yd*	*$2*	*$780,000*	*390,000*	*cu yd*	*$2*	*$780,000*
ramps	*11,700*	*sq yd*	*$35*	*$409,500*	*11,700*	*sq yd*	*$35*	*$409,500*	*11,700*	*sq yd*	*$35*	*$409,500*	*11,700*	*sq yd*	*$35*	*$409,500*	*11,700*	*sq yd*	*$35*	*$409,500*	*11,700*	*sq yd*	*$35*	*$409,500*	*11,700*	*sq yd*	*$35*	*$409,500*	*11,700*	*sq yd*	*$35*	*$409,500*	*11,700*	*sq yd*	*$35*	*$409,500*
total each		*total each*		*$3,079,500*				$3,079,500		*total each*		*$3,079,500*		*total each*		*$3,079,500*				$3,079,500				$3,079,500				$3,079,500				$3,079,500				$3,079,500
ROADWAY CROSSING	11	ea	$2,214,000	$24,354,000	9	ea	$2,214,000	$19,926,000	11	ea	$2,214,000	$24,354,000	10	ea	$2,214,000	$22,140,000	10	ea	$2,214,000	$22,140,000	11	ea	$2,214,000	$24,354,000	10	ea	$2,214,000	$22,140,000	10	ea	$2,214,000	$22,140,000	9	ea	$2,214,000	$19,926,000
structure	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*
embankment	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*
total each				*$2,214,000*				$2,214,000				*$2,214,000*				*$2,214,000*				$2,214,000				$2,214,000				$2,214,000				$2,214,000				$2,214,000
RAILROAD CROSSING	2	ea	$2,214,000	$4,428,000	4	ea	$2,214,000	$8,856,000	1	ea	$2,214,000	$2,214,000	1	ea	$2,214,000	$2,214,000	3	ea	$2,214,000	$6,642,000	3	ea	$2,214,000	$6,642,000	3	ea	$2,214,000	$6,642,000	1	ea	$2,214,000	$2,214,000	3	ea	$2,214,000	$6,642,000
structure	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*	*21,000*	*sq ft*	*$90*	*$1,890,000*
embankment	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*	*162,000*	*cu yd*	*$2*	*$324,000*
total each				*$2,214,000*				$2,214,000				*$2,214,000*				*$2,214,000*				$2,214,000				$2,214,000				$2,214,000				$2,214,000				$2,214,000
STREAM CROSSING	1	ea	$756,000	$756,000	2	ea	$750,000	$1,512,000	1	ea	$756,000	$756,000	1	ea	$756,000	$756,000	2	ea	$756,000	$1,512,000	3	ea	$756,000	$2,268,000	2	ea	$756,000	$1,512,000	1	ea	$756,000	$756,000	1	ea	$756,000	$756,000
structure	*8,400*	*sq ft*	*$90*	*$756,000*	*8,400*	*sq ft*	*$90*	*$756,000*	*8,400*	*sq ft*	*$90*	*$756,000*	*8,400*	*sq ft*	*$90*	*$756,000*	*8,400*	*sq ft*	*$90*	*$756,000*	*8,400*	*sq ft*	*$90*	*$756,000*	*8,400*	*sq ft*	*$90*	*$756,000*	*8,400*	*sq ft*	*$90*	*$756,000*	*8,400*	*sq ft*	*$90*	*$756,000*
embankment	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*	*0*	*cu yd*	*$2*	*$0*
total each				*$756,000*				$756,000				*$756,000*				*$756,000*				$756,000				$756,000				$756,000				$756,000				$756,000
INTERSECTION, AT GRAD	0	ea	$500,000	$0	0	ea	$500,000	$0	1	ea	$500,000	$500,000	1	ea	$500,000	$500,000	1	ea	$500,000	$500,000	1	ea	$500,000	$500,000	1	ea	$500,000	$500,000	0	ea	$500,000	$0	0	ea	$500,000	$0
PAVEMENT	538,400	sq yd	$35	$18,844,000	571,936	sq yd	$35	$20,017,760	575,484	sq yd	$35	$20,141,940	561,438	sq yd	$35	$19,650,330	601,264	sq yd	$35	$21,044,240	621,100	sq yd	$35	$21,738,500	594,394	sq yd	$35	$20,803,790	616,702	sq yd	$35	$21,584,570	640,287	sq yd	$35	$22,410,045
CONNECTING LINK PVMT	151,419	sq yd	$25	$3,785,475	225,269	sq yd	$25	$5,631,725	235,627	sq yd	$25	$5,890,675	217,405	sq yd	$25	$5,435,125	309,422	sq yd	$25	$7,735,550	315,544	sq yd	$25	$7,888,600	297,322	sq yd	$25	$7,433,050	301,741	sq yd	$25	$7,543,525	381,658	sq yd	$25	$9,541,450
EMBANKMENT (pavement)	1,242,600	cu yd	$2	$2,485,200	1,316,553	cu yd	$2	$2,633,106	1,324,719	cu yd	$2	$2,649,438	1,292,387	cu yd	$2	$2,584,774	1,384,064	cu yd	$2	$2,768,128	1,433,300	cu yd	$2	$2,866,600	1,368,157	cu yd	$2	$2,736,314	1,419,602	cu yd	$2	$2,839,204	1,473,892	cu yd	$2	$2,947,784
CULVERTS (major)	3	ea	$250,000	$750,000	4	ea	$250,000	$1,000,000	5	ea	$250,000	$1,250,000	4	ea	$250,000	$1,000,000	6	ea	$250,000	$1,500,000	6	ea	$250,000	$1,500,000	5	ea	$250,000	$1,250,000	6	ea	$250,000	$1,500,000	8	ea	$250,000	$2,000,000
SUBTOTAL				$109,834,675				$100,372,591				$110,088,553				$106,612,729				$102,538,418				$106,454,200				$101,713,654				$109,929,799				$101,939,779
HOUSES	22	ea	$500,000	$11,000,000	16	ea	$500,000	$8,000,000	15	ea	$500,000	$7,500,000	18	ea	$500,000	$9,000,000	17	ea	$500,000	$8,500,000	14	ea	$500,000	$7,000,000	12	ea	$500,000	$6,000,000	24	ea	$500,000	$12,000,000	17	ea	$500,000	$8,500,000
RIGHT-OF-WAY	0	ac	$10,000	$0	300	ac	$10,000	$3,000,000	827	ac	$10,000	$8,270,000	597	ac	$10,000	$5,970,000	1,251	ac	$10,000	$12,510,000	1,297	ac	$10,000	$12,970,000	1,000	ac	$10,000	$10,000,000	900	ac	$8,000	$7,200,000	900	ac	$8,000	$7,200,000
RIGHT-OF-WAY	1,159	ac	$12,000	$13,908,000	636	ac	$12,000	$10,752,000	400	ac	$12,000	$4,800,000	600	ac	$12,000	$7,200,000	0	ac	$12,000	$0	0	ac	$12,000	$0	238	ac	$12,000	$2,856,000	407	ac	$12,000	$4,884,000	425	ac	$12,000	$5,100,000
ENGINEERING DESIGN			6%	$6,590,081			6%	$6,022,355			6%	$6,605,313			6%	$6,396,764			6%	$6,152,305			6%	$6,387,252			6%	$6,102,819			6%	$6,595,788			6%	$6,116,387
CONSTRUCTION ADMIN			8%	$8,786,774			8%	$8,029,807			8%	$8,807,084			8%	$8,529,018			8%	$8,203,073			8%	$8,516,336			8%	$8,137,092			8%	$8,794,384			8%	$8,155,182
CONTINGENCIES			25%	$27,458,669			25%	$25,093,148			25%	$27,522,138			25%	$26,653,182			25%	$25,634,605			25%	$26,613,550			25%	$25,428,414			25%	$27,482,450			25%	$25,484,945
TOTAL				$177,578,198				$161,269,901				$173,593,089				$170,361,693				$163,538,401				$167,941,338				$160,237,979				$176,886,421				$162,496,293

*Includes two railroad crossings and one stream crossing

TABLE 2.11
NON-BELTWAY PRELIMINARY COST ESTIMATES
1996 DOLLARS

ITEM	OPTION SET #1			OPTION SET #2			OPTION SET #3		
	QUANTITY (ENGLISH)	UNIT PRICE (ENGLISH)	AMOUNT	QUANTITY (ENGLISH)	UNIT PRICE (ENGLISH)	AMOUNT	QUANTITY (ENGLISH)	UNIT PRICE (ENGLISH)	AMOUNT
WILDERNESS PARK									
GRADE SEPARATION									
structure	*15 385 sq m* (165,600 sq ft)*	*$970 ($90)*	*$14,904,000*	*18 210 sq m** (196,000 sq ft)*	*$970 ($90)*	*$17,640,000*	*0 sq m*** (0 sq ft)*	*$970 ($90)*	*$0*
embankment	*123 900 cu m (162,000 cu yd)*	*$2.60 ($2)*	*$324,000*	*185 800 cu m (243,000 cu yd)*	*$2.60 ($2)*	*$486,000*	*0 cu m (0 cu yd)*	*$2.60 ($2)*	*$0*
mitigation			*$1,000,000*			*$1,000,000*			*$0*
total			$16,228,000			$19,126,000			$0
RAILROAD CROSSING	*2 ea*	$2,214,000	$4,428,000	*1 ea*	$3,051,000	$3,051,000	*5 ea*	$2,214,000	$11,070,000
structure	*1 950 sq m (21,000 sq ft)*	*$970 ($90)*	*$1,890,000*	*2 648 sq m (28,500 sq ft)*	*$970 ($90)*	*$2,565,000*	*1 950 sq m (21,000 sq ft)*	*$970 ($90)*	*$1,890,000*
embankment	*123 900 cu m (162,000 cu yd)*	*$2.60 ($2)*	*$324,000*	*185 800 cu m (243,000 cu yd)*	*$2.60 ($2)*	*$486,000*	*123 900 cu m (162,000 cu yd)*	*$2.60 ($2)*	*$324,000*
total each			*$2,214,000*			*$3,051,000*			*$2,214,000*
STREAM CROSSING	*2 ea*	$756,000	$1,512,000	*4 ea*	$1,062,000	$4,248,000	*4 ea*	$756,000	$3,024,000
structure	*780 sq m (8,400 sq ft)*	*$970 ($90)*	*$756,000*	*1 096 sq m (11,800 sq ft)*	*$970 ($90)*	*$1,062,000*	*780 sq m (8,400 sq ft)*	*$970 ($90)*	*$756,000*
embankment	*0 cu m (0 cu yd)*	*$2.60 ($2)*	*$0*	*0 cu m (0 cu yd)*	*$2.60 ($2)*	*$0*	*0 cu m (0 cu yd)*	*$2.60 ($2)*	*$0*
total each			*$756,000*			*$1,062,000*			*$756,000*
INTERSECTIONS, AT GRADE (major)	*19 ea*	$500,000	$9,500,000	*24 ea*	$500,000	$12,000,000	*23 ea*	$500,000	$11,500,000
PAVEMENT	*529 850 sq m (633,700 sq yd)*	$42 ($35)	$22,179,500	*889 379 sq m (1,063,688 sq yd)*	$42 ($35)	$37,229,080	*693 820 sq m (829,800 sq yd)*	$42 ($35)	$29,043,000
CONNECTING LINK PAVEMENT	*131 901 sq m (157,752 sq yd)*	$30 ($25)	$3,943,800	*0 sq m (0 sq yd)*	$30 ($25)	$0	*125 038 sq m (149,544 sq yd)*	$30 ($25)	$3,738,600
PAVEMENT REMOVAL	*315 200 sq m (377,000 sq yd)*	$6 ($5)	$1,885,000	*431 860 sq m (516,500 sq yd)*	$6 ($5)	$2,582,500	*430 190 sq m (514,500 sq yd)*	$6 ($5)	$2,572,500
EMBANKMENT	*337 550 cu m (441,500 cu yd)*	$2.60 ($2)	$883,000	*643 450 cu m (841,600 cu yd)*	$2.60 ($2)	$1,683,200	*439 240 cu m (574,500 cu yd)*	$2.60 ($2)	$1,149,000
CULVERTS (major extensions)	*3 ea*	$100,000	$300,000	*1 ea*	$100,000	$100,000	*4 ea*	$100,000	$400,000
SUBTOTAL			$60,859,300			$80,019,780			$62,497,100
HOUSES	*1 ea*	$200,000	$200,000	*45 ea*	$200,000	$9,000,000	*8 ea*	$200,000	$1,600,000
RIGHT-OF-WAY	*45 ha (110 ac)*	$50,000 ($20,000)	$2,200,000	*51 ha (127 ac)*	$50,000 ($20,000)	$2,540,000	*54 ha (133 ac)*	$50,000 ($20,000)	$2,660,000
ENGINEERING DESIGN		6%	$3,651,558		6%	$4,801,187		6%	$3,749,826
CONSTRUCTION ADMINISTRATION		8%	$4,868,744		8%	$6,401,582		8%	$4,999,768
CONTINGENCIES		25%	$15,214,825		25%	$20,004,945		25%	$15,624,275
TOTAL			$86,994,427			$122,767,494			$91,130,969

* Includes one railroad crossing and one stream crossing.
** Includes two railroad crossings and one stream crossing.
*** 14th already at grade; no separation over Wilderness Park needed.

Economic Efficiency Benefits. Benefits and costs were determined using local data where available and national statistics when necessary. The economic benefits are those derived from increased transportation efficiency. Transportation cost savings that result from improvements to a corridor are true benefits to society as a whole. When travelers experience time savings, greater safety, or reduced vehicle operating costs, their gain is not offset by losses to other people. From an economic standpoint, these cost savings are the same as a direct increase in income by making resources available for other purposes.

The transportation efficiency benefits of a roadway improvement are of three types: travel-time savings, vehicle operating cost savings, and accident reduction savings. Transportation efficiency benefits are calculated for two vehicle types: passenger vehicles (automobiles) and commercial vehicles (trucks).

To provide consistency with the results of the travel demand model (Chapter 2, *Interim Report No. 3*, WSA, 1999), the economic efficiency benefits for each alternative were estimated for the same two analysis years, 1995 and 2020. This consistency was necessary since the results of the travel demand model are used to calculate benefits. Intermediate year benefits were interpolated between the two years and benefits beyond 2020 were extrapolated.

Travel Time Savings. One objective of the Lincoln south and east beltways project is to reduce the time required to travel around Lincoln. There are three potential ways to reduce travel time: (1) Reduce mileage to reach one's destination by offering a more direct route, (2) Increase the speed at which one can travel by providing facilities with higher design standards, (3) Reduce congestion by providing additional high capacity facilities. A methodology to take into account all three elements of time-savings was developed. For each trip with the potential to improve their trip time by using a beltway or non-beltway alternative the travel time with and without the new facility was calculated and summarized. Excess travel time due to congestion was calculated for each segment using the Highway Performance Monitoring System (HPMS) model methodology (December 1987) and data developed by FHWA (Appendix D, *Interim Report No. 3*, WSA, 1999). This methodology recognizes that excess travel time due to congestion-induced speed change cycles varies according to the level of congestion (expressed in terms of volume/capacity ratios) and varies by type of vehicle (it takes longer for a truck to resume original speed).

To include time-savings in the transportation efficiency evaluation, it was necessary to place a monetary value on time saved. In reality, the value of time varies by person and situation. For the purpose of this study, values of time based on average hourly wage rates in Nebraska and average occupancy and cargo values were developed using the FHWA methodology outlined in the Highway Economic Requirements System (HERS). These values of time are:

1. $23.4 per on-the-clock auto hour (travel while on business);
2. $8.64 per off-the-clock auto hour (commuter and non-business travel);
3. $25.3 per truck hour.

Vehicle Operating Cost Savings. The costs of operating motor vehicles can be a significant portion of the total cost of transportation. Vehicle operating costs include a number of components, some that are variable costs or use related costs, and others that are fixed costs (e.g. insurance and license fees). Only use related costs -- engine oil, gasoline, maintenance, and tires -- are directly affected by an improved roadway. Vehicle operating cost, like travel time, varies with the characteristics of the trip made including trip length, running speed, and speed change cycles. For each trip with the potential to use a beltway or non-beltway alternative the vehicle operating costs with and without the new facility were calculated using the results of the travel demand model. Again, the methodology and data of the HPMS model was used. With this methodology, vehicle operating costs vary with trip length, the various speeds on different portion of the trip, and the type of vehicle. Excess vehicle operating costs due to speed change cycles are also calculated by type of vehicle.

Accident Reduction Cost Savings. Improvement in roadway safety is another reason for considering roadway improvements. Because freeways and access controlled facilities are safer than roadways of a lesser standard, Lincoln beltway and non-beltway alternatives could reduce accident potential compared to the existing roadway system. National average accident rates by type of accident (fatal, injury, property damage only) and by type of roadway facility (freeway, principal arterial, etc.) were used to calculate accident potential in the Lincoln area with and without the roadway improvements considered.

To include the impact of reducing accidents in the transportation efficiency evaluation, a monetary value was associated with each type of accident. The values used for this study are based on the "The Economic Cost of Motor Vehicle Crashes (National Roadway Traffic Safety Administration (NHTSA), 1994). They are:

1. $2,854,000 per fatality
2. $654,000 per seriously injured person
3. $20,600 per other injured person
3. $1,600 per property damage only (PDO) vehicle

Total Transportation Efficiency Benefits. Total estimated transportation efficiency benefits over the 33-year analysis period, discounted at seven percent are presented in **Table 2.12**.

It is estimated that 33 years from the beginning of construction, a beltway or non-beltway alternative would save between $56 and $141 million to travelers in Lincoln depending on the alternative. The alternatives can be grouped in three categories based on total efficiency benefits.

1. The highest total benefits are for alternatives that combine a close beltway with another close or mid beltway.

    - Route 2: EC-1 to SC-4
    - Route 3: EC-1 to SM-4
    - Route 8: EM-1 to SC-4 (west of Magee Lake)
    - Route 9: EM-1 to SC-4 (via north diagonal)

Table 2.12

TOTAL EFFICIENCY BENEFITS
OVER THE 33-YEAR PERIOD[1] ($1,000's)
1996 Dollars

ROUTE	ALTERNATIVE	TRAVEL TIME SAVINGS	VEHICLE OPERATING COST SAVINGS	ACCIDENT REDUCTION SAVINGS	TOTAL EFFICIENCY BENEFITS
2	EC-1 to SC-4	$64,229	-$3,805	$78,386	$138,810
3	EC-1 to SM-4	59,984	-3,938	68,605	124,651
8	EM-1 to SC-4 (west of Magee	65,714	-872	67,833	132,675
9	EM-1 to SC-4 (via north diagonal)	68,754	1,201	70,887	140,842
10	EM-1 to SM-4 (west of Magee	59,929	-826	57,342	116,445
11	EM-1 to SM-4 (east of Magee	60,042	455	56,828	117,325
14	EM-1 to SM-4 (via north diagonal)	57,726	-600	59,042	116,169
16	EF-1 to SC-4	51,340	-3,812	54,800	102,328
17	EF-1 to SM-4 (via short diagonal)	40,287	-4,094	36,981	73,174
	Non-Beltway Option 1	51,393	-922	21,935	72,406
	Non-Beltway Option 3	39,783	-1,891	17,751	55,642

[1] Discounted at 7 percent per year.

2. The next highest total benefits are for all mid alternatives that combine with another mid alternative.

   - Route 10: EM-1 to SM-4 (west of Magee Lake)
   - Route 11: EM-1 to SM-4 (east of Magee Lake)
   - Route 14: EM-1 to SM-4 (via north diagonal)

3. The lowest total benefits are for alternatives that include the east far beltway, and the non-beltway alternatives.

   - Route 16: EF-1 to SC-4
   - Route 17: EF-1 to SM-4 (via short diagonal)
   - Non-Beltway Option 1
   - Non-Beltway Option 3

2.3.6.3 Economic Feasibility

To calculate the economic feasibility of the various beltway and non-beltway alternatives in terms of transportation efficiency, all costs and benefits in constant (1996) dollars were determined for the study period, and then discounted back to the first year of construction using a discount rate of 7 percent. The benefits were then compared with the costs using the conventional feasibility indicators discussed at the beginning of this section. **Table 2.13** presents the economic feasibility indicators for the beltway and non-beltway alternatives analyzed at this stage.

Table 2.13

ECONOMIC FEASIBILITY INDICATORS
TRAVEL EFFICIENCY FEASIBILITY ($1,000's)
1996 Dollars

ROUTE	ALTERNATIVE	NET PRESENT VALUE[1]	INTERNAL RATE OF RETURN	BENEFIT/ COST RATIO[1]
2	EC-1 to SC-4	-$19,074	6.8	0.97
3	EC-1 to SM-4	-4,523	6.8	0.96
8	EM-1 to SC-4 (west of Magee Lake)	-8,531	6.6	0.94
9	EM-1 to SC-4 (via north diagonal)	2,247	7.1	1.02
10	EM-1 to SM-4 (west of Magee Lake)	-13,706	6.3	0.89
11	EM-1 to SM-4 (east of Magee Lake)	-19,074	6.0	0.86
14	EM-1 to SM-4 (via north diagonal)	-14,200	6.2	0.89
16	EF-1 to SC-4	-43,032	4.8	0.70
17	EF-1 to SM-4 (via short diagonal)	-58,971	3.5	0.55
	Non-Beltway Option 1	-2,715	6.8	0.96
	Non-Beltway Option 3	-23,738	4.7	0.70

[1] Discounted at 7 percent per year

The previous table illustrates the relative economic feasibility of each alternative in terms of travel efficiency. When examining these results, it is important to remember that no model (travel demand model or benefit/cost model) is completely accurate. In terms of feasibility, the alternatives can be grouped in the same three categories used previously based on total benefits alone with one exception. Non-beltway option 1 shifted toward the most feasible group because it costs about half as much as the other beltway and non-beltway alternatives.

1. The most economically feasible alternatives are those that combine a close beltway with another close or mid beltway, and non-beltway option 1.

   - Route 2: EC-1 to SC-4
   - Route 3: EC-1 to SM-4
   - Route 8: EM-1 to SC-4 (west of Magee Lake)
   - Route 9: EM-1 to SC-4 (via north diagonal)
   - Non-Beltway Option 1

   Note that this group includes a beltway alternative that avoids Wilderness Park entirely (Route 3).

2. The next group of alternatives is less economically feasible; however, a change in discount rate to 6 percent or some reduction in costs could make them more feasible. This group includes the all mid alternatives.

   - Route 10: EM-1 to SM-4 (west of Magee Lake)
   - Route 11: EM-1 to SM-4 (east of Magee Lake)
   - Route 14: EM-1 to SM-4 (via north diagonal)

   None of these routes impact Wilderness Park.

3. The last group of alternatives is the least economically feasible. This group includes the east far beltway alternatives, and non-beltway option 3.

   - Route 16: EF-1 to SC-4
   - Route 17: EF-1 to SM-4 (via short diagonal)
   - Non-Beltway Option 3

   Again, one of the alternatives (Route 17) avoids impacts to Wilderness Park.

It should be pointed out that this analysis was performed using the Build Out Scenario (BOS) land use plan which is based on the approved 1994 Comprehensive Plan. Since that time, the BOS II land use plan was developed to account for revisions (amendments) to the 1994 plan (see **Section 2.4.1**). The assumptions in the BOS II scenario include large increases in beltway traffic volumes which are expected to improve most of the benefit/cost ratios to greater than 1.0 (see **Section 2.4.4**).

2.3.7 Wilderness Park Considerations

Wilderness Park was initially acquired with a $500,000 grant from the US Department of Housing and Urban Development (HUD) in the late 1960s and early 1970s for the purpose of flood control. Consultation with HUD indicated that there are no special requirements related to use of land purchased with these types of HUD grants. No Land and Water Resources Fund (LWRF) moneys were ever used for development of Wilderness Park. Therefore, the project would not need to comply with Section 6(f). However, Section 4(f) of the 1966 Transportation Act prohibits the FHWA from approving use of land from a significant publicly owned public park, recreation area, or wildlife or waterfowl refuge, or any significant historical site unless a determination is made that: (i) there is no feasible and prudent alternative to the use of the property, and (ii) the action includes all possible planning to minimize harm to the property resulting from such use.

Anticipated Park Impacts. At the beginning of the Level III analysis, two beltway (SC-1 and SC-4) and two non-beltway alternatives (options 1 and 2) required takings for new crossings through Wilderness Park (and all would require grade separations over Salt Creek and the railroad tracks). One non-beltway alternative (option 3) also required park takings for widening the existing at-grade crossing through the park.

Determination of Feasible and Prudent. To obtain 4(f) approval, supporting information must demonstrate that there are unique problems or unusual factors involved in the use of alternatives that avoid these properties or that the cost, social, economic, and environmental impacts, or community disruption resulting from such alternatives reach extraordinary magnitudes.

Since any beltway alternative through Wilderness Park would likely have greater cost, social and economic impact, and community disruption, the primary question arose as to whether traffic need would be considered as a unique problem or unusual factor. Because the project purpose and need was to solve a traffic problem, and if the park routes better served this need (or the southern routes did not serve this need), then there would be a strong case for approval of the 4(f). Therefore, it was considered premature to throw out the park routes prior to the determining feasibility in the Level III analysis.

Based on the results of the economic feasibility study, it was shown that there are feasible alternatives that avoid impacts to Wilderness Park. If there are feasible and prudent alternatives, then routes requiring park or any other 4(f) land must be eliminated.

Future Park Expansion. Extension of Wilderness Park south to Hickman Road has been identified as a goal in the 1994 Comprehensive Plan and subsequent amendments to the plan. Therefore, by the time the south beltway is built, it may cross public park land. However, if the future park lands are concurrently planned with the proposed roadway project, they would not be considered 4(f) properties in the future. Right-of-way for the beltway will be acquired prior to or separate from any acquisition for expansion of Wilderness Park.

2.3.8 Consideration of 148th Street Alignments

At the end of the Level III analysis, the study team was requested to evaluate two additional scenarios–a beltway alternative along 148th Street and a non-beltway alternative along 148th Street. (Although an alternative along 148th Street had been included previously in the universe of alternatives, it had been eliminated during the Level II analysis along with all other alignments along section line roads due to the required frontage roads and higher level of impacts to existing rural residences along these roads).

148th Street Beltway Scenario. Under this scenario, 148th Street would be improved to expressway standards (versus freeway standards for all other beltway alternatives) to allow at-grade intersections at section line roads. Diamond type interchanges would be constructed at I-80, US 34 and N-2. Since no other direct access would be allowed, frontage roads would be required to provide access to adjacent properties. If buildings are close on both sides of 148th Street, the alignment would be shifted to take all buildings on the side which would result in the least number of structures being taken.

The benefits of this scenario would be similar to those anticipated for the east far alternative in terms of projected traffic volumes and time savings. A much smaller benefit is expected in accident savings since more dangerous at-grade intersections would still be permitted. Traffic volumes would range between 8,300 vehicles per day on the south end and 11,800 on the north end. In the vicinity of East O Street, traffic volumes would likely be between 13,000 and 14,000 vehicles per day.

One measure of the impacts of improvements in the east beltway study area has been the effect on 84th Street. Improving 148th Street to expressway standards would result in a approximate 6 percent reduction in traffic volumes along 84th Street in the vicinity of East O Street. Although the reduction in traffic on 84th Street is more dramatic south of N-2, where a reduction of 25 percent is anticipated, in comparison, improving 98th Street to non-beltway standards would result in almost a 40 percent reduction in the number of lane miles along 84th Street that are in the E/F Level of Service range.

This scenario would require taking an estimated 30 houses, including 2 historic structures; five other historic structures are located within 0.4 km (0.25 mi). In comparison, the east far alternative would require 10 houses, none of which are historic. The construction cost for the 148th Street beltway scenario was an estimated 9 percent higher than the east far alternative.

148th Street Non-Beltway Scenario. Under this scenario, 148th Street would be improved to a 4-lane non-beltway section. Direct access to 148th Street would be permitted for agricultural and residential properties on either side of the roadway. Existing cross roads would remain as intersections, but no interchange would be constructed at I-80.

When 148th Street is modeled as a non-beltway, the assumption is that the capacity of the roadway is increased from 6,000 to 28,000 vehicles per day with a speed of 60 km/h (40 mph). Since this capacity is unlikely to be reached, model results would be inaccurate. Therefore, recommended assumptions for 148th Street were to use the no-build network. Under these assumptions of a paved 2-lane rural roadway, traffic levels on 148th Street would be approximately 1,500 vehicles per day near East O Street, and would taper off to about 600 vehicles per day to the north and south.

Since this scenario has no interchange at I-80 and includes no restriction of access to adjacent properties, the potential for 148th Street to relieve traffic congestion along other major arterials is even less than with the 148th Street beltway scenario.

The 148th Street non-beltway scenario would require taking an estimated 12 houses, including 2 historic structures; five other historic structures are located within 0.4 km (0.25 mi). In comparison, the east far alternative would require 10 houses, none of which are historic. The construction cost was estimated as 12 percent lower than the east far alternative.

Comparison with Other East Alternatives. Comparison of the benefits and impacts of the 148th Street alternative with other east alternatives indicates that 148th Street is not as viable an alternative as other available alternatives. Although it will operate efficiently and effectively as a 2-lane rural roadway for many years to come, improving it to 4-lanes in either the beltway or non-beltway configuration would do little to relieve traffic congestion on other major urban arterials.

Based on these considerations, the 148th Street scenarios were not carried forward for further analysis.

2.3.9 Four Finalist Alternatives Carried Forward

The Level III analysis began with four alternative alignments in the south beltway study area, three alternative alignments in the east beltway study area, and three non-beltway alternatives. Throughout the course of the Level III evaluation, these alignments were subjected to several different types of evaluation criteria.

South Beltway. Initial task screening for the Level III analysis eliminated the closest south beltway alignment (SC-1) based on the similar traffic volumes using it and the other close beltway alignment (SC-4). SC-1, while providing benefits similar to SC-4, had a greater impact on Wilderness Park and homes within the corridor.

The south far beltway alignment (SF-1) was also eliminated after the traffic analysis based on the low volume of traffic projected to use the route and the comparable negative affects on other criteria when compared to the remaining south beltway alignments (SC-4 and SM-4).

At the conclusion of the environmental and economic analyses, SC-4 was recommended for elimination based on the impacts to Wilderness Park, a 4(f) property. The 4(f) process requires that in order for park land to be taken for the purposes of a federally funded roadway, no feasible and prudent alternatives exist. In the case of SC-4, there is a reasonable and economically prudent alternative in SM-4. For this reason SC-4 was eliminated as a possible alternative. This also eliminated from further consideration any south beltway alternative which crossed through the rural acreage subdivisions along 56th Street.

As described above, three of the four remaining beltway alternatives in the south corridor have been eliminated from further consideration, leaving SM-4 as the only remaining south beltway alignment alternative.

East Beltway. The three remaining beltway alignments in the east corridor were subjected to the entire list of Level III screening criteria. The east beltway alternative traffic volumes are not substantially impacted by distance from the existing urbanized area of Lincoln, thus the benefits from each alignment are similar. The disbenefits (disadvantages or liabilities) of each of the east beltway alternatives are varied. Each alternative has impacts in the corridor, however, the type of impacts of each alignment vary greatly. As a result all three east beltway alternatives were carried forward into the final screening. This final analysis includes refining the alignments and further evaluation of impacts on social, historic, environmental and economic resources.

Non-Beltway. Non-beltway option 2 was eliminated early in the Level III analysis based on the limited traffic benefits it provided in relation to the other two non-beltway options. With only a limited increase in benefits, option 2 would have required the acquisition of approximately 45 homes, having a detrimental socio-economic impact on the area and as such was eliminated from further analysis.

Non-beltway options 1 and 3 were eliminated after the environmental and economic analyses based on the impacts each alternative has to Wilderness Park, a 4(f) property, and the availability of other reasonable alternatives.

Four Finalist Alternatives. The remaining five end-to-end alignments were split into their four separate south and east components, and these four finalist beltway alternatives along with various connectors were carried forward for the Level IV analysis. These were SM-4, EC-1, EM-1 and EF-1 (**Figure 2.9**).

2.4 LEVEL IV ANALYSIS OF THE FINALIST ALTERNATIVES

In the Level IV analysis, each finalist beltway alternative was refined, providing a preliminary alignment, functional interchange design and updated traffic projections. The Level IV analysis provides a more precise assessment of the impacts and benefits than previous analyses.

2.4.1 Build Out Scenario II Land Use Plan

As described previously in **Section 2.1.7**, land use revisions to the 1994 *Lincoln-Lancaster County Comprehensive Plan* were modeled as the Build Out Scenario II (BOS II) land use plan (see **Figures 3.1** and **3.2** in **Chapter 3**). The BOS II plan assumes greater population growth and an expanded urban service area beyond that included in the previously approved Build Out Scenario (BOS) (which was current at the time of the Level III analysis). The planned increase in population growth and physical expansion of the City has a direct impact on the projected traffic volumes for all beltway scenarios. In addition to greater population densities within the Lincoln metropolitan area, roadways carrying traffic external to the metropolitan area are also planned to see higher growth than that anticipated in the BOS model. For the purposes of this study, it was assumed that the BOS II land use plan would build out with a 25 to 30 year period. The external growth estimates, provided by the NDOR, reflect conditions that will likely exist 30 years into the future. Thus, the BOS II land use represents a 25 to 30 year planning horizon.

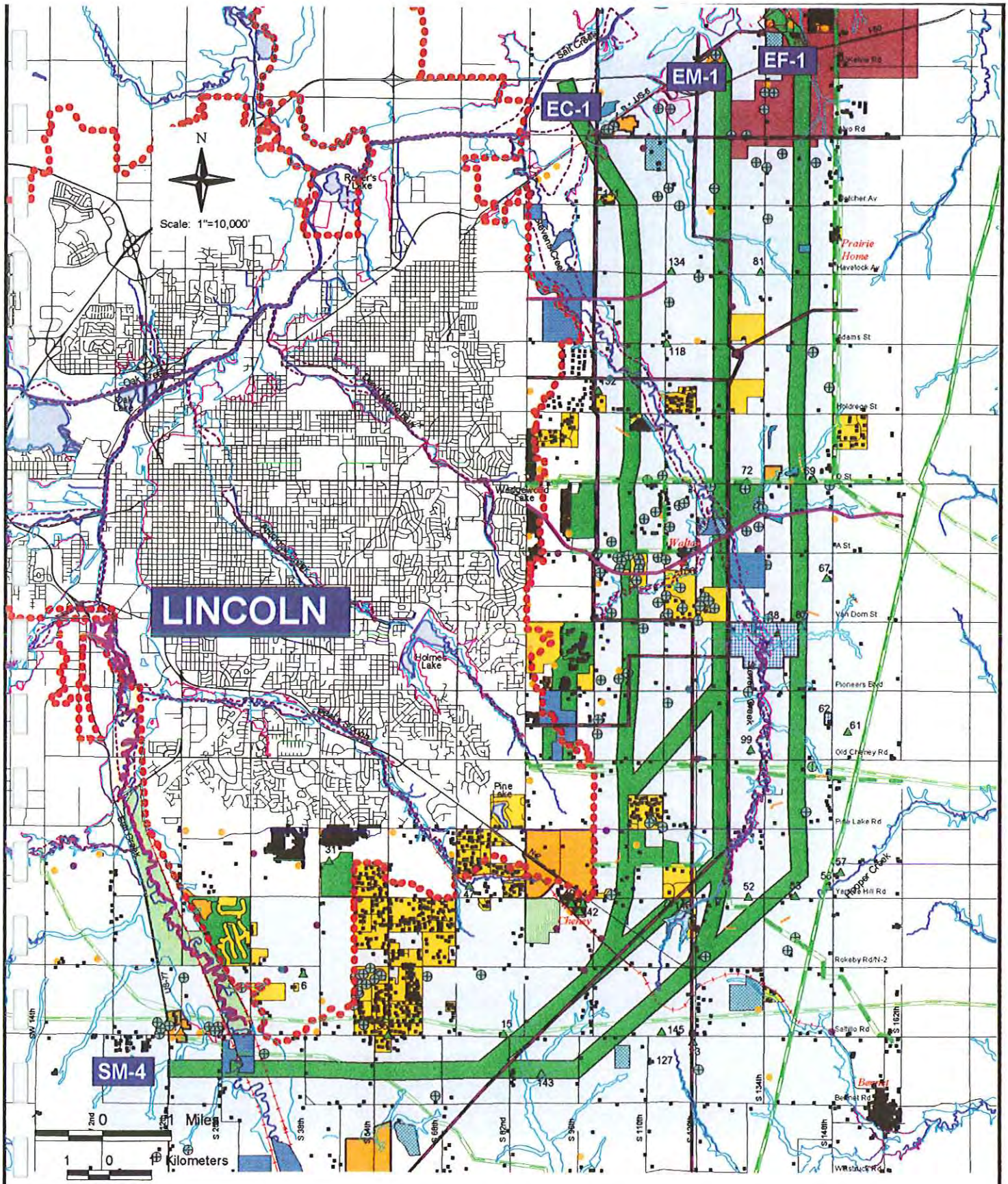
It should be noted that the current plan forecasts that about two-thirds of the south beltway study area and most portions of the east beltway study area will remain undeveloped within the 25 year time frame. There are no assumptions of expansion into the Stevens Creek basin which is currently being studied for planning purposes. However, if the result of the Stevens Creek Basin Study Initiative is to recommend of expansion of the urban service area into the watershed, traffic volumes on the beltway alternatives would be even greater.

2.4.2 Comprehensive Plan Street Network

Since initiation of the beltway study, the Lincoln-Lancaster Planning Department also updated the future roadway network to include additional street improvements. Most relevant to the beltway traffic were the improvements and recommendations found in the Southeast Fringe Roadways Study, South and East Fringe Roadways Study, East O Street Project, and Antelope Valley MIS. These improvements were included in the updated network using the most recent information available at the time. **Figure 2.10** is an illustration of the improvements identified in the comprehensive plan and included in the future transportation network.

2.4.3 Traffic Projections

New traffic projections were developed for each of the beltway scenarios using the revised land use assumptions and future roadway network. **Figures 2.11 to 2.13** illustrate the projected traffic volumes for each of the beltway alternatives. The total vehicle miles of travel expected for each of the end-to-end beltways is as follows:



EXISTING FEATURES

- Residential Structures
- Residential/Subdivisions
- Public Utilities
- Public Utilities
- Commercial/Industrial
- Commercial/Industrial
- Towns
- Other Constraints
- Cemeteries
- Golf Courses
- Registered Wells
- Streams
- 100 Year Flood
- Floodway
- 500 Year Flood
- Dam Sites
- Parks
- Native Prairie
- Lakes
- Wellhead Protection
- Wetlands
- Surface Water Permits
- Overhead Power Lines
- Natural Gas Lines
- Railroads
- Trails
- Service Limits
- Super Fund Sites
- NRHP Sites
- NRHP Eligible

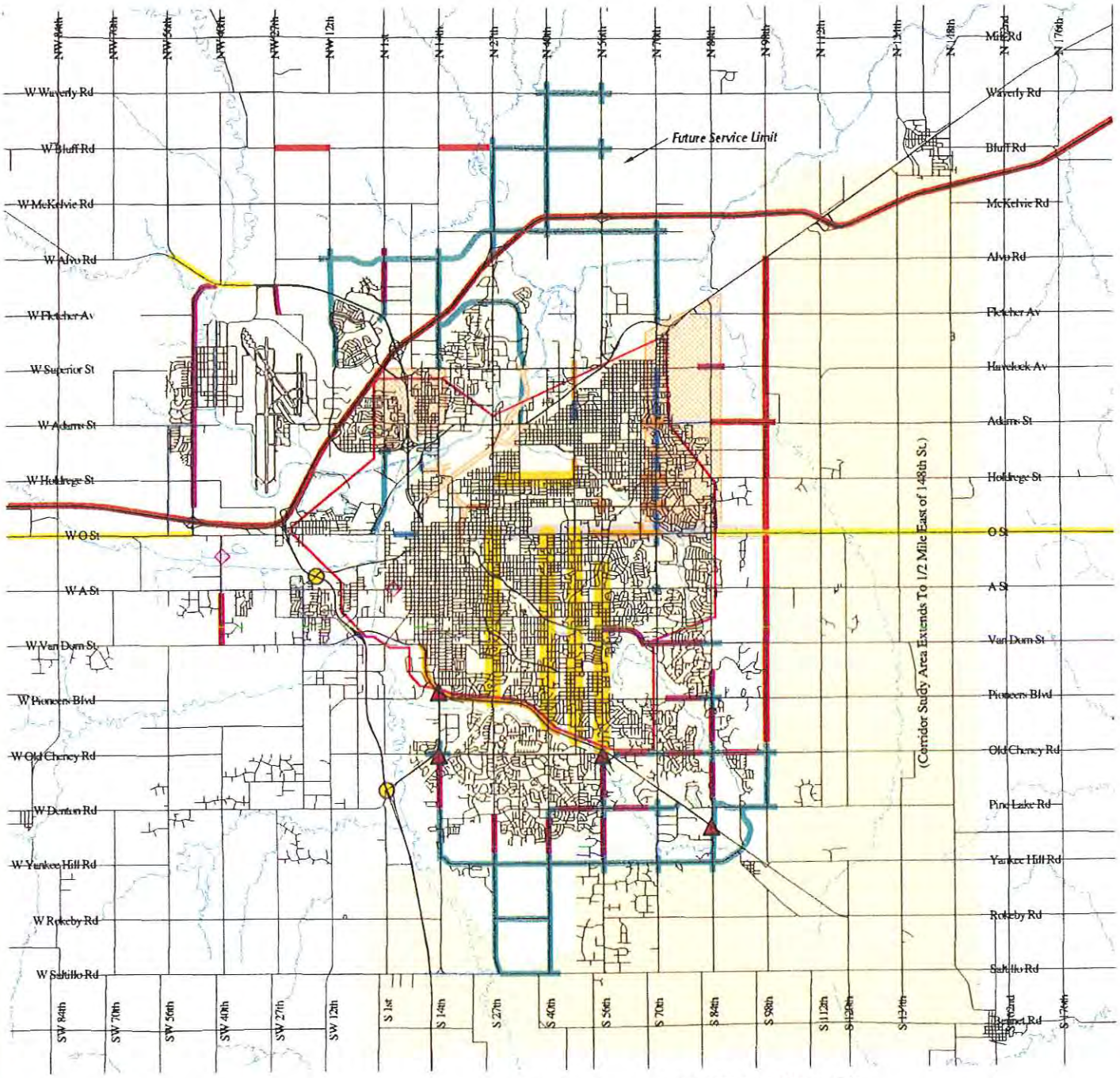
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

Finalist Beltway Alternatives

May 2nd, 2002

Figure 2.9

FIGURE 2.10
IMPROVEMENTS FOR FUTURE ROAD NETWORK
1 - 25 YEAR PROGRAM



(Corridor Study Area Extends To 1/2 Mile South Of Bennet Rd.)

LEGEND

- (K) Six Through Lanes, 140 ft. ROW
- (J) Four Lane Divided Highway, 200 Ft. ROW
- (D/F) Four Through Lanes, Left Turn Lane, Raised Medians, 100 Ft. ROW
- (E) Two Through Lanes, Painted Left Turn Lane, 100 Ft. ROW
- (D+) Four Through Lanes, Two Left/One Right Turn Lanes, Raised Median, 120 Ft. ROW
- (G/H) Rural Two Through Lanes, Painted Left Turn Lane, 100 Ft. Row
- Project Development Areas - Detailed project design may occur in these areas. A Comprehensive Plan amendment is required prior to final project approval.
- Needs Analysis Study Areas

- Interchange
- R R Overpass
- Intersection Study
- (C) Four Through Lanes, Painted Left Turn Lane, 80 Ft. ROW
- (B) Four Through Lanes, 80 Ft. ROW
- 6 Lane Interstate Highway
- Built Environment
- High Impact Corridor Study Areas
- South And East Beltway Corridor Study Area (Extends South to 1/2 Mi South Of Bennet Rd. and East to 1/2 Mi East of 148th St.)
- Antelope Valley Facility: 4 Lane Roadway, with 6 Lane Elevated Sections (See Text)
- East 'O' Street Study Area
- Capacity Enhancement Study Areas

- 763 000 vehicle kilometers (474,000 vehicle miles) for EC -1/SM-4;
- 721 000 vehicle kilometers (448,000 vehicle miles) for EM-1/SM-4; and
- 697 000 vehicle kilometers (433,000 vehicle miles) for EF-1/SM-4.

These traffic volumes are substantially higher, especially on the south beltway, than those identified during the Level III analysis. The reason for the higher volume can be attributed directly to the increased population projections and revised land use plan that shows further development in the south fringe of the metropolitan area. In addition to the change in land use, the updated travel demand model more accurately portrays the time savings of freeway facilities versus that of arterial streets.

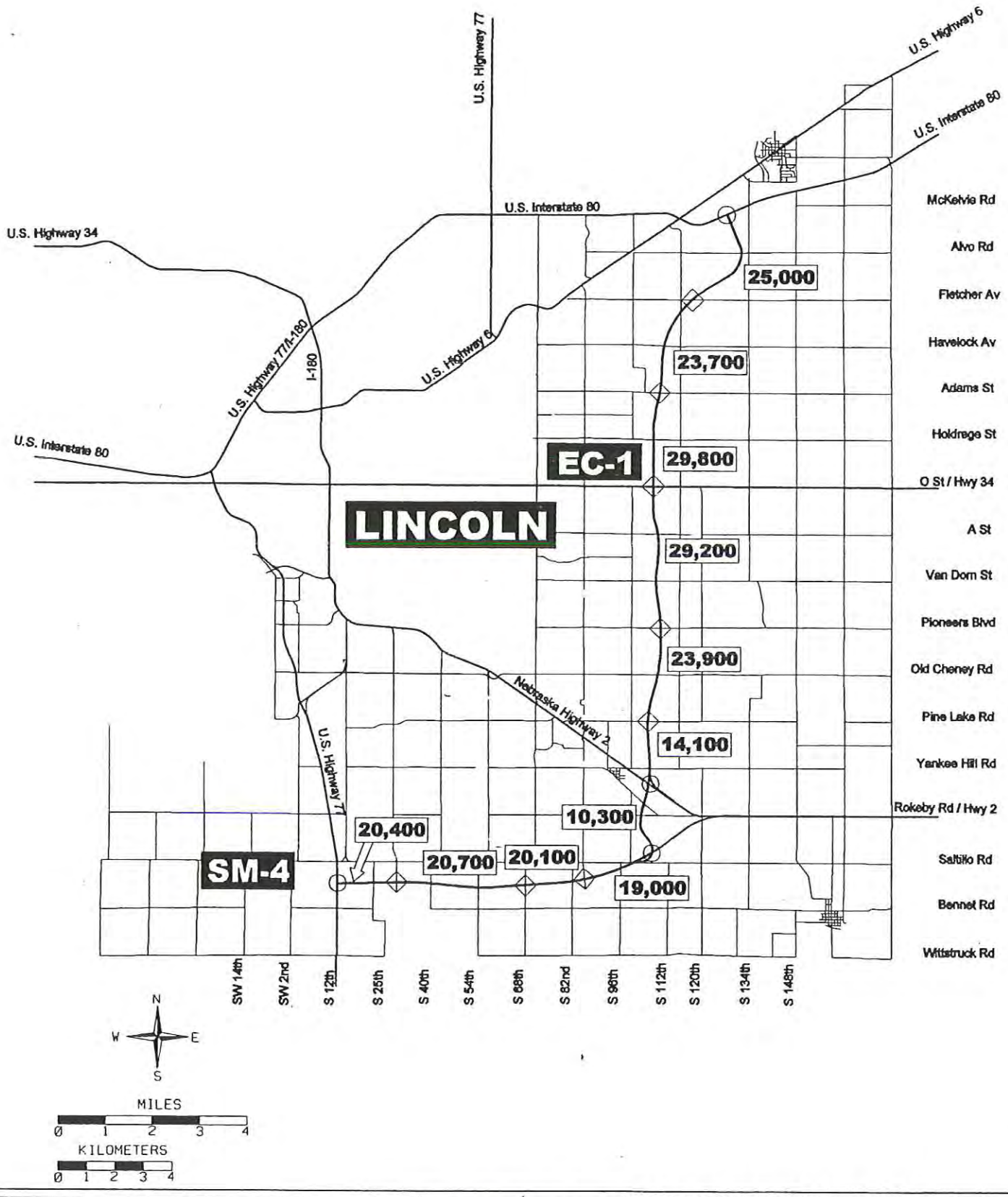
The additional traffic on the proposed beltways shows an even greater impact on the arterial street system. **Table 2.14** is a list of the effect of each beltway on key arterial streets. The streets most affected by the beltway are N-2, 84th Street, Yankee Hill Road, and US 6. These are the streets that show the greatest congestion reduction with the beltway system. **Figure 2.14** shows the impact of the beltway alternatives on four example roadway segments. Construction of the beltway would permit US 6 and N-2 to operate at an acceptable level of service as four-lane facilities through the 25 to 30 year planning horizon. Yankee Hill Road could remain a two-lane roadway with improvements for the same period. Without the beltway, these roadways would need to be constructed to six-lanes and four-lanes respectively in the future. Currently, the City's 20-Year Capitol Improvement Program shows Yankee Hill Road being widened to 4-lanes and N-2 widened to 6-lanes between 14th Street and Van Dorn Street.

2.4.4 Measures of Effectiveness

Two comparisons were made to further evaluate the remaining beltway alternatives. One compares the BOS traffic projections with BOS II. The other compares each beltway alternative with the no build alternative using the BOS II projections. Two primary measures of effectiveness were evaluated:

Vehicle Hours Traveled (VHT). This statistic provides a measure of the network wide travel time expected for each of the alternatives for a typical day in the future. By comparing the alternatives with the no build base condition, it is possible to predict the daily time savings associated with each alternative. It not only measures time savings for people who use the beltway, but also time savings for people on alternative routes that are less congested due to a shift in traffic to the beltways. The greater the time savings the more beneficial the improvement.

Vehicle Miles Traveled (VMT). VMT is a measure of the network wide total travel for a typical day in the future. While this statistic is considered positive if travel is reduced, it many times can show that travel will increase with an improvement due to the desire by some motorists to use the new facility because of faster trip times, even though the trip length may be greater.



LEGEND

- ○ DIRECTIONAL INTERCHANGE
- ◇ DIAMOND INTERCHANGE
- XXXXX VEHICLES PER DAY

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

EC-1 / SM-4
TRAFFIC VOLUMES

Figure 2.11

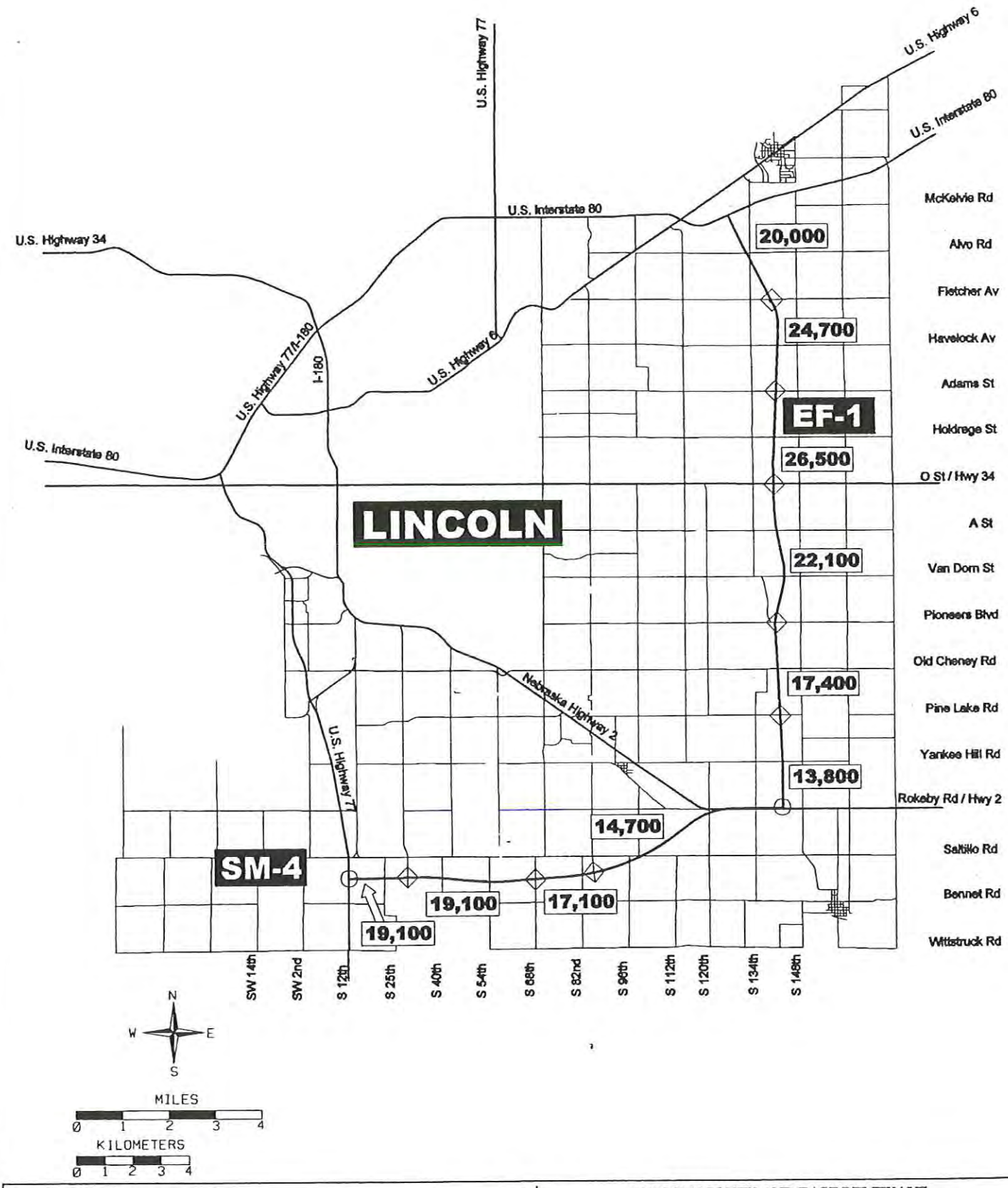
LEGEND

- ○ DIRECTIONAL INTERCHANGE
- ◇ DIAMOND INTERCHANGE
- XXXXX VEHICLES PER DAY

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

EM-1 / SM-4
TRAFFIC VOLUMES

Figure 2.12



LEGEND

- ○ DIRECTIONAL INTERCHANGE
- ◇ DIAMOND INTERCHANGE
- XXXXX VEHICLES PER DAY

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

EF-1 / SM-4
TRAFFIC VOLUMES

Figure 2.13

Table 2.14
EFFECT OF BELTWAY
ON KEY ARTERIAL STREETS
(With BOS II LAND USE)

STREET SEGMENT	CLOSE VPD	CLOSE VS. NO BUILD VPD	CLOSE CHANGE %	MIDDLE VPD	MIDDLE VS. NO BUILD VPD	MIDDLE CHANGE %	FAR VPD	FAR VS. NO BUILD VPD	FAR CHANGE %
South Beltway Between:									
Hwy 77 & 27th	20,400	N/A	N/A	19,400	N/A	N/A	19,100	N/A	N/A
27th & 56th	20,700	N/A	N/A	19,500	N/A	N/A	19,100	N/A	N/A
56th & 84th	20,100	N/A	N/A	18,000	N/A	N/A	17,100	N/A	N/A
84th & Hwy 2	19,000	N/A	N/A	15,600	N/A	N/A	14,700	N/A	N/A
East Beltway Between:									
I-80 & Fletcher	25,000	N/A	N/A	23,000	N/A	N/A	20,000	N/A	N/A
Fletcher & Adams	23,700	N/A	N/A	25,400	N/A	N/A	24,700	N/A	N/A
Adams & 'O' St.	29,800	N/A	N/A	28,300	N/A	N/A	26,500	N/A	N/A
O' St. & Van Dorn	29,200	N/A	N/A	26,200	N/A	N/A	22,100	N/A	N/A
Van Dorn & Old Cheney	23,900	N/A	N/A	21,200	N/A	N/A	17,400	N/A	N/A
Old Cheney & Hwy 2	14,100	N/A	N/A	14,500	N/A	N/A	13,800	N/A	N/A
US 77 Between:									
Saltillo & Old Cheney	24,300	4,000	20%	24,200	3,900	19%	24,400	4,100	20%
Old Cheney & Van Dorn	29,900	3,400	13%	30,000	3,500	13%	29,700	3,200	12%
Van Dorn & I-80	35,600	3,000	9%	36,000	3,400	10%	35,000	2,400	7%
Hwy 2 Between:									
84th & 112th	16,200	-7,100	-30%	15,100	-8,200	-35%	15,700	-7,600	-33%
56th & 84th	25,100	-6,000	-19%	25,800	-5,300	-17%	25,800	-5,300	-17%
27th & 56th	31,200	-5,200	-14%	32,000	-4,400	-12%	31,800	-4,600	-13%
27th & Van Dorn	53,400	4,700	10%	53,800	5,100	-10%	55,000	6,300	13%
US 34/ **O' Street Between:**									
98th & 84th	27,600	5,800	27%	21,800	0	0%	22,200	400	2%
84th & 56th	39,200	600	2%	38,700	100	0%	39,000	400	1%
56th & 40th	40,700	0	0%	41,100	400	1%	41,000	300	1%
40th & 27th	42,200	-200	0%	42,400	0	0%	42,000	-400	-1%
27th & 10th	25,700	0	0%	25,000	-700	-3%	26,200	500	2%
US 6 Between:									
I-80 & 84th	20,900	-11,500	-35%	23,200	-9,200	-28%	25,400	-7,000	-22%
84th & 56th	22,900	-2,100	-8%	23,700	-1,300	-5%	24,300	-700	-3%
56th & 33rd	31,900	-400	-1%	32,000	-300	-1%	31,300	-1,000	-3%
33rd & 27th	32,900	-300	-1%	35,200	2,000	6%	33,000	-200	-1%
27th & 14th	32,200	-700	-2%	33,100	200	1%	32,300	-600	-2%
I-80 Between:									
Hwy 77 S & Cornhusker	51,800	-1,800	-3%	52,400	-1,200	-2%	53,000	-600	-1%
Cornhusker & I-180	43,400	-1,400	-3%	44,000	-800	-2%	44,000	-800	-2%
I-180 & 27th	48,100	-1,900	-4%	49,500	-500	-1%	49,400	-600	-1%
27th & 56th	44,200	-1,900	-4%	45,700	-400	-1%	45,300	-800	-2%
56th & Hwy 6	47,600	-3,800	-7%	46,900	-4,500	-9%	49,000	-2,400	-5%

Table 2.14 (cont'd)
EFFECT OF BELTWAY
ON KEY ARTERIAL STREETS

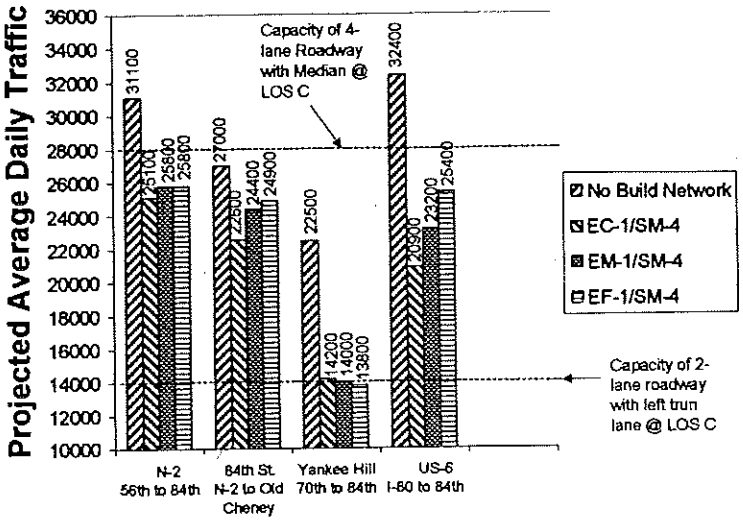
STREET SEGMENT	2030 NO BUILD VPD	CLOSE VPD	CLOSE VS. NO BUILD VPD	CLOSE CHANGE %	MIDDLE VPD	MIDDLE VS. NO BUILD VPD	MIDDLE CHANGE %	FAR VPD	FAR VS. NO BUILD VPD	FAR CHANGE %
9th/10th Streets Between:										
'O' St. & Van Dorn	51,500	51,100	-400	-1%	50,800	-700	-1%	51,600	100	0%
27th Street Between:										
'O' St. & Normal	30,500	31,000	500	2%	31,300	800	3%	30,900	400	1%
Normal & South	25,000	25,900	900	4%	25,400	400	2%	25,100	100	0%
South & Hwy 2	19,500	19,300	-200	-1%	19,800	300	2%	18,900	-600	-3%
Hwy 2 & Old Cheney	28,100	26,700	-1,400	-5%	27,000	-1,100	-4%	26,500	-1,600	-6%
Old Cheney & Pine Lake	26,200	24,800	-1,400	-5%	25,000	-1,200	-5%	25,200	-1,000	-4%
Pine Lake & Yankee Hill	17,600	17,000	-600	-3%	17,200	-400	-2%	17,100	-500	-3%
Yankee Hill & Rokeby	13,800	13,400	-400	-3%	13,500	-300	-2%	13,600	-200	-1%
Rokeby & Saltillo	4,600	5,300	700	15%	5,300	700	15%	5,300	700	15%
56th Street Between:										
'O' St. & Cotner*	32,800	31,200	-1,600	-5%	32,600	-200	-1%	33,100	300	1%
Cotner & 'A' St.	20,400	19,100	-1,300	-6%	19,900	-500	-2%	20,800	400	2%
'A' St. & Normal	19,200	18,100	-1,100	-6%	18,800	-400	-2%	19,900	700	4%
Normal & Pioneer	23,000	22,000	-1,000	-4%	22,500	-500	-2%	23,600	600	3%
Pioneer & Hwy 2	27,400	26,800	-600	-2%	22,700	-4,700	-17%	23,600	-3,800	-14%
Hwy 2 & Pine Lake	28,600	27,900	-700	-2%	28,200	-400	-1%	28,200	-400	-1%
Pine Lake & Yankee Hill	10,300	10,100	-200	-2%	10,400	100	1%	10,400	100	1%
Yankee Hill & Saltillo	10,100	5,200	-4,900	-49%	5,500	-4,600	-46%	5,600	-4,500	-45%
70th Street Between:										
Hwy 6 & Adams	18,600	17,000	-1,600	-9%	17,600	-1,000	-5%	17,900	-700	-4%
Adams & 'O' St.	25,300	23,200	-2,100	-8%	23,500	-1,800	-7%	24,300	-1,000	-4%
'O' St. & Van Dorn	33,300	31,200	-2,100	-6%	31,900	-1,400	-4%	32,400	-900	-3%
Van Dorn & Hwy 2	27,900	24,600	-3,300	-12%	25,400	-2,500	-9%	26,100	-1,800	-6%
Hwy 2 & Yankee Hill	11,300	9,400	-1,900	-17%	10,100	-1,200	-11%	10,400	-900	-8%
Yankee Hill & Saltillo	4,100	2,400	-1,700	-41%	2,800	-1,300	-32%	3,100	-1,000	-24%
84th Street Between:										
Hwy 6 & Adams	22,100	17,700	-4,400	-20%	17,200	-4,900	-22%	18,200	-3,900	-18%
Adams & 'O' St.	33,100	30,700	-2,400	-7%	31,200	-1,900	-6%	31,200	-1,900	-6%
'O' St. & Van Dorn	27,900	26,600	-1,300	-5%	27,100	-800	-3%	26,900	-1,000	-4%
Van Dorn & Old Cheney	32,700	30,200	-2,500	-8%	31,200	-1,500	-5%	31,200	-1,500	-5%
Old Cheney & Hwy 2	27,000	22,600	-4,400	-16%	24,400	-2,600	-10%	24,900	-2,100	-8%
Hwy 2 & Yankee Hill	12,700	7,700	-5,000	-39%	8,100	-4,600	-36%	8,100	-4,600	-36%
Yankee Hill & Rokeby	40	700	660	1650%	1,700	1,660	4150%	2,000	1,960	4900%
Rokeby & Saltillo	10	600	590	5900%	1,700	1,690	16900%	1,900	1,890	18900%
148th Street Between:										
Hwy 6 & Fletcher	3,600	1,000	-2,600	-72%	700	-2,900	-81%	1,500	-2,100	-58%
Fletcher & Adams	5,700	3,100	-2,600	-46%	1,300	-4,400	-77%	430	-5,270	-92%
Adams & 'O' St.	7,000	3,700	-3,300	-47%	2,000	-5,000	-71%	1,100	-5,900	-84%
'O' St. & Pioneers	6,500	4,500	-2,000	-31%	700	-5,800	-89%	380	-6,120	-94%
Pioneers & Pine Lake	6,100	3,700	-2,400	-39%	430	-5,670	-93%	400	-5,700	-93%
Pine Lake & Hwy 2	4,800	3,500	-1,300	-27%	60	-4,740	-99%	80	-4,720	-98%

*includes one-way volumes on Cotner & 56th St.

Table 2.14 (cont'd)
EFFECT OF BELTWAY
ON KEY ARTERIAL STREETS

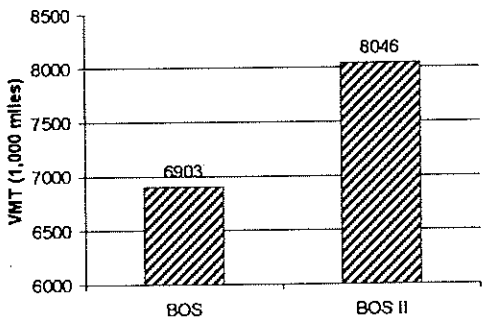
		CLOSE			MIDDLE			FAR		
STREET SEGMENT	2030 NO BUILD VPD	VPD	VS. NO BUILD VPD	CHANGE %	VPD	VS. NO BUILD VPD	CHANGE %	VPD	VS. NO BUILD VPD	CHANGE %
Fletcher Avenue Between:										
98th & Hwy 6	4,500	7,000	2,500	56%	8,700	4,200	93%	7,200	2,700	60%
Adams Street Between:										
98th & 84th	10,000	13,100	3,100	31%	11,200	1,200	12%	10,700	700	7%
84th & 56th	12,300	12,100	-200	-2%	12,100	-200	-2%	12,100	-200	-2%
Van Dorn Between:										
98th & 84th	4,900	4,300	-600	-12%	4,700	-200	-4%	4,800	-100	-2%
84th & 56th	12,900	12,700	-200	-2%	12,600	-300	-2%	12,500	-400	-3%
56th & 40th	10,800	10,500	-300	-3%	10,200	-600	-6%	11,200	400	4%
Hwy 2 & Hwy 77	23,100	21,400	-1,700	-7%	20,800	-2,300	-10%	20,300	-2,800	-12%
Old Cheney Between:										
98th & 84th	5,000	4,000	-1,000	-20%	4,400	-600	-12%	4,500	-500	-10%
84th & Hwy 2	21,300	21,700	400	2%	21,400	100	0%	21,500	200	1%
Pine Lake Rd Between:										
Hwy 2 & 70th	7,900	8,900	1,000	13%	8,400	500	6%	8,100	200	3%
70th & 56th	20,300	19,600	-700	-3%	19,200	-1,100	-5%	19,100	-1,200	-6%
56th & 27th	27,300	26,100	-1,200	-4%	26,200	-1,100	-4%	26,100	-1,200	-4%
27th & 14th	15,400	15,100	-300	-2%	15,100	-300	-2%	15,200	-200	-1%
Yankee Hill Between:										
98th & 84th	12,300	7,800	-4,500	-37%	8,100	-4,200	-34%	8,000	-4,300	-35%
84th & 70th	22,500	14,200	-8,300	-37%	14,000	-8,500	-38%	13,800	-8,700	-39%
70th & 56th	24,700	17,000	-7,700	-31%	16,900	-7,800	-32%	16,700	-8,000	-32%
56th & 27th	26,600	22,100	-4,500	-17%	22,100	-4,500	-17%	21,900	-4,700	-18%
27th & 14th	22,000	19,200	-2,800	-13%	19,500	-2,500	-11%	19,500	-2,500	-11%
Saltillo Between:										
98th & 84th	300	70	-230	-77%	130	-170	-57%	90	-210	-70%
84th & 70th	430	30	-400	-93%	50	-380	-88%	20	-410	-95%
70th & 56th	4,500	2,900	-1,600	-36%	3,100	-1,400	-31%	3,200	-1,300	-29%
56th & 27th	7,500	3,000	-4,500	-60%	3,200	-4,300	-57%	3,200	-4,300	-57%
27th & Hwy 77	7,800	4,300	-3,500	-45%	4,300	-3,500	-45%	4,200	-3,600	-46%

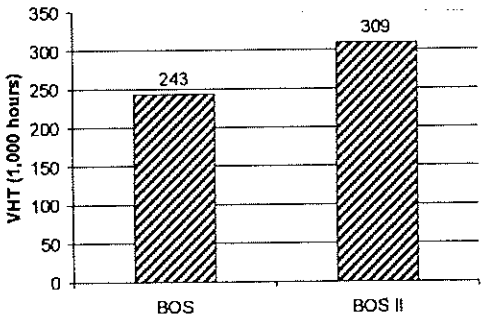
Figure 2.14
EFFECT OF BELTWAY ON EXAMPLE ROADWAY SEGMENTS



Source: Lincoln-Lancaster County Planning Department

Figure 2.15
COMPARISON OF BOS AND BOSII MODELS FOR VEHICLE MILES TRAVELED AND VEHICLE HOURS TRAVELED (No Build Network)





BOS to BOS II Comparison. **Figure 2.15** illustrates the comparison between the BOS and BOS II model outputs for VMT and VHT for the respective network without construction of a beltway. As expected, both statistics show an increase in the BOS II over the BOS land use and network. This is to be expected because of the greater development and higher population in the BOS II land use scenario. The increase is approximately 16 percent for VMT and 27 percent for VHT.

Beltway Alternative Comparison. A comparison of the beltway alternatives to the no build base condition using the BOS II land use and future network is presented in **Figures 2.16 and 2.17. Figure 2.16** shows the VMT and VHT for each alternative. **Figure 2.17** illustrates the difference in VHT of each alternative as compared to the no build beltway alternative. **Figure 2.17** also compares the projected time savings for each alternative using the BOS and BOS II travel demand models. These statistics show that there is a considerable improvement in projected vehicle hours traveled with any of the beltway alternatives as compared to the no build alternative. The differences between the beltway alternatives are minimal. However, it is interesting that the expected time savings with EM-1 is slightly better than EC-1 with the BOS II model. The reverse relationship occurred with the BOS model.

2.4.5 Cost Effectiveness Analysis

In **Section 2.3.6**, a detailed discussion of cost-effectiveness and economic efficiency was conducted on seven candidate beltway alternatives and two non-beltway alternatives. This analysis was done using the BOS travel demand model which, as stated earlier, showed less traffic using the beltways and a lower reduction in VHT (time savings) than the updated BOS II model. Despite the fact that traffic volumes were projected to be lower, the beltway alternative was shown to be generally cost-effective with the east-close and east-mid alternatives having a benefit-cost ratio approaching 1.0. The BOS II model show substantially better statistics in terms of time savings and therefore, it is anticipated that further economic analysis would show even more convincingly that constructing EC-1 or EM-1 is cost-effective.

An analysis of the time savings with the BOS II model comparing the end-to-end beltway alternatives and no-build alternatives indicates a relatively quick payoff of the investment. Assuming an average time value of $14.15 per hour, construction costs and residual values identified in **Section 2.3.6.2**, and a 7 percent discount rate, the investment to construct the end-to-end beltway would be paid off in time savings alone in 14 years for SM-4/EC-1, 13 for SM-4/EM-1, and 19 for SM-4/EF-1. This assumes the reduction in VHT over the analysis period is consistent with estimates from the BOS II model summarized in **Figure 2.17**. It also assumes straight line growth in time savings from 0 hours at the beginning of Year 1 to over 43,500,000 hours per year in Year 20 after construction. This is unrealistic since a large number of motorists will begin using the beltways immediately after construction. Therefore, the actual payback period could be much sooner. **Figure 2.18** compares each alternative in terms of the estimated number of years to pay off the investment. Based on payoff periods of 13 to 19 years, all three end-to-end beltway alternatives for all the east alignments are considered to have a positive benefit-cost ratio and are economically feasible; therefore, no additional benefit-cost analyses were conducted. These calculations are based on extremely conservative assumptions and include no savings benefits related to the reduction in accidents.

Figure 2.16
COMPARISON OF BELTWAY ALTERNATIVES FOR VEHICLE MILES TRAVELED AND VEHICLE HOURS TRAVELED (BOS II Model)

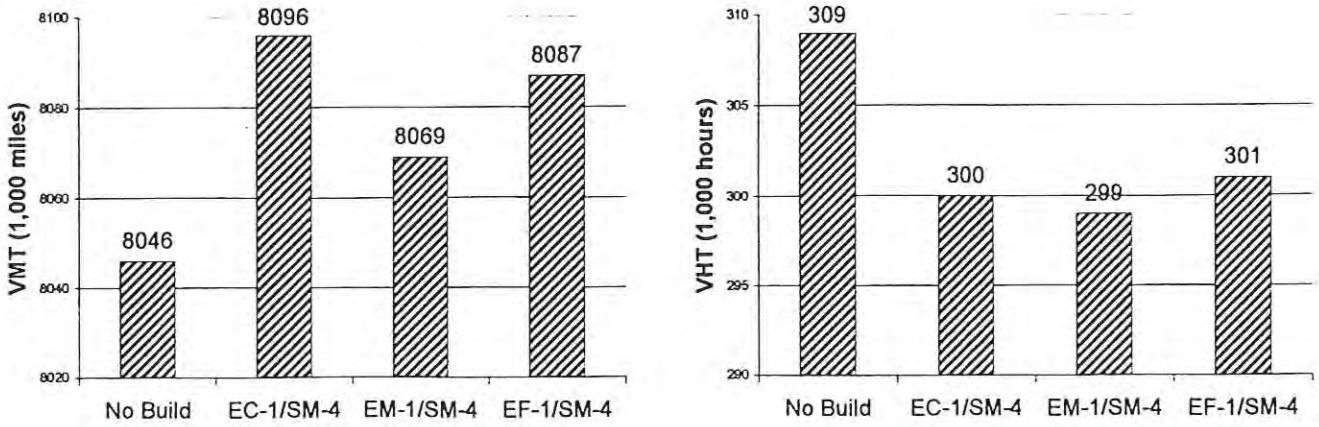
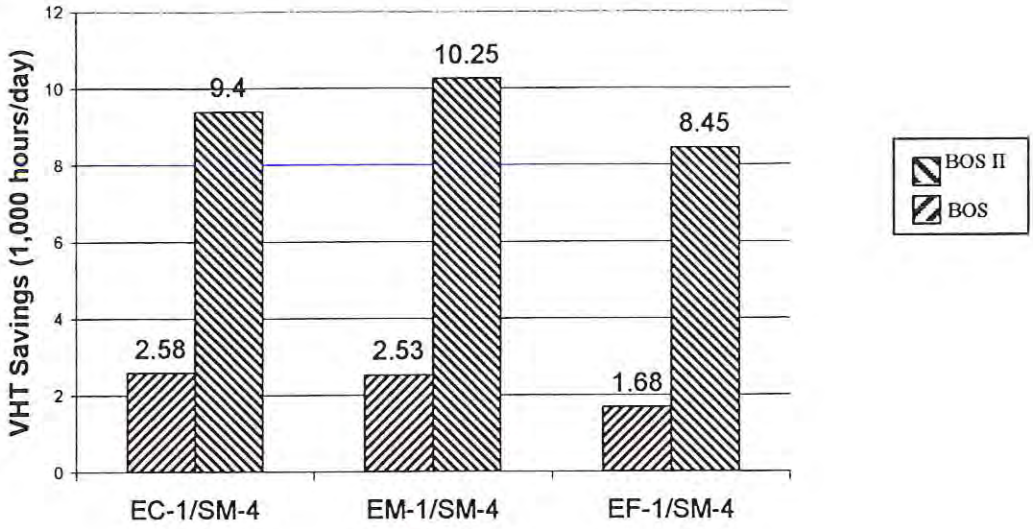


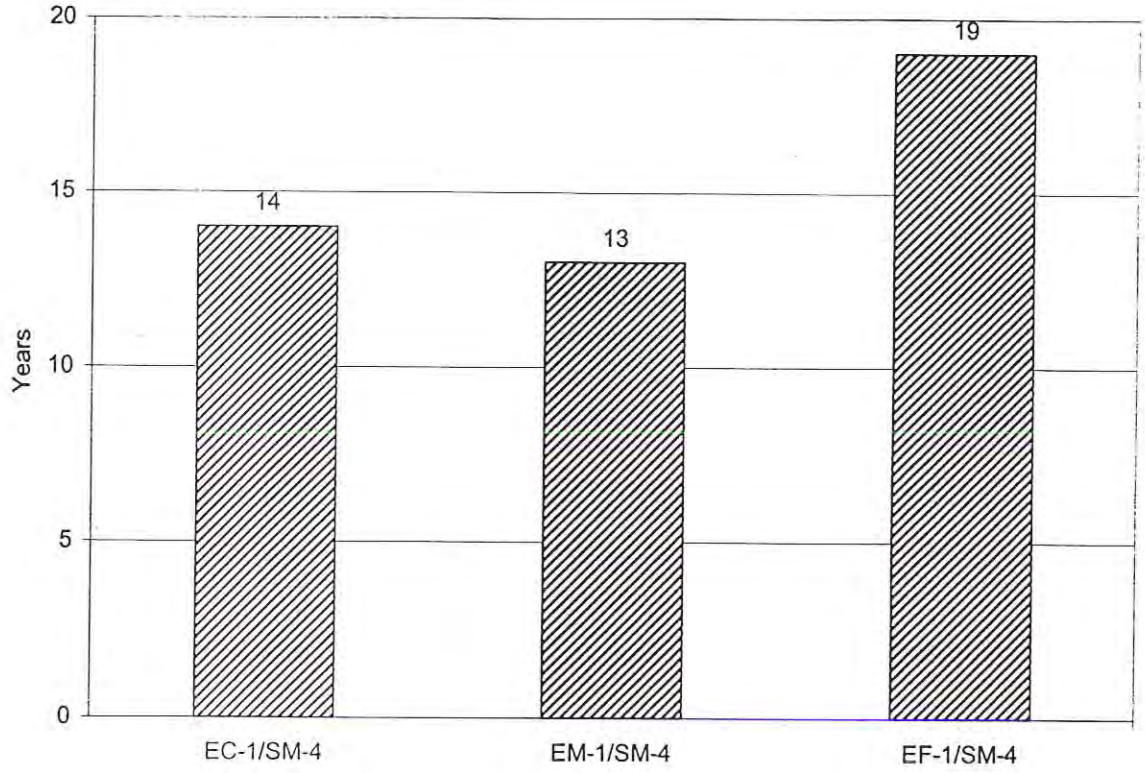
Figure 2.17
COMPARISON OF BOS[1] AND BOS II[2] MODELS FOR REDUCTION IN VEHICLE HOURS TRAVELED (TIME SAVINGS) FOR BELTWAY ALTERNATIVES

Beltway Alternatives Compared to No Build



[1] VHT values for BOS obtained from South & East Beltways Interim Report Number 3
[2] VHT values for BOS II based on Level IV Analysis

Figure 2.18
PAY OFF PERIOD FOR END TO END BELTWAY ALTERNATIVES
BOS II TRAVEL DEMAND MODEL



LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

Figure 2.18

2.4.6 Traffic Engineering Analysis

Traffic engineering analyses are an integral part of the planning process for any transportation facility, these analyses generally include consideration of both supply and demand. The south and east beltways study included preliminary traffic analyses that evaluated key components of the proposed beltway project including basic number of lanes, connecting link improvements and interchange design.

2.4.6.1 Capacity and Level of Service

In planning studies, the demand component of the traffic analysis includes the use of traffic projections based on the adjacent roadway network and land uses in the corridor. Roadway capacity is a measure of the supply for a transportation facility and is a function of many factors, including geometric features, access control and facility type. For purposes of the beltway study, the capacity for many types of facilities was obtained from the Lincoln-Lancaster County Planning Department. These values for capacity are based on the conditions present in the Lincoln area as indicated by the transportation model for the City.

Level of Service is a qualitative measure used to characterize the operational conditions within a traffic stream and their perception by motorists (Transportation Research Board, 1998). The following descriptions of level of service characterize these conditions for freeway facilities in terms of speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

> LOS A describes free-flow operations. Free-flow or near free-flow speeds prevail on both freeway and arterial type roadways. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.
>
> LOS B represents reasonably free flow. Free-flow speeds are maintained on freeways, and arterial streets maintain approximately 70 percent of free-flow speed. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high.
>
> LOS C provides for flow with speeds at or near the free-flow speed of the freeway. Arterial streets flow at roughly 50 percent of the free-flow speed. Freedom to maneuver within the traffic stream is noticeably restricted at LOS C, and lane changes require more care and vigilance on the part of the driver.
>
> LOS D is the level at which freeway speeds begin to decline slightly with increasing flows. Arterial streets are now averaging 40 percent of free-flow speed. In this range, density begins to increase somewhat more quickly with increasing flow. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels.

LOS E, at its highest capacity, represents operation at capacity. Operations at this level are volatile since there are virtually no usable gaps in the traffic stream. Speeds on arterial streets average 30 percent of free-flow speed. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is poor.

LOS F describes breakdowns in vehicular flow.

In general, planning studies strive to achieve LOS C for future year traffic volumes. LOS C is used to ensure efficient use of resources while providing an acceptable level of service to the traveling public for the design year. Typical values for roadway capacity by facility type for LOS C were also obtained from the Lincoln–Lancaster County Planning Department. **Table 2.15** lists the maximum traffic volumes at LOS C for various types of roadways.

Table 2.15

MAXIMUM TRAFFIC VOLUMES AT LEVEL OF SERVICE C VERSUS FACILITY TYPE

TYPE OF STREET AND NUMBER OF THROUGH LANES (2-Way Traffic)	MAXIMUM CAPACITY (vehicles per day)
2-lane surfaced street, 7.9-9.8 m (26-32 ft) wide, without turn lanes	3,500 -6,000
2-lane surfaced street, 7.9-9.8 m (26-32 ft) wide, with turn lanes	6,000 – 14,000
4-lane surfaced street, 13.4 m (44 ft) wide, without turn lanes	16,000
4-lane surfaced street, 13.4-18 m (44-60 ft) wide, with turn lanes	20,000 – 24,000
4-lane surfaced street with medians	28,000 – 30,000
4-lane divided roadway with partial access control	32,000
4-lane divided roadway with full access control	38,000
6-lane surfaced roadway with medians	40,000

Source: Lincoln-Lancaster County Planning Department

These values were used in conjunction with the traffic projections from the BOS II model to determine the appropriate number of lanes for the beltways and connecting links. The scope of the beltway study included characterization of the proposed beltway as a freeway type facility with full access control. The capacity, as determined by the local planning agency, for a four-lane divided roadway with full access control is approximately 38,000 vehicles per day at LOS C. The projected volumes on the beltway are all under this threshold, indicating that as a freeway, the beltways will operate at an acceptable level. The volumes on the beltways range from 13,800 to 29,300 vehicles per day. The range of volumes is a reflection of the different connecting link volumes. These volumes have a much greater effect on beltway traffic than does distance from the city.

2.4.6.2 Connecting Links

The roadways leaving the edge of Lincoln on both the south and east sides that will intersect the beltway at an interchange were evaluated based on the traffic projections from the BOS II land use plan and the capacities at LOS C for roadways in the Lincoln area. The traffic projections for all connecting links except US 34 (O Street) were within the acceptable range for a two-lane roadway. The US 34 link is projected to require a four-lane facility, however, these improvements are already planned by NDOR.

2.4.6.3 Interchange Design

Preliminary interchange design was required as part of the beltway study to allow full control of access to the proposed beltways. The interchange locations were chosen based on a number of factors. Use of the beltway by heavy trucks, through traffic and connectors necessitate interchanges at I-80, US 34, US 6, US 77, and N-2. The distance between additional interchanges at section line roads was established at not less than 3.2 km (2 mi) to provide for smooth traffic flow between interchanges and minimize impact to surrounding properties. Shorter interchange spacing can result in less than desirable merge and weave characteristics and should be avoided if possible.

In addition to traffic and geometric considerations, interchange locations were also evaluated based on potential impacts to historic properties near the interchanges or along roadways that connect to the beltway interchanges. Specifically, there are no historic properties along the connector roads to the proposed interchanges at South 27th, South 68th, Pine Lake Road, Pioneers Boulevard, and Fletcher Avenue. In contrast, no interchanges are proposed along Yankee Hill Road, Old Cheney Road, Van Dorn Street, A Street and Havelock Avenue which all have historic properties along them. The only connector roads with historic properties in close proximity are South 84th (Wunibald Farmstead), O Street (Mayer Farmstead and Haeger Dairy), and Adams Street (road sign). Of these, only the Wunibald Farmstead is expected to be impacted by the beltway project.

The three basic types of interchanges that were evaluated for use on the beltway are: diamond, cloverleaf and directional. A brief description of each type of interchange and its application in the beltway study is included below:

> Diamond.. A diamond interchange provides ramps for entry and exit onto the freeway with the ramp terminals having either stop sign or traffic signal control at the intersection with the intersecting roadway. This type of interchange was used for all interchanges with surfaced arterial streets. Diamond interchanges are proposed at the intersection with the following connecting links on the south beltway: 27th Street, 68th Street, and 84th Street. Diamond interchanges are also proposed at the intersection with the following connecting links on the east beltway: Fletcher Road, Adams Street, US 34, Pioneers Boulevard, and Pine Lake Road. For cost estimating purposes of this study, it was assumed that ultimately all unpaved county roads which provide access to the beltway interchanges would be upgraded to 4-lane paved roadways.

Cloverleaf. A cloverleaf interchange provides a system of ramps and loops to provide entry and exit to both roadways without requiring a stop condition. This type of interchange was not deemed necessary for any beltway interchanges based on the types of intersecting facilities. No cloverleaf interchanges are proposed at this time.

Directional. Directional interchanges permit high-speed, high volume operation for movements between the intersecting facilities. This type of interchange was deemed appropriate for use at freeway intersections with the proposed beltways. Directional interchanges are proposed at four locations:

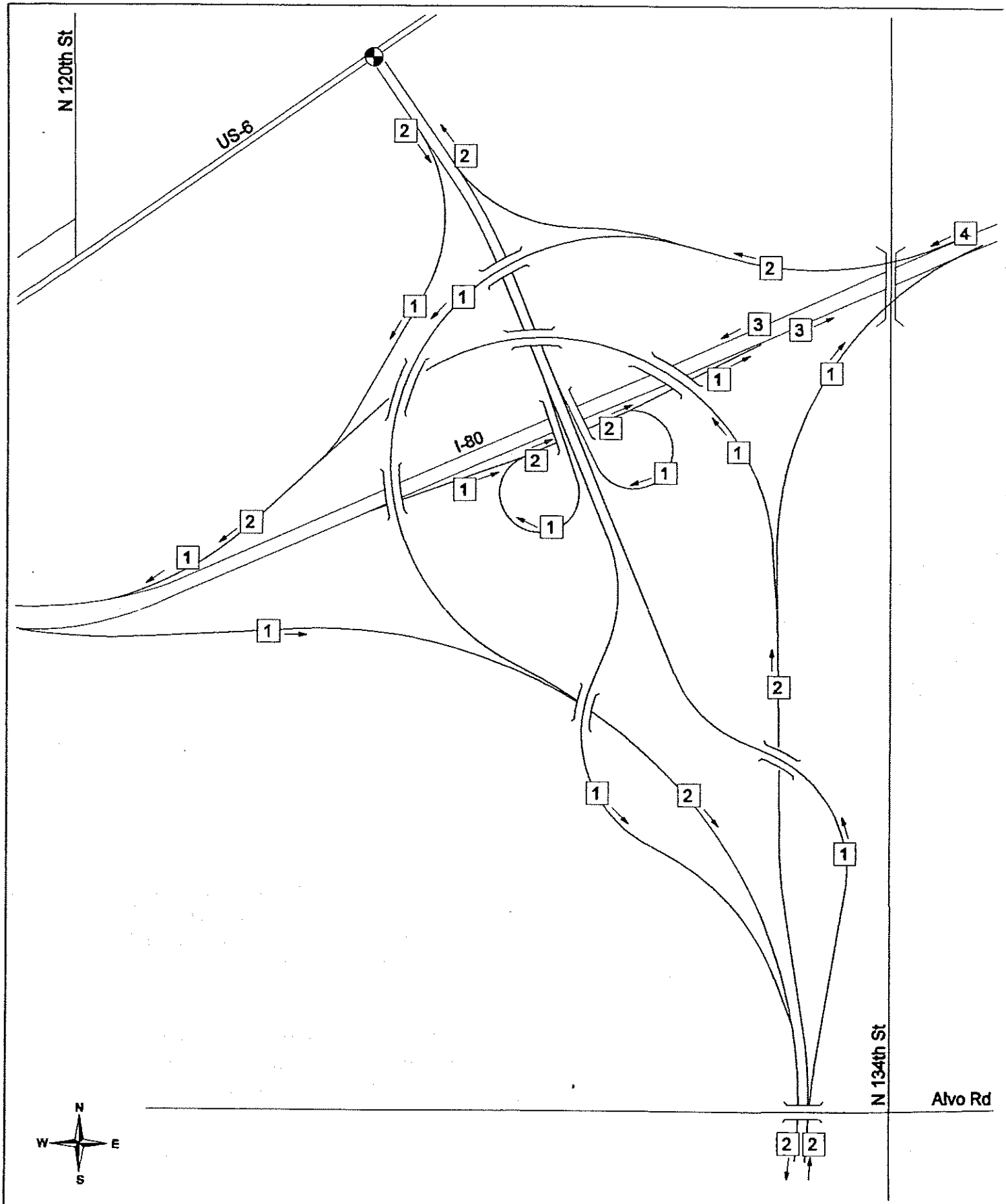
- I-80/East Beltway Interchange
- N-2/East Beltway Interchange
- East Beltway/South Beltway Interchange
- US 77/South Beltway Interchange

Figures 2.19- 2.24 illustrate the basic configuration and number of lanes required for each of the directional interchanges based on a capacity of 14,000 vehicles per day for a one-lane ramp. It should be noted that the east close and east far beltways have separate interchanges for connections with N-2 and the south beltway. In comparison, the east mid has one interchange which provides connections to N-2 and the south beltway. In addition, not all movements are accommodated in all of the beltway interchange configurations. The primary reason for omitting a movement from an interchange configurations was cost and the availability of an alternate route to accomplish the movement. The discussion below illustrates which movements are missing and the alternative routes that are available.

East Beltway/I-80. All movements are accommodated with the proposed interchange layout (**Figure 2.19**).

South Beltway/N-2. The eastbound N-2 to westbound south beltway movement is not directly accommodated in the proposed interchange layout (**Figure 2.20**). However, the driver can accomplish this movement by using southbound 84th Street to go west on the south beltway. Eastbound N-2 traffic is also restricted from accessing 120th Street in the proposed interchange configuration. This movement is accommodated by using eastbound Yankee Hill Road to access 120th Street.

East Close Beltway/N-2. The East Close Beltway/N-2 interchange (**Figure 2.21**) works in conjunction with the South Beltway/N-2 interchange (**Figure 2.20**) to provide access to all movements. The only movements not directly accommodated by these two interchanges are the eastbound N-2 to westbound south beltway and the eastbound N-2 to northbound east close beltway. However, these two movements are easily accomplished using 120th Street and Yankee Hill Road.



LEGEND

1 NUMBER OF PROPOSED LANES

DIRECTION OF TRAFFIC FLOW

PROPOSED

EXISTING

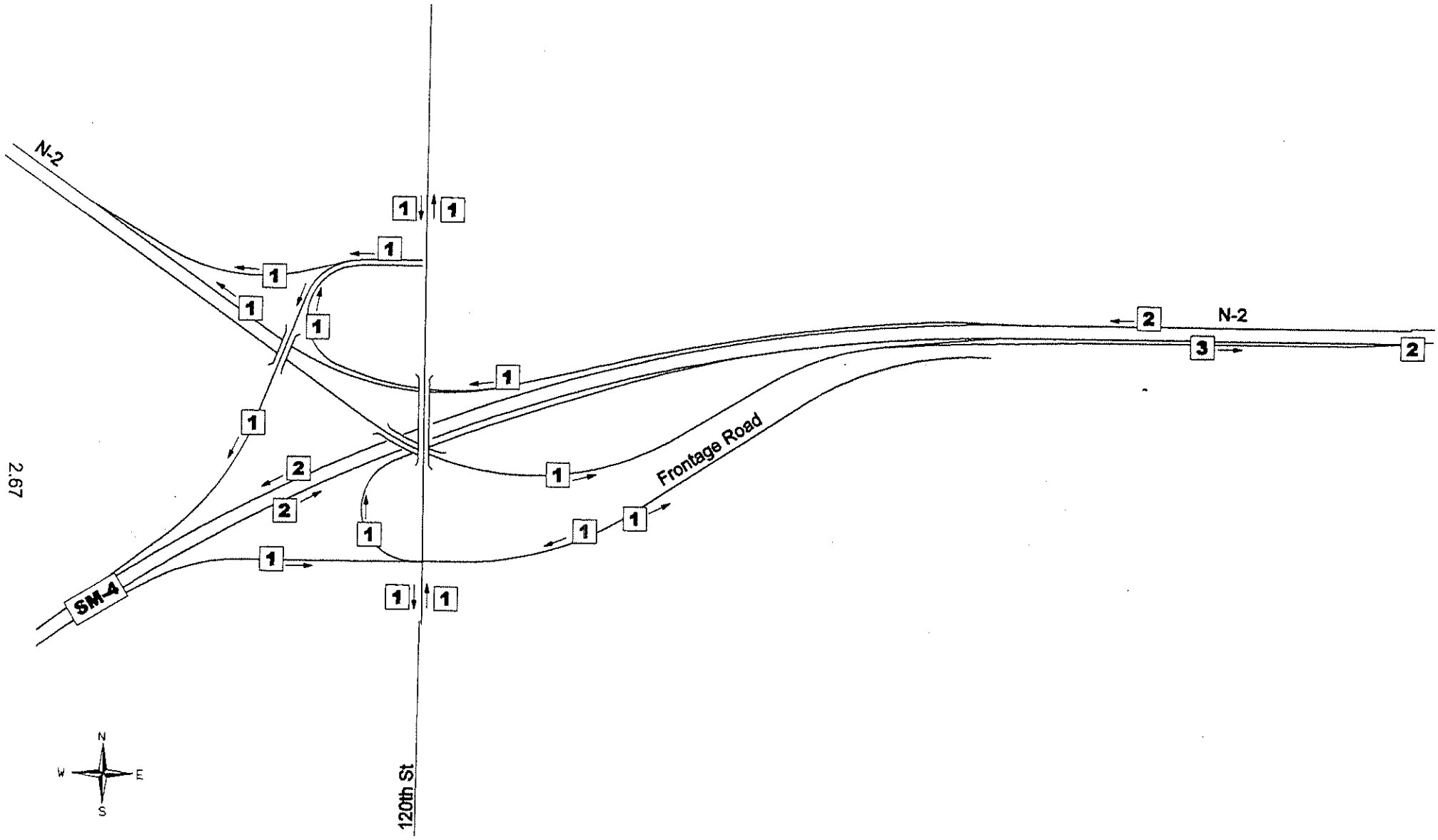
PROPOSED TRAFFIC SIGNAL

LINCOLN SOUTH AND EAST BELTWAYS

ENVIRONMENTAL IMPACT STATEMENT

INTERCHANGE LANE CONFIGURATION EAST BELTWAY / I-80

Figure 2.19



LEGEND

1 NUMBER OF PROPOSED LANES

DIRECTION OF TRAFFIC FLOW

PROPOSED

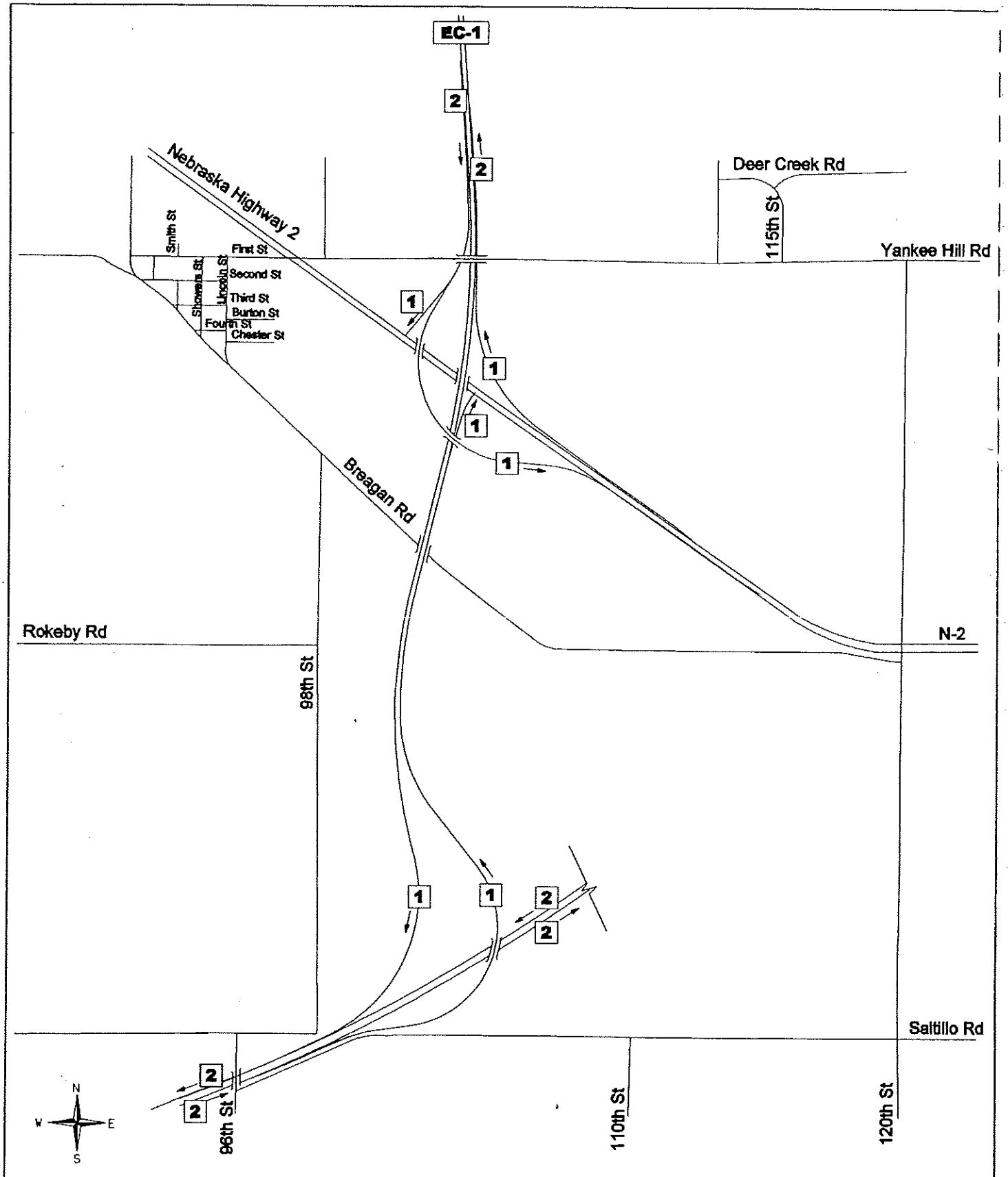
EXISTING

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

INTERCHANGE LANE CONFIGURATION SOUTH BELTWAY / N-2

Figure 2.20

Figure 2.20

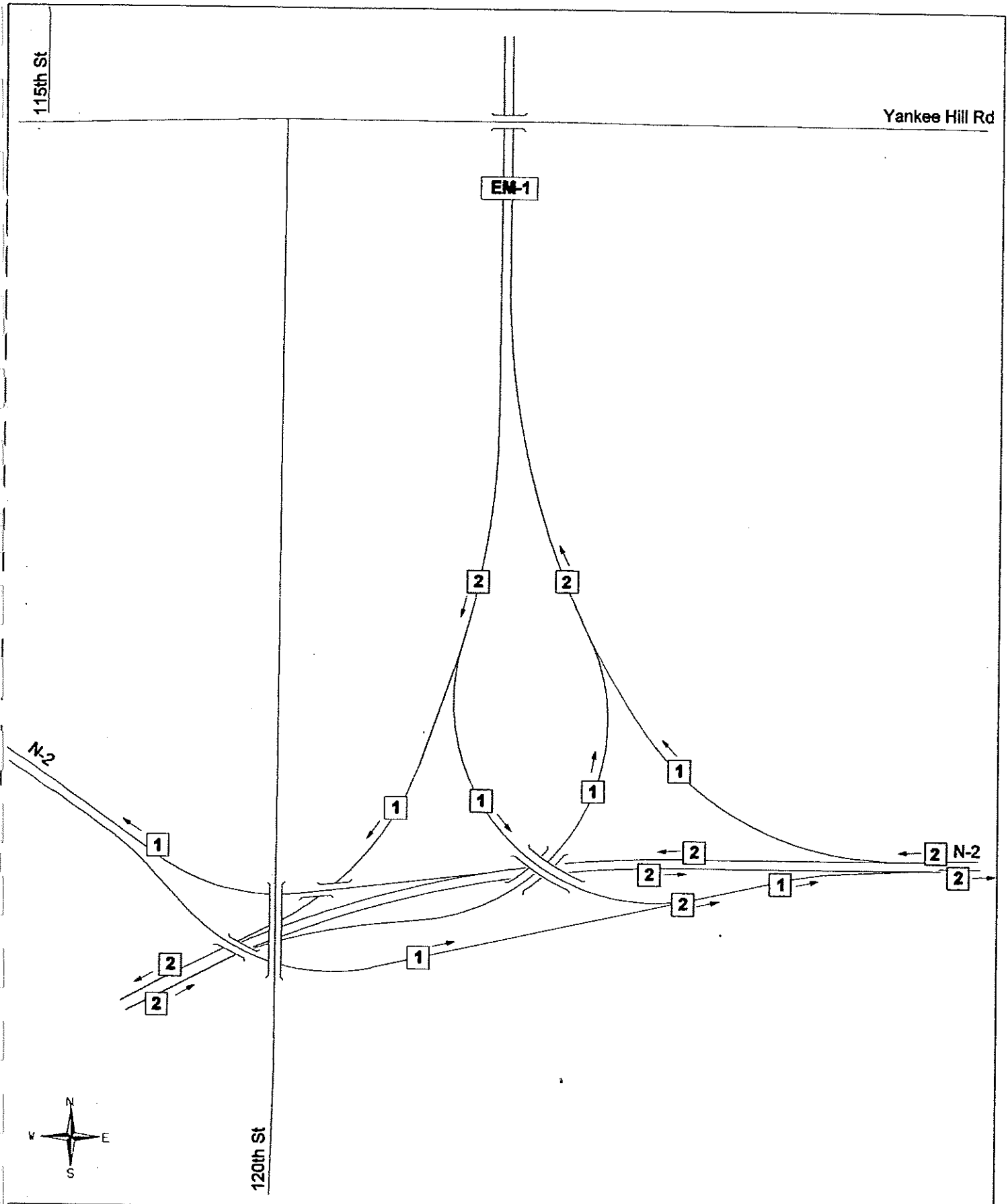


LEGEND

- 1 — NUMBER OF PROPOSED LANES
- → — DIRECTION OF TRAFFIC FLOW
- PROPOSED
- EXISTING
- PROPOSED TRAFFIC SIGNAL

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

INTERCHANGE LANE CONFIGURATION EAST CLOSE BELTWAY / SOUTH BELTWAY / N-2 ***Figure 2.21***



LEGEND

1 NUMBER OF PROPOSED LANES

DIRECTION OF TRAFFIC FLOW

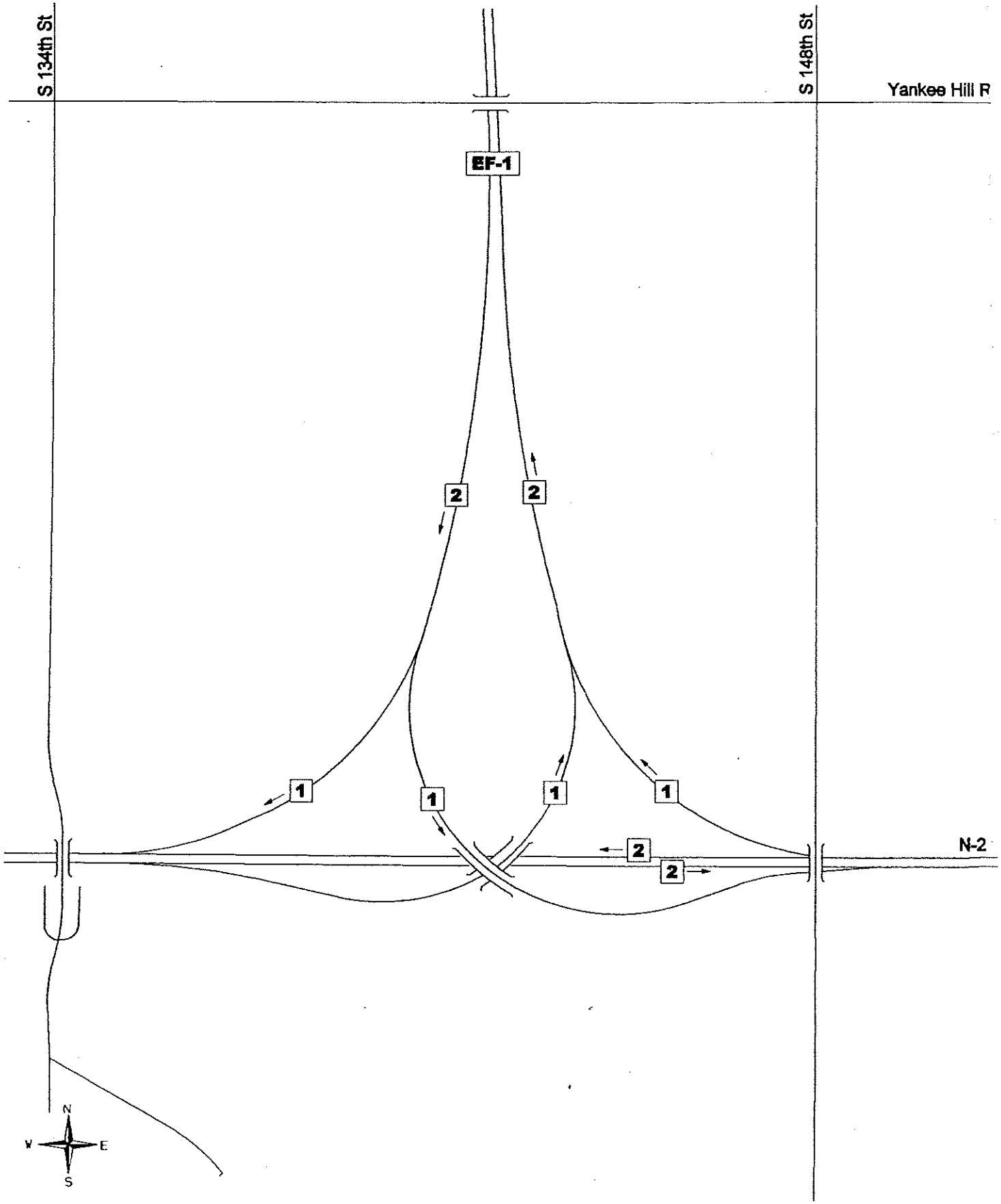
PROPOSED

EXISTING

PROPOSED TRAFFIC SIGNAL

LINCOLN SOUTH AND EAST BELTWAYS

INTERCHANGE LANE CONFIGURATION EAST MID BELTWAY / SOUTH BELTWAY / N-2 ***Figure 2.22***



LEGEND

1 NUMBER OF PROPOSED LANES

DIRECTION OF TRAFFIC FLOW

PROPOSED

EXISTING

PROPOSED TRAFFIC SIGNAL

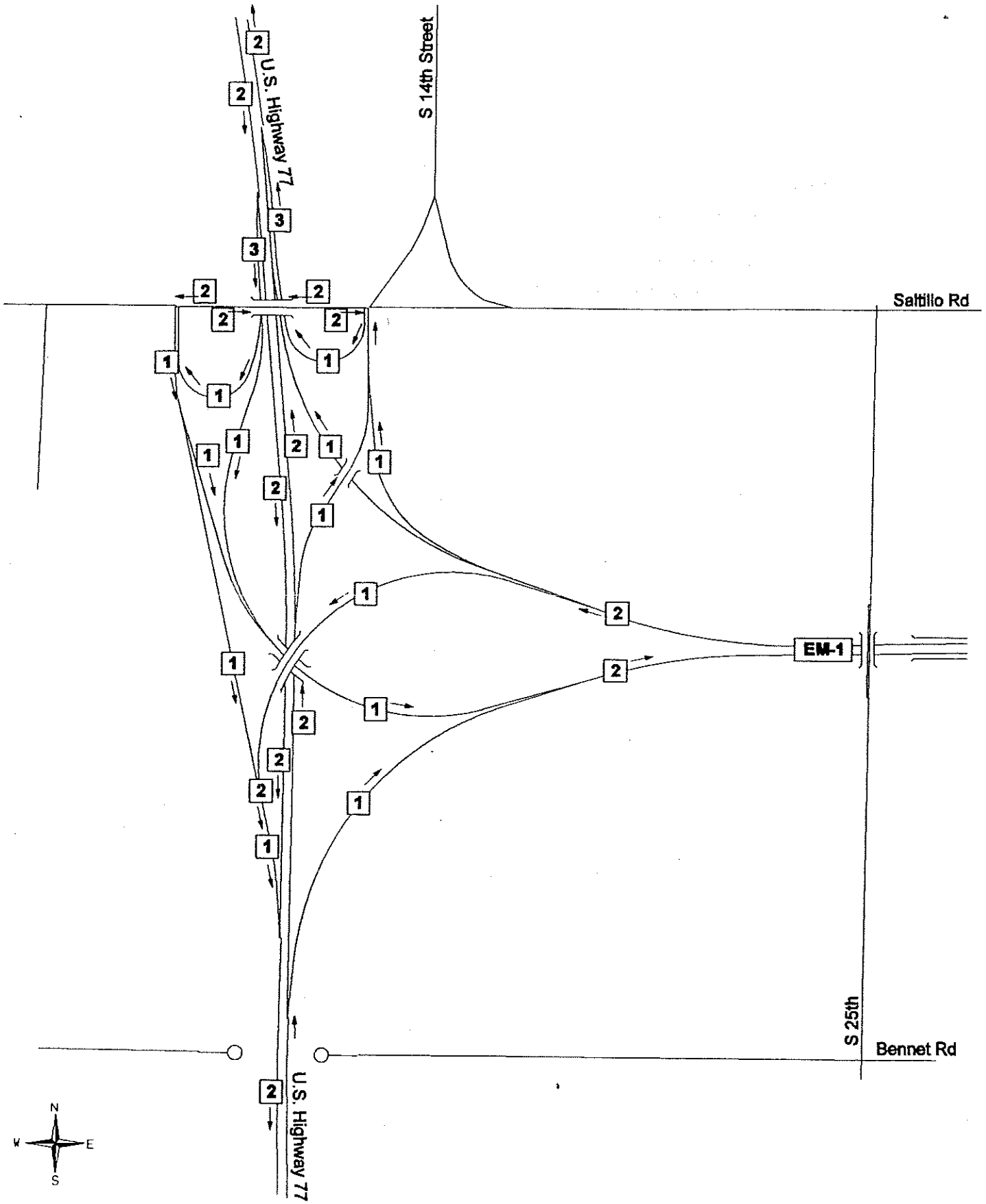
LINCOLN SOUTH AND EAST BELTWAYS

ENVIRONMENTAL IMPACT STATEMENT

INTERCHANGE LANE CONFIGURATION

EAST FAR BELTWAY / N-2

Figure 2.23



LEGEND

2 NUMBER OF PROPOSED LANES

DIRECTION OF TRAFFIC FLOW

PROPOSED

EXISTING

PROPOSED TRAFFIC SIGNAL

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

INTERCHANGE LANE CONFIGURATION
SOUTH BELTWAY / US-77

Figure 2.24

East Mid Beltway/South Beltway/N-2. This interchange layout is the most complex because the intersection of the east mid beltway and the south beltway both occur near 120th Street along N-2 (**Figure 2.22**). This location does not permit access to 120th Street from the beltways or from N-2. As such, 120th Street must be accessed using other surfaced roads in the area. The southbound east mid beltway to westbound N-2 and the eastbound N-2 to northbound east mid beltway movements are not directly accommodated with the proposed interchange layout. These movements can be accomplished by using Pine Lake Road and 98th Street/Yankee Hill Road. The eastbound south beltway to westbound N-2 and the eastbound N-2 to westbound south beltway movements must use 84th Street.

East Far Beltway/N-2. All movements are accommodated with the proposed interchange layout in conjunction with the South Beltway/N-2 interchange (**Figure 2.23**).

South Beltway/US 77. All movements are accommodated with the proposed interchange layout, including providing access to Saltillo Road from US 77 and the South Beltway (**Figure 2.24**).

I-80 Interchange Location. The locations of the east beltway interchanges with I-80 have changed over the course of the beltway study. Earlier in the study, each of the three finalist alternatives for the east beltway had a separate interchange locations (distinct termini); whereas, there is currently only one recommended location where all of the east beltway alternatives would connect to I-80. The original EC-1 terminus was shifted east to move it away from the floodway and floodplain of the Stevens Creek overflow channel, as well as saline wetlands in the vicinity of 98th Street. The EF-1 terminus was shifted west in response to the request by the City of Waverly to keep the interchange outside of the city.

2.4.7 Engineering Analysis

During the Level IV screening, the four finalist beltway alignments were reviewed and refined with respect to several criteria. These criteria included maintaining straight or nearly straight alignments with minimal superelevation and gentle, sweeping curves where possible. Diagonal portions of the alignments were minimized in order to reduce the impacts to adjacent properties and minimize the number and size of unusable remnants. Skew was minimized at all beltway/county road intersections in order to simplify interchange and overpass design as well as to reduce costs for bridges. Stream crossings were also evaluated to minimize bridge lengths and changes to the channel. In addition to these criteria, the refined beltway alignments considered other projects in the corridor. The refined finalist alternatives are shown in **Figure 2.25.**

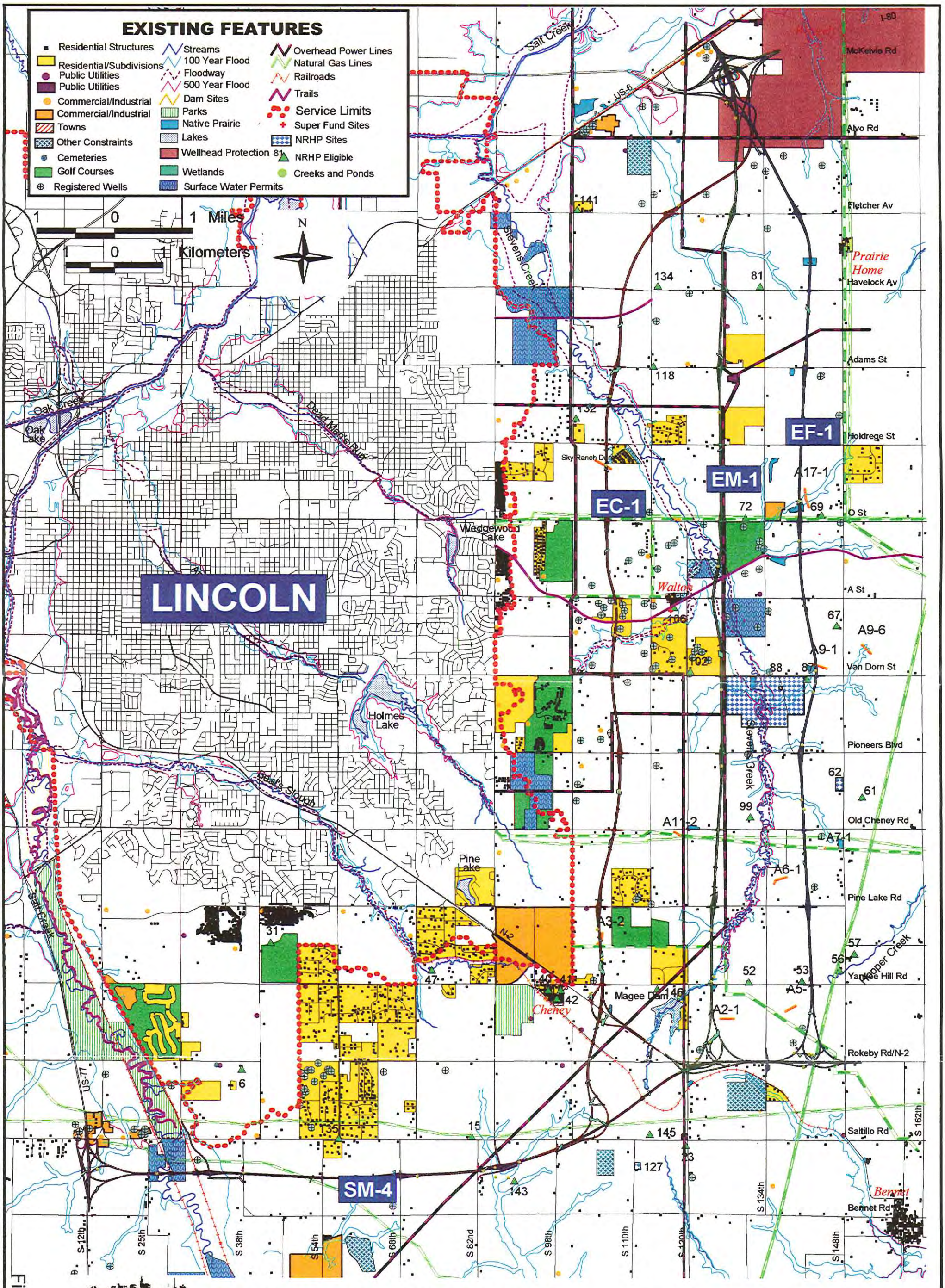


Figure 2.25

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

May 2nd, 2002

Refined Finalist Beltway Alternatives

Preliminary Hydrology and Hydraulics. As part of the engineering analysis for the south and east beltways project, preliminary hydrologic and hydraulic analyses were conducted. These analyses were used to determine the preliminary impacts of the beltways on the waterways within the corridor and to determine the major hydrologic issues that need to be addressed in final design of the preferred alternatives.

The preliminary discharges for the alternatives for the south and east beltways were estimated by methods outlined in the NDOR, Roadway Design Manual, Chapter 11: Drainage. The rational method was used for structures with a drainage area less than 259 ha (640 ac), and regional regression equations for Nebraska were utilized for those drainage areas greater than 259 ha (640 ac). The discharge for Salt Creek was obtained from the "Salt Creek at Wilderness Park Hydrologic Study" (June 1999) by the US Army Corps of Engineers. A 100-year storm frequency was estimated in locations of established floodplains. All other locations were estimated using a 50-year storm frequency according to NDOR Design Manual Standards for culverts on this type of facility. Additional information on hydrologic issues is provided in **Sections 3.17** and **3.18.**

Right-of-Way Requirements. Right-of-way requirements were determined for each beltway alternative assuming a 90 m (300-ft) width for the right-of-way. In addition, the number of residential and commercial acquisitions required, and the number of residences and commercial buildings within 0.4 km (0.25 mi) of the refined alignments were also determined. Additional information on right-of-way requirements is provided in **Section 3.6.**

2.4.8 Construction Cost Estimates

Construction cost estimates were prepared based on the refined finalist beltway alignments. These cost estimates are presented in **Tables 2.16 and 2.17** and summarized in **Table 2.18.** These estimates do not include mitigation costs.

Construction cost for the south beltway as a stand alone (partial beltway) project was estimated at $107 million. Costs for the east alternatives ranged from $128 million with EF-1, $147 million with EC-1, and $157 million with EM-1.

Construction costs for end-to-end beltways ranged from $231 million with SM-4/EF-1, $249 million with SM-4/EC-1, and $252 million with SM-4/EM-1. Costs are within 8 percent of each other for the end-to-end beltways, and within 14 percent for the stand alone east beltway alternatives. This is within the 20 percent contingency contained in all cost estimates.

TABLE 2.17
EAST BELTWAY PRELIMINARY COST ESTIMATES
1996 DOLLARS

ITEM	CLOSE			MID			FAR		
	QUANTITY (ENGLISH)	UNIT PRICE (ENGLISH)	AMOUNT*	QUANTITY (ENGLISH)	UNIT PRICE (ENGLISH)	AMOUNT*	QUANTITY (ENGLISH)	UNIT PRICE (ENGLISH)	AMOUNT*
DIAMOND INTERCHANGE	5 ea	$3,254,000	$16,270,000	5 ea	$3,254,000	$16,270,000	5 ea	$3,254,000	$16,270,000
structure	1 230 sq m (13,200 sq ft)	*$970 ($90)*	*$1,188,000*	1 230 sq m (13,200 sq ft)	*$970 ($90)*	*$1,188,000*	1 230 sq m (13,200 sq ft)	*$970 ($90)*	*$1,188,000*
embankment	474 000 cu m (620,000 cu yd)	*$2.60 ($2)*	*$1,240,000*	474 000 cu m (620,000 cu yd)	*$2.60 ($2)*	*$1,240,000*	474 000 cu m (620,000 cu yd)	*$2.60 ($2)*	*$1,240,000*
ramps	19 700 sq m (23,600 sq yd)	*$42 ($35)*	*$826,000*	19 700 sq m (23,600 sq yd)	*$42 ($35)*	*$826,000*	19 700 sq m (23,600 sq yd)	*$42 ($35)*	*$826,000*
total each			*$3,254,000*			*$3,254,000*			*$3,254,000*
DIRECTIONAL INTERCHANGE									
I-80/East Beltway									
structure (8)	8 439 sq m (90,840 sq ft)	*$970 ($90)*	*$8,175,600*	8 439 sq m (90,840 sq ft)	*$970 ($90)*	*$8,175,600*	8 439 sq m (90,840 sq ft)	*$970 ($90)*	*$8,175,600*
embankment	1 896 000 cu m (2,480,000 cu yd)	*$2.60 ($2)*	*$4,960,000*	1 896 000 cu m (2,480,000 cu yd)	*$2.60 ($2)*	*$4,960,000*	1 896 000 cu m (2,480,000 cu yd)	*$2.60 ($2)*	*$4,960,000*
ramps	123 250 sq m (147,400 sq yd)	*$42 ($35)*	*$5,159,000*	123 250 sq m (147,400 sq yd)	*$42 ($35)*	*$5,159,000*	123 250 sq m (147,400 sq yd)	*$42 ($35)*	*$5,159,000*
total each			*$18,294,600*			*$18,294,600*			*$18,294,600*
East Beltway/N-2/South Beltway	5 Structures			6 Structures			3 Structures		
structure	5 254 sq m (56,550 sq ft)	*$970 ($90)*	*$5,089,500*	9 304 sq m (100,150 sq ft)	*$970 ($90)*	*$9,013,500*	3 382 sq m (36,400 sq ft)	*$970 ($90)*	*$3,276,000*
embankment	969 460 cu m (1,268,000 cu yd)	*$2.60 ($2)*	*$2,536,000*	1 422 000 cu m (1,860,000 cu yd)	*$2.60 ($2)*	*$3,720,000*	597 900 cu m (782,000 cu yd)	*$2.60 ($2)*	*$1,564,000*
ramps	124 200 sq m (149,100 sq yd)	*$42 ($35)*	*$5,218,500*	111 960 sq m (133,900 sq yd)	*$42 ($35)*	*$4,686,500*	111 120 sq m (132,900 sq yd)	*$42 ($35)*	*$4,651,500*
total each			$12,844,000			*$17,420,000*			*$9,491,500*
ROADWAY CROSSING	8 ea	$1,170,000	$9,360,000	6 ea	$1,170,000	$7,020,000	7 ea	$1,170,000	$8,190,000
structure	873 sq m (9,400 sq ft)	*$970 ($90)*	*$846,000*	873 sq m (9,400 sq ft)	*$970 ($90)*	*$846,000*	873 sq m (9,400 sq ft)	*$970 ($90)*	*$846,000*
embankment	124 000 cu m (162,000 cu yd)	*$2.60 ($2)*	*$324,000*	124 000 cu m (162,000 cu yd)	*$2.60 ($2)*	*$324,000*	124 000 cu m (162,000 cu yd)	*$2.60 ($2)*	*$324,000*
total each			*$1,170,000*			*$1,170,000*			*$1,170,000*
RAILROAD CROSSING	1 ea	$1,934,000	$1,934,000	0 ea	$1,934,000	$0	0 ea	$1,934,000	$0
structure	1 170 sq m (12,600 sq ft)	*$970 ($90)*	*$1,134,000*	1 170 sq m (12,600 sq ft)	*$970 ($90)*	*$1,134,000*	1 170 sq m (12,600 sq ft)	*$970 ($90)*	*$1,134,000*
embankment	300 000 cu m (400,000 cu yd)	*$2.60 ($2)*	*$800,000*	300 000 cu m (400,000 cu yd)	*$2.60 ($2)*	*$800,000*	300 000 cu m (400,000 cu yd)	*$2.60 ($2)*	*$800,000*
total each			*$1,934,000*			*$1,934,000*			*$1,934,000*
BIKE TRAIL CROSSING	2 ea	$580,000	$1,160,000	0 ea	$580,000	$0	1 ea	$580,000	$580,000
structure	370 sq m (4,000 sq ft)	*$970 ($90)*	*$360,000*	370 sq m (4,000 sq ft)	*$970 ($90)*	*$360,000*	370 sq m (4,000 sq ft)	*$970 ($90)*	*$360,000*
embankment	84 100 cu m (110,000 cu yd)	*$2.60 ($2)*	*$220,000*	84 100 cu m (110,000 cu yd)	*$2.60 ($2)*	*$220,000*	84 100 cu m (110,000 cu yd)	*$2.60 ($2)*	*$220,000*
total each			*$580,000*			*$580,000*			*$580,000*
MINOR STREAM CROSSING	2 ea	$756,000	$1,512,000	4 ea	$756,000	$3,024,000	3 ea	$756,000	$2,268,000
structure	780 sq m (8,400 sq ft)	*$970 ($90)*	*$756,000*	780 sq m (8,400 sq ft)	*$970 ($90)*	*$756,000*	780 sq m (8,400 sq ft)	*$970 ($90)*	*$756,000*
embankment	0 cu m (0 cu yd)	*$2.60 ($2)*	*$0*	0 cu m (0 cu yd)	*$2.60 ($2)*	*$0*	0 cu m (0 cu yd)	*$2.60 ($2)*	*$0*
total each			*$756,000*			*$756,000*			*$756,000*
MAJOR STREAM/RR CROSSING									
#1	1 ea	$3,402,000	$3,402,000	0 ea	$0	$0	0 ea	$0	$0
structure	3 512 sq m (37,800 sq ft)	*$970 ($90)*	*$3,402,000*	0 sq m (0 sq ft)	*$970 ($90)*	*$0*	0 sq m (0 sq ft)	*$970 ($90)*	*$0*
#2-Stevens Creek	1 ea	$8,316,000	$8,316,000	1 ea	$16,632,000	$16,632,000	0 ea	$0	$0
structure	8 584 sq m (92,400 sq ft)	*$970 ($90)*	*$8,316,000*	17 950 sq m (184,800 sq ft)	*$970 ($90)*	*$16,632,000*	0 sq m (0 sq ft)	*$970 ($90)*	*$0*
INTERSECTIONS, AT GRADE	1 ea	$500,000	$500,000	1 ea	$500,000	$500,000	1 ea	$500,000	$500,000
PAVEMENT	263 210 sq m (314,800 sq yd)	$42 ($35)	$11,018,000	269 900 sq m (322,800 sq yd)	$42 ($35)	$11,298,000	269 320 sq m (322,100 sq yd)	$42 ($35)	$11,273,500
SHOULDERS	120 650 sq m (144,300 sq yd)	$16 ($13)	$1,875,900	123 830 sq m (148,100 sq yd)	$16 ($13)	$1,925,300	123 410 sq m (147,600 sq yd)	$16 ($13)	$1,918,800
CONNECTING LINK PAVEMENT	106 020 sq m (126,800 sq yd)	$30 ($25)	$3,170,000	231 770 sq m (277,200 sq yd)	$30 ($25)	$6,930,000	305 200 sq m (365,000 sq yd)	$30 ($25)	$9,125,000
EXCAVATION	1 174 400 cu m (1,536,000 cu yd)	*$2.60 ($2)*	$3,072,000	1 601 700 cu m (2,151,000 cu yd)	*$2.60 ($2)*	$4,302,000	1 539 800 cu m (2,014,000 cu yd)	*$2.60 ($2)*	$4,028,000
CULVERTS (major)	5 ea	$250,000	$1,250,000	1 ea	$250,000	$250,000	1 ea	$250,000	$250,000
DRAINAGE STRUCTURES	18 km (11.2 mi)	$83,890 ($135,000)	$1,512,000	18 km (11.4 mi)	$83,890 ($135,000)	$1,539,000	18 km (11.4 mi)	$83,890 ($135,000)	$1,539,000
SUBTOTAL			$95,491,000			$105,405,000			$83,728,000
CONTINGENCIES		20%	$19,098,000		20%	$21,081,000		20%	$16,746,000
TOTAL CONSTRUCTION COST			$114,589,000			$126,486,000			$100,474,000
ENGINEERING DESIGN		6%	$6,875,000		6%	$7,589,000		6%	$6,028,000
CONSTRUCTION ADMINISTRATION		8%	$9,167,000		8%	$10,119,000		8%	$8,038,000
HOUSES/COMMERCIAL	6 ea	$500,000	$3,000,000	5 ea	$500,000	$2,500,000	10 ea	$500,000	$5,000,000
RIGHT-OF-WAY	449 ha (1,110 ac)	$29,900 ($12,000)	$13,320,000	388 ha (960 ac)	$25,000 ($10,000)	$9,600,000	449 ha (1,110 ac)	$20,000 ($8000)	$8,880,000
TOTAL			$146,951,000			$156,294,000			$128,420,000

* extended costs are based on English quantity and unit prices

Table 2.18

SUMMARY OF BELTWAY CONSTRUCTION COSTS

ALTERNATIVE	SM-4	EC-1	EM-1	EF-1
STAND-ALONE	107,000,000	147,000,000	157,000,000	128,000,000
END-TO-END (with SM-4)	--	249,000,000	252,000,000	231,000,000

It should be noted that the common interchange at N-2 results in a $12 million cost savings with the EM-1 alternative which is not realized with the other two east alternatives. In contrast, the SM-4/EC-1 alternative requires two interchanges at N-2, one 0.8 km (0.5 mi) east of 98th Street and the other at 120th Street. The two N-2 interchanges for the SM-4/EF-1 alternative are located at 120th Street and 0.8 km (0.5 mi) east of 134th Street.

2.4.9 Environmental Analysis

The Level IV environmental analysis was defined as the preparation of the Draft Environmental Impact Statement (DEIS). Assessment of environmental impacts is addressed in **Chapter 3** of this FEIS document.

It should be noted that with additional refinements, the locations of centerlines and interchanges were modified to further minimize conflicts. Therefore, Level III and Level IV impact assessments are not directly comparable.

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Chapter 3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF THE FINALIST ALTERNATIVES

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF THE FINALIST ALTERNATIVES

3.1 INTRODUCTION

Site Location. The study area for the Lincoln South and East Beltways Study is located on the southern and eastern edges of the City of Lincoln, partially within the city limits, in Lancaster County, Nebraska. The study area for the south beltway is bounded on the north by Yankee Hill Road, on the south by the half-section line 0.8 km (0.5 mi) south of Bennett Road, on the east by the half-section line 0.8 km (0.5 mi) east of 148th Street, and on the west by US 77. The study area for the east beltway is bounded on the west by 98th Street, on the east by the half-section line 0.8 km (0.5 mi) east of 148th Street, on the north by I-80, and on the south by N-2.

Topography and Drainage. The approximately 207 km^2 (80 sq mi) study area is characterized by gently rolling uplands and nearly level bottomlands along Stevens Creek and Salt Creek which drain the area. More strongly sloping areas occur along the foot slopes of the stream terraces.

Vegetation. The native vegetation of Lancaster County was originally dominated by mid and tall grasses with trees growing along the narrow stream floodplains. With settlement, the prairie landscape was transformed by production agriculture which dominates the landscape today. Although woodlands still remain along the watercourses, only a few remnant prairie locations remain. Typical riparian woodland species in the study area are cottonwood, peach-leaf willow, American elm, green ash, hackberry, mulberry, honey locust, and box elder. Wetlands are generally limited to areas along the smaller stream courses.

Agriculture. Dominant crops are milo, corn, soybeans, wheat and hay crops. Historically, local farmers raised dairy and beef cattle, hogs, sheep and chickens; however, stock production has decreased significantly in the county. In 1997, the market value of agricultural products sold was $82,386,000. Crop sales accounted for 72 percent of the market value; livestock sales accounted for 28 percent.

Demographic Characteristics. Population in Lancaster County has shown steady increases during the past several decades. From 1980 to 1990, the County as a whole grew from 192,882 to 213,641, a 10.8 percent increase during the ten-year period (Bureau of Census, 1990). The population continued steady growth through the 1990's with a 2000 population of 250,291, a 17.2 percent increase (Lincoln-Lancaster County Planning Dept, 2001). The annualized rate of population growth in the County during the 1990s was 1.60–significantly higher than the annualized rate of 1.03 during the 1980's (Lincoln-Lancaster County Planning Dept, 2001). Growth during the 1990's was attributable to both natural increase (more people born than dying) (60 percent) and positive net migration (more people moving into the area than leaving) (40 percent). The positive net migration reflected both strong domestic migration (54 percent) and international migration (45 percent) (Lincoln-Lancaster County Planning Dept, 1999).

Most of the growth in the region has occurred within the City of Lincoln which had a 2000 population of 225,581 and now accounts for 90 percent of the total population of the County.

The annualized rate of population growth for the City during the 1990s was 1.63–significantly higher than the annualized rate of 1.11 during the 1980's (Lincoln-Lancaster County Planning Department, 2001).

The farm population within the County continued a steady decline from 4,275 to 3,081 in the ten-year period from 1980 to 1990. This contrasts with the rural non-farm population which had a steady increase from 15,059 in 1980 to 17,982 in 1990 (US Bureau of Census 1992). More current data is more limited but shows that full time farms decreased 6 percent from 713 to 670 in the 5-year period from 1992 to 1997 (US Bureau of Census 1997). Similarly, the average size of farms decreased 5 percent from 123 ha (305 ac) to 117 ha (289 ac) during this period. The trend in the beltway study area toward suburban growth is consistent with trends evidenced in the comparison of the total County's farm and non-farm population. The non-farm population consists of persons living in unincorporated towns, or acreages and in other non-farm settings.

In addition, trends for the incorporated towns within the beltway study area also show increasing populations. For example, the town of Waverly increased from 511 in 1960, to 1,869 in 1990, and 2,448 in 2001. It is projected that the population of Waverly will range from 2,500 to 2,700 by 2010, a 17 to 26 percent increase from 1990.

3.2 LAND USE

3.2.1 Existing Conditions

Agricultural Uses. Current land uses in the beltway study area are primarily agricultural. The dominant crops are milo, corn, soybeans, wheat and hay crops. Historically, local farmers raised dairy and beef cattle, hogs, sheep and chickens; however, stock production has decreased significantly in the county. Like the rest of Lancaster County, the farm population in the beltway study area has decreased considerably as the urban population of the City of Lincoln has increased. Following this trend, land uses in the study area are beginning to transition from agricultural to suburban uses.

Rural Non-Farm Uses. Although most of the tillable land is in active production, review of the constraints map (see **Figure 2.1**) shows that there has been substantial development of non-farm uses in the beltway study area. Some of this development has occurred in clusters; however, the overall pattern is scattered throughout the area. The majority of the development has been for residential land use.

In particular, farm home and farmstead split-offs are common, as well as residential acreages (large lot single family homes). On the south, there are a large number of contiguous large lot subdivisions. On the east the subdivisions tend to be fewer and more scattered. Some of the subdivisions have special common use features such as an airstrip, lake, golf course, or equestrian facilities. The east tends to have some of the older subdivisions as well as non-subdivision areas of 2 ha (5 ac) lots which predate current zoning policies. These residential areas appear to have been deliberately located to provide convenient access to O Street and downtown Lincoln, or I-80 and Omaha. In comparison, the south tends to have many more newer subdivisions appealing more generally to those interested in country living, but with quick access to Lincoln on paved roads. In general, rural residences constructed in the beltway study area are custom built homes for higher income households.

There are three unincorporated towns within the study area–Cheney on the south, and Prairie Home and Walton on the east. These towns vary in size and generally reflect a rural community neighborhood of mixed use that serves the local residents. Growth of these former railroad junction towns has been relatively slow; however, the settlements closest to Lincoln, such as Cheney and Walton, are experiencing some development pressure.

Commercial uses are very limited and are generally located along State Highways or are internal to the unincorporated towns. Commercial uses are typically convenience-type services, but are beginning to include large warehouse retail sales businesses such as Rod's Outdoor Power and Apache Camper Center. Other commercial businesses in the study area include several nursery, greenhouse and tree farm operations; two kennels; a pet cemetery; and grain elevators at Cheney and Walton.

Industrial uses in the study area are few and are generally located along State Highways or arterial roads due to the need for accessibility for work force and materials and the availability of central utilities. Industrial sites include Williams Pipeline, Conoco Pipeline, Lincoln Oil Products, Bedient Organ, and Norris Public Power District at US 77 and Saltillo Road; Parker Fluid Connectors on O Street (US 34); Novartis, Pavers, Linweld, National Crane and ADM along US 6. There is one active quarry and sand pit in the project area; Schwarck Quarries, located along South 54th Street south of Saltillo Road, produces crushed rock, agricultural lime and retaining wall stone. Three private airstrips--Weaver Field, Stewart Field and Skyranch Acres (Pester Field)–are also located in the study area.

Several urban recreational elements occur in the beltway study area including two city parks. Wilderness Park, which extends 12 km (7.5 mi) from Lincoln to Saltillo Road along Salt Creek, is owned by the County and operated by the City. The park provides hiking, bicycle and equestrian trails. Jensen Park, located west of Cheney, is soon to be developed by the City of Lincoln with ballfield facilities. There are three private golf courses within the study area--Wilderness Ridge, Hidden Valley and Crooked Creek. Four other private courses abut the study area (Yankee Ridge, Himark, Firethorn and Hillcrest Country Clubs). All of the golf courses have surrounding housing developments. The Izaak Walton League has a facility south of Highway 2 on South 134th Street, and the Boy Scouts of America have recently purchased a property near A Street and Stevens Creek.

Other features throughout the beltway study area are extensive electric distribution lines, radio and communication towers, rural and municipal water distribution systems, county maintenance buildings, several cemeteries, and the MoPac and Murdock hiker/biker trails. The Marion Catholic Center is located near 112th and Alvo Roads.

Local Planning Process. The City of Lincoln has a tradition of planning which dates back to the 1950s and the first Comprehensive Plan. The current *1994 Lincoln-Lancaster County Comprehensive Plan* embraces the concept of "managed contiguous growth" and the phasing of infrastructure expenditures based on this policy. The plan was adopted with the understanding that it should "provide for the overall health of the community, but only if such growth is not injurious to the overall health of the community's neighborhoods and commercial areas including Lincoln's downtown". The Plan suggests a number of "policy initiatives for the healthy growth and development of the community".

One of the most long held policies has been to develop "a compact and generally contiguous urban form" around its confines with the goal to "protect existing rural areas from urban sprawl through planned development". However, the plan also encourages a unified planning approach between urban and rural interests and encourages "services to meet a range of urban and rural lifestyles". An analysis of the City's growth over the last 30 years shows a gradual expansion outward from the original urban core, building on the availability of infrastructure. Much of this growth continues to occur to the south and east of Lincoln in the beltway study area. Although the City has an existing, clearly defined boundary denoting urban versus rural uses, it has begun to envelop large lot residential areas that were once remote from the City's boundaries.

Policy initiatives specific to the beltways study include "the development of a circumferential roadway network around the City of Lincoln" and providing for "a long-range plan to develop early identification of bypass corridors and right-of-way retention".

In order to establish a rational policy of City expansion, ensure the availability and adequacy of the resources in which to construct infrastructure, the City has identified a future urban service area that has taken into account limitations poised by natural features, current city limits and prior plan designations. As such, the 1994 Comprehensive Plan included a map of future land uses in the City and County. Since that time, the maps have been revised to show amendments to the Comprehensive Plan. For the purposes of this study, the revised land use plans for the City and County were used to develop the Build Out Scenario II (BOS II) which assumed a projected population of 374,630 within a 25 to 30 year period, representing a 57 percent increase over the 1999 County population. **Figures 3.1** and **3.2** are the most recent versions of the City and County land use plans. The current plans forecast that about two-thirds of the south beltway study area and most portions of the east beltway study area will remain undeveloped within 25 years. Future land uses in the beltway study area are shown primarily as the existing agricultural and low-density residential uses–with highway commercial and industrial along State Highways.

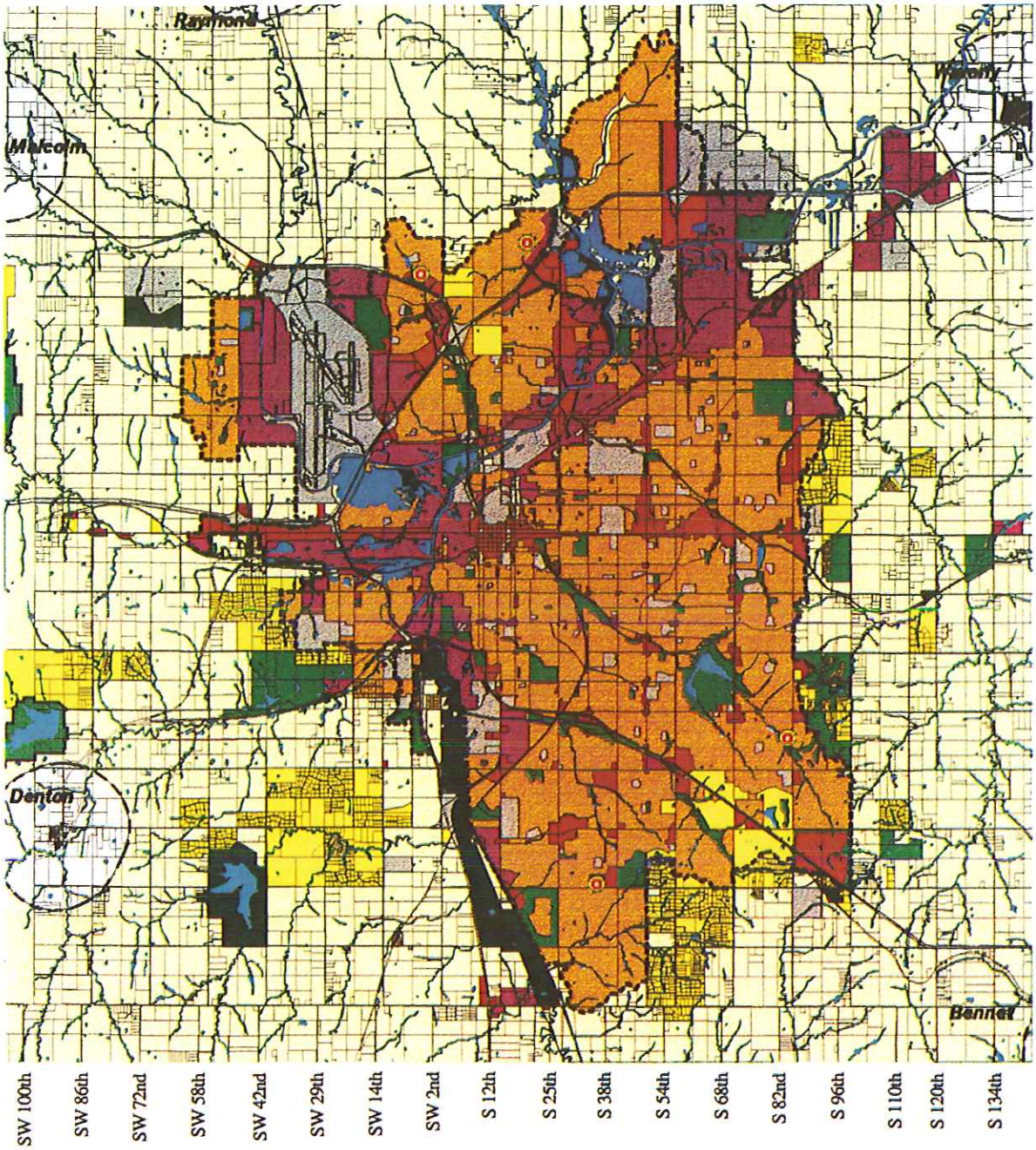
The two incorporated cities in the study area, Waverly and Bennet, have jurisdiction over unincorporated areas within 1.6 km (1 mi) of their existing city limit boundary. The Village of Bennet has designated the portion of the study area under its jurisdiction for agricultural use, consistent with the County designation. The Waverly Comprehensive Plan also designates the areas south of I-80 and 0.8 km (0.5 mi) west of 134th Street for agricultural uses. The remaining land use designation in the Waverly plan recognizes (1) expanding residential uses from Amberly Road south to I-80, and (2) new industrial and commercial uses at the proposed interchange at I-80 and a realigned 134th Street.

Zoning. Zoning in the study area is determined by four entities. The majority of the area is governed by Lancaster County, with some areas falling within the 4.8 km (3-mi) extraterritorial jurisdiction of the City of Lincoln, and the 1.6 km (1 mi) extraterritorial jurisdictions of the City of Waverly and Village of Bennet.

In general, the majority of beltway study area is zoned for Agricultural (AG) or Agricultural Residential (AGR) uses. The exceptions are commercial and industrial districts located along State Highways at US 77 and Saltillo Road, US 34 (O Street) and 134th Street, and US 6. In these areas, Highway Commercial (H3), Industrial (I-1), Industrial Park (I-2), County Industrial (I) uses have been deemed appropriate.

Figure 3.1

LINCOLN'S LAND USE PLAN



LEGEND

- Residential, Urban
- Residential, Low Density
- Commercial
- Industrial
- Parks and Open Space
- Future Service Limit
- Public and Semi-Public
- Wetland and Water Bodies
- Natural / Environmentally Sensitive
- Agricultural
- Urban Village

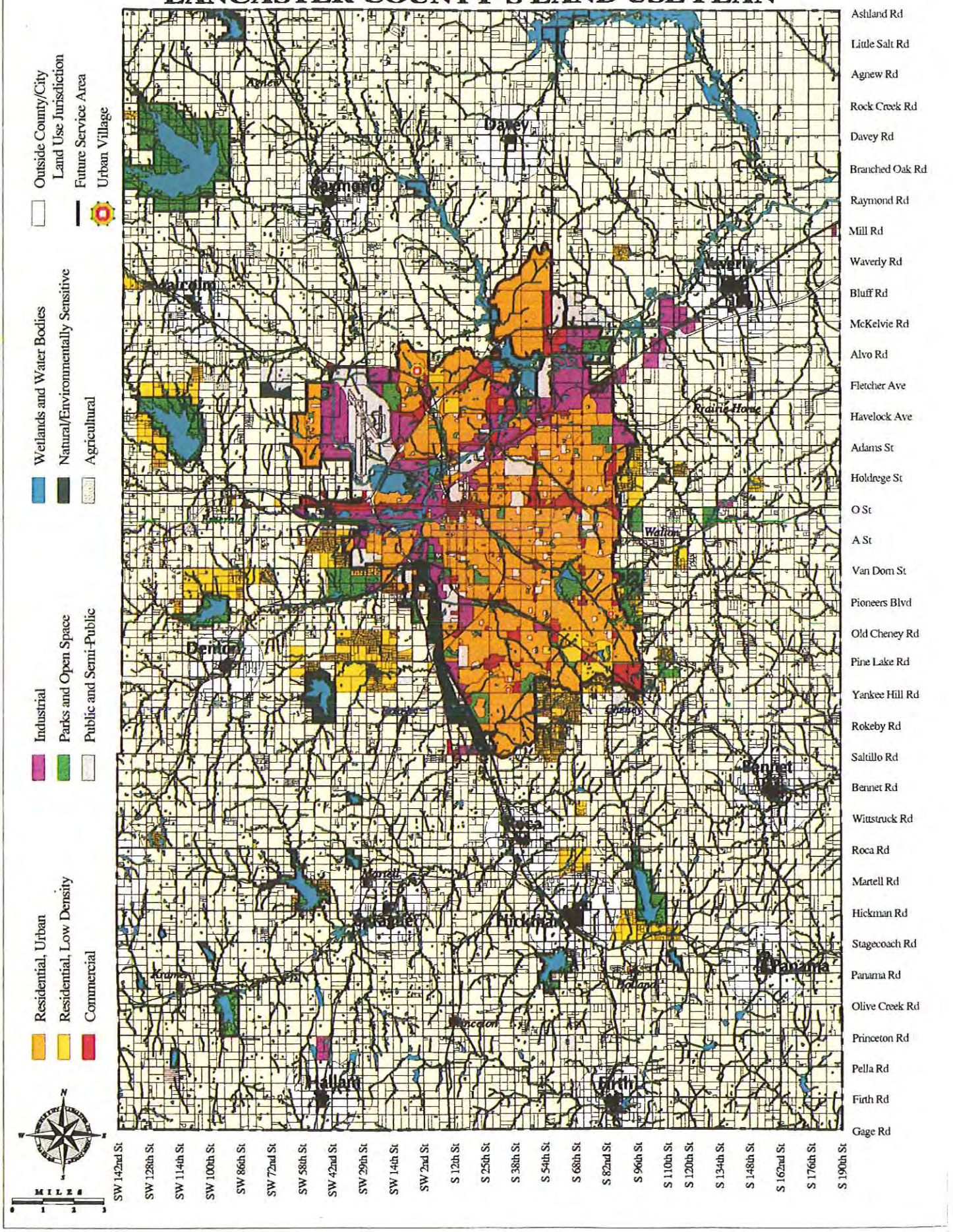
N W E S

MILES 0 1 2 3

Mar 27, 2000 (Amendment No. 94-01,3,4,5,6,7,8,10,14,16,22,23,27,29,30,31,32,34,35,37,39,40,41,43,46)
(/plan/plots/amls/citylusm.aml /plots/develop/rtl/citylu.rca)

19 Apr 00 09:36:30 Wednesday

Figure 3.2
LANCASTER COUNTY'S LAND USE PLAN



These approved zoning districts, and the policies that created them, have resulted in the proliferation of rural non-farm residential development in the beltway study area. Within the County juridictional area, there are two residential zoning classifications. The AG classification allows for a minimum buildable lot size of 8.1 ha (20 ac); creation of such lots requires only a survey and documented conveyance (deed). In comparison, the AGR classification allows for a minimum buildable lot size of 1.2 ha (3 ac); creation of these lots requires subdivision approval (final plat) by the or County (or City if within the 4.8 km (3 mi) limit). In general, approval of the subdivisions has taken into account factors such as the location along a paved road, availability of water, appropriate soils for septic systems, and close proximity to villages.

Past Limitations. In general, the rural non-farm areas rely on individual wells or rural county water, and septic systems. The City of Lincoln's service area, which is based on a gravity flow system, has not been extended farther south than Rokeby Road, or father east over the ridge line into the Stevens Creek watershed (approximately between 84th and 98th Streets). The lack of centralized utilities in the area has been the major contributing factor in maintaining the rural character of the area.

However, the future urban service area has been extended into the south beltway study area and to the edge of the east beltway study area due to the continuing growth of Lincoln. On the south, the City has recently approved inclusion of the S-1 and S-2 Subareas (Urban Planning Zones) into the *Lincoln-Lancaster County Comprehensive Plan* bringing the future City service area up Saltillo Road (within the beltway study area). On the east, the future City service area has been extended to 98th Street (the edge of the east beltway study area) between N-2 and Old Cheney Road. In addition, the City has recently initiated the Stevens Creek Basin Planning Initiative to assess future urban and rural development in the basin relative to the overall long-term growth objectives of Lincoln and Lancaster County. The goal of the initiative is to prepare a long range conceptual plan for inclusion in the Comprehensive Plan update process. The current Stevens Creek study has expanded the area of the Urban Planning Zones (which generally covered the west bank) to include the entire basin, including the east bank.

Social Acceptability. As documented throughout the beltways study, there is a growing conflict between increasing numbers of citizens who choose to live in rural areas of the County and the prospect of a "circumferential roadway" regardless of the location. However, there appears to be substantially more objection to the three east beltway alternatives, than to the SM-4 alternative.

3.2.2 Impacts of the Four Finalist Alternatives

Direct Impacts. Construction of the beltway will require conversion of existing land uses to road right-of-way, including paved lanes and grassed shoulders and medians. Estimates of direct impacts are listed in **Table 3.1.**

Table 3.1

ESTIMATE OF LAND USE IMPACTS
WITHIN BELTWAY RIGHTS-OF-WAY
Hectares (Acres)

LAND USE	ALTERNATIVE			
	SM-4	EC-1	EM-1	EF-1
Cropland	205.5 (507.7)	295.8 (730.8)	282.6 (698.3)	315.5 (779.5)
Pasture/Hayland	26.5 (65.6)	69.4 (171.6)	46.3 (114.5)	55.9 (138.2)
Other Farm	5.5 (13.7)	1.6 (3.9)	0.1 (0.3)	3.2 (8.0)
Woodland (Upland)	1.1 (2.7)	10.4 (25.6)	3.6 (8.9)	9.4 (23.3)
Wetland	7.3 (18.0)	16.9 (41.8)	8.8 (21.8)	8.3 (20.4)
Ponds/Streams	3.5 (8.6)	2.4 (5.9)	1.8 (4.4)	3.2 (7.9)
Residential Use	9.5 (23.4)	12.3 (30.3)	4.0 (10.0)	7.8 (19.3)
Commercial Use	4.2 (10.3)	0.9 (2.2)	0.0 (0.0)	0.0 (0.0)
Industrial Use	0.0 (0.0)	0.7 (1.7)	0.6 (1.4)	1.1 (2.7)
Road	31.2 (77.1)	39.7 (98.1)	40.3 (99.6)	44.5 (110.0)
Railroad	1.2 (2.9)	0.2 (0.6)	0.0 (0.0)	0.0 (0.0)
Hiker/Biker Trails	0.0 (0.0)	0.6 (1.5)	0.3 (0.8)	0.3 (0.7)
TOTAL Right-of-Way	295.4 (730.0)	450.8 (1114.0)	388.5 (960.0)	449.2 (1110.0)

Indirect Impacts. In addition to direct impacts, concerns have been raised that the east beltway will indirectly impact land uses by encouraging urban sprawl along the beltway route, where urban sprawl is considered to be any non-farm development not contiguous to the Lincoln City limits, or any low density development (such as suburban acreages). The implication has been that a far location will create non-contiguous growth, and a close location will continue compact growth. The EC-1 alternative is within 0.8 to 3.2 km (0.5 to 2.0 mi) of the city limits; EM-1 is within 2.4 to 4.8 km (1.5 to 3 mi); and EF-1 is within 2.4 to 6.4 km (1.5 to 4 mi). The SM-4 alternative is as far distant as EF-1--between 2.4 to 5.6 km (1.5 to 3.5 mi) of the city limits.

New policies are proposed to be included in the revised Lincoln/Lancaster County Comprehensive Plan (Lincoln/Lancaster County Planning Department, September 2001). This plan includes mechanisms to protect historic and natural resources and to avoid urban sprawl. Goals of the proposed policies include:

- to prohibit new acreage development within the area of future urban growth, which includes the beltway study area (albeit within the 25-to-50 and 50-to-100+ year planning periods).

- to discourage further development within the 100-year floodplain which will help preserve the Stevens Creek bottoms and tributaries
- to encourage increased residential density (up to 5 dwelling units per acre)

Further evidence of a commitment to preservation, was Change of Zone #3209 (4/17/00) which removed over 100 ac of industrial, general commercial and local business zoning from the interchange at US 77 and Van Dorn Street to retain the use of the land as open space. This action was proposed by the Planning Department, and approved unanimously by the City Council and Mayor.

Over the next 25 years, no additional development is proposed to occur in about two-thirds of the south beltway study area and most portions of the east beltway study area. The proposed revision to the Comprehensive Plan shows some new development in the area of the SM-4 and EM-1 alignments within the next 25 years. The proposal is for 50 to 100 years or more for the City to fill most of the beltway study area. Specific to the Stevens Creek watershed, the Stevens Creek Basin Initiative proposed urbanization of northwest bank of basin within next 25 years, then the rest of the west bank within 25 to 50 years, followed by the east bank beyond 50 years.

While City/County policies are aimed at planned growth and avoiding urban sprawl, the vision of the Comprehensive Plan very clearly shows that population growth and physical expansion into the beltways study area is eventually expected as the city grows outward. Ultimately, the beltway study area could become part of the urban limit in the long-term.

Due to existing and proposed policies which determine the pattern of development, urban growth in the beltway study areas is expected to occur with or without a beltway project--so long as the City of Lincoln continues to experience the current rate of population growth.

In response to public comments, an expanded discussion on secondary and cumulative impacts has been prepared for this FEIS document in **Section 9.6**.

Air Traffic Impacts. There are three private airfields in the study area. EC-1 is approximately 0.5 km (0.33 mi) from the end of the runway at Skyranch Acres (Pester Field); and SM-4 is approximately 0.4 km (0.25 mi) from Steward Field and 1.2 km (0.75 mi) from Weaver Field. There is also an abandoned airfield east of 148th Street between Van Dorn Street and Pioneers Boulevard that has not been used in about 10 years; the airstrip is currently planted in alfalfa.

Consultation with the Federal Aviation Administration (FAA) Air Traffic and Environmental Divisions indicated that (1) there are no federal regulations applicable to private use airfields (Donna O'Neil, FAA, Kansas City, personal communication with A. Zlotsky, 28 September 2000 and 4 October 2000; and Mark Schenkelberg, FAA, Kansas City, personal communication with A. Zlotsky, 28 September 2000), and (2) none of the three airfields had published approaches therefore there are no NPIAS (National Plan of Integrated Airport System) airports in the area of potential effect for the beltways study.

In addition, consultation with the Nebraska Department of Aeronautics indicated that the most important standard when locating a new road is the 20:1 approach (Anna Lannin, personal communication with A. Zlotsky, 6 October 2000; Diane Hoffer, personal communication with A. Zlotsky, 28 September 2000). In addition, in all three locations the beltway alternatives would exceed the minimum licensing standards for a public use airport which includes a 20:1 approach from the end of the runway which would clear a 5 m (15 ft) height over the road at a distance of at least 91 m (300 ft) from the end of the runway. Further, all three airfields are already constrained by existing Holdrege Street and Saltillo Road. Beyond this, all three locations were reviewed for potential height encroachment from light standards or elevated bridges. Since lights are only proposed at interchanges, and no interchanges or elevated bridges occur along the vector from the air fields, there would be no height constraints. It is noted that the Stevens Creek Bridge would be in close proximity to Skyranch Acres, but it would not occur along the approach to Skyranch Acres. As such, the proposed alternatives would have no impact on air traffic or use of the three private airfields. However, the project will need to be reviewed again regarding airspace considerations during final design with possible coordination with FAA.

3.2.3 Proposed Mitigation

No mitigation for impacts to land use is proposed.

3.2.4 No Build Alternative

The no build alternative will not require conversion of existing land uses for road right-of-way, other than that required for construction of the proposed future roadway network improvements. Development pressure will continue under current growth policies as the City continues to grow. In addition, changes in farming, farm consolidation and escalating agricultural land prices will contribute to urbanization of the area.

3.3 TRANSPORTATION

3.3.1 Existing Conditions

Traffic. Traffic data, regional growth trends and previous studies have all indicated a need for south and east beltways. Some of the highest rates of growth have been on the south and east fringes of the Lincoln necessitating a long-range plan to develop early identification of bypass corridors and right-of-way retention. Existing through traffic, with external origin and destination, exacerbates high traffic volumes on arterials such as US 6 and N-2. Internal to external trips and external to internal trips are currently made using arterial roadways with signalized intersections and unlimited access to adjacent properties. This results in excessive delay and congestion along these roadways.

Safety. The existing congested conditions along many of Lincoln's arterial streets subject drivers to increased exposure to accidents due to abrupt stopping, turning and lane changing. Other safety concerns in the beltway study area are (1) the I-80 interchange at Waverly, (2) the at grade intersections of County Roads with US 77, N-2, US 34 and US 6, and (3) Saltillo Road and 148th Streets which currently serve as popular routes for through traffic, especially trucks. These locations have higher accident rates due to high speeds, less than desirable intersection configurations, and/or high traffic volumes.

3.3.2 Impacts of the Four Finalist Alternatives

Traffic. The beltway system is viewed as an essential component of the regional transportation network that would move through traffic around congested urban areas, as well as reduce delay and improve traffic flow on the existing urban street system.

In addition to accommodating through traffic, a beltway system will also facilitate trips that have an origin within the metropolitan area and a destination outside of the area, or vice versa. While it is unlikely that internal trips will use the beltway system as much as those with an external origin or destination, these trips will also benefit by reduced delay and accidents due to reduction of abrupt stopping, turning, and lane changing. A significant amount of through traffic on the current major routes (N-2, US 34, US 6 and 84th Street) will be relocated to the beltway system providing additional capacity and reduced congestion for internal trip traffic.

The south beltway is expected to carry 14,000 to 19,000 vehicles per day and the east beltway is expected to carry 14,000 to 30,000 vehicles per day depending upon the segment examined and, to a lesser degree, its relative distance from the center of Lincoln. This shift of traffic from the arterial street system to the beltways results in a 10 to 30 percent reduction in traffic on major arterials such as N-2, US 6, and 84th Street. This reduction will preserve roadway capacity for these streets. Since these roadways are currently situated within developed areas, widening to 6-lanes would be very expensive and have substantial negative impacts to adjacent properties.

In addition to reducing through traffic on internal urban roadways within the existing metropolitan area, a significant benefit is expected by reducing truck traffic on rural roadways on the fringe of the metropolitan area. The most reduction is expected on Saltillo Road between South 84th Street and US 77 and on North 148th Street between N-2 and Waverly. These roadways are expected to experience a 40 to 80 percent and 40 to 90 percent reduction in total traffic, respectively.

The location of the east beltway in terms of the close, mid or far corridors does not seem to have a significant effect on the amount of traffic it is expected to carry or the benefits obtained. The east beltway provides relief to traffic coming into or through Lincoln from the northeast (Omaha) and the southeast (Nebraska City). This traffic will use the east beltway regardless of which corridor is selected. The major differences between the east corridors involve the interchanges at I-80 , N-2 and the south beltway. The close and far corridors require significant diagonal routing to connect to an interchange at I-80. The close and mid corridors require more complicated interchanges at N-2 and the south beltway than is required for the far corridor. These differences are best reflected in the construction cost estimates and right-of-way impacts; however, they have little effect on system performance.

Safety. The beltway will be designed using modern standards which incorporate safety features designed to protect the traveling public. The primary effect on safety will be positive due to the relocation of truck and other through traffic from congested urban streets and unpaved County Roads to a more appropriate high speed limited access freeway facility. Freeways have a 50 to 80 percent lower accident rate than urban arterials. Accidents throughout the Lincoln roadway network are expected to be fewer as traffic shifts from local streets and collectors to fill the excess capacity available on the arterials due to the beltways.

The beltway project will also result in the reconfiguration of the Waverly interchange which needs some modifications to accommodate current traffic volumes and heavy truck usage.

I-80, US 77 and N-2 will be provided with full directional interchanges; these are the most efficient and safest types of interchanges because they allow high speed, high volume movements between intersecting roadways. Diamond interchanges will be provided at all other arterial intersection locations.

Additional safety features include fencing of the beltway right-of-way, and lighting at freeway interchanges. These features increase the safety factor for the traveling public and adjacent landowners. Overall, the construction of the beltways is projected to save between $37 and $68 million per year in vehicle accidents using the BOS traffic model. These savings are expected to be even greater using the BOS II model because of the higher projected usage of the beltways.

Measures of Effectiveness. The beltway alternatives provide considerable improvement in projected vehicle hours traveled (time savings) compared to the no build alternative. The differences between the east beltway alternatives are minimal, but slightly better with EM-1 than EC-1 or EF-1 under the BOS II model. The beltways are expected to save approximately 8,500 to 10,300 hours of travel time per day for Lincoln motorists depending on which beltway corridor is selected.

Cost Effectiveness. In **Section 2.3.6**, a detailed discussion of cost effectiveness and economic efficiency was conducted on seven candidate beltway alternatives and two non-beltway alternatives. This analysis was done using the BOS travel demand model which showed less traffic using the beltways and a lower reduction in VHT (time savings) than the updated BOS II model. Despite the fact that traffic volumes were projected to be lower, the beltway alternative was shown to be generally cost effective with the east-close and east-mid alternatives having a benefit-cost ratio approaching 1.0.

An analysis of the time savings with the BOS II model comparing the end-to-end beltway alternatives and no build alternative indicated the investment to construct the beltway would be paid off through time savings alone in less than three years. Based on a payoff period of less than three years, all three end-to-end beltway alternatives are considered economically feasible for all east alignments.

3.3.3 Proposed Mitigation

Traffic. No mitigation is necessary.

Safety. No mitigation is proposed, beyond planned fencing of the freeway right-of-way, and lighting at interchanges.

3.3.4 No Build Alternative

Other than that included in the 1 and 20 Year Program of proposed future roadway network improvements, the no build alternative will do nothing to address the problem of increasing traffic on the south and east fringes of the City of Lincoln, nor will it specifically address high truck use and through traffic on Saltillo Road and 148th Streets, and other locations in the beltway study area.

3.4 FARMLAND

3.4.1 Existing Conditions

Farmland. Current land uses in the beltway study area are primarily agricultural. The dominant crops are milo, corn, soybeans, wheat and hay crops. Historically, local farmers raised dairy and beef cattle, hogs, sheep and chickens; however, stock production has decreased significantly in the county.

Prime Farmland Soils. Numerous soil types occurring in Lancaster County have been listed as prime farmland soils (NRCS, 1998). Several of these prime farmland soils are mapped as occurring withing the project area. Form AD-1006 was submitted to the Natural Resources Conservation Service (NRCS) requesting determination of impacts to prime farmland soils. This form uses the NRCS Farmland Conversion Impact Rating which is based on a scale of 0 to 260.

3.4.2 Impacts of the Four Finalist Alternatives

Conversion of Farmland. Construction of the beltway will require conversion of existing farmland to road right-of-way, including paved lanes and grassed shoulders and medians. Impacts to production agricultural land, consisting of cropland, pasture/hayland, and other farm (including corrals, livestock waste lagoons, etc.) are listed in **Table 3.2**. Other on farm land uses, not typically in agricultural production, include woodlands, wetlands and ponds/streams are included in the previous **Table 3.1.** The majority of these acres occur on farms, but some occur on residential acreages. **Table 3.2** shows that the alternatives will impact less than 1 percent of the 186 425 ha (460,666 ac) of farmland in Lancaster County--whether constructed as partial or end-to-end- beltways.

Indirect Impacts to Farms. Data has not been developed to exactly determine the indirect impacts due to bisected parcels. However, general practices in right-of-way acquisition for rural properties include provision of access to the extent possible, and sale of uneconomic remainders to neighboring landowners who do have access. These practices minimize the loss of production agriculture. It also appears that the project may impact two pivots amounting to 36 ha (90 ac); however, use of the land for agriculture is not lost. Landowners will be compensated for any loss of property caused by loss of access, uneconomic remainders or diminished value as described in **Section 3.6.**

Based on the number of owners with one or more parcels crossed by the beltway, the number of bisected farms was estimated at 16 for SM-4, 33 for EC-1, 29 for EM-1, and 23 for EF-1. These numbers do not include small uneconomic remainders that would be purchased outright.

During the public comment period, concern was raised regarding the impact of artificial lighting on crops. According to David Andrews, Professor of Agronomy, University of Nebraska-Lincoln, the only impact to Nebraska crops that he is aware of is a very limited delay in soybean flowering due to the tropical origin and short photo period of the plant. In his experience, this effect was observed from street lights and did not extend beyond a 15 m (50-ft) radius from the base of the pole. This impact would be negligible with the beltway project because lighting is only proposed at the interchanges, and because the interchanges generally include at least a 9 m (30-ft) clear zone.

Table 3.2

ESTIMATE OF FARMLAND IMPACTS
WITHIN BELTWAY RIGHTS-OF-WAY
Hectares (Acres)

PRODUCTION AGRICULTURAL LAND USE	ALTERNATIVE			
	SM-4	EC-1	EM-1	EF-1
Cropland	205.5 (507.7)	295.8 (730.8)	282.6 (698.3)	315.5 (779.5)
Pasture/Hayland	26.5 (65.6)	69.4 (171.6)	46.3 (114.4)	55.9 (138.2)
Other Farm	5.5 (13.7)	1.6 (3.9)	0.1 (0.3)	3.2 (8.0)
TOTAL Farmland	237.5 (587.0)	366.8 (906.3)	329.0 (813.0)	374.6 (925.7)
Percent of Farmland in County	0.13	0.20	0.18	0.20

Prime and Unique Farmland Soils. According to the Prime Farmland Policy Act, the NRCS assigns a relative value up to 100 points and the project proponent (federal agency) assigns up to 160 points for the site assessment. Once the score is tabulated, the lead federal agency can identify the effect of the project on farmland and determine the suitability of the site for protection as farmland. Once the score is computed, the NRCS recommends that 1) alternatives with the highest combined scores be regarded as most suitable for preservation and those with lower scores as less suitable, and 2) alternatives receiving a score less than 160 need not be given further consideration for protection and no additional alternatives need to be evaluated.

Table 3.3 lists impacts to prime and unique farmland soils for each of the end-to-end beltway alternatives as determined by the NRCS (**see Appendix A**) using Form AD-1006. Impacts for the highest impact route represent less than 0.5 percent of the 102 340 ha (252,900 ac) of prime and unique farmland soils in Lancaster County. Because scores for all alternatives are all less than 160, no further consideration is required and the project is considered to have a minor effect on prime and unique farmland soils.

During the public comment period, concerns were raised regarding the assumptions used in the Form AD-1006. Further discussion of the evaluation is provided in **Section 9.7.**

3.4.3 Proposed Mitigation

In order to minimize farmland impacts, beltway right-of-way will be limited to that necessary for roadway design standards and any required mitigation. No other mitigation is required specifically for farmland impacts.

Table 3.3

IMPACTS TO PRIME AND UNIQUE FARMLAND SOILS
(End-to End Beltway Analysis)

	ALTERNATIVES		
	SM-4 / EC-1	SM-4 / EM-1	SM-4 / EF-1
Impact Rating Points	140	143.5	142
Prime and Unique Farmland Impacts ha (ac)	461 (1139)	466 (1152)	494 (1221)
Percent of Prime and Unique Farmland in County	0.45	0.46	0.48

3.4.4 No Build Alternative

The no build alternative has no adverse impact on farmland or prime and unique farmland soils in the project area, other than that necessary for construction of the proposed future roadway network improvements. The current trend of the conversion of farmland to rural non-farm uses, especially residential use, would continue with or without the beltway project.

3.5 ENVIRONMENTAL JUSTICE

The Executive Order on Environmental Justice (EO 12898) was signed by President Clinton on February 11, 1994. The executive order requires that, to the extent practicable and permitted by law, neither low-income nor minority populations may receive disproportionately high or adverse impacts as a result of a proposed project. Federal agencies must take the appropriate and necessary steps to identify and address "disproportionately high and adverse" effects of federal projects on the health or environment of low-income and minority populations. Also, representatives of any low-income or minority populations in the community that may be affected by a project must be given the opportunity to be included in the impact assessment and public involvement process.

3.5.1 Existing Conditions

The beltway alternatives are located in Census Tracts 37.03, 101, 103, and 104, all in Lancaster County. The four census tracts comprise approximately 8.0 percent of the total population of the county and approximately 65 percent of the total land area of the county.

Table 3.4 summarizes selected 1990 Census Data regarding these tracts and the greater community of Lancaster County (2000 Census data was not yet available for these statistics). The median household income for each of the four census tracts is substantially higher than the median household income of Lancaster County. Also, the percentage of persons living below the poverty level in each of the four census tracts is substantially less than the percentage for Lancaster County.

Table 3.4

INCOME AND POVERTY STATISTICS FOR BELTWAY CENSUS TRACTS

1990 CENSUS STATISTIC	Lancaster County	Census Tract 37.03	Census Tract 101	Census Tract 103	Census Tract 104
Median Household Income	$28,909	$51,619	$35,212	$33,733	$30,799
Percent below Poverty Level	10.5%	5.6%	1.6%	4.1%	5.7%

Table 3.5 shows the 2000 Census data for the number of minority residents in the beltway census tracts compared to the number of minority residents in all of Lancaster County. The percent of minority residents in each of the four census tracts is substantially less than that of Lancaster County.

Table 3.5

MINORITY POPULATION STATISTICS FOR BELTWAY CENSUS TRACTS

2000 CENSUS STATISTIC	Lancaster County		Census Tract 37.12		Census Tract 101		Census Tract 103		Census Tract 104	
	#	%	#	%	#	%	#	%	#	%
White	225,426	90.07	4,348	97.4	4,903	98.1	3,161	97.6	6,104	98.3
Black	7,052	2.82	24	0.5	11	0.2	2	0.1	13	0.2
American Indian, Eskimo, or Aleut	1,599	0.64	4	0.1	16	0.3	15	0.5	12	0.2
Asian or Pacific Islander	7,311	2.92	35	0.8	28	0.5	34	1.0	36	0.5
Other Race	4,225	1.69	14	0.3	20	0.4	17	0.5	22	0.4
Hispanic Origin (of any race)	8,437	3.37	41	0.9	55	1.1	31	1.0	52	0.8

3.5.2 Impacts of the Four Finalist Alternatives

None of the finalist alternatives will impact low-income or minority neighborhoods or populations.

3.5.3 Proposed Mitigation

No mitigation is necessary.

3.5.4 No Build Alternative

The no build alternative would also have no impact on low income or minority populations.

3.6 ACQUISITIONS AND RELOCATIONS

3.6.1 Existing Conditions

The beltway alternatives cross a predominately rural area dominated by production agricultural and agricultural residential land uses.

3.6.2 Impacts of the Four Finalist Alternatives

Acquisition of new right-of-way will be required for the beltway alternatives. Property owners of land acquired will be paid fair market value for property taken and damages accrued. If both the south and east beltways are constructed, the alternatives are expected to require the acquisition of up to ten residential properties (including some farmsteads) that will result in the displacement of the occupants from their residences. In addition, there are two business displacements--Major Oil Company along SM-4 and Stevens Creek Storage along EF-1. Some of the farmsteads may also qualify as a business displacement. **Table 3.6** lists the residential properties requiring acquisition and relocation. Of these properties, at least three are known to have elderly residents; and there may be one minority resident in a rental property. With few exceptions, the parcels affected are primarily owner occupied. The elderly are sometimes more difficult to relocate therefore residential relocation will begin as soon as possible to allow sufficient time.

3.6.3 Proposed Mitigation

All right-of-way acquisition will be handled in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. In addition, relocation assistance for all eligible residential and business relocatees would be provided without discrimination, through the Nebraska Relocation Assistance Act as required by federal and state laws (Neb. Rev. Stat. Section 76-1214 *et seq.*).

A Relocation Assistance Program will be offered to all who are displaced by the project. This program is designed to provide advisory assistance to all displacees and under many circumstances, to make payments to help offset some of the expenses and costs experiences by those who are displaced.

Table 3.6

REQUIRED ACQUISITIONS AND RELOCATIONS

PARCEL ID	PROPERTY TYPE	RESIDENTIAL SQ FT[1]	NUMBER OF BEDROOMS[1]
SM-4 (3 Residences and 1 Business)			
22-32-200-012-000	1 ha (2 ac) suburban acreage	2276	3
08-01-100-002-000	1 ha (2 ac) business (Major Oil)	–	-
08-01-100-002-I03	mobile home–double-wide	1518	3
08-02-400-003-000	2 ha (5 ac) farmstead split-off	3118	4
EC-1 (7 Residences)			
17-36-300-002-000	43 ha (106 ac) farm	1920	5
16-01-200-001-000	2 ha (5 ac) suburban acreage	1617	3
16-01-200-002-000	2 ha (6 ac) farmstead split-off	2690	3
16-12-300-002-000	4 ha (9 ac) farmstead split-off	1536	4
16-24-300-006-000	1 ha (3 ac) suburban acreage	1921	2
16-25-100-006-000	8 ha (19 ac) suburban acreage	1592	4
17-36-204-001-000	1 ha (3 ac) suburban acreage	3200	3
EM-1 (4 Residences)			
22-29-300-005-000	10 ha (25 ac) suburban acreage	2211	4
22-32-200-015-000	3 ha (8 ac) suburban acreage	1304	3
22-32-200-012-000	1 ha (2 ac) suburban acreage	2276	3
22-29-100-007-000	8 ha (21 ac) suburban acreage	3215	3
EF-1 (7 Residences and 1 Business)			
24-33-100-001-000	5 ha (13 ac) farmstead split-off	3298	4
22-28-300-002-000	15 ha (36 ac) suburban acreage	1400	3
22-33-100-012-000	2 ha (5 ac) farmstead split-off	1632	3
22-33-200-003-000	6 ha (14 ac) farmstead split-off	1120	3
23-21-300-006-000	17 ha (42 ac) suburban acreage plus business (Stevens Creek Storage)	1713	3
23-09-300-001-00	63 ha (155 ac) farm	1768	5
24-33-100-002-000	59 ha (147 ac) farm	672	2

[1] From the records of the Lancaster County Assessors Office

Residential Relocations. The following residential relocation payments can be made under certain conditions.

1. Moving cost payments
2. Replacement housing payments
3. Incidental expenses payments
4. Mortgage differential payments
5. Tax differential payments

No person shall be displaced from their residence unless a comparable replacement dwelling is available or provided for the displaced occupant.

Rural residential farmsteads may either be occupied by tenants; owned and occupied by non-farmers; or owned and occupied by someone in the business of farming at the location of the dwelling. When acquisition is partial, affecting only the farm home occupied by someone in the business of farming at the location of the dwelling, consideration will be given to providing replacement housing in the form of new construction on the remaining land, so as not to separate the owner of the business from his/her business operation.

For the beltway project, a worst case scenario would require relocation of ten residences at the same time if SM-4 and EF-1 were built together. In January 2001, the Lincoln Board of Realtors Multiple Listing Service listed approximately 49 rural residences ranging from 1 to 10 ha (2 to 25 acres), and $150,000 to $300,000 in price (**Table 3.7**). This number of residences on the market is considered average for Lancaster County, but could increase during spring and summer when, in general, more houses are put on the market. The available housing appears to be an adequate amount to handle relocations for the beltway; however, it may take adequate lead time to successfully relocate all occupants. In addition, if relocations exceed payment limits then last resort housing provisions will be implemented to ensure that all displaced occupants will have comparable, decent, safe and sanitary housing available to them.

Table 3.7

**ACREAGE SITES (1 to 10 HECTARES (2 TO 25 ACRES))
FOR SALE IN LANCASTER COUNTY
IN THE MULTIPLE LISTING SERVICE
(as of 1/26/01)**

NUMBER OF BEDROOMS	LESS THAN $150,000	$150,000 -$200,000	$200,000 - $250,000	GREATER THAN $250,000
2 Bedrooms	1	2		
3 Bedrooms	4	4	3	7
4 Bedrooms	4	2	4	16
5 Bedrooms				2

Business Relocations. A displaced business would be offered a Relocation Assistance Program that meets all the criteria under federal and state laws governing displacements on publicly financed projects. This program is designed to offer advisory services and under many circumstances, to make payments to help offset some of the expenses and costs experienced by those who are displaced.

The following relocation payments can be made for businesses, provided certain conditions are met:

1. Moving cost payments,
2. Searching cost payments,
3. Actual direct loss of personal property,
4. Reestablishment expenses for small businesses, or
5. Fixed payment, based on income, in lieu of the previous payments.

Acquisition and Relocation Payment Provisions. Following an appraisal, property owners would be offered and paid no less than fair market value for their residential or commercial property. This payment would be through fee simple acquisition. In addition, the Relocation Assistance Act would provide displaced persons and businesses with various types of payments related to moving. The length of occupancy would determine eligibility for certain replacement housing benefits, but moving costs would be available to all persons regardless of length of occupancy, provided they are in occupancy as of the date of acquisition.

3.6.4 No Build Alternative

The no build alternative will require no acquisitions or relocations, other than that required for construction of the proposed future roadway network improvements.

3.7 RAILROADS, UTILITIES, AND PUBLIC SERVICES AND FACILITIES

3.7.1 Existing Conditions

Railroads. There are four railroad lines in the beltway study area providing freight and passenger service to and through the region. From west to east, the Union Pacific Railroad (UP) has a single track line which parallels Salt Creek and Wilderness Park in the south beltway study area. A portion of the line, from the half-section line south of Saltillo Road to Beatrice, has been identified for abandonment in the near future and placed in conservancy for the Rails-to-Trails program. The rest of the line to the north remains in active status. The Burlington Northern Santa Fe Railway Company (BNSF) has a double track mainline which parallels the UP on the east; this line provides freight service with up to 30 trains per day. Omaha Public Power District (OPPD) has recently purchased the BNSF line to the OPPD coal-fired electric generating plant at Nebraska City. This line roughly parallels N-2 through the south beltway study area and carries approximately 12 trains per week. BNSF also has a double track mainline which runs along the north side of US 6 in the east beltway study area; this line provides freight and passenger service with upwards of 42 trains per day.

Utilities. Numerous public and private utilities are located in the beltway study area, including:

1. Extensive electric distribution lines, substations and other facilities belonging to Lincoln Electric System, Norris Public Power District and Nebraska Public Power District.
2. Extensive telephone distribution lines belonging to Alltel.
3. Radio and communication towers belonging to several public and private entities.
4. Municipal and rural water distribution systems for the City of Lincoln, City of Waverly, Lancaster County Rural Water District No. 1, and Cass County Rural Water District No. 2. These include the City of Lincoln's Northeast Pump Station and underground reservoir, and City of Waverly's well field.
5. Underground gas and liquid fuel transmission mains belonging to Peoples Natural Gas, Enron Transportation/Northern Natural Gas and Kinder Morgan Energy Partners.
6. Underground cable lines, including Galaxy Cablevision, Level 3 Communications, MCI-Worldcom, and Sprint.
7. Lancaster County maintenance buildings.
8. Petroleum pipelines and storage tanks belonging to Williams Pipeline/Mid-America Pipe Company and Conoco Pipeline Company.

Many of the above ground features are shown on the constraints map, (see **Figures 2.1 and 2.25**). More detailed maps are provided in *Interim Report No. 1* (WSA, 1996a).

Public Services and Facilities. The beltway study area is served by the following emergency services:

1. County Sheriff
2. Rural Fire Districts
3. Rural/Metro Medical Services

3.7.2 Impacts of the Four Finalist Alternatives

Railroads. The SM-4 alternative will cross three railroad lines; including the very end of the active portion of the UP (SM-4 crosses the UP line just north of the half-section line). All of these locations will be provided with grade separations. None of the east alternatives cross railroad lines north of N-2; however, if SM-4 and EC-1 are constructed, two crossings of the OPPD line will be required. **Table 3.8** lists required railroad crossings.

Table 3.8

REQUIRED RAILROAD CROSSINGS

RAILROAD LINES	ALTERNATIVES			
	SM-4	EC-1	EM-1	EF-1
UP along Salt Creek	Yes	No	No	No
BNSF along Salt Creek	Yes	No	No	No
OPPD along N-2	Yes	Yes*	No	No
BNSF along US 6	No	No	No	No
TOTAL CROSSINGS	3	2	0	0

* If SM-4 and EC-1 are constructed, two crossings of the OPPD line will be required. EC-1 alone does not require any railroad crossings.

Utilities. Utility relocations will be determined during final design. Any approvals for relocations will be obtained at that time. Major underground pipe lines are generally buried deep enough to avoid potential impacts. EM-1 will need to be designed to avoid impacts to the nearby transmission towers.

The majority of the utilities found in the beltway study area are routinely encountered on roadway projects. Most of these utilities can be easily relocated at minimal cost once final design has identified those utilities that must be moved. There are a few major utilities in the beltway corridor that may require additional consideration during final design due to the high cost of relocation. These utilities include major gas distribution lines, water mains, major fiber optic lines, and electrical transmission lines.

Major underground utilities such as water, gas and fiber optic lines can be accommodated during final design by adjusting the vertical alignment as necessary to provide adequate cover over existing lines. Water mains generally require 1.5 m (5 ft) minimum cover. Other underground utilities may allow as little as 0.75 m (2.5 ft) of cover. Any adjustments to the vertical alignment will likely be determined based on a cost comparison of the cost of relocating the utility versus adjusting the roadway alignment.

The major electrical distribution lines in the area may require alignment shifts during final design in order to accommodate the existing steel towers. Alignment shifts would likely be determined based on a comparison of the cost to realign the roadway (including right-of-way costs) versus the cost to relocate the distribution line. General guidelines for roadway construction near electrical distribution lines include: maintain transmission towers on private property, no grade changes or disturbed soil within 9 to 15 m (30 to 50 ft).

After initiation of the beltways study, Lincoln Electric System completed a transmission line to service the City of Waverly. This line is crossed by EM-1 and then continues parallel to the beltway. During final design the beltway alignment may need to be adjusted to cross this transmission line at a right angle in order to fit the beltway in between the transmission towers which are spaced 205 to 210 m (675 to 700 ft) apart. This can be accomplished by moving the alignment to the east of the substation located south of Adams Street or by crossing the line where it turns west between Fletcher and Havelock Avenues.

Public Services and Facilities. Public services and public facilities are not expected to be negatively impacted by construction of a beltway. The primary effect on community services will be positive due to improved access for emergency vehicles.

3.7.3 Proposed Mitigation

Railroads. All of the beltway/railroad crossings will include grade separations over any active railroad lines.

Utilities. Utility relocations will be determined during final design. Any approvals for relocations will be obtained from the affected utility at that time.

Public Services and Facilities. No mitigation is proposed.

3.7.4 No Build Alternative

The no build alternative will avoid any impacts to railroads, utilities or public services and facilities, other than that required for construction of the proposed future roadway network improvements.

3.8 ECONOMIC IMPACTS

3.8.1 Existing Conditions

Lincoln and Lancaster County have experienced a growing and prosperous economy, resulting in the sustained population growth, employment and aggregate income observed over the past three decades. The City has continually expanded the area of the urban service area to meet the demands for new residential, commercial, industrial, institutional and recreational land uses.

3.8.2 Impacts of the Four Finalist Alternatives

Construction Cost. The preliminary construction cost estimates are summarized in **Table 3.9.** Costs are within 8 percent of each other for the end-to-end beltways, and within 19 percent for the stand alone east beltway alternatives. This is within the 20 percent contingency contained in all cost estimates. It should be noted that the common interchange at N-2 results in a $12 million cost savings with the EM-1 alternative which is not realized with the other two east alternatives. In contrast, the SM-4/EC-1 alternative requires two interchanges at N-2, one 0.8 km (0.5 mi) east of 98th Street and the other at 120th Street. The two N-2 interchanges for the SM-4/EF-1 alternative are located at 120th Street and 0.8 km (0.5 mi) east of 134th Street.

Table 3.9

SUMMARY OF BELTWAY
PRELIMINARY CONSTRUCTION COST ESTIMATES

ALTERNATIVE	COST
PARTIAL BELTWAY	
SM-4	$107,000,000
EC-1	$147,000,000
EM-1	$157,000,000
EF-1	$128,000,000
END-TO-END BELTWAY	
SM-4/EC-1	$249,000,000
SM-4/EM-1	$252,000,000
SM-4/EF-1	$231,000,000

Cost Effectiveness and Economic Efficiency. Construction of the beltway involves commitment of fiscal resources, requiring a substantial expenditure of public funds. The commitment of these funds is based on the idea that residents of Lincoln and Lancaster County, as well as travelers through the region, would benefit by improving the quality of the transportation system. The economic benefits are those derived from increased transportation efficiency. Transportation cost savings that result from improvements to a corridor are true benefits to society as a whole. When travelers experience time savings, greater safety, or reduced vehicle operating costs, their gain is not offset by losses to other people. From an economic standpoint, these cost savings are the same as a direct increase in income by making resources available for other purposes. Based on the economic analyses in **Sections 2.4.4, 2.4.5 and 2.3.6**, all four of the beltway alternatives were considered to be cost-effective and to provide substantial road user benefits, including travel-time savings, vehicle operating cost savings, and accident reduction savings. These benefits are considered to outweigh the commitment of financial resources.

Property Values. Currently, the Stevens Creek Basin Initiative is proceeding on development of a land use plan for the east beltway area. It is unknown at this time whether the subarea plan will or will not include development along the east beltway alignment. (No similar effort has been initiated for the south). Although no proposed land use plan has been developed for a beltway scenario, property values in the vicinity of a freeway typically increase, especially at the interchanges. This would result in greater net gain in tax revenue over existing conditions, or with loss of tax base from acquisition of public right-of-way. If a land use plan is developed with a no growth scenario, property values would not be expected to increase as dramatically.

Tax Revenue. Based on average County tax valuations, the acquisition of private property to construct an end-to-end beltway would remove up to $3.8 million from the County property tax base, and reduce annual property tax revenue for the County by an estimated $100,000. This amount is far less than 1 percent of the annual property tax revenues in the County.

Acquisition Costs. Construction cost estimates for acquisition of right-of-way, residences and businesses are substantially higher than the average County tax valuations. For the purposes of this study, acquisition costs were estimated at are $10.3 million for SM-4, $16.3 million for EC-1, $12.1 million for EM-1, and $13.9 million for EF-1 (see **Tables 2.16** and **2.17**).

3.8.3 Proposed Mitigation

No mitigation is proposed.

3.8.4 No Build Alternative

The no build alternative will avoid commitment of fiscal resources for a beltway, but will require further investment for the existing arterial street system which may include widening streets. This is in addition to that required for construction of the proposed future roadway network improvements.

3.9 JOINT DEVELOPMENT

As part of the alternatives analysis, early consideration was given to joint development of the beltway with other new features that might be incorporated into the beltway right-of-way in order to enhance the concept. Options considered included features that might be compatible with a 90 m (300 ft) road right-of-way such as bicycle and pedestrian trails; linear parks; rail freight line consolidations; and utility lines.

Although some features, such as a trail or linear park, could be incorporated into the beltway project corridor with additional right-of-way, most other joint use opportunities were not considered feasible (see **Section 2.1.6**). The City of Lincoln is experiencing some problems at Wilderness Park, where environmental and trails activists are adamantly opposed to the construction of arterial connectors to US 77 through the park. No joint use opportunities are being pursued for the beltway project at this time.

3.10 RECREATION IMPACTS

3.10.1 Existing Conditions

Recreational facilities in the study area include two public parks, two private recreation areas, three private golf courses, a privately owned arboretum, and three public hiker/biker trails and two public equestrian trails. Wilderness Park, which extends 12 km (7.5 mi) from Lincoln to Saltillo Road along Salt Creek, is a County-owned, City-operated park providing separate trails for hiking, bicycle and equestrian users. Jensen Park, also owned by the City, is soon to be developed with ballfield facilities. Golf courses in the study area include Wilderness Ridge, Hidden Valley and Crooked Creek. Four other courses abut the study area and include Yankee Hill, Himark, Firethorn and Hillcrest Country Clubs. The MoPac East and David Murdock Trails are located in the east beltway study area. The Izaak Walton League has a facility south of

Highway 2 on South 134th Street. The Boy Scouts of America (BSA) have recently purchased a property near A Street and Stevens Creek; the organization was fully advised of the location of the beltway alternatives prior to acquisition of the property.

It should be noted that the City of Lincoln is considering two new park areas within the beltway study area which could result in the beltway crossing future public recreation land; however, Section 4(f) only applies to existing resources. In addition, if these park lands are concurrently planned with the proposed roadway project, they would not be considered 4(f) properties in the future. The first location is the Salt Valley Heritage Greenway Corridor extending south from Wilderness Park to Hickman which would be crossed by SM-4. The second is a new park location in the vicinity of Stevens Creek which could be crossed by EM-1.

3.10.2 Impacts of the Four Finalist Alternatives

The only recreational impacts are that (1) all of the east beltway alternatives will require grade separated crossings of MoPac East hiker/ biker and equestrian trails (2) EC-1 will require a grade separated crossing of the David Murdock Trail, and (3) EM-1 will require acquisition of approximately 3.6 ha (9 ac) from the BSA property, and will have noise impacts at the BSA property and at Crooked Creek golf course. Noise at Crooked Creek and the adjacent BSA properties will not approach or exceed the 66 dB level, but will increase by 15 dBA or more near the property boundary. However, the noise study indicated that the 66 dBA contour would extend no more than 12 m (40 ft) beyond the beltway right-of-way (**Appendix C, Section 7.4**).

3.10.3 Proposed Mitigation

Mitigation for the trail impacts are discussed in detail in **Section 3.11** and **Appendix H**. Mitigation of noise impacts to the golf course are discussed in **Section 3.13** and **Appendix C.**

Early in the project planning, it was discussed that if mitigation was required for impacts to parks or other appropriate resources, then consideration should be given to acquiring project right-of-way to extend Wilderness Park south of Saltillo Road. At this point in time, no mitigation requirements of this type have been identified.

3.10.4 No Build Alternative

The no build alternative will avoid any impacts to recreation, other than that required for construction of the proposed future roadway network improvements.

3.11 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

3.11.1 Existing Conditions

Existing Trails. There are three recreational trails within the beltway study area as listed in **Table 3.10**. Locations of the trails are shown in **Figures 2.1 and 2.25.** The Wilderness Park Trail has two trail heads in the study area (14th Street at Salt Creek and Saltillo Road at Salt Creek). The MoPac East Trail also has two trailheads in the study area at 98th Street and in Walton. There are no other pedestrian or bicycle accommodations in the study area, with the exception of the Walton Trail Company in Walton, a private business enterprise which primarily serves users of the MoPac East Trail. Use of the trails is limited to daylight hours.

Table 3.10

EXISTING RECREATIONAL TRAILS IN THE BELTWAY STUDY AREA

TRAIL	TYPES	SURFACE	OWNER/MANAGER	LOCATION
Wilderness Park	1. Pedestrian 2. Bicycle 3. Equestrian	Wood Chip Ground Surface Ground Surface	Lancaster County (Owner) City of Lincoln (Manager)	South Beltway
MoPac East	1. Pedestrian/Bicycle 2. Equestrian	Crushed Limestone Ground Surface	Lower Platte South Natural Resources District	East Beltway
David Murdock	1. Pedestrian/Bicycle	Crushed Limestone	City of Lincoln	East Beltway

The Wilderness Park trails occur entirely within the 12 km (7.5 mi) long park, with the exception of several at-grade crossings of paved city streets. The trails are located within a wooded setting along the banks of Salt Creek. In general, the trails are visually screened, but not audibly shielded from traffic along US 77 and the BNSF and UP railroads.

The MoPac East and David Murdock trails were developed along abandoned railroad rights-of-way. Both trails have 30 m (100 ft) rights-of-way. Roadway intersections have been variously treated with both at-grade and grade separated crossings. Both trails originate within urban portions of the city, extend east through suburban developments, and continue east into agricultural areas. Visually, these trails occur in more open settings than the Wilderness Park Trail. The MoPac Trail, which follows the old Missouri Pacific line, is owned by the City of Lincoln to 150 m (500 ft) east of 84th Street. From this point east, the MoPac East Trail is owned by LPSNRD and extends to Elmwood; future plans include extending the route to Omaha. In the east beltway area, the trail is located in the vicinity of A Street. The Murdock Trail, which follows the old Chicago-Rock Island line, is owned by the City of Lincoln and ends at 112th Street. The trail terminus has no trailhead, and all former railroad right-of-way to the east has been sold to adjacent landowners. In the east beltway area, the trail is located in the vicinity of Havelock Avenue.

Through the beltway study area, hiker/biker usage on the Wilderness Trail is considered moderate compared to very heavy use on the MoPac East and fairly light use on the Murdock Trail. Equestrian usage is considered moderate on the Wilderness Park Trail (personal communication between Amy Zlotsky and Terry Genrinch, City of Lincoln Parks and Recreation Department, 22 August 2000) and very heavy on the MoPac East Trail (personal communication between Amy Zlotsky and Glenn Johnson, LPSNRD, 27 June 2000).

Proposed Trails. There are three proposed trails within the beltway study area. The LPSNRD's approved Stevens Creek Watershed Plan includes an open space component to acquire conservation easements over the 100-year floodplain between the MoPac East and Murdock Trails. The plan (which has been incorporated into the *Lincoln-Lancaster County Comprehensive Plan*) includes constructing a proposed connector trail within this easement between the MoPac East and Murdock Trails. The Stevens Creek Connector would follow the west bank of Stevens Creek from the MoPac East Trail to 112th Street. After crossing the 112th Street bridge, the connector would then follow the east bank of the creek to the Murdock Trail

and on to Salt Creek. The study team has been in contact with LPSNRD regarding potential beltway conflicts.

The UP rail line, from the half-section line south of Saltillo Road and extending south to Beatrice, has been recently abandoned and filed upon for rail banking for the Rails-to-Trails program by the Nebraska Trails Council. Several entities have been approached for participation in construction of this project–the Homestead Trail. To date, LPSNRD, Nemaha NRD and the City of Beatrice have decided to participate; Gage County and Little Blue NRD have decided not to; and the City of Lincoln and Lancaster County have not yet decided. Even if the proposed trail project is constructed, the trail will still be considered a transportation corridor, and could be used for railroad purposes in the future. It should be noted that there would be a 0.8 km (0.5 mi) gap between the end of the Wilderness Park (and its trails) and the beginning of the proposed Homestead Trail, and that the south edge of the SM-4 right-of way is located approximately 135 m (450 ft) north of the beginning of the proposed Homestead Trail.

The UP has also filed abandonment on the section beginning 0.5 mi south of Saltillo Road and extending north along the edge of Wilderness Park, through the South Bottoms neighborhood, and into downtown Lincoln. The City has filed for rail banking and is negotiating the purchase of this segment–Jamaica North. Therefore, it is very likely that a trail would be located so as to connect Wilderness Park (and its trails) to the Homestead Trail should the Homestead Trail become a reality.

3.11.2 Impacts of the Four Finalist Alternatives

The required trail crossings and approximate right-of-way from construction of the four alternatives is summarized in **Table 3.11**.

Table 3.11

REQUIRED TRAIL CROSSINGS

TRAILS	ALTERNATIVES			
	SM-4	EC-1	EM-1	EF-1
Wilderness Park Trails	No	No	No	No
MoPac East Trail	No	Yes 0.3 ha (0.7 ac)	Yes 0.3 ha (0.8 ac)	Yes 0.3 ha (0.7 ac)
David Murdock Trail	No	Yes 0.3 ha (0.8 ac)	No	No
Proposed Stevens Creek Connector	No	Yes	Possible	No
Proposed Homestead Trail	No	No	No	No
Proposed Jamaica North Trail	Yes	No	No	No

Existing Trails. The south beltway, SM-4, crosses no existing trails. All east beltway alternatives cross the MoPac East Trail; but only EC-1 crosses the Murdock Trail. It should be noted that EC-1 crosses the Murdock Trail very close to the trail terminus at 112th Street.

Construction of the beltway will introduce a new roadway element into these segments of the trails, and may adversely impact the visual and audible experience of the trail users for a short distance. However, the beltway impact on trails is considered negligible considering the trails are part of an urban trail system that already crosses many roadways (approximately 1 per 1.6 km (1 mi)), and considering the length of the trails (over 14 km (9 mi) for MoPac/MoPac East; over 11 km (7 mi) for Murdock). Since the trails crossings will be mitigated for, there will be no adverse impact on existing pedestrian and bicycle accommodations.

Proposed Trails. SM-4 would cross the proposed Jamaica North Trail (or other connector trail) in the vicinity of the bridge over Salt Creek. EC-1 would cross the proposed Stevens Creek Connector. Since EM-1 crosses the MoPac East Trail very near Stevens Creek is possible that EM-1 could cross the Stevens Creek Connector as well.

3.11.3 Proposed Mitigation

Existing Trails. For the MoPac East Trail, design of the beltway/trail intersections will include (1) grade separations to safely accommodate the trail, (2) separate access through confined areas for the hiker/biker and equestrian trails (or a physical divider), and (3) underpasses for all equestrian trail crossings since horses are hesitant to use overpasses (personal communication between A. Zlotsky and Glenn Johnson, LPSNRD, 27 June 2000). The hiker/biker trail may be designed as an overpass or underpass. For the Murdock Trail, design of the beltway/trail intersection will be handled as an overpass since it is not an equestrian trail. Design of the trails will follow AASHTO and ADA trail guidelines, and will be coordinated with the trail owners, LPSNRD and the City. Specific details on the crossings will not be determined until final design.

Because the trails are publicly owned recreational facilities and rights-of-way will need to be acquired from LPSNRD and the City of Lincoln, the existing trails are considered 4(f) resources. The 4(f) resources are discussed further in the Section 4(f) Statement in (**Appendix H**).

Proposed Trails. SM-4 crosses the abandoned UP line just north of the half-section line within the Jamaica North segment for which the City has filed for rail banking. If a trail has already been built in this location, the beltway project would provide an appropriate crossing over the trail right-of-way. If the Homestead Trail is built prior to the beltway and prior to the Jamaica North Trail (or other connector), the beltway project would provide a bicycle/pedestrian trail (and appropriate trail crossing) to connect the south end of Wilderness Park with the north end of the Homestead trail. The beltway project would also be designed to accommodate the proposed Stevens Creek Connector at the EC-1 or EM-1 crossings.

Construction of the proposed trails could result in the beltway crossing future public recreation areas, however, these trails are being concurrently planned with the proposed roadway project, including discussion of appropriate crossings. Therefore, they would not be considered Section 4(f) properties in the future. (Relative to the Jamaica North Trail, stipulations of the rail banking agreement allow for any transportation use of the right-of-way. The 4(f) resources are discussed further in the Section 4(f) Statement in (**Appendix H**).

Although the potential exists for acquiring additional land to provide pedestrian and bicycle trails within the beltway right-of-way, other options through the city would be more desirable. Such options are already being considered with the ultimate effect of connecting the Wilderness Park Trail to the MoPac Trail, and the MoPac East Trail to the Murdock Trail (see above).

There are no other trail connections proposed within the beltway right-of-way at this time. If necessary, the issue of whether additional trails should occur within highway right-of-way could be reevaluated.

3.11.4 No Build Alternative

The no build alternative will have no impacts on pedestrian and bicycle accommodations that can be identified at this time. However, as County roads are hard surfaced to accommodate a growing suburban population (as part of the proposed future roadway network improvements), there will be some impact to recreational trails. An example would be the recent paving of 148th Street across the MoPac Trail.

3.12 AIR QUALITY

An air quality analysis was conducted for the beltway project. Results of the evaluation are summarized here; more detailed information is provided in the Air Quality Analysis (**Appendix B**).

3.12.1 Existing Conditions

Based on the most currently published data, the Nebraska Department of Environmental Quality (1998) reports that all of Nebraska is in attainment with the National Ambient Air Quality Standards (NAAQS) for particulate matter (PM_{10}) and carbon monoxide.

3.12.2 Impacts of the Four Finalist Alternatives

Construction Impacts. Construction impacts generated from internal combustion engines and fugitive dust generated during excavation, grading and site preparation will cause a short term impact on ambient air quality. Of these emissions, fugitive dust will be the most predominant. Dust generated from these activities is generally large particles which are redeposited in close proximity to the construction site. However, a fraction of the dust is composed of small particles referred to as PM_{10} which can remain airborne for an indefinite period of time.

Impacts from Vehicle Emissions. A long term increase in the carbon monoxide levels proximal to the beltway alignment will be caused by the additional vehicular traffic. As such, an air quality analysis was conducted for the beltway project (**Appendix B**). Since Nebraska is in compliance with NAAQS, a regional analysis was not required; therefore, the evaluation focused on a project-level analysis. Although there are several criteria pollutants associated with mobile sources, FHWA considers carbon monoxide to be the most significant criteria pollutant of concern for a project-level analysis (FHWA, 1986); therefore, only evaluation of carbon monoxide is required for compliance purposes.

The air quality analysis for carbon monoxide was conducted based on the most conservative assumptions which assumed worst-case conditions for all variables. The highest predicted carbon monoxide levels proximal to the beltway segments with the highest traffic volumes are listed in **Table 3.12** along with the NAAQS criteria levels. NAAQS levels may be equaled, but not exceeded.

Table 3.12

HIGHEST 1-HOUR AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS FOR WORST-CASE LOCATIONS

ROADWAY ANALYZED	1-HOUR CARBON MONOXIDE CONCENTRATION (ppm)	8-HOUR CARBON MONOXIDE CONCENTRATION (ppm)
SM-4 Roadway Segment (between South 27th and 68th Streets)	7	5
EC-1 Roadway Segment (between Adams and O Streets)	8	6
SM-4 and US 77 Interchange	6	4
EC-1 and I-80 Interchange	9	6
NAAQS Criteria	35	9

Based on the air quality analysis, the carbon monoxide contribution at these beltway locations together with the background carbon monoxide concentration is within the 1-hour and 8-hour concentration limits established in the NAAQS at all receptors. Since the worst-case roadway segments and interchanges are in compliance, it is reasonable to assume that all the beltway roadway segments and interchanges will be in compliance with the NAAQS. The increase in carbon monoxide is considered insignificant.

3.12.3 Proposed Mitigation

If objectionable dust levels occur during construction, dust will be controlled by timely applications of water and temporary seeding to the areas of construction.

No mitigation is proposed for vehicle emissions.

3.12.4 No-Build Alternative

Use of unpaved County roads will continue to generate dust over the long-term. Construction impacts associated with improvements to these section line roads and other planned roadway network improvements will generate temporary increases in dust. Increased vehicular traffic on existing roadways will increase local levels of carbon monoxide.

3.13 NOISE

A noise study was conducted for the beltway project. Results of the study are summarized here; more detailed information is provided in the Noise Study Report (**Appendix C**).

3.13.1 Existing Conditions

The Federal Highway Administration has developed noise abatement criteria based on the A-weighted, equivalent level noise descriptor ($L_{eq(h)}$). The $L_{eq(h)}$ is the equivalent steady state sound level measured in decibels (dBA), and reported over a period of one hour which contains the same acoustic energy as the time-varying traffic sound level during that same hour. **Table 3.13** lists the upper limits of the $L_{eq(h)}$ desirable noise levels that are part of the Noise Abatement Criteria (NAC) established by the FHWA. Any noise levels that approach or exceed these criteria would not be desirable and would be considered a noise impact.

Table 3.13

NOISE ABATEMENT CRITERIA
HOURLY A-WEIGHTED SOUND LEVEL

ACTIVITY CATEGORY	HOURLY NOISE LEVELS (Leq(h) dBA)	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, play grounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	—	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

The majority of the beltway study area lies within rural areas, and the land use is classified as Activity Category "B" or "D". Activity "C" mostly pertains to commercial land use or business offices. Storage buildings or warehouses are not usually considered to be noise sensitive.

Ambient noise levels within the study area are primarily caused by vehicular traffic moving on the existing roadway network. Noise levels for the project area were determined by direct field measurements using a Quest 2800 sound level meter. Noise levels for locations near existing highways were determined by modeling the current traffic volume (1998 traffic data). Noise levels ranged in the mid to upper 40 $L_{eq(h)}$ dBA level adjacent to unimproved county roads and ranged in the upper 50 $L_{eq(h)}$ dBA to mid 60 $L_{eq(h)}$ dBA level near existing highways. Noise levels exceeding FHWA impact criteria currently occur at several residences located adjacent to N-2 .

3.13.2 Impacts of the Finalist Alternatives

The procedures included in the FHWA Traffic Noise Model involve an analysis of traffic noise in terms of traffic parameters (vehicle type and speed), roadway design and receptor characteristics. These parameters are input into the computer model which provides the noise level estimate. All noise levels referred to in this study are exterior noise levels. Detailed engineering regarding the exact alignment and grade of the beltway alternatives, cut and fill areas, and intersection design is beyond the scope of the current level of the beltway study. As such, the traffic engineer's best estimates of these parameters have been incorporated into the model, therefore, these results must be considered preliminary. Further analysis of the noise impacts and recommended mitigation will be completed using more detailed design information on the preferred alternatives.

In accordance with the Nebraska Department of Roads policy, a noise impact occurs and abatement measures will be considered for receptors in Activity Category B if:

1. The predicted future year noise levels approach or exceed NAC criteria (67 dBA or 72 dBA for Activity Category C). Approach is defined by the NDOR as 1 dBA less than the noise abatement criteria or;

2. The predicted future year noise level exceeds the existing noise level by 15 dBA or more.

Future Noise along Existing Roadways. Construction of the east beltway alternatives will increase traffic volume on several existing roadways that cross or parallel the beltway alignments (*Interim Report No. 3* (WSA, revised 1999)) and which are not necessarily in the beltway study area. Those roadway segments which were predicted to have an increase of 50 percent or greater traffic volume were included in the noise study.

For these locations, the 2030-Build projected traffic Leq(h) noise level at each receptor was compared to the 2020 No-Build traffic Leq(h) noise level to determine future noise impacts for receptors adjacent to the existing roadways. This analysis indicated that noise levels will generally increase, however, no noise impacts were predicted (see **Appendix C, Tables C.4** to **C.11**).

Future Noise along the Beltway. The beltway noise analysis included all receptors within approximately 240 m (800 ft) of the edge of pavement (within the 300 m (1000 ft) range of accuracy of the model). The results of the noise analysis for all of the receptors analyzed are provided in **Appendix C, Tables C.12** to **C.17**. **Tables C.12** to **C.14** are the SM-4 alternative with the varying traffic volumes depending on connection with the three different east alternatives. Although traffic volumes are somewhat different, the noise impacts are the same at the receptor sites. **Tables C.15** to **C.17** are the three east beltway alternatives.

Receptors which are predicted to have a noise impact are listed in **Table 3.14.** There are 39 impacted residential receptors, including 5 along SM-4; 13 along EC-1, 8 along EM-1; and 13 along EF-1.

Table 3.14

RECEPTORS IMPACTED BY NOISE

ALTERNATIVE	RECEPTOR MAP NUMBER	RECEPTOR TYPE	EXISTING NOISE LEVEL	2030-BUILD NOISE LEVEL	TYPE OF IMPACT	
					Approach or Exceed NAC	Increase Equal to or Greater than 15 dBA
SM-4	11	Residence	44	61	No	Yes
SM-4	25	Residence	64	67	Yes	No
SM-4	27	Residence	67	70	Yes	No
SM-4	28	Residence	66	68	Yes	No
SM-4	29	Residence	66	70	Yes	No
EC-1	10	Residence	45	62	No	Yes
EC-1	17	Residence	49	66	Yes	Yes
EC-1	19	Residence	46	66	Yes	Yes
EC-1	39	Residence	48	64	No	Yes
EC-1	40	Residence	48	65	No	Yes
EC-1	42	Residence	48	63	No	Yes
EC-1	44	Residence	63	67	Yes	No
EC-1	45	Residence	44	61	No	Yes
EC-1	46	Residence	44	62	No	Yes
EC-1	47	Residence	44	62	No	Yes
EC-1	51	Residence	44	59	No	Yes
EC-1	55	Residence	52	67	Yes	Yes
EC-1	56	Residence	52	68	Yes	Yes
EM-1	6	Residence	67	67	Yes	No
EM-1	7	Residence	66	66	Yes	No
EM-1	8	Residence	66	66	Yes	No
EM-1	17	Residence	44	64	No	Yes
EM-1	23	Golf Course	44	59	No	Yes
EM-1	25	Golf Course	44	60	No	Yes
EM-1	27	Residence	43	59	No	Yes
EM-1	31	Residence	43	58	No	Yes
EM-1	35	Residence	47	63	No	Yes

Table 3.14 (continued)

ALTERNATIVE	RECEPTOR MAP NUMBER	RECEPTOR TYPE	EXISTING NOISE LEVEL	2030-BUILD NOISE LEVEL	TYPE OF IMPACT	
					Approach or Exceed NAC	Increase Equal to or Greater than 15 dBA
EM-1	36	Residence	47	62	No	Yes
EF-1	2	Residence	69	73	Yes	No
EF-1	5	Residence	66	71	Yes	No
EF-1	6	Residence	66	69	Yes	No
EF-1	7	Residence	67	69	Yes	No
EF-1	8	Residence	62	66	Yes	No
EF-1	9	Residence	65	69	Yes	No
EF-1	10	Residence	65	69	Yes	No
EF-1	12	Residence	46	63	No	Yes
EF-1	13	Residence	46	61	No	Yes
EF-1	24	Residence	43	66	Yes	Yes
EF-1	25	Residence	43	58	No	Yes
EF-1	30	Residence	47	64	No	Yes
EF-1	31	Residence	47	66	Yes	Yes

The area adjacent to the roadway which will be within the 66 dBA contour will vary depending on traffic volume and type, and topography. This contour was estimated based on review of the predicted noise levels for the existing receptors along the alignments, and by inserting additional receptors. Along SM-4 the contour ranges from 52 to 76 m (170 to 250 ft) from the edge of pavement; along EC-1 and EM-1 the contour ranges from 46 to 58 m (150 to 190 ft); and along EF-1 the contour is approximately 46 m (150 ft) from the edge of pavement. These distances will increase near the major intersections. Based on this evaluation, the 66 dBA contour would extend no more than 30 m (100 ft) beyond the edge of the right-of-way, under the worst case scenario; and in some cases, would not extend beyond the right-of-way at all.

Noise was modeled at the three historic properties that occur within 240 m (800 ft) of the edge of pavement of the road (**Table 3.15**). None of these sites were predicted to have noise impacts (noise impacts generally occur within 75 m (250 ft) of the edge of pavement. None of the other historic standing structures were within 300 m (1,000 ft) of the edge of right-of-way; therefore, they were not modeled.

Table 3.15

HISTORIC SITES MODELED FOR NOISE IMPACTS

HISTORIC SITE	ALTERNATIVE	RECEPTOR NO.	1999 EXISTING NOISE LEVEL	2030 BUILD NOISE LEVEL	MODEL RESULTS
Henry Wunibald Farmyard LC00: S-143	SM-4	R-16	47 dBA	59 dBA	No Impact
Penterman Farmyard LC00:E-53	EF-1	R-3	43 dBA	55 dBA	No Impact
Theresa Retzlaff Farmyard LC00:E87	EF-1	R-21	45 dBA	55 dBA	No Impact

3.13.3 Proposed Mitigation

In accordance with the NDOR Noise Abatement Policy, noise abatement measures must be considered where predicted traffic noise levels approach or exceed the noise abatement criteria, or when the predicted traffic noise levels substantially exceed the existing noise levels (i.e. 15 $L_{eq(h)}$ dBA). Two types of noise mitigation measures were considered during this study: shifting the roadway alignment horizontally and constructing noise barriers.

Shifting the Roadway Alignment Horizontally. A shift in the horizontal alignment can sometimes be made to reduce traffic noise where receptors are typically on one side of the roadway alignment and the topography is acceptable. Shifting the roadway away from the receptor will reduce noise levels as sound intensity decreases with distance.

Constructing Noise Barriers. A noise barrier, either a wall made of concrete or wood products or an earthen berm, may be constructed to break the line-of-sight to the receptor. To be effective, a noise barrier must be continuous and have substantial length and height. In accordance with the NDOR Policy, a noise barrier must be *feasible* from an engineering standpoint and *reasonable* from a cost, effectiveness, and access standpoint to be considered.

The feasibility of implementing these types of noise abatement measures was analyzed for the impacted receptors. The conclusions of the feasibility study are summarized in **Table 3.16.** It should be noted that some locations have feasibility for alignment shifts and/or barriers.

Because noise barriers for certain locations appear to be feasible based on the current alignments, a reasonableness test was conducted for each of these locations. Reasonableness is judged on a point system (see **Appendix C**). Barriers with a total of 9 points or less are judged to be not reasonable and are excluded from further consideration. Barriers were considered reasonable at 6 locations (7 receptors). Reasonableness of barriers will be reassessed prior to construction based on costs at that time; if earthwork costs or right-of-way acquisition are too high, the noise barrier could be considered unreasonable at that time.

For locations where noise abatement is feasible and reasonable, a public information meeting will be held and benefitted property owners will be given an opportunity to vote according to NDOR Noise Policy. Noise abatement will be provided if 75 percent of the benefitted property owners are in favor of the proposed noise abatement device.

Table 3.16

NOISE ABATEMENT FEASIBILITY

Alternative	Receptor Number	Horizontal/Vertical Roadway Alignment Shift Feasible?[1]	Barrier Feasibility Determination				
			Compatible with Topography	Height[2]	Other Noise Sources[3]	Location	Is Barrier Feasible?
SM-4	R-11	Yes: shift 37 m (120 ft) north	Yes	No	No	OK	No
SM-4	R-25, 27, 28, 29	No	Yes	Yes	No	OK	Yes
EC-1	R-10	No	Yes	No	No	OK	No
EC-1	R-17	No	Yes	Yes	No	OK	Yes
EC-1	R-19	No	Yes	Yes	No	OK	Yes
EC-1	R-39, 40	No	Yes	No	No	OK	No
EC-1	R-42	Yes: shift 15 m (50 ft) west	Yes	No	No	OK	No
EC-1	R-44	No	Yes	No	Yes	OK	No
EC-1	R-45, 46, 47, 51	No	Yes	No	No	OK	No
EC-1	R-55	No	Yes	Yes	No	OK	Yes
EC-1	R-56	No	Yes	Yes	No	OK	Yes
EM-1	R-6, 7, 8	No	Yes	Yes	No	OK	Yes
EM-1	R-17	Yes: shift 90-105 m (300-350 ft) east	Yes	No	No	OK	No
EM-1	R-23, 25	No	Yes	Yes	No	OK	No
EM-1	R-27	No	Yes	No	No	OK	No
EM-1	R-31	No	Yes	No	No	OK	No
EM-1	R-35, 36	Yes: shift 120 m (400 ft) east	Yes	No	No	OK	No
EF-1	R-2	No	Yes	Yes	No	OK	Yes
EF-1	R-5, 6, 7, 8, 9, 10	No	Yes	Yes	No	OK	Yes
EF-1	R-12	Yes: shift 30 m (100 ft) west	Yes	Yes	No	OK	Yes
EF-1	R-13	Yes: shift 7.5-15 m (25-50 ft) west	Yes	Yes	No	OK	Yes
EF-1	R-24, 25	No	Yes	Yes	No	OK	Yes
EF-1	R-30	Yes: shift 60 m (200 ft) east	Yes	No	No	OK	No
EF-1	R-31	Yes: shift 75 m (250 ft) east	Yes	No	No	OK	No

Notes: 1 - Alignment shifted to eliminate noise impact (less than 66dBA or below significant increase of 15 dBa).
2 - Can the exposed height of a barrier be built 4.9 meters (16 feet) or less?
3 - Other noise sources include other roadways that contribute to noise.

The preliminary evaluation indicates noise abatement measures should be considered at 12 locations (14 receptors) as described in **Table 3.17.** All proposed barriers provide an insertion loss of a least 5 dBA below the predicted level. Roadway alignment shifts provide a reduction in the predicted traffic noise level increase to less than 15 dBA over existing; however, in most cases only a 1 to 2 dBA reduction is gained.

Table 3.17

LOCATIONS FOR CONSIDERATION OF ABATEMENT MEASURES

ALTERNATIVE	RECEPTOR	ABATEMENT CONSIDERATION(S)
SM-4	R-11	Shift horizontal roadway alignment of roadway north approximately 37 m (120 ft).
EC-1	R-17	Installation of an earthen berm ranging in height from 3.4 to 4.3 m (11 to 14 ft) and a length of 189 m (621 ft).
EC-1	R-42	Shift horizontal roadway alignment of roadway west approximately 15 m (50 ft).
EC-1	R-55	Installation of an earthen berm at a height of 3.7 m (12 ft) and a length of 132 m (434 ft).
EC-1	R-56	Installation of an earthen berm at a height of 3.7 m (12 ft) and a length of 143 m (468 ft).
EM-1	R-17	Shift horizontal alignment of roadway 90 to 105 m (300 to 350 ft) east.
EM-1	R-35, 36	Shift horizontal alignment of roadway 122 m (400 ft) east.
EF-1	R-12	Installation of an earthen berm at a height ranging from 2.4 to 3 m (8 to 10 ft) and a length of 197 m (646 ft) OR shift horizontal alignment of the roadway 30 m (100 ft) west.
EF-1	R-13	Installation of an earthen berm ranging in height from 3.4 to 4.6 m (11 to 15 ft) and a length of 197 m (646 ft) OR shift roadway alignment 7.5 to 9 m (25 to 30 ft) west.
EF-1	R-24, 25	Installation of an earthen berm ranging in height from 4 to 4.9 m (13 to 16 ft) and a length of 98.5 m (323 ft).
EF-1	R-30	Shift roadway alignment 60 m (200 ft) east.
EF-1	R-31	Shift roadway alignment 75 m (250 ft) east.

There are 25 remaining residential receptors which are impacted, but for which it appears there are no feasible or reasonable noise abatement measures available. These include 4 on SM-4; 9 on EC-1; 5 on EM-1; and 7 on EF-1. Further evaluation of noise abatement measures should be conducted during final roadway design.

In addition to traffic noise, the project area would experience temporary noise increase during construction. Construction noise levels are typically a function of the scale of the project, the phase of construction, the condition of the equipment and its operating cycles, and the number of construction equipment units operating simultaneously. Measures that may be employed to reduce objectionable construction noise include designating haul routes away from sensitive receptors, controlling noise at the source, and limiting construction activities to certain hours of the day.

3.13.4 No Build Alternative

Under the no build alternative, traffic will continue to increase in the future; thereby increasing noise levels especially as unpaved roads are paved and/or widened with the planned roadway network improvements. However, the No Build alternative would not cause any noise impacts above NAC levels other than at the receptors already exceeding criteria levels under existing traffic conditions.

3.14 LIGHTING

3.14.1 Existing Conditions

The beltway study area is in a rural setting with very little street lighting. The main exceptions are in the vicinity of the small cities, towns and villages, and at intersections along the state highways.

3.14.2 Impacts of the Four Finalist Alternatives

Lighting features will be determined during final design. Location and choice of specific lighting structures will likely be determined by surrounding land uses. It is expected that the beltway will only be lighted at the intersections and within the City limits, if it extends to the beltway at the time of construction. There are a wide variety of lighting options available to minimize light intrusion on adjacent properties.

3.14.3 Proposed Mitigation

To the extent possible, the location and choice of specific lighting structures will be designed to minimize light intrusion on adjacent properties. In addition, landscape treatments will be considered to screen lighting if sufficient right-of-way is included outside the lateral obstacle clearances.

3.14.4 No Build Alternative

The no build alternative will avoid the need for lighting structures within the beltway study area, and there will be no impact due to lighting.

3.15 WATER QUALITY

3.15.1 Existing Conditions

Groundwater. Groundwater in Lancaster County is very complex. Groundwater quantity, quality and the ability of the principal aquifer to yield water all vary markedly within the county (Lincoln-Lancaster County Ecological Advisory Committee, 1997). In the beltway area, the principal aquifer is composed of mostly fine-grained material, primarily glacial till, and well yields are generally low. Depth of the principal aquifer is generally within 30 m (100 ft), but closer to 60 m (200 ft) east of Stevens Creek. As a result, most of the beltway area is served by rural water districts. Local shallow water aquifers occur along the creek bottoms, and spring or seep areas are not uncommon.

It should be noted that the City of Lincoln obtains all of its drinking water from a recently constructed well field and treatment plant located near Ashland on the Platte River. Water is conveyed underground approximately 48 km (30 miles) from this site to the City.

The Nebraska Department of Environmental Quality in coordination with the Nebraska Health and Human Services manage the State Wellhead Protection Program. This program assists communities and other public water suppliers in establishing zones (wellhead protection areas (WHPA)) surrounding water supply wells which if contamination occurred in would impact the water quality in the well in 20 years or less. Participation in this program is voluntary and no state statutes require delineation of a WHPA. As such, there are no state statutes restricting land use in a designated WHPA. However, other state statutes do restrict certain land uses such as septic tanks, lagoons, and injection wells within 300 m (1,000 ft) of the well.

Two wellhead protection areas (WHPA) occur in the beltway study area, the City of Waverly and Firethorn Subdivision (Lincoln) WHPAs. The City of Waverly WHPA encompasses the City of Waverly and an area west-southwest of Waverly (see **Figure 2.25**). Each of the east alignments passes through the southwest portion of the Waverly WHPA. The two wells in this area are at approximately 47 m (155 ft) in depth and screened in the Dakota sandstone, with approximately 30 m (100 ft) of till and clay protecting the aquifer from any potential spills. Although the four wells which are located just south of the City are much shallower, the WHPA for these wells would not be affected by the beltway alignments. The Firethorn Subdivision WHPA encompasses an area which is bounded approximately by A Street on the north, 70th on the west, Old Cheney on the south, and South 112th on the east. The EC-1 alignment passes through the eastern portion of the Firethorn Subdivision WHPA. The two Firethorn wells are around 61 m (200 ft) in depth and screened in the Dakota sandstone, with approximately 30 m (100 ft) of till and clay protecting the aquifer from any potential spills. In Lancaster County, the overlying layers of glacial tills and clays act as an aquiclude and serves as a natural barrier for the transmission of groundwater.

Private wells in the beltway are both the deep Dakota type wells, and shallow wells in reliable alluvial sources near creeks or in coarse material filled fissures in the geologic profile. These aquifers should be fairly well protected from potential surface contamination, unless a well was improperly constructed allowing floodwaters to enter the aquifer around the well casing. Generally, there are no large contiguous aquifers in the project area, and the smaller drinking water sources are limited in extent and often well buffered from surface contamination by thick clay material. Registered groundwater wells are shown in **Figure 2.25.**

Surface Water. There are two major streams in the south and east beltways study area: Salt Creek and Stevens Creek. Both have perennial flow through the study area. In addition, there are numerous tributaries to the creeks, and to the Little Nemaha River and Wagon Train Lake. These tributaries tend to have intermittent flow. Surface water rights are shown on **Figure 2.25.**

There has been limited surface water quality monitoring conducted for the stream segments within the south and east beltways study area. What data is available supports the beneficial use classifications identified by the Nebraska Department of Environmental Quality (NDEQ) (**Table 3.18**). The beneficial use designations correlate with specific numerical criteria of the Nebraska Surface Water Quality Standards. Based on the classification, Salt Creek and Stevens Creek are designated as providing warmwater aquatic life, agricultural water supply, and aesthetic uses. The tributaries of the Little Nemaha River and Wagon Train Lake are not classified within the beltways study area.

Table 3.18

STREAM CLASSIFICATION BY BASIN AND DESIGNATED BENEFICIAL USES

STREAM SEGMENT	SEGMENT NO.	USE CLASSIFICATION								Key Species
		State Resource Water	Recreation	Aquatic Life[1]		Water Supply[3]			Aesthetics	
				Coldwater	Warmwater	Public Drinking Water	Agricultural	Industrial		
Salt Creek--Hickman Branch to Beal Slough	30000				A[2]		A		X	channel catfish, walleye
Stevens Creek	20200				B		A		X	

[1]Warmwater Class A waters provide, or could provide, a habitat suitable for maintaining one or more key species on a year-round basis. These waters are capable of maintaining year-round populations of a variety of other warmwater fish and invertebrate organisms and plants. Warmwater Class B are waters where the variety of warmwater biota is presently limited by water volume or flow, water quality (natural or irretrievable human-induced conditions), substrate composition, or other habitat conditions. These waters are only capable of maintaining year-round populations of tolerant warmwater fish and associated vertebrate and invertebrate organisms and plants. Key species may be supported on a seasonal or intermittent basis (e.g., during high flows) but year-round populations cannot be maintained.

[2] Site specific water quality criteria for un-ionized ammonia are assigned.

[3] Agricultural Class A are waters used for general agricultural purposes (i.e., irrigation and livestock watering) without treatment; water quality criteria have been assigned for conductivity, nitrate and nitrite as nitrogen, and selenium.. Agricultural Class B are waters where the natural background water quality limits its use for agricultural purposes; no water quality criterial are assigned to protect this use.

Source: Nebraska Department of Environmental Quality
Title 117 - Nebraska Surface Water Quality Standards
Revised Effective Date: 3 March 1996

In regard to aquatic life uses, which relate most directly to fish and wildlife impacts, Salt Creek has been designated as Class A Warmwater stream; and Stevens Creek is designated as Class B Warmwater stream. Class A "waters provide, or could provide, a habitat suitable for maintaining one or more key species on a year-round basis. These waters are capable of maintaining year-round populations of a variety of other warmwater fish and invertebrate organisms and plants" (NDEQ, 1996). In contrast, Class B "are waters where the variety of warmwater biota is presently limited by water volume or flow, water quality (natural or irretrievable human-induced conditions), substrate composition, or other habitat conditions. These waters are only capable of maintaining year-round populations of tolerant warmwater fish and associated vertebrate and invertebrate organisms and plants. Key species may be supported on a seasonal or intermittent basis (e.g., during high flows) but year-round populations cannot be maintained" (NDEQ, 1996).

Because Nebraska is an agricultural state, NDEQ considers all streams to have agricultural water supply uses-regardless of actual or potential agricultural uses. All stream segments in the state are also considered to have aesthetic uses-regardless of actual physical appearance (personal communication between A. Zlotsky and John Bender, NDEQ, 12 March 1998). None of the streams provide public drinking water uses.

Wagon Train Lake, located approximately 4.8 km (3 mi) downstream of the beltway, has been included on the List of 303(d) Impaired Waters for Nebraska, as well as the Nebraska Priority Watersheds for Nonpoint Source Surface Water Quality Actions. The lake has been recently renovated.

3.15.2 Impacts of the Four Finalist Alternatives

Groundwater. None of the four alternatives will adversely affect groundwater.

Surface Water. The primary adverse impact on surface water quality would be limited to temporary construction effects of erosion and sedimentation, particularly during construction of the bridges and culverts. Construction impacts to surface waters are considered minor and temporary, and can be minimized through the use of temporary and permanent erosion control.

In addition, surface water impacts can be expected from wash off of accumulated pollutants from the road surface after construction; however, these are considered minimal and do not require mitigation.

Construction for the new bridges and culverts requires a Section 404 permit from the U.S. Army Corps of Engineers for dredge and fill activities in waters of the United States and their adjacent wetlands. As part of this permit, the project requires Section 401 Water Quality Certification from the Nebraska Department of Environmental Quality. In addition, the project will require a National Pollution Discharge Elimination System (NPDES) permit from NDEQ which is needed for all sites greater than 2 ha (5 ac) in size. The permit will require incorporation of erosion and sedimentation control measures during construction.

3.15.3 Proposed Mitigation

Groundwater. No mitigation is required. Roadway designers will consider storm water drainage patterns in the vicinity of the WHPAs; however, there are no land use restrictions in the areas except within 90 m (300 ft) of a well.

Surface Water. Mitigation measures will be implemented for construction-related erosion and sedimentation control and include, as appropriate, dikes, dams, sediment basins, fiber mats, temporary and permanent seeding, straw mulch, plastic liners, slope drains, and other devices which would intercept and trap transported sediments during construction. All heavy equipment will be refueled and serviced away from water courses to prevent accidental contamination of surface waters with petroleum products. Only clean fill material will be used in construction in the waters and wetlands. Special consideration will be given to erosion and sedimentation control measures in the vicinity of the tributary to Wagon Train Lake.

3.15.4 No Build Alternative

Groundwater. The no build alternative will have no impact on groundwater.

Surface Water. The no build alternative will have no impact on surface water, other than temporary increases in sedimentation during construction of the proposed future roadway network improvements.

3.16 WETLANDS

3.16.1 Existing Conditions

Due to the rural setting of the project, there are numerous wetlands in the study area. However, the wetlands are fairly limited in areal extent and diversity, and tend to be dominated by monocultures of cattails or reed canarygrass. Wetlands generally occur along Stevens Creek, Salt Creek and tributary streams, as well as in isolated depressions and impoundments throughout the watersheds. The wetlands and waterways are categorized into six major groups:

1. Riverine wetlands within Salt Creek and Stevens Creek
2. Forested wetlands along tributaries
3. Scrub-Shrub wetlands along tributaries
4. Emergent wetlands along tributaries
5. Impounded wetlands along tributaries
6. Emergent, Forested and Scrub-Shrub isolated wetlands in depressions

Additional information on wetlands in provided in the Wetlands Delineation Report in **Appendix D**.

3.16.2 Impacts of the Four Finalist Alternatives

Wetlands in the study area were delineated in July and August 1999 using the 1987 Corps of Engineers (Corps) Wetland Delineation Manual. The field survey included all potential wetland areas and stream crossings that had the potential to be affected by the four finalist beltway alternatives. Depending on the configuration and selection of an alignment, some of these wetlands will not be affected. **Table 3.19** is a summary of the estimated wetlands impacts for each of the the project alternatives.

Table 3.19

ESTIMATE OF WETLAND IMPACTS

WETLAND IMPACTS	ALTERNATIVE			
	SM-4	EC-1	EM-1	EF-1
Number of Wetlands	19	33	17	22
Wetland Impacts - hectares (acres)	7.3 (18.0)	16.9 (41.8)	8.9 (21.9)	8.3 (20.4)

3.16.3 Proposed Mitigation

Mitigation has been proposed to replace all impacted wetlands, whether jurisdictional or not, at a minimum ratio of 1:1 replacement-to-loss. Wetland mitigation sites may be located along the proposed project route at feasible sites, or may be located in the City of Lincoln's Wetland Mitigation Bank, currently under development.

3.16.4 No Build Alternative

The no build alternative will impact wetlands along all proposed roadway network improvements in the Future 1 and 25 Year Program which will be implemented with or without a beltway.

3.16.5 Compliance with Executive Order 11990, Protection of Wetlands

The south and east beltways, a linear transportation project by definition, must provide expressway connectors in both east-west and north-south directions. Because of the location of Salt Creek in the south, and Stevens Creek in the east, there are no alternatives which completely avoid impacts to wetlands or waters of the United States. Although few wetlands remain in the study area and the wetlands have been avoided to the extent possible, the project will unavoidably impact some wetlands due to (1) the linear nature of the project, and (2) the project goal to follow half section lines to the extent possible to minimize impacts to agricultural production and landowners. With the proposed wetland mitigation, the project would conform to existing State (NDEQ) requirements for mitigation of wetland impacts. Since these wetlands would be mitigated in-kind at accepted replacement-to-loss ratios, there is minimal impact on the beneficial values of wetlands in the area.

3.17 WATER BODY MODIFICATION AND WILDLIFE

3.17.1 Existing Conditions

Water Bodies. The main bodies of water in the beltway study area are Salt Creek and Stevens Creek and their tributaries, along with the North Fork of the Little Nemaha River and an unnamed tributary of Wagon Train Lake. Other minor water features include scattered farm ponds.

Terrestrial Habitat. Typical mammals that utilize riparian habitat along the creeks include white-tailed deer, red fox, raccoon, muskrat, beaver, opossum, mink, cottontail rabbit, and fox squirrel. Common bird species are mallard, blue-winged teal, belted kingfisher, great blue-heron, ring-necked pheasant, bobwhite quail, blackbirds, sparrows and wrens. Typical reptiles and amphibians include snakes, turtles, salamanders, and frogs.

Aquatic Habitat. Typcial fish species in Salt Creek and Stevens Creek include bullheads, carp, sunfish, shiners, and minnows. Typical fish species in most of the smaller tributaries are limited to minnows and shiners.

SM-4 Alternative. SM-4 crosses the mainstem of Salt Creek between Saltillo Road and Bennet Road near 25th Street. The floodplain is very broad at this location, nearly 1.6 km (1 mi) wide. The mainstem channel is deeply entrenched and has been subject to significant erosion. The channel overbanks are planted in commodity crops with a significant zone of riparian vegetation along each bank. SM-4 also crosses the Wagon Train tributary of Salt Creek between Saltillo Road and Bennet Road near 84th Street. The floodplain at this location is narrow and the channel is incised. The channel overbanks are planted in commodity crops with riparian vegetation along the banks. The US 77 interchange also crosses a tributary of Salt Creek. The channel overbanks are planted in commodity crops with little to no zone of riparian vegetation along the banks.

EC-1 Alternative. EC-1 crosses the mainstem of Stevens Creek, two tributaries to Stevens Creek, and an unnamed tributary to Salt Creek. The mainstem crossing of Stevens Creek occurs between Adams Street and Holdrege Street. The floodplain is broad at this location and is generally perpendicular to the proposed route. The channel overbanks are planted in commodity crops with a significant zone of riparian vegetation along each bank. The tributary floodplains crossed by EC-1 are located in the upper and middle portions of the respective drainage basins. They are broad with incised channels generally varying from 0.6 to 0.9 m (2 or 3 ft) deep and twice as wide. The channel overbanks are planted in commodity crops with a narrow zone of riparian vegetation along each bank.

EM-1 Alternative. EM-1 crosses the mainstem of Stevens Creek in two locations, two tributaries to Stevens Creek, and two unnamed tributaries to Salt Creek. The two mainstem crossings of Stevens Creek occur near Yankee Hill Road and 120th Streets, and between O and A Streets near the MoPac Trail bridge over Stevens Creek east of Walton. Near Yankee Hill Road, the channel is deep and narrow, approximately 2.4 m (8 ft) deep and wide, with near vertical slopes. Riparian vegetation occurs in a narrow strip along each bank. The floodplain is broad and parallel to the proposed route. Near Walton, the channel is deeply incised, approximately 4.9 to 5.5 m (16 to 18 ft) deep and about three times as wide with a bottom width of 3.7 to 4.3 m (12 to 14 ft). Riparian vegetation occurs along each bank varying from zero to 30 m (100 ft) wide. The flood plain is very flat and broad at this location and is crossed at approximately a 45-degree angle by the proposed route. The tributary floodplains crossed by EM-1 are located in the lower and middle reaches of the respective drainage basins. They are broad with deeply incised channels generally varying from 2.4 to 3.0 m (8 to 10 ft) deep and two to three times as wide. Some channels have developed intermediate benches. The channel overbanks are planted in commodity crops with a significant zone of riparian vegetation along each bank.

EF-1 Alternative. EF-1 crosses five tributaries to Stevens Creek and an unnamed tributary to Salt Creek; the route does not cross the Stevens Creek mainstem channel. The tributary floodplains crossed by EF-1 are located in the middle to lower reaches of the respective drainage basins. They are broad with incised channels generally varying from 1.5 to 1.8 m (5 to 6 ft) deep and two to three times as wide. The channel overbanks are planted in commodity crops with a significant zone of riparian vegetation along each bank.

3.17.2 Impacts of the Four Finalist Alternatives

The primary water body modifications will be construction of bridges and culverts at the stream crossings. In general, the structures would cause no adverse long-term modification of water bodies, and would have no adverse impacts on wildlife that utilize the waterbodies–other than a minor loss of riparian habitat where it is currently present. The primary negative impacts would be temporary disturbance of wildlife, and temporay impact to aquatic habitat from increases in turbidity and total suspended solids during bridge construction. Good construction practices should keep suspended sediments at acceptable levels. Temporary construction impacts to surface waters are considered minor and can be minimized through use of temporary and permanent erosion control. Any riprap that may be used in embankment and pier protection for the new bridges would provide a new stable substrate for periphyton and macroinvertebrate colonization, thereby increasing the availability of food for fish in the area.

A list of the structures for each beltway alternative is provided in **Table 3.20.** Major culverts were defined as those costing upwards of $250,000. Additional minor bridges or major culverts may be required to accommodate the emergency spillways from the LPSNRD dam sites near the beltway alignments.

Table 3.20

WATER BODY MODIFICATIONS

WATER BODY MODIFICATION	ALTERNATIVE			
	SM-4	EC-1	EM-1	EF-1
Major Bridge Structures: > 75 m (> 250 ft)	2	2	1	0
Minor Bridge Structures: < 75 m (< 250 ft)	5	2	4	3
Major Culverts	1	5	1	1
TOTAL	8	9	6	4

3.17.3 Proposed Mitigation

Mitigation measures will be implemented for construction-related erosion and sedimentation control and include, as appropriate, dikes, dams, sediment basins, fiber mats, temporary and permanent seeding, straw mulch, plastic liners, slope drains, and other devices which would intercept and trap transported sediments during construction. In addition, the project will require a National Pollution Discharge Elimination System (NPDES) permit from NDEQ which is needed for all sites greater than 2 ha (5 ac) in size. The permit will require incorporation of erosion and sedimentation control measures during construction.

3.17.4 No Build Alternative

The no action alternative would avoid all temporary adverse impacts to waterbodies and associated wildlife from construction of bridges and culverts, other than that required for construction of the proposed future roadway network improvements.

3.18 FLOODPLAINS

3.18.1 Existing Conditions

Floodplains. Portions of the beltway alternatives are located in 100-year floodplains established by the Federal Emergency Management Agency (FEMA). The City of Lincoln and Lancaster County participate in the FEMA National Flood Insurance Program (NFIP) which regulates construction within the 100-year floodplain. A 100-year floodplain is estimated as the limits of the water surface created by a 100-year flood, or an event with a 1 percent annual chance of occurrence.

The concept of a floodway and floodway fringe is used to regulate encroachment (development) within the floodplain. A floodway consists of a channel and portion of the adjacent floodplain area required to convey the 100-year flood discharge with no more than 0.3 m (1 ft) increase in the 100-year flood elevation. Floodway fringe is defined as the area between the limits of the floodway and the 100-year floodplain. In essence, once a floodway is established for an area, theoretically the entire floodway fringe may be developed in most cases.

Some locations along the beltway alternatives are within areas where floodplain boundaries have only been estimated. In other locations regulated floodway and floodway fringe have been established. The boundaries of the 100-year floodplains and floodways are shown on **Figure 2.25.**

Through participation in the NFIP, the local floodplain ordinances require that floodplain development permits be obtained from the City/County. Any development within designated floodways must include certification from a registered professional engineer that the proposed development will result in no increase of the water surface elevation associated with the 100-year flood event. In some locations, where no floodway has been designated, development may not cause more than 0.3 m (1 ft) of rise in the 100-year flood elevation. These ordinances allow some, but only very minor encroachment.

Currently, the City and the Lower Platte South Natural Resources District (LPSNRD) are evaluating a more stringent floodplain ordinance for the City of Lincoln and its 5 km (3 mi) zoning jurisdiction to protect infrastructure and properties within the floodway fringe. Some concepts being discussed include provisions for no net loss of floodplain storage, and no net rise of base flood elevation within the floodway fringe/floodplain. These provisions might also have the potential for application within the County's jurisdiction to achieve a more uniform countywide floodplain management program.

Salt Creek Hydrologic Study. As part of the Wilderness Park Subarea Study, the US Army Corps of Engineers (Corps) was contracted by the LPSNRD to prepare the *Hydrologic Study of Salt Creek at Wilderness Park* (1999). This study evaluated various alternatives to determine their effects on the peak flows (discharges) and stages (water surface elevations) on Salt Creek through Wilderness Park. Pertinent recommendations from the study that apply to the beltway study were:

1. Channel confinement or shortening within upstream areas should be strongly discouraged.

2. Any fill within the Salt Creek floodplain should be compensated for by providing an equal amount of storage elsewhere on the site.

3. Analysis of all the alternatives involving bridge removal or additions resulting in findings that there would be no significant reduction in peak discharge, and there would be no system wide impact on flow rates.

Stevens Creek Watershed Plan. LPSNRD prepared the *Concept Comprehensive Flood Management Plan for Stevens Creek* (1997) study identifying measures that would provide at least a 40 percent reduction of flood damages in the watershed. Several components were identified that would provide a holistic approach to stormwater management in the watershed and meet the flood damage reduction goal. These include:

1. Preserving portions of the Stevens Creek mainstem and tributary 100-year floodplain as open space through acquisition and regulation,

2. Augmenting culverts at select locations to reduce flooding,

3. Erosion healing treatment in the lower channel reach using solutions such as vegetative plantings of woody and herbaceous species to stabilize the stream banks, using rip rap to construct riffle pools along the channel to dissipate energy and arrest headcutting, and installing live willow mats to stabilize the channel banks.

4. Land treatment as a conservation measure with new and retrofit pipe outlet terraces, and establishment of permanent vegetative cover on Class IV lands,

5. Watershed management using integrated watershed models, and

6. Providing detention storage for flood waters using a system of ten farm pond dams and reservoirs (see **Figure 2.25**).

The LSPNRD has obtained partial support through state funding to construct the system of farm ponds. Five of the ten sites are currently in final design stage (sites A6-1, A7-1, A9-1, A9-6 and A17-1), and land rights negotiations are underway. Construction is anticipated to begin late in 2001. The remaining five sites are currently scheduled for construction in 2002. Each of the east beltway alternatives may impact one or two of the proposed dam sites.

Pertinent recommendations in the plan include (1) land rights acquisition using conservation easements in the Stevens Creek floodway and flood fringe between the MoPac Trail and the Murdock Trail, (2) continued reliance on existing floodplain regulations for development in the rest of the delineated Stevens Creek mainstem and tributary floodplains, and (3) a public access easement for a trail along Stevens Creek from the MoPac Trail to Salt Creek. The study team has been in contact with LPSNRD and its consultant regarding potential beltway impacts.

FEMA Mitigation Grant Program. The City of Lincoln is looking into establishing conservation easements in the south beltway corridor in the vicinity of Salt Creek for the purposes of flood control. Such easements would be established so as not to preclude construction of the south beltway. The City has applied for a grant through FEMA for this purpose.

3.18.2 Impacts of the Four Finalist Alternatives

Since the beltway project will comply with all local floodplain ordinances, preliminary evaluation indicates that floodplain encroachment will not be significant and will not adversely affect the natural and beneficial floodplain values for any of the beltway alternatives. As discussed in the previous section, the Stevens Creek Watershed will be modified over the next decade as a result of the LSPNRD project. A risk analysis in accordance with 23 CFR 650, Subpart A, will be completed at final design stage, prior to construction to insure continued compliance with floodplain ordinances.

SM-4 Alternative. SM-4 crosses the floodplain and main stem of Salt Creek between Saltillo Road and Bennet Road near 25th Street, as well as a tributary of Salt Creek at the US 77 interchange. SM-4 also crosses the Wagon Train tributary of Salt Creek, and one of its tributaries, between Saltillo Road and Bennet Road near 84th Street. A floodway has not been established in any of these locations.

EC-1 Alternative. EC-1 crosses the floodplains of the main stem of Stevens Creek, two tributaries to Stevens Creek, and an unnamed tributary to Salt Creek. The mainstem crossing of Stevens Creek occurs between Adams Street and Holdrege Street where a floodplain has been delineated, base flood elevations and flood hazard factors have been determined, and a floodway has been established. A floodway has also been established in the vicinity of the tributary crossing location between A Street and Van Dorn Street. No floodways have been established for the tributary crossing location between Fletcher Avenue and Alvo Road, or the Salt Creek tributary crossing.

EC-1 will impact two of the proposed LPSNRD farm ponds. The alignment goes through the Sky Ranch Dam site (**Exhibit EC1-4**). Moving the dam upstream (to the southwest) away from the beltway would likely reduce the flood control capacity of the structure, and the beltway would obstruct the emergency spillway of the dam--requiring an additional culvert under the beltway capable of conveying the flow from the emergency spillway. It is not practical to shift the beltway alignment at this location due to its proximity to the Sky Ranch Acres subdivision. The

alignment also goes through a portion of the A3-2 dam site (**Exhibit EC1-2**). Moving this dam site upstream (to the west) away from the beltway would likely reduce the flood control capacity of the structure. This shift would also bring the permanent pool closer to 98th Street and would require that the culvert under 98th Street be evaluated and possibly replaced. In addition, the beltway could obstruct the emergency spillway of the A3-2 dam--requiring an additional culvert or bridge under the beltway capable of conveying the flow from the emergency spillway. It is not practical to shift the beltway at this location due to its proximity to a housing development at 112th and Pine Lake Road. A shift would also impact the Pine Lake Road interchange, possibly increasing the required structure lengths and therefore cost. Both dam sites are in Phase 2 of the LPSNRD project and final design has not begun.

EM-1 Alternative. EM-1 crosses the floodplain and mainstem of Stevens Creek in two locations, as well as the floodplains of two tributaries to Stevens Creek, and two unnamed tributaries to Salt Creek. The two mainstem crossings of Stevens Creek occur near Yankee Hill Road and 120th Streets, and between O and A Streets near the Walton. No floodway has been established in the vicinity of the Yankee Hill Road crossing. However, the floodway is designated in the vicinity of the crossing near Walton. In this location, the floodplain is very flat and broad and is crossed at approximately a 45-degree angle by the proposed route. The tributaries of Stevens Creek which are crossed by EM-1 are located in the lower reaches of the drainage basins; no floodways have been established in these locations between Pine Lake Road and Yankee Hill Road, and between Van Dorn and Pioneers Boulevard. No floodways have been established on the Salt Creek tributaries.

EM-1 will impact one of the proposed LPSNRD farm ponds, A2-1, in the vicinity of the emergency spillway at the west side of the dam (**Exhibit EM1-1**). The permanent pool also appears to be very close to the westbound-to-northbound ramp of the beltway/N-2 interchange. The spillway for the dam could be relocated on the east side of the dam, thus eliminating the conflict. The impacts relative to the permanent pool can not be accurately determined based on the information available at the present time and should be addressed during final design of both projects. Dam site A2-1 is in Phase 2 of the LPSNRD project and final design has not begun.

EF-1 Alternative. EF-1 crosses floodplains along five tributaries to Stevens Creek; the route does not cross the main stem of Stevens Creek. No floodways have been established in any of these locations.

EF-1 will impact two of the proposed LPSNRD farm ponds. The alignment goes through the west end of the A9-1 dam site (**Exhibit EF1-3**). It appears that the dam embankment could be tied into the roadway embankment; it is likely that this could cause the beltway embankment to have water from the permanent pool against it. This issue would need to be addressed in the final design of the beltway to provide adequate protection of the roadway embankment. EF-1 is also close to the A-17 dam site, but does not directly impact the dam (**Exhibit EF1-4**). The emergency spillway for the dam would have to be addressed during design of the beltway bridge to ensure that the spillway flows would be conveyed downstream unimpeded. Both dam sites are in Phase 1 of the LPSNRD project and final design has already begun.

3.18.3 Proposed Mitigation

Floodplain Development. The proposed project will comply with or exceed the current minimum requirements of the City/County floodplain management ordinance. There are no additional mitigation measures above what is already required by the City/County program.

Channel Realignment. According to the US Army Corps of Engineers requirements, if channel straightening is proposed for any of the crossings, it will be necessary to demonstrate that there are no other practicable alternatives.

SM-4 Alternative. It is anticipated that all major crossings in this alternative will allow channels to remain in their existing configurations.

EC-1 Alternative. The Stevens Creek tributary crossing at Adams Street may require minor channel realignment at an existing meander due to encroachment of the channel by the roadway embankment.

The Salt Creek tributary crossing north of Fletcher Avenue cuts across an existing channel meander. There are several options to accommodate the road crossing. The channel can be realigned to provide a relatively straight section of channel at the bridge location, and meanders upstream and downstream of the crossing can be reconfigured to enable the total channel length to remain the same as before the realignment. Other options would be to straighten the channel (with the effect of shortening the channel approximately 210 m (700 ft), or extending the bridge approximately 98 m (320 ft) to span the meander.

EM-1 Alternative. The Stevens Creek tributary crossing south of Pine Lake Road cuts across two existing channel meanders. Again, there are several options. The channel can be aligned to provide a relatively straight section of channel at the bridge location, and the meanders upstream and downstream can be reconfigured to enable the total channel length to remain the same as before the realignment. Other options would be to straighten the channel (with the effect of shortening the channel approximately 73 m (240 ft), or extending the bridge approximately 38 m (125 ft) to span the meanders.

The Stevens Creek tributary crossing between Van Dorn Street and Pioneers Boulevard may require minor channel realignment at two existing channel meanders due to encroachment of the channel by the roadway embankment.

It is not anticipated that other major crossings along EM-1 will require channel reconfiguration.

EF-1 Alternative. The Stevens Creek tributary crossing between Old Cheney Road and Pioneers Boulevard cuts across two existing channel meanders. The channel can be aligned to provide a relatively straight section of channel at the bridge location, and the meanders upstream and downstream can be reconfigured to enable the total channel length to remain the same as before the realignment. Other options include straightening the channel (with the effect of shortening the channel approximately 177 m (580 ft), or extending the bridge approximately 94 m (310 ft) to span the meanders.

The Stevens Creek tributary crossing south of Van Dorn Street cuts across an existing channel meander. In this location, the channel can be aligned to provide a relatively straight section at the bridge location, and the meanders upstream and downstream can be reconfigured to enable

the total channel length to remain the same as before the realignment. Other options include straightening the channel (with the effect of shortening the channel approximately 111 m (365 ft), or extending the bridge approximately 61 m (200 ft) to span the meanders.

It is not anticipated that other major crossings along EF-1 will require channel reconfiguration.

Stevens Creek Farm Ponds. All of the east beltway alternatives will require continued coordination with LPSNRD, as well as modifications to the roadway design to reduce conflicts with the proposed farm ponds. EC-1 will require (1) moving the Sky Ranch dam site upstream, (2) installing an additional culvert or bridge under the beltway capable of conveying the flow from the Sky Ranch emergency spillway, (3) moving the A3-2 dam site upstream, and (4) evaluation and possible replacement of the culvert under 98th Street near the A3-2 site. In addition, the beltway could obstruct the emergency spillway of the dam--requiring an additional culvert or bridge under the beltway capable of conveying the flow from the emergency spillway. The resulting loss of flood control capacity from moving the dams upstream has not been estimated at this time; therefore, mitigation options have not been identified. EM-1 will require (1) the A2-1 spillway to be relocated on the east side of the dam, and (2) adequate protection of the roadway embankment at the same site. EF-1 will require (1) adequate protection of the roadway embankment at the A9-1 site, and (2) accommodation of the emergency spillway flows at the A-17 site.

Stevens Creek Conservation Easements and Trail. For EC-1 and EM-1, proposed development in the Stevens Creek mainstem floodplain between the Murdock Trail and the MoPac Trail would be required to comply with the terms of the conservation easements to be acquired by LPSNRD relative to the Stevens Creek watershed plan; however, these terms will not prohibit construction of a beltway facility.

3.18.4 No Build Alternative

The no build alternative would avoid any direct alteration to the existing floodplain conditions other than that required for construction of the planned roadway network improvements. Even without a beltway project, modifications to the existing floodplains are likely to continue as agricultural land is converted to suburban and urban uses for paved County roads, housing and subdivision developments, golf courses, and commercial and industrial sites. The no build alternative would avoid any conflicts with the Stevens Creek watershed project.

3.18.5 Compliance with Executive Order 11988, Floodplain Management

To meet the project purpose, the south beltway must cross the Salt Creek floodplain because it is impossible to connect US 77 to N-2 without crossing Salt Creek within the defined 200 km^2 (80 mi^2) study area. Based on the defined east study area, only alternatives located east of 134th Street would be able to avoid any impacts to the Stevens Creek floodplain. Of the three east beltway alternatives, only EF-1 meets this criteria.

Through the Lancaster County participation in the National Flood Insurance Program, it is A local requirement that floodplain development permits be obtained from the City/County. This requires that any developments within designated floodways must include certification from a registered professional engineer that the proposed development will result in no increase along the floodway water surface profiles. The City/County are both sponsors of the project and are aware of floodplain management requirements.

3.19 WILD AND SCENIC RIVERS

No Wild and Scenic Rivers segments have been designated by the Department of the Interior in the project area; therefore, the proposed project will have no impacts on Wild and Scenic Rivers.

3.20 COASTAL BARRIERS

The proposed project is not located along a coast and no Coastal Barrier Units have been designated by the Department of the Interior in the project area; therefore, the proposed project will have no impacts on coastal barriers.

3.21 COASTAL ZONE IMPACTS

The proposed project is not located along a coast and no Coastal Zone Management Areas have been designated by the State; therefore, the proposed project will have no impacts on coastal zones.

3.22 THREATENED AND ENDANGERED SPECIES

3.22.1 Existing Conditions

Based on letters from the Fish and Wildlife Service (FWS) and the Nebraska Game and Parks Commission (NGPC) (**Appendix A**), four federal and state endangered and threatened species had the likelihood to occur in the beltways study area. Since that time, the status of two species have changed, and NGPC has listed three other species with the likelihood of occurrence in the beltway study area. These species, and their current listing status are presented in **Table 3.21**. Based on information compiled by the Nebraska Natural Heritage Program (NNHP) and field surveys for the beltway study, none of the listed species are known to inhabit the south and east beltways study area.

3.22.2 Impacts of the Four Finalist Alternatives

Bald Eagle. The bald eagle has been sighted in various locations in Lancaster County; mostly in the vicinity of larger creeks and lakes, and thermal discharge points from local industries. It is generally considered a winter visitor and nesting is not known in the county. The wetlands, ponds and streams along the four potential alignments of the beltway are generally small and isolated in nature, and do not contain typical bald eagle habitat. No nests or individuals were observed during the field surveys for wetlands and the western prairie fringed orchid. The FWS has indicated that the bald eagle may pass through the project area, but they have not observed any potential feeding habitat that would attract them to the area.

For the above reasons, we conclude there will be no effect on this species from any of the four beltway alternatives.

Table 3.21

LIST OF THREATENED AND ENDANGERED SPECIES WITH LIKELIHOOD OF OCCURRING IN THE BELTWAYS STUDY AREA

COMMON NAME	SCIENTIFIC NAME	STATUS	
		USFWS	NGPC
Bald eagle	*Haliaeetus leucocephalus*	Threatened[1]	Threatened
Peregrine falcon	*Falco peregrinus*	(no longer listed)	(no longer listed)
American burying beetle	*Nicrophorus americanus*	Endangered	Endangered
Salt Creek tiger beetle	*Cicindela nevadica lincolniana*	(proposed Endangered)	Endangered
Western prairie fringed orchid	*Platanthera praeclara*	Threatened	Threatened
Small white lady's slipper	*Cypripedium candidum*	(not listed)	Threatened
Saltwort	*Salicornia rubra*	(not listed)	Endangered

Peregrine Falcon. Although the peregrine falcon does feed in wetlands, the wetlands, ponds and streams along the four potential alignments of the Beltway contain only marginal feeding habitat. The drainages in the study area contain only small open water areas, and have low plant diversity (being mostly dominated by reed canarygrass, peachleaf willow and cottonwoods). The surrounding hills are mostly in agricultural production (row crops). The only potential peregrine falcon nesting habitat is in downtown Lincoln at the State Capitol and other high-rise buildings.

For the above reasons, we conclude there will be no effect on this species from any of the four beltway alternatives.

American Burying Beetle. The American burying beetle is a carrion feeder that buries its prey, which it then uses below the ground surface for the feeding of its young. Habitat for the beetle has not been clearly defined. Although virgin or primary forest has been suggested as habitat, recent captures in the Midwest since 1960 have been in mixed agricultural lands. Most past records in Nebraska show that it has been collected near major watercourses such as the Platte Elkhorn, Loup, and Dismal Rivers. Until more information on habitat is acquired, any area with enough humus and topsoil for burying carrion is considered potential beetle habitat. Past surveys have not found any beetles in the Lancaster area, therefore, a survey is not required by the FWS.

For the above reasons, we conclude there will be no effect on this species from any of the four beltway alternatives.

Salt Creek Tiger Beetle. The Salt Creek tiger beetle has one of the most restricted ranges of any insect in the United States; it is found only in the eastern Nebraska saline wetlands of Lancaster County (Spomer and Higley, 1994). Within the saline wetlands, it is restricted to the wetter unvegetated, mudflat (saltflat) sites and internal drainages. Although once found

predominately on mudflats on the terraces on Salt Creek and its tributaries, the tiger beetle is commonly found near the base of the Little Salt Creek embankment where salt crusts form from interception of the local groundwater. According to Steve Spomer (Research Associate, University of Nebraska-Lincoln), the Salt Creek tiger beetle may be found at one location in a given year, but not be present at the same location in another year. This is particularly true for mudflats, saltflats, and ephemeral pond areas where populations of the tiger beetle are considered transient. In comparison stable populations are known from locations along Little Salt Creek. Between 1990 and 1995, the number of Salt Creek tiger beetles counted in the annual surveys of the species steadily increased as new populations were found (personal communication between Amy Zlotsky and Steve Spomer, 23 August 1995 and 2 June 1998). Since 1995, population estimates based on visual counts of adults have averaged around 600 individuals per year (Spomer and Hoback, 1998). Because of its highly localized distribution, the beetle is considered vulnerable to environmental threats.

There are no areas of saline soils mapped within any of the beltway alignments, and there are no saline wetlands within any of the beltway alignments (see **Appendix D**). The closest location of saline soils and saline wetlands is approximately 2.4 km (1.5 mi) west of the proposed I-80 interchange location near Cornhusker Highway and 98th Street. These particular saline wetlands do not contain saltflat or unvegetated mudflat habitats.

For the above reasons, we conclude there will be no effect on this species from any of the four beltway alternatives.

Western Prairie Fringed Orchid. The western prairie fringed orchid grows in wet tall grass meadows and wet-mesic tall grass prairies, and has been found at a few native prairie tracts in Lancaster County. The closest known populations of the orchid are at Nine-Mile Prairie on West Fletcher Avenue 1.6 km (1 mi) west of NW 48th Street, and at two locations in southern Lancaster County, both of which are over 16 km (10 mi) away from the beltway alignments.

Because its presence in the study area was possible, a survey to look for the orchid was conducted as part of the South and East Beltways Study. The survey was conducted in 1998, 1999 and 2000 during the blooming period of the orchid which is considered to extend from the second half of June through the first half of July. The survey was conducted by biologists Dr. Joan Darling and Mr. Craig Meilke in 1999 and 2000, and Amy Zlotsky in 1998. During the survey, native grass hayfields and native prairies along the finalist alignments were investigated for the orchid. In addition, other grassland and wetland areas that might support the orchid were investigated. No orchids were found during the survey. **Table 3.22** provides a list of the surveyed sites, dates they were surveyed, grassland type (including water regime and location in the landscape), associated species, known management practices, and a subjective assessment of the quality of the site.

Based on the negative results of the survey, we conclude there will be no effect on this species from any of the four beltway alternatives.

Small White Lady's Slipper. The small white lady's slipper is a perennial orchid. In Nebraska, it is known from native sub-irrigated wet meadows which are not common in the study area. The species appears to be intolerant of cattle grazing, and susceptible to herbicides application and drift from adjacent agricultural fields (NGPC, 1999). There are only two documented localities of the species in Lancaster County, and these are over 20 years old.

Table 3.22

GRASSLAND SITES SURVEYED FOR THE WESTERN PRAIRIE FRINGED ORCHID

Site Number/ Name	Survey Date(s)	Grassland Type	Soil Type	Associated Species	Management Practices/ Quality	Route	Prairie Impact ha (ac)
P-1 Berneisse	7/6/99	Bottomland brome pasture	Wymore silty clay loam	reed canarygrass, prairie cordgrass, foxtail barley, curly dock, smartweed	Grazed/ Low	SM-4	
P-2 Camelot Acres	6/13/00	Bottomland wildflower seeding on old cropland	Judson silt loam	grey-headed coneflower, black-eyed susan, purple coneflower, daisy fleabane, soybeans	Unknown/ Low	EC-1	
P-3 Hagerman	6/13/00	Bottomland brome pasture	Judson silt loam	smooth brome, prairie cordgrass, foxtail barley, path rush, American bugleweed	Heavily grazed/ Low	EC-1	
P-4 Kirchoff	7/16/99	Bottomland brome pasture	Judson silt loam	smooth brome, Kentucky bluegrass, blue vervain, foxtail barley	Heavily grazed/ Low	EC-1	
P-5 Nisley	6/13/00	Upland native prairie hay	Burchard clay loam	big bluestem, prairie cordgrass, switchgrass, plains coreopsis	Mowed/ Medium	EC-1	0.4 (1.1)
P-6 Gottula	7/15/99	Upland CRP	Judson silt loam	big bluestem, smooth brome	CRP planted in 1990/ Medium	EM-1	
P-7 Wilson	7/12/99	Upland native prairie	Burchard clay loam	big bluestem, silvery scurf pea, lead plant	Unknown/ Medium	EM-1	1.3 (3.2)
P-8 Hoffman	7/12/99	Upland CRP	Pawnee clay loam	big bluestem, prairie cordgrass, daisy fleabane, common milkweed, indian hemp dogbane, ironweed	CRP planted in 1988/ Medium	EM-1	
P-9 Reed	6/15/00 6/25/01	Upland native prairie with PEMA wetland through center	Sharpsburg silty clay loam	big bluestem, prairie cordgrass, germander, rosin weed, lead plant, white sage, silvery scurf pea, purple prairie clover	Mowed/ High	EF-1	1.5 (3.8)
P-10 Skoda	7/6/99 6/19/98	Upland brome pasture	Judson silt loam	Kentucky bluegrass, downy brome, sedges	Mowed/ Low	EF-1	
P-11 T. Retzlaff (north)	7/7/99	Upland native prairie hay	Sharpsburg silty clay loam	big bluestem, Kentucky bluegrass, western wheatgrass, purple sweet clover, prairie larkspur	Mowed/ Medium	EF-1	0.2 (0.6)
P-12 T. Retzlaff (south)	7/7/99	Historic upland native prairie, now forested	Morrill clay loam	elderberry, American elm; smooth sumac, smooth brome, nettles	None/ Low	EF-1	0.9 (2.2)
P-13 Schroeder	7/16/99	Upland CRP pasture with PEMC wetland	Sharpsburg silty clay loam	big bluestem, prairie cordgrass, foxtail barley, curly dock, smartweed	Grazed/ Medium	EC-1	

As part of the beltway survey, native grass hayfields, native prairies, and other grassland and wetland areas along the finalist alignments were investigated for the western prairie fringed orchid. No orchids of any kind were found during the survey. Based on **Table 3.22**, there are four locations of native prairie hay along the beltway alignments; all but one are upland locations. Prairie P-9 does have a drainage wetland through the field; however, the wetland portion is dominated by cattail, cordgrass and peachleaf willow (Wetland EF-3 in **Appendix D**) which are not species indicative of a diverse biological assemblage more typical of conditions for the small white lady's slipper. In addition, the approximately 4 ha (10 ac) prairie is surrounded on four sides by cropland.

For the above reasons, we conclude there will be no effect on this species from any of the four beltway alternatives.

Saltwort. The saltwort is a weedy annual species that grows in moist saline and alkaline soils throughout the midwest. Within Nebraska, it is known only from the saline wetlands in Lancaster County, and from an alkali saltflat near a pothole wetland in Phelps County. Saltwort grows in the areas of highest salt concentration within the saline wetlands, and is typically found in the saltflat areas.

There are no areas of saline soils mapped within any of the beltway alignments, and there are no saline wetlands within any of the beltway alignments (see **Appendix D**). The closest location of saline soils and saline wetlands is approximately 2.4 km (1.5 mi) west of the proposed I-80 interchange location near Cornhusker Highway and 98th Street. These particular saline wetlands do not contain saltflat or unvegetated mudflat habitats.

For the above reasons, we conclude there will be no effect on this species from any of the four beltway alternatives.

Prairies. Although prairies are not a threatened or endangered specie *per se*, it was possible to calculate the project impacts on prairies as a result of the orchid survey information. Due to the extent of agricultural row crops only small remnants of these native grasslands remain in the County. Direct project impacts to prairies are a loss of 0.45 ha (1.1 ac) with EC-1; 1.3 ha (3.2 ac) with EM-1 and 2.7 ha (6.6 ac) with EF-1. It is a goal of the Lincoln/Lancaster County Comprehensive Plan to preserve prairies habitats.

In the Public Comments, concern was raised that the EF-1 route may have an additional secondary impact to the remainder of the Reed prairie.

3.22.3 Proposed Mitigation

Since construction is not expected for several years, surveys for threatened and endangered species will be updated, as appropriate. Although prairies are not regulated, impacts to these areas will be avoided or minimized to the extent possible.

3.22.4 No Build Alternative

As with the build alternatives, the no build alternative would have no effect on endangered or threatened species.

3.23 CULTURAL RESOURCES

3.23.1 Existing Conditions

As part of the south and east beltways study, several cultural resources investigations were conducted in the study area. The purpose of the investigations was to provide compliance with Section 106 of the National Historical Preservation Act which requires that historical resources (*both standing structures and archeological materials*) be considered during the planning and execution of any federally funded project. Under this legislation, historical resources are defined as those listed in or considered eligible for listing in the National Register of Historic Places (NRHP). Eligibility is based on two primary considerations (1) the degree of historic integrity, and (2) the overall significance of the resource. Integrity requires the site to retain enough of its early materials, appearance, and feeling to illustrate its history clearly. Significance requires that the resource relate to a historical context and must be based on at least one of the following four criteria: (a) association with events that have made a significant contribution to the broad patterns of our history, (b) association with the lives of persons significant in our past, (c) embodiment of the distinctive characteristics of a type, period or method of construction, or high artistic values, and (d) likelihood to yield information important to historical understanding.

Survey Investigations. Survey investigations were conducted to identify existing cultural resources. A survey of historic standing structures was conducted by On-Site Preservation and Photography (On-Site); a survey of archeological resources was conducted by the University of Nebraska Department of Anthropology (UNL). Following completion of the initial surveys, several additional surveys were requested and conducted by UNL.

Project Scope. The project scopes for the two surveys were developed in consultation with the Nebraska State Historic Preservation Office (SHPO), NDOR, FHWA and the City of Lincoln. The scope of the historical survey was to identify historic standing structures, and to evaluate those sites using the federally-established criteria to determine eligibility for the NRHP. The survey included two components: (1) a reconnaissance-level survey to identify all historic resources within the 200 km^2 (80 mi^2) study area, and (2) an intensive-level survey of the Stevens Creek Bottoms, the area of some of Lancaster County's earliest settlements.

The scope of the archeological survey was to identify archeological sites within defined 0.4 km (0.25-mi) wide corridors, and to evaluate those sites using the federally-established criteria to determine eligibility for the NRHP. The survey included two components: (1) an intensive archeological survey of all project stream crossings from valley margin to valley margin, and (2) an intensive survey of a ten-percent sample of upland areas. Corridors covered by the surveys were SM-4, EC-1, EM-1 and EF-1, as well as several diagonal alignments connecting the south and east corridors. All aspects of the archeological survey were coordinated with the Nebraska State Historical Society Highway Archeology Program. It should be noted that although the 10-percent upland survey was completed, the bottomland survey was incomplete due to landowners who denied permission to survey. Any of the unsurveyed parcels along the final beltway route would be surveyed once they have been acquired.

Public Participation. Both investigations incorporated public participation opportunities, including running announcements on the public access channel, newspaper articles in the *Lincoln Journal Star, Waverly News* and *Hickman Village Voice,* and questionnaires mailed to landowners within the study area. A feature story on the archeological survey was aired on the Channel 10/11 6:00 P.M. evening news on 21 July 1998. Extensive discussions were held with landowners with a familiarity with historic standing structures in the area; and contact was made with 193 landowners during the process of obtaining permission of access for the archeological survey. In addition, representatives of various advocacy groups were contacted, including Friends in the East-Mid Beltway, Citizens for Accountable Route Selection, Preservation Association of Lincoln, Stevens Creek Preservation Association, Nebraska Indian Commission, Waverly Planning Commission, Lincoln Trails Committee, Native American Tribes, and several homeowners associations.

Survey Documents. Findings of the survey inventories and evaluation of eligibility for the National Register of Historic Places (NRHP) were presented in the following documents:

1. *Archeological/Cultural Resources Survey of Lincoln South and East Beltways Study, Lancaster County, Nebraska. Phase I Records Search.* Prepared by Department of Anthropology, University of Nebraska-Lincoln. January 1996.

2. *Lincoln South and East Beltways Historic Survey Report.* Prepared by On-Site Photography and Preservation, Lincoln, Nebraska. August 1998.

3. *(DRAFT) Archeological Inventory and Evaluation of Lincoln's South and East Beltway: Investigation Along the Southern Route SM-4, Lancaster County, Nebraska* (Not For General Distribution). Prepared by Archeological Laboratory, Department of Anthropology, University of Nebraska-Lincoln. January 1998.

4. *Archeological Inventory and Evaluation of Lincoln's South and East Beltway: Investigations Along the Eastern Alternatives EC-1, EM-1 and EF-1, Lancaster County, Nebraska* (Not For General Distribution). Prepared by Archeological Laboratory, Department of Anthropology, University of Nebraska-Lincoln. August 1998.

5. *Archeological Inventory and Evaluation of Lincoln's South and East Beltway, Lancaster County, Nebraska* (For General Distribution). Prepared by Archeological Laboratory, Department of Anthropology, University of Nebraska-Lincoln. December 1998.

6. *Evaluations of the Hulda Otto House, Guenzel Farmstead and Wunibald Farmstead for Eligibility to the National Register of Historic Places.* Prepared by Archeological Laboratory, Department of Anthropology, University of Nebraska-Lincoln. July 1999.

7. *Archeological Inventory and Testing of Lincoln's South and East Beltway: Alternatives SM-1, EC-1, EM-1 and EF-1, Lancaster County, Nebraska* (Not for Public Distribution). 2 Volumes. Prepared by Archeological Laboratory, Department of Anthropology, University of Nebraska-Lincoln. January 2000.

It should be noted that some of the archeological documents were not made available to the public because they contain information on the location of protected cultural sites. In order to provide information to the public (minus locality data), one comprehensive report (Number 5 above) was prepared for general distribution which covers information on all the archeological sites. All owners were notified of any archeological findings on their properties.

Documents prepared for general distribution are available for review at the offices of the City of Lincoln Public Works and Utilities Department, Engineering Services (531 Westgate Boulevard).

Findings of the Reconnaissance (and Supplemental) Surveys of Historic Standing Structures. The reconnaissance survey identified 144 sites over 50 years old–the cut-off limit for historic resources according to NRHP guidelines. Of these, two sites were already listed on the NRHP (Steven Creek Stock Farm and Ehler's Round Barn). Based on a comparative analysis and evaluation of historic integrity, 28 other sites were determined to be eligible for listing. The majority of the eligible sites are farmyards and barns which individually, and as a group, contribute to the overall understanding of agricultural development in rural Lancaster County. The 30 sites included 12 farmyards, 8 individual barns, 4 residences, 1 school, 3 cast concrete road signs, and 2 grain elevators. Since that time, two additional cast concrete road signs were identified within the study area in June 2000 (**Appendix G**).

Results of the survey showed that historical resources nearer to central Lancaster County have already been affected by growth pushing eastward from the City of Lincoln. In general, the concentration of historic resources increases with distance from the City. This is attributable to the growth throughout the twentieth-century of Lincoln as a center of business, commerce and government, and the increasing impact of the city on its surroundings.

Findings of the Intensive-Level Survey of the Stevens Creek Bottoms. The intensive-level survey focused on the Stevens Creek Bottoms--a small area within the overall study area. Because Stevens Creek was known to be the location of the earliest settlement in the County, the purpose of the intensive level survey was to develop a cultural context (narrative history) with which to evaluate any cultural landscapes or the potential for any historical districts. Thirteen sites were surveyed within the defined area–generally within 0.8 km (0.5 mi) of either side of Stevens Creek. These sites included 10 farms, 1 automobile garage, and 2 relocated school buildings.

Although the survey revealed broad patterns of nineteenth century immigrant settlement and the consequent early development of agriculture in Lancaster County, only one site (Norma and Bob Lemke Residence) was considered eligible for the NRHP (other than the already listed Stevens Creek Stock Farm). No cultural landscapes were identified, and no historical districts were considered appropriate. The low-incidence of Register-eligible properties in the Stevens Creek Bottoms can be attributed to the steady adaptation of the farm to the changing demands of agriculture. As a result, the physical manifestation of early settlement has eroded with time, and few resources in the area retain the historic integrity necessary for the determination of eligibility.

Findings of the Archeological Surveys. The Archeological Survey Reports included a records and archives search. Information obtained was used to develop a narrative which covers the physiographic and environmental background of the region, general overview of Great Plains culture history, Native American cultures in Eastern Nebraska, and documented accounts of Indians in Lancaster County. The Schrader Site, located 0.8 km (0.5 mi) from the centerline of SM-4, was the only recorded archeological site within the entire beltway study area that was already listed on the NRHP.

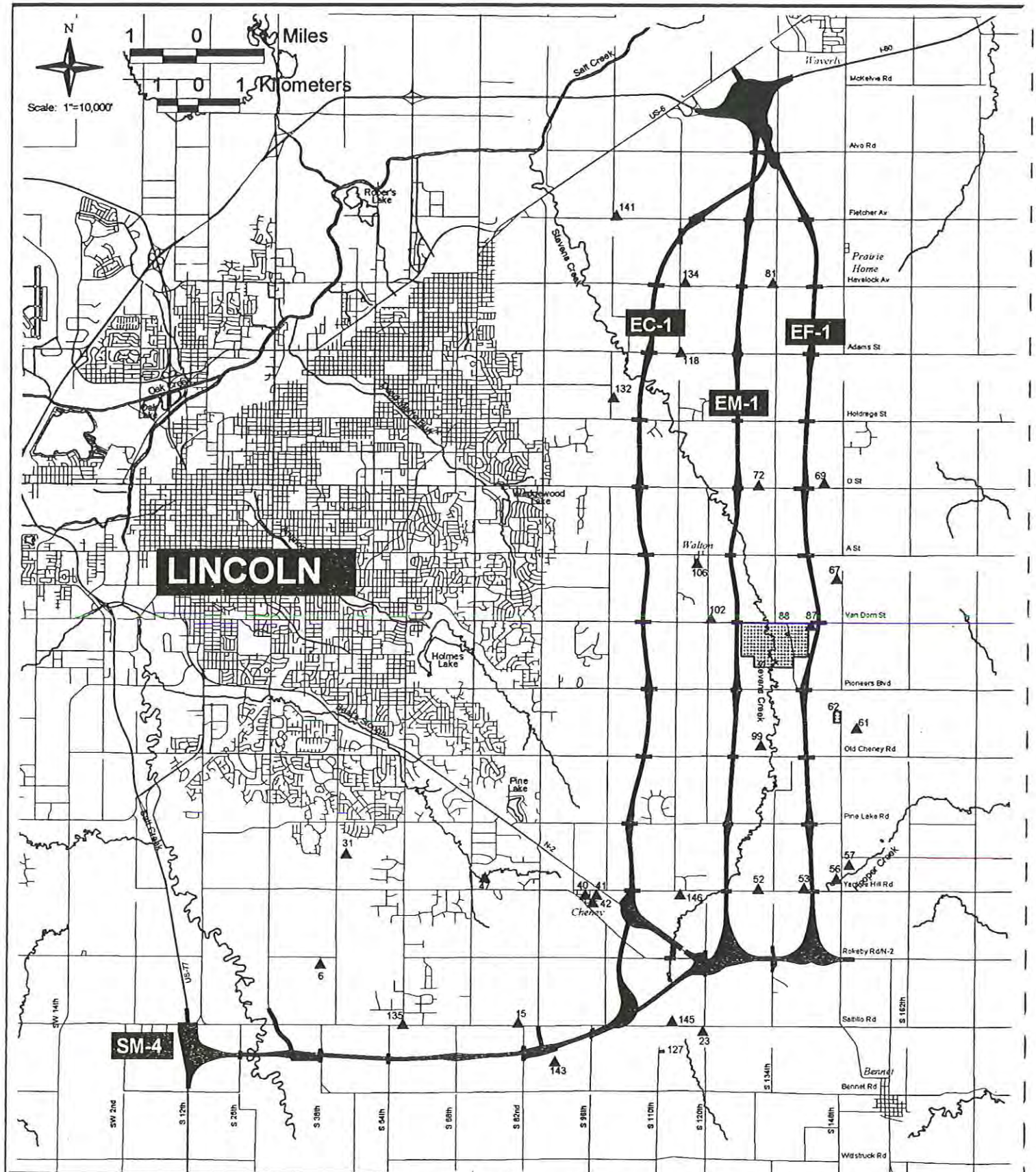
The archeological survey of the south and east beltways identified 47 previously unrecorded sites along SM-4, EC-1, EM-1 and EF-1. Of these 47 sites, 28 are indicative of Native American activities. Euroamerican activities are represented by 17 sites, and 1 site is a multicomponent site which contains both prehistoric and historic material. After further investigation, 1 site is considered non-cultural. Controlled subsurface testing was conducted on 18 sites selected in consultation with the SHPO. Upon completion of testing, two archeological sites were recommended eligible to the NRHP. Based on surface evidence, a Euroamerican wagon road was also recommended eligible to the NRHP.

The majority of the sites were located along the east beltway alignments. The relatively small number of sites in the south beltway study area was thought to be related to the lack of well-defined terraces above the floodplain along the SM-4 route. Most prehistoric sites tend to be located on terraces. Along SM-4, there are sudden slopes rising from the floodplain to the uplands. Any sites or materials that might once have been present were either washed away down the steep slopes, or remain deeply buried in the floodplain. In contrast, the relative abundance of prehistoric sites in the east beltway study area is due to the presence of terraces at the stream crossing locations. These areas were favorable environmental settings for prehistoric groups which were attracted to the reliable year-round water sources. At the time of occupation, villages or other long-term sites were close enough to streams for water to be available, but high enough in the landscape to prevent recurrent flooding.

NRHP and NRHP-Eligible Properties. Based on the recommendations of the Historic Survey Report, Archeological Evaluation, and supplemental investigations requested by the State Historic Preservation Office (SHPO), there are 36 sites in the study area which are either on or eligible for listing on the NRHP. These include 32 historic (**Figure 3.3**) and four archeological sites. The SHPO and FHWA have concurred with the recommendations of eligibility; all other historic and archeological sites were determined not eligible (**Appendix A**). The historic resources being considered as part of the Section 106 consultation with the SHPO are listed in **Table 3.23.** This table provides the site number, site name (with historic name in quotation marks), type of site, and closest beltway corridor.

In addition to historic and archeological sites, the project included a good faith effort to contact Native American groups for the purpose of identifying traditional cultural properties; none were identified.

Information from the surveys was used in developing alignments to avoid impacts to historic resources to the extent possible.



EXISTING FEATURES

81 NRHP Eligible Sites

81 NRHP Sites

Streams

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

Sites On Or Eligible For
National Register Of Historic Places

May 2nd, 2002

Figure 3.3

Table 3.23

SITES ON OR ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES BY NEAREST BELTWAY CORRIDOR LOCATION [1]

SITE NUMBER	SITE NAME	CORRIDOR						
		SC-1	SC-4	SF-1	SM-4	EC-1	EM-1	EF-1
FARMYARDS								
LC00: S-15	Del O'Brien Farmyard				X			
LC00: S-143	Henry Wunibald Farmyard				X			
LC00: E-52	Steve Johnson Farmyard						X	X
LC00: E-53	Penterman Farmyard, "Penterman Farm"							X
LC00: E-56	Michael Smith Farmyard							X
LC00: E-61	Elaine and Owen Herter Farmyard							X
LC00: E-62	Joel and Kathy Sartore Farmyard, "Herter's-Hagaman Farm"							X
LC00: E-69	Arthur Monahan Farmyard, "Haeger Dairy"							X
LC00: E-72	Lyle and Maverne Mayer Farmyard						X	X
LC00: E-87	Theresa Retzlaff Farmyard, "Forest Brook Farm"							X
LC00: E-88	Stevens Creek Stock Farm, Mardale Farm						X	X
LC00: E-134	Laura Reed Farmyard, "Reed Homestead"					X	X	
BARNS								
LC00: S-6	David McEwen Gable Roof Barn		X					
LC00: S-31	Steve Speidel Gothic Arch Roof Laminated Truss Barn	X						
LC00: S-47	Margene Zachek Gable Roof Connected Barn	X						
LC00: S-127	Ehler's Round Barn				X			
LC00: E-57	Elton Haase Gable Roof Mortise and Peg Barn, "Haase Farm"							X

Table 3.23
(continued)

SITE NUMBER	SITE NAME	CORRIDOR						
		SC-1	SC-4	SF-1	SM-4	EC-1	EM-1	EF-1
LC00: E-67	Shirley Retzlaff Barns and Silo "Retzlaff Farm"							X
LC00: E-102	Donna Keane Gambrel Roof Barn, "Kettlehut Farm"						X	
LC00: E-132	Lynn Lenhoff Gambrel Roof Concrete Block Barn					X		
RESIDENCES								
LC00: S-23	Forest Nicely Residence, "Jensen Homeplace"				X			
LC00: E-81	Chuck Hobza Residence, "Jacoby Homestead"						X	X
LC00: E-99	Norma and Bob Lemke Residence, "Karl Lemke Farm"						X	X
LC00: E-141	William Fagen Residence, "Fagen's Acres"					X		
SCHOOL								
LC00: S-41	"Cheney School"				X	X		
GRAIN ELEVATORS								
LC00: S-40	Circle 4 Feed and Grain Elevator, Cheney				X	X		
LC00: E-106	Farmers Coop Grain Elevator, Walton					X	X	
ROAD SIGNS								
LC00: S-42	Road Sign at 1st and 91st, Cheney				X	X		
LC00: S-135	Road Sign on at Saltillo and 56th				X			
LC00: S-145	Road Sign at Saltillo and approx 112th			X				
LC00: E-118	Road Sign at 112th and Adams						X	X
LC00: E-146	Road Sign at Yankee Hill and approx 116th						X	
ARCHEOLOGICAL SITES								
25LC1	Schrader Site–Small Late Prehistoric Village, Smokey Hill Phase			X				
25LC125	Lithic Scatter						X	
25LC129	Lithic and Ceramic Scatter						X	
25LC147	Euroamerican Trail, ca. 1860-1880					X		

[1] List includes two additional road signs identified in June 2000.

3.23.2 Impacts of the Four Finalist Alternatives

A preliminary assessment of adverse effects to NRHP sites was conducted by a team of technical persons who have been involved in the Beltway project over the course of several years (see **Appendix F**). Methodology for the assessment followed 36 CFR Part 800.5, as described in the revised guidance dated 18 May 1999. The assessment of effects included three levels of screening.

Results of Level 1 Screening. The original 34 sites were reviewed to determine which beltway corridors could potentially affect them (previous **Table 3.23**). However, only the four remaining beltway corridors were considered in the evaluation; these are SM-4, EC-1, EM-1 and EF-1. Based on this review, 3 historic sites and 1 archeological site were determined not to be affected by any of these four corridors. Eliminated from further consideration were sites LC00: S-6, LC00: S-31, LC00: S-47 and 25LC1.

Results of Level 2 Screening. The remaining 30 sites (27 historic and 3 archeological) were compared with the most recently refined corridor concept. Materials available to the reviewers included site survey data forms, descriptions, maps, and photographs of the sites. For each corridor, materials available included recent aerial photography, existing and future contour maps, revised centerline concepts and cut and fill information.

Using the list of examples of adverse effects found in 36 CFR Part 800.5 (a) (2), a matrix of potential adverse effects was determined for each site along each corridor. Among other things, the teams evaluated the physical characteristics of and type of historic property; the distance between the property and the beltway; the topography in between the property and the beltway; any existing screening; whether the beltway was in a cut or fill section; whether the property was already affected by other transportation facilities; and any changes in access.

Based on the matrix, sites were either determined to (a) not be adversely affected by the beltway project, (b) be adversely affected, or (c) possibly be adversely affected, but needed field verification.

Results of Level 3 Screening. In Fall 1999, a field investigation was conducted by the team members to survey the sites in question. The field trip included viewing sites from the corridor centerlines and viewing the centerlines from the sites. Based on the field review, the team finalized the preliminary assessment of adverse effects. Seven sites were determined to be impacted by the four routes (**Table 3.24**). Of the seven sites, the beltway would require incorporation of land from only the two archeological sites. These takings are discussed further in the Section 4(f) Statement (**Appendix H**).

Table 3.24

SUMMARY OF NRHP SITES
ADVERSELY AFFECTED BY THE BELTWAY CORRIDORS

SM-4	EC-1	EM-1	EF-1
LC00: S-143 Henry Wunibald Farmyard	25LC147 Euroamerican Trail	LC00: E-52 Steve Johnson Farmyard	LC00: E-53 Penterman Farmyard
		25LC129 [1] Lithic and Ceramic Scatter	LC00: E-87 Teresa Retzlaff Farmyard
			LC00: E-88 Stevens Creek Stock Farm

[1] In December 2001, refinements to the EM-1 alignment allowed this site to be avoided.

Additional Sites. Two additional cast concrete road signs which were identified in the study area in June 2000 (**Appendix G**) have been added to **Table 3.23**. Neither of these signs will be impacted by finalist beltway alignments.

Public Coordination. The Preliminary Assessment of Adverse Effects to NRHP and NRHP-Eligible Sites was made available for review and comment by the consulting parties and general public. A total of 32 letters were received, including 20 which mentioned being members of CARS–Citizens for Accountable Route Selection.

Comments were reviewed, summarized and discussed by the teams listed above. Additional investigations were conducted, and information from the comments and investigations was incorporated into (1) the Assessment of Adverse Effects to NRHP and NRHP-Eligible Sites to be submitted to the SHPO, and (2) the Environmental Impact Statement, where appropriate.

Additional Investigations. As recommended in the consulting party/public comments, several additional investigations were conducted. These included:

1. Determination of specific boundaries for all historic properties eligible for the NRHP (see **Appendix G**).
2. Evaluation of the Stevens Creek Stock Farm 320 ha (800 ac) (see **Appendix F**).
3. Evaluation of the Sartore (Herter) Farmyard 40 ha (100 ac) (see **Appendix F**).
4. Noise evaluation of the sensitive receptors, including three residences on or eligible for the NRHP (Henry Wunibald, Penterman and Teresa Retzlaff) (see **Section 3.13** and **Appendix C**).
5. Evaluation of urban sprawl (see **Sections 3.2** and **3.31**).
6. Reevaluation/evaluation of other sites, including four that had already been evaluated, two previously not considered to have retained a sufficient degree of historic integrity to warrant inclusion in the original historic survey report, and three archeological sites (**Appendix F**).
7. Reevaluation of a historic district centered on the German/Trinity Lutheran Church (**Appendix F**).
8. Resolution of various other issues (see **Appendix F**).

Reevaluation of Effects. Based on the consulting party/public comments and additional investigations, the list of eligible sites remained unchanged from that determined by FHWA in a letter dated 7 October 1999, and for which concurrence was obtained by the SHPO in letters dated 3 June 1998, 11 June 1998, 7 December 1998, 7 September 1999 and 2 June 2000. The only exceptions were the addition of the two more recently identified road signs which are considered eligible for the NRHP.

Based on the additional investigations, sites on or eligible for the NRHP were reevaluated and the Assessment of Adverse Effects was updated with current information. However, the list of sites which were determined to be adversely affected remained unchanged from the December 1999 preliminary assessment (see **Appendix F**). In letters dated 1 February 2001 and 27 November 2000 (**Appendix E**), the SHPO concurred with the findings of the Assessment of Adverse Effects (**Appendix F**) and the Determination of Boundaries report (**Appendix G**). Since that time, public comments on the DEIS raised several other historic issues. These are addressed in **Sections 9.5 and 9.6.**

Section 4(f) Resources. All of the seven sites in **Table 3.24**, as well as the road sign at 112th and Adams, were included in the Draft Section 4(f) Statement which further addressed transportation impacts to historic resources. The Final Section 4(f) Statement is included in **Appendix H**; this version of the document evaluates only those resources along the preferred alternative. Based on the Draft 4(f) evaluation, the only historic resource which falls under Section 4(f) is the road sign. The road sign is located along the preferred alternative and may require protection during construction and nearby repositioning, if it is not moved prior to the beltway project for County road widening. Repositioning the sign is a minor impact, required for operation and safety of an existing roadway. The SHPO has concurred that the beltway project will have no adverse effect on the sign, with the condition of protection during construction and repositioning nearby (see letter dated 26 September 2000, **Appendix H-A**).

3.23.3 Proposed Mitigation

Proposed mitigation follows the guidelines of the Nebraska SHPO and is included in the Assessment of Adverse Effects (**Appendix F**). A Memorandum of Agreement was developed to implement mitigation for the two historic properties which are adversely affected by the preferred SM-4/EM-1 alternative (Henry Wunibald and Steve Johnson Farmyards), and includes a clause for donation of easements. Modification of the EM-1 alignment made it possible to avoid archeological site 25LC129. Other cultural resource management activities will include:

- Completion of an archeological survey of bottomlands where access has been previously denied.
- Use of NDOR standard provisions regarding previously unsuspected archeological remains that provide for cessation of work and notification of the SHPO
- Use of NDOR standard provisions regarding monitoring of archeological sites during construction.
- A historic marker located at Saltillo Road and South 14th Street will need to be relocated. The marker commemorates the Nebraska City to Fort Kearny Road, "The Great Central Route to the Gold Fields" which crossed near this location. There are no remnants of the trail known within or near the SM-4 right-of-way.

Additional details on mitigation are included in **Section 9.5.4.**

3.23.4 No Build Alternative

Under the no build alternative, deterioration of some historic properties will likely continue while others may be preserved and maintained. The no build alternative probably maintains the characteristics of the area that motivate certain owners to invest in maintaining historic properties. However, even with the no build scenario, development pressures will continue to accelerate in both the south and east beltways areas under current growth policies. There is reason to believe that continued changes in farming, farm consolidation, escalating agricultural land prices, and proliferation of non-farm residential acreages will contribute to urbanization. With no evidence of major public or private funding for historic preservation, the same processes that caused the decline of former historic structures will continue into the future.

Although the no build alternative may avoid the specific impacts to cultural resources of the beltway alternatives; construction of the proposed future roadway network improvements are likely to impact other cultural resources along roadways to be paved and/or widened in the 1 and 25 Year Program.

3.24 ENVIRONMENTAL RISK SITES

3.24.1 Existing Conditions

Environmental risk sites are those facilities and/or locations where hazardous substances, hazardous waste or petroleum products were or can be released into the ground water, surface soils or subsurface sediments. The beltway could impact these sites during roadway construction by direct contact with contamination present in contaminated media (surface soil, subsurface sediments, and ground water). The assessment of the impact of the beltway project on environmental risk sites considered the extent of contamination at the facility and extending from the facility.

Existing conditions have been determined by review of regulatory records through the Federal Freedom of Information Act requests to the Nebraska Department of Environmental Quality (NDEQ), the United States Environmental Protection Agency (EPA) and the Nebraska State Fire Marshal (SFM). Each agency provided a list of sites regulated by their agencies occurring in the study area. Regulatory records examined and date of the database were as follows:

1. **NPL** — The National Priorities List (NPL) documents sites which have been identified for priority remedial actions under the Superfund Program by EPA. Database date: 4/14/00.

2. **CERCLIS** — The Comprehensive Environmental Response, Compensation and Liability Index System (CERCLIS) is a compilation of sites in which the EPA investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980. Database date: 4/14/00.

3. **Landfills** — The Landfills list is a listing maintained by the NDEQ of closed or operating registered solid waste landfills.

4. RCRIS The Resource Conservation and Recovery Act Information System (RCRIS) is a compilation by the EPA and the NDEQ of reporting facilities that generate or transport hazardous waste or facilities that treat, store or dispose (TSD) of hazardous waste. RCRIS also contains a listing of TSD facilities required to complete corrective action. Database dates: 3/29/00 and 4/17/00.

5. UST The UST list is a compilation by the SFM of registered underground storage tanks (UST) and facilities that previously had tanks. Database date: 5/9/00.

6. LUST The LUST list is a compilation by the NDEQ of leaking underground storage tanks (LUST) indicating the type of release from the tank and status of the site (active or closed). Database date: 4/12/00.

7. Surface Spills A listing of releases to land or water of petroleum products or hazardous substances that have occurred and been reported. Database date 4/12/00.

The above regulatory lists were reviewed for environmental risk sites occurring within the study area (and up to 1.6 km (1 mi) from each alternative). In addition, other potential environmental risk sites not identified on the above regulatory lists have been identified based on current or previous land uses.

Review of potential environmental risk sites in the study area identified one NPL site, two CERCLA sites, five RCRA generators, no registered Landfills, five LUST sites, two UST facilities (sites with tanks and not appearing on the LUST list), and 17 surface spills (more than one on some properties). Several of the 32 sites identified have no potential for conflict or impact by the beltway project based on distance from features, type of site, and type of contamination; therefore, the number of potential impact sites is reduced.

The NPL site occurs north of Waverly over 2.4 km (1.5 mi) northeast of the east beltway routes, and the two CERCLA sites occur in Waverly near the NPL site and in Walton southwest of the intersection of South 120th and A Streets. None of these sites are considered potential impact sites based on the distance each is located from the alignments and the type of contamination.

Five hazardous waste generators are located in the study area; however none are located in close enough proximity to any of the alignments to warrant further consideration of impact.

Contaminant plumes resulting from leaking underground storage tanks (LUSTs) are relatively small and expected to be approximately 150 m (500 ft) long by 75 m (250 ft) wide based on the type and volume of releases noted, low permeability of soils and sediments within the study area and the resulting low ground water flow and contaminant migration velocities. No known LUST sites occur within 150 m (500 ft) of the proposed beltway alignments; therefore, no potential impact sites are identified.

The UST list was also searched for sites within approximately 150 m (500 ft) of linear features which currently have underground tanks installed, but, have not reported any releases from the tanks. Potential plumes from these sites would be of similar type and size as those noted at known LUST sites. Two UST sites are located at the intersection of US 77 and Saltillo Road.

Seventeen surface spills were identified in the study area. These spill have occurred from above ground storage tanks, pipelines, fixed facilities, and motor vehicles. In some cases, insufficient information is included in the regulatory database to determine the exact location and extent of the spill, therefore, these spills are assumed to occur in the study area. Eleven of the 17 spills are identified as potential impact sites and occur in seven locations along the beltway alignments.

Two major above ground petroleum storage facilities with petroleum pipelines are located near the intersection of US 77 and Saltillo Road. Releases from these facilities could result in more extensive surface contamination due to the volume stored, absence of spill prevention measures in the past and length of operation. Both of these sites have had releases from the tanks or other portions of the facility and are included in the surface spill list.

Another potential environmental risk site occurring in the study area is the United States Department of Agricultural (USDA) grain storage facility in Cheney. This site has not been identified by the NDEQ or EPA as a potential hazardous waste site; however, past activities at similar facilities included the use of hazardous substances (grain fumigants) which have since contaminated surface soils, subsurface sediments and ground water in the vicinity of these type of facilities. This site is located approximately 1.6 km (1 mi) west of the EC-1 alignment. Contaminated surface soils and subsurface sediments could be expected near the facility and contaminated ground water could be expected at distance from the site.

In addition, impacts from unreported releases, unregistered facilities and facilities with insufficient location information are unable to be assessed. The potential does occur that these sites may exist along the project alternatives. Due to the rural setting of the majority of the project, contaminated media may also be encountered in areas impacted by unreported releases, in particular from unregistered tanks at farm operations that do not appear on regulatory agency lists, and from undocumented rural landfills.

Prior to right-of-way acquisition, Phase I and Phase II environmental evaluations may be conducted for improved properties (with structures) to determine site-specific operational histories, historical land use, and potential waste streams during demolition.

3.24.2 Impacts of the Four Finalist Alternatives

The total number of environmental risk sites with potential to be impacted by the beltway alternatives are summarized in **Table 3.25.** Descriptions of the individual facilities are discussed under each alternative.

SM-4 Alternative. Two underground tank facilities are located at the intersection of US 77 and Saltillo Road. These are Major Oil Company (SMF #4708) and Shoemaker's Truck Stop South (SFM #11650) located on the southeast corner and the northeast corner of this intersection, respectively. Each facility appears on the UST list and not on the LUST list indicating that no release from the underground tanks has been documented to date. However, since these sites still have underground tanks installed, there is a potential that a release has occurred and not been noted. The risk of exposure to potential contamination from these sites would be higher with excavation below approximately 3 m (10 ft) below ground level. Minimal risk of exposure would be expected with shallower excavation activities.

Table 3.25

NUMBER OF RECORDED ENVIRONMENTAL RISK SITES WITH POTENTIAL FOR BELTWAY IMPACTS

ENVIRONMENTAL RISK SITES IN REGULATORY RECORDS	ALTERNATIVE			
	SM-4	EC-1	EM-1	EF-1
NPL	0	0	0	0
CERCLIS	0	0	0	0
RCRIS	0	0	0	0
UST	2	0	0	0
LUST	0	0	0	0
Surface Spills	7	4	4	4
TOTAL	9	4	4	4

Major Oil Company is the only business relocation required on any of the beltway alternatives. Regulatory records indicate that underground storage tanks are installed at the site and no release of petroleum products has been documented at this site. However, the NDEQ has documented thousands of releases from underground storage tanks in the State of Nebraska. Upon taking the business, State regulations require that the underground storage tanks be removed and a soil assessment completed to determine if a release has occurred. There is a potential that when the underground storage tanks are removed, petroleum contamination may be encountered. It would be the responsibility of the tank owner/operator to notify state and local authorities regarding the contamination. In the event that petroleum contamination is encountered during construction, removal and on-site treatment mitigation measures may need to be addressed as discussed in **Section 3.24.3.**

Seven spills have occurred at or near the intersection of US 77 and Saltillo Road. Information in the regulatory database is insufficient to determine the exact location of some of the spills. Information on these spills are summarized in **Table 3.26.** Surface and subsurface soil and ground water contamination would be expected at these sites, and could be mitigated as described in **Section 3.24.3.**

EC-1, EM-1 and EF-1 Alternatives. Four surface spills have occurred along I-80 and US 6 in the vicinity of the proposed east beltway interchange. Since all of the east beltway alternatives join I-80 at the same location, the potential impacts for each east alternative are the same. These spills are summarized in **Table 3.27.** Surface contamination would be expected and could be mitigated by removal and disposal at a licensed landfill as described in **Section 3.24.3.**

Table 3.26

POTENTIAL SURFACE SPILL SITES ON SM-4

FACILITY NAME	FACILITY ADDRESS	NDEQ FILE NO.	STATUS
Conoco, Inc.	South 14th Street and Saltillo Road	062691-RF-1445	No Further Action (NFA)
Williams Pipeline	2000 Saltillo Road	02278-K-0216	Unknown
	11200 South 14th Street	06139-CAB-1545	Unknown
	11200 South 14th Street	04028-H-1245	Unknown
	2000 Saltillo Road	042792-KM-1640	NFA
	2000 Saltillo Road	06028-M-1900	Unknown
AF Agromony	Hwy 77 & Saltillo Road	051194-DT-1045	NFA

Table 3.27

POTENTIAL SURFACE SPILL SITES ALONG EC-1, EM-1 AND EF-1

FACILITY NAME	FACILITY ADDRESS	NDEQ FILE NO.	STATUS
Pavers, Inc.	12303 US 6	060797-KM-1420	Suspended
	12303 US 6	061797-KM-1420	Unknown
Interstate 80	Mile marker 410 Eastbound	060491-KM-1830	NFA
	US 6 & I-80 Interchange	082598-DB-1620	NFA

3.24.3 Proposed Mitigation

Contaminated media encountered in the project area could include contaminated soil and/or sediment and ground water. Mitigation measures include avoidance, removal of the contaminated media or on-site treatment. Selection of an appropriate mitigation strategy will depend on the type and concentration of the contaminant and the type and quantity of media contaminated. Contaminated media may be encountered in or near areas of identified releases.

Avoidance. If possible, contamination should be avoided by realignment of the beltway feature. This approach is difficult because the contamination occurs in the subsurface and the surface extent is typically uncertain. Furthermore, right-of-way acquisition may preclude realignment.

Removal. Contaminated soil and sediment may be removed and managed off-site in accordance with requirements of the State of Nebraska for special waste or hazardous waste. If contaminated soil meets the classification of a special waste then the most common management option involves disposal at a licensed Subtitle D landfill in accordance with NDEQ Title 132. If contaminated soil is classified as a hazardous waste, disposal must be at a licensed hazardous waste disposal site in accordance with NDEQ Title 128.

On-Site Treatment. Contaminated water generated from any de-watering activities may require treating prior to discharge. Cost of treatment would vary depending on the type and concentration of contaminant, receiving waterway, volume of discharge and treatment system required. Permits issued by NDEQ may be required for this option for water discharges in accordance with NDEQ Title 119 and contaminant emissions to ambient air in accordance with NDEQ Title 129.

3.24.4 No Build Alternative

The no build alternative will have no impact to existing environmental risk sites and would avoid the expenses of any mitigation measures, other than those required for construction of the proposed future roadway network improvements.

3.25 VISUAL AESTHETICS

3.25.1 Existing Conditions

Visually, the project area is characterized by rolling hills and an agricultural landscape. Narrow strips of woodlands occur along the stream courses which break up the typical scenery of large fields of row crops. Existing farm ponds dot the drainages between the hills. This rural landscape is regularly dissected by a grid of paved and unpaved section line roads spaced at 1.6 km (1 mi) intervals in both directions. Portions of the project area are characterized by suburban residential acreage residences.

3.25.2 Impacts of the Four Finalist Alternatives

The beltway will introduce a linear freeway facility into a rural landscape, including associated bridges, overpasses and interchanges. Although the size of a freeway facility is out-of-character for the beltway study area, the visual effect of an additional linear roadway is not greatly different than that of the existing grid system of section line roads except for those residences in close proximity to the beltway. For these residences, the visual isolation of the existing landscape will be replaced with a view of a 4-lane freeway facility, not unlike US 77 through the south beltway study area.

To estimate the potential visual impact of each alternative, a determination was made of the number of residences within 0.4 km (0.25 mi) of the beltway right-of-way (**Table 3.28**).

Table 3.28

NUMBER OF RESIDENCES AND BUSINESSES WITHIN 0.4 km (0.25 MI) OF BELTWAY ALTERNATIVES

	ALTERNATIVE			
	SM-4	EC-1	EM-1	EF-1
RESIDENCES	27	58	31	41

3.25.3 Proposed Mitigation

Public concern has been increasing for Lincoln's major transportation corridors. This was recently observed in the adoption of a new 'Boulevard' concept for future Public Way Corridors to create a positive physical image for the community along the mile-line section roadways within Lincoln's future urban area. The Boulevard concept is a 37 m (120-ft) multiple-use corridor which expands to 40 m (130 ft) at mile-line intersections and allows for landscaping, open space, pedestrians, and cyclists, while accommodating utilities and the addition of future traffic lanes. There is an opportunity to apply a similarly 'green' concept to the beltway corridor. Accommodating landscaping and open space would have a clear benefit to adjacent properties, but is likely to require the acquisition of additional right-of-way or easements and will need to be weighed against the additional loss of private property

As part of final design, consideration will be given to visual impacts on residential properties. Measures to screen the road from the residence will be evaluated including landscaping, berming and fencing which can be accomplished within the road right-of-way or on additional road right-of-way acquired for this purpose.

3.25.4 No Build Alternative

The no build alternative will have no impact on visual aesthetic, other than paving and or widening proposed future roadway network improvements in the 1 and 20 Year Program.

3.26 ENERGY

3.26.1 Methodology

The proposed project will affect energy usage by providing a new roadway for automobiles--which consume fossil fuels as an energy source. To compare energy impacts of the alternatives an analysis was made of fossil fuel consumption. The analysis involved a comparison of the finalist alternatives and the no build alternative. Typically, both direct and indirect energy consumption would be calculated for a transportation system. The direct energy consumption includes the amount of energy consumed by vehicles operating on the roadway network, and was calculated by multiplying the total vehicle kilometers (miles) traveled within the County by the energy consumption rate per vehicle. Indirect energy requirements, which are not quantified in this analysis, include construction and maintenance of roadways, and are dependent on such factors as roadway length, pavement type, number of bridges, etc.

The direct energy analysis compares the anticipated direct energy consumption level between the finalist alternatives and the no build alternative for long-range planning conditions. The direct energy consumption figures have been calculated using speed sensitive formulae developed by FHWA (1981). The analysis also makes an allowance for anticipated improvements in vehicle fuel efficiency, and assumes that the fleet would consume 23.8 percent less fuel per kilometer traveled than vehicles operating presently.

3.26.2 Impacts of the Four Finalist Alternatives

Table 3.29 shows the anticipated annual vehicle kilometers traveled (vehicle miles traveled (VMT)), average 24-hour travel speeds, and fuel consumption for the finalist alternatives and no build alternative. Annual vehicle kilometers (miles) traveled would be minimally higher (4.5 to 5.8 percent) with the beltway alternative versus the no build alternative. At the same time, average travel speeds would be 0.6 to 0.8 km/h (0.4 to 0.5 mph) faster, or 1.4 to 1.9 percent faster. This increase in travel speeds would enable vehicles to operate in a more fuel efficient environment, with savings derived from these conditions offsetting the fuel required to support the minimal increase in the vehicle kilometers traveled (VMT). Direct energy consumption under the finalist alternatives is approximately 6,412,000 to 6,494,000 billion barrels (bbl) of oil, representing a 4.5 to 5.6 percent decrease over the no build alternative. Therefore, energy consumption with the beltway alternatives is considered a small improvement over the no build conditions.

Table 3.29

ENERGY ANALYSIS

ALTERNATIVE	ANNUAL VEHICLE km (mi) TRAVELED (millions)	AVERAGE TRAVEL SPEED km/h (mph)	TOTAL GASOLINE liters (gallons) (millions)	TOTAL DIESEL liters (gallons) (millions)	TOTAL ANNUAL BTU's (billions)	TOTAL ANNUAL BBL
SM-4 / EC-1	10.23 (6.356)	43.8 (27.2)	950 (251)	68 (18)	35,100	6,412,000
SM-4 / EM-1	10.29 (6.392)	43.6 (27.1)	958 (253)	68 (18)	35,300	6,449,000
SM-4 / EF-1	10.36 (6.437)	43.6 (27.1)	965 (255)	68 (18)	35,600	6,494,000
No Build	10.82 (6.726)	43.0 (26.7)	1007 (266)	72 (19)	37,100	6,787,000

A beltway alternative would also require a one-time non-recoverable expenditure of energy for the construction of the roadway. However, this expenditure would be compensated for over time by the ongoing annual savings in direct energy requirements. Also, none of the energy resources to be used during construction are in short supply, and no unusual demands on energy supply would result from constructing the beltway.

All of the beltway alternatives would require similar energy consumption for construction and operation of a roadway facility, in comparison to the no build alternative which requires no additional expenditure of energy, other than that required for construction of the proposed future roadway network improvements. However, post-construction operational requirements will be less with the more efficient beltway (freeway) alternatives as opposed to the no build alternative. Savings in operational energy requirements would more than offset construction energy requirements and thus, in the long-term, result in a net savings in energy usage.

3.26.3 Proposed Mitigation

No mitigation is proposed since energy consumption with the beltway alternatives is less than that with the no build alternative.

3.26.4 No Build Alternative

Regional travel increases and proposed future roadway network improvements are included in the no build alternative resulting in an overall increase in future travel speeds. Annual vehicle kilometers traveled (VMT) in the County is forecast to be approximately 10,824,000 kilometers (6,726,000 miles). Vehicles operating within the County are expected to consume approximately 6,600 bbl of oil which is more than with any of the beltway alternatives.

3.27 CONSTRUCTION IMPACTS

3.27.1 Existing Conditions

All of the beltway alternatives would be constructed along new right-of-way located within rural areas.

3.27.2 Impacts of the Four Finalist Alternatives

Primary construction impacts would include:

- Detours and access impacts to adjacent properties,
- Increased dust generation from earth moving activities,
- Increased erosion and sedimentation in waterways from earth moving activities, and
- Increased noise from construction equipment.

All of these impacts are considered temporary and mitigatable.

3.27.3 Proposed Mitigation

Provision of Access. In general, detours and access to adjacent properties will only be required when construction crosses existing streets or driveways. Because most of the project will be along new corridors, access problems should be minimal with the exceptions of the major interchanges at US 77, N-2, US 34, I-80 and US 6. For minor intersections, motorists will be rerouted to nearby parallel streets. Delay would be minimized and adequate signage provided. For the major intersections, construction phasing plans will be prepared to address traffic handling operations. Private landowners will be provided access to their property at all times.

Dust Supression. If objectionable dust levels occur, dust can be controlled by timely applications of water and temporary seeding to the construction areas.

Erosion and Sedimentation Control. Mitigation measures for construction-related erosion and sedimentation control will include dikes, dams, sediment basins, fiber mats, temporary and permanent seeding, straw mulch, plastic liners, slope drains, and other devices which would intercept and trap transported sediments during construction.

Noise Controls. Construction noise levels are typically a function of the scale of the project, the phase of construction, the condition of the equipment and its operating cycles, and the number of construction equipment units operating simultaneously. Measures that may be employed to reduce objectionable construction noise include designating haul routes away from sensitive receptors, controlling noise at the source, and limiting construction activities to certain hours of the day.

3.27.4 No Build Alternative

The no build alternative will require similar mitigation for construction of the proposed future roadway network improvements.

3.28 PERMITS

Table 3.30 includes a list of permits that will be required for the beltway project. No other permits are known at this time. A no build scenario would likely require similar permits for construction of the proposed future roadway network improvements.

Table 3.30

LIST OF REQUIRED PERMITS

PERMIT	ISSUING AGENCY	REASON
Interchange Justification	Federal Highway Adminstration	Required for a new interchange on the interstate highway system
Section 404 Permit	U.S. Army Corps of Engineers	Required for dredge or fill activities in wetlands or waters of the United States.
Section 401 Water Quality Certification	Nebraska Department of Environmental Quality	Required as part of Section 404 permit process
National Pollution Discharge Elimination System (NPDES) Permit	Nebraska Department of Environmental Quality	Required for construction sites greater than 2 ha (5 ac) in size.
Flood Plain Development Permit	Lancaster County	Required for construction within 100-year floodplain.

3.29 RELATIONSHIP OF LOCAL SHORT-TERM USES VS. LONG-TERM PRODUCTIVITY

The short-term use of resources to construct the beltway are necessary for the long-term benefits related to the transportation improvements described in **Section 3.3.** These improvements are based on the adopted *Lincoln/Lancaster County Comprehensive Plan* which considers the need for present and future traffic requirements within the context of present and future land uses. Therefore, local short-term use of resources for the beltway project is consistent with the maintenance and enhancement of long-term productivity for the local area and regional transportation network.

3.30 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction of the beltway involves commitment of a range of natural, physical, human and fiscal resources. These include land, fossil fuels, labor and construction materials.

Land is not considered an irreversible commitment of resources. If a greater need arises for use of the land or if the improvements are no longer needed, land can be converted to another use if considered appropriate and consistent with the *Lincoln/Lancaster County Comprehensive Plan*. At present, there is no reason to believe such a conversion would ever be necessary given the amount of forethought invested in the beltway planning process.

Resources irretrievably committed to the project will consist primarily of construction materials, fuel and related labor. However, they are not in short supply and their use would not have an adverse effect on the continued availability of these resources in the future. Construction activities would also require a substantial one-time expenditure of Federal and State funds which are not retrievable.

Natural resources such as soil, water, air, vegetation and wildlife will be disrupted or utilized but not in an irreversible manner.

The commitment of these resources is based on the idea that residents of Lincoln and Lancaster County, as well as travelers through the region, would benefit by improving the quality of the transportation system. These improvements include improved traffic conditions, time of travel, and safety. These benefits outweigh the commitment of resources.

3.31 SECONDARY AND CUMULATIVE IMPACTS

In compliance with NEPA and the Council on Environmental Quality (CEQ) regulations, secondary and cumulative effects of a project should be examined as part of the Environmental Impact Statement review. CEQ defines secondary (or indirect) effects as:

> "effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water on other natural systems, including ecosystems." (40 CFR 1508.8(b))

CEQ defines cumulative impact as:

> "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time." (40 CFR 1508.7)

While the DEIS included a discussion of secondary and cumulative impacts, several concerns were raised during the public comment period requiring an expanded evaluation in the FEIS. The revised secondary and cumulative impacts evaluation is included in **Section 9.6**

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Chapter 4
COMPARISON OF ALTERNATIVES

4. COMPARISON OF THE FINALIST ALTERNATIVES AND SELECTION OF THE PREFERRED ALTERNATIVE

Comparison of the Finalist Alternatives. A comparison of project benefits and impacts is summarized in **Table 4.1.** The table includes data generated during the Level IV analysis, the most detailed evaluation of the alternatives. Comparison of the beltway alternatives indicates that all of the alternatives, except the no build alternative, are feasible solutions that will serve the project purpose and need to complete the circumferential transportation network around Lincoln, to move through traffic around Lincoln's congested urban area, and to improve traffic flow on the existing urban street system. Additionally, all of the end-to-end beltway alternatives are cost-effective based on an analysis of time savings from the BOS II model (**Section 2.4.5**).

The location of the east beltway in terms of the close, mid or far corridors does not seem to have a significant effect on the amount of traffic it is expected to carry or the benefits obtained. The east beltway provides relief to traffic coming into or through Lincoln from the northeast (Omaha) and the southeast (Nebraska City). This traffic will use the east beltway regardless of which corridor is selected. The major differences between the east corridors involve the interchanges at I-80, N-2 and the south beltway. The close and far corridors require significant diagonal routing to connect to an interchange at I-80, and both require two separate interchanges at N-2 and the south beltway. In comparison, the mid corridor requires a single but more complicated interchange at N-2 and the south beltway. These differences are best reflected in the construction cost estimates and right-of-way impacts; however, they have little effect on system performance.

Comparison of the project impacts indicates that all of the alternatives have relatively low impact considering the length of the segments. This is due to the primarily rural setting and the great effort made to minimize impacts throughout the beltway planning process. However, all of the east routes have impacts to Section 4(f) resources.

Overall differences between the east alternatives are relatively minor. EC-1 and EF-1 have greater right-of-way requirements than EM-1; and therefore, have greater land use impacts. EC-1 has slightly more impact to suburban type land uses such as residential and commercial acreage and impacts to trails due to its closer proximity to Lincoln; whereas EF-1, which is 4.0 km (2.5 mi) more distant than EC-1, has slightly more impact to rural uses such as farmland, prairie, historic structures, and actual number of residences. EM-1 and EC-1 have slightly more impact to natural resources such as streams, floodplains and floodways, and wetlands due to their closer proximity to Stevens Creek, where as EF-1 has slightly less impact to natural resources due to its general location along the ridgeline.

Although all of the alternatives meet the project purpose and need, obviously, there are benefits and trade-offs with any of the three east alternatives. A few noteworthy differences in impacts between the routes are:

Table 4.1

LEVEL IV: SUMMARY OF BELTWAY BENEFITS AND IMPACTS

IMPACTS	UNITS	ALTERNATIVES			
		SM-4	EC-1	EM-1	EF-1
TRANSPORTATION BENEFITS (End to End Beltway Analysis: South and East Combined)					
Total Daily Beltway Usage	Vehicle Kilometers (Miles) Traveled	--	762 800 (474,000)	721 000 (448,000)	696 800 433,000
Average Daily Time Savings	Hours	--	9,400	10,250	8,450
Average Annual Accident Savings[1]	$	--	$8,691,000	$7,430,000	$4,712,000
ECONOMIC IMPACTS					
Construction Cost (partial beltway)	$ (1996)	$107,000,000	$147,000,000	$157,000,000	$128,000,000
Construction Cost (end-to-end beltway with SM-4)	$ (1996)	--	$249,000,000	$252,000,000	$231,000,000
Payoff Period[2] (end-to-end beltway with SM-4)	Years	-	14	13	19
Cost Effectiveness	Payoff Period less than Design Life of Project	--	Yes	Yes	Yes
SOCIOECONOMIC IMPACTS					
Total Right-of-Way	ha (ac)	295 (730)	451 (1114)	389 (960)	449 (1110)
Residential Relocations	No. of houses	3	7	4	7
Business Relocations	No. of businesses	1	0	0	1
Railroad Crossings[3]	No. of crossings	3	2	0	0
Airfield Impacts	Impacts	none	none	none	none
Cropland Impacts	ha (ac)	206 (508)	296 (731)	282 (698)	316 (780)
Total Farmland Impacts	ha (ac)	238 (587)	367 (906)	329 (813)	375 (926)
Prime and Unique Farmland Impacts (end-to-end beltway with SM-4)	Impact Rating Points (0-260)	--	140 (minor)	143.5 (minor)	142 (minor)
Estimate of Bisected Farms	No. of owners	16	33	29	23
LAND USE IMPACTS					
Distance from 2000 City Limit	km (mi)	0.8-2.4 (0.5-1.5)	0.8-3.2 (0.5-2.0)	2.4-4.8 (1.5-3.0)	2.4-6.4 (1.5-4.0)
Residential Impact	ha (ac)	9.5 (23.4)	12.3 (30.3)	4.0 (10.0)	7.8 (19.3)
Commercial/Industrial Impact	ha (ac)	4.2 (10.3)	1.6 (3.9)	0.6 (1.4)	1.1 (2.7)
Trail Impacts	No. of crossings ha (ac)	0 0	2 0.6 (1.5)	1 0.3 (0.8)	1 0.3 (0.7)
Modification of Proposed LPSNRD Farm Ponds	No. of ponds	0	2	1	2

IMPACTS	UNITS	ALTERNATIVES			
		SM-4	EC-1	EM-1	EF-1
ENVIRONMENTAL IMPACTS					
Air Quality	NAAQS impacts	no impact	no impact	no impact	no impact
Noise[4]	No. of impacted receptors[4]	4	9	5	7
Water Quality	Impacts	minor and temporary	minor and temporary	minor and temporary	minor and temporary
Major Stream Crossings	No. of crossings	2	2	1	0
Total Streams	No. of crossings	8	9	6	4
100-Year Floodplains	No. of crossings	4	4	6	5
Floodways	No. of crossings	0	2	1	0
Wetlands	ha (ac)	7.3 (18.0)	16.9 (41.8)	8.9 (21.9)	8.3 (20.4)
Prairie Grasslands	ha (ac)	0	0.4 (1.1)	1.3 (3.2)	2.7 (6.6)
Endangered & Threatened Species	Impacts	none	none	none	none
NRHP Archeological Sites Adversely Affected under Section 106	No. of sites	0	1	0	0
NRHP Standing Structures Adversely Affected under Section 106	No. of sites	1	0	1	3
Section 4(f) Impacts-Recreation	No. of resources	0	2	1	1
Section 4(f) Impacts-Historic	No. of sites	0	0	1	1
Potential Environmental Risk Sites	No. sites along route	9	4	4	4
Visual Impacts to Residences	No. w/in 0.4 km (0.25 mi)	27	58	31	41

[1] Average Annual Accident Savings is based on end-to-end beltway analyses performed with the BOS land use plan. The BOS II land use plan is expected to provide even greater accident cost savings.

[2] An analysis of the time savings with the BOS II model comparing the end-to-end beltway alternatives and no build alternative indicates the investment to construct the beltway would be paid off through time savings in 13 to 19 years **(Section 2.4.5)**,. The conclusions of this comparison are that all end-to-end beltway alternatives for all the east alignments are economically feasible.

[3] If SM-4 and EC-1 are constructed, two crossings of the OPPD line will be required. EC-1 alone does not require any railroad crossing.

[4] These are receptors for which noise abatement measures were not considered reasonable.

1. For EC-1, *noise and visual impacts* to nearby residences are greater than with other alternatives because it extends across a more developed landscape closer to the city.

2. For EF-1, impacts to *historic structures* are greater due to the greater presence of resources with increasing distance from the city and urbanization.

3. The *higher costs* of EC-1 and EM-1 compared to EF-1 are due to the major bridge structure at Stevens Creek. However, all of the costs are within 8 percent of each other for the end-to-end beltways, and within 14 percent for the stand alone east beltway alternatives. This is within the 20 percent contingency contained in all cost estimates.

4. The diagonal crossing at the north end of EC-1 creates a less desirable *circuitous route* (with backtracking for westbound traffic).

5. The EC-1 connection at N-2 and the south beltway requires two interchanges which creates an undesirable triangle of land and *access problems* for several residences.

6. There are *cost savings* with the SM-4/EM-1 end-to-end beltway due to the common interchange at N-2. This savings partially offsets the cost of a longer bridge over Stevens Creek.

Selection of the Preferred Alternative. Following receipt and consideration of comments on the Draft EIS, the SM-4/EM-1 alternative was selected as the preferred alternative.

SM-4 was selected because:

1. Transportation Functions. A south beltway would aid in completing a circumferential roadway in the Lincoln area. The route is within 0.8 km (0.5 mi) of the future service limit and would reduce the amount of through traffic that otherwise would be on N-2. The route has potential as a multi-use corridor for future trails, open space, utilities and other transportation alternatives.

2. Environmental Impact. SM-4 minimizes impact on natural resources in that it has relatively little impact on wetlands, no impact on native prairie, does not cross the existing boundaries of Wilderness Park, and could be built in a manner to minimize the floodplain impact on Salt Creek. While the route does impact some homes and businesses, these impacts have been minimized to the extent possible.

EM-1 was considered the best east alternative compared to EC-1 and EF-1 because:

1. Transportation Functions. The EM-1 route would aid in completing a circumferential roadway and provide a new truck route without the less efficient "backtracking" found in the EC-1 and EF-1 options.

2. Environmental Impacts. EM-1 minimizes environmental impacts to those resources that are considered most valuable by the local community. In comparison to EC-1, the EM-1 route minimizes impacts to rural and urban neighborhoods, including noise and visual impacts to residences. It also has the least number of relocations of any

of the east alternatives. While EM-1 and EF-1 are similar in environmental impact, EM-1 minimizes impacts to historic properties. At the same time, EM-1 has less impact to prairies (versus EF-1), relatively low impact to wetlands (versus EC-1), and requires 150 ac less in right-of-way than the other alternatives. While the EM-1 crossing of Stevens Creek is the longest of the three east alternatives, it could be built to minimize impacts to the floodplain. In consideration of these resources, the EM-1 route protects and preserves the environment to the greatest extent, and is considered the most compatible with the goals, objectives and values of *Lincoln/Lancaster County Comprehensive Plan*.

3. Multi-Use Corridor Potential. The EM-1 route has the greatest potential as a multi-use corridor for trails, open space, utilities and other transportation alternatives. It could be integrated well with a possible trail in Stevens Creek and then tie into possible trails along the South Beltway route to Wilderness Park trails. The potential as an open space corridor is high given that its is within 0.8 km (0.5 mi) of Stevens Creek for over a 10-km (6-mi) stretch. EM-1 also parallels an existing LES transmission line with a 46 m (150-ft) easement which would allow some overlap of a joint utility and road corridor for over 13 km (8 mi).

4. Travel Time. EM-1 has greater travel savings than EF-1.

5. Cost. While EM-1 is more expensive than EF-1 or EC-1, EM-1 may provide future cost savings as a multi-use corridor, and it uses less land than the other two routes.

The selection of the preferred alternative was unanimously approved on 15 June 2001 by the Beltway Management Committee representing the four project sponsors–the City of Lincoln, Lancaster County, NDOR and FHWA.

Local Preference Decision. The SM-4 and EM-1 alternatives were approved by the Lincoln City Council and the Lancaster County Board of Supervisors, in separate actions, on 22 August 2001 for amendment to the *Lincoln/Lancaster Comprehensive Plan*. With the Mayor of Lincoln's signature on 30 August 2001, the alternatives were officially adopted into the plan.

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Chapter 5
REFERENCES

5. REFERENCES

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Chapter 6
AGENCY AND PUBLIC INVOLVEMENT

6. AGENCY AND PUBLIC INVOLVEMENT

Due to the significance of the South and East Beltways Study, the project sponsors decided at the project onset that anyone and everyone should be given ample opportunity to participate in the study planning process. Toward this end an extensive Public Participation Program (PPP) was developed with input from the consultant team, study sponsors and the general public *(Interim Report 1*, WSA, 1996). The program included the following committees and activities.

- Management Committee
- Technical Advisory Committee
- Citizens Advisory Committee
- Newsletters/Landowner Notifications
- Telephone Hotline
- Agency Scoping Meeting
- Partnering Workshop
- Public Information Meetings
- Presentations to Elected Officials
- Small Group Workshops/Meetings
- Meetings with Individual Landowners
- Media Relations
- Correspondence
- Consultant Availability
- Merge Agency Review
- Public Hearing

As the study progressed, each element of the program was implemented and additional elements were added, including the establishment of a Beltway telephone hotline as an additional public forum for comments and questions. Weekly progress meetings between the study team and sponsoring agencies were conducted during critical periods of the study.

Throughout the course of the South and East Beltways Study the level of interest and concern on the part of the public has been quite high as evidenced by the letters, phone calls and other inquiries received during the course of the study. The PPP has proven to be an effective way of informing the public and receiving information to be used for the conduct of the study. The process provided the consultant team with valuable information as they formulated recommendations.

6.1 MANAGEMENT COMMITTEE

The Management Committee gives direction to the consulting team on key matters. It is made up of representatives of the study sponsors:

- City of Lincoln
- Lancaster County
- Nebraska Department of Roads
- Federal Highway Administration

The Management Committee met 23 times during the beltway study. The Management Committee received input and advice from both the Technical Advisory Committee, made up of technical staff from several local, state and national agencies, and the Citizens Advisory Committee, made up of a diverse cross section of individuals representing the entire City of Lincoln. Occasionally, these committees met on the same day to facilitate the flow of information and coordination.

6.2 TECHNICAL ADVISORY COMMITTEE

The Technical Committee included local, state, and federal agency representatives who bring technical expertise to the study. These individuals reviewed the work of the consultants, guided the study, and advised the Management Committee. This committee met on six occasions during the beltway study. Members of this group also attended many other meetings of the beltway study. Agencies included were:

- City of Lincoln Public Works Department
- Lancaster County Engineers Office
- Lincoln-Lancaster County Planning Department
- Lincoln Chamber of Commerce
- Lower Platte South Natural Resources District
- Nebraska Department of Roads
- Nebraska Game and Parks Commission
- Nebraska Department of Environmental Quality
- Nebraska State Historical Society
- Federal Highway Administration
- Federal Transit Authority
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency

6.3 CITIZENS ADVISORY COMMITTEE

This committee comprised a cross-section of individuals from within and outside the study area who reflected a diverse, yet balanced, set of perspectives. The committee provided the study sponsors and consultants with a community-based "sounding board". This committee met 13 times during the beltway study.

6.4 NEWSLETTERS / LANDOWNER NOTIFICATIONS

Five Beltway Newsletters were published and distributed to all persons on the beltway mailing list throughout the course of the study. Additional written communication occurred via press releases and articles that appeared in area newspapers.

6.5 BELTWAY HOTLINE

A telephone hotline was set up and advertised for use by anyone wishing to ask questions, make comments, or request information. The hotline received over 350 calls. All questions received a call-back to try to answer their question. All requested information was provided, if available. All comments were catalogued and forwarded to appropriate study team members for use in the beltway evaluations.

6.6 AGENCY SCOPING MEETING

An interagency scoping meeting and bus tour of the study area was conducted on 11 October 1995. The purpose of the meeting was to present the project and solicit input and concerns. The meeting was attended by 36 representatives of local, state and federal agencies; railroads; utilities; and the project sponsors and consultants (WSA, Interim Report 1, 1996). A summary of the meeting is included in **Appendix A**.

6.7 PARTNERING WORKSHOP

A Partnering Workshop was conducted on 12 and 13 December 1995 for orientation of the three committees. This two-day session included discussion of the beltway study progress, decision making roles, advisory roles, approval process, and public participation objectives. Exercises were also conducted to identify constraints, potential corridors and evaluation criteria. Input on all study matters were received by the project team.

6.8 PUBLIC INFORMATION MEETINGS

Public meetings were held at key milestones in the Studies to provide a forum for the dissemination of information to all interested citizens. These meetings and other forms of public participation were instrumental in receiving input and feedback from interested parties. Meetings were held on:

- 2 November 1995
- 18 April 1996
- 19 June 1997
- 27 March 2001
- 12 February 2002

2 November 1995. This meeting was designed to introduce the public to the general purpose of the Studies and to begin receiving input on the alternatives screening process. The meeting was preceded by the first newsletter, which discussed: background information, study purposes, general options for consideration, public participation process, and the study committees. It invited the readers to subscribe to the newsletter mailing list and it gave specific information about the location, date, and time of the upcoming public meeting.

The meeting was an open house format that allowed participants to circulate between tables that had information about the Studies. Display tables included: (1) a slide show of the study area, (2) the history of defining the problems/needs, (3) the study overview (goals, processes, timelines), (4) locations of key features in the study area, (5) evaluation criteria, (6) corridor maps (aerial photographs), and (7) public involvement opportunities. Attendees were encouraged to visit with City of Lincoln and Lancaster County representatives at the display tables. There were interactive opportunities for citizens to show their preference for or in opposition to any theoretical roadway. In addition, there were presentations by the Studies Team. Approximately 700 attended the meeting.

There were several major issues and concerns expressed at the meeting. These issues and how they were addressed or considered are as follows:

1. The south study area was too narrow and should be expanded.
   Following the meeting, the Comprehensive Plan was amended to expand the study area one mile further to the south (to 0.5 mile south of Bennet Road).

2. Concern was expressed that the study was not completed 30 years ago.

   It was explained that a study was completed 30 years ago (1971) and that the decision was made at that time not to proceed ahead.

3. Would landowners whose property was needed for a Beltway be compensated?

   The legal process for government acquisition of right-of-way was explained.

4. Will long-time farmers and landowners have priority over other land uses?

   It was explained that length of time as a landowner has no bearing on the selection process.

5. Why is a park (Wilderness Park) untouchable?

   It was explained that Wilderness Park was not untouchable, and several crossings and alternatives were still being considered.

A second newsletter was mailed in January 1996 to explain the continuing process. It discussed the need for Management, Technical, and Citizens Committees to evaluate alternative alignments over the next few months. It notified readers of a 24-hour Beltway Hot Line that could be accessed, and invited interested parties to mail in ideas, concerns, and opinions to the Studies Office.

A third newsletter was mailed in March 1996 to explain the Beltway Alignment Alternatives Recommended For Further Evaluation. It was reported that the Citizens Advisory Committee concurred with the consultants approach and that the Committee added new alignment options for consideration. The centerpiece of this newsletter was the four alternatives in the south area and the three alternatives in the east area that were recommended. This newsletter announced the next public meeting for 18 April 1996.

18 April 1996. This meeting was designed to review the Studies progress and the various project options. It was organized similar to the previous public meeting. Participants were encouraged to visit with City and County officials and to share ideas and opinions with the Studies Team. There were displays of the work completed to date and presentations by the Studies Team. Approximately 500 citizens attended the meeting.

There were several kinds of issues and concerns that were expressed at the meeting. These matters and how they were addressed or considered are discussed:

1. A large number of citizens expressed concern that they could be in the path of a beltway. Many said they felt "betrayed" by local government because they were allowed to build in the Studies area and should have been warned that a beltway might be built nearby. Many in attendance suggested routes that would be in locations further from their own properties. Some questioned whether a beltway was needed at all.

   In response, the consultants explained the process of continuing studies. It was noted that additional details would be needed such as travel demand from traffic models, preliminary cost estimates, and the environmental impacts of each option.

2. In addition, citizens asked that there be additional time at meetings for questions and answers in a full group setting. They requested more detail and information on cause and impacts. Another request was that maps be updated because of the constant change of new homes and residential subdivisions in the Studies area. The public wanted more information on traffic studies, and they wanted more information on the decision making process and who the decision makers would be.

   In response, the Studies Team and Management Committee reviewed the responses and re-evaluated the project resources.

3. The public and sponsoring agencies also stated at this point that they would prefer a more detailed study of non-beltway alternatives including the widening of some existing County roads.

   At this point, the Studies Team and sponsoring agencies began a process of evaluating the project scope. During the summer and fall of 1996, these discussions concluded that 1) greater citizen participation would be required, including the resources to meet that demand, and that 2) the study details would need to be greatly expanded to meet these needs. The culmination of these efforts was an expanded scope of services and extension of the Studies timelines.

A fourth newsletter was mailed in November 1996 for the purpose of explaining the status of the Studies at that point. It noted that surveys indicated an 87 percent approval rating of the public meeting format by those who had attended the previous meeting.

19 June 1997. This meeting was designed to bring new and more extensive data to the public. The fifth beltway newsletter preceded and announced the meeting. This step was the result of eight additional months of intensive study on key aspects of the project. The Studies Team presented three non-beltway options, four beltway corridors in the south area, and three beltway corridors in the east area. The studies included information on congestion/accident reduction, construction costs, socio-economics, land use, and environmental impacts as a means of evaluating the different options. There were an estimated 400 citizens in attendance.

The Studies Team recommended that one beltway alternative in the south area (SM-4) and two alternatives in the east (EC-1 and EM-1) be considered as finalist alignments for more detailed evaluation.

1. The reaction of the public intensified at this meeting and there were a number of challenges to the recommendations. Many in attendance questioned the need for a beltway, doubted the results of the traffic projections, complained about the land needed for beltways, questioned whether there would be a fair compensation for lost property, and expressed concerned about decreasing land values. Some disagreed with the recommendation to drop the easternmost alternative (EF-1)

   The Studies Team responded that much more detailed work would be needed to answer all the questions, and that they would work more closely with landowners as the more detailed work began.

Subsequent to the 19 June 1997 public meeting, the City Council, County Board, and Planning Commission met in joint session to consider the recommendations. This meeting was advertised to the public, but was not for public participation in the form of questions and answers. This joint session was held on 27 June 1997, and the planning and elected officials expressed a "local preference" to eliminate the EC-1 route and add the EF-1 route back into the studies. Also, they endorsed the SM-4 route for the continuing work.

It was determined and agreed by the sponsor agencies that all four alternative beltway routes (EC-1, EM-1, EF-1, SM-4) and the no build alternative should be evaluated as part of the Draft Environmental Impact Statement (DEIS). Extensive environmental studies were conducted by the Studies Team from August 1997 until March 2001 to address the issues that were raised by the public, private landowners, and sponsor agencies.

27 March 2001. This meeting was designed to present detailed environmental and planning information to the public concerning all the remaining alternatives. The publication and distribution of the Draft Environmental Impact Statement on 1 March 2001 preceded it. Also, the sixth newsletter was prepared and mailed to interested parties prior to this meeting. The newsletter summarized the additional information that was now available, noted the availability of the DEIS, and announced the planned public meeting.

The public meeting used the same basic format of previous such meetings. Members of the Beltways Study Team, including the project sponsors, consultants, and State Historic Preservation Office staff were available to meet with the public and answer questions. There were various displays and tables at which citizens could inquire about detailed information and talk with the experts that has prepared or reviewed the work to date. Displays and information tables included: historic resources/archeology, land acquisition specialists, traffic projections, cost estimates, alternative route maps, and a project video program. There were 375 interested parties that attended the 9-hour open house.

Prior to this public meeting, the sponsor agencies agreed that no specific recommendations for or against any particular alternative would be made. It was agreed that the Public Hearing on the DEIS and local government hearings to determine the local preference should be conducted prior to making recommendations. The Studies Team held a variety of discussions with individuals and small groups during the course of this public meeting. Hand out materials and displays gave information on the dates, time, and location of the Public Hearings on the DEIS.

Observations and expressions of public attitude and opinion at this meeting included the following:

1. A recurring theme that it was "time to get on with" making a decision

   The response was to inform citizens of the timetables for the DEIS Public Hearings and the local preference process.

2. There was very little concern expressed about the south beltway, while the east beltway drew most of the interest and concerns.

3. Residents along the path of alternative beltway routes expressed concern about the noise level impacts. Most felt that the noise would be excessive.

   The response was to explain the noise impact study methodology and the federal guidelines.

4. In general, those near any of the alternative routes expressed concern about being too close to that route.

   The response was to invite interested parties to give oral or written testimony at the DEIS Hearings.

12 February 2002. A public meeting on historic mitigation was conducted for property owners and consulting parties on 12 February 2002 (see **Section 9.5.9**). The meeting included an update on historic issues and review of the proposed mitigation plan developed for the two historic properties which are adversely affected by the preferred SM-4/EM-1 alternative. Prior to the meeting, property owners and consulting parties were mailed copies of the Draft Memorandum of Agreement and a draft version of Chapter 9 of this FEIS.

Approximately 24 people attended the meeting, including representatives of the ACHP, NTHP, SHPO and Preservation Association of Lincoln. Seven written comments were received over the 10-day comment period. Comments related to historic issues covered the following topics:

1. Two landowners on EM-1 objected to the revised boundary of the Stevens Creek Stock Farm as it included their properties. The boundary changes were made without their permission. One owner expressed concern that they would now be subject to federal permits or stipulations on receiving federal subsidies.

2. The owner of the non-historic log cabin residence (located on the additional NRHP-eligible parcel west of the Stevens Creek Stock Farm) expressed concern about noise impacts from EM-1.

3. The owner of the Henry Wunibald Farmyard expressed concern that their non-historic farmyard would be more adversely affected by noise impacts from SM-4 that the NRHP eligible property.

4. The FEIS should address the impacts on the Stevens Creek Stock Farm from additional traffic on 138th which is traveling from the EF-1 interchange on Pioneers Boulevard to Van Dorn Street.

5. Certain consulting parties felt that properties along all the routes should be studied for possible boundary changes.

6. The NTHP believes that the beltway will have the potential for cumulative and indirect effects on historic properties, and suitable mitigation strategies should be developed.

7. Certain consulting parties felt that the FEIS should contain a statement that the EF-1 alternative is eliminated from any future consideration. They did not feel that selection of EM-1 was strong enough assurance that the EF-1 route would never be reconsidered.

The MOA was finalized (**Appendix E**) based on comments from this meeting.

6.9 PRESENTATIONS AT CITY COUNCIL, COUNTY BOARD, COMMONS AND SUPERCOMMONS MEETINGS

The study team included elected officials from the community in the study process by presenting information and study findings at Supercommons Meetings. The Supercommons is made up of the Lincoln City Council, Lancaster County Board and the Lincoln/Lancaster County Planning Commission. All meetings of the Supercommons, Lincoln City Council and Lancaster County Board were advertised and open to the general public. Meetings of these bodies, where the beltway was on the agenda, were held on:

- August 1995 City Council and County Board
- 18 October 1995 Supercommons Meeting
- November 1996 City Council and County Board
- 21 February 1997 Supercommons Meeting
- 16 May 1997 Supercommons Meeting
- 16 June 1997 Pre-City Council Meeting
- 27 June 1997 Supercommons Meeting
- 15 August 1997 Supercommons Hearing
- 27 March 1998 Supercommons Meeting
- 16 October 1998 Supercommons Meeting
- 20 November 1998 Supercommons Meeting
- 15 December 1998 City Council and County Board
- 15 March 1999 City Council
- 30 March 1999 County Board
- 18 June 1999 Supercommons Meeting

6.10 GROUP BRIEFINGS WITH NEIGHBORHOODS AND OTHER SPECIAL INTEREST GROUPS

Neighborhood workshops and group briefings were also held at the request of many groups to provide the public with direct access to the consultant team in an informal setting. Several of these meetings were well attended and included extensive dialog between neighborhoods and the project management team. The larger meetings included:

- 10 December 1996 South Corridor Group (estimated 50 attending)
- 6 March 1997 South Beltway Group (estimated 25 attending)
- 12 May 1997 South Beltway Group (estimated 150 attending)
- 21 May 1997 Yankee Hill Group (estimated 60 attending)

- 10 June 1997 East Beltway Group (estimated 60 attending)
- 17 June 1997 East Beltway Group (estimated 200 attending)

Comments were summarized and forwarded to study team members for use in the beltway evaluations.

6.11 MEETINGS WITH INDIVIDUAL LANDOWNERS AND OTHER CONTACTS

During the beltway study, there were frequent informal contacts with individual landowners and other interested parties regarding beltway information. Comments were summarized and forwarded to study team members for use in the beltway evaluations.

6.12 MEDIA COVERAGE

From August 1995 through June 1999, there were 25 new articles in the *Lincoln Journal Star* regarding the beltway study progress. The *Waverly News* and *Hickman Village Voice* also provided newspaper coverage during this period. Lincoln television stations, Channels 10-11 (CBS) and Channel 8 (ABC), provided news coverage at most of the key public meetings. The study was also covered in radio interviews with local stations KFOR and KLIN.

6.13 CORRESPONDENCE

During the multi-year planning process, all comment letters received on the beltway study were considered, catalogued and forwarded to study team members for use in the beltway evaluations. Letters were sent to respond to all letters received during the study.

Comment letters received on the *Draft Assessment of Adverse Effects to NRHP and NRHP-Eligible Sites* have been addressed in the revised version of that document (**Appendix F**).

6.14 CONSULTANT AVAILABILITY

The most crucial element of the Public Participation Program was the availability of the consultants. Throughout the study, the consultant team received and responded to hundreds of calls and letters from citizens. In addition to this, the team met with many interested parties to discuss specific issues one-on-one.

During the beltway study, the consulting team attended over 275 documented meetings on the beltway project. In addition, the consultants received and answered hundreds of direct calls from interested citizens.

6.15 MERGE AGENCY REVIEW

Following the Nebraska Local Operating Procedures for Integrating NEPA/404, the Purpose and Need Statement for the beltway project EIS was reviewed by five agencies in June 1996. Concurrence was received from the US Army Corps of Engineers, US Environmental Protection Agency, US Fish and Wildlife Service, Nebraska Department of Environmental Quality and Nebraska Game and Parks Commission (**Appendix A**) indicating that the statement was satisfactory and the information provided was adequate to advance to the next stage of project development.

The same five agencies reviewed the Preliminary Draft Environmental Impact Statement (PDEIS, dated 13 November 2000) and concurred that it was satisfactory (**Appendix A**). Specific comments were received from the US Army Corps of Engineers and the US Environmental Protection Agency, and have been incorporated into this document.

US Army Corps of Engineers. A letter was received from the USACE Kearney Regulatory Office indicating that the findings of the wetland delineation were highly preliminary. The following three issues were raised.

ISSUE	RESOLUTION
1. Soils data was not provided for all locations.	Further coordination with the Corps indicated that the methodology used for the beltway wetland delineation was the same methodology used by the Corps for preliminary studies where the final design is not known (see **Appendix A,** email dated 19 December 2000 from Keith Tillotson to Amy Zlotsky). No resolution required.
2. Some locations were delineated from a distance as permission for access was denied.	Final wetland delineations will be conducted after right-of-way acquisition when all properties may be surveyed on-site.
3. Three of the sheets were incorrectly completed.	The three data forms with errors have been corrected.

US Environmental Protection Agency. The EPA raised four issues as described below.

ISSUE	RESOLUTION
1. Statements in the PDEIS will require endorsement by other federal and state agencies	Concurrence has been received from all five Merge agencies, including all agencies mentioned in the EPA letter. Other agencies will receive copies of the DEIS for review and comment.
2. The PDEIS implies that modeling or scientific study of TDM/TSM improvements had been performed, but no reference was given.	No additional investigations were conducted. The TDM/TSM text in the DEIS was summarized from *Interim Report Number 1* (WSA, 1996a) prepared by a firm with national expertise in transportation planning. References have been added to the text to indicate the source of the information.
3. Depending on the type of wetland impacted, mitigation ratios greater than 1:1 are sometimes preferred.	The text states that mitigation has been proposed at a minimum ratio of 1:1. This does not preclude the use of greater ratios.
4. They suggest simplifying and clarifying Table 4.1 for the Benefit Cost Ratio and Cost Effectiveness parameters.	These two parameters have been revised to aid in understanding.

Nebraska State Historic Preservation Office. In November 2000, the PDEIS was also reviewed by the Nebraska State Historic Preservation Office who concurred with the findings of the PDEIS and the findings of the appendices as they related to Section 106 consultation (**Appendix E**).

6.16 PUBLIC HEARING

The Public Hearing for the south and east beltways was conducted on 23 and 24 April 2001 for the purpose of receiving oral testimony on the DEIS. Morning, afternoon and evening sessions were available during the two-day hearing for the convenience of the public. Three hearing rooms were available, each with a hearing officer and court recorder, for taking oral testimony. Seating was available for those interesting in observing the testimony, including the news media. A public information room was open throughout the hearings to allow further opportunity to review the DEIS materials, including various reports and documents, exhibits of the beltway corridor locations, and handouts. Members of the Beltways Study Team, including the project sponsors, consultants, and State Historic Preservation Office staff were available to meet with the public and answer questions.

Notice for the Public Hearing was published in the *Lincoln Journal Star* on 9 and 15 April 2001, with two notices on each date. The notice was also published on 19 April 2001 in *The Voice*, a regional newspaper serving western Otoe, northern Gage and Lancaster Counties. A newspaper serving the Waverly community, *The News*, published a front page story about the hearing process in its 19 April 2001 edition. During the week of 9 April 2001, Public Hearing notices were mailed to approximately 1,100 citizens on the mailing list for the south and east beltways study area. In addition, other Lincoln news media, including KOLN/KGIN-TV, KLKN-TV, and KFOR Radio were active in covering the Public Hearings, and other beltway meetings.

The attendence at the hearings was relatively low, with 162 names on the sign-in sheets. It was estimated that an additional 100 persons may have been present who did not sign in. Oral testimony was received from 49 individuals. The original public comment period extended from 23 March until 7 May 2001. The comment period was extended until 15 June 2001 in response to a request from the National Trust for Historic Preservation.

Written comments were received from 108 persons, and an additional 23 public agencies and private organizations. The comments are summarized in **Chapter 9**. This chapter documents public and agency coordination that occurred following the circulation of the DEIS. It includes responses to comments.

Chapter 7
LIST OF PREPARERS

7. LIST OF PREPARERS

This Draft Environmental Impact Statement was prepared by a number of professionals comprising the Beltway Study Team, including:

John Cambridge, P.E.: Civil Engineer, Olsson Associates. B.S. Civil Engineering (1984), University of Nebraska–Lincoln. Study Involvement: floodplain issues.

Joan Darling, Ph.D.: Senior Scientist, Olsson Associates. Ph.D. Biology (1976), M. Phil. Biology (1971), Yale University; B.A. Biology (1969), Queens College. Study Involvement: wetlands, threatened and endangered species.

Melissa Dirr: Preservation Historian, On Site Photography and Preservation. M.A. History (1990); B.S. Historic Preservation (1992), Southeast Missouri State University. Study Involvement:: historic buildings survey.

Mark Elliot: Photographer, On Site Photography and Preservation. B.A. Fine Arts/Photography (1990), State University of New York, Purchase. Study Involvement: historic buildings survey.

Mike Gorman, P.E.: Vice President, Transportation, HWS Consulting Group. M.S. Transportation Engineering (1991), University of Nebraska-Lincoln; B.S. Construction Engineering (1979), Iowa State University. Study Involvement: Project Manager.

William H. Imig: Environmental Scientist, Olsson Associates. B.S. Environmental Management (1977), Kearney State College. Study Involvement: air quality, noise.

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Craig Mielke: Wetlands Scientist, Olsson Associates. B.S. Agriculture (1998), Purdue University. Study Involvement: wetlands, threatened and endangered species.

Stan Parks: Research Archeologist, University of Nebraska-Lincoln. M.A. Anthropology (1992), B.S. Ed. Secondary Education, Anthropology, History (1989), University of Nebraska-Lincoln. Study Involvement: archeological survey report, other cultural resources management activities.

Daryoush Razavian, P.E., P.H.: Senior Engineer, Olsson Associates. M.S. Water Resources Engineering (1981), B.S. Civil Engineering (1979), University of Nebraska-Lincoln. Study Involvement: floodplain issues.

Lisa Richardson, P.E.: Project Engineer, HWS Consulting Group. B.S. Civil Engineering (1995), University of Nebraska–Lincoln. Study Involvement: Project Engineer.

Stacy Stupka-Burda: Research Archeologist, University of Nebraska-Lincoln. M.A. Anthropology (1995), B.S. Anthropology (1991), University of Nebraska-Lincoln. Study Involvement: archeological survey report, other cultural resources management activities.

Dale Vagts: Environmental Scientist, Olsson Associates. M.L.A. Landscape Architecture (1993), Kansas State University; B.S. Agriculture (1989), University of Nebraska–Lincoln. Study Involvement: farmland, prime farmland, environmental justice.

Jennifer Zeigler: Environmental Engineer/Civil Engineer, Olsson Associates. B.S. Civil Engineering (1996), University of Nebraska-Lincoln; M.S. Environmental Engineering (1998), University of Wyoming. Study Involvement: environmental risk.

Amy Zlotsky: Senior Scientist, AZ Environmental. M.S. Plant Ecology (1981), University of Connecticut; B.S. Botany (1979), Duke University. Study Involvement: Project Manager for EIS and principal author.

This document has been reviewed for technical accuracy by the following persons:

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Roger Figard, P.E.: City Engineer, Public Works and Utilities Department, City of Lincoln.

Steve Henrichsen: Urban Planner, City of Lincoln-Lancaster County Planning Department.

Virendra Singh: Long-Range Planner, Public Works and Utilities Department, City of Lincoln.

Edward Zimmer, Ph.D.: Historic Planner, City of Lincoln-Lancaster County Planning Department.

Mark Ottemann, P.E.: Noise/Air Studies Engineer, Nebraska Department of Roads.

Leonard Sand: Environmental Analysis Supervisor, Nebraska Department of Roads.

Cynthia Veys: Environmental Section Manager, Nebraska Department of Roads.

Arthur Yonkey, P.E.: Project Development Engineer, Nebraska Department of Roads.

Wes Bolinger, P.E.: Operations Engineer, Federal Highway Administration.

Stephen Burnham, P.E.: Planning Engineer, Federal Highway Administration.

Edward W. Kosola: Realty/Environmental Officer, Federal Highway Administration.

John Snowdon: Transportation Engineer, Federal Highway Administration.

Chapter 8

LIST OF AGENCIES, ORGANIZATIONS AND PERSONS

to Whom Copies of this Statement are Sent

8. LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THIS STATEMENT ARE SENT

LIST OF PUBLIC AGENCIES

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Chapter 9
COMMENTS AND COORDINATION

9. COMMENTS AND COORDINATION ON THE DEIS

This chapter includes documentation of public and agency coordination since the circulation of the Draft Environmental Impact Statement (DEIS). The following list provides an overview of the sections and topics included.

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9.1 SUMMARY OF COMMENTS ON DEIS: WRITTEN COMMENTS AND ORAL TESTIMONY

This summary of comments addresses (1) all written comments received by mail during the public comment period for the DEIS, (2) written comments received at the Public Meeting conducted in March 2001 and the two Public Hearings conducted in April 2001, as well as (3) comments provided through oral testimony at the two Public Meetings. The summary includes responses to the comments. To aid the reader, a listing of abbreviations used in the document has been provided. In addition, a list of notes was developed to provide standard responses on issues which were raised in a large number of the comments. Please note that "comments considered", as used in this summary, are comments that did not point out specific errors requiring additional investigation for the FEIS, but were part of the public record for review by decision makers.

ABBREVIATIONS:

106	Section 106 of the National Historic Preservation Act	N-2	Nebraska Highway 2
4(f)	Section 4(f) of the Department of Transportation Act	NDOR	Nebraska Department of Roads
ASAP	as soon as possible	NE	Nebraska
CARS	Citizens for Accountable Route Selection	NRCS	Natural Resource Conservation Service
DEIS	Draft Environmental Impact Statement	NRHP	National Register of Historic Places
EC	East Close, EC-1 alignment	ROW	right-of-way
EF	East Far, EF-1 alignment	StCk	Stevens Creek
EM	East Middle, EM-1 alignment	SHPO	State Historic Preservation Office
FEIS	Final Environmental Impact Statement	SM	South Middle, SM-4 alignment
FHWA	Federal Highway Administration	UNL	University of Nebraska-Lincoln
HWS	HWS Consulting Group, Engineering Consultant	WSA	Wilbur Smith Assoc., Engineering Consultant
LPSNRD	Lower Platte South Natural Resources District		

NOTES:

1. Use of **148th Street** for non-beltway & beltway options was evaluated, and eliminated from further consideration (page 2.45). In general, it has greater social, environmental (including historic) and economic impacts due to existing structures close to the roads.
2. Section 4(f) is involved when a protected property is acquired for a transportation project. A Section 4(f) "constructive use" can occur when property is not acquired, however, its use must be substantially impaired. The Section **4(f) constructive use evaluation** has a higher criteria level than Section 106 evaluation; therefore it is possible for a project to "adversely affect" a historic resource under 106, and yet under 4(f), it may not necessarily "substantially impair" the features or attributes that make the site significant (page H.5).
3. Fair Market Value will be paid for acquired property (page 3.17). **Acquisition** will occur after the Record of Decision, as appropriate.
4. Federal-Aid Highway Funding is to be used for the benefit of the traveling public in general, rather than for the exclusive **benefit of Lincoln** or any other specific community.
5. A tabulation of **bisected farm parcels** has been added to Section 3.4.2 and Table 4.1).
6. The **cost estimates** included in the DEIS were prepared using very conservative assumptions in 1996, and are still considered valid in 2001. The cost estimates have been revised in the FEIS (pages 2.73 to 2.75). A final cost estimate will be prepared during final design.
7. Roadway projects are typically designed to balance cut and fill (**earth moving**).
8. A review of **economic issues** has been included in Section 9.4.

9. An EIS must discuss all **environmental impacts**, and none are assigned greater priority than another.
10. Use of **existing roadways** for non-beltway options were evaluated and eliminated because they did not meet the project purpose and need (pages 2.15 and following). Use of existing roadways for beltway alternatives was eliminated because they would have greater social, environmental and economic impacts due to existing structures close to the roads (page 2.13).
11. **Historic issues** have been further evaluated in Section 9.5.
12. The beltway alignments were rechecked in July 2001 with only a few new **houses** identified in the vicinity of any of the routes. Based on public comments, a few additional houses were added in November 2001.
13. City Council and County Board both have **jurisdiction** on the Comprehensive Plan amendment.
14. The **No Build** option was evaluated, but did not serve project purpose and need (pages 2.3 and 3.12).
15. Although **noise** may increase at various locations, it may not necessarily exceed FHWA criteria levels; when noise levels do not exceed criterial levels, it is defined as "no impact" (page 3.32).
16. **Population growth** assumptions in the DEIS were taken from the approved Comprehensive Plan. Updated population data from the 2000 Census has been included in Section 3.1 of the FEIS.
17. The NRCS form on impacts to **prime farmland** has been reviewed in Section 9.7.
18. The **public hearing** format used for the beltway study is in common use by FHWA throughout the country, and was used successfully in Lincoln for the Antelope Valley DEIS. All comments, both written and oral testimony, have been provided to decision-makers for the project.
19. A revised discussion of **secondary and cumulative impacts** has been included in Section 9.6.
20. Extensive **Section 106** cultural resource investigations were completed prior to release of the DEIS. The cultural resource reports were made available to the consulting parties and others for review and comments prior to the DEIS. After this comment period, additional revisions were made and included in the DEIS. Because of the previous limited cultural resource information and premature directives of elected officials, FHWA required the DEIS to include evaluation of all three east routes.
21. **Section line roads** are already planned for widening and paving as the Lincoln urban area expands. They are part of the No Build Scenario, and do not solve the need for a beltway (page 3.12).
22. The **tax issue** has been expanded in the FEIS.
23. It is recognized that none of the east beltway alternatives solve city **traffic problems in Lincoln**. However, the east beltways do reduce the amount of through traffic on N-2, US 6, 84th Street, Yankee Hill Road and Pine Lake Road, thereby providing more capacity for local traffic.
24. The **traffic model** shows that there is a need for a beltway (Sections 1.2 and 2.4).
25. A revised discussion of **urban sprawl** has been included in Section 9.6.
26. Because of the previous limited cultural resource information and premature directives **(voting)** of elected officials, FHWA required the DEIS to include evaluation of all three east routes to the same level of detail.
27. Any need for **wildlife** crossings will be evaluated with appropriate resource agencies during final design.

	NAME	COMMENTS	RESPONSES
INDIVIDUALS AND NEIGHBORHOOD ASSOCIATIONS–WRITTEN COMMENTS			
1	Lincoln residents	Think money should be spent on improving routes w/in city, not for diverting people around city. Think beltway shouldn't be so far east as 148th is available.	Comments considered.
2	Lincoln resident	(Against EF) Requests preservation of Lockyer (Penterman) Farm--a historical site on EF. Farm is visited by Lincoln Public School children.	Public use of Penterman Farm has been noted. Other comments considered.
3	Landowner on EC	Favors EF (but should be even farther east) primarily due to impacts to his property. Its unfair that EC was previously eliminated and now being considered.	See Note 26 (voting). Other comments considered.
4	Landowner on SM	Says process is taking too long. Wants to see south beltway built now, not 5 or 10 years down the road.	Comments considered.
5	Landowner on EC	Says most members of Sunrise Estates Community Association favor EF.	Comments considered.
6	Lincoln resident	Says use of an existing road was not fully evaluated, discussion of urban sprawl is biased and surficial, and project is not worthwhile at projected cost.	See Note 10 (existing roadways) and Note 25 (urban sprawl). Other comments considered.
7	Landowner on EF	Favors no build, one-way pairs, or add turn lanes to 148th.	See Note 14 (no build) and Note 1 (148th St). Other comments considered.
8	Landowner on EF	Against EF because least benefit, most cost, and causes urban sprawl. Favors no build, one-way pairs on 112th and 120th. SM and EM are most logical.	See Note 25 (urban sprawl), Note 14 (no build), and Note 10 (existing roadways. Other comments considered.
9	Landowner near EF	Favors EM. It allows for city growth, but not too far out that no one will use.	Comments considered.
10	Landowner on EC	Favors EF, because other routes are too close to city and development in StCk. Population growth is 1.6 not 1.18. Thinks short term solution is to pave county roads.	See Note 16 (population growth) and Note 10 (existing roadways). Will add new status of StCk. Other comments considered.
11	Landowners on EF	Against current alignment of EF due to impacts on their property. They previously relocated family homestead for widening N-2. Sent another letter that they are not happy with noise model, want someone to take actual reading at house. Want to know why City Council will decide route when they are outside of 3-mi jurisdiction.	Options will be discussed with landowners during final design. HWS has contacted these landowners. See Notes 15 (noise) and 13 (jurisdiction).
12	Lincoln resident?	Wants access provided from east beltway to N-2 heading east into Lincoln, especially for EC and EM.	Need to add explanation of interchange access in FEIS
13	Landowners along EF-1	Against EF (CARS) primarily due to impacts to their property (splits farm, noise, visual, artificial lighting on crops, future development at interchange). Want land acquisition to begin immediately after selection. Says DEIS missed Waverly Wellhead Protection Area.	See Note 3 (acquisition). ,Waverly Wellhead Protection Area has been corrected in Figure 2.25. Information on the affect of artificial lighting on crops has been added to Section 3.4. Other comments considered.

14	Lincoln resident	Against any beltway as it will cause urban sprawl. Wants moratorium on all development until there is an integrated sustainable environmental and social plan for the County. Says there are alternatives to a beltway, including mass transit.	See Note 25 (urban sprawl). Other comments considered.
15	Landowners along SM	Wants to know if there are plans to pave Saltillo and 120th prior to beltway construction? When does acquisition process begin? Other questions related to impacts to their property.	Letter was sent to landowner with answers to requested information.
16	Lincoln resident	Favors EM or EF, because route should have least environmental impact. Thinks historic impacts not as important as other types of impacts.	See Note 9 (environmental impacts). Other comments considered.
17	Landowners on SM	Against project because traffic reduction doesn't justify expense, trucks won't come off N-2, already have west bypass for N-S traffic, etc.	See Note 24 (traffic model). Other comments considered.
18	Lincoln resident	Favors EM. Says to identify routes ASAP to avoid more buildings in the way, and build the beltways as soon as possible.	Comments considered.
19	Landowners on EC	Against EC, because too close to existing and planned development in StCk.	Comments considered.
20	Lincoln resident	Against EF. States concern about cost of project, money should be spent to benefit Lincoln, not people passing by. States EF is too far, road should be nearer for Lincoln residents to benefit. Says beltway will cause urban sprawl, especially EF. Thinks price is too high in cost and impacts.	See Note 4 (benefit to Lincoln). See Note 25 (urban sprawl). Other comments considered.
21	Lincoln resident	Supports EM and SM. Thinks growing city has created traffic burden on existing infrastructure, danger to citizens and inefficient transportation route. Thinks EM most logical since least ROW and residences, and best time savings. EM is far enough out, but close enough to be used. EF least desirable as too close to 148th and poor connections to I-80.	Comments considered.
22	Landowner on EM	Against EM, due to impacts on her property (divides family farm). Thinks original decision to select EF are still valid.	Comments considered.
23	Landowner on EM	Favors EF. Says closer routes interfere with residential developments & future city growth, have greater impacts to farm ponds, cross proposed StCk greenspace. Says EF avoids StCk since on ridgeline, east beltway doesn't solve traffic on arterials. Says EM was located along Lincoln Electric System line to reduce impacts but Lincoln Electric System advises not to co-locate. Thinks truckers won't use east beltway and time savings between routes is inconsequential. Says elected officials already chose EF.	See Note 23 (traffic in Lincoln). Have consulted with Lincoln Electric System and developed two options for EM to parallel Lincoln Electric System line. LES is not opposed to any beltway route. See Note 26 (voting). Other comments considered.

24	Landowner on EF	Against EF. Says missing airfield on EF. Says DEIS doesn't emphasize that 148th is a major road and it would be redundant to have beltway w/in 0.5 mi. Says 12 mi long strip of ag land betw 148th and EF would be impacted by urban sprawl as commercial or industrial would be highest and best use. Requests special discussion of this strip which contains 7 historic sites in severe danger. Says proliferation of acreages is not true for EF area, doesn't believe results of noise on historic sites, wants calculation of severed farm parcels, disputes rating scores on NRCS form, wants economic reevaluation based on issues in report by engineers/businessmen/UNL professor.	Former airfield has been added to Figure G-1; however, airfield is not on record with NE Dept Aeronautic or Federal Aviation Administration; current owner says it has not been used in about 10 years, permits have not been renewed, and currently planted in alfalfa. See Note 25 (urban sprawl). Discussion of 12-mi strip has been added to FEIS. Acreage development is present in the vicinity of EF on 148th between Pine Lake & Old Cheney, betw O & Holdrege, and between Fletcher and Alvo–as well as on the cross roads on Rokeby, Pine Lake, Old Cheney and Pioneers. Noise model as been double checked by NDOR. See Notes 15 (noise),11 (historic issues, 5 (bisected farm parcels), 17 (prime farmland) and 8 (economic issues).
25	Landowner on EC	Against EC because too close to existing and proposed development in StCk.	Comment considered.
26	Landowner near EC	Against EC, no reason given.	Comment considered.
27	Landowners on EF	Against EF. They are owners of 100 ac of farmground adjacent to Sartore property to be submitted for addition to NRHP site. Concern that sprawl will change character of rural farming area. Say no one ever contacted them about beltway study or historic evaluation.	See Notes 11 (historic issues) and 25 (urban sprawl). Beltway study team has been requesting names for the mailing list since 1995. Standing structures survey contacted all owners of properties built prior to 1948 either by written communication and/or by knocking on doors. Archeological report shows that Marguerite Herter, LF Estate was contacted by letter dated 6/98, but no response was received.
28	Landowner on EF	Against EF, favors EM because EF was not recommended by consultants, EM lines up with I-80 interchange best, redundancy of EF being within 0.5 mi of a paved road. Thinks EM would have cost savings because land was devalued by power lines.	Comments considered.
29	Lincoln residents	Against EF. Concerned with process to evaluate historic properties including boundaries, assessment of adverse effects and 4(f) evaluation. Disputes sprawl discussion. Says farther out a beltway is built, the less it will be used and the more harm done to downtown. Restates points in report by engineers/businessmen/UNL professor, says benefit-cost info is misleading, but agrees EF is least cost-effective.	See Notes 11 (historic issues), 2 (4(f)), 25 (urban sprawl), and 8 (economic issues). Other comments considered.

30	Lincoln resident	Concerned about cost. Thinks money should benefit Lincoln residents not travellers bypassing city. Thinks closer beltway is better. Says beltway will cause sprawl and harm downtown. Concerned about impacts to historic sites, especially on EF, and loss of prime farmland.	See Notes 4 (benefits to Lincoln), 25 (urban sprawl), 11 (historic issues) and 17 (prime farmland). Other comments considered.
31	Landowners on SM	Wants to see SM moved slightly south to avoid homestead.	Alignment has been adjusted to avoid the homestead.
32	Landowners on SM	Wants to see SM moved slightly south to avoid homestead.	Alignment has been adjusted to avoid the homestead.
33	Atty for Landowners on SM	Wants to see SM revised to avoid taking Hornung farmstead. Says relocation costs would exceed costs of resulting uneconomic remainders.	Alignment has been adjusted to avoid the homestead.
34	Landowner on EF	Against EF, favors no build or EC. Concerned about impacts to historic farm sites, especially Lockyer (Penterman) Farm which is open to Lincoln Public School students. Also concerned about impacts to her property which is highest in County and was terraced and hand-seeded to brome by grandfather and maintained since.	See Note 11 (historic issues). Public use of Penterman Farm has been noted. Other comments considered.
35	Atty for Landowner on EM	Against EC and EM, because of proposed development in StCk and environmental impacts. EIS underestimates costs of EC and EM, and benefits of EF. Poor assumptions for population growth (Comp Plan to use 1.5%), Build Out Scenario (BOS) II doesn't include growth in StCk.	See Note 16 (population growth). Status of StCk has been updated. Other comments considered.
36	Landowner on EC	Against EC, favors EF because too close to existing and proposed development in StCk. Build Out Scenario (BOS) II does not include growth in StCk; therefore, is inaccurate. Missing homes (105th and A) and Wenzl historic site. EC1-5 is missing relocation of Havelock due to removal of railroad overpass. All routes should have interchange, not overpass at Havelock for new event center. EC and EM were previously eliminated (unfair).	See Note 16 (population growth). Status of StCk has been updated. Landowner was contacted regarding missing homes. See Note 12 (houses). Wenzl site was checked again by SHPO, and is still not considered to be eligible for NRHP. Interchange locations are discussed further in the FEIS. See Note 27 (voting). Other comments considered.
37	Landowner near EF	Had reason to believe there are orchids on Reed prairie. Requested copy of full report on search.	Prairie was revisited on 25 June 2001 by Dr. Joan Darling and Craig Mielke. No orchids were found; however, prairie larkspur (which also has a white spike of flowers) was abundant. There is no other report other than discussion in DEIS. Letter has been sent to Johansen and Reed.

38	Landowner on EF	Against EF (CARS) and any alteration of landscape. She grew up on their humble historic family farm. EF would sacrifice their historic agricultural landscape and harm many irreplaceable historic farms. Says sprawl will follow beltway construction and make commuting to Lincoln even more difficult, take businesses from downtown, and bring residential and commercial growth into their quiet farming area, including billboards, widened paved streets, commercial lighting and noise pollution. Seven generations....	See Note 11 (historic issues). See Note 25 (urban sprawl). Other comments considered.
39	Landowners on EC	Against EC, due to impacts to their property and too close to existing and planned development in StCk, etc. Concerned about impacts to sewage treatment plant and wells at Skyranch Acres.	Landowners were contacted about sewage treatment plant and well situation, and was determined not to be affected by the beltway. Other comments considered.
40	Landowners on EM and EF	Requests info on impacts to trees on their property.	Landowner has been contacted.
41	Landowners on EF	Against EF. Question why EF is being considered when previously eliminated. Suggest that personal interests of two elected officials will weigh the decision toward EF, and suggests that they may have insider information where the corridor may be placed. Request response to these concerns. Still have same concerns from previous letter (see below). Against EF. Integrity of Preliminary Assessment of Adverse Effects is in question because (1) list of citizens requesting consulting party status was incomplete, (2) only 5 of 7 criteria were used, other types of criteria were not used, (3) there was a recently refined corridor concept and revised centerline that they had never heard of before or been allowed to comment on, (4) ways to mitigate adverse effects were only suggested for adverse effects in EF, and (5) EF has more affected historic sites than other corridors and should never have been selected, and should be eliminated from further consideration.	(1) Everyone who asked for consulting party status was put on list. (2) The other two criteria were not used because they don't apply to the beltway project (one is for alterations to properties such as restoration, rehabilitation, repair maintanence, adding handicap access, etc. and the other is specific to Federally owned properties). (3) The refined corridor concept was developed in 1998. The only change to the alignments was the location of the I-80 interchange. (4) It is inappropriate to develop specific mitigation for historic impacts until a final route is selected. (5) See Notes 26 (voting), 9 (environmental impacts). Historic impacts are not the only protected resources that must be considered.
42	Lincoln resident	Against EF. Same letter No. 20 as above.	See No. 20 above.
43	Lincoln resident	Against EF. Thinks problems are with north/south streets such as 27th and 48th and EF would not help. Thinks 148th is adequate for bypassing and needs of city. Thinks money should be spent on internal streets not new beltway which will not benefit anyone.	See Notes 10 (existing roadways), 1 (148th St), and 4 (benefits to Lincoln). Other comments considered.
44	Landowner on SM	Gives preference for provision of access to his property.	Options will be discussed with landowners during final design.
45	Lincoln resident	Supports EF because it doesn't cross StCk and has best connection with N-2. He thinks there will be a linear park along StCk and EM would intrude by crossing twice. Thinks EC is too close	Planned development must includes roadway planning to serve future needs. Other comments considered.

46	Landowner on SM	SM4-3 shows their house within ROW of Saltillo Rd. They would prefer that house be taken.	Options will be discussed with landowners during final design. It does not appear necessary to relocate this house as the ROW of Saltillo Rd is unlikely to require 300 ft in this location.
47	Landowner near EM and EF	Against EM and EF primarily due to impacts on his property, especially loss of direct access to N-2 and aesthetics. Also thinks its too far out, and 148th is adequate for traffic. Wants to know if traffic projections for N-2 are available.	See Note 1 (148th St). City Planning will contact Lang about traffic projections. Other comments considered.
48	Landowner on EM	Favors EF because others are too close to city and proposed development in StCk. Does not believe traffic count and time savings are correct	See Note 24 (traffic model). Other comments considered.
49	Lincoln residents	Favors EF because least impacts. Very supportive of beltway to get trucks off N-2.	Comments considereds.
50	Landowner on EC	Against east beltway. Thinks DEIS lacks enough information to evaluate accuracy of traffic projections. Thinks 1996 cost data are not reliable. Thinks project is too expensive, will harm historic farms, change agricultural character.	See Notes 24 (traffic model) and 6 (cost estimates). Other comments considered.
51	Landowners on EF	Owners of historic Penterman Farm, been in family for 50 years. Think historic boundaries should include pastureland and fields. Says fields are contoured not terrraced, and could be reversed. Says Exhibit G-5 is labeled incorrectly. Disputes results of noise evaluation, and says inconsistent info on distance to roadway and whether ROW is taken or not. Questions if options are really available for visual impacts. Says paving Yankee Hill will interfere with horseback riding activities which are a significant part of their life-style. Have let Lincoln Public School classes use their property for history lessons. Concerned about development in area will diminish rural setting. Thinks EF will allow encourage a skip in development.	See Note 11 (historic issues). Exhibit has been revised. See Note 15 (noise). Noise and distances were checked and are considered correct. References to distances have in clarified in text. Visual impacts are mitigated to the extent possible. See Note 21 (section line roads). Uses for horseback riding and by Lincoln Public Schools have been noted. See Note 25 (urban sprawl). Other comments considered.

52	Landowner on EF	(1) Says DEIS is incomplete, inaccurate and imprecise, a wetland and a prairie are missing, and the value of tallgrass prairies are underrated and there is no discussion of secondary impacts to the remainder of the Reed prairie, (2) the benefit-cost analysis has serious inaccuracies, is misleading, and is missing information on input parameters and assumptions according to evaluation by engineers/businessmen/UNL professor, (3) disputes NRCS rating scores, thinks indirect impacts should be included for future development, uneconomic remainders and loss of irrigated acreage from pivots taken out of use, (4) says summary is imprecise, missing info, does not emphasize that EM minimizes impacts better than EC and EF, misses info on Waverly Wellhead Protection Area, does not state differences between beltway routes for potential for sprawl, and thinks Table 4.1 should be part of the summary, and (5) document is biased against the no build which should be more quantitatively evaluated, thinks it is not factual that the differences between the east routes is relatively minor.	(1) A wetland delineation was conducted only for areas w/in the proposed ROWs; these wetlands are mapped on the Exhibits. Therefore not all wetlands in the study area are shown in the DEIS. Landowner was contacted: "missing" wetland is not in ROW , Deitrich prairie was added to Figure 2.25; however, prairie is not within any alignment and has would have no effect on the findings. A statement was added to FEIS regarding the City's goal of preservation of prairies. As noted for the Reed letter, options will be discussed with landowners during final design. (2) See Note 8 (economic issues). (3) See Notes 17 (prime farmland) and 5 (bisected farm parcels). (4) Waverly Wellhead Protection Area has been corrected on Figure 2.25. See Note 25 (urban sprawl). (5) See Note 14 (no build). Other comments considered.
53	Landowners near EF	Against EF. Thinks 148th already serves that area. Beltway should be closer to city to be used by Lincoln residents.	See Note 1 (148th St). Other comments considered.
54	Lincoln resident	Against EF. Same letter as No. 20 above.	See No. 20 above.
55	Lincoln resident	Against EF. Same letter as No. 29 above.	See No. 29 above.
56	Landowners on EF	Against EF, favors closer routes or Hwy 43, primarily due to impacts to their property including lack of appropriate compensation. If N-2 interchange is at 148th there should be access east and west.	Hwy 43 is outside the defined study area for this project. See Note 3 (acquisition). Other comments considered.

57	Landowners on EF	Against EF (CARS). Say consultants originally recommended elimination of EF (and imply reasons are still valid) yet EF was selected in June 1997 without explanation. Request evaluation of economic issues from report by engineers/businessmen/UNL professor. Say east beltway will not benefit Lincoln motorists and will harm downtown. Say beltway will cause sprawl, bring noise pollution, destroy air quality, create visual intrusion and change character of land, and importance of urbanization is not worth this expense. Numbers don't justify EF. Says historic impacts are inadequately addressed; these impacts preclude construction of EF. City made premature decisions and therefore 106 process is meaningless. Cumulative impacts section doesn't address historic sites. Other impacts are not addressed (noise, lighting and visual changes). Disputes statement that most historic sites in the area are being modernized or deteriorating. Says noise barrier at T. Retzlaff would be visual problem. No info provided on loss in tax revenue and bond issues to support school districts. No info on severed farmground. Amount of fill required will catastrophically change the terrain. Says no build not addressed for the east, thinks could pave other north-south roads instead. Say they have very little local representation because no ability to vote for City Council, and 2 of 5 County Commissioners have declared conflicts. Previous letter questions (1) noise results for T. Retzlaff and visual impact of noise barrier, (2) discussion on secondary effects to historic properties, (3) why no mention of cumulative effects on historic sites. States (4) costs should be in 2001 not 1996 dollars, (5) should include tax loss and bond support to Norris and Waverly school districts, (6) cut and fill will have catastrophic change on terrain, (7) should be discussion of amount of land that will be inaccessible, (8) need to discuss impacts to value of existing residences, (9) negotiations with landowners must begin immediately following route selection, (10) object to Public hearing format.	See Notes 8 (economic issues), 23 (traffic in Lincoln), 25 (urban sprawl), 24 (traffic model), 11 (historic issues), 26 (voting), 20 (Section 106), and 19 (cumulative impacts). Since the 1997 field investigation for the historic structures, the Michael Smith barn has collapsed, Lemke residence has been partially vinyl sided, Mayer farmyard has been purchased for a nursery with alteration of buildings, storage units have been constructed next to Monahans, one road sign has been painted and relocated, and Ehler's round barn continues to deteriorate. See Note 22 (tax issue), 5 (bisected farm parcels), 7 (earth moving), 14 (no build), 10 (existing roadways). Other comments considered. Answers to previous letter: (1) See Notes 15 (noise) and 11 (historic issues). No noise barriers are proposed at this site (2) See Note 19 (secondary impacts) and 11 (historic issues) (3) See Note 19 (cumulative impacts) and 11 (historic issues) (4) See Note 6 (cost estimates) (5) See Note 22 (tax issue) (6) See Note 7 (earth moving) (7) See Note 5 (bisected farm parcels) (8) See Note 3 (acquisition) (9) See Note 3 (acquisition) (10) See Note 18 (public hearing)
58	Landowners on EC	Against EC, favor EF primarily due to impacts to their property and too close to existing and proposed development in StCk, etc. Concern about deer strikes.	See Note 27 (wildlife). Other comments considered.
59	Lincoln resident	Against EF. Same letter as No. 20 above.	See No. 20 above.
60	Landowner on EF	Says EF will cause adverse effects on his historic property not noted in DEIS, including construction of new houses on adjacent property, increase in commercial development in the area, more traffic and widening of O St, and much more traffic noise and lights from light poles and headlights. Says negative impacts were dismissed without consultation of documentation.	See Notes 11 (historic issues) and 19 (cumulative impacts). O St is already planned for widening.
61	Lincoln resident	Supports the project, can't happen fast enough.	Comments considered.

62	Landowner on EF	Against EF (CARS). Says DEIS is sloppy. Disputes NRCS form rating scores, thinks should include indirect impacts from severed parcels, future development beyond ROW, and loss of irrigated farmground from pivot impacts. Missing 1 wetland and 1 prairie; another prairie mismarked. Disputes boundaries of T. Retzlaff. Missing 1 Waverly well. Benefit-cost calculations are unreliable and cost estimates are underestimated according to group of engineers/businessmen/UNL professor. Summary doesn't mirror rest of document. No build option was not well presented. No discussion of impact to City, implies will harm downtown and airport.	See Notes 17 (prime farmland), 5 (bisected farm parcels). Wetland is not missing, prairie location has been corrected. See Note 11 (historic issues). Waverly Wellhead Protection Area has been corrected in Figure 2.25. See Notes 8 (economic issues), 19 (cumulative impacts). discussion, and 14 (no build). Other comments considered.
63	Landowners on EF	Farmstead will be taken for EF. Have lived on farm for 50 years. DEIS is disrespectful of area farmers. Land is some of richest in US and should be protected. Short sighted to destroy prime farmland with project and urban sprawl that will follow.	See Notes 17 (prime farmland) and 25 (urban sprawl). Other comments considered.
64	Landowner on EF	Against EF primarily due to impacts to his property as beltway will alter farm setting and bring development. As owner of 2 trucking companies, he thinks east beltway will not remove traffic from N-2. As director of LPSNRD, says EF will go right over one farm pond. Says DEIS is inaccurate about bike trail along StCk as LPSNRD voted not to build it. Says landowners won't sell easements for conservation along creek, if they think there may be bike trail. Thinks it would cost less for Lincoln to widen city streets and N-2 instead of seeking roadway outside city. Thinks no build will save tax dollars and prevent development from overtaking farmland.	Consultation with LPSNRD General Manager indicated that beltway routes and LPSNRD ponds can be engineered to be compatible, or impact can be mitigated. Also, says trail is still included in the StCk Watershed Management Plan even though the NRD is not proceeding to acquire trail easements. See Notes 21 (section line roads), 10 (existing roadways) and 4 (benefits to Lincoln). Other comments considered.
65	Landowner on EC	Against EC due to impacts on his property, favors the EF because less impact to existing houses and proposed development in StCk. EIS is missing houses on maps, conflict with LPSNRD ponds not adequately addressed, impact to flooding on StCk not addressed, incorrect population growth . Can't quantify many of the impacts to nearby residents. EC exit is too close to shopping center entrance. EF was already chosen, unfair to go with something else.	See Note 12 (houses). See Peterson, Dean, above. See Notes 16 (population) and 26 (voting). Other comments considered.
66	Lincoln resident	Against beltway, specifically EF. Cost of beltway is too high. Money should not be spent on truckers bypassing City. Concern for severed farmground, change in terrain (drainage problems on farms and wetlands).	See Notes 4 (benefits to Lincoln, 5 (bisected farm parcels), 7 (earth moving). Other comments considered.
67	Lincoln resident	Against EF. Same letter as No. 20 above.	See No. 20 above.
68	Lincoln resident	Against EF. Money should be spent on those who pay taxes not on people bypassing Lincoln. Concerned about historic resources, prime farmland, severed parcels. Thinks 148th St is adequate.	See Notes 4 (benefits to Lincoln), 11 (historic issues), 17 (prime farmland), 5 (bisected farm parcels), and 1 (148th St). Other comments considered.

69	Landowner near SM	Says no one on Saltillo Rd west of US 77 was contacted about beltway project. There are 25-30 homes in the area. There is a historic marker for the former location of aa Pioneer trail in the southeast "turnpike corner". They will lose their restaurant, gas station, access to 77 and great view. Says don't need a long off ramp to north (ramp at I-80 and 77 is 35 mph).	Landowners may not have received direct mailings as original study area did not extend west of 77. Historic marker needs to be relocated, but no features of historic trail remains in this area. As to ramp, options will be discussed with landowners during final design.
70	Landowner on EF	Against EF because of impact to her virgin prairie which she considers a historic site. If EF is selected, requests looking at options to avoid the prairie.	Options to minimize impacts will be discussed with landowners during final design.
71	Lincoln residents	Against east beltway, especially EF. Need has not been proven. Money should be spent on improving existing roads. Thinks cost estimate should be updated. Thinks selection process is flawed, elected officials prejudiced the process, government agencies will be biased. Thinks beltways cause sprawl along road and at interchanges.	See Notes 24 (traffic model), 10 (existing roads), 6 (cost estimates), 26 (voting), 25 (urban sprawl). Other comments considered.
72	Landowners on EF	Against EF(CARS) which crosses their property, for historic reasons and impacts to their property. They are part owners of NRHP eligible barns and silo (E-67). Concerned that EF sacrifices historic agricultural landscape, harms historic farms, and endangers their historic properties. Concerned about noise, fumes, vibrations and lights from trucks. Says EF separates their barns and silo from land they were built to support, DEIS doesn't consider cumulative effects, including residential and commercial development. Says EF would promote urban sprawl, and more traffic on roads connecting to the beltway which would destroy the setting and feeling of their rural neighborhood. Says annexation by Lincoln will threaten tax base of local school district 145, cost estimates are understated, neighborhood will become cluttered with trash, billboards, signs and crime will increase.	See Notes 11 (historic issues, 19 (secondary and cumulative impacts), 25 (urban sprawl), 22 (tax issue), and 6 (cost estimates), Otherwise, Other comments considereds.

73	Landowners on EF	Against EF for historic reasons. Owners of StCk Stock Farm. Lists flaws in DEIS as not considering that the historic significance of the Stock Farm would be undermined by (1) construction of the beltway which will destroy the rural setting, (2) induced growth from the beltway which will harm the rural setting, (3) street widening and paving of Van Dorn, Pioneers and 138th St to connect to the beltway would have adverse impacts, (4) impacts to farmland from visual, atmospheric and audible elements. (5) States no noise evaluation was conducted for the Stock Farm.	(1) Assessment of adverse effects did find that EF would adversely affect setting and (2) acknowledged that the potential for development is greater if road is east of the site (page F.11). (3) See Note 21 (section line roads). Pioneers is being paved to 120th. It is less likely that 138th would be paved due to the discontinuity in the grid system (4) The EIS assumes that there is no impact to farmland from visual, atmospheric and audible elements, only people and structures are affected by these. (5) The noise model is applicable within 1,000 ft of a roadway, and EF is over 2,000 ft from any of the structures on the Stock Farm.
74	Landowners on EF	Against EF (CARS), for historic reasons and impacts to their property. They are part owners of NRHP eligible barns and silo (E-67). Say farm will be isolated between beltway and 148th St, noise will be deafening, divided property will make access difficult for farm equipment. Say EF will cause the loss of 10,000 ac of prime farmland to development. Say DEIS does not discuss extra energy consumed by cars making longer trips, lighting for interchanges, and higher driving speeds. Think cost estimates are understated, beltways ruin downtowns.	See Note 15 (noise). Noise levels will increase, but not above criteria levels as residence is about 2,000 ft from EF. See Notes 17 (prime farmland) and 25 (urban sprawl). DEIS did address longer trips and higher speeds on page 3.74. Energy used for lighting has not been addressed, and is not typically included, as it is a minor impact which is more than compensated for by the safety it provides. See note 6 (cost estimates). Other comments considered.
75	Landowners on EF	Against EF, historic reasons and impacts to their property. Owners of historic T. Retzlaff Farm. Think previous comments were not adequately addressed. Dispute historic boundaries, thinks should be entire 80 ac (S of Van Dorn). Says that parcel does not have terracing or man-made pond, Van Dorn has changed very little since farmhouse was built, and trees do not alter integrity of property. Say they will be submitting NRHP nomination. Say noise, lights and pollution will destroy agricultural setting. Road will cut across farm and cattle will not be able to get to pasture. No practical mitigation offered. No discussion of development that will follow EFconstruction.	See Notes 11 (historic issues) and 15 (noise). Mitigation will be developed if EF route is selected; options to minimize impacts will be discussed with landowners during final design. See Note 25 (urban sprawl).

76	Landowners on EF	Against EF, owners of the StCk Stock Farm. Problems with DEIS include (1) benefit-cost analysis is flawed & correction would make EF even less economically feasible, (2) historic survey & boundary issues have not been rectified, including nature of standing structures survey, boundaries for historic farms, investigation of a historic district, failure to identify negative effects of EF, and failure to identify all resources in the area, (3) DEIS disagrees with SHPO that 800 acs are eligible for inclusion with the Stock Farm on the NRHP , and an additional 320 acs are also eligible, (4) 4(f) evaluation doesn't address direct, secondary and cumulative impacts of EF on historic sites, including adverse affects from increased traffic volumes on 138th St, (5) 11 points that illustrate process failures in the beltway study and decision process including illegal votes by elected officials, improper public hearings, inadequate consultation with consulting parties, inadequate study methodology, etc, (6) urban sprawl discussion, (7) consulting party letters were not answered and issues not addressed, (8) discussion of "elimination of EF" is not addressed , (9) statement about StCk connector trail, (10) dates on figures are not correct, and they are missing information, (11) historic sites should be included in Table 2.3, the environmental screening criteria, (12) NRCS farmland conversion rating scores need to be corrected, including consideration of impacts from severed parcels, irrigation systems, and loss of access. Request that Table 4.1 not be provided to public officials or general public until corrected.	(1) See Note 8 (economic issues) (2) See Notes 11 (historic issues) and 20 (Section 106) (3) See Note 11 (historic issues). The SHPO concurred with the DEIS statement that an additional 560 ac are not eligible as they are not adjacent to the 240 ac which are on/eligible for NRHP. The SHPO was not previously informed that the 560 ac were not adjacent. Additional 320 are addressed in Section 9.5. (4) See Note 2 (4(f)). While future traffic will increase on 138th St, it will not create an adverse noise impact. The noise evaluation shows that Old Cheney Rd is the only connector road along EF-1 expected to have a greater than 50 percent increase in traffic volume. (5) See Notes 26 (voting) and 18 (public hearring) (6) See Note 25 (urban sprawl) (7) consulting parties did not receive response letters, however, issues were investigated and included in the revised assessment of adverse effects (8) consultant recommendation to eliminate EF has been added to FEIS (9) see Dean Peterson letter (No. 64) above (10) Figures have been corrected in FEIS (11) historic sites, and specifically StCk Stock Farm, were covered under Item 16 in Table 2.3 (see Interim Report 2) (12) See Note 17 (prime farmland). Table 4.1 was part of DEIS and should be made available to the public. Revisions to the table have been made in the FEIS, as appropriate.

77	Atty for CARS	Against EF. Position of CARS is that (1) process was flawed since August 1995 regarding failure to comply with Section 106 and 4(f) process, (2) federal public hearing process was not appropriately followed due to open house style, (3) report by (engineers/businessmen/UNL professor) found erroneous assumptions and conclusions, and (4) previous findings of City's consultants as to why EF should not be selected. (5) Wants to know if correspondence from Stupka-Burda is her position or UNL's.	(1) See Note 20 (Section 106). The only historic resource adversely affected under 4(f) is a road sign. No land is required from any other historic resource. (2) See Note 18 (public hearing) (3) See Note 8 (economic issues) (4) The DEIS includes analysis of all 3 east routes. With more detailed evaluations, 6 of the 8 conclusions remain the same. Item 7 (wetlands) was reevaluated by area of impact (not number), and the findings are slightly different. Item 6 (school districts) were not reevaluated. (5) UNL Department of Anthropology was subcontracted by the beltway study team to conduct several of the cultural resources investigations. Stupka-Burda was one of the principal investigators at UNL.
78	Landowner near EC	Against EC due to impacts on her property and it is too close to existing developments, most expensive and impacts most wetlands.	Comments considered.
79	Lincoln residents	Against beltway, especially EF. Says will have negative effect on downtown and airport. Concerned about noise, air and visual impact, houses and businesses, endangered species, wetlands and StCk watershed. Money should be spent on Lincoln residents not travelers by-passing city. Concerned about historic properties, agricultural setting, loss of prime farmland, urban sprawl, harm to downtown. No info on loss of tax revenues and bond issue suppport for Norris and Waverly school districts, or severed parcels. Earth moving will cause catastrophic changes in terrain.	See Notes 4 (benefits to Lincoln), 11 (historic issues), 17 (prime farmland), 25 (urban sprawl, 22 (tax issue), 6 (bisected farm parcels), 7 (earth moving). Other comments considered.
80	Landowners near EF	Against EF. Owners of historic Herter-Hagaman Farm. Disputes Prelim Assessment which says EF will not have visual, audible or atmospheric impacts to their property. Disputes historic boundaries, thinks additional 100 ac should be included and will be sending in NRHP nomination. Says land was contoured not terraced, says trees don't compromise integrity. Say EF will bring sprawl and that impact has not been addressed on their property.	See Notes 11 (historic issues) and 25 (urban sprawl).

81	Lincoln resident & member of Preservation Assoc. of Lincoln	Said organization did not receive DEIS. Concern that residents of beltway corridor have no vote in Lincoln politics. Favors no build, because of NRHP sites in StCk area. Thinks NRHP sites should include farmland. Thinks beltway and urban sprawl will impact StCk area. Should choose east beltway with least impact on historic resources (EC). Objects to Public hearing format.	Called and verified that they did receive DEIS. See Notes 11 (historic issues), 25 (urban sprawl), 9 (environmental impacts, and 18 (public hearing). Other comments considered.
82	Landowners on EC	Against EC, due to impacts on their property and too close in considering the fast growth of the city. EIS overestimates traffic relief on arterials, uses incorrect population growth (1.6 not 1.18), Build Out Scenario (BOS) II underestimates traffic as no urban uses in StCk, understates future residential conflicts, ignores effect of beltway in the way of urban development. Notes that 2 LPSNRD dams will be constructed in the path of EC-1, wasting money to relocate. EC-1 previously eliminated (unfair), etc.	See Notes 16 (population), 23 (traffic in Lincoln), 25 (urban sprawl) and 26 (voting). Other comments considered.
83	Lincoln resident	Against EF as too far away. Thinks east beltway should be 1 mi west of Walton. Disputes that beltway will not bring urban sprawl. Concerned about loss of farmland.	See Notes 25 (urban sprawl) and 17 (prime farmland). Other comments considered.
84	Neighborhood Assoc on EC	Against EC because too close to existing and proposed development in StCk, not economical, not efficient. Concern about deer strikes. EC was eliminated previously (unfair).	See Notes, 27 (wildlife) and 26 (voting). Other comments considered.
85	Lincoln resident	Wanted to see traffic data for outer segments of connecting roads with east beltway interchanges; DEIS only had segments west of beltway. Wanted to know if roads with only overpasses show same trend. Concerned about increased traffic on connecting roads.	This request was forwarded to Planning Department.
86	Landowners on EC	Against EC, favors no build, due to impacts to their property and EC is too close to existing and proposed development, etc.	Comments considered.
87	Landowners near EC and EM	Against EC and EM because too close to populated areas.	Comments considered.
88	Landowners Association in East Beltway area	Against cutting through StCk basin, especially against EM. Would have devastating effect on StCk, StCk should be preserved as greenspace, prefer to see upgrade of existing roadways.	See Notes 10 (existing roadways) and 21 (section line roads). Other comments considered.
89	Landowner near SM	Says SM will cut their farm in half and concerned about access.	Options will be discussed with landowners during final design.
90	Landowner near EF	Questions need for beltway. Thinks 148th should be widened with access to I-80 south of Waverly, or widen Hwy 63 and connect to N-2.	See Notes 24 (traffic model) and 1 (148th St). Other comments considered.

91	Landowner near EF	Against EF. Disputes need for beltway. EF is too far away, and traffic can use 148th. Concerned about loss of farmland, and opening area up for development. Disagrees with DEIS on sprawl issue.	See Notes 24 (traffic model), 1 (148th St) and 17 (prime farmland) and 25 (urban sprawl). Other comments considered.
92	Landowner on SM	Has access and irrigation concerns for sod farm.	Options will be discussed with landowners during final design.
93	Landowners Assoc on EM	Favor EF. Same letter points as Foy.	See Foy (No. 23) above.
94	Lincoln resident	Thinks far location will not solve traffic problems, and will diminish Lincoln by making access to Omaha easier. Thinks should use 148th.	See Notes 24 (traffic model) and 1 (148th St). Other comments considered.
95	Landowners on EC	Against EC, due to impacts to their property and too close to existing development, previously eliminated (unfair), etc. DEIS is out of date, missing homes and archeological findings.	See Notes 12 (houses) and 26 (voting). Location of archeological sites is considered confidential. All additional archeological sites identified by landowners were investigated. Other comments considered.
96	Landowner on EC	Against EC due to impacts to her property and too close to existing and proposed development in StCk. Missing home at 1900 105th, missing (Wenzl) historic site, pond at 1500 105th, underestimates no. of residences within 0.25 mi. EC and EM previously eliminated (unfair).	See Note 12 (houses) and 26 (voting). Wenzl site was checked again by SHPO, and is still not considered to be eligible for NRHP. Other comments considered.
97	Lincoln residents	Supports the project to get truckers off N-2.	Comments considered.
98	Landowner near SM	For SM. Saltillo Rd is dangerous/too busy. Thinks project should start sooner.	Comments considered.
99	Lincoln business owner	Against east beltway. Owner of downtown restaurant. Says too far out to be used, will cause sprawl, will harm downtown by encouraging relocations to the suburban edge, and by making it easier to shop, dine and fly out of Omaha.	See Note 25 (urban sprawl). Other comments considered.
100	Lincoln resident	Against EF. Same letter as No. 20 above.	See No. 20 above.
101	Landowner on EC	Against EC and too close to existing and proposed development in StCk, etc. EC was previously eliminated (unfair). Incorrect population growth. Concern about impacts to septic fields and wells. Also sent information on Teachman Cemetery and Shirley Road Ranch.	See Notes 26 (voting) and 16 (population). Options will be discussed with landowners during final design. Already have records of these historic sites and they are not affected. Other comments considered.
102	Landowner near EM	Thinks east beltway support is from city residents only, and its unfair that county residents will be most impacted. Concerned area will look like West Omaha. Doesn't think there is a traffic problem.	See Note 24 (traffic model) Other comments considered.
103	Landowner near EC	Against EC, due to impacts to her property and too close to existing development.	Comments considered.
104	Landowner near EF	Favors EC, thinks we need an east beltway.	Comments considered.

105	Lincoln resident	Against EF. Thinks its too far east of city, would not benefit city traffic, infrastructure costs to reach EF would be too costly, and not needed because 148th St already in place.	See Notes 23 (traffic in Lincoln) and 1 (148th St). Other comments considered.
106	Landowners on EF	Errors and omissions in DEIS, will send later, problem with PH format. Against EF primarily due to impacts to their property. Was raised on StCk Stock Farm and currently lives there (7th generation). Says farm is privately owned but they host school children, University students and others interested in history, farming and preservation. Concerned about air, light and noise, breaking up farmground, and making difficulties for farmers. Thinks wildlife would disappear, development would be out of character with current pristine setting. Thinks EF is not most feasible. EF corridor and process have fatal flaws. Concerned about benefit-cost issues, historic survey and boundary issues, boundary of Stock Farm, 4(f) considerations, process failures, urban sprawl, public input, consultant recommendations against EF (see letter 76 above).	See Note 26 (voting). Other comments considered. See Notes 5 (bisected farm parcels), 27 (wildlife), 26 (voting), 8 (economic issues), 11 (historic issues), 2 (4(f)), 20 (Section 106), 25 urban sprawl, and 18 (public hearing).
107	Landowner on EF	Favors EF. Other routes conflict with opening up StCk watershed for development. Previously told would be EF.	See Note 26 (voting). Other comments considered.
108	Beltway Citizens Advisory Committee member	Favors SM and EM. All routes will have adverse impacts to those along it, therefore its important to choose a route that most benefits the traveling public and is most cost-effective.	Comments considered.
	ORAL TESTIMONY FROM PUBLIC HEARING		
109	Lincoln resident	Feels there is a high need for the beltway. He works in Bennett. Feels that EM is the most appropriate because of existing power line, and it doesn't displace the most homes.	Comments considered.
110	Landowner on EC	Says there is increasing confusion over east bypass. East originally was not to alleviate traffic in Lincoln. Should use existing state highways instead of a whole new highway. Proposals should be farther east than are being proposed. Thinks HWS messed up traffic study done a few years ago	See Notes 23 (traffic in Lincoln), 24 (traffic model), and 10 (existing roadways. Proposals farther east do not serve project purpose and need. Other comments considered.
111	Landowner on EC	No one is going to go out of their way. If you are going to build, you should build where the edge of the city will be in 2025.	Comments considered.
112	Representative of Lincoln Chamber of Commerce	Stated the Board of Directors of the Chamber of Commerce supports the south & east beltways. Thinks the DEIS was very thorough in its study of the south alignment. Feels the study is very good for the east alignment. Urges local officials to make a decision.	Comments considered.

113	Lincoln resident	He liked the original beltway proposal at 141st St, but does not like the 105th St location. Believes the StCk area will be developed. Wants the beltway to be past StCk so Lincoln can develop out to the beltway. Feels the beltway would prohibit growth if it were in the StCk location (EM).	Comments considered.
114	Landowner on EF	Against current alignment of EF. Her family owns a house very close to the exit ramp of EF. House has been in the family for many years. When N-2 was widened, they had to relocate the house and fix it up do to the move. The family was not repaid for repairs of a mandatory move. They feel they, and other families, should not be burdened to move again due to this project. They did not know of the latest EF alignment until last year. If they do have to move, they have water wells on the north side of N-2 in area of the proposed interchange. They want to be rehooked up to the existing wells because they are used extensively for their cattle. Overall, they do not want to move the house again.	Options will be discussed with landowners during final design if EF is selected. Other comments considered.
115	Hearing Officer for NDOR and Lincoln resident	Asked a FHWA representative to give testimony on the format of the public hearing (then in progress) and asked how the information obtained at the hearing would be used. Said he lives close to Hwy 2 and there is heavy truck traffic and a need for a beltway. Doesn't think roads should be located by a vote. Thinks we need the beltway ASAP.	No response required. Comments considered.
116	Landowner on EC	Against EC. Does not want EC being so close to the city limits. It is not practical to build a beltway so close to Lincoln. Feels the beltway should be built past StCk. He doesn't feel any alignment will relieve traffic, or is a solution to improving city streets. Overall, he feels EF would be the best option. EM would be an option to him but not as practical as EF.	Comments considered.
117	Landowner on EC	Against EC. Supports EF. Her house is in EC alignment. She is upset her house is not on any of the maps. Thinks EC and EM disrupt the MOPAC Trail. She does support an alignment to alleviate traffic around the city.	House has been added to map. All three routes cross MOPAC Trail but will be mitigated. Other comments considered.
118	Landowner on EC and EM	Supports EF. Thinks decision-makers should stick by the vote on 6/27/97 by the Supercommons for the EF alignment. Thinks it is bad to put the EM in the StCk floodplain. EC was the worst alignment in his opinion and because of legal problems. Says data used in the EIS was outdated. There are legal problems with the EC and a bad location at the EM.	See Notes 26 (voting) 12 (houses). Data in DEIS was best available and considered relevant for a plannning document. Other comments considered.

119	Lincoln resident	Supports both south & east projects, supports EM. He is banker for Union Trust, resident of southeast Lincoln. Thinks south should be separated from east beltway. Thinks they are two different situations that should be dealt with separately. Thinks EM is the best route because few residential impacts, fewest acs needed, best time savings.	Comments considered.
120	Landowner on EM	Supports EF because he thought the vote in January 99 finalized it. Does not want growth prohibited from the EC or EM. He feels development will be rapid into StCk. Supports EF as it is farthest away from development and the floodplain.	See Note 26 (voting). Other comments considered.
121	Lancaster County resident	Against EC. Landowner on 176th. Wants to widen 148th St to four lanes.	See Note 1 (148th St). Other comments considered.
122	Landowner on EF	Says there is an airstrip at 148th and Van Dorn that is not in the EIS. Questioned the method of this public hearing.	Airstrip is planted in alfalfa, has not been used in about 10 years, and permits have not been renewed (see written comment No. 24 above). See Note 18 (public hearing).
123	Landowner on near EC	Moved to 112th because of rural environment. Was attracted by StCk Development. City of Lincoln finally seemed to have a plan and now the beltway opposes the StCk Basin (Plan). Either the beltway or StCk (Plan) need to go. EIS Summary says 7 out of 8 people say protect natural resources. EIS Summary says EC is costly. City officials were concerned about EC but it is still being studied. There is a contradiction of information. Too many studies going on at once. Should focus on 4-lane arterials, especially east-west. Beltway won't help inner city.	Project will be designed to protect natural resources to the extent possible consistent with good design practices. See Notes 26 (voting), 10 (existing roadways) and 23 (traffic in Lincoln). Other comments considered.
124	Preservation Assoc of Lincoln member	She was very disappointed in this hearing process. She wanted a real public hearing in front of elected officials. She also felt a public hearing should be in a public building, and not a church.	See Note 18 (public hearing). Other comments considered.
125	Landowner on SM	Speaking on behalf of Hornungs. He farms approx 500 acs, 450 affected by new proposal. Wants SM moved back to the south.	Options will be discussed with landowners during final design.
126	Atty for Landowner on SM	SM intersects Hornung property, might take most of their property and will relocate Hornungs. Earlier alignment did not affect Hornungs, recent SM-4 does significantly affect their property. Hornungs position should be considered throughout design. Want SM moved back south.	Options will be discussed with landowners during final design.
127	Landowner on EC	Asked which choices are more viable as far as cost? Has heard on TV that EC is better, more economical, etc. Owns real estate and has done research and found that if choosing EC the city would be out to it by the time it's built.	See Table 4.1 for differences between routes. Other comments considered.

128	Landowner on EC	If EC is chosen, their house won't be taken but frontage will. When all property is taken they will end up with only 2.5 acs from the 5 ac they bought. There will be a 12 ft berm 45 ft from their walkout basement. Property access has not been addressed. Wenzl Farm does not appear on map, they have an 1860's barn on their property. Says got tired of waiting for decision to be made and put another building up this year. Page 3 says there is low impact, but the beltway meanders and property values are low. Study contains assumptions that are incorrect. 148th St is a corridor if that's what you want.	Options will be discussed with landowners during final design. Wenzl Farm has been rechecked by SHPO and is still not considered eligible for NRHP. See Notes 3 (acquisition) and 1 (148th St). Other comments considereds.
129	Landowner on SM	Where his house is, the ROW will be in his living room. He would like access road moved south so it will impact his property less.	Options will be discussed with landowners during final design.
130	Landowner on SM	Said access road comes up to his driveway, and the ROW would take away his front yard. He wishes the road to be moved to the west, but there is a wetland and doubts it can be moved.	Options will be discussed with landowners during final design.
131	Secretary of Landowner Association in east beltway area and Landowner on EM and EF	She encourages a proposal to upgrade existing roads.	See Notes 21 (section line roads) and 10 (existing roadways). Other comments considered.
132	Landowner on EM	Supports south beltway, against east. People don't understand why an east bypass is needed. Says beltway won't take semi traffic off 70th and 84th. 85% of people want to know why 148th isn't just made a divided highway. Wants to know if using 148th will affect funding or not, has gotten several different answers on this. Project has pitted groups or people against each other. Says you could go around Wilderness Park. You hear trucks in it anyway. EM is least likely because you have to cross StCk. Says its silly to open StCk for development and then put a bypass through it. Says to take 112th, 148th and 162nd, take ROW on each road and you would be able to have a 2-lane divided highway with limited access. Thinks traffic could be handled by upgrading streets. None of this will alleviate Lincoln's traffic in town. Need to not have so many entrances and exits on O St, it slows you down too much. Doesn't like farms being divided. Thinks if land is taken, the price people are receiving for it should be adjusted in anticipation of future land prices.	See Notes 24 (traffic model) and 1 (148th St). EC also crosses StCk. See Notes 21 (section line roads), 10 (existing roadways), 23 (traffic in Lincoln), and 3 (acquisition). Other comments considered.
133	Landowner on EF	Against EF. Owns 20 ac of land on Yankee Hill eligible for NRHP (Penterman's). He was discouraged because he thought he would be voicing his opinion to the decision-makers at this meeting.	See Note 18 (public hearing). Other comments considered.
134	Landowner on EF	Objects to public hearing format. Says the data is still not right on the revised version of the maps.	See Note 18 (public hearing. See written comment No. 62 above. Other comments considered.

135	Landowner on EC	Against EC. Says information is still not accurate on what has been built. Asks if still using old information. Says some houses and farm ponds are not shown. Asks why 148th is not used or considered, says federal friends say it is eligible as a beltway route. Asks if there is critical engineering data that says an east beltway should be built. Doesn't think there are adequate numbers to justify it. Thinks this is a waste of taxpayer money and NDOR won't want to touch it!	See Note 12 (houses). Data in DEIS was best available and considered relevant for a plannning document. See Note 1 (148th St) and 24 (traffic model). Other comments considered.
136	Landowner on EF	Says this is not a public hearing, it is an effort by the government to avoid controversy. Says east bypass is ill conceived, City of Lincoln is trying to put traffic problems in somebody else's backyard. Says he has a trucking company and will not use the east bypass because it is several miles out of the way. Would use Hwys 2, 34 and 6, and 148th St. Will maybe use the south bypass. By using this format for a public hearing you can't tell how much opposition or support there is for the project. Says to put this on a ballot and let the county vote on it. Says this is just like Antelope Creek which is being rammed down people's throat. Says should make State 43 the bypass since it keeps going further east.	See Notes 18 (public hearing), 24 (traffic model) and 1 (148th St). Hwy 43 would not serve project purpose and need. Other comments considered.
137	Lancaster County resident	He is concerned about the ecology and quality of life issues the beltway would make. He does feel the EIS is extensive, and overall very good. He wishes to move forward and make a decision. He did not wish to state his preference to which alignment he supports.	Comments considered.
138	Nebraska Advisor to Nat'l Trust for Historic Pres	Says he has been involved and is a consulting party. Says the Trust has placed the east beltway corridors on the top 11 most endangered historic corridors. Says they object to the format of the meeting as people are deprived of hearing others' comments. The requirement for a public hearing has not been satisfied and they will pursue this with FHWA in DC. A proper public hearing should be held. The Trust will provide its comments directly to the FHWA.	Information on the Trust list was released after the public hearing. See Note 18 (public hearing). Other comments considered.
139	Landowner on EM	Nothing has changed with all these meetings. Says there are lots of mistakes in reference books. Says new houses and powerlines have been constructed. Thinks City of Lincoln hasn't taken into account how important farms are to Lincoln. Bus routes and safety of children should be taken into account. People living in the city should have to sacrifice more than what they are.	Data in DEIS was best available and considered relevant for a plannning document. See Note 12 (houses). Safe design practices will be incorporated in final design plan. See Note 21 (section line roads). Other comments considered.
140	Lincoln resident	Opposes beltways in general. City should learn from Atlanta, Georgia which built beltways and has problems with resulting sprawl, new traffic problems and air quality. Thinks global warming will result in road construction restrictions, and Lincoln should be prepared by choosing smarter growth. Thinks money should be spent on interior streets of Lincoln. Thinks truckers will use beltways, but not the vast majority of people.	See Notes 25 (urban sprawl),21 (section line roads), 10 (existing roadways) and 24 (traffic model). Other comments considered.

141	Landowner on EF	Objected to the format of the public hearing. Didn't think there was public interaction in this process. Says there were errors and omissions in the DEIS which she would address in written comments.	See Note 18 (public hearing). See written comment No. 76 above).
142	Bennet resident	Thinks route should be further east (suggests 148th St) and wants the I-80 interchange to be even further east (Hwy 63). She suggests somewhere between Waverly and Exit 420 (Greenwood-Ashland).	See Note 1 (148th St). Hwy 63 would will not serve project purpose and need. Other comments considered.
143	Lincoln resident and Preservation Assoc of Lincoln member	Says there are pristine farmlands and pastures that are eligible for historic status but are not included in beltway study. Says should consider urban sprawl. Doesn't think no build option was considered (see DEIS, p. 2.3, 3.13, and throughout Chapter 3). Encourages east beltway be built as a parkway. Says impact of noise on animals was not addressed. Thinks public hearing isn't valid as public officials are not here to listen. Thinks it's inappropriate to have the hearing at a church since there should be separation of church and state.	See Notes 11 (historic issues), 25 (urban sprawl), 14 (no build) and 18 (public hearing). Noise has been considered in accordance with federal regulations. Other comments considered.
144	Landowner on EC	Thinks there wasn't much study of property assessment in DEIS. Is worried about noise and light pollution in the country from the beltway. Feels a beltway would degrade property values. Thinks EC affects the most homes, and has bad design aspects. Says development of StCk affects traffic on the beltways; says this wasn't brought up 5-8 years ago. Wants more information on the No Build option. Is wondering if the beltway is needed at all. Thinks existing infrastructure improvements should be considered first. Thinks more information is needed on design and property evaluation.	See Notes 3 (acquisition), 14 (no build), 14 (traffic model), 21 (section line roads) and 10 (existing roadways). Other comments considered.
145	Lincoln resident	Against east beltway, but if you are going to do it look at EF. Thinks should widen 148th, 120th, 134th, 112th and 96th to five lane roads. Says to keep beltway as far east as possible since houses will be way out east in another 15-20 years anyway.	See Notes 1 (148th St), 21 (section line roads) and 10 (existing roadways. Other comments considered.
146	Landowner on SM	They will be 1,000 ft from the beltway. Says they were told decibels aren't high enough for the project to put in trees or anything else to screen out noise. They would like to get trees to screen out both noise and view of the beltway.	See Note 15 (noise). Mitigation is not typically provided unless there is an adverse noise impact. Landscaping options will be discussed with landowners during final design. Planting trees will not typically mitigate noise.
147	Lincoln resident	In favor. Thinks EC or EM best. Lives near 84th St and gets a lot of traffic going to I-80 or to grain elevators. Trucks are coming off of Hwy 2 and have no motivation to slow down, someone is going to get hurt. People are already pricing acreages very high in corridor so doesn't have sympathy for those saying their acreages are losing value.	Comments considered.

148	Landowners near EC	Supports EF. Lives near Pioneers and 98th. Doesn't think he'll be around when beltway is finally built. Says Pioneers near his house will have increased traffic. Says population of 220,000 shouldn't need an east beltway. Asks why didn't Lincoln do this earlier? Says 84th and 70th are not fully finished yet. When StCk opens up it will fill in quickly, therefore thinks beltway should be as far east as possible.	See Note 24 (traffic model). Other comments considered.
149	Landowner near EC	Supports EF. Thinks the 3 east routes chop up ground and don't leave enough ground to have an acreage (21 ac policy). Says only new residences on west bypass are multifamily because land can be bought cheaply; single family homes are built farther away. Says you won't be able to do anything with the land that remains because of small size parcels. Says to use 162nd St because there are no homes bothered, minimizes damage and already has an overpass at I-80 which can be used for a cloverleaf. He drives a school bus on 148th and sees heavy rock haulers and 12-15 semi's twice a day. Thinks should move location further east and go for it.	162nd St does not serve project purpose and need. Other comments considered.
150	Landowner on EC	Asks two questions (1) unsure about voting on EC (2) was never notified that EC was again being considered, therefore EC residents did not give opinions. Says there are three houses on EC not on map. Does not think there is a need for east beltway.	See Note 26 (voting). This determination was made in early 1999 in a letter from FHWA to NDOR. See Note 12 (houses). Landowner was contacted regarding missing information and some houses were added to figures and exhibits. Other comments considered.
151	Landowner on EC	Strongly against EC. He believed the June 1997 vote omitted EC. Says he asked city officials before he bought his property if there was any future development in the area. He moved into his new home in 1998 and found out that EC was brought back into the proposals. He wouldn't have moved if he knew this in advance. Believes a new survey has to be taken to reflect the number of new homes in EC corridor. Thinks MoPac Trail would be ruined by a beltway. Wishes StCk watershed remain undeveloped, but admits this may not happen. He doesn't think there will be adequate relief from the beltways. Supports widening inner city streets first.	See Notes 26 (voting) and 12 (houses). MOPAC will remain with all three east routes and crossing will be provided. See Notes 24 (traffic model), 10 (existing roadways) and 21(section line roads).Other comments considered.
152	Lincoln resident	He is in strongest support of EC because of the cost and least political resistance. Supports the beltway project overall. Owns land at 176th and Hwy 2. Wants EF and StCk area to remain rural.	Comments considered.
153	Landowner on EF	Lives on North 148th. Doesn't want things (proposed alignments) changed from the way they are shown on the maps . Says when the (EF) interchange in Waverly was added it turned the beltway away from him. Says 148th Street is used as truck bypass now. Doesn't have sympathy for StCk, they have been complaining forever.	Comments considered.

154	Landowners on EC	Say EC was removed from consideration in 1998. They feel offended that it has been brought back into consideration. Are worried about the resale of their property, air quality, water quality, noise, and visual impact. Say EC would cut through his 5-acre lot, and it would become useless. They won't have access to Holdrege St from this alignment. Says beltway would affect the drainage from his property, that there is a lack of cooperation with LPSNRD on this project, and EIS is flawed. Noise, water quality, and access to Holdrege Street are their major concerns. Wants beltway moved out to the county line.	See Notes 26 (voting) and 3 (acquisition). Air, noise, visual and water quality impacts were addressed in DEIS. Consultation with LPSNRD General Manager indicated that beltway routes and LPSNRD ponds can be engineered to be compatible, or impact can be mitigated. Data in DEIS was best available and considered relevant for a plannning document. Options will be discussed with landowners during final design. Beltway at county line will not serve project purpose and need. Other comments considered.
155	Landowner on EC	Feels the public or the media does not understand the noise impact of this study. Says that a noise level of about 66 dB would be a noise impact, and wonders how many people would hear the noise, no matter what the dB level is. Feels EC would have the most noise impact. Wants more study on noise for the public to understand.	See Note 15 (noise). Other comments considered.
156	Landowner on EF	Says the hearing did not represent a public hearing. She found numerous errors in the DEIS, and would address them in the future.	Comments considered.
157	Landowner on EM	Against EC and EM alignments. He is upset that the city council voted for EF two years ago, yet further environmental impact is being studied. He feels that if you can hear it or see in any way, it is a direct impact and is not in support of that. He wishes the corridor study would be widened to look at farther east alignments.He feels the vote of the city council should go the original way, and support EF.	See Notes 26 (voting) and 15 (noise). Visual impacts were been addressed in the DEIS. Other comments considered.
AGENCIES, INDUSTRIES AND OTHER ENTITIES			
158	Advisory Council on Historic Preservation Don Klima	Disagree with DEIS on urban sprawl; thinks not adequately addressed. Think cumulative impacts, including Comp Plan, are not adequately addressed for historic properties. Suggest a meeting among various consulting parties to discuss indirect effects and resolution of those effects.	ACHP advised FHWA of their interest in the project beyond their 15-day required time-frame. A public meeting was held in March 2001 and two public hearings were held in April 2001. Representatives of the study team, cultural resource consultants, SHPO, FHWA, NDOR and City were available throughout these meetings to discuss historic issues with consulting parties. See Notes 26 (urban sprawl) and 19 (cumulative impacts).
159	Cass County Rural Water District No. 2 Robert West	Easements and pipelines cross EF-1 at Holdrege, and EM-1 at Holdredge, Adams and Havelock. Concerned about City encroaching on their service area.	Locations of lines have been noted.

160	ENRON Jim Sanford	All 3 alternatives cross two lines each. Both lines would need to be replaced. Provided cost estimates for 2 types of replacement.	Locations of lines have been noted. Replacement costs have been considered in the cost estimates. Options will be discussed with ENRON during final design.
161	Environmental Law & Policy Center Ann Spillane	DEIS and 4(f) improperly fail to analyze full impacts to historic properties, ignores impacts on several sites, minimizes impacts on 5 identified sites, including secondary and cumulative impacts. Says impacts of EF trigger 4(f) to choose another feasible and prudent alternative, which has less impact to 4(f) properties.	See Notes 11 (historic issues), 19 (secondary and cumulative impacts) and 2 (4(f)).
162	Lincoln City Council Jerry Shoecraft	Against EF supports EM due to sensitive wetland areas and historic farms on EF. EM already along infrastructure and power lines which will reduce costs and would relieve inner city traffic, and get truck traffic closer to Lincoln business districts.	See Note 23 (traffic in Lincoln). Other comments considered.
163	Lincoln Electric System Dan Pudenz	No problems with SM, need to coordinate about possible joint corridor usage for their future projects. Problem with intersection of EM and their N-S line, would need to adjust in final design to minimize impacts.	Will work with LES regarding potential joint use in south beltway. Have met with LES to discuss options for EM, and information is included in Section 9.3. LES is not opposed to any route.
164	Lincoln-StarTran Larry Worth	Provided updated information on transit service in Lincoln. Requested consideration to integrate public bus transit complimentary to beltway.	FEIS has been updated to reflect this information.
165	Nat'l Trust for Historic Pres. Barbara Pahl	Request extension of comment period by 60 days.	Extension was granted for 30 days.
166	Nat'l Trust for Historic Pres. Perry Poyner	East beltway is on Trust's list of 11 Most Endangered Historic Places. Objects to Public hearing format. Will submit comments at later date.	See written comment No. 138 above. See Note 18 (public hearing).
167	Nat'l Trust for Historic Pres. Robert Niewig	Thinks there are problems not fully addressed. Urge FHWA to (1) refer disputed NRHP eligibility issues to Keeper of the NRHP with particular attention to boundaries, setting & associated acreage, (2) with the Advisory Council for Historic Preservation, convene meeting of consulting parties to discuss ways to correct DEIS esp. assessment of adverse effects, (3) require Supplemental EIS to address unresolved issues on historic resources. Problems with DEIS are that it fails to properly identifies historic properties within area of potential effect or properly establish boundaries, esp for Penterman, M. Smith, Herter-Hagaman, Retzlaff Farm, Haeger Dairy, Forest Brook Farm and StCk Stock Farm therefore assessment of adverse effect is flawed (2) fails to consider potential cumulative effects of future development on historic properties.	See Notes 11 (historic issues) and 19 (secondary and cumulative impacts). Trust letter was received after due date.
168	NE Dept of Aeronautics Diane Hoffer	Endorsed	No response required.

169	NE Dept of Natural Resources Steve McMaster	Provided maps of registered ground water wells, and surface water rights. Need to contact them if impact these. Requests minimizing floodplain impacts.	Locations of wells and water rights have been added to Figure 2.25. Floodplains were evaluated in the DEIS and will continue to be evaluated during final design.
170	Preservation Assoc. of Lincoln Peter Bleed	Comments forthcoming. Concerns re: preservation of historic landscape and structures, proper procedures in defining resources and public hearing.	See Notes 11 (historic issues) and 18 (public hearing). Other comments considered.
171	Preservation Assoc. of Lincoln Bleed, Bergt, Gutgsell, Schleicher, Scholz	Inadequate discussion of secondary and cumulative impacts, or mitigating measures. Concerned about farmland conversion impact rating, and documentation for scores. Object to Table 4.1 being used by decision makers as it has not been revised. Object to the public hearing format, that public letters and comments were not included in DEIS (expect to see them in FEIS), that elected officials voted to consider only the EF. All this taints the research and conclusions of the DEIS. DEIS lacks thorough study of no build or non-beltway alternatives due to biased views. Boundaries of historic properties need to be resurveyed as evaluation process was flawed. 4(f) evaluation is only cursory. Also, bring up evaluation by engineers/businessmen/UNL professor.	See Notes 19 (secondary and cumulative impacts) and 17 (prime farmland). NRCS scores were developed based on land uses in Table 3.1 and constraints map (see Section 9.7). Table 4.1 was part of DEIS and should be made available to the public. Revisions to the table have been made in the FEIS, as appropriate. See Note 18 (public hearing). Comment summaries are provided in FEIS in Section 9.1. Refer to pp. F.16 - F.20. See Notes 26 (voting), 14 (no build), 10 (existing roadways), 11 (historic issues) and 8 (economic isssues). PAL letter was received after due date.
172	USDA-Natural Resource Conservation Service-Lincoln Steven Chick	Prime farmland issues have been addressed. Other non-specific comments.	No response required.
173	US-DOD-Offutt Air Force Base Marty Hughes	Endorsed	No response required.
174	US-DOT-Federal Aviation Administration-Kansas City Mark Schenkelberg	No environmental comment; however, project must be evaluated from an airspace standpoint	Already evaluated airspace concerns relative to preliminary design and were no exceedences (see page 3.9). Need to reevaluate final design and construction methods 30 days prior to construction.
175	US-DOT-Federal Transit Administration-Kansas City Moktee Ahmad	(1) how was StarTran involved, (2) are factors listed still valid for decline in bus use, (3) was StarTran contacted regarding future transit in beltway corridor, (4) has consideration been given to transit use of Park and Ride lots at beltway interchanges?, (5) will the two Omaha Public Power District crossings be grade-separated?, (6) any measures for mitigation of mortality from wildlife crossings?, (7) were transit providers invited to scoping?	(1) StarTran provided review comments on DEIS, (2) text has been revised per StarTran comments, (3) see StarTran comment letter No. 164 above, (4) StarTran has provided a comment letter on this issue and their comments have been incorporated in FEIS, (5) yes, (6) See Note 27 (wildlife) (7) FTA was invited to scoping and management committee meetings but never attended. StarTran is managed by the City of Lincoln Public Works Department, one of the project sponsors.

176	US-Dept of Interior Wille Taylor	Defer on 4(f) until final 4(f), and dispute statement about future parkland conflicts. Says project may adversely affect threatened and endangered species which use Platte River if borrow material comes from Platte River watershed (depletion of flows), and need to address those species in DEIS. Recommend different wetland mitigation ratio. Disagree that wetlands are protected under other regulations and want wetlands protected. Say beltway will tie into I-80 and will encourage development, and therefore will degrade saline wetlands. Request cumulative impact study for saline wetlands.	Parklands discussion has been revised in FEIS. See Note 19 (secondary and cumulative impacts to Platte River depletions and saline wetlands). FHWA supports a commitment that all wetland impacts will be avoided if possible, and will be mitigated whether jurisdictional or not.
177	US-Environmental Protection Agency-Kansas City Leo Alderman	Gave EC-2 rating for all alternatives. Thinks DEIS needs to be made clearer to relate all work and studies that have been done previously, including incorporation of public comments. Need to include info on severed parcels. Recommend different treatment of wetland mitigation, including ratio. Want to see wetland impacts for no build. Says archeological survey for bottomland was not completed.	Meeting was held with EPA to discuss misunderstandings on the document (see letter below from J. Cothern). See Note 5 (bisected farm parcels). Archeological survey for the bottomland was completed according to all requirements of the SHPO. For a few locations where permission of access was denied, those properties will be surveyed upon acquisition (DEIS, p. 3.58).
178	US-Environmental Protection Agency-Kansas City Joe Cothern	Documented meeting with project sponsors to discuss previous comment letter. State that they now have a clearer understanding, including level of effort for archeological survey which exceeded normal practice. Recommend FEIS convey clearer summary of supporting documents and transitions between issues analysis, impact and mitigation.	Have attempted to clarify summary in FEIS.
179	US-Housing and Urban Development-Omaha Gregory Bevirt	Returned document since has no staff to review it	No response required.
180	Voice (Newspaper) Lynda Bryant	Favors bypass on south and east, but takes no position on location of east. Thinks new bypass should follow existing roads.	Comments considered.

9.2 SUMMARY OF THE LOCAL PREFERENCE DECISION PROCESS

The local preference decision for the south and east beltways studies has been a process that was envisioned in the original contracting phases of this project. It was discussed at various stages of the project, and has been the subject of intense interest in Lincoln and Lancaster County since late 1995. On 12 and 13 December 1995, the sponsoring partners (City of Lincoln, Lancaster County, Nebraska Department of Roads, and Federal Highway Administration) held scoping meetings and discussed the role of local government in the decision regarding the need for a beltway and any location issues.

Early recognition of the role of local government in the local preference decision was embodied in the consultant's scope of services, and this role crystallized as the local planning and elected officials began to monitor the project. In November 1996, the Lincoln City Council and the Lancaster County Board asked that the project be jointly monitored by the body of local elected officials, the Lincoln/Lancaster County Commons. In June 1997, the Lincoln/Lancaster Planning Commission joined the Commons in this monitoring process.

The approved scope of services, dated 1 October 1996, specified that the studies incorporate their findings in the Lincoln/Lancaster County Comprehensive Plan as part of the Long Range Transportation Plan and Transportation Improvement Program. Thus, the intent of local government to participate in the local preference decision was established early in the studies process. From that point, there have been numerous public meetings of the elected and planning officials of Lincoln and Lancaster County to keep abreast of the studies findings.

Publication of the Draft Environmental Impact Statement (DEIS) on 1 March 2001 established the formal declaration of the purpose and need for both south and east beltway projects in Lancaster County. It documented the project alternatives, including beltways, non-beltway options, and the no-build option. These alternatives were made available for public review at an advertised Public Meeting on 27 March 2001 at the Lancaster Events Center in Lincoln. Following that meeting, the Public Hearings on the DEIS were held on 23 and 24 April 2001 at the Berean Church in Lincoln.

Following the Public Hearings on the DEIS, the studies team assembled input from the Public Meeting and Public Hearings for use in the local preference decisions. The formal process for the local preference began with a briefing by the Lincoln/Lancaster Planning Department to the Super-Commons (Lincoln City Council, Lancaster County Board, and Lincoln/Lancaster County Planning Commission) on 8 May 2001. In that meeting, it was stated that the Planning Commission would hold hearings on the project first, and would then make recommendations to the Lincoln City Council and Lancaster County Board thereafter.

The Planning Commission received briefings on the project on 14 May 2001 and 27 June 2001. A bus tour of the studies area was conducted for the Planning Commission on 29 June 2001. The Planning Commission requested additional information on the beltways prior to formal public hearings of that body. A second bus tour of the beltways was conducted on 10 July 2001.

The Planning Commission conducted a Special Public Hearing at the County/City Building on 11 July 2001 to receive public input on the need for and possible locations of project alternatives. Four project alternatives were presented, including the (1) South Mid Route (SM-4), (2) East Far Route (EF-1), (3) East Mid Route (EM-1), and (4) East Close Route (EC-1). The no-build alternative was presented as the rejection of all four routes.

The Planning Commission requested additional information prior to their second Special Public Hearing, which was held on 18 July 2001 at the County/City Building in Lincoln. Then, on 23 July 2001, the Commission held a Public Meeting, also at the County/City Building. At that meeting, the Commission voted to amend the Long Range Transportation Plan and other portions of the 1994 Lincoln/Lancaster County Comprehensive Plan by including the SM-4 and EM-1 routes as future beltways. The Planning Commission also voted to reject the other alternative routes (EF-1 and EC-1). These recommendations were then forwarded to the City Council and County Board for their consideration.

The next step in the local preference decision was a bus tour of the Beltway area for the elected officials of Lincoln and Lancaster County. This tour was conducted on 10 August 2001. Following that, the City Council and Lancaster County Board held their first Joint Public Hearing on 15 August 2001 at the County/City Building in Lincoln. A second Joint Public Hearing was held on 22 August 2001, also at the County/City Building. After the hearing was closed, each body voted separately on the Planning Commission recommendations. The County Board voted to approve the recommendations and adopt them into the Comprehensive Plan. The City Council then also voted to accept the same recommendations and amend the Comprehensive Plan accordingly.

On 30 August 2001, the Mayor of Lincoln signed the amendments to the Comprehensive Plan, adopting the SM-4 and EM-1 routes for future beltways.

Comprehensive Plan Amendments Nos. 94-62 and 94-64, were approved for the SM-4 and EM-1 routes, respectively. With the Mayor of Lincoln's signature on 30 August 2001, they were officially adopted into the Long Range Transportation Plan of the Lincoln City-Lancaster County Comprehensive Plan.

9.3 REFINEMENT OF ALTERNATIVES IN RESPONSE TO PUBLIC COMMENTS

During the review process for the DEIS, concerns were raised about certain locations along the preferred alternative–the SM-4 and EM-1 corridors. These locations were:

1. On SM-4, just west of the South 54th Street crossing, the location of the corridor would require the taking of a farmstead and relocation of the owners.

2. On EM-1, between A Street and O Street, the corridor passes in the vicinity of an archeological site and where the 100-year floodway for Stevens Creek is fairly wide. The corridor shown in the DEIS clipped the corner of the archeological site and crossed the floodway at a skew, which increased the length of the bridge structure.

3. On EM-1, between Adams Street and Fletcher Avenue, the corridor crosses Lincoln Electric System (LES) overhead power lines at a skew. This would require the relocation of several overhead electrical line towers.

To address the concerns, these corridor locations were further analyzed. More detailed topographic information was received from Lancaster County which was used to develop more accurate horizontal and vertical curves at each location. Using this information and keeping the same criteria as with the earlier design, the alignments were refined to minimize impacts in the areas of concern. A report entitled "South and East Beltways Alternative Alignment Analysis, November 2001, HWS Consulting Group Inc." provides details of the various alignments studied along with the impacts associated with each. In every case, the concerns identified by the public relating to the farmstead, archeological site, and power lines could be addressed through minor changes in the earlier alignments.

Specifically, the refined alignments (1) avoid taking the farmstead and do not require relocating the residents, (2) avoid the archeological site, and (3) avoid the need to relocate any of the LES towers. The refined alignments result in $746,000 lower costs for SM-4 and $4,596,000 higher costs for EM-1. The lower costs for SM-4 are mainly due to having less earthwork than anticipated with the earlier design. The higher costs for EM-1 were due to lengthening the bridge over Stevens Creek, raising the beltway over A Street, and the addition of a retaining wall. There are no additional impacts to homes or businesses as a result of these alignment changes; however, there are minor changes in environmental impacts. Tables 2.16, 2.17 and 4.1, and Exhibits SM4-2, EM1-3 and EM1-4 have been modified to reflect these changes.

9.4 BENEFIT-COST ANALYSIS: A RESPONSE TO PUBLIC COMMENTS

Opponents to the construction of the EF-1 Beltway alignment submitted an anonymously authored critique that identified a number of areas where the DEIS may have incorrectly calculated the economic costs and benefits of the various east beltway routes. While the critique suggests there were errors in the analysis, the conclusions with respect to the relative cost-effectiveness of each of the east beltway alternatives, were unchallenged. The disagreement appears to be in areas where the author may not be familiar with transportation economic analysis techniques or where a change in assumptions would not significantly affect the conclusions. The following will address the issues in the order and format they were presented in the critique.

9.4.1 First Analysis

As indicated by the author of the critique, the first benefit-cost analysis presented in Section 2.3.6 of the DEIS was a detailed evaluation of the finalist alternatives using the transportation model that was in effect during 1997 when the analysis was conducted. This model used the Build Out Scenario (BOS) land use plan and a transportation network that reflected planned improvements over a 20-year period. The criticisms of this analysis include that it underestimated maintenance costs and did not properly identify residual values.

The analysis used FHWA data on maintenance for similar facility types. No information was available from the NDOR as to maintenance costs for a freeway facility at the time the economic analysis was conducted. Since maintenance costs are very low in comparison to the cost of constructing the beltway, and the costs for all three (3) east beltway alignments would be similar, the usefulness of a more accurate maintenance cost is questionable. Even doubling the assumed annual maintenance costs of approximately $120,000 per year would not materially affect the benefit-cost ratio or the comparison of the three (3) beltway alignments. Therefore, this is not considered to be a significant issue.

The other critique of the detailed economic analysis was a failure to treat residual value properly. The DEIS clearly states the assumptions that were used to calculate the residual value of the proposed improvement after the analysis period. This procedure has been used for a number of similar transportation studies without challenge. The author does not offer a different procedure; therefore there is nothing to compare with the procedure used in the DEIS.

9.4.2 Second Analysis

After the first economic analysis was completed, the City and County amended the BOS Land Use Plan by expanding future growth into the southern and northern fringes of the city. The new plan, called BOSII, required the City to update the Travel Demand Model to reflect the new growth areas and planned roadway improvements. The second beltway economic analysis compared the results of the earlier traffic projections with BOSII. The travel demand model using the BOSII Land Use Plan showed a significant change in the amount of travel on the beltways as compared to the BOS Land Use Plan. Traffic volumes on the beltways increased significantly, resulting in even greater time savings for motorists if the beltways were constructed.

The purpose of the second analysis was not to conduct a detailed economic analysis as was done with the earlier travel demand model. Instead, the purpose was to show, in terms of travel benefits, the relationship between the Close, Mid and Far alternatives (which were similar) and benefits from construction of a beltway (which were even greater than anticipated). The following addresses the concerns identified in the second analysis:

Wrong Construction Costs Were Used. The critique suggests that Level III analysis construction costs were used rather than Level IV in the second analysis. This was intentional because the entire discussion regarding the second analysis involved building upon the information derived from the first economic analysis that used Level III construction costs. The discussion in the second analysis was included only to verify that an additional economic analysis in Level IV was not necessary.

Travel Time Savings were Calculated Based on Lancaster County Population of 374,630. The critique suggests that the future year population should not be used without discounting the benefits derived from the beltway by 7 percent for 30 to 46 years. The analysis does not discount the benefits nor does it inflate the value of time savings for the same time period.

A more detailed and significantly more conservative approach to determining cost-effectiveness was completed in the FEIS. **Section 2.4.5** (second paragraph) examines economic benefits by discounting future year time savings and comparing them to beltway depreciation over a 25-year period. In this analysis, the payback period is 13 years after construction, which is still below the 20-year planning horizon (see **Figure 2.18**). Attached T**able 9.1** summarizes the assumptions in this analysis.

Table 9.1
BENEFIT-COST ANALYSIS FOR SM-4/EM-1 BELTWAY
BOS II LAND USE PLAN

YEAR	TIME SAVINGS ($1,000's)			RESIDUAL VALUE[3] ($1,000's)			DEPRECIATION[4] ($1,000's)	BENEFIT/ COST RATIO
	FUTURE VALUE[1]	PRESENT VALUE[2]	CUMULATIVE PRESENT VALUE	STRUCTURES	PAVEMENT	GRADING/RW		
2027								
2026								
2025	43511	8017	136661	58934	35524	58745	97641	1.40
2024	41336	8149	128644	60136	36749	58745	95214	1.35
2023	39160	8261	120495	61364	38016	58745	92719	1.30
2022	36985	8348	112234	62616	39327	58745	90156	1.24
2021	34809	8407	103886	63894	40683	58745	87522	1.19
2020	32633	8433	95479	65198	42086	58745	84815	1.13
2019	30458	8422	87046	66528	43537	58745	82033	1.06
2018	28282	8368	78624	67886	45039	58745	79174	0.99
2017	26107	8265	70257	69272	46592	58745	76236	0.92
2016	23931	8106	61992	70685	48198	58745	73215	0.85
2015	21756	7885	53885	72128	49860	58745	70111	0.77
2014	19580	7593	46000	73600	51580	58745	66920	0.69
2013	17405	7222	38407	75102	53358	58745	63639	0.60
2012	15229	6762	31184	76635	55198	58745	60266	0.52
2011	13053	6202	24423	78199	57102	58745	56799	0.43
2010	10878	5530	18221	79795	59071	58745	53234	0.34
2009	8702	4733	12691	81423	61108	58745	49569	0.26
2008	6527	3799	7958	83085	63215	58745	45800	0.17
2007	4351	2710	4159	84780	65395	58745	41924	0.10
2006	2176	1450	1450	86510	67650	58745	37939	0.04
2005	0	0	0	88276	69982	58745	33841	0.00
2004								
2003								
2002								
2001								
2000								

[1]Assumes $14.15/hr value of time x 10,250 hours saved/day x 300 days/yr in Year 2025
[2]7% discount rate.
[3]Structure Life = 50 years, Pavement Life = 30 years, Grading and ROW Life = Infinite
[4]Depreciation = Total Project Cost - Total Residual Value

9.4.3 Lancaster County Population Data.

The critique stated that the values in Figure 2.17 of the DEIS contradict Lancaster population data. A comparison of the projected 2020 population (BOS Land Use) and the 2025 population (BOS II Land Use) shows that the expected increases in population as compared to the expected amount of travel in the Metropolitan area are consistent. **Table 9.2** indicates that the expected changes in vehicle miles traveled and vehicle hours traveled are proportional to the expected population increase.

Table 9.2
POPULATION AND TRAVEL CHARACTERISTICS COMPARISON

Land Use Plan	Anticipated Population	Percent Change	Daily Vehicle Miles Traveled	Percent Change	Daily Vehicle Hours Traveled	Percent Change
BOS	315,000		6,903,000		243,000	
BOS II	374,000	+ 19 %	8,046,000	+ 17 %	309,000	+ 27 %

The projected time savings with a beltway using the BOSII Land Use Plan is 300 percent greater than time savings obtained with the BOS Land Use Plan. This does not mean total vehicle hours of travel in the metropolitan area will improve 300 percent. The estimated time savings achieved by building the beltways, using the BOSII model, is between 8,500 and 10,000 vehicle hours per day depending on which east beltway alignment is selected. This represents approximately 3 percent of the total daily vehicle hours traveled in the metropolitan area.

9.4.4 Accident Reduction Savings

The critique indicates there have been improvements in accident statistics over the past several years that were not taken into account by the Economic Analysis. While the number and severity of accidents have been improving nationwide, it is still clear that the relationship between various roadway facility types and accident rates remains constant. Freeways are safer than arterial streets in terms of the average number of accidents that occur per vehicle, per mile. Freeway traffic is not subject to the conflicting movements that arterial streets have with abrupt stops, driveways, cross streets, traffic signals, etc. The accident reduction estimates used in the DEIS reflect the fact that some traffic now using arterial streets will be using the freeway (beltways). The estimated accident savings reflect the relative differences between accident rates of the two types of facilities rather than overall accident rates for all roadway types.

9.4.5 Maintenance Costs

The critique stated that maintenance costs were less than half of the historical rates identified by NDOR. At the time the Benefit-Cost Analysis was conducted, no maintenance information for freeways was available from the NDOR. The only FHWA information available was for similar facility types. If the maintenance costs were doubled for each of the roadways, it would have no significant effect on the economic feasibility of the roadways. In addtion, it would not change the relationship of each of the east beltways with respect to cost-effectiveness.

9.4.6 Construction Costs Estimates

The critique stated that construction cost estimates in Tables 2.9 and 2.10 did not agree. A review of the construction cost estimates in each table indicate that there are differences. These differences are due to the fact that **Table 2.9** does not include costs for connecting links (paving arterial roadways up to the beltway interchanges) to the beltway which were included in **Table 2.10.** The cost of connecting links represent approximately 3 percent of the overall beltway construction and would not significantly change the feasibility analysis or the comparison of one beltway alignment to another.

9.4.7 Costs of Improving Connector Roads

The critique stated that the costs of improving connector roads were not included in any of the analyses. See **Section 9.4.6** above.

9.4.8 The Most Cost-Effective Alternative

The critique indicates the most cost-effective alternative was to build the south beltway and improve existing section line roads between N-2 and I-80. While this may have been the most cost-effective alternative, it did not achieve the goals and objectives of the study. The Purpose and Need Statement in the DEIS states the beltway was to provide a "Circumferential Transportation System" around Lincoln. The likely non-beltway alternatives could not provide that function because they do not connect to I-80 . They also have excessive impacts to adjacent properties. In addition, improvements to roadways such as 84th Street, 98th Street, 112th Street, and 148th Street will likely occur with or without construction of a beltway. The City of Lincoln will improve these roadways to 4-lane as development occurs in the future to maintain the existing one-mile grid pattern.

9.5 STATUS OF HISTORIC ISSUES SINCE CIRCULATION OF THE DEIS

9.5.1 Comments on Historic Issues

Comments on the DEIS, including written comments and oral testimony, were compiled and summarized. Comments regarding historic issues primarily concerned the following issues:

1. Secondary and Cumulative Impacts. The most frequent comment on historic properties was regarding secondary and cumulative impacts, and specifically, the likelihood of the beltway to cause development and urban sprawl to the point of having an adverse effect on historic structures, and specifically on the Stevens Creek Stock Farm. Comments of the National Trust for Historic Preservation, Environmental Law and Policy Center, and landowners in the beltway study area have only ever raised concerns about secondary and cumulative impacts to historic properties on the EF-1 route. While the Preservation Association of Lincoln (PAL) raised the issue for all east routes in their letter dated 15 June 2001, they changed their opinion in testimony at the City/County Public Hearing on 15 August 2001 where the president of PAL urged that the preferred alternative be the EM-1 route.

2. Boundaries of the Historic Properties. Several letters from historic preservation organizations and landowners stated that the boundaries of the historic properties were delineated too narrowly. With the exception of PAL, all comments focused on the EF-1 route only. In general, the commentors felt that most of the properties should be defined as the original parcel of land containing the historic structure, or in the case of the Stevens Creek Stock Farm, all agricultural land holdings of the property owners during the period of significance. Documentation was provided for changing the boundaries of the Theresa Retzlaff (Forest Brook) Farmyard and Sartore (Herter-Hagaman) Farmyard. Various acreage amounts or descriptive requests were made for the Stevens Creek Stock Farm, Retzlaff Farms, Penterman Farmyard, Haeger Dairy, and Michael Smith Farmyard.

3. Additional Historic Property. Two letters stated that the Wenzl Farmyard/Barn had not been considered as a historic site.

4. Assessment of Adverse Affects. Several property owners and PAL stated that the Assessment of Adverse Affects did not adequately assess all impacts to the properties, including noise, visual, lighting, traffic impacts, fuel smells, trash and crime. With the exception of PAL, all comments focused on the EF-1 route only.

5. Advisory Council on Historic Preservation (ACHP). The ACHP requested that FHWA seek a formal determination from the Keeper of the National Register for the boundaries of seven historic properties on the EF-1 route consisting of the Herter-Hagaman Farm, Forest Brook Farm, Penterman Farm, Michael Smith Farmyard, Haeger Dairy, Alan and Shirley Retzlaff Farm, and Stevens Creek Stock Farm.

9.5.2 Field Trip on Historic Issues.

A field trip was conducted on 17 October 2001 to (1) revisit the historic properties, (2) visit an additional 320 ac requested for inclusion in the Stevens Creek Stock Farm, (3) revisit the Wenzl Farm on EC-1, and (4) discuss potential mitigation strategies for historic sites with adverse affects along the SM-4 and EM-1. Participants included:

Bill Callahan	Nebraska State Historical Society, SHPO
Stacy Stupka-Burda	Nebraska State Historical Society, SHPO
Ed Kosola	Federal Highway Administration, NEPA Coordinator
Rod O'Sullivan	Federal Highway Administration,
Len Sand	Nebraska Department of Roads, Environmental Analyst Supervisor
Ed Zimmer	City-County Planning Department, Historic Planner
Scott Cockrill	City Engineering, Senior Engineering Specialist
Jim Linderholm	HWS, Principal-in-Charge
Brian Ray	HWS, Transportation Engineer
Amy Zlotsky	AZ Environmental, Environmental Scientist
Stan Parks	University of Nebraska, Research Archeologist

9.5.3 Secondary and Cumulative Impacts.

A discussion of secondary and cumulative impacts to historic properties has been added to the FEIS (see **Section 9.6**).

9.5.4 Boundaries of the Historic Properties.

The Herter-Hagaman Farm, Forest Brook Farm, Penterman Farm, Michael Smith Farmyard, Haeger Dairy, and Alan and Shirley Retzlaff Farm are all located on EF-1. Since this alternative is not being developed, FHWA has determined that no additional analysis of the property boundaries is necessary at this time. In addition, an important reason why the EM-1 route was selected was because it minimized impacts to these historic resources.

9.5.5 Evaluation of the Additional Acres for the Stevens Creek Stock Farm

A consulting party had previously requested that an additional 560 ac be added to the 240 ac already on or eligible for the NRHP--for a total of 800 ac–which were owned by Charles Retzlaff by 1888 (defined by NSHS letter dated 18 September 1995). With the additional information that none of the 560 ac were contiguous with the 240 ac, the SHPO stated that the 560 ac were not considered eligible. Following receipt of this second request for consideration of the 560 ac, the SHPO again stated that the 560 ac were not considered eligible because they were not contiguous to the original 240 ac.

This consulting party further requested that an additional 320 ac, not previously requested for consideration, be considered eligible for the NRHP because these were part of the Stevens Creek Stock Farm during the period of significance. Therefore, research was conducted in the Registrar of Deeds records to determine ownership history of these parcels. The information was provided to the consulting party for their review, and then was provided to the SHPO. All of the parcels were acquired by Charles Retzlaff or his son George by 1909 which predates construction of some of the historic structures. Most, but not all of the parcels are contiguous with the 240 ac which are on or eligible for the NRHP, or they are contiguous with each other.

Of the parcels in the additional 320 ac, two are in close proximity to the preferred alternative, EM-1. Assessment of adverse affects to these two properties relative to the preferred alternative were discussed during a field trip conducted on 17 October 2001.

The first parcel is west of the Stevens Creek Stock Farm (West Half of the Northeast Quarter of Section 5, Township 9 Range 8). FHWA has determined that at least a portion of the west parcel would be eligible for the NRHP because (1) it was acquired by Charles Retzlaff during the period of significance (1850 to 1924, according to NPS data base) and (2) at least the southern portion of the property retains enough integrity to contribute to the rural landscape of the Stevens Creek Stock Farm (the parcel has serious integrity problems in the northwest and west portions of the property, including a modern log cabin residence and high voltage transmission line).

The second parcel is located south of the Stevens Creek Stock Farm (Northeast Quarter of the Southeast Quarter of Section 5, Township 9 Range 8 and Northwest Quarter of the Southwest Quarter of Section 4, Township 9 Range 8). FHWA has determined that the second parcel is eligible for the NRHP because (1) it was acquired by George Retzlaff during the period of significance and (2) at least the east portion of the parcel retains enough integrity to contribute to the rural landscape of the Stevens Creek Stock Farm (there is a non-historic dam and pond on the west side of the parcel).

The SHPO has concurred with the FHWA determinations by signature dated 30 January 2002 (**Appendix E**).

9.5.6 Additional Historic Property.

The Wenzl Farm was revisited during the field trip, and the SHPO restated that neither the barn nor the farmstead had the significance or integrity to be eligible for the NRHP. Specifically, the barn was not individually architecturally significant, and it had been subject to many alterations, including the addition of an I-beam lean-to, replacement windows, and a newer corrugated metal roof. In addition, the setting was no longer intact with a modular home on the property.

9.5.7 Assessment of Adverse Affects.

All of the comment letters which comment on the assessment of adverse affects are in regards to properties on EF-1, and none of these properties are affected by the preferred alternative– SM-4/EM-1. A reassessment of adverse affects was conducted only for the preferred alternative. In consultation with the SHPO, FHWA determined that there were no additional adverse affects to properties on the preferred alternative. The noise evaluation was also checked, and no noise impacts were identified at the historic sites.

Further, FHWA has determined that the EM-1 alternative will have no adverse affects on the first additional Stevens Creek Stock Farm parcel because (1) EM-1 is located approximately 300 ft west of the parcel and takes no land from the parcel for either the beltway or overpass, (2) there is a high-voltage transmission line located between the parcel and EM-1, (3) the property has been subdivided with a modern log cabin and tree-lined driveway constructed on a 6-ac lot in the northwest portion of the property, and (4) the historic structures of the Stevens Creek Stock Farm are already screened from the EM-1 route by the tree line of Stevens Creek.

FHWA has also determined that the EM-1 alternative will have no adverse affects on the second additional Stevens Creek Stock Farm parcel because (1) EM-1 is located more than 0.25 mi west of the parcel and takes no land from the parcel, (2) there is a high-voltage transmission line located between the parcel and EM-1, and (3) the historic structures of the Stevens Creek Stock Farm are already screened from the EM-1 route by the tree line of Stevens Creek.

The SHPO concurred with the FHWA determinations of no effect by signature dated 30 January 2002 (**Appendix E**).

9.5.8 Advisory Council on Historic Preservation.

Since receipt of the ACHP letter, the SM-4/EM-1 route has been identified as the preferred alternative. Since all of the properties listed in the ACHP letter are on the EF-1 route and none are affected by the EM-1 route, FHWA made the decision that it was not necessary to seek a determination from the Keeper of the National Register.

An additional 320 ac were evaluated for the Stevens Creek Stock Farm to determine if the EM-1 alternative would affect any of the property. Based on this evaluation, two additional parcels (west and south of the original 240 acre site) were considered eligible for the NRHP; however, FHWA determined that EM-1 would have no adverse affect on the additional parcels, or on the original 240 ac of the historic site. The SHPO concurred with these determinations.

At a meeting conducted in February 2002 with the ACHP and the National Trust for Historic Preservation (NRHP), these agencies stated that it was reasonably foreseeable that the EM-1 beltway could potentially cause adverse secondary and cumulative affects on some historic properties, and specifically the Stevens Creek Stock Farm. They felt that a beltway would induce "development", potentially changing the timing and character of development near historic properties. It was suggested that appropriate mitigation should be offered to the owners of the historic properties. Their main recommendation for mitigation was to establish conservation easements on the historic properties.

In regards to the proposed mitigation, it was pointed out that the owners of the Stevens Creek Stock Farm, as well as the Preservation Association of Lincoln, had previously expressed written opposition to the use of conservation easements. Copies of their letters were provided to ACHP and NRHP. Upon additional discussion with FHWA, the owners of the Stevens Creek Stock Farm again stated their opposition to pursuing conservation easements with FHWA.

In regards to the beltway inducing development, it is not reasonably forseeable to assume that the EM-1 beltway route will have potential adverse secondary and cumulative effects on the Stevens Creek Stock Farm or other historic sites. This statement is based on analysis of local conditions and the facts of the specific EM-1 route, such as (1) the City of Lincoln has a unique and long history of managed, contiguous growth, (2) the community contemplates development in the Stevens Creek basin--with or without a beltway, (3) the community's proposed plans are to develop in the Stevens Creek area, prior to the construction of the beltway, thus the beltway will not change the timing of the planned growth, (4) while interchanges may change the character of development nationwide, interchanges in the EM-1 route have been planned to avoid roads (specifically Van Dorn Street which is adjacent to the Stock Farm) which could impact historic properties, thus the beltway will not change the character of the development near historic properties, and (5) development is proposed to be restricted in the floodplain areas (greenspace) which cover much of the Stevens Creek Stock Farm and vicinity.

9.5.9 Mitigation Plan for Historic Properties along SM-4/EM-1

A mitigation plan has been developed to cover the two historic properties which are adversely affected by the preferred SM-4/EM-1 alternative. These are the Henry Wunibald Farmyard on SM-4 and the Steve Johnson Farmyard on EM-1. Modification of the EM-1 alignment made it possible to avoid archeological site 25LC129. The mitigation plan is based on observations and discussions from the field trip, recommendations by the SHPO, input from a professional landscape architect, and meetings with the property owners.

A Draft Memoranda of Agreement was developed to implement the mitigation plan. The document, along with a draft version of Chapter 9 of this FEIS, was provided to the property owners and consulting parties, including the ACHP and NTHP. A public meeting on historic mitigation was conducted for the property owners and consulting parties on 12 February 2002.

Approximately 24 people attended the meeting, including representatives of the ACHP, NTHP, SHPO and Preservation Association of Lincoln. Seven written comments were received over the 10-day comment period. Comments related to historic issues covered the following topics:

1. Two landowners on EM-1 objected to the revised boundary of the Stevens Creek Stock Farm as it included their properties. The boundary changes were made without their permission. One owner expressed concern that they would now be subject to federal permits or stipulations on receiving federal subsidies.

2. The owner of the non-historic log cabin residence (located on the additional NRHP-eligible parcel west of the Stevens Creek Stock Farm) expressed concern about noise impacts from EM-1.

3. The owner of the Henry Wunibald Farmyard expressed concern that their non-historic farmyard would be more adversely affected by noise impacts from SM-4 that the NRHP eligible property.

4. The FEIS should address the impacts on the Stevens Creek Stock Farm from additional traffic on 138th which is traveling from the EF-1 interchange on Pioneers Boulevard to Van Dorn Street.

5. Certain consulting parties felt that properties along all the routes should be studied for possible boundary changes.

6. The NTHP believes that the beltway will have the potential for cumulative and indirect effects on historic properties, and suitable mitigation strategies should be developed.

7. Certain consulting parties felt that the FEIS should contain a statement that the EF-1 alternative is eliminated from any future consideration. They did not feel that selection of EM-1 was strong enough assurance that the EF-1 route would never be reconsidered.

Based on comments, the MOA was finalized (**Appendix E**). The mitigation plan, as described in the MOA, is as follows.

Henry Wunibald Farmyard. The primary emphasis of the mitigation proposal is to screen the view of the beltway from the house and yard. Presently, the north and west sides of the property are lined with many mature deciduous trees (cottonwood, mulberry, walnut) which extend up to the house. While the existing trees screen the view from the house and yard during the growing season, the beltway would be visible during winter. The period of significance for this site is 1901-1950 which includes the period when shelterbelts and windbreaks were a part of the farm culture. Some existing trees on the property appear to be remains of old windbreaks to the north and west of the residence.

Prior to implementation of the undertaking, NDOR, in consultation with the SHPO, shall design a landscape site plan to screen the view of the beltway from the farmyard, and shall ensure that the area is landscaped in accordance with the approved plan. The plan shall consist at a minimum of a windbreak planting along the north and west sides of the farmyard in the general area of the original windbreak. This may include up to three rows: a shrub, cedar trees, and possibly a deciduous tree, such as cottonwood. Further refinement of plant types and spacings will be addressed as part of final design.

In order to implement the landscape plan, NDOR shall obtain an easement or agreement with the property owners of the Henry Wunibald Farmyard or adjacent property owners to the west.

Steve Johnson Farmyard. The primary emphasis of the mitigation proposal is to screen the view of the beltway from the house and yard. South of Yankee Hill Road, the beltway would be hidden by a hill across the road and to the east of the site. North of Yankee Hill Road, the beltway would be visible to a point about 0.25 mi north of the road; further north it is hidden by another hill. There is a small creek with trees within 100 to 300 ft of the beltway--between the beltway and the house. On the property itself, there is a line of mature cedar trees along the driveway, and a number of scattered shrubs and deciduous trees west of the tree line. These trees hide the view of the beltway from the house itself, but not from the yard west of the drive.

The period of significance for this property is 1890-1936. While windbreaks, for the most part, are outside of this historic period, it is reasonably in context with the site to add a lilac or similar large shrub hedge.

Prior to implementation of the undertaking, NDOR, in consultation with the SHPO, shall design a landscape site plan to screen the view of the beltway from the farmyard, and shall ensure that the area is landscaped in accordance with the approved plan. The plan shall consist at minimum of a screen, large shrub, or hedge planting along the west side of the farmyard, extending north from Yankee Hill Road to the north end of the corral. This is anticipated to consist of one row (hedge) of lilacs or similar large shrub. Further refinement of plant types and spacings will be addressed as part of final design.

In order to implement the landscape plan, NDOR shall obtain an easement or agreement with the property owners of the Steve Johnson Farmyard or adjacent property owners to the west.

Easements. In order to address the potential cumulative effects on historic properties in the Area of Potential Effect for the Lincoln South and East Beltways Project, the National Trust for Historic Preservation and other consulting parties agree to assist owners of such historic properties who may be interested in donating historic preservation or conservation easements. Such assistance may include conducting workshops on easements, providing information on potential easement-holding organizations in the local area, and serving as a resource for technical assistance in developing easement documents.

Archeological Site 25LC129. Based on discussions during the site visit on 17 October 2001, further engineering refinements were evaluated (see **Section 9.3**). From the reanalysis, it appears possible to completely avoid impacts to the archeological site by incorporating a retaining wall on the west side of the beltway right-of-way. No additional mitigation is proposed.

Additional Cultural Resource Management Activities. Other activities will include:

- Completion of an archeological survey of bottomlands where access has been previously denied.
- Use of NDOR standard provisions regarding previously unsuspected archeological remains that provide for cessation of work and notification of the SHPO
- Use of NDOR standard provisions regarding monitoring of archeological sites.
- A historic marker located at Saltillo Road and the abandoned South 14th Street right-of way will need to be relocated. The marker commemorates the Nebraska City to Fort Kearny Road, "The Great Central Route to the Gold Fields" which crossed near this location. There are no remnants of the trail known within or near the SM-4 right-of-way.

9.6 SECONDARY AND CUMULATIVE IMPACTS EVALUATION

This evaluation has been prepared to address agency and public comments regarding inadequacies in the secondary and cumulative impacts sections in the DEIS for the south and east beltways project. This evaluation brings together in one location new information as well as information previously provided in several different chapters in the DEIS.

In compliance with NEPA and the Council on Environmental Quality (CEQ) regulations, secondary and cumulative effects of a project should be examined as part of the Environmental Impact Statement review. CEQ defines secondary (or indirect) effects as:

> "effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water on other natural systems, including ecosystems" (40 CFR 1508.8(b)).

CEQ defines cumulative impact as:

> "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time" (40 CFR 1508.7).

Additionally, Section 106 of the National Historic Preservation Act requires that a federal agency evaluate adverse effects to historic properties, including "reasonably foreseeable effects caused by an undertaking that may occur later in time, be farther removed in distance or be cumulative" (36 CFR 800.5 (a)(1)).

9.6.1 Resources and Ecosystem Components

During the review period for the DEIS, concerns were raised regarding secondary and cumulative impacts on (1) historic resources, (2) farmland, (3) saline wetlands and other wetlands, and (4) flows in the Platte River. Due to the extensive public and agency review of the DEIS, this supplemental discussion is focused on these four resources.

Historic Resources. The most frequently raised issue during the beltway review process was the potential cumulative impact on historic resources, and specifically, the likelihood of the beltway to cause development and urban sprawl to the point of having an adverse effect on historic properties. The National Trust for Historic Preservation has stated that the beltway would create secondary and cumulative adverse effects by inducing the construction of new residential, commercial and industrial development that is inconsistent with the historic character of the landscape. The Advisory Council for Historic Preservation has stated that any increased access to rural areas has the potential to diminish the rural setting and therefore the historic resources. Comments of the National Trust for Historic Preservation, Environmental Law and Policy Center, and landowners in the beltway study area have focused concerns about secondary and cumulative impacts to historic properties on the EF-1 route. While the Preservation Association of Lincoln (PAL) raised the issue for all east routes in their letter dated

15 June 2001, they changed their opinion in testimony at the City/County Public Hearing on 15 August 2001 where the president of PAL urged that the preferred alternative be the EM-1 route. This discussion addresses all beltway routes.

Farmland. The PAL and certain landowners in the beltway study area have raised concerns about secondary and cumulative impacts to farmland relative to the assumptions used in completing the NRCS Farmland Conversion Impact Rating (USDA Form AD-1006).

Flows in the Platte River. The U.S. Fish and Wildlife Service (FWS) has determined that the beltway project may adversely affect federally listed species which utilize habitat areas along the Platte River. These species include the pallid sturgeon (*Scaphirhynchus albus*) which is known from the lower reach of the Platte River, the interior least tern (*Sterna a. athalassos*) and piping plover (*Charadrius melodus*) which nest on sand and gravel bars in the Platte River, and the western prairie fringed orchid (*Platanthera praeclara*) which occurs in subirrigated wet meadows along the Platte River. Although the beltway is located 30 mi from the Platte River, the FWS alleges that any construction project which (a) obtains borrow material from any location in the Platte watershed and (b) results in the exposure of surface or ground water in the excavated pit, will result in evaporation and will deplete instream flow contributions to the Platte River. FWS further considers any depletion of flows from the Platte River system to be significant.

Saline Wetlands and Other Wetlands. The FWS has stated that the beltway project could indirectly impact the regionally unique Saline Wetland Complex of Eastern Nebraska (SWC) and other wetland systems in the Stevens Creek drainage because the beltway will facilitate future urban development in Lincoln/Lancaster County. Additionally, FWS implies that the extent of cumulative impacts from the beltway extends to other aquatic and terrestrial resources occurring within the lower Platte River Valley because the beltway will connect to I-80, and there are plans to widen I-80 through Lincoln and on to Sarpy County, including a bridge over the Platte River at the Cass/Sarpy County line.

9.6.2 Geographic Boundaries and Time Period

Geographic Boundaries. Several geographic boundaries are appropriate for this discussion.

South and East Beltways Study Area. The south and east beltways study area boundary, as shown in **Figure 1.1 of the DEIS**, is an 80 sq mi area that has been studied intensively as part of the NEPA review process. This same area was defined as the Area of Potential Effect (APE) as part of the Section 106 consultation.

Comprehensive Plan Future Service Limit. The approved Lincoln/Lancaster County Comprehensive Plan includes a future service limit which is defined as the area to be included inside the City limits and provided with City services in the future. The most current version of the plan is shown in **Figure 3.1 of DEIS** and includes the limits from the 1994 Comprehensive Plan and subsequent amendments. The Comprehensive Plan is currently being revised and is expected to be approved in May 2002.

Saline Wetland Complex of Eastern Nebraska. This area covers portions of the Salt Creek watershed in Lancaster and Saunders Counties as described by Gersib and Steinauer (1991). These areas are influenced by saline geologic deposits and resulting saline influences on the groundwater.

Platte River Watershed. This is the land area that contributes surface water runoff to the Platte River and its tributaries. This area applies only to the discussion of cumulative impacts to flows in the Platte River.

Time Period. The approved Lincoln/Lancaster County Comprehensive Plan uses a 25-year planning period, from present to 2025. A new Comprehensive Plan is currently under review which has a 25-year period as well as 25-to-50 and greater than 50-year planning periods.

9.6.3 Data Sources

This evaluation has been conducted using readily available data, observed local trends, and discussions with knowledgeable persons. It has not included developing predictive modeling or other predictive tools which are beyond the scope of this effort. The primary sources for this evaluation have included:

Currier, P.J., G.R. Lingle, and J.G. VanDerwalker. 1985. *Migratory Bird Habitat on the Platte and North Platte Rivers in Nebraska.* The Platte River Whooping Crane Critical Habitat Maintenance Trust, Grand Island, Nebraska.

Gersib, R.A. and G.A. Steinauer. 1991. *A biological inventory and general assessment of eastern Nebraska saline wetlands in Lancaster and southern Saunders Counties.* Transactions of the Nebraska Academy of Sciences, Vo. XVIII:37-44.

Lincoln - Lancaster County Planning Department. 1994. *Lincoln City-Lancaster County Comprehensive Plan.* Lincoln, Nebraska

Lincoln/Lancaster County Planning Department. September 2001. *Blueprint: Lincoln and Lancaster County 2025 Comprehensive Plan, 3rd Edition.* Lincoln, Nebraska.

On-Site Photography and Preservation. August 1998. *Lincoln South and East Beltways Historic Survey Report.* Lincoln, Nebraska.

Taylor, Thomas J. and Leslie D. Krueger, eds. 1997. *(DRAFT) Mitigation Guidelines for Nebraska's Eastern Saline Wetlands.* Prepared for the Eastern Saline Wetlands Interagency Study Project. U.S. Environmental Protection Agency, Region VII, and U.S. Army Corps of Engineers, Omaha District. 46 pp.

University of Nebraska-Lincoln, Department of Anthropology. July 1999. *Evaluations of the Hulda Otto House, Guenzel Farmstead and Wunibald Farmstead for Eligibility to the National Register of Historic Places.* Lincoln, Nebraska.

University of Nebraska-Lincoln. 2000. *Public Policy Study for the Lower Platte River Corridor Region.* Prepared for the Lower Platte River Corridor Alliance. Lincoln, Nebraska.

U.S. Fish and Wildlife Service. 1981. *The Platte River Ecology Study, Special Report.* Northern Prairie Wildlife Research Center, Jamestown, North Dakota.

In addition, discussions were conducted with:

- Steve Henrichsen, Lincoln-Lancaster County Planning Department,
- John Bender, Nebraska Department of Environmental Quality
- Cindy Veys and Len Sand, Nebraska Department of Roads, Environmental Unit
- Bill Callahan, Nebraska State Historical Society, State Historic Preservation Office
- Tiffany Cattau, US Army Corps of Engineers, Omaha District
- Tim Schaaf and Marvin Brown, USDA Natural Resources Conservation Service
- Wally Jobman, US Fish and Wildlife Service, Grand Island
- Mike Jess, University of Nebraska-Lincoln, Conservation and Survey Division
- Matt Joeckel, University of Nebraska-Lincoln, Conservation and Survey Division

9.6.4 Past, Present and Reasonably Forseeable Future Actions

9.6.4.1 Past and Present Actions

Table 9.3 provides a list of past and present actions in Lancaster County which have had impact on the physical, biological and human environment of the county. These actions are considered to have relevance to a cumulative impacts discussion related to historic resources, farmland and saline wetlands. Many of these actions are discussed in detail in the DEIS. The table also includes a few key actions related to the Platte River watershed and the discussion of flows in the Platte River.

Table 9.3

LIST OF PAST AND PRESENT ACTIONS

TIME	ACTIONS
	PAST ACTIONS
1850 - 1900	Europeans settle in Lancaster County (and Platte River valley).
	Native grass prairies are converted to farmground, farming includes grain, hay and livestock
	Grid system of township, range and sections is established and eventually, a system of county line roads
	Railroad reaches Lancaster County, beltway study area
	Lincoln selected as state capital and site of University of Nebraska; thereby encouraging city growth. Growth is primarily east and south, limited by Salt Creek to west and north.
	Saline wetlands in Lancaster County are drained for agriculture, landfilled for municipal waste, filled for development of the city and excavated for stormwater detention (continues into present)
1900 - 1950	Construction of large reservoir and irrigation projects in the Platte River Valley in NE and WY (which continue into the 1980s). Seasonal reduction in peak flows and average annual discharge due to diversion and storage. Reduction in width of Platte River, especially in central Nebraska, and loss of riparian habitat.
	Salt Creek is channelized through Lincoln
	Construction of VA Hospital and Shriner's Club (Hillcrest Country Club) beyond the east edge of Lincoln (1929)
	Lincoln begins piping in drinking water from wells in the Platte River Valley (1934).
	Federal soil conservation programs encourage terracing, shelterbelts, windbreaks, farm ponds, etc. (beginning in late 1930s and through present)
1950s	First Lincoln Comprehensive Plan. One of the most long held policies has been to develop "a compact and generally contiguous urban form" around the City's confines with the goal to "protect existing rural areas from urban sprawl through planned development"
1960s	Construction of I-80 north of Lincoln, and through the Platte Valley.
	Livestock production declines in Lancaster County, almost all tillable land is in agricultural production
	Lincoln population grows; rural farm population of County shrinks
	Development expands on east edge of Lincoln, including construction of St. Elizabeth Hospital, Banker's Life (Ameritas), Gateway Mall, Lincoln East High School, etc. and Pine Lake SID on southeast edge
	US 77 relocated off 14th Street to new location west of Salt Creek (1967)
1970s	Establishment of Wilderness Park to mitigate flooding in downtown Lincoln
	Widening of N-2 through south Lincoln, including incorporation of bike and pedestrian trails, transmission lines and drainage features. Development of commercial and industrial along N-2 to 56th, including East Ridge Shopping Center, Old Cheney Center, Briarhurst Center, etc.
1980s	Construction of West Bypass: US 77 widened from Warlick to N-33 (1980); construction of US 77 from Warlick to O Street (1985-87); construction of K & L Street Extension (Capitol Parkway) and intersection with US 77 (1989)
	Pattern of large industrial facilities to locate just outside the City (in beltway study area) along State Highways or arterial roads (Williams Pipeline, Conoco Pipeline, Lincoln Oil Products, Norris Public Power District, Parker Fluid Connectors, Novartis, Linweld, National Crane and ADM). Southeast Community College constructed east of City

TIME	ACTIONS
	Other urban recreational facilities constructed just outside the City (in the beltway study area), including MoPac and Murdock hiker/biker trails, Izaak Walton League facility
	Proliferation of acreage subdivisions in the beltway study area (and other parts of the County) due to policies that allow for it, prosperity of the local economy, decreasing economic feasibility of the family farm, and availability of rural land for sale in the beltways study area. Continues into the 1990s.
1990s	Construction of Lincoln municipal wellfield on Platte River near Ashland
	Proliferation of golf courses and surrounding housing developments on east edge of Lincoln (Yankee Ridge, Himark and Firethorn Country Clubs) and within study area (Wilderness Ridge, Hidden Valley, Crooked Creek).
	Expansion of utilities through beltway study area to support growth of city and county, including extensive electric distribution lines, radio and communication towers, rural and municipal water distribution systems, county maintenance buildings. Gravity-flow waste water treatment system limits growth into Steven's Creek watershed and south of Rokeby Road
	Increased use of Saltillo Road as a truck route south of Lincoln. Paving of 148th Street and increased use of 148th St as a truck route east of Lincoln.
	Additional improvements to West Bypass/US 77, including interchanges at Van Dorn St (1994) and Crete corner (1998). Expansion of existing highway commercial and existing industrial development on Saltillo Road.
	Increase in suburban-type commercial uses in beltway study area (such as large warehouse retailers, nurseries, greenhouse and tree farm operations; and kennels)
	Movement of several large insurance companies and other employment centers (Ameritas, State Farm, Lincoln Benefit, Gallup) from downtown Lincoln to large campus settings on the east fringe of the City.
	Relocation of many churches to larger settings on the east fringe of Lincoln
	1994 Lincoln-Lancaster County Comprehensive Plan includes community goals for preservation of historic resources, saline wetlands, native prairies, and riparian corridors. Also includes location for regional shopping center at 98th and N-2
2000	Extension of the future urban service area into the south beltway study area and to the edge of the east beltway study area due to the continuing growth of Lincoln.
	Stevens Creek Basin Initiative proposes goals and policies for development in Stevens Creek.

PRESENT ACTIONS	
2001	Lower Platte South Natural Resources District (LPSNRD) has obtained partial support through state funding to construct a system of 10 farm ponds as part of the Stevens Creek Watershed Plan. Five of the ten sites are currently in final design stage (sites A6-1, A7-1, A9-1, A9-6 and A17-1), and land rights negotiations are underway. Construction is anticipated to begin late in 2001. The remaining five sites are currently scheduled for construction in 2002. Each of the east beltway alternatives may impact one or two of the proposed dam sites.
	City of Lincoln and NDOR are constructing saline and freshwater wetland mitigation banks to compensate for unavoidable future impacts.
	In east beltway corridor, construction of Lancaster County Events Center, Boy Scouts of America facility, Shriner's Temple, and mixed use development at N-2 and 98th St, and proposed construction of City of Lincoln Jensen Park
	Lincoln has received grant money through the FEMA Mitigation Grant Program for establishing conservation easements in the south beltway corridor in the vicinity of Salt Creek for the purposes of flood control. Such easements would be established so as not to preclude construction of the south beltway.

9.6.4.2 Reasonably Forseeable Actions

Reasonably forseeable actions must be far enough in the planning process that their implementation is likely. For this analysis, a reasonably forseeable action is one that is funded or advanced through the majority of the planning process, whether or not it has obtained local, state or federal approval.

Urban Development. While reasonably forseeable actions are difficult to predict, Lincoln/Lancaster County has had a strong history of planning for the future, beginning in the 1950s with the first comprehensive planning document. Over the years, the City has demonstrated that growth can follow planning initiatives. One of the most long held policies has been to develop "a compact and generally contiguous urban form" around the City's confines with the goal to "protect existing rural areas from urban sprawl through planned development". Generally, the City has controlled growth by controlling the location of new utilities, as well as through zoning ordinances. In order to establish a rational policy of City expansion, and to ensure the availability and adequacy of the resources in which to construct infrastructure, the City has identified a future urban service area that has taken into account limitations poised by natural features, current city limits and prior plan designations. This service area is defined by a map in the Comprehensive Plan along with future land uses in the City and County. The current plan was approved in 1994 and includes subsequent amendments (see **Figures 3.1 and 3.2**).

From 1970 to 2000, the City population grew 50 percent with a corresponding increase in metropolitan area of 50 percent, demonstrating the ability to control and maintain compact, contiguous growth. Current plans for the City and County assume a projected County population of 363,159 by 2025, representing a 45 percent increase over the 1999 population (Lincoln/Lancaster Planning Department). Past and future population increases are due to the availability of jobs, excellent schools and universities, and a high quality of life. This level of growth is expected with or without a beltway, and is directly related to the City of Lincoln being the center of state government, a center of commerce, industry and cultural activities, and the location of the main campus of the state university system.

The Lincoln/Lancaster County Comprehensive Plan is currently being revised and is scheduled to be approved by the City Council and County Board in May 2002. The current working document includes a number of recommendations which would affect future development in the beltway study area, and are considered reasonably foreseeable actions for the future. The current proposal (1) encourages increased urban residential density (up to 5 dwelling units per acre) to increase efficiency of growth, (2) encourages mixed-use development (urban village concept), (3) discourages development in the 100-year floodplain, (4) prohibits further acreage development within the path of future urban growth, (5) places greater emphasis on preservation of historic resources, saline wetlands, native prairies, and riparian corridors, and (6) provides 78 km^2 (30 sq mi) of additional area, including 60 km^2 (23 sq mi) of developable area within the 25-year planning period. The proposed provision for 78 km^2 (30 sq mi) of growth area represents a 39 percent increase in area compared to the anticipated 45 percent increase in population.

Over the next 25 years, no additional development is proposed to occur in about two-thirds of the south beltway study area and most portions of the east beltway study area. The proposed revision to the Comprehensive Plan shows some new development in the area of the SM-4 and EM-1 alignments within the next 25 years. The proposal is for 50 to 100 years or more for the City to fill most of the beltway study area. Specific to the Stevens Creek watershed, the Stevens Creek Basin Initiative proposed urbanization of northwest bank of the basin to occur within the next 25 years, with the rest of the west bank within 25 to 50 years, and the east bank beyond 50 years.

While City/County policies are aimed at planned growth and avoiding urban sprawl, the vision of the Comprehensive Plan very clearly shows that population growth and physical expansion into the beltways study area is eventually expected as the city grows outward. The beltway study area could become part of the urban limit in the long-term.

Future Roadway Projects. The NEPA evaluation for the beltway project includes the assumption that all section line roads would be paved out to the beltway interchanges. Costs for paving these connecting links as 2-lane sections are included in the beltway cost estimates. Paving of these section line roads is not a new proposal as the County has always included a provision to pave section line roads to two lanes once traffic volumes reach 500 vehicles per day, and expand to four lanes once traffic volumes reach 6,000 vehicles per day.

The NEPA evaluation for the beltway project also includes the assumption that all projects in the City/County 1 and 25 Year Program of Improvements for Future Roadway Network would be constructed–many of which involve improvements to section line roads as discussed above. These projects include:

1. 84th Street - Widen to 4 through lanes with left turns lanes, US-6 to N-2
2. Adams Street - Widen to add left-turn lanes, 70th Street to 98th Street
3. Pioneers Boulevard - Widen to 4 through lanes with left-turn lanes, 70th Street to 84th Street
4. Old Cheney Road - Widen to 4 through lanes with left-turn lanes, N-2 to 98th Street
5. Pine Lake Road - Widen to 4 through lanes with left-turn lanes, 14th Street to 98th Street
6. 14th Street - Widen to 4 through lanes with left-turn lanes, Old Cheney Road to Pine Lake Road
7. 27th Street - Widen to 4 through lanes with left-turn lanes, Pioneers Boulevard to Yankee Hill Road
8. 40th Street - Widen to 4 through lanes w/ left-turn lanes, N-2 to 0.8 km (0.5 mi) south of Pine Lake Road
9. 56th Street - Widen to 4 through lanes with left-turn lanes, Old Cheney Road to Pine Lake Road
10. 70th Street - Widen to 4 through lanes with left-turn lanes, Pioneers Boulevard to Pine Lake Road

These projects are already programed in the FY 2003-2008 Transportation Improvement Program which will bring 4-lane sections to within 2 mi of the east beltway, and 0.5 to 3.0 mi of the south beltway within the next six years even if the beltway is not built. Extension of these arterials to connect with the beltway interchanges will be included as part of the beltway project.

Other proposed future roadway projects in Lancaster County include several NDOR projects which are designed to increase capacity on Interstate 80 and US Highways. These include:

1. Widening I-80 to 6-lanes through Lincoln and on to the Sarpy County line
2. Constructing grade separations on US 77 at Capital Parkway and Warlick Boulevard
3. Widening US 6 to 4 lanes from West O Street to Cornhusker Highway (Sun Valley Boulevard), and from Lincoln to Emerald (West O Street)
4. Widening US 34 to 6 lanes from 52nd Street to Wedgewood (East O Street), to 4 lanes from Lincoln to N-63, and to 4-lanes from Lincoln west to the Seward/Lancaster County line.

Protection of Natural Resources. Lower Platte South Natural Resources District's (LPSNRD) Stevens Creek Watershed Plan includes (1) preserving open space along portions of the 100-year floodplain of Stevens Creek and its tributaries through land rights acquisition (using conservation easements in the Stevens Creek floodway and flood fringe between the MoPac Trail and the Murdock Trail), (2) continued reliance on existing floodplain regulations for maintaining open space in the rest of the delineated Stevens Creek main stream and tributary floodplain, (3) a public access easement for a trail along Stevens Creek from the MoPac Trail to Salt Creek, (4) augmenting culverts at select locations to reduce flooding, (5) erosion healing treatment in the lower channel reach using "soft engineered" solutions, (6) land treatment as a conservation measure with new and retrofit pipe outlet terraces, and establishment of permanent vegetative cover on Class IV lands (soils with very severe limitations according to the Natural Resource Conservation Service), and (7) watershed management using integrated watershed models.

The City and LPSNRD are evaluating a more stringent floodplain ordinance for the City of Lincoln and its 5 km (3 mi) zoning jurisdiction to discourage floodplain development and to protect infrastructure and properties within the floodway fringe. Some concepts being discussed include provisions for no net loss of floodplain storage, and no net rise of base flood elevation within the floodway fringe/floodplain. These provisions might also have the potential for application within the County's jurisdiction to achieve a more uniform countywide floodplain management program.

FWS is reviewing the possibility of proposing emergency listing as federally endangered for the Salt Creek tiger beetle (*Cicindela nevadica lincolniana*) which is currently listed as a state-endangered species. This activity will likely require certain restrictions on development projects in the vicinity of saline wetlands. A task force has been asked to review the situation and make recommendations to the Mayor regarding appropriate action for the community.

9.6.5. Analysis of Historic Resources

The most frequently raised issue during the beltway review process was the potential cumulative impact on historic resources, and specifically, the likelihood of the beltway to cause development and urban sprawl to the point of having an adverse effect on historic properties. The National Trust for Historic Preservation has stated that the beltway would create secondary and cumulative adverse effects by inducing the construction of new residential, commercial and industrial development that is inconsistent with the historic character of the landscape. The Advisory Council for Historic Preservation has stated that any increased access to rural areas has the potential to diminish the rural setting and therefore the historic resources. Comments of the National Trust for Historic Preservation, Environmental Law and Policy Center, and landowners in the beltway study area have only ever raised concerns about secondary and cumulative impacts to historic properties on the EF-1 route. While the Preservation Association of Lincoln (PAL) raised the issue for all east routes in their letter dated 15 June 2001, they changed their opinion in testimony at the City/County Public Hearing on 15 August 2001 where the president of PAL urged that the preferred alternative be the EM-1 route. This discussion addresses all beltway routes.

9.6.5.1 Condition of the Environment

Land Uses. Current land uses in the beltway study area are primarily agricultural. The dominant crops are milo, corn, soybeans, wheat and hay crops. Historically, local farmers raised dairy and beef cattle, hogs, sheep and chickens; however, stock production has decreased significantly in the county in the last 30 years or more. Like the rest of Lancaster County, the farm population in the beltway study area has decreased considerably as the urban population of the City of Lincoln has increased. Following this trend, land uses in the study area are beginning to transition from agricultural to suburban uses.

Although most of the tillable land is in active production, review of the constraints map (see **Figure 2.1**) shows that there has been considerable development of non-farm uses in the beltway study area. Some of this development has occurred in clusters; however, the overall pattern is scattered throughout the area. The majority of the development has been for residential land use. It is estimated that approximately 20 percent of the land in the beltway study area is in non-farm uses.

Based on the estimate of direct impacts within the beltway rights-of-way, farmland comprises between 81 to 83 percent of the rights-of ways (see **Table 3.2**), whereas non-farm uses comprise 17 to 19 percent of the rights-of-way. Urban uses in the overall study area are higher than within the rights-of-way because of the intentional routing of the beltways to avoid impacts to residences, and are estimated at 10 percent of the 207 km^2 (80 sq mi) study area.

In particular, farm home and farmstead split-offs are common, as well as residential acreages (large lot single family homes). On the south, there are a large number of contiguous large lot subdivisions. On the east the subdivisions tend to be fewer and more scattered. Some of the subdivisions have special common use features such as an airstrip, lake, golf course, or equestrian facilities. The east tends to have some of the older subdivisions as well as non-subdivision areas of 2 ha (5 ac) lots which predate current zoning policies. These residential areas appear to have been deliberately located to provide convenient access to O Street and downtown Lincoln, or I-80 and Omaha. In comparison, the south tends to have many more newer subdivisions appealing more generally to those interested in country living, but with quick

access to Lincoln on paved roads. In general, rural residences constructed in the beltway study area are custom built homes for higher income households.

There are few commercial uses in the beltway study area. These are generally located along State Highways or are internal to the unincorporated towns. Commercial uses are typically convenience-type services, but are beginning to include large warehouse retail sales businesses such as those at US 77 and Saltillo Road. Other commercial businesses in the study area include several nursery, greenhouse and tree farm operations; kennels and a pet cemetery; and grain elevators at Cheney and Walton. A large mixed use/commercial center is currently under development along N-2, between 84th and 98th Streets.

Industrial uses in the study area are few and are generally located along State Highways or arterial roads due to the need for accessibility for work force and materials and the availability of central utilities. Industrial sites are located at US 77 and Saltillo Road, on O Street (US 34), and along US 6. There is one active quarry and sand pit in the project area located along South 54th Street south of Saltillo Road that produces crushed rock, agricultural lime and retaining wall stone. Three private airstrips are also located in the study area.

Several urban recreational elements occur in the beltway study area including two city parks. Wilderness Park, which extends 12 km (7.5 mi) from Lincoln to Saltillo Road along Salt Creek, is owned by the County and operated by the City. The park provides hiking, bicycle and equestrian trails. Jensen Park, located west of Cheney, is soon to be developed by the City of Lincoln with ballfield facilities. There are three private golf courses within the study area. Four other private courses abut the study area. All of the golf courses have surrounding housing developments. The Izaak Walton League has a facility south of Highway 2 on South 134th Street, and the Boy Scouts of America have recently purchased a property near A Street and Stevens Creek.

One other noteworthy trend has been the movement of several large insurance companies and other employment centers from downtown to large campus settings on the east fringe of the City. Many large churches have also relocated to larger settings along 70th and 84th Streets, and two of the City's hospitals are on 70th Street. While none of these have yet been located within the east beltway study area, they are within 0.5 mi of the study area. There is also a pattern of large industrial facilities to locate beyond the city limits, but near Interstate access.

Zoning. Zoning in the study area is determined by four entities. The majority of the area is governed by Lancaster County, with some areas falling within the 4.8 km (3-mi) extraterritorial jurisdiction of the City of Lincoln, and the 1.6 km (1 mi) extraterritorial jurisdictions of the City of Waverly and Village of Bennet. In general, the majority of beltway study area is zoned for Agricultural (AG) or Agricultural Residential (AGR) uses. The exceptions are commercial and industrial districts located along State Highways at US 77 and Saltillo Road, US 34 (O Street) and 134th Street, and US 6. In these areas, Highway Commercial (H3), Industrial (I-1), Industrial Park (I-2), County Industrial (I) uses have been deemed appropriate.

These approved zoning districts, and the policies that created them, have resulted in the proliferation of rural non-farm residential development in the beltway study area. Within the County juridictional area, there are two residential zoning classifications. The AG classification allows for a minimum buildable lot size of 8.1 ha (20 ac); creation of such lots requires only a survey and documented conveyance (deed). In comparison, the AGR classification allows for a minimum buildable lot size of 1.2 ha (3 ac); creation of these lots requires subdivision approval

(final plat) by the County (or City if within the 4.8 km (3 mi) limit). In general, approval of the subdivisions has taken into account factors such as the location along a paved road, availability of water, appropriate soils for septic systems, and close proximity to villages.

Past Limitations on Development. In general, the rural non-farm areas rely on individual wells or rural county water, and septic systems. The City of Lincoln's service area, which is based on a gravity flow system, has not been extended farther south than Rokeby Road, or farther east over the ridge line into the Stevens Creek watershed (approximately between 84th and 98th Streets). The lack of centralized utilities in the area has been the major contributing factor in maintaining the rural character of the area.

Although existing policies allow for continued agricultural residential growth, other types of land uses are not permitted without amendment to the Comprehensive Plan. In addition, many other types of land uses are limited without the availability of City infrastructure and services.

Condition of the Historic Resources. The reconnaissance (and supplemental) surveys for historic standing structures identified 146 sites over 50 years old within the 80 sq mi beltway study area (On Site, 1998, UNL, 1999). Of these, three are listed on the National Register of Historic Places (NRHP) and 29 others are considered eligible for listing. The 32 sites include 12 farmyards, eight individual barns, four residences, one school, five cast concrete road signs and two grain elevators. In addition, an intensive-level survey was conducted for the Stevens Creek Bottoms as this area was known to be the location of the earliest settlement in the County. The purpose of the intensive level survey was to develop a cultural context (narrative history) with which to evaluate any cultural landscapes or the potential for any historical districts. Thirteen sites were surveyed within the defined area–generally within 0.8 km (0.5 mi) of either side of Stevens Creek. These sites included 10 farms, 1 automobile garage, and 2 relocated school buildings. Although the survey revealed broad patterns of nineteenth century immigrant settlement and the consequent early development of agriculture in Lancaster County, only one site (Norma and Bob Lemke Residence) was considered eligible for the NRHP (other than the already listed Stevens Creek Stock Farm). The archeological survey (UNL, 1998) identified 48 sites along the finalist beltway alignments. Of these, one archeological site is already on the NRHP, and two additional archeological sites and a Euroamerican wagon road site are considered eligible.

The historic survey report for the beltway documents the deterioration of historic structures near Lincoln that has occurred as a result of a growing community. The survey shows that "historic resources nearer to central Lancaster County have already been affected by growth pushing eastward from the City of Lincoln". The concentration of historic resources "increases with distance from the City". This is "attributable to the growth throughout the twentieth-century of Lincoln as a center of business, commerce, and government, and the increasing impact of the city on its surroundings".

The report points out that the broad patterns of agricultural development have been eroded over the last century: "No cultural landscapes were identified, and no historic districts were considered appropriate. The low-incidence of Register-eligible properties in the Stevens Creek Bottoms can be attributed to the steady adaptation of the farm to the changing demands of agriculture. As a result, the physical manifestation of early settlement has eroded over time, and few resources in the area retain the historic integrity necessary for the determination of eligibility".

The research provides a particularly important view of the structures that make up the agricultural landscape. The authors note that agricultural structures "such as barns, granaries, and silos" are "erected as revenue producing elements of a family farm". They were "often replaced as their contribution to farm profitability declined with the introduction of newer innovations in farming and improvements in building construction". Further, the researchers point out that "preservation and maintenance is thus directly contingent upon the continued economic viability of the farm. Should viability of the farm be threatened and the land sold or leased (contributing to farm consolidation), necessary maintenance will likely cease".

In summary, there are several factors that have led to deterioration of many historic structures in the study areas, including:

1. Century-long changes in agricultural operations
2. Economic impacts on agriculture resulting in abandonment of farmsteads
3. Increasing consolidation of farm units
4. Urban pressure from a growing Lincoln community
5. Policies that allow for rural non-farm development

As a result of the cultural resources surveys, it was concluded that the rural landscape and associated built environment found in the project area has low physical integrity as an historic rural landscape. This opinion is due to the intrusion of existing large scale urban developments of various kinds in the beltway study area, and the deterioration of historic properties. The most obvious types of urban development are the acreage subdivisions. Other urban elements include extensive electric distribution lines, radio and communication towers, rural water towers, petroleum storage tanks, golf courses, municipal parks, club parks/facilities, and hiker/biker trails.

Acreage subdivisions and other urban uses (golf courses, parks, commercial) account for approximately 10 percent of the 80 sq mi study area. According to records of the Lancaster County Register of Deeds, Year 2000 land sales in the Stevens Creek watershed were as high as $21,000 to $65,000 per hectare ($8,500 to $26,000 per acre), indicating proposed uses other than agricultural production. In comparison, average prices of comparable agricultural land in more distant parts of the County ranged from $3,700 to $6,200 per hectare ($1,500 to $2,500 per acre). Although existing policies allow for agricultural residential growth (see **Section 3.2**), other types of land uses are not permitted without amendment to the Comprehensive Plan. In addition, many other types of land uses are limited without the availability of City infrastructure and services.

9.6.5.2 Assessment of Future Degradation

As assessment was made to determine potential secondary and cumulative impacts that might be caused by the beltway project, including reasonably foreseeable effects that might occur later in time, be farther removed in distance or be cumulative.

Potential for Urban Sprawl. Concerns have been raised that the east beltway will indirectly impact land uses by encouraging urban sprawl along the beltway route, where urban sprawl is considered to be any non-farm development not contiguous to the Lincoln City limits, or any low density development (such as suburban acreages). The implication has been that a far location will create non-contiguous growth, and a close location will continue compact growth. The EC-1 alternative is within 0.8 to 3.2 km (0.5 to 2.0 mi) of the city limits; EM-1 is within 2.4 to 4.8 km (1.5 to 3 mi); and EF-1 is within 2.4 to 6.4 km (1.5 to 4 mi). The SM-4 alternative is as far distant as EF-1--between 2.4 to 5.6 km (1.5 to 3.5 mi) of the city limits.

As discussed previously, the south and east beltways study area is primarily agricultural in character, but includes areas of residential acreage development. The pattern of scattered non-farm development in the beltway study area has been established.

New policies are proposed to be included in the revised Lincoln/Lancaster County Comprehensive Plan (Lincoln/Lancaster County Planning Department, September 2001) which includes a renewed emphasis on preservation of historic resources. Some of the mechanisms to protect resources and avoid urban sprawl include the goals:

- to prohibit new acreage development within the area of future urban growth, which includes the beltway study area (albeit within the 25-to-50 and 50-to-100+ year planning periods).
- to discourage further development within the 100-year floodplain which will help preserve the Stevens Creek bottoms and tributaries
- to encourage increased residential density (up to 5 dwelling units per acre)

Further evidence of a commitment to preservation, was Change of Zone #3209 (4/17/00) which removed over 100 ac of industrial, general commercial and local business zoning from the interchange at US 77 and Van Dorn Street to retain the use of the land as open space. This action was proposed by the Planning Department, and approved unanimously by the City Council and Mayor.

While city/county policies are aimed at planned growth and avoiding urban sprawl, the vision of the Comprehensive Plan very clearly shows that land development could extend into the beltway study area as the population of the City grows.

Potential for Highway Commercial/Industrial Development. While some limited highway commercial or mixed use development might be expected at the 11 proposed interchanges (along the 20 mi roadway), the likelihood of any development at the interchanges will depend on many considerations, including the proximity of existing services, the likely market for the proposed services, the availability of rural or well water, and suitability of the soils for wastewater treatment. The most likely locations for highway commercial development would be at the higher traffic volume interchanges with existing highway designations. Commercial and industrial development is already present at US 77 and US 6 (Cornhusker Highway) in the vicinity of the proposed interchanges. At the US 34 (O Street) interchange location with EM-1, large tracts of land are currently in industrial land use or uses which might be considered temporary (nursery, golf course) and could be converted to other urban uses in the future. The N-2 intersection with SM-4/EM-1 is extremely complicated and does not allow immediate access to adjacent land for typical highway commercial uses.

Development between the interchanges will also be limited by control of access along the entire beltway. Any access would need to be from parallel section line roads, few of which are currently paved through the study area. Exceptions are Saltillo Road on the south and 98th and 148th Streets on the east. In regards to the preferred alternative, Saltillo Road is within 0.5 mi of SM-4; however, it is already used as a truck route and has about 1.0 mi of existing highway commercial and industrial use at the US 77 intersection, as well as at least 1.0 mi of suburban residential acreages in the vicinity of 56th Street. Relative to EM-1, the closest paved parallel road is 1.5 mi to the east at 148th Street; however, there already are highway commercial and industrial uses at the US 6 intersection, and 2.5 mi of suburban residential acreages along it.

Many of the public comments allege that development will be fast and expansive beginning at the beltway interchanges and extending out to destroy the landscape in every direction. In particular, some commentors pointed out that the EF-1 route would create a strip of land (0.5 mi wide and 12-mi long) located between two paved roads--the beltway and 148th Street– and that this would be a very desirable location for development. However, review of Lincoln's west bypass, US 77, indicates a much slower and limited scenario. Improvements to US 77, between I-80 and N-33 (Crete interchange) began in 1967 and were completed in 1998. The improvements included relocation of the highway from 14th Street to its current location west of Wilderness Park, widening the roadway to four lanes, and construction of grade-separated interchanges at Van Dorn Street and N-33. Since completion of the improvements, there has been construction of highway commercial uses at only one rural location, on Saltillo Road, where highway commercial and industrial uses have existed for decades. There has been no new highway commercial development at either of the new urban intersections (Capitol Parkway and Van Dorn Street) or the other rural intersections (the larger of which are Pioneers Boulevard, Old Cheney, Warlick Boulevard or N-33).

Development between the intersections has also been slow and limited on US 77. The only development along the rural portion of the highway has been the YMCA Spirit soccer/ball fields, the proposed Optimists baseball/softball complex, and a church--all in the vicinity of Pioneers Boulevard. (It is noted that churches are allowed by right in all zoning districts). The lack of development is likely related to (1) the agricultural land uses identified for the area in the Comp Plan, (2) the lack of zoning to allow any uses other than AG and AGR, (3) the lack of City water and sewer, and perhaps (4) the perceived availability of better locations for development.

Along much of its length, US 77 is no more than 0.5 to 1.0 mi from existing urban residential areas, whereas the EM-1 beltway would be even further away--2.0 to 3.0 mi from the existing City limit, and 1.0 to 3.0 mi from the anticipated 2025 limit.

Impacts along Connector Roads. To the extent possible, the location of the proposed interchanges minimizes the number of connector roads to beltway interchanges which have historic properties along them; therefore minimizing impacts to these properties. Specifically, there are no historic properties along the proposed connector roads at South 27th, South 68th, Pine Lake Road, Pioneers Boulevard, and Fletcher Avenue. In contrast, no interchanges are proposed along Yankee Hill Road, Old Cheney Road, Van Dorn Street, A Street and Havelock Avenue which all have historic properties along them. The only connector roads with historic properties in close proximity are South 84th (Wunibald Farmstead), O Street (Mayer Farmstead and Haeger Dairy), and Adams Street (road sign). Of these, only the Wunibald Farmstead is expected to be impacted by the beltway project. A discussion of these impacts has already been addressed in (see **Appendix F**). Mitigation has been proposed in **Section 9.5.9**.

Protection of Valuable Resources. A variety of federal, state and local policies and regulations already exist to protect valued resources to a certain degree (for example wetlands, floodplains and endangered species). However, most regulations still permit landowners to disturb or destroy native prairies or alter historic properties without the need for government approval or review.

Additional measures do exist for protection of resources depending on the value the community places on these resources and the commitment they are willing to invest. These measures may range from the simple commitment of existing landowners to maintain valued land uses–perhaps through deed restrictions, to the adoption of a subarea plan as part of the

Lincoln-Lancaster County Comprehensive Plan, to donation or purchase of public or private conservation easements, to purchase and public ownership of resources. However, the need for protection measures to be implemented as part of the beltway project has not yet been demonstrated. In fact, preservation through planning measures is one of the considerations assessed in the Stevens Creek Basin Planning Initiative.

9.6.5.3 Assessment of Secondary and Cumulative Impacts

Due to existing and proposed policies which determine the pattern of development, urban growth in the beltway study areas is expected to occur with or without a beltway project--so long as the City of Lincoln continues to experience the current rate of population growth.

With or without a beltway, deterioration of some historic properties could continue while others may be preserved and maintained. Following the proposed Comprehensive Plan, the rural landscape of the entire beltway study area could be converted to an urban form over the long-term–except perhaps in areas where landowners refuse to sell their farm ground. Urbanization could have an adverse effect on the integrity of the setting for the 12 historic farmstead properties for which the surrounding rural landscape contributes, to one degree or another, to the historic context. The integrity of the setting for the barns and residences has already been compromised (the boundaries of these historic properties were originally defined as only the barn or residence because the historic farmyard setting was gone). The school, grain elevators and road signs are unlikely to be affected. Of course, significance of the properties will not be affected.

Since no cultural landscapes were identified and no historic districts were considered appropriate, the setting of the 12 farmsteads has to a certain extent already been compromised. In particular, concerns have been raised by Retzlaff family members regarding impacts on the historic setting of the Stevens Creek Stock Farm. While an estimated 80 percent of the beltway study area is rural and agricultural, the rural landscape has changed significantly compared to what existed during the period of significance for the Stevens Creek Stock Farm (1850 to 1924). The period of significance for this property includes the amassing of lands and the corresponding success of a large scale cattle operation (and other stock). During this period, Charles Retzlaff acquired close to 1,000 ac of prairie grasslands which were used primarily for cattle range and pasture. In contrast, the present day landscape of the beltway study area (including that within the Stevens Creek Stock Farm boundaries) is primarily agricultural row crops. The beltway study area also includes various modern agricultural features such as terraces, grassed waterways, farm ponds and pivot irrigation–as well as urban elements described under Existing Conditions.

Any resulting environmental damage, such as impacts to the landscape surrounding historic properties or loss of prime farmland, would be caused primarily by proposed development as guided by the Lincoln\Lancaster County Comprehensive Planning process, and not by the beltway project. The beltway project does include mitigation measures for direct environmental damages to resources, but it does not compensate or mitigate for the damages caused by future housing and commercial developments. Environmental degradation caused by these developments will be addressed through local, state and federal permits and clearances, as appropriate. FHWA has no legal tools to direct the local planning process.

9.6.6. Analysis of Farmland

PAL and certain landowners in the beltway study area have raised concerns about secondary and cumulative impacts to farmland relative to the assumptions used in completing the NRCS Farmland Conversion Impact Rating (USDA Form AD-1006) (see **Appendix A, page A-33**). The form was used to assess impacts to prime farmland, including indirect impacts. While PAL has requested information on the assumptions used for eight parameters, only one of these parameters–Acres to be Converted Indirectly–relates to indirect impacts. (A discussion of the other parameters of concern to PAL is included in **Section 9.7**).

9.6.6.1 Condition of the Environment

The condition of the environment is described fully in **Section 9.6.5.1** above, and summarized here.

Current land uses in the beltway study area are primarily agricultural. The dominant crops are milo, corn, soybeans, wheat and hay crops. Historically, local farmers raised dairy and beef cattle, hogs, sheep and chickens; however, stock production has decreased significantly in the county. Like the rest of Lancaster County, the farm population in the beltway study area has decreased considerably as the urban population of the City of Lincoln has increased. Decreasing economic feasibility of farming, federal programs to encourage and subsidize removing land out of production, and high sale prices for developable land have resulted in the transition from agricultural to suburban land uses in the beltway study area.

Although most of the tillable land is in active production, review of the constraints map (see **Figure 2.1**) shows that there has been substantial development of non-farm uses in the beltway study area. Some of this development has occurred in clusters; however, the overall pattern is scattered throughout the area. The majority of the development has been for residential land use.

Based on the estimate of direct impacts within the beltway rights-of-way, farmland comprises between 81 to 83 percent of the rights-of ways (see **Table 3.2**), whereas non-farm uses comprise 17 to 19 to percent of the rights-of-way. Urban uses in the overall study area are higher (around 10 percent) than within the rights-of-way because of the intentional routing of the beltways to cross farmland to avoid impacts to residences.

9.6.6.2 Assessment of Future Degradation

PAL states that the assumption of no indirect impacts is erroneous because farmlands would be indirectly converted due to increased accessability to the new highway. They also imply that additional acres could be indirectly converted due to partial acquisitions resulting in uneconomic remainders, and due to restriction of access.

One comment letter from a landowner on EF-1 proposes indirect impacts amounting to 58 ha (144 ac) on SM-4 and 78 ha (192 ac) on EF-1 that would be lost to development at the interchanges (6 ac at each of 14 interchanges); and 27 ha (66 ac) on SM-4 and 64 ha (158 ac) on EF-1 that will be left without access–amounting to 227 ha (560 ac). The landowner also mentions 36 ha (90 ac) on EF-1 that would lose pivot irrigation.

It is emphasized that it is the Comprehensive Plan that determines the location of future development and not the location of a beltway. City/County policies are intentionally aimed at planned growth and avoiding urban sprawl, and the proposed vision of the Comprehensive Plan very clearly shows that the beltway study area could ultimately become part of the urban limit as the city grows in the future (see **Section 9.6.4.2** above). Therefore it is the planned growth of the City of Lincoln, rather than the beltway, that would result in the majority of farmland conversion. As such the assumption was made that no acres would be converted indirectly.

At the time of the DEIS, there was no data available to determine the indirect impacts due to uneconomic remainders. However, general practices in right-of-way acquisition for rural properties include provision of access to the extent possible, and sale of uneconomic remainders to neighboring landowners who do have access. These practices minimize the loss of production agriculture. While the project may impact two pivots amounting to 36 ha (90 ac); use of the land for agriculture is not lost. Lastly, landowners will be compensated for any loss of property caused by loss of access, or uneconomic remainders.

9.6.6.3 Assessment of Secondary and Cumulative Impacts.

Due to existing and proposed policies which determine the pattern of development, urban growth in the beltway study areas is expected to occur with or without a beltway project--so long as the City of Lincoln continues to experience population growth. Following the proposed Comprehensive Plan, the rural landscape of the beltway area would be converted to an urban form in the long-term–except perhaps in areas where landowners refuse to sell their farm ground.

While prime farmland is a valuable resource, it has not sustained significant degradation that warrants no further adverse impacts to occur–particularly in Nebraska. Review of the USDA database (www.nhq.nrcs.usda.gov/land/tables), shows that Nebraska ranked 30th in the states for number of acres of prime farmland converted per year between 1992 and 1997. The number of acres of prime farmland converted (1 942 ha (4,800 ac per year)), amounted to less than 1 percent of the loss for the nation during this period. Further, the amount of all land developed in Nebraska during this period amounted to less than 0.5 percent of all the land developed in the nation during this time period.

According to the NRCS, the acres of prime farmland that would be lost directly with construction of any of the end-to-end beltway alternatives amounts to less than 0.5 percent of the 102 345 ha (252,900 ac) of prime farmland soils in Lancaster County. The conversion of prime farmland soils for the beltway project is considered a greater public need than the preservation of 466 ha (1,152 ac) of prime farmland soils along the SM-4/EM-1 route.

9.6.7. Analysis of Flows in the Platte River

The FWS has determined that the beltway project ***may*** adversely affect four federally listed species which utilize habitat areas along the Platte River (letter dated 3 May 2001). These species are the pallid sturgeon which is known from the lower reach of the Platte River, the interior least tern and piping plover which nest on sand and gravel bars in the Platte River, and the western prairie fringed orchid which occurs in subirrigated wet meadows along the Platte River–as well as wet and wet-mesic tallgrass prairies in various locations in Nebraska. Although the beltway is located 48 km (30 mi) from the Platte River, the FWS alleges that any construction project which (a) obtains borrow material from any location in the Platte watershed and (b) results in the exposure of surface or ground water in the excavated pit, will result in evaporation and will deplete instream flow contributions to the Platte River. The FWS letter further states that they consider any depletion of flows from the Platte River system to be significant.

According to FWS, their agency currently defines two types of depletions in the lower Platte River. Major depletions are defined as projects which result in greater than 3 ha-m (25 ac-ft) of water loss between February and July–which FWS considers the critical period for the pallid sturgeon. Mitigation requirements for major depletions involve acquisition of water rights and transfer of those water rights to FWS. Minor depletions are defined as up to 3 ha-m (25 ac-ft) of water loss, and requires a mitigation fee of $300 per ha-m ($37 per ac-ft) of water loss. These fees go to the National Fish and Wildlife Foundation Fund, and are used to purchase water rights, create new habitat or maintain existing habitat (personal communication between Amy Zlotsky and Wally Jobman).

9.6.7.1 Condition of the Environment

It has been well documented that construction of large reservoir and irrigation projects in the Platte River valley in Nebraska, Wyoming and Colorado have reduced seasonal peak flows and average annual discharge due to diversion and storage. This has resulted in the reduction in the width of Platte River, especially in central Nebraska, and loss of riparian habitat. In particular, open sandy river channels have become vegetated with trees and shrubs, and adjacent grasslands have been lost to agricultural production. These ecological changes have benefitted certain fish and wildlife species at the expense of others. Specifically, these changes have had impacts on the populations of migratory birds which travel through the Central Flyway, which covers only a narrow stretch of the Platte River in central Nebraska.

Since the late 1990's much effort has been expended on securing increased flows for habitat maintenance in the central Platte River, as well as habitat restoration and preservation to protect threatened and endangered species. The central Platte is considered habitat for the whooping crane, piping plover, interior least tern and pallid sturgeon–including critical habitat for the whooping crane from Lexington to Shelton. As a result, new water uses along the Platte River above Columbus are severely limited in order to protect these species. In addition, NGPC has acquired water rights for instream flows for habitat all the way to the mouth of the Platte River with the result of no remaining water rights in the lower Platte River (personal communication between Amy Zlotsky and Mike Jess, University of Nebraska, Conservation and Survey Division). The lower Platte is considered habitat for the piping plover, interior least tern, pallid sturgeon and western prairie fringed orchid. Critical habitat has been proposed for the piping plover from downstream of Cozad to the Missouri River.

Although the impacts of reservoir and irrigation projects in the upper Platte River watershed dwarf the impacts of other water users, several large water-dependent projects have been approved or are nearing approval in the lower Platte River. These include the City of Lincoln wellfield at Ashland, and the Omaha Municipal Utilities Districts Platte West wellfield near Venice. While not trying to dismiss the impact of such municipal water projects, these projects have received the approval of FWS (albeit with mitigation requirements, including those described above). There have also been several Natural Resource District reservoir projects and sand and gravel operations approved in the lower Platte. While the FWS depletion concern has not stopped permits, is has created a mechanism for acquiring funds to restore and preserve habitat.

9.6.7.2 Assessment of Degradation

The south and east beltway is not expected to impact depletion of flows on the Platte River because:

1. The south and east beltway is a relatively long project requiring considerable grading of the existing soil. While all construction projects strive to balance cut and fill requirements on-site, this is generally very achievable for a roadway project as long as the South and East Beltways (approximately 20 mi long). Balancing cut and fill within the project right-of-way is far more economical than bringing in fill material, or disposing of material to an off-site location.

2. If any additional borrow material might be required, it would preferably be taken from upland sources due to better compactability and ease of handling.

3. If, for some unknown reason, some borrow material would be required from sources within the Platte River drainage basin, the amount would be so small that it would result in less than 3 ha-m (25 ac-ft) of lake evaporation between February and July, even if it came from a newly exposed source. If mined deeper or from an existing pit, the amount could be further reduced. Such a small impact would be considered a minor depletion, and mitigation would be calculated at the time of construction using the formula in use at that time.

9.6.7.3 Assessment of Secondary and Cumulative Impacts

Use of borrow material from a source that may expose groundwater for construction of the south and east beltway project is projected to result in evaporation of less than 3 ha-m (25 ac-ft) of water between February and July. FWS considers this a minor depletion which can be mitigated by payment to the National Fish and Wildlife Foundation fund for use in habitat mitigation.

The south and east beltway project will have no other secondary or cumulative effects on federally listed species.

9.6.8. Analysis of Saline Wetlands and Other Wetlands

The FWS has stated that the beltway project could indirectly impact the regionally unique Saline Wetland Complex of Eastern Nebraska (SWC) and other wetland systems in the Stevens Creek drainage because the beltway will facilitate future urban development in Lincoln/Lancaster County. Additionally, FWS implies that the extent of cumulative impacts from the beltway extends to other aquatic and terrestrial resources occurring within the lower Platte River Valley because the beltway will connect to I-80, and plans are underway to widen I-80 through Lincoln and on to Sarpy County, including a bridge over the Platte River at the Cass/Sarpy County line.

9.6.8.1 Condition of the Environment

Although saline wetlands occur throughout the west and midwest on soils high in chlorides, sulfates or carbonates, relatively few exist within Nebraska. The eastern Nebraska saline wetlands only occur near Lincoln on the historic terraces of Salt Creek and its tributaries. The characteristic saltflats in these wetlands support two species which received State Endangered status from the Nebraska Game and Parks Commission in 2000--saltwort *(Salicornia rubra)* and the endemic Salt Creek tiger beetle (*Cicindela nevadica lincolniana).* Although thought to once cover more than 6 500 ha (16,000 ac) in and around Lincoln, the saline wetlands are now estimated at approximately 490 ha (1,200 ac) (Gersib and Steinauer, 1991).

Historically, losses were related to the physical development of the City of Lincoln which originally was settled because of the abundant salt deposits. Over time, the wetlands have been drained for agriculture, filled for development of the city, and excavated for stormwater detention and landfills. In 1917, the U.S. Army Corps of Engineers began channelization of Salt Creek through the city to reduce flooding. The channelization projects ultimately caused significant downcutting of the Salt Creek channel–which in turn resulted in drawdown of the local groundwater table beneath the saline wetlands. In addition, the highly dispersive clay soils have created severe headcutting into the wetlands causing flow-through conditions and direct drainage of what was previously a closed basin system. The rarity of the eastern Nebraska saline wetlands was first recognized in the late 1980's and early 1990's following work conducted by Gersib and Steinauer (1991) and the publication of *Last of the Least* in *Nebraskaland* (Farrar and Gersib, 1991).

9.6.8.2 Assessment of Degradation

There are many policies and regulations in place to limit impacts to wetlands, and specifically saline wetlands. Dredge and fill activities in all wetlands and waters of the United States have been regulated since 1977 through the U.S. Army Corps of Engineers Section 404 permit program. While the jurisdiction of the 404 permit program has been reduced recently to exclude isolated wetlands, the authority remains in place for any federally funded project–such as the south and east beltways. FHWA has stated that the beltway project will include mitigation for all wetland impacts, at a minimum of a 1:1 replacement-to-loss ratio, whether the wetlands are considered jurisdictional under the 404 permit program or not.

Saline wetlands also remain jurisdictional under the 404 permit program because they occur on the first terraces of Salt Creek and its tributaries–thereby having a direct connection (or at least historic adjacency) to the waters of the United States. According to the Omaha District Corps of Engineers, they have not yet lost jurisdiction over any saline wetlands permit actions (personal communication between Amy Zlotsky and Tiffany Cattau, USACE).

In addition, the Nebraska Department of Environmental Quality (NDEQ) has authority under Title 117 of the Nebraska Administrative Code, Nebraska Surface Water Quality Standards to regulate impacts to waters of the State, including wetlands (as defined in the 1987 Corps of Engineers *Wetland Delineation Manual*). Under the anti-degradation clause, no one may adversely affect the existing uses of wetlands. In general, mitigation of wetland impacts has been required in Nebraska since the mid 1980s at a minimum 1.5:1 replacement-to-loss ratio as required by the Section 401 Water Quality Certification program administered by the NDEQ. By agreement between the agencies, this ratio has been a minimum of a 1:1 ratio for NDOR projects. For saline wetlands, NDEQ follows the saline wetland guidelines described below. While NDEQ has no permit program in place, project proponents are advised to coordinate with NDEQ to obtain a letter of opinion that a project will not cause degradation.

In the mid 1990's several policies were implemented to limit further impact on saline wetlands. In 1994, the Lincoln/Lancaster County Comprehensive Plan included a community goal to encourage preservation of saline wetlands. In 1997, Eastern Saline Wetlands Interagency Study Team established draft guidelines for mitigation of saline wetland impacts based on a weighted area score methodology which generally requires greater replacement-to-loss ratios than what was previously required, and creates incentives for restoring higher quality habitats (which support rare species) and restoring in advance of need through the use of wetland banks. In 2000, saline wetlands were removed from the Nationwide permit program, thus requiring a more extensive review process for obtaining an Individual Permit. That same year, saltwort and the Salt Creek tiger beetle, two saline wetland species, received State Endangered status. The new Lincoln/Lancaster County Comprehensive Plan, currently in preparation, includes renewed emphasis on preservation of saline wetlands (as well as other wetlands, riparian corridors, and floodplains). The City of Lincoln is currently constructing a 76 ha (189-ac) saline and freshwater wetland mitigation complex in advance of future mitigation needs.

In 1990, the first saline wetland restoration was completed at Arbor Lake as mitigation for a roadway project. The success of this restoration resulted in the implementation of many other saline wetland restorations in Lancaster and adjacent Saunders Counties--for both mitigation and non-mitigation purposes.

Table 9.4 is a list of saline wetland impacts and restoration activities since 1989–about the time when the rarity of the resource was first recognized. The table shows that over the past 12 years there has been a net increase of approximately 144 ha (356 ac) of saline wetlands amounting to nearly a 6:1 replacement-to-loss ratio. The net increase is due to (1) the implementation of policies and regulations designed to limit further impacts to saline wetlands, (2) the saline wetland mitigation guidelines generally result in higher replacement-to-loss ratios, (3) the establishment of saline wetland mitigation banks in advance of impacts, and (4) the construction of several large saline wetland restorations for environmental enhancements (non-mitigation).

Further, an estimated 850 ha (2,100 ac) of the Saline Wetland Complex has been preserved through acquisition and management by various public agencies and private conservation groups, including the Nebraska Game and Parks Commission, Lower Platte South Natural Resources District, City of Lincoln, The Nature Conservancy and others (see **Table 9.4**).

Table 9.4
SALINE WETLAND IMPACTS AND RESTORATION ACTIVITIES
(since 1989)

MITIGATION PROJECTS

PROJECT PROPONENT/ PROJECT LOCATION	YEAR	SALINE WETLAND IMPACTS	RESTORED ACRES	PRESERVED SWC ACRES
BNSF Hobson Yard Expansion and other projects included in wetland bank permit	1995-1997	20.51 ac saline to-date (10/01) (permit allows up to 25 ac saline Cat I, 20.94 ac Cat II)	to be debited from BNSF wetland bank using weighted score methodology	-
BNSF Hobson Yard Wetland Mitigation Bank	1997	N/A	228 ac at 2 off site locations, including 51 ac restored Cat I wetlands, plus preservation of additional 88 ac saline & FW wetlands, and 89 ac upland buffer.	228
Campbell's Northwoods Development and Warner Tract Wetland Mitigation Site	1998 ?	FW impact at east Lincoln site	2.71 ac restored saline wetland off-site, owned and managed by LPSNRD	-
Capitol Soccer Association Ethel Abbot Soccer Complex at North 70 St	1993	0.88 ac Cat III	1.32 Cat III, on-site	-
City of Lincoln K & L St Extension	1990	16.58 ac saline	58 ac saline wetland complex, off-site at Arbor Lake WMA, managed by NGPC	58
City of Lincoln Wetland Mitigation Bank at 98th & Cornhusker	2001	de minimis FW impacts only	189-ac complex, including restoration of 61 ac Cat I wetlands, 49 ac FW wetlands, 12 ac saline prairie, 14 ac upland buffer, & enhancement of 24 ac wetlands and 6 ac of upland islands, to be managed by LPSNRD	189
Concrete Industries Wash Operations at North 70th Street	1993	2.48 ac saline	4.96 ac saline wetland, on-site	12
Dennis R. Schworer Building Co North 33rd & Superior	1998	0.40 ac Cat III 0.59 ac Cat IV	2.09 ac Cat III, on-site	-

PROJECT PROPONENT/ PROJECT LOCATION	YEAR	SALINE WETLAND IMPACTS	RESTORED ACRES	PRESERVED SWC ACRES
Dial Realty North 27th Street Development	1999 ?	1.16 ac Cat I 0.87 Cat III	6.45 ac Cat I, on-site, and transfer of approx 12 ac conservation easement to LPSNRD	-
ISCO, Inc. Grading Project	1993	1.10 ac Cat III	1.65 ac Cat III, on-site	-
Lancaster County North 27th St Grading, Arbor Rd North	1992	1 ac	1:1, off-site at NDOR Ceresco South site	-
Nebraska Department of Roads 27th St Interchange	1994	part of 16.7 ac (with next)	1:1, off-site at NDOR Ceresco South site	-
Nebraska Department of Roads Improvements to US 77 Lincoln to Ceresco	1994-1996	remainder of 16.7 ac (with above)	1:1, on-site at NDOR Ceresco South site	-
Nebraska Department of Roads Saline Wetland Mitigation Site	1994	N/A	17.7 ac Cat I, at NDOR Ceresco South site near Jack Sinn WMA	40?
Noddle Development Co & GenEx Hendricks Property Migitation Site for Kmart & General Excavating Impact Sites	1993	2.46 ac (Kmart North) 4.2 ac (GenEx)	8 ac restored saline wetlands, off site, now owned by Sue Kuch	-
North 33rd St Landowners/City of Lincoln North 33rd St Extension	1999	0.07 ac Cat II 0.15 ac Cat III	0.66 ac, on-site, mitigated by Superior Pointe Partners, to be managed by LPSNRD	-
Rogge North 70th St Development	1997 ?	1.03 ac Cat III	3.09 ac Cat III, on-site	-
Superior Pointe Partners North 33rd St Development	1999 ?	0.04 ac Cat III	1 ac Cat III, on-site, to be managed by LPSNRD	-
Whitehead Oil Company North 27th Street Development	1996	2.2 ac Cat II	99 ac Cat I complex, including 36.6 ac restored saline wetland and enhancement of remaining wetlands, on-site, now owned by LPSNRD	99
Subtotal–Saline Mitigation Projects		**approx. 72.42 ac impacted**	**approx. 258.32 ac restored (3.6:1 replacement-to-loss)**	

Table 9.4 (continued)
WETLAND RESTORATION PROJECTS

NOT FOR MITIGATION

PROJECT PROPONENT PROJECT NAME/LOCATION	YEAR	IMPACTED WETLANDS	WETLAND RESTORATION	PRESERVED SWC ACRES
Vicky and Kim Wheeler Private Wetland Restoration, North 14th & Mill Road	1993	0	5 ac including salt marsh, saltflats	-
George Hendricks (now Sue Kuch) Private Wetland Restoration North 27th Street and Arbor Road	early 1990s	0	approx. 5 ac	-
George Hendricks (now Sue Kuch) Private Wetland Restoration North 27th Street and Arbor Road	mid 1990s	0	approx. 8 ac	-
LPSNRD Lincoln Saline Wetlands Nature Center Capitol Beach Lake	1996?	0	130 ac site including restoration of 1 ac saltflat, 4 ac FW wetlands, large prairie area, & preservation of existing saline and FW wetlands	130
Nebraska Game and Parks Commission & LPSNRD Jack Sinn WMA/Rock Creek Saline Wetland Restorations	1989 - 2001	0	120 ac restored saline wetlands w/ 265 ac wetlands & 1007 ac upland in preservation, 165 ac funded but not yet restored (then 430 ac wetlands, and 842 ac upland).	1,272
Pfizer Saline Wetland Restoration Trail Cornhusker & North 1st	1998	0.49 ac Cat I	25 ac Cat I site, including restoration of salt marsh, saltflats, saltgrass meadow and saline prairie	25
The Nature Conservancy Noble Tract Restoration, Little Salt Creek & Mill Rd	2002 ?	0	Have heard from TNC that wetlands restoration is planned on this approx. 60 ac tract	60?
Subtotal–Saline Restoration Projects		**approx 0.49 ac impacted**	**approx 171 ac restored to-date**	
TOTAL– All Saline Mitigation and Restoration Projects		**approx 72.91 ac impacted**	**approx 429.32 restored (5.9:1 replacement-to-loss)**	**2,113 ac**

In addition, many of the restoration projects have been designed to maximize the restoration of the higher quality plant associations, especially the saltflat habitats which support the rare species. One impetus is the agencies' use of the weighted score methodology which gives greater mitigation "credit" to those areas. For restorations which have not involved mitigation, there has been an intrinsic interest in trying to restore the full complement of saline habitats, especially the rare ones. Some of the success stories, which illustrate the state of the restoration effort in the SWC, have included a net increase in 11 ha (27 ac) of saltflat (saltwort and seablite) communities as part of the BNSF wetland bank restorations on Little Salt and Rock Creeks, and the reintroduction of saltwort (by seeding) at the Pfizer site on Oak Creek. The fact that the BNSF saline wetland bank was fully certified in five years following construction shows that restoration of these areas has been proven possible.

While it is likely that there could be some future saline wetland permits in Lancaster County, particularly for linear projects such as roads and utilities, these impacts are generally expected to be minor and related to expansion of existing facilities. In addition, the City is constructing a saline and freshwater wetland mitigation bank in advance of future impacts.

9.6.8.3 Assessment of Secondary and Cumulative Impacts

The beltway project should not facilitate urban growth in the areas of the Saline Wetlands Complex and thereby indirectly result in the loss of saline wetlands because:

1. There are City and County policies and programs which dictate the direction of urban growth and specifically discourage development in saline wetlands (as well as in the Stevens Creek floodplain and floodplains in general).

2. There are Federal and State regulations which regulate saline wetland impacts through permit programs, and require net gains in saline wetlands. There is already a demonstrated trend of a net gain in saline wetland acres due to many successful restorations.

3. FWS is reviewing the possibility of proposing emergency listing of the Salt Creek tiger beetle as a federally endangered species. This activity will likely require certain restrictions on development projects in the vicinity of saline wetlands. A task force has been asked to review the situation and make recommendations to the Mayor regarding appropriate action for the community.

4. Despite the lack of a beltway, Lincoln grew 50 percent in population and 50 percent in area between 1970 and 2000. The City is expected to grow by approximately 47 percent by 2025 with or without a beltway. Population increases are due to the availability of jobs, excellent schools and universities, and a high quality of life–not a remote beltway facility.

5. The proposed beltway location is fairly remote from the urban portion of the City, and there are essentially no saline wetlands between the beltway and the existing City limits. The only exception is an area of saline wetlands located within the 100-year floodplain between I-80 and Cornhusker Highway (about 2.4 km (1.5 mi) from the I-80 interchange at the north end of the beltway). The majority of the saline wetlands are 6.4 km (4 mi) or more away, west of the Stevens Creek basin.

6. While some limited highway commercial or mixed use development might be expected early on at the 11 proposed new interchanges (along the 32 km (20 mi) roadway), the Comprehensive Plan shows no development in the area of the SM-4 and EM-1 alignments within the next 25 years. Between 25 and 50 years, it is expected that growth of the City could reach some portions of the beltway study area. But it could take 50 to 100 years or more for the City to fill most of the beltway study area.

For these reasons, the beltway is not considered to have any direct, secondary or cumulative adverse impacts on saline wetlands or other wetlands.

9.7. RESPONSE TO COMMENTS ON NRCS FORM AD-1006

The Preservation Association of Lincoln raised concerns about the assumptions used in completing the Natural Resource Conservation Service (NRCS) Farmland Conversion Impact Rating (USDA Form AD-1006) (see **Appendix A, page A-33**). This form was used to assess impacts to farmland. The following discussion explains (a) requests by the Preservation Association of Lincoln, (b) the assumptions used in completing the AD-1006 as included in the DEIS, and (c) alternative calculations, if appropriate.

Acres to be Converted Indirectly

(a) PAL states that the assumption of no indirect impacts is erroneous because farmlands would be indirectly converted due to increased accessability to the new highway. They also imply that additional acres could be indirectly converted due to partial acquisitions resulting in uneconomic remainders, and due to restriction of access.

One comment letter from a landowner on EF-1 proposes indirect impacts amounting to 58 ha (144 ac) on SM-4 and 78 ha (192 ac) on EF-1 that would be lost to development at the interchanges (6 ac at each of 14 interchanges); and 27 ha (66 ac) on SM-4 and 64 ha (158 ac) on EF-1 that will be left without access–amounting to 227 ha (560 ac). The landowner also mentions 36 ha (90 ac) on EF-1 that would lose pivot irrigation.

(b) It is emphasized that it is the Comprehensive Plan that determines the location of future development and not the location of a beltway. City/County policies are intentially aimed at planned growth and avoiding urban sprawl. The proposed vision of the Comprehensive Plan very clearly shows that the beltway study area could ultimately become part of the urban limit as the city grows (see **Section 9.6.4.2**). Therefore it is the planned growth of the City of Lincoln that would result in the majority of farmland conversion, and not the beltway. As such the assumption was made that no acres would be converted indirectly.

At the time of the DEIS, there was no data available to determine the indirect impacts due to uneconomic remainders. However, general practices in right-of-way acquisition for rural properties include provision of access to the extent possible, and sale of uneconomic remainders to neighboring landowners who do have access. These practices minimize the loss of production agriculture. While the project may impact two pivots amounting to 36 ha (90 ac); use of the land for agriculture is not lost.

It is also interesting to note that if the assumption was made that the beltway would indirectly convert additional acres of farmland (Part III, B.), the additional acres would have no effect on the value of Part V unless the composition of the soil types, as a group, was more productive than that already included in Part IV, A. In fact, adding acres could possibly reduce the value of 71 assigned to the SM-4/EF-1 alternative. This is because the Part V value is determined as a weighted average of rankings of soil types based on the productivity of the soils–which for the beltway study area appears to be around 70.

(c) No changes in calculations.

Criterion 1: Area (within 1-mi which is) in Non Urban Use.

(a) PAL requests documentation to support a score of 14 for all three routes. They imply that 90 percent of the land within 1 mi of the project is in non-urban use, and therefore the score should be 15 points as stated in the guidelines.

(b) For the DEIS, this value was estimated by taking the sum of the non-urban land uses (cropland, pasture/hayland, other farm, woodland, wetland and ponds/streams) within the beltway rights-of-way (see **Table 3.1**), and dividing by the total right-of-way. The percent non-urban was approximately 87 percent for all three end-to-end routes; which equates approximately to a score of 14. If anything, this method overestimates the amount of non-urban land within one mile of the beltway because the beltways were routed to avoid urban elements such as residences and businesses.

(c) No change in calculations.

Criterion 2: Perimeter in Non-Urban Use.

(a) PAL requests documentation to support the scores of 9, 9 and 8.5 for the close, mid and far routes, respectively.

(b) For the DEIS, this value was estimated by taking the percent of non-urban land uses within the beltway rights-of-way (see (b) above), and multiplying this times 10, the maximum number of points for this criteria. This results in an actual value of 8.7 for each of the routes; therefore, each of the routes should have had the same assigned score of either 8.5 or 9. This appears to be an error.

(c) Change score to 8.5 for all three routes.

Criterion 3: Percent of Site Being Farmed (within the last 5 to 10 years) .

(a) PAL requests documentation to support the scores of 16, 16.5 and 16.5 for the close, mid and far routes, respectively.

(b) For the DEIS, this value was estimated by taking the total farmland (see **Table 3.2**) as a percentage of the total right-of way for each of the three end-to-end routes (81, 83 and 82 percent), and multiplied times 20–the maximum number of points for this criterion. With rounding to the nearest 0.5, this resulted in the assigned values of 16, 16.5 and 16.5, for the close, mid and far, respectively.

(c) No changes in calculations.

Criterion 4: Protection Provided by State and Local Government.

(a) PAL states that all of the routes should be scored 20--the maximum number of points for this category because agricultural uses are protected by the Comprehensive Plan.

(b) For the DEIS, it was assumed that only minor protection measures in the beltway study area were in place through USDA agricultural programs, conservation easements, floodplain ordinances, etc.

(c) We agree that a better assumption is that the Lincoln/Lancaster Comprehensive Plan and local zoning affords the maximum protection. However, we would reduce the number of points to reflect the fact that the percent farmland is 81, 83 and 82 percent for the close, mid and far routes, respectively, due the presence of other uses in the area including agricultural residential (AGR) and highway commercial and industrial (H3, I-3, I-2, and I). Change assigned values to 16, 16.5 and 16.5, respectively.

Criterion 7: Size of Present Farm Unit Compared to Average.

(a) PAL requests data supporting the scores of 5 for each route.

(b) For the DEIS, the assumption was made that roughly 20 percent of the land uses in the rights-of-way were other than cropland or pasture/hayland. Using a weighted average, the highest possible score for this criterion would be 8 (out of a maximum of 10 points) if all the farm units were at least as large as the county average of 289 ac (Census of Agriculture, 1997). An assumption was made that farm units were smaller on average was due to the observed trends of farms being divided and sold for acreage subdivisions and farmstead split-offs. It was subjectively assumed that overall the average size of farms was 15 percent smaller than average, and the criterion was assigned 5 points (one point reduction for each 5 percent below average).

(c) No change in calculations.

Criterion 10: On-Farm Investments.

(a) PAL requests data supporting the scores of 12 for each of the three corridors.

(b) The guidance says to use judgement in assigning points, and that 10-18 points should be assigned if the site is part of an average farming operation for the area. An assumption was already made that farm units were smaller on average was due to the observed trends of farms being divided and sold for acreage subdivisions and farmstead split-offs. For the DEIS, the routes were subjectively assigned 12 points each because there were no extraordinary farming investments noted in the area. While field terraces and drainage features are common, irrigation systems are unusual in the study area. Many of the barns and storage buildings are neither substantial nor well-maintained as documented in the historic survey report. There are no orchards or vineyards.

(c) No change in calculations.

Criterion 12: Compatibility with Existing Agricultural Use.

(a) PAL requests rationale or data supporting the score of 4 for each of the three corridors.

(b) For the DEIS, a score of 4 was subjectively assigned in recognition that there is likely to be some farmland conversion at some of the beltway interchanges prior to growth of the city into this area (which is not expected for 50 to 100+ years). In the near term, most of the land adjacent to the beltway will not be adversely affected to the point of eliminating agricultural uses. For comparison, US 77 and I-80 through Lancaster County are compatible with existing agricultural uses, and they have not contributed to wholesale conversion of surrounding farmland to nonagricultural uses (see **Section 9.6.5.2** above). While some loss of agricultural lands to development has occurred, it has been related to planned development outlined in the Comprehensive Plan–such as that along the North 27th Street corridor, and at major interchanges (Cornhusker Highway on I-80, West O Street on US 77).

(c) Change scores to 3, 4 and 5 for close, mid and far to reflect eventual timing of growth.

Recalculation of AD-1006. The suggested changes described above would result in scores of 151.5, 156.5 and 157.5 for SM-4/EC-1, SM-4/EM-1 and SM-4/EF-1, respectively. The revised scores would not change the findings in the DEIS which states that "because all scores are less than 160, no further consideration is required and the project is considered to have a minor effect on prime and unique farmland soils".

Additionally, the purpose of completing the AD-1006 is to distinguish between alternatives as to which locations might be more or less suitable for preservation–relative to prime farmland resources. The results of the evaluation show that there is very little difference between the three alternatives.

If the score were to exceed 160, then it is recommended that other alternatives be developed. It is unlikely that other alternatives within the 80 sq mi study area would have significantly - different scores for either Part V or Part IV because of (1) the uniformity of soils types in the landscape (Sharpsburg-Pawnee-Burchard Association on the east and Wymore-Pawnee on the south), (2) similar types of farming operations, and (3) similar patterns of non-farm land uses. As such, other alternatives within the study area would have similar ratings.

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Chapter 11
GLOSSARY AND LIST OF ABBREVIATIONS

11. GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AG	agricultural zoning
AGR	agricultural-residential zoning
bbl	billion barrels of oil
BNSF	Burlington Northern - Sante Fe Railway Company
BOS	Build Out Land Use Plan (Scenario I)
BOS II	Build Out Land Use Plan (Scenario II)
BTU	British Thermal Unit
CERCLIS	Comprehensive Environmental Response, Compensation, and Liabilities Index System
dBA	noise level in decibels weighted with A-frequency response
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FWS	Fish and Wildlife Service
GIS	geographic information system
HOV	high occupancy vehicle
HUD	U.S. Department of Housing and Urban Development
I-80	U.S. Interstate 80
LES	Lincoln Electric System
LOS	level of service
LPSNRD	Lower Platte South Natural Resources District
LUST	leaking underground storage tank
LWCF	Land and Water Conservation Fund
N-2	Nebraska Highway 2
NAAQS	National Ambient Air Quality Standards
NAC	noise abatement criteria
NDEQ	Nebraska Department of Environmental Quality
NDOR	Nebraska Department of Roads
NEPA	National Environmental Policy Act
NeSHPO	Nebraska State Historic Preservation Office
NFA	no further action
NFIP	National Flood Insurance Program
NGPC	Nebraska Game and Parks Commission
NNHP	Nebraska National Heritage Program
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OPPD	Omaha Public Power District
PM_{10}	particulate matter
PPP	public participation program
RCRIS	Resource Conservation and Recovery Information System
ROW	right of way
RTSD	Rail Transportation Safety District

SFM	Nebraska State Fire Marshall
SHPO	State Historic Preservation Office
TDM	transportation demand management
TSD	treat, store, or dispose
TSM	transportation system management
UP	Union Pacific Railroad
US 77	U.S. Highway 77
US 6	U.S. Highway 6, Cornhusker Highway
US 34	U.S. Highway 34, O Street
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
V/C	volume to capacity ratios
VHT	vehicle hours traveled
VMT	vehicle miles traveled
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Program

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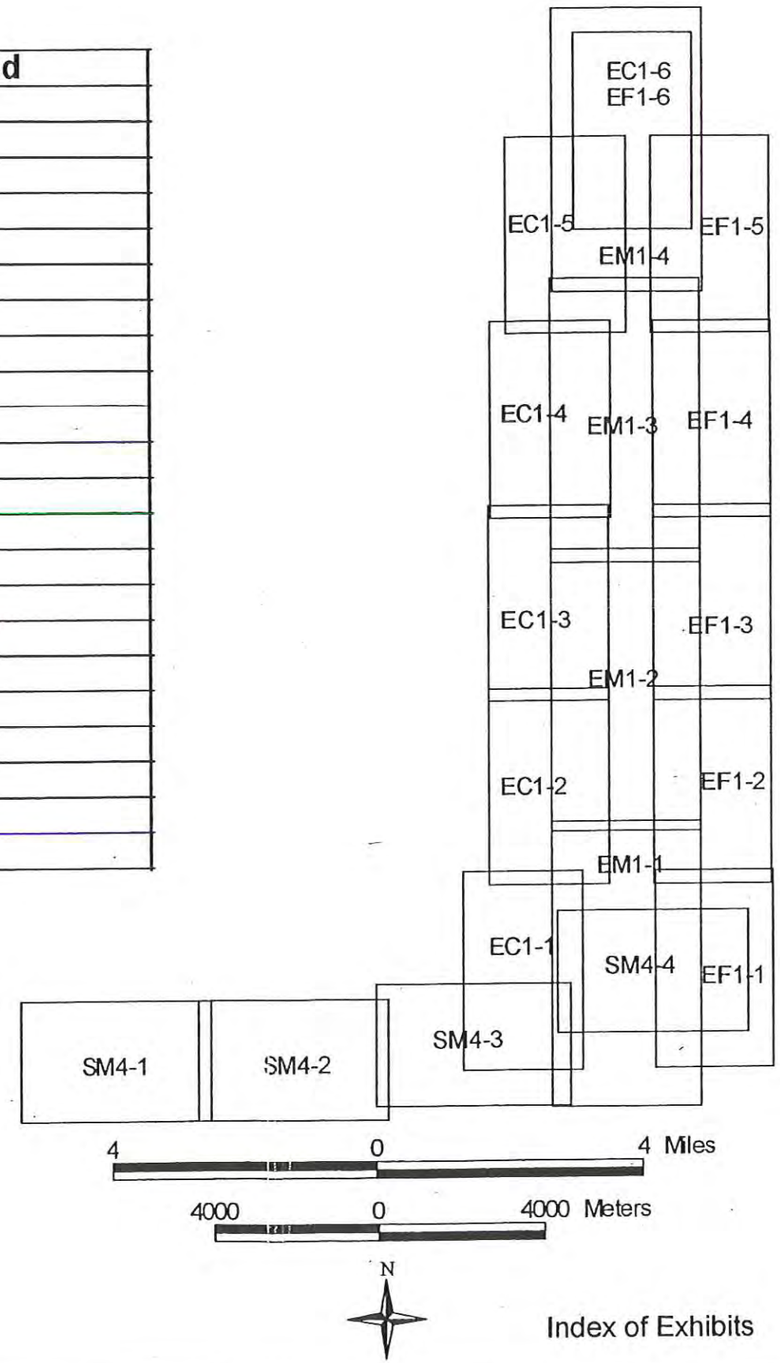
EXHIBITS

Exhibit	Drawing Name	Date Last Issued
SM4-1	Connection of U.S. 77 to South Alignment	06/09/2000
SM4-2	Alignment from S. 38th to S. 68th St.	06/09/2000
SM4-3	Alignment from S. 82nd to S. 110th St.	06/09/2000
SM4-4	Alignment of Neb. Hwy 2 to South Alignment	06/09/2000
EC1-1	Connection of East close to South Alignment	06/09/2000
EC1-2	Alignment from Yankee Hill to Pioneers Blvd.	06/09/2000
EC1-3	Alignment from Pioneers to O St.	06/09/2000
EC1-4	Alignment from O St. to Havelock Ave.	06/09/2000
EC1-5	Alignment from Havelock to Alvo Rd.	06/09/2000
EC1-6	Connection of East close to I-80	06/09/2000
EM1-1	Connection of East Mid to South Alignment	06/09/2000
EM1-2	Alignment from Yankee Hill to Pioneers Blvd.	06/09/2000
EM1-3	Alignment from Pioneers to O St.	06/09/2000
EM1-4	Alignment from O St. to Havelock Ave.	06/09/2000
EM1-5	Alignment from Havelock to Alvo Rd.	06/09/2000
EM1-6	Connection of East Mid to I-80	06/09/2000
EF1-1	Connection of East Far to South Alignment	06/09/2000
EF1-2	Alignment from Yankee Hill to Pioneers Blvd.	06/09/2000
EF1-3	Alignment from Pioneers to O St.	06/09/2000
EF1-4	Alignment from O St. to Havelock Ave.	06/09/2000
EF1-5	Alignment from Havelock to Alvo Rd.	06/09/2000
EF1-6	Connection of East far to I-80	06/09/2000



Lincoln South and East Beltways ***I-80 to Highway 77***

Environmental Impact Statement

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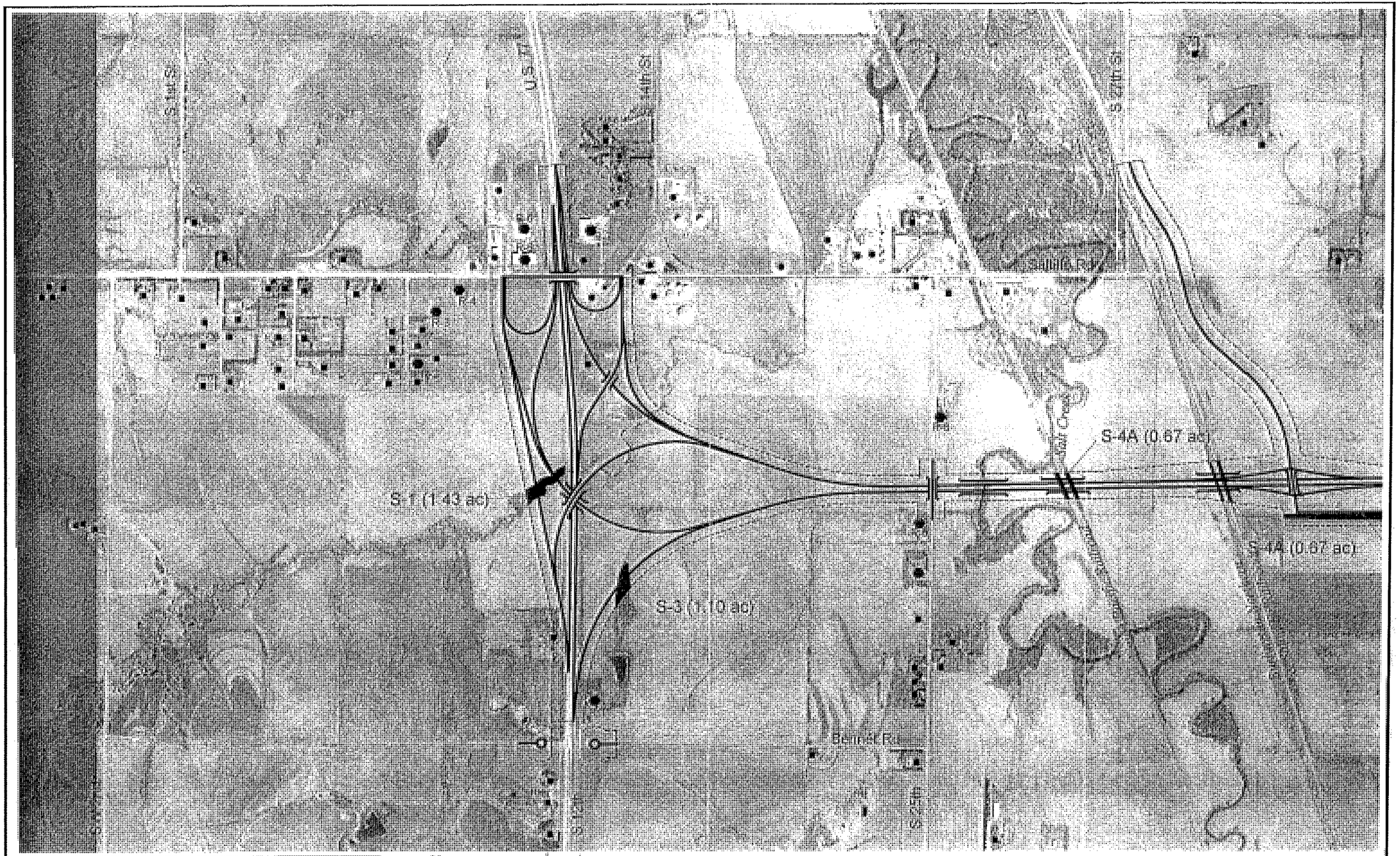


Route SM-4: Photo Mosaic and Schematic

Exhibit SM4-1

Legend

- NRHP Eligible Sites (80)
- Residences
- Berm
- Right of Way
- NRD Dam Site (A1-1)
- Noise Receptor (R-10)
- Wetlands (EF-1)
- Creeks/Ponds

N

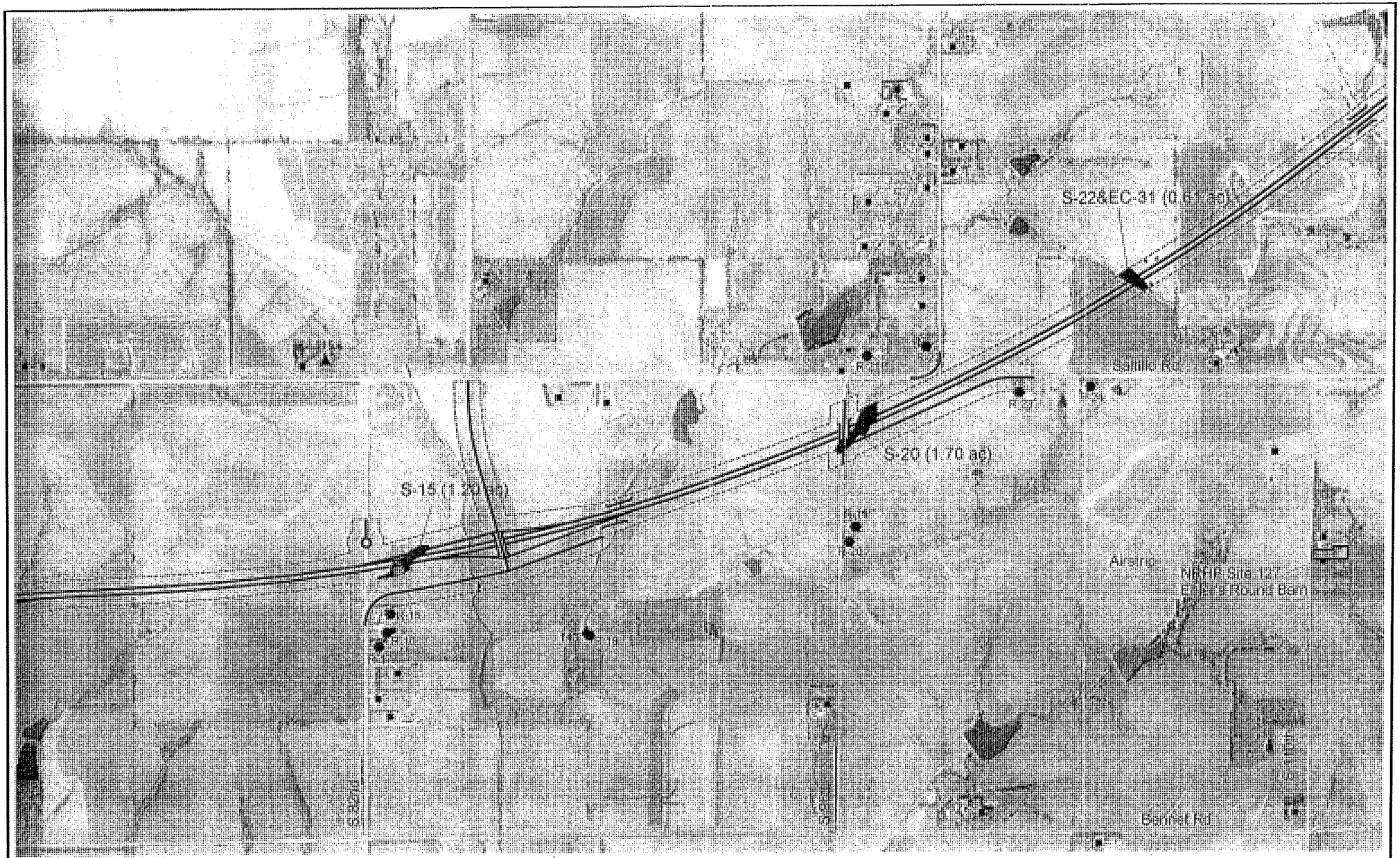
May 23rd, 2002

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

1000 0 1000 Feet
300 0 300 Meters

Route SM-4: Photo Mosaic and Schematic

Exhibit SM4-2



Legend

- NRHP Eligible Sites
- Residences
- Berm
- Right of Way
- NRD Dam Site
- Noise Receptor
- Wetlands
- Creeks/Ponds

N

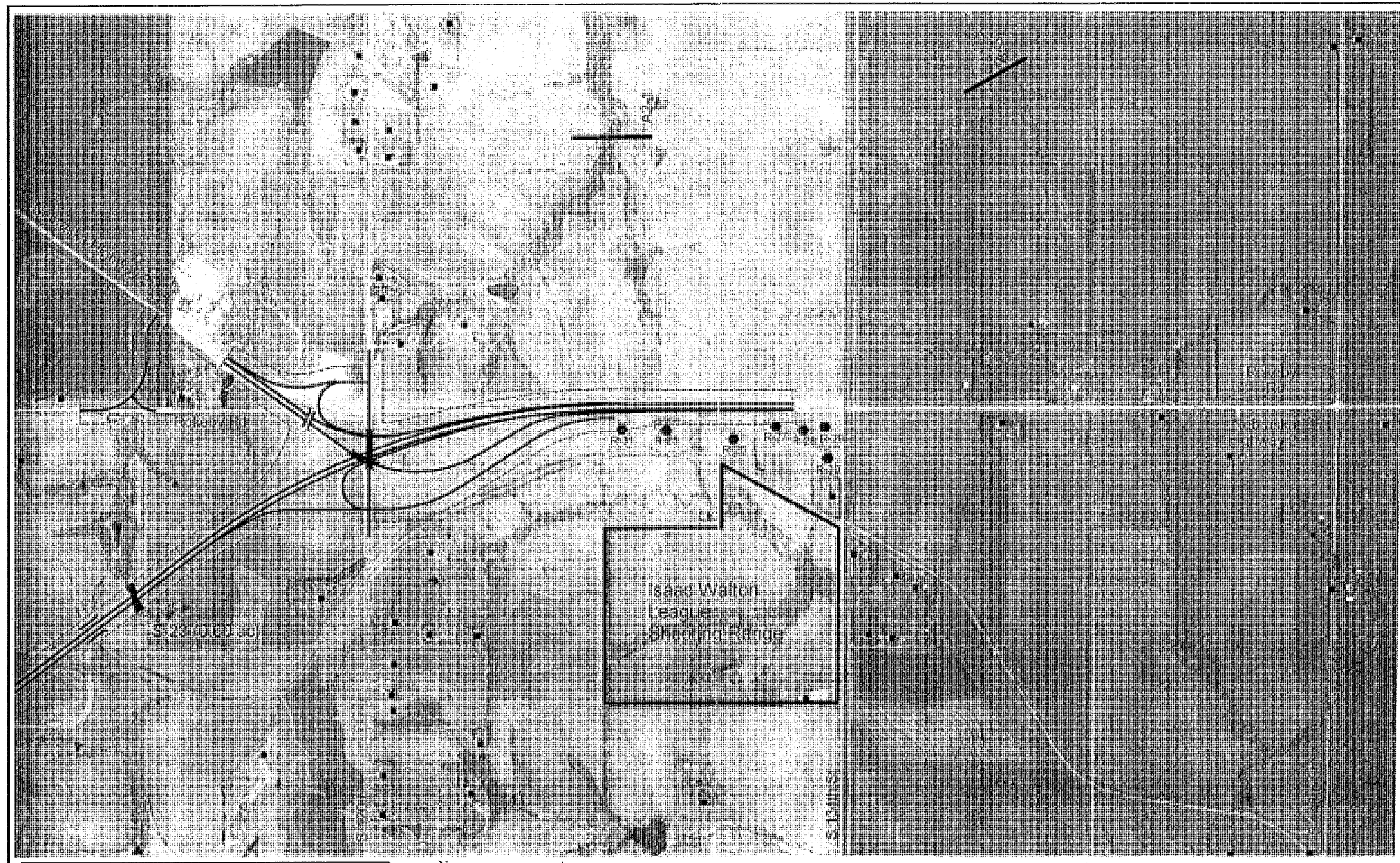
Nov. 16th, 2001

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

1000 0 1000 Feet
300 0 300 Meters

Route SM-4: Photo Mosaic and Schematic

Exhibit SM4-3



Legend

- NRHP Eligible Sites (80)
- Residences
- Berm
- Right of Way
- NRD Dam Site (A1-1)
- Noise Receptor (R-10)
- Wetlands (EF-1)
- Creeks/Ponds

N

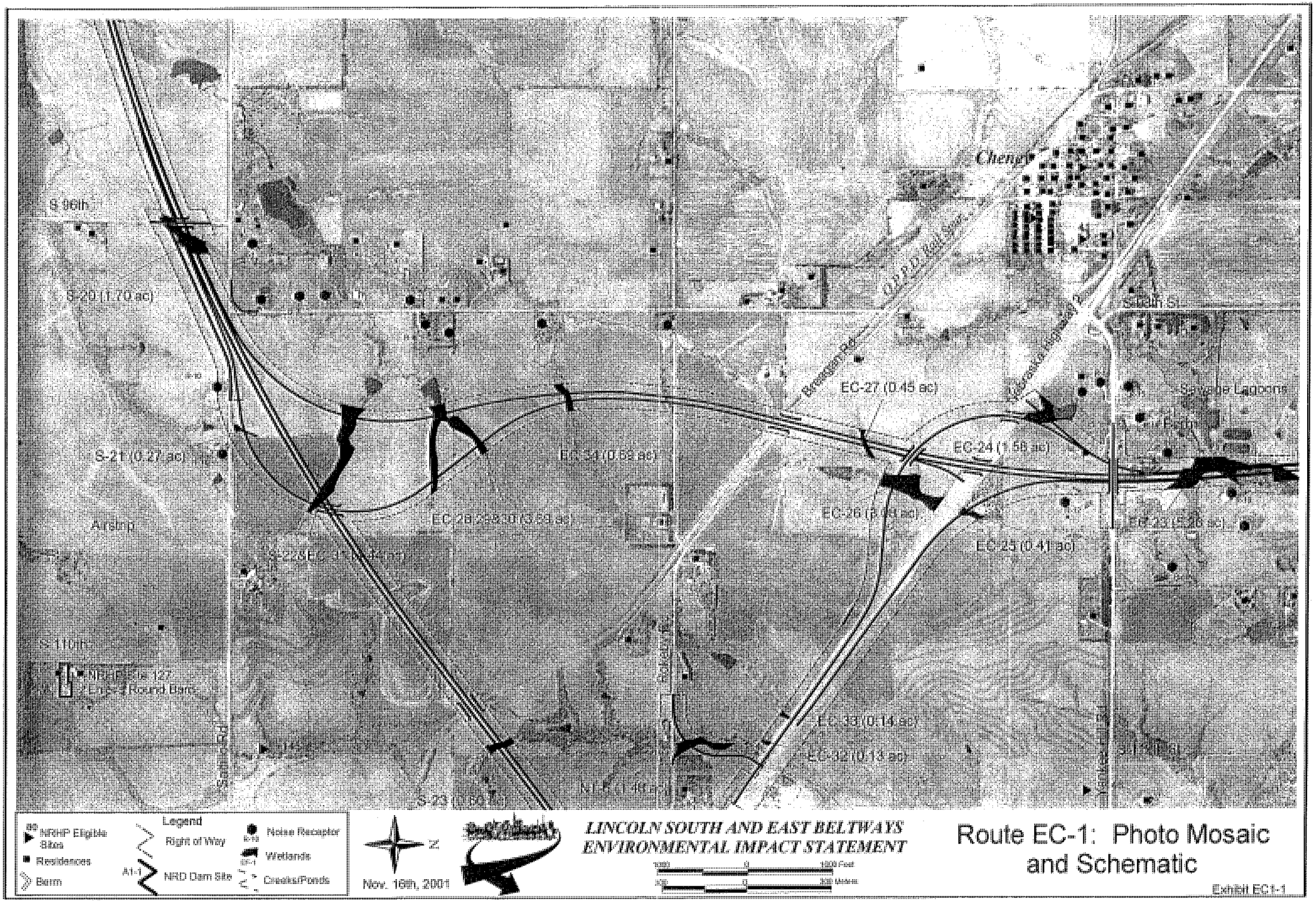
Nov. 16th, 2001

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

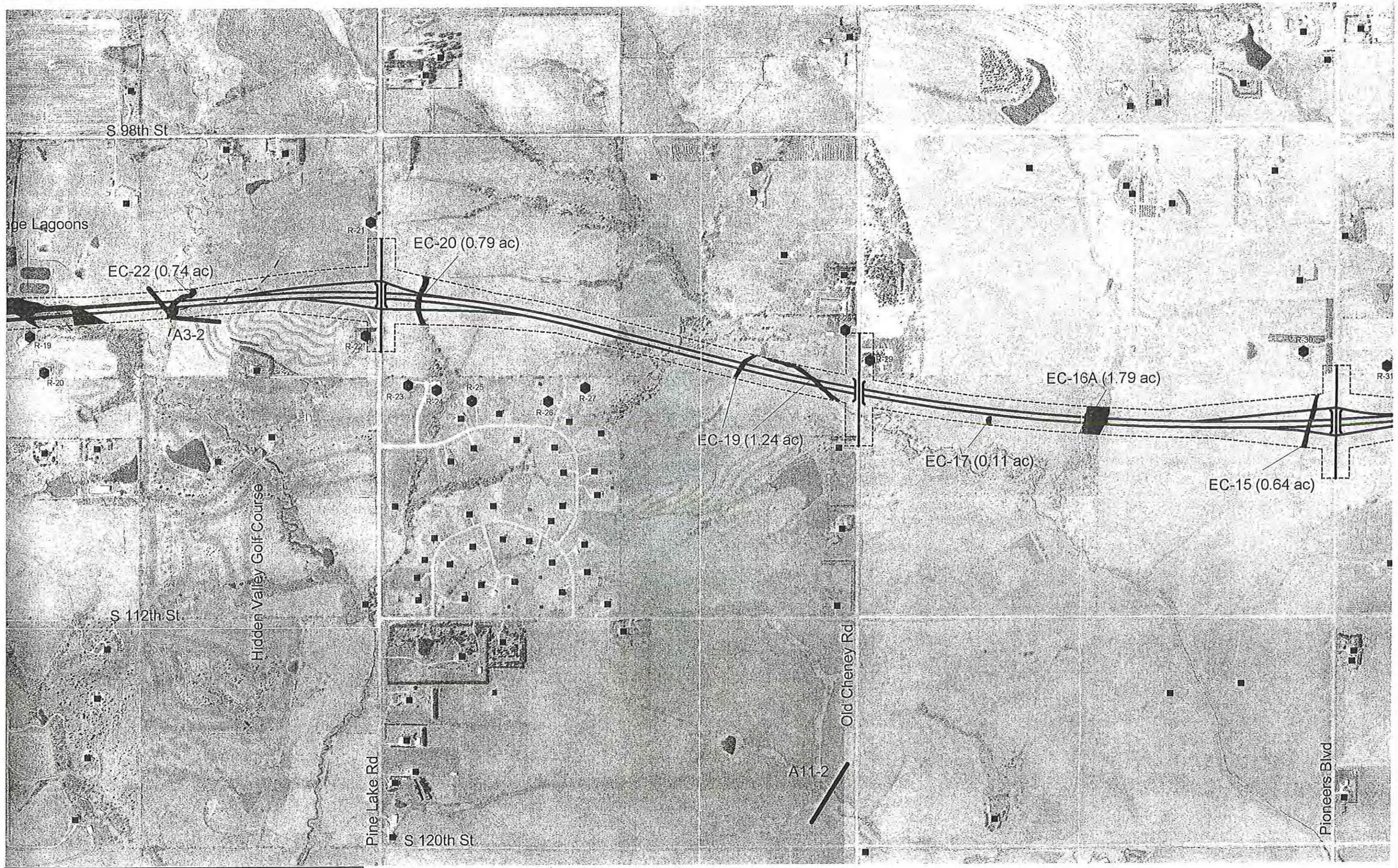
1000 0 1000 Feet
300 0 300 Meters

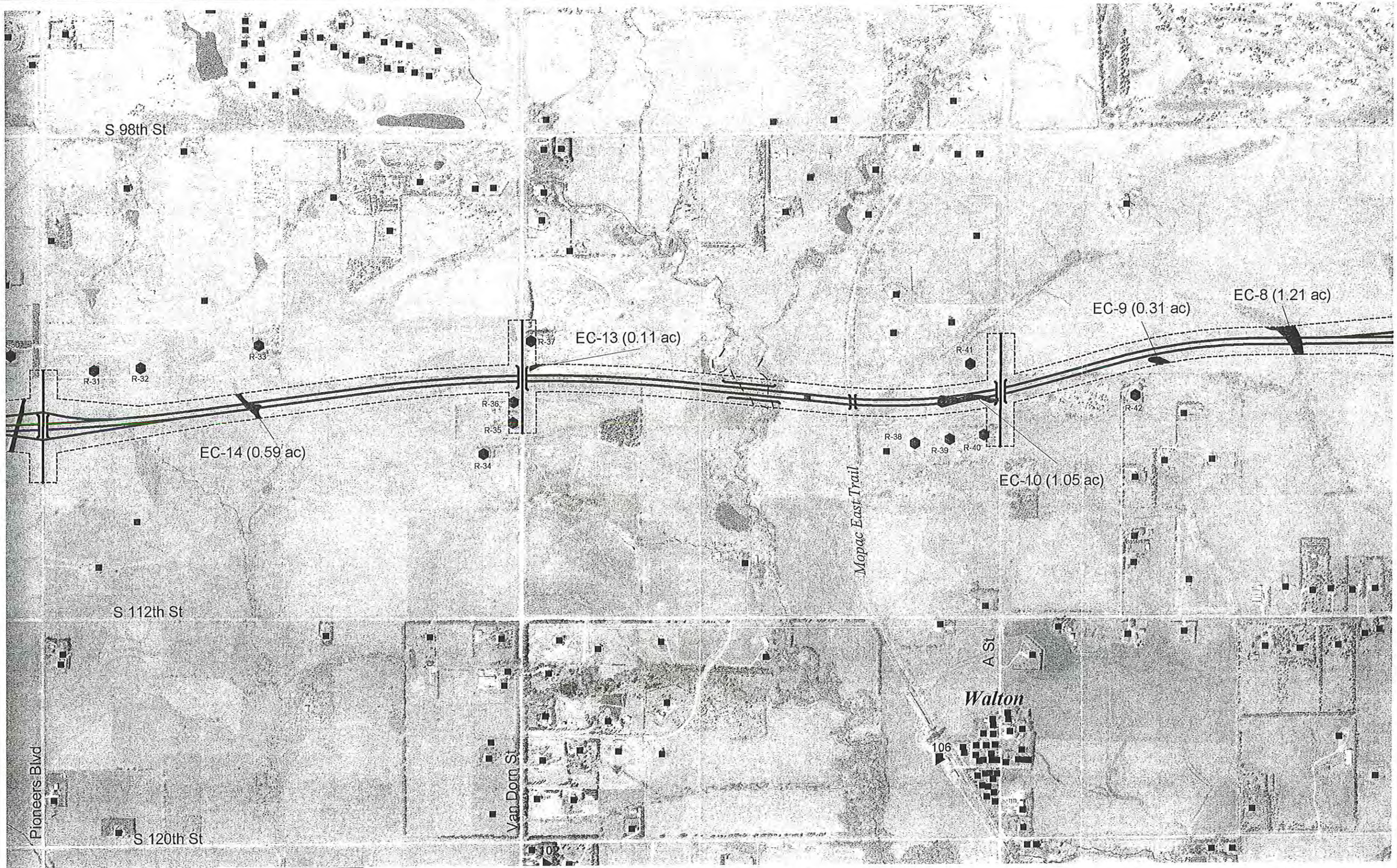
Route SM-4: Photo Mosaic and Schematic

Exhibit SM4-4



S 96th
S-20 (1.70 ac)
S-21 (0.27 ac)
Airstrip
S 110th
Cheney
Breagan Rd
EC-27 (0.45 ac)
EC-24 (1.58 ac)
EC-25 (0.41 ac)
EC-33 (0.14 ac)
EC-32 (0.13 ac)
Sewage Lagoons
Legend
NRHP Eligible Sites
Residences
Berm
Right of Way
NRD Dam Site
Noise Receptor
Wetlands
Creeks/Ponds
N
Nov. 16th, 2001
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
Route EC-1: Photo Mosaic and Schematic
Exhibit EC1-1

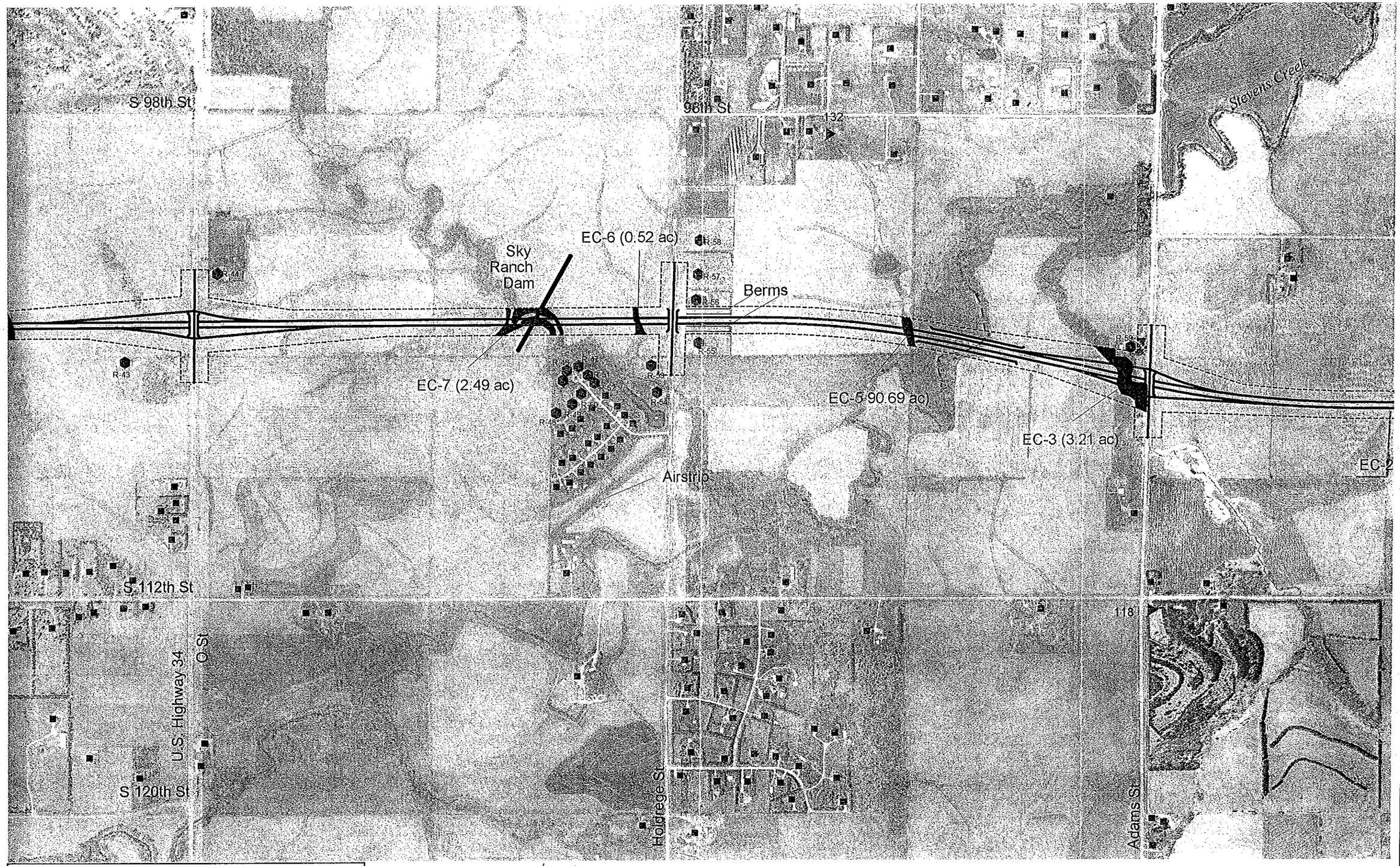

S 98th St
ge Lagoons
EC-22 (0.74 ac)
EC-20 (0.79 ac)
A3-2
R-19
R-20
R-21
R-22
R-23
R-24
R-25
R-26
R-27
R-29
R-30
R-31
EC-19 (1.24 ac)
EC-16A (1.79 ac)
EC-17 (0.11 ac)
EC-15 (0.64 ac)
Hidden Valley Golf Course
S 112th St
Pine Lake Rd
S 120th St
Old Cheney Rd
A11-2
Pioneers Blvd
Legend
80 NRHP Eligible Sites
Residences
Berm
Right of Way
A1-1 NRD Dam Site
R-10 Noise Receptor
EF-1 Wetlands
Creeks/Ponds
N
Nov. 16th, 2001
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
1000 0 1000 Feet
300 0 300 Meters
Route EC-1: Photo Mosaic and Schematic
Exhibit EC1-2

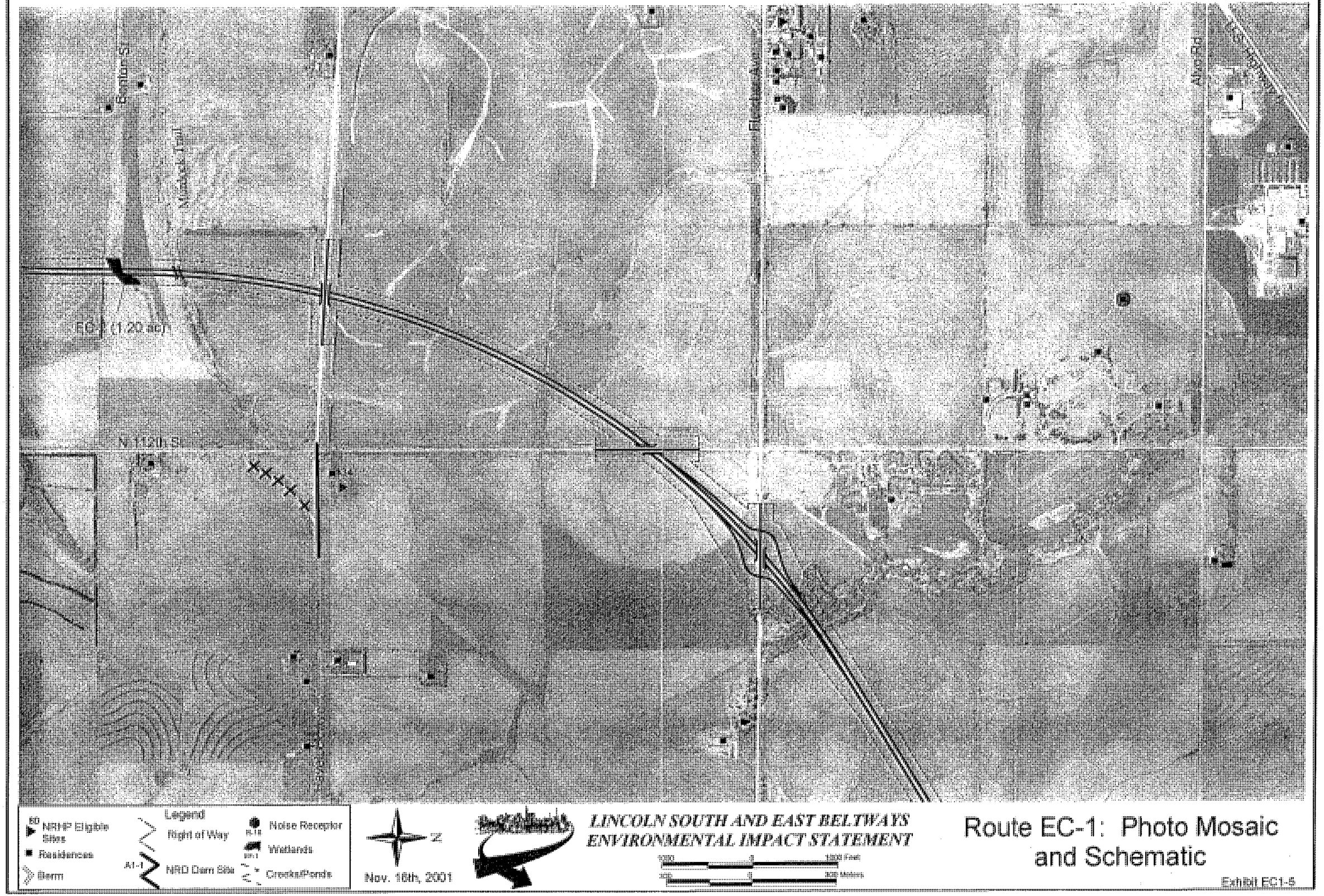


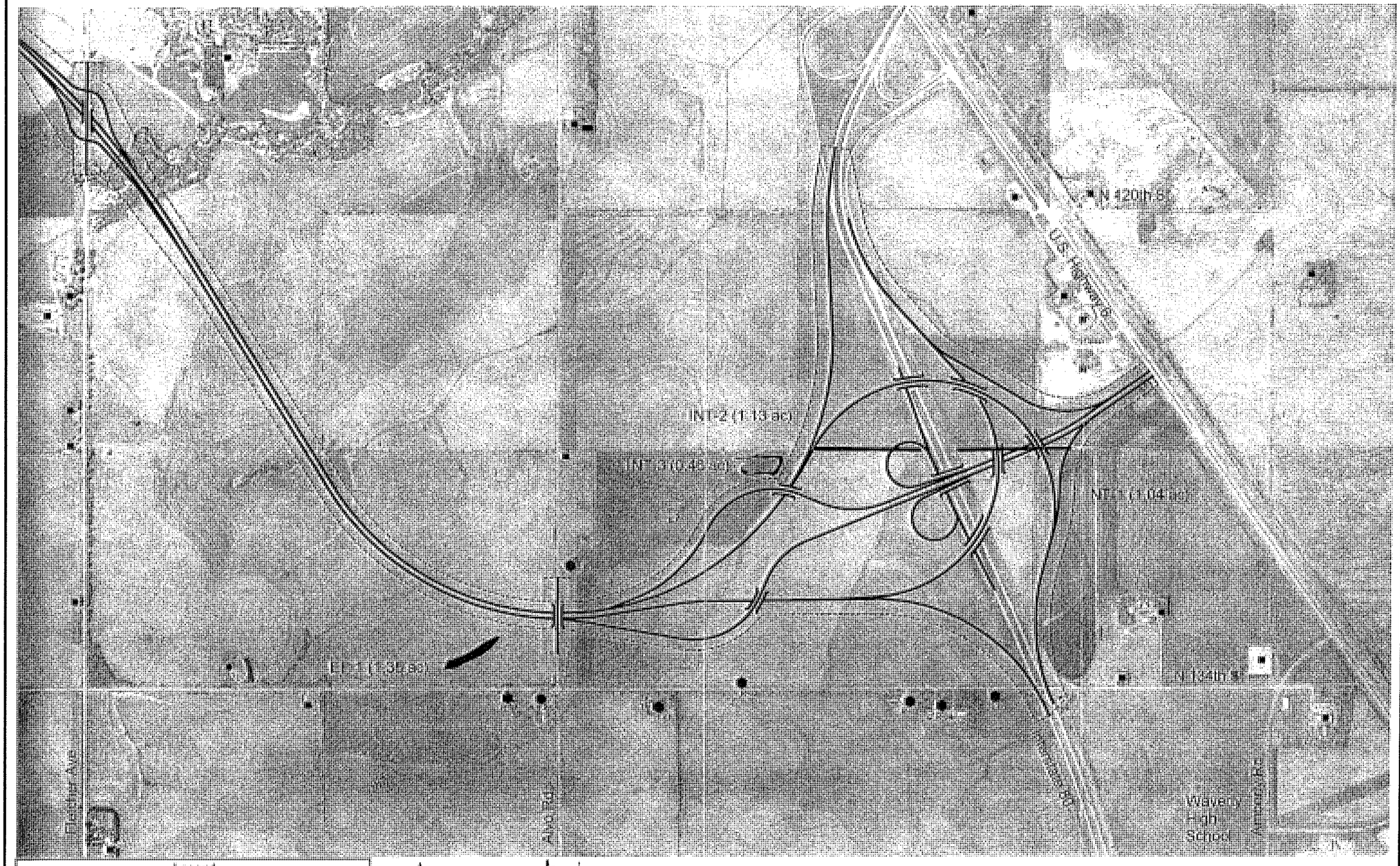
LINCOLN SOUTH AND EAST BELTWAYS ENVIRONMENTAL IMPACT STATEMENT

Route EC-1: Photo Mosaic and Schematic

Exhibit EC1-3


S 98th St
98th St
132
Stevens Creek
EC-6 (0.52 ac)
Sky Ranch Dam
Berms
EC-7 (2.49 ac)
EC-5 90.69 ac)
EC-3 (3.21 ac)
EC-2
Airstrip
S 112th St
118
U.S. Highway 34
O St
S 120th St
Holdrege St
Adams St
Legend
NRHP Eligible Sites
Residences
Berm
Right of Way
NRD Dam Site
Noise Receptor
Wetlands
Creeks/Ponds
N
Nov. 16th, 2001
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
1000 0 1000 Feet
300 0 300 Meters
Route EC-1: Photo Mosaic and Schematic
Exhibit EC1-4


Legend
NRHP Eligible Sites
Residences
Berm
Right of Way
NRD Dam Site
Noise Receptor
Wetlands
Creeks/Ponds
Nov. 18th, 2001
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
Route EC-1: Photo Mosaic and Schematic
Exhibit EC1-5

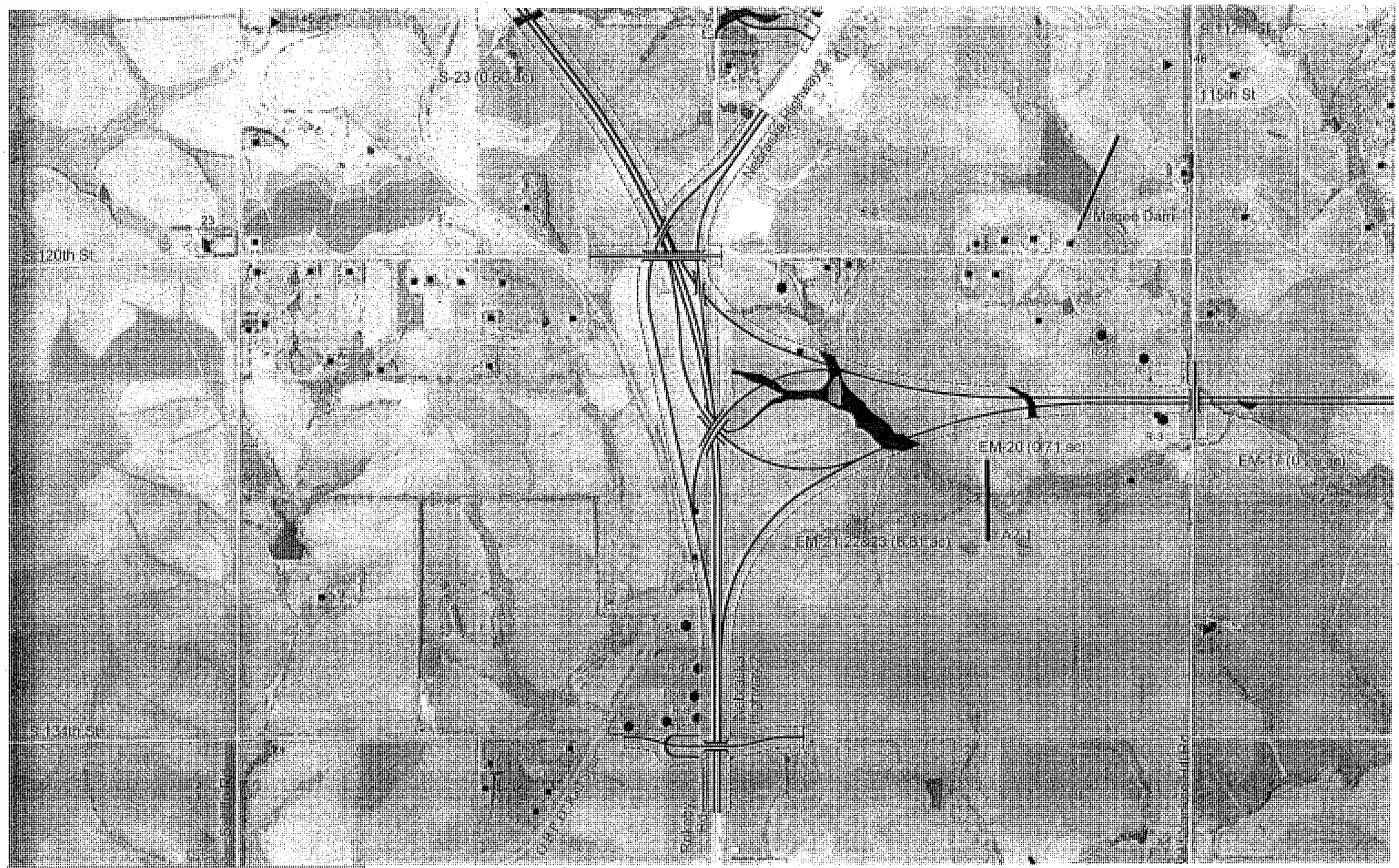


Nov. 16th, 2001

LINCOLN SOUTH AND EAST BELTWAYS ENVIRONMENTAL IMPACT STATEMENT

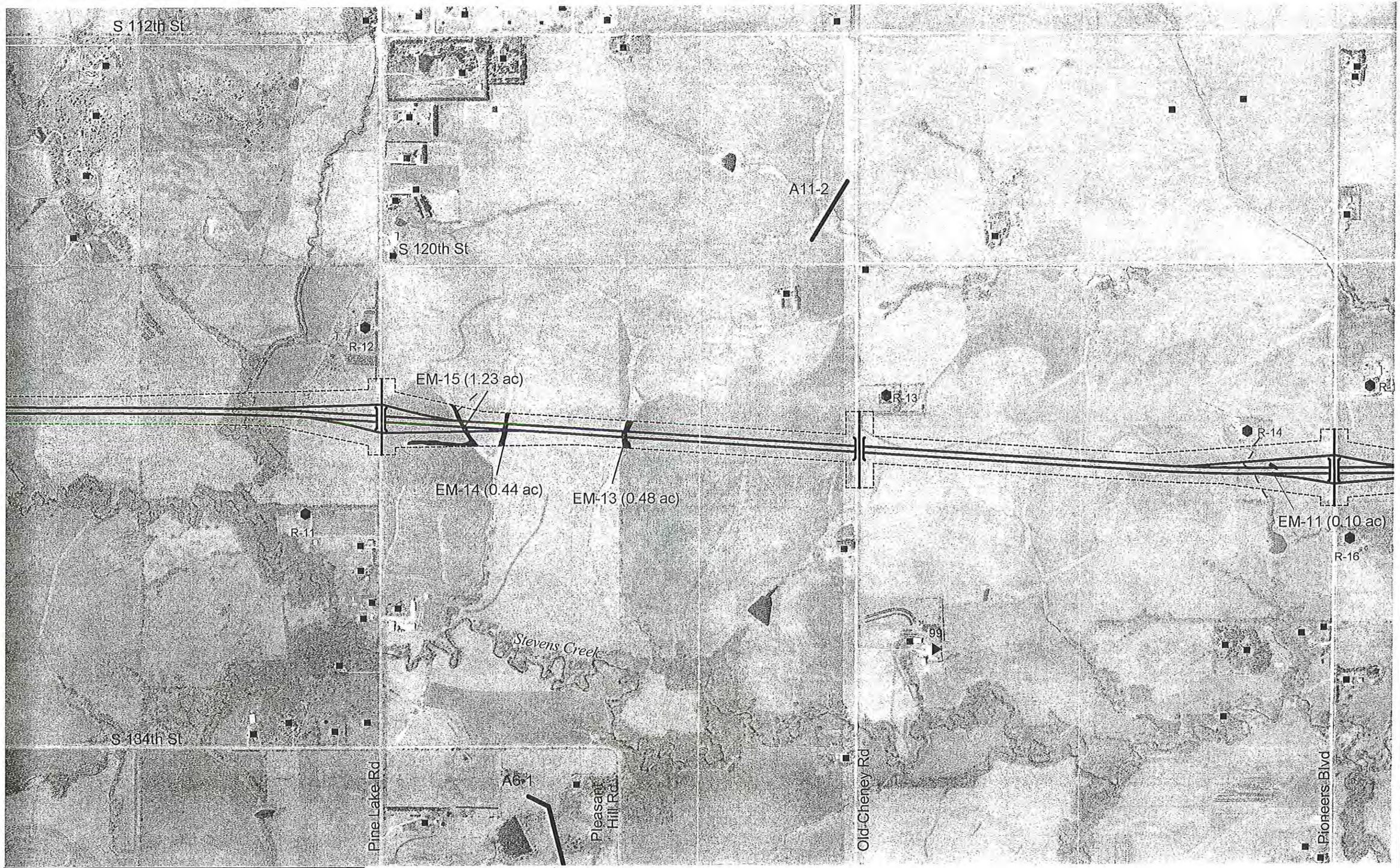
Route EC-1: Photo Mosaic and Schematic

Exhibit EC1-6



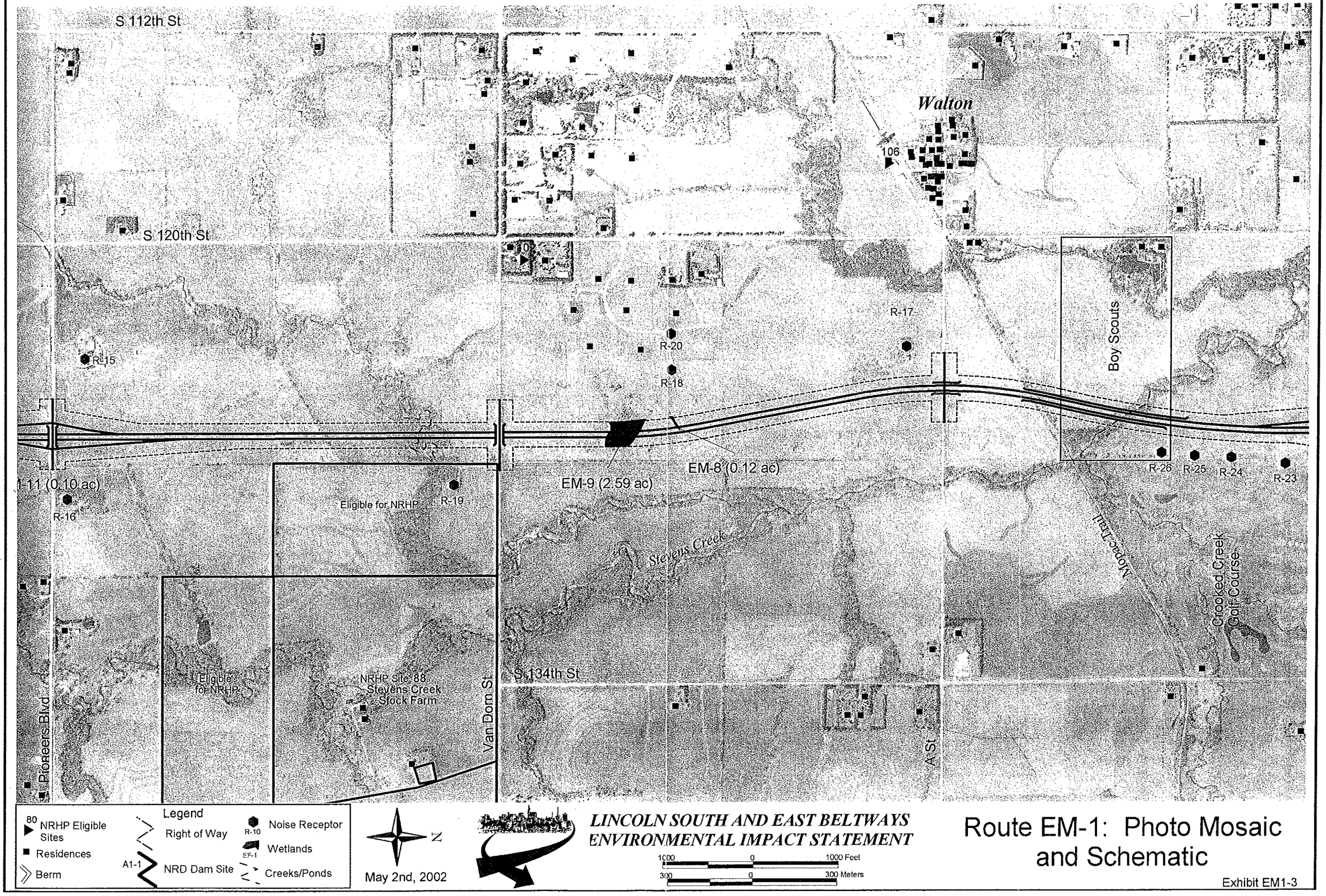
Route EM-1: Photo Mosaic and Schematic

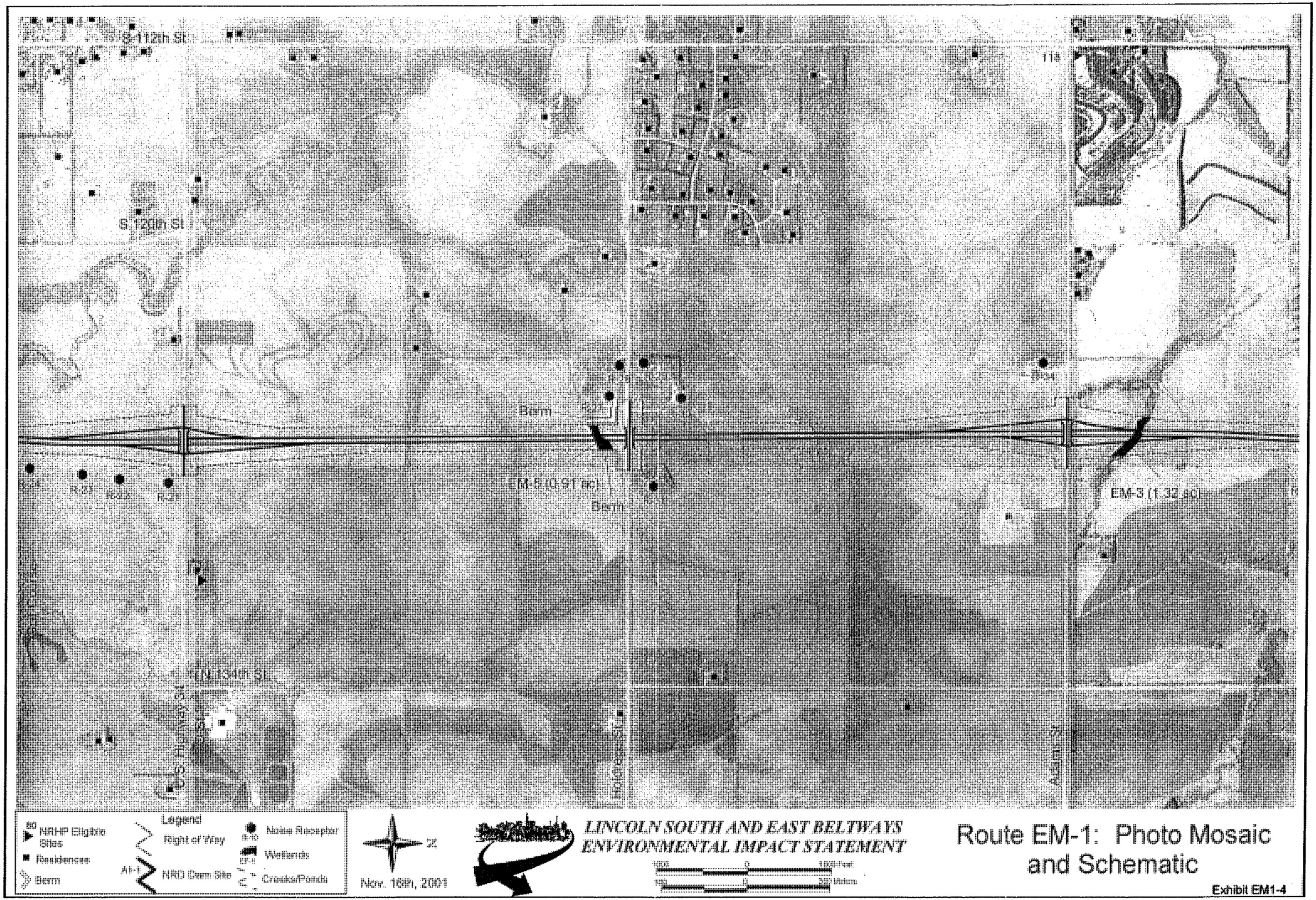
Exhibit EM1-1



Route EM-1: Photo Mosaic and Schematic

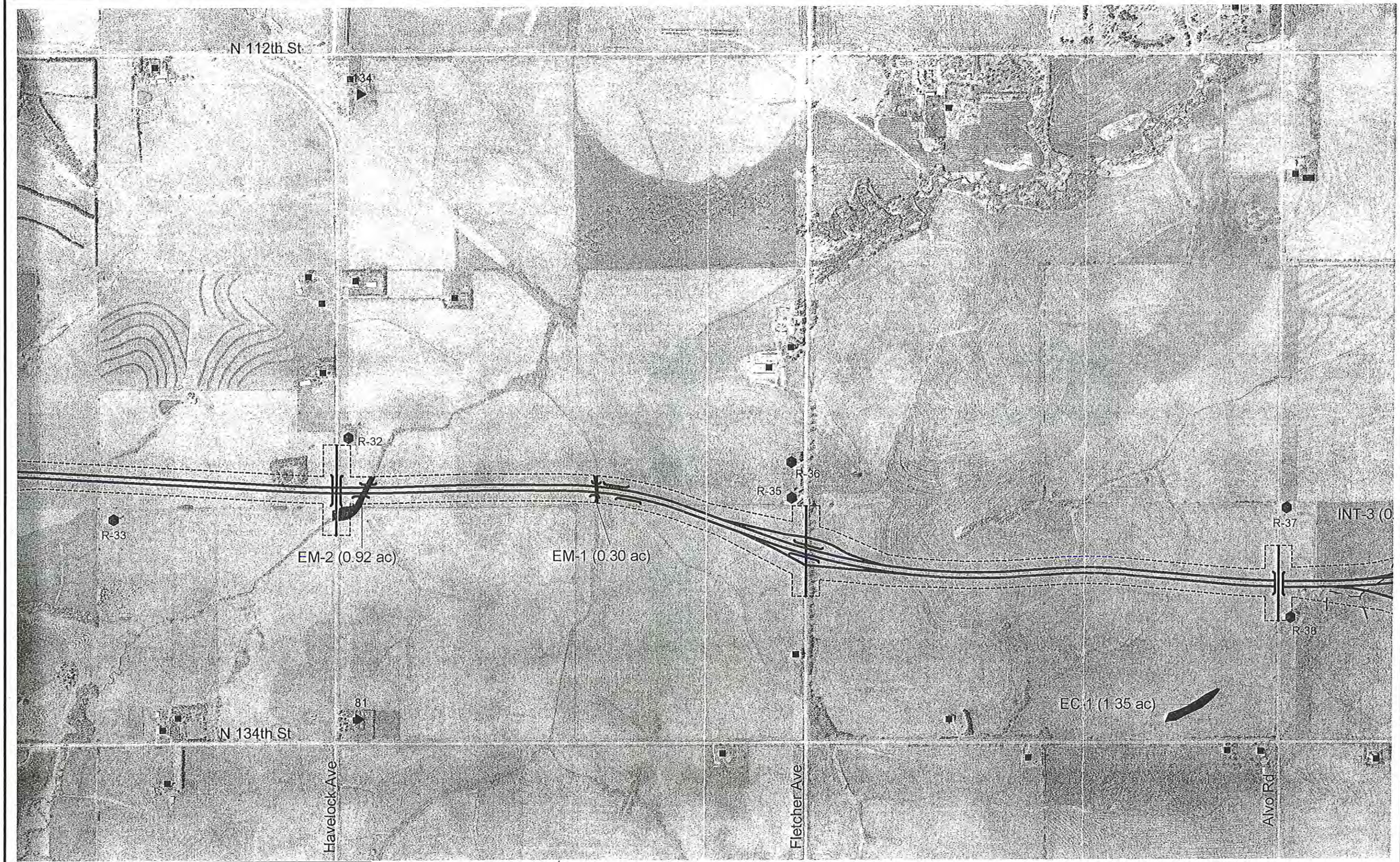
Exhibit EM1-2


S 112th St
S 120th St
Walton
106
R-15
R-16
R-17
R-18
R-19
R-20
R-23
R-24
R-25
R-26
Boy Scouts
EM-8 (0.12 ac)
EM-9 (2.59 ac)
Eligible for NRHP
Eligible for NRHP
NRHP Site 88
Stevens Creek Stock Farm
Stevens Creek
Crooked Creek Golf Course
Nopac Trail
S 134th St
Pioneers Blvd
Van Dorn St
A St
Legend
NRHP Eligible Sites
Residences
Berm
Right of Way
NRD Dam Site
Noise Receptor
Wetlands
Creeks/Ponds
N
May 2nd, 2002
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
1000 0 1000 Feet
300 0 300 Meters
Route EM-1: Photo Mosaic and Schematic
Exhibit EM1-3



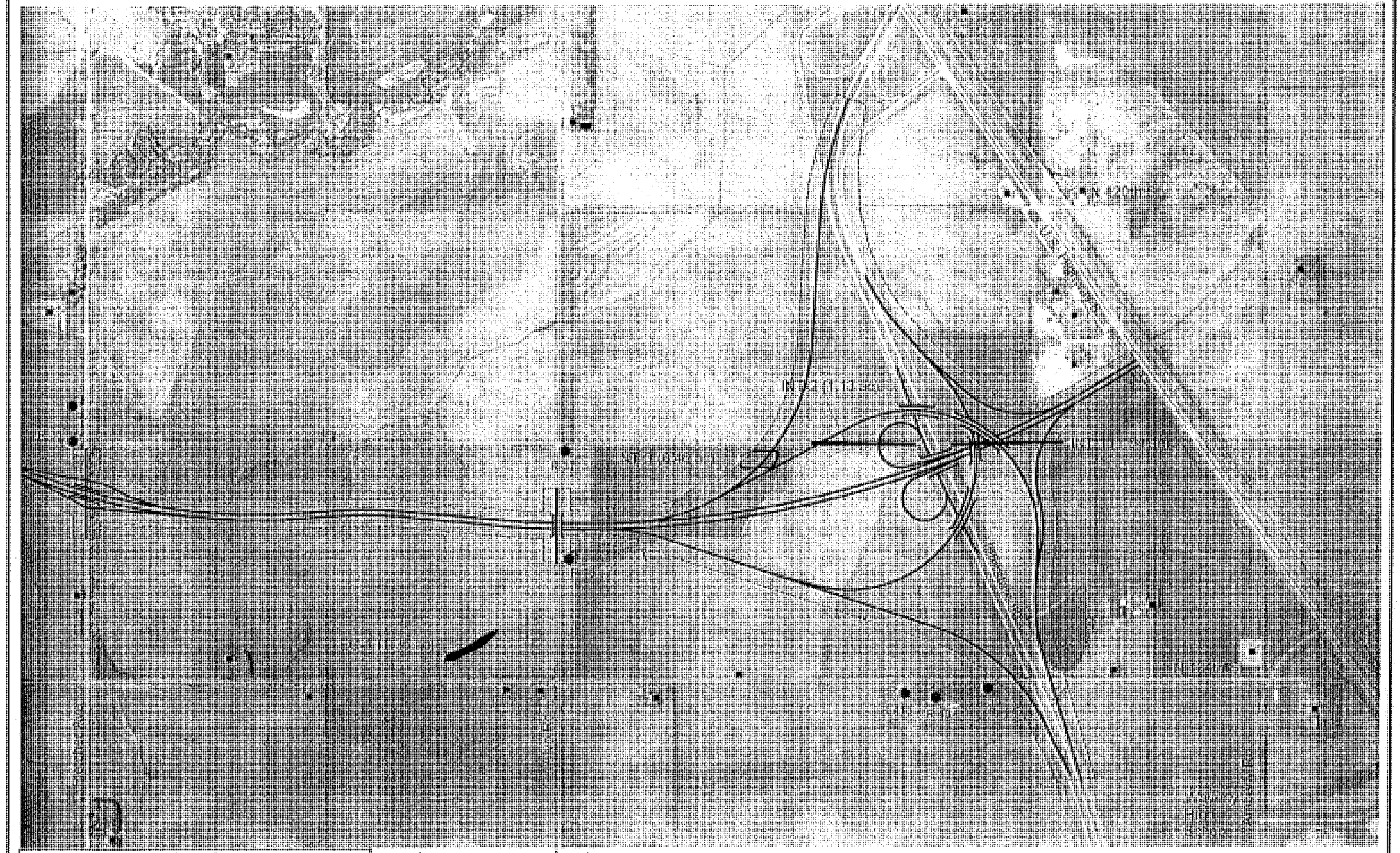
Route EM-1: Photo Mosaic and Schematic

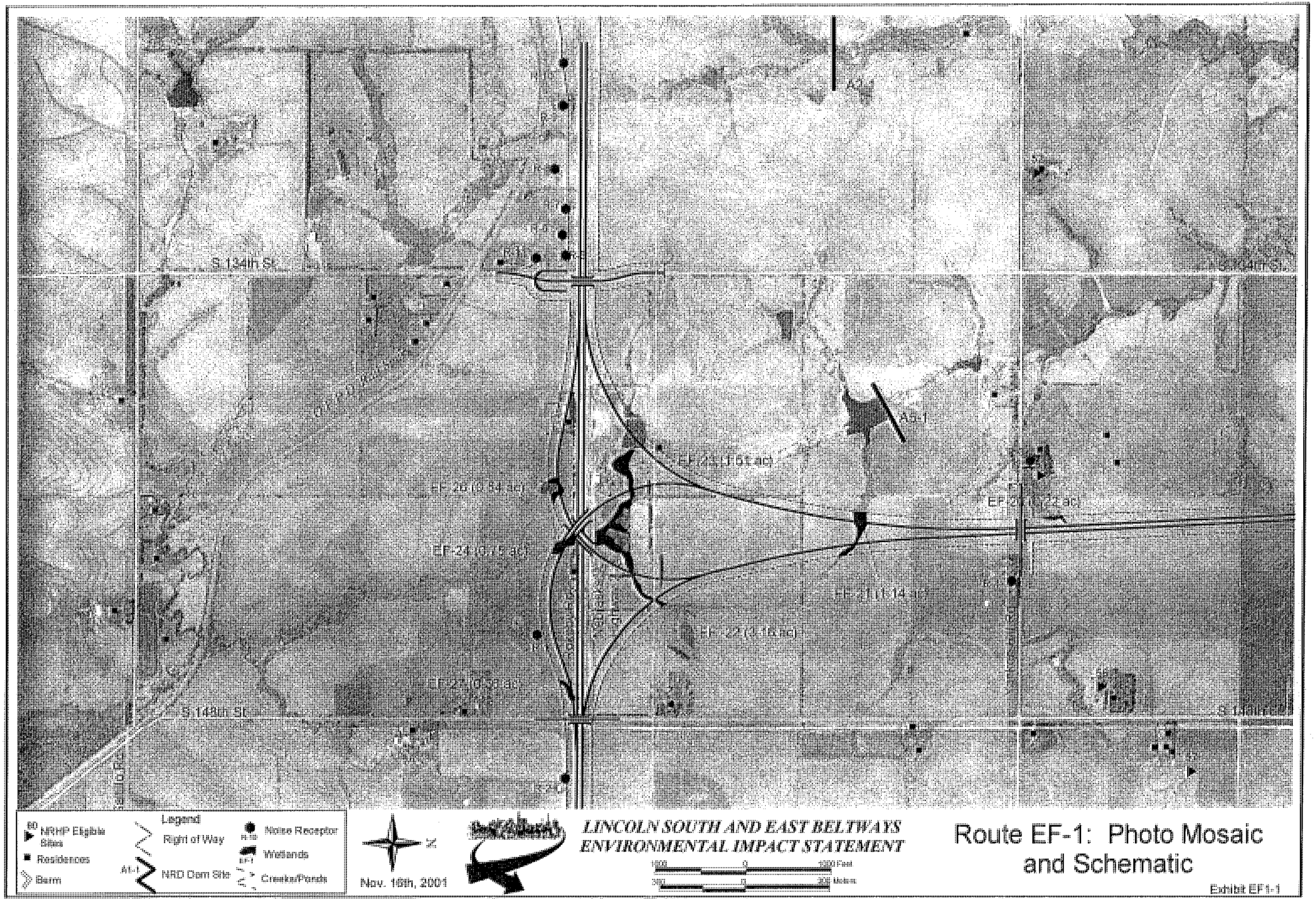
Exhibit EM1-4

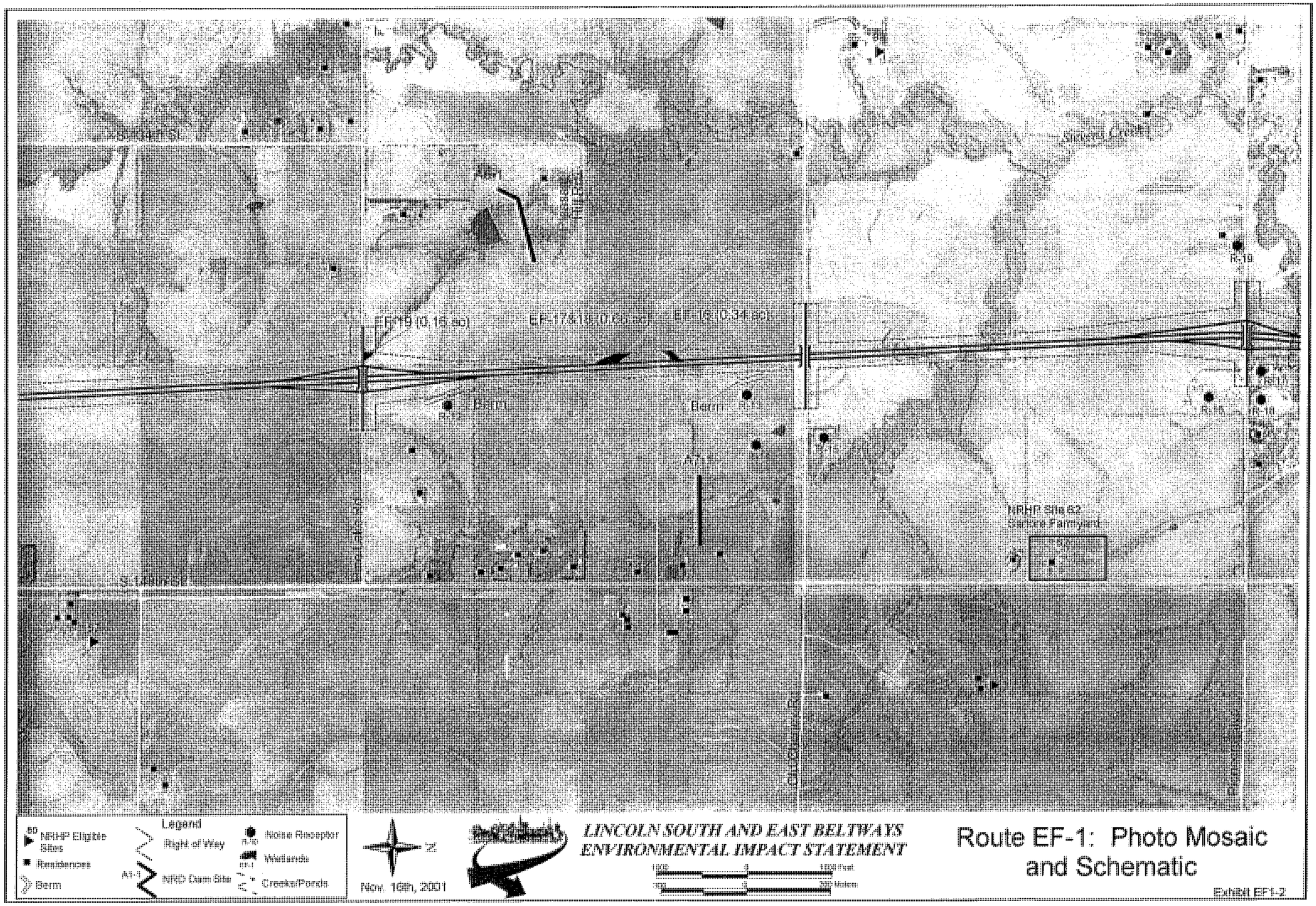


Route EM-1: Photo Mosaic and Schematic

Exhibit EM1-5

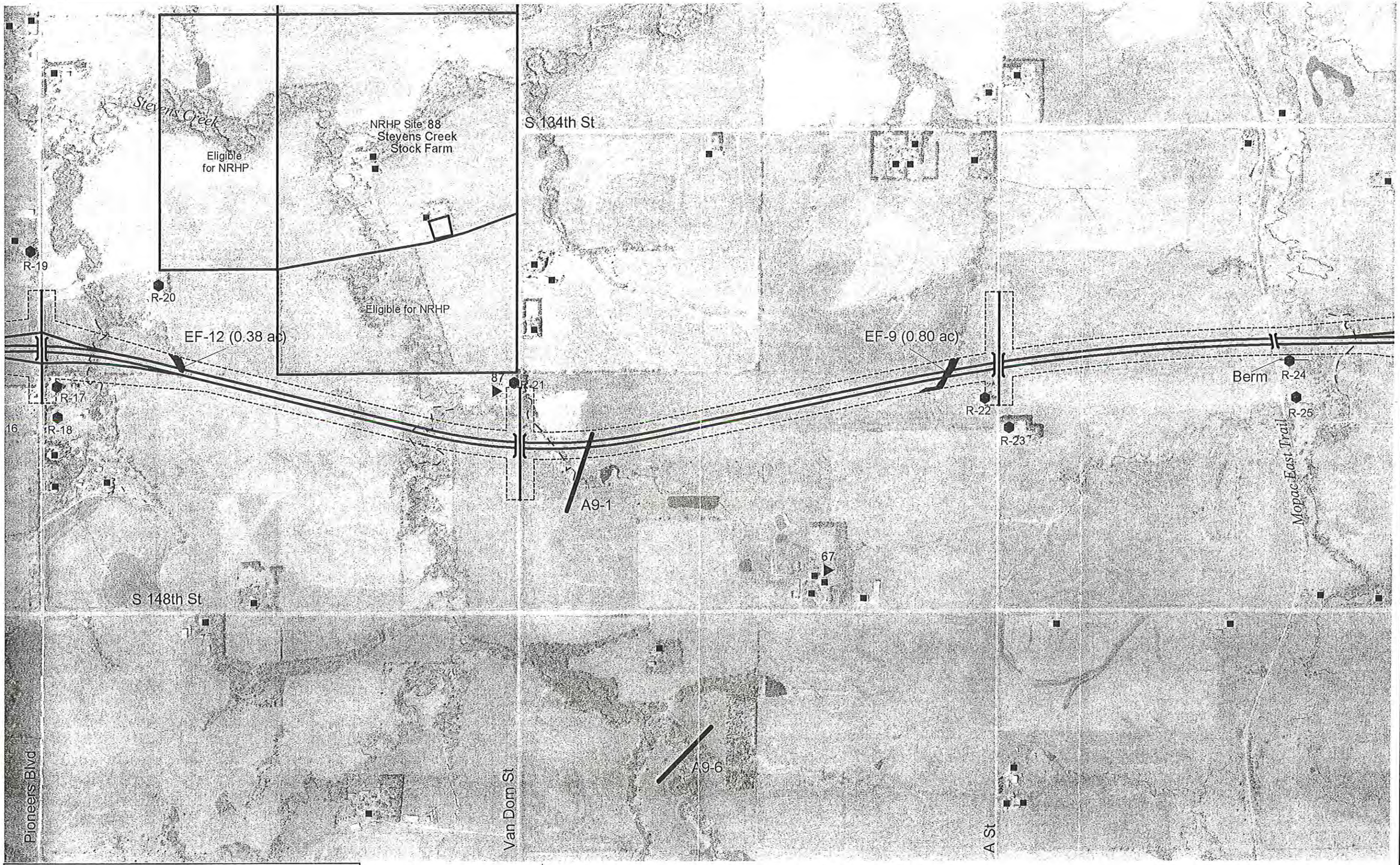

Legend
NRHP Eligible Sites
Residences
Berm
Right of Way
NRD Dam Site
Noise Receptor
Wetlands
Creeks/Ponds
Nov. 16th, 2001
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
Route EM-1: Photo Mosaic and Schematic
Exhibit EM1-6

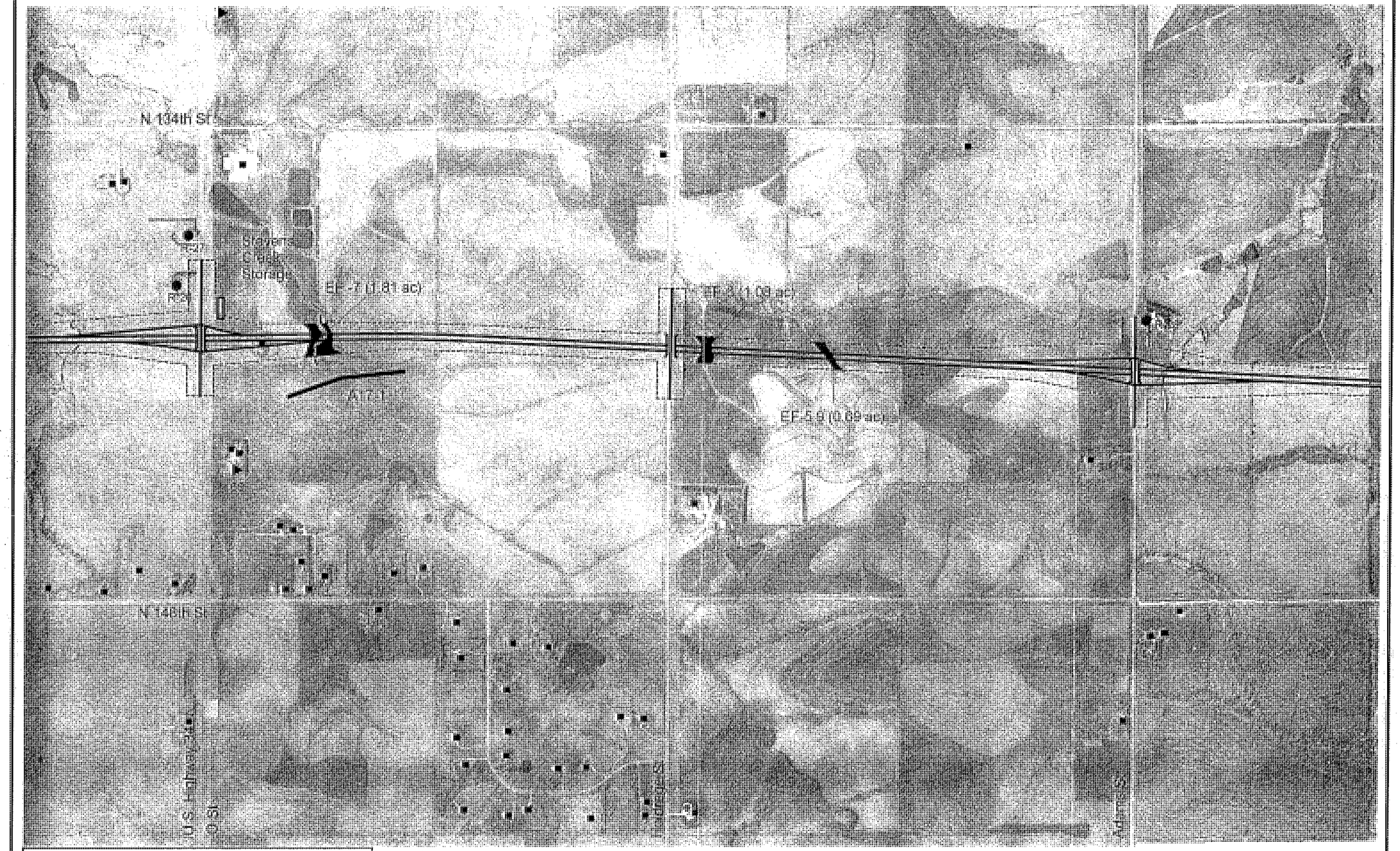

S 134th St
S 148th St
EF-23 (1.51 ac)
EF-26 (0.54 ac)
EF-24 (0.75 ac)
EF-21 (1.14 ac)
EF-22 (3.16 ac)
EF-27 (0.56 ac)
A5-1
Legend
NRHP Eligible Sites
Residences
Barn
Right of Way
NRD Dam Site
Noise Receptor
Wetlands
Creeks/Ponds
N
Nov. 16th, 2001
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
Route EF-1: Photo Mosaic and Schematic
Exhibit EF1-1



Route EF-1: Photo Mosaic and Schematic

Exhibit EF1-2


Stevens Creek
NRHP Site 88
Stevens Creek
Stock Farm
Eligible
for NRHP
Eligible for NRHP
S 134th St
R-19
R-20
EF-12 (0.38 ac)
EF-9 (0.80 ac)
87
R-21
R-17
R-18
16
R-22
R-23
Berm
R-24
R-25
Mopac East Trail
A9-1
67
S 148th St
A9-6
Pioneers Blvd
Van Dorn St
A St
Legend
80 NRHP Eligible Sites
Residences
Berm
Right of Way
A1-1 NRD Dam Site
R-10 Noise Receptor
EF-1 Wetlands
Creeks/Ponds
N
May 2nd, 2002
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
1000 0 1000 Feet
300 0 300 Meters
Route EF-1: Photo Mosaic and Schematic
Exhibit EF1-3



Legend

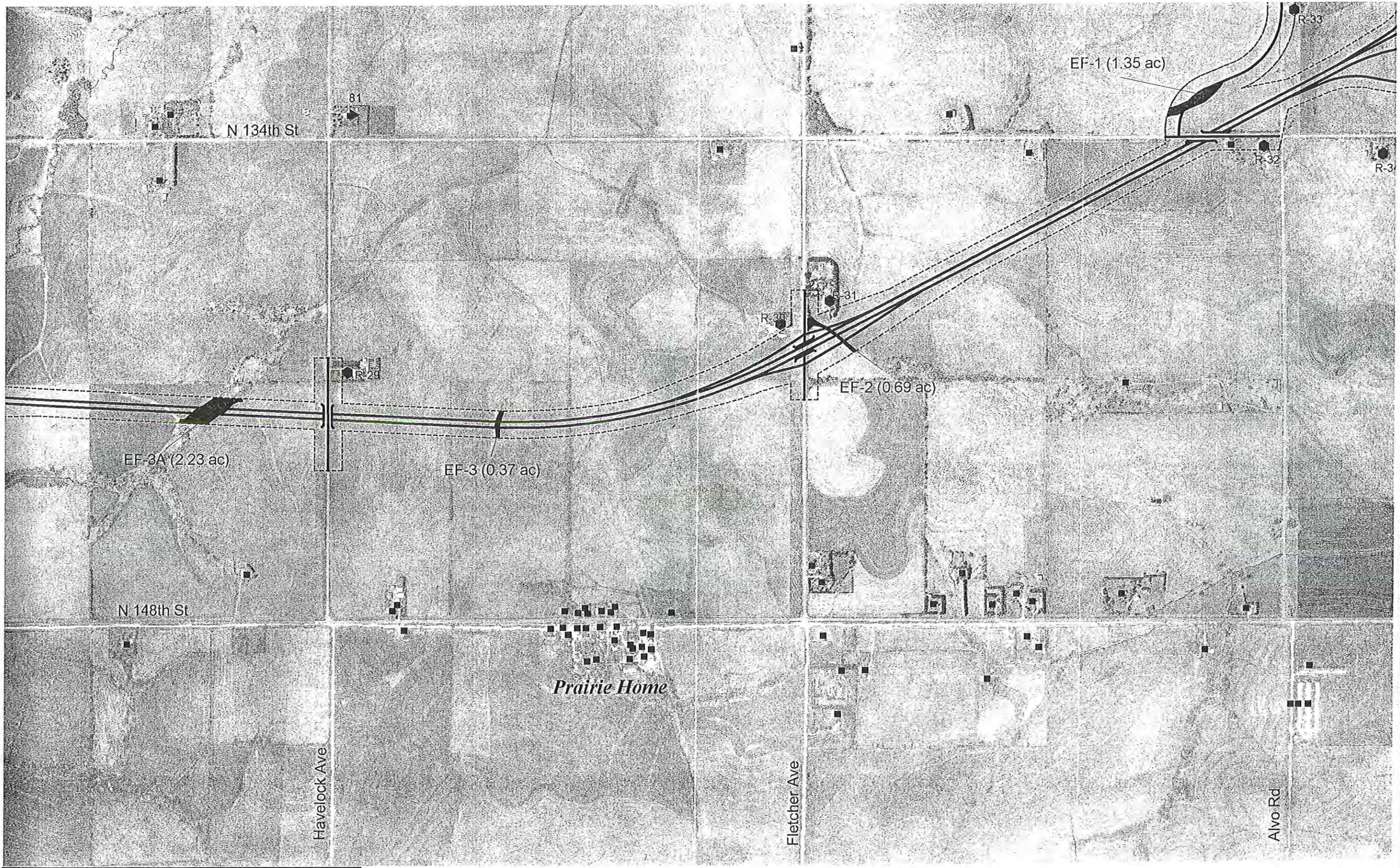
- NRHP Eligible Sites
- Residences
- Barn
- Right of Way
- NRD Dam Site
- Noise Receptor
- Wetlands
- Creeks/Ponds

Nov. 16th, 2001

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

Route EF-1: Photo Mosaic and Schematic

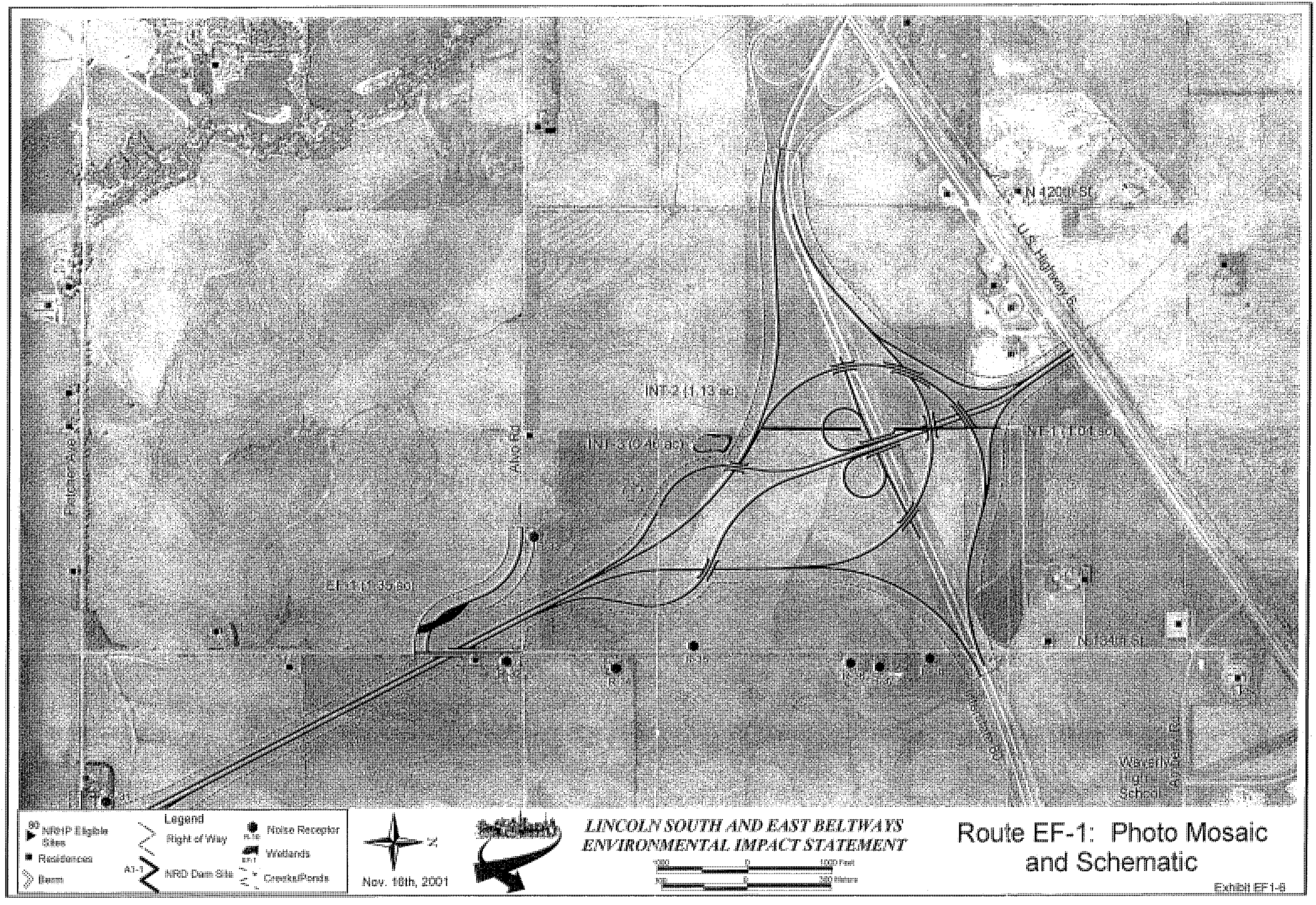
Exhibit EF1-4



LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

Route EF-1: Photo Mosaic and Schematic

Exhibit EF1-5



N 120th St
U.S. Highway 6
INT-2 (1.13 ac)
INT-3 (0.46 ac)
INT-1 (1.04 ac)
EF-1 (1.35 ac)
Alvo Rd
Fletcher Ave
N 134th St
Waverly High School
Legend
NRHP Eligible Sites
Residences
Berm
Right of Way
NRD Dam Site
Noise Receptor
Wetlands
Creeks/Ponds
Nov. 16th, 2001
LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT
Route EF-1: Photo Mosaic and Schematic
Exhibit EF1-6

Appendix A
AGENCY COORDINATION

LETTERS OF CONCURRENCE

US.Department
of Transportation
Federal Highway
Administration

100 Centennial Mall North, Room 220
Lincoln, NE 68508-3851
Nebraska.FHWA@FHWA.DOT.GOV

December 3, 2001

In Reply Refer To:
HRW-NE

NEBRASKA DIVISION FHWA

SEE ADDRESSEES

DPU-3300(1) Environmental Impact Statement
Integrating NEPA/404 Processing,
Concurrence in Selected Alternative & Impact Minimization
Due: January 4, 2002

The proposed project would involve the construction of a beltway around the south and east of Lincoln, Nebraska. The Federal Highway Administration (FHWA) is preparing an environmental impact statement for the proposed improvements. A Purpose and Need statement was forwarded to all merge agencies on April 9, 1996, and the Alternatives Carried Forward (Preliminary Draft Environmental Impact Statement) was sent on November 14, 2000.

The NEPA/404 merge procedures provide for four written concurrence points during project development. These points are:

- Purpose and Need
- Alternatives Carried Forward
- Selected Alternatives
- Impact Minimization

All agencies have had an opportunity to concur in the Purpose and Need Statement and with the Alternatives Carried Forward. We would like to reach concurrence on the Selected Alternative and Impact Minimization at this time. Please review the enclosed Preliminary Final Environmental Impact Statement. If your agency concurs in the statement, please sign the concurrence block below and return a signed copy of this letter to the Federal Highway Administration **by January 4, 2002.** We will assume you concur with the Preliminary Draft Environmental Impact Statement if we do not receive a written response by January 4, 2002. However, if you need additional time for review, please contact us prior to January 4 to discuss your needs.

If you have any questions or would like to discuss the project in more detail, please contact Ed Kosola at 402-437-5973.

Sincerely yours,
Edward W. Kosola
Realty/Environmental Officer

EnclosurE

Concurrence: Selected Alternative and Impact Minimization

"We have reviewed the Preliminary Final Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development."

Signed: _____

Title: _____

Agency: _____

Date: _____

ADDRESSEES:

U.S. Environmental Protection Agency Region VII
Attn: Joe Cothern, NEPA Team Leader
Environmental Services Division, Region VII
901 N 5th Street
Kansas City, KS 66101-2670

US Army Corps of Engineers (2 Copies)
Nebraska Program Manager
Nebraska Regulatory Office – Wehrspann
8901 S. 154th Street
Omaha, NE 68138-3621

Steve Anschutz
U.S. Fish and Wildlife Service
230 W. 2nd Street
Grand Island, NE 68801 – 5907

Nebraska Game and Parks Commission
Attn: Rex Amack
2200 N. 33rd
Box 30370
Lincoln, NE 68503-0370

Nebraska Department of Environmental Quality
Attn: Jay Ringenberg
1200 N. Street, Ste 400
P.O. Box 98922
Lincoln, NE 68509 – 8922
cc: John Bender, Water Quality Standards Coordinator

COPY

Concurrence: Selected Alternative and Impact Minimization

We have reviewed the Preliminary Final Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development.

Signed: _____

Title: NEPA Reviewer

Agency: U.S. EPA

Date: 1/7/02

COPY

Concurrence: Selected Alternative and Impact Minimization

We have reviewed the Preliminary Final Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development.

Signed: for Michael Rabbe

Title: State Program Manager

Agency: U.S. Army Corps of Engineers

Date: January 4, 2002

Concurrence: Selected Alternative and Impact Minimization

We have reviewed the Preliminary Final Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development.

Signed:

Title: Acting Nebraska Field Supervisor

Agency: U.S. Fish and Wildlife Service

Date: January 17, 2002

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

January 17, 2002

Mr. Edward Kosola, Realty Officer
Federal Highway Administration
Federal building, Room 220
100 Centennial Mall North
Lincoln, NE 68508-3851

RE: Environmental Impact Statement (Selected Alternative)for Project DPU-3300(1), Lincoln Beltway Project, Lancaster County, Nebraska

Dear Mr. Kosola:

This responds to your letter dated December 3, 2002, regarding the above referenced project. The U.S. Fish and Wildlife Service has reviewed the selected alternative in the Environmental Impact Statement for Project DPU-3300(1) and have enclosed our signed Concurrence Statement.

The Service appreciates the opportunity to comment on this Environmental Assessment and the Federal Highway Administration's involvement in assuming a shared responsibility for protecting federal trust fish and wildlife resources in Nebraska. Should you have any questions, please contact Mr. Wally Jobman within our office at (308) 382-6468, extension 16.

Sincerely,

John Cochnar
Acting Nebraska Field Supervisor

Enclosure

cc: COE; Omaha, NE (Attn: Mike Rabbe)
EPA; Kansas City, KS (Attn: Tom Taylor)
NGPC; Lincoln, NE (Attn: Frank Albrecht)
NDEQ; Lincoln, NE (Attn: John Bender)

COPY

Concurrence: Selected Alternative and Impact Minimization

We have reviewed the Preliminary Final Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development.

Signed:

Title: Asst. V Division Administrator

Agency: Nebraska Game & Parks Commission

Date: 12-10-01

Concurrence: Selected Alternative and Impact Minimization

We have reviewed the Preliminary Final Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development.

Signed:

Title: Deputy Director

Agency: Environmental Quality

Date: Jan 2, 2002

JAN - 3 2002

STATE OF NEBRASKA

COPY

DEPARTMENT OF ENVIRONMENTAL QUALITY
Michael J. Linder
Director
Suite 400, The Atrium
1200 'N' Street
P.O. Box 98922
Lincoln, Nebraska 68509-8922
Phone (402) 471-2186
FAX (402) 471-2909

Mike Johanns
Governor

January 2, 2002

Edward W. Kosola
Realty/Environmental Officer
U. S. DOT – Nebr. Div. FHWA
100 Centennial Mall North, Rm. 220
Lincoln, NE 68508-3851

RE: DPU-3300(1) Environ. Impact Statement
FEIS and Final Section 4(F) Statement
South & East Beltways
Lincoln, NE

Dear Mr. Kosola:

Our agency has been asked to review the above referenced project. We have no comments regarding any impact within our programs or jurisdiction.

We have enclosed our signed Concurrence sheet for your records.

Should you have any questions, feel free to contact me at 402/471-2186.

Sincerely,

for Jay D. Ringenberg
Deputy Director, Programs

JDR:hs
Enclosure

An Equal Opportunity/Affirmative Action Employer

US Department
of Transportation
**Federal Highway
Administration**

100 Centennial Mall North, Room 220
Lincoln, NE 68508-3851
Nebraska.FHWA@FHWA.DOT.GOV

November 14, 2000

In Reply Refer To:
HRW-NE

NEBRASKA DIVISION FHWA

Ms. Amy Zlotsky
Olsson Environmental Sciences
1111 Lincoln Mall
Lincoln, NE 68508

SEE ADDRESSEES:

DPU-3300(1)
Integrating NEPA/404 Processing,
Concurrence in Alternatives Carried Forward for Environmental Impact Statement
Due: December 20, 2000

The proposed project would involve the construction of a beltway around the south and east of Lincoln, Nebraska. The Federal Highway Administration (FHWA) is preparing an environmental impact statement for the proposed improvements. A Purpose and Need statement was forwarded to all merge agencies on April 9, 1996. All agencies have concurred with the purpose and need statement.

The NEPA/404 merge procedures provide for four written concurrence points during project development. These points are:

- Purpose and Need
- Alternatives Carried Forward
- Selected Alternatives
- Impact Minimization

Please review the enclosed preliminary Draft Environmental Impact Statement. If your agency concurs in the statement, please sign the concurrence block below and return a signed copy of this letter to the Federal Highway Administration **by December 20, 2000.** We will assume you concur with the preliminary draft Environmental Impact Statement if we do not receive a written response by December 20, 2000, however, if you need additional time for review, please contact us prior to December 20th to discuss your needs.

If you have any questions or would like to discuss the project in more detail, please contact Ed Kosola at 402-437-5973.

Sincerely yours,

Edward W. Kosola
Realty/Environmental Officer

Enclosure

Concurrence: Alternatives Carried Forward

"We have reviewed the preliminary Draft Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development."

Signed: _____

Title: _____

Agency: _____

Date: _____

ADDRESSEES:

Mr. Joe Cothern
Environmental Services Division
U.S. Environmental Protection Agency
901 N. 5th St.
Kansas City, Kansas 66101

Mr. Steve Anschutz
U.S. Fish and Wildlife Service
203 West Second Street
Grand Island, NE 68801

Mr. Rex Amack
Nebraska Game and Park Commission
2200 N. 33rd Street
Lincoln, NE 68503

Mr. Jay Ringenberg
Nebraska Department of Environmental Quality
P. O. Box 98922
Lincoln, NE 68509-8922
CC: John Bender, Water Quality Standards Coordinator
P. O. Box 98922
Lincoln, NE 68509-8922

U.S. Army Corps of Engineers
Attention: Planning Division
215 North 17th Street
Omaha, Nebraska 68102

Nebraska Program Manager
U. S. Army Corps of Engineers
Nebraska Regulatory Office - Wehrspann
8901 South 154th Street, Suite 1
Omaha, Ne 68138-3621

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

DEC 20 2000

DEC 15 2000

Edward Kosola
U.S. Department of Transportation
Nebraska Division FHWA
100 Centennial Mall North, Room 220
Lincoln, Nebraska 68508-3851

SUBJECT: DPU-3300(1), Integrated NEPA/404 Processing of Draft EIS for South and East Beltways

Dear Mr. Kosola:

This is to inform you that EPA has received and reviewed the Preliminary Draft Environmental Impact Statement (PDEIS) for the South and East Beltways in Lincoln, Nebraska, November 14, 2000. In your cover letter, you ask for concurrence for the 'Alternatives Carried Forward.' Unless found unsatisfactory by other agencies, USEPA concurs with those alternatives. EPA offers the following suggestions for the writing and/or presentation of data in the PDEIS.

1) Many of the claims presented in the PDEIS will require other agency endorsement. For example, your analysis that no Threatened or Endangered Species will be affected by the project may be (and probably is) accurate. However, final endorsement lies with the Fish and Wildlife Service. Similarly, your scheme for wetlands mitigation (see p. 3.40) is subject to approval by the U.S. Corps of Engineers, and your research into the effects of the project on Historical or Cultural Resources is subject to review by the Nebraska State Historic Preservation Office. Assuming that these and other appropriate agencies agree with your assessments, USEPA concurs with the 'Alternatives Carried Forward'.

2) Paragraph 2.1.4 Transportation Demand Management (TDM)/Transportation System Management (TSM) Improvements. This paragraph begins with a general description of the appropriateness of TDM/TSM in a city such as Lincoln (and as a former resident of Lincoln, I agree with this general assessment). However, it also includes some very specific claims: "Even a doubling or tripling of transit usage, car pooling or adjusted work schedules would not significantly affect traffic congestion. More specifically, it would accomplish little within the south and east beltways study area." This language implies that modelling or scientific study has been performed. If this is the case, a reference to that study would be appreciated.

3) Paragraph 3.16.3. Proposed Mitigation (for wetlands destruction). "Mitigation has been proposed to replace the wetlands at a minimum ratio of 1:1 replacement-to-loss." Depending on the type of wetland being impacted (i.e. forested, emergent, impounded, etc), ratios greater than 1:1 are sometimes preferred.

RECYCLE

4) Table 4.1 LEVEL IV: SUMMARY OF BELTWAY BENEFITS AND IMPACTS (p. 4.2). There are two impacts listed, back to back: Benefit Cost Ratio, and Cost Effectiveness. The Benefit Cost Ratio for three alternatives is listed, ranging from 0.55 to 0.96. The Cost Effectiveness, on the next line, is (I believed) defined as simply warranting a 'yes' response if the Benefit Cost Ratio (from the previous line) exceeds 1.0. As already noted, those ratios range 0.55-0.96, yet all alternatives warrant a 'yes' response in the Table.

This discrepancy is explained in footnotes, which suggest that the two rows of numbers were calculated based on two different BOS land use plans (BOS and BOS II). The reader is then referenced to Table 2.14 on page 2.43.

I would suggest simplifying and clarifying this aspect of the Table. Table 4.1 is a summary comparison of the four alternatives, and as such may be the first (or even only) data studied by the lay public. It is not clear why different land use plans (BOS and BOS II) are used for different impacts being analyzed, and the referenced page (2.43, Table 2.14) does not aid in understanding.

Thank you for the opportunity to comment on this project. I look forward to participating in the remaining concurrence points (Selected Alternatives and Impact Minimization) on the project. If you have any questions or require technical assistance you may contact me at 913-551-7656.

Sincerely,

Stephen Smith
NEPA Team
U.S. EPA, Region VII

Concurrence: Alternatives Carried Forward

"We have reviewed the preliminary Draft Environmental Impact Statement on project DPU-3300(I) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development."

Signed:

Title: Acting Nebraska Field Supervisor

Agency: U. S. Fish and Wildlife Service

Date: November 17, 2000

DEC 2 0 2000

Concurrence: Alternatives Carried Forward

"We have reviewed the preliminary Draft Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development."

Signed:

Title: Environmental Analyst Supervisor

Agency: NJGPC

Date: 12-19-00

Concurrence: Alternatives Carried Forward

DEC 2 0 2000

"We have reviewed the preliminary Draft Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development."

Signed:

Title: Deputy Director

Agency: NDEA

Date: 12-11-00

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO
ATTENTION OF

DEC 14 2000

December 8, 2000

Planning Branch

Mr. Edward Kosola
Federal Highway Administration
Federal Building, Room 220
100 Centennial Mall North
Lincoln, Nebraska 68508-3851

Dear Mr. Kosola:

We have reviewed your letter in regard to the Preliminary Draft EIS and Draft Section 4(f) Statement and concur with the selection of Alternatives Carried Forward.

It is our understanding that issues regarding Regulatory matters will be coordinated with Keith Tillotson of the Nebraska Regulatory office.

Enclosed is the endorsement you requested. If you have any questions, please contact Lisa Peterson of our staff at (402)221-4628. Thank you for the opportunity to review this proposal.

Sincerely,

Candace M. Gorton
Chief, Environmental and Economics Section
Planning Branch
Planning, Programs and Project
Management Division

Enclosure

Concurrence: Alternatives Carried Forward

"We have reviewed the preliminary Draft Environmental Impact Statement on project DPU-3300(1) and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development."

Signed:

Title: Chief, Environmental & Economics Sec.

Agency: U.S. Army Corps of Engineers

Date: 12-11-00

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NEBRASKA REGULATORY OFFICE-KEARNEY
1430 CENTRAL AVENUE STREET, SUITE 4
KEARNEY, NEBRASKA 68847-6856

DEC 05 2000

REPLY TO
ATTENTION OF:

December 4, 2000

Mr. Ed Kosola
Federal Highway Administration
100 Centennial Mall North
Lincoln, Nebraska 68508

Dear Mr. Kosola:

I am writing to comment on the preliminary draft environmental impact statement for South and East Beltways, Lincoln, Nebraska (Project No. DPU-3300(1)). Based on the Corps of Engineers authority under Section 404 of the Clean Water Act, I have limited my review to wetlands and floodplains.

After reviewing all of the wetland data sheets, I regard the findings as highly preliminary. First, some of the observations were conducted from a distance, since access to private property was apparently not obtained. The observations could not be considered to qualify as "approved" determinations. Second, most of the data sheets had incomplete soils data, resulting in an educated guess, but not a wetland determination. This might possibly result in overestimating the wetland acres. Third, I noted that 3 of the 88 sheets provided supporting evidence for a wetland, yet the conclusion was "not a wetland". In conclusion, whenever a permit application is submitted, it will need to be accompanied by completed data sheets.

I reviewed section 3.18 on floodplains and noted the various alternatives for channel crossings (i.e. channel straightening, bridge extensions). The Corps of Engineers will issue a permit for the project design that is determined to be the least environmentally damaging, practicable alternative. If channel straightening is proposed for any of the crossings, it will be very important to explain the rejection of a bridge extension as a practicable alternative.

If you have any questions about my comments, feel free to contact me at (308) 234-1403.

Sincerely,

Keith Tillotson
Senior Project Manager

From: "Tillotson, Dwight K NWO" <Dwight.K.Tillotson@nwo02.usace.army.mil>
To: 'Amy Zlotsky' <AZlotsky@oaconsulting.com>
Date: 12/19/00 8:53AM
Subject: RE: Lincoln Beltway PDEIS

Data sheets were complete for plants and hydrology but I noted that only 3 sites had any data under the soil profile description. This would be needed for a complete or "approved" jurisdictional determinination, but, as I think about it, I don't think that a soil profile description is needed for a preliminary study such as this one. (In our own agency, we are now using "preliminary" and "approved" determinations for the purposes of the new appeal process.) I also recognize the limitations imposed by lack of access to some sites. I agree with the procedure/methodology for a PDEIS, as long as its limitations are recognized (i.e., skewing wetland acres to the high side) and its intent is clear.

I checked again on the sheets that came to a conclusion of no wetland when all 3 parameters were met: (1) Transect ID 32-11-8, Plot ID EF-1, (2) Transect ID 16-9-8, Plot ID EF-18, EF-19. In another case (Transect ID 17-10-8, Plot ID EM-4), the vegetation parameter was met, but was marked "no" by mistake under "Wetland Determination", resulting in a conclusion of no wetland.

If you have any questions at all, feel free to call or e-mail.

> -----Original Message-----
> From: Amy Zlotsky [SMTP:AZlotsky@oaconsulting.com]
> Sent: Monday, December 18, 2000 8:21 AM
> To: Tillotson, Dwight K
> Cc: Edward.Kosola@fhwa.dot.gov; Craig Mielke; Joan Darling
> Subject: Lincoln Beltway PDEIS
>
> Keith--I just got a copy of your comments. Would you mind sending me
> the numbers of the data sheets that you specifically feel are
> incomplete or have the wrong conclusion. There is nothing we can do
> about being denied access to properties...however, we should be able to
> provide complete data sheets. Would appreciate it.--Amy

U.S. Department
of Transportation

Federal Highway Administration

Region Seven

Nebraska Division Office
Federal Building, Room 220
100 Centennial Mall North
Lincoln, NE 68508-3851

June 13, 1996

In Reply Refer To:
HOP-NE

Mr. Art Yonkey
Project Development Division
Nebraska Department of Roads
Lincoln, Nebraska

Dear Mr. Yonkey:

DPU-3300(1); South and East Beltways Study, Lincoln, Nebraska;
Integrating NEPA/404 Processing, Concurrence in Purpose and Need

Enclosed are five concurrences from the following agencies in the Purpose and Need Statement for the subject project:

- US Army Corps of Engineers
- US Fish and Wildlife Service
- US Environmental Protection Agency
- Nebraska Game and Parks Commission and
- Nebraska Department of Environmental Quality.

These agencies along with the Nebraska Department of Roads and the FHWA consider the Purpose and Need Statement satisfactory. The project can now be advanced to the next stage of project development.

The second concurrence point in the Nebraska Local Operating Procedures for Integrating NEPA/404 is Alternatives Carried Forward. The FHWA is also responsible for obtaining agency concurrence for this concurrence point. We will need, when available, copies of the full range of material on alternatives studied and copies of the preliminary draft environmental impact statement for review by the agencies.

Please transmit copies of the agency concurrences to the City of Lincoln and/or their consultants for placement in the appendix of the draft and final EIS.

Sincerely Yours,

Philip E. Barnes
Operations Engineer

PURPOSE AND NEED
South and East Beltways Study
Lincoln, Nebraska
DPU-3300(1)

BACKGROUND

The concept of a complete circumferential roadway system around the City of Lincoln has been discussed formally for about 35 years. The 1961 *Lincoln City-Lancaster County Comprehensive Plan* identified Interstate 80 (north of the City) as the most important link in the circumferential route, supplemented by a loop system around the urban area. The 1966 *Lincoln Metropolitan Area Transportation Study* depicted an "East Side Freeway" and a "U.S. 77 West Bypass" in the Major Street Plan. In 1971, a comprehensive study was undertaken of the east and west bypasses that identified several alternate corridors and their associated costs and impacts. The following year, the State Highway Commission designated the U.S. Highway 77 (U.S. 77) west bypass as the top priority for funding. Since then, the efforts and resources of the community, NDOR, and various political entities have been focused on the completion of the U.S. 77 west bypass, the K and L Street connection between the west bypass and downtown area, and the Nebraska Highway 2 (Highway 2) connection to the west bypass along Van Dorn Street. As these projects approach completion, attention has focused on the need to complete the loop road network with south and east beltways.

PROJECT PURPOSE

Purpose. The purpose of the ongoing work is to conduct a Feasibility Study/ Alternatives Evaluation for multi-use transportation corridors along the south and east fringes of the City of Lincoln. The study includes preparation of the required Environmental Impact Statement (EIS)/ Major Investment Study (MIS), as well as concurrent traffic, land use, and economic modeling to determine the project benefits and costs under several future scenarios. The south beltway corridor would connect Highway 2 with the recently completed U.S. 77 west bypass, while the east beltway corridor would connect Highway 2 with Interstate 80. These two corridors would complete a circumferential transportation system around the City of Lincoln.

Other secondary goals that will be considered as part of the project include coordination with existing and planned drainageways and utility corridors; the consolidation of railway corridors in the south beltway corridor; the development of a linear park and hiker/biker/equestrian trail along both the south and east corridors; and the preservation of the corridor for wildlife habitat and an ecologically sensitive wilderness park.

Study Goal. The ultimate goal of the study is to determine if south and/ or east transportation corridors are needed and feasible and, if so, to identify preferred alignments to guide the preservation of right-of-way and allow for eventual construction of the beltways and related facilities.

PROJECT NEED

Although traffic data is not currently available for the beltways study, regional growth trends and previous studies have indicated a need for south and east beltways. Further analysis of project need will be conducted as part of the south and east beltways study, and will include concurrent and interdependent evaluations of land use and transportation patterns.

Regional Growth. The City of Lincoln and Lancaster County have had a long, sustained history of population expansion, with an average increase of around one percent per year over the past several decades. Much of this growth has taken place in the City of Lincoln, where population has been increasing at a rate of 1.6 percent annually for the past three decades, partially due to annexation. Some of the highest rates of growth have been on the south and east fringes of the City. This continued growth in both population and area necessitates planning ahead for future major transportation corridors.

Long-Range Regional Transportation Plan. The *Lincoln City/Lancaster County Comprehensive Plan* serves as the Lincoln Metropolitan Planning Organization's Long-Range Regional Transportation Plan, and includes projects encompassing twenty years. The Community Congress, a citizen's advisory group involved in the update of the 1994 *Lincoln City-Lancaster County Comprehensive Plan*, clearly established the desire of the community to complete the loop around the City. One of the goals suggested by the Community Congress and adopted by City and County officials was to "provide for a long-range plan to develop early identification of bypass corridors and right-of-way retention". The south and east beltway corridor study is being conducted for this purpose. The beltway system is viewed as an essential component of the regional transportation network that would move through traffic around congested urban areas, as well as reduce delay and improve traffic flow on the existing urban street system.

The South Beltway. The south beltway would provide an alternative connection between the relatively undeveloped portion of Highway 2 southeast of Lincoln and U.S. 77 in the southwest. Highway 2 is the most direct route between Kansas City (Interstate 29) and Interstate 80 west, and currently serves as a major truck route. The portion of the roadway within and adjacent to the city limits also serves as the City's primary arterial from growth areas in the south part of the City to downtown. A beltway could divert through traffic from the urbanized portions of Highway 2, and improve the

flow of interstate travel around the City. It could also reduce congestion on the urban street system and improve safety by reducing the number of heavy trucks that share the roadway with passenger vehicles with local destinations.

The East Beltway. The east beltway would connect Highway 2 in the southeast with Interstate 80 in the northeast, with access points to U.S. 6 (Cornhusker Highway) and U.S. 34 (O Street). This corridor could serve many trips between the southern and eastern portions of Lincoln and Interstate 80 east, including Omaha. It would relieve traffic on the existing urban street system and serve as a truck route.

Truck Routes. The 1993 *Lincoln Truck Route Study*, a comprehensive study of long-range and interim truck routes in the Lincoln area, strongly supports the need for south and east beltways to divert through truck traffic around the urban area. The need for these truck routes will become increasingly evident upon completion of the upgrade of Highway 2 between Lincoln and Nebraska City to an expressway facility. This facility, which is scheduled for completion in 1998, will likely experience increased use by through traffic, leading to increased traffic volumes on the urbanized portions of Highway 2.

Need for Advance Planning. The need for the south and east beltways is expected to increase as the City grows, and as state highways leading to the City become more congested. However, if the planning process is delayed until the need becomes urgent, acquisition of right-of-way will become increasingly costly and disruptive to the community. Conducting a comprehensive feasibility study at this time will provide for early determination and location of potential corridors. This will allow the growth of the City to occur around the corridors, rather than forcing a transportation corridor through otherwise developed areas.

Other benefits that can be expected from early identification of the corridors include more pro-active public participation and agency involvement; compressed time line; enhanced positive environmental impacts and reduced negative impacts; reduced impacts on developed property; reduced costs for right-of-way acquisition and roadway construction; fewer compromises in design; accelerated relief for other area roadways; and coordination with commercial and industrial parks.

U.S. Department
of Transportation

Federal Highway Administration

Region Seven

Nebraska Division Office
Federal Building, Room 220
100 Centennial Mall North
Lincoln, NE 68508-3851

April 9, 1996

In Reply Refer To:
HOP-NE

Mr. Steve Anschutz
US Fish and Wildlife Service
203 West Second Street
Grand IslandNE68801

Dear Mr. Anschutz:

DPU-3300(1); South and East Beltways Study, Lincoln, Nebraska; Integrating NEPA/404 Processing, Concurrence in Purpose and Need for Environmental Impact Statement

By letter dated September 13, 1995, we advised each agency that we were initiating an environmental study for the South and East Beltways around Lincoln. A consultant team consisting of Wilbur Smith and Associates; HWS Consulting Group, Inc.; EA Engineering, Science and Technology; and the Center for Environmental Solutions was selected to perform the study. A comprehensive interagency scoping meeting was held on October 11, 1995, which included a bus tour of the corridor areas. A two day partnering workshop was held December 12-13, 1995, for the project's Management Board Committee, Technical Staff Committee, Citizen Advisory Committee, the consultant team and other interested parties. Also, working committee meetings and a public information meeting have been held.

The project encompasses two basic project corridors and the general limits for the project are:

- The South corridor area: Yankee Hill Road to 0.8 km (1/2 mile) South of Saltillo Road and U.S. 77 on the west to Nebraska Highway 2 on the East
- The East corridor area: I-80 to Nebraska Highway 2 and 96th Street on the West to 0.8 km (1/2 mile) East of 148th Street
- The approximate length of the study area is 27.4 km (17 miles).

The general design concept for the proposed South and East Beltways envisions a multi-lane freeway or expressway-type facility with design features such as depressed center median, paved shoulders, full control of access, fence along the right-of-way, bridges at creek crossings, two-span bridges over the beltways, few if any at-grade intersections, and 62 meters to 75 meters (203 ft. to 246 ft.) typical right-of-way widths. Greater

right-of-way widths could be proposed for buffer areas or joint corridor uses. At a minimum, interchanges would connect the South and East Beltways to U.S. Highway 77, Nebraska Highway 2, U.S. Highway 34, and Interstate 80.

The primary goal of the study is to place the sponsoring agencies in a position to preserve the transportation corridors within the South and East fringes of Lincoln.

The merge procedures provide for four written concurrence points during project development. These points are:

- Purpose and Need
- Alternatives Carried Forward
- Selected Alternatives
- Impact Minimization

We are now ready to reach concurrence on Purpose and Need. Merge resource agencies were invited and/or attended the project scoping meeting, partnering workshop, various technical committee meetings and the public information meeting. A draft Purpose and Need for the Project was provided for comment to the Citizen's Advisory, Technical Advisory and Management Board Committees and comments received were incorporated into the purpose and need statement. Based on this input it was determined that the Purpose and Need was ready for agency concurrence and is enclosed.

Please review the enclosed Purpose and Need project statement. If your agency concurs in the statement, please sign the concurrence block below and return a signed copy of this memorandum to the Federal Highway Administration by May 3, 1996.

If you have any questions or would like to discuss in more detail the project, please contact Mr. Philip E. Barnes at 437-5971.

Sincerely yours,

for Ronald W. Carmichael
Division Administrator

Enclosures

Concurrence: Purpose and Need

"We have reviewed the Purpose and Need statement for this project's environmental impact statement and concur that it is satisfactory. The information provided to date is adequate and we agree that the project can be advanced to the next stage of project development."

Signed:

Title: Acting Field Supervisor

Agency: U.S. Fish and Wildlife Service

Date: April 15, 1996

Signed:

Title: Nebraska State Program Manager

Agency: U.S. Army Corps of Engineers

Date: 6-6-96

Signed

Title: NEPA Program Manager

Agency: U.S. EPA Region 7

Date: May 7, 1996

Signed

Title: Assistant Director

Agency: Dept. Environmental Quality

Date: 6/5/96

Signed:

Title: Director

Agency: Game & Parks Commission

Date: April 15, 1996

INTERAGENCY SCOPING MEETING

INTERGENCY SCOPING MEETING

An Interagency Scoping Meeting for the South and East Beltways Project was held on 11 October 1995. Attendees included representatives of Federal, State, and local resource agencies; utilities and railroads in the project area; members of the project's Technical Advisory Committee; and the consultant team. A list of attendees is provided in Exhibit G-1. The purpose of the scoping meeting was to present the project to the agencies, utilities, and railroads, and to solicit their input and concerns. Following a formal presentation, a bus tour of the study area was given. The group reconvened after the bus tour to make observations and discuss concerns.

Comments were as follows.

Floodplains/Wetlands. Concerns over potential impacts to the Stevens Creek watershed were expressed by a number of agencies. The potential for impacts to the creek is greatest if the beltway were to parallel the creek. Because the East Beltway corridor runs parallel to Stevens Creek, it was suggested that it would be best to cross the creek at a right-angle, to quickly get out of the floodplain, and than avoid the creek for the rest of the route. The riparian strip along Stevens Creek should also be preserved. Wetlands should be avoided to the extent possible throughout the corridor, and mitigated if impacts are unavoidable. Some wetlands occur between Saltillo and Rokeby Roads along Salt Creek, and along Stevens Creek.

A flood management study of the Stevens Creek watershed is currently underway by the Lower Platte Natural Resources District. They expect to narrow down alternatives from 4 to 2 by end of year. All alternatives include preservation of a corridor along Stevens Creek, possibly to the elevation of the 100-year floodplain. This may be accomplished through easement or title. Alternatives may or may not have structures at the north end of the watershed. A large landowner activist group developed in response to this study.

Wilderness Park. Wilderness Park is part of the National Trails System. Any impacts to it would require replacement land. The Van Dorn Connector used a 2:1 replacement ratio to mitigate impacts to the park. If mitigation is required, land south of park would be desirable. The Lincoln/Lancaster County Comprehensive Plan calls for Wilderness Park to extend south of Saltillo Road to Roca. Wilderness Park is County-owned land that is managed by the City. The park also serves as flood storage area.

Threatened and Endangered Species. No threatened or endangered species issues are anticipated, and surveys are unlikely to be required. The only possibility would be if there is any potential habitat for prairie fringed orchid.

Farmland. Beltways will unavoidably cross conservation terraces; farmers may require compensation. Since some conservation terraces will drain toward the beltways, the project should determine drainage outlet requirements. There will also be some prime farmland impacts.

LIST OF ATTENDEES
Interagency Scoping Meeting

Name	Organization
Ray Ayars	Lincoln Chamber of Commerce
Philip Barnes	Federal Highway Administration
Terry Barton	University of Nebraska-Lincoln
John Bender	Nebraska Department of Environmental Quality
Val Bohaty	USDA Natural Resources Conservation Service
Mike Brienzo	Lincoln-Lancaster County Planning Department
Mark Brohman	Nebraska Game and Parks Commission
Steve Burnham	Federal Highway Administration
Walter Case	HWS Consulting Group
Randy Evans	Norris Public Power District
Roger Figard	Rail Transportation Safety District
Terry Genrich	City of Lincoln - Parks and Recreation Department
Mike Gorman	HWS Consulting Group
Jack Guinn	Northern Natural Gas Company
Rick Haden	City of Lincoln - Public Works
Steve Hanks	Lincoln Electric System
Vic Hannan	Conoco, Inc.
William Hurst	Nebraska Department of Roads
Wally Jobman	US Fish and Wildlife Service
Glenn Johnson	Lower Platte South Natural Resources District
Ted LaGrange	Nebraska Game and Parks Commission
Laura Lenzen	Nebraska Department of Roads
Steve McBeth	Nebraska Department of Roads
Mary McKenney	EA Engineering, Science, and Technology
Kevin McLaury	Federal Highway Administration
Garry Mick	US Army Corps of Engineers
Kent Morgan	Lincoln-Lancaster County Planning Department
John Peterson	US Army Corps of Engineers
Rich Ruby	Nebraska Department of Roads
Roger Ruckman	Northern Natural Gas Company
Leonard Sand	Nebraska Department of Roads
Al Schroeder	Lincoln Telephone Company
Virendra Singh	City of Lincoln - Public Works
D.D. Smith	City of Lincoln - Public Works
Tim Stewart	Lincoln-Lancaster County Planning Department
Steve Sulek	Lancaster County Rural Water District No. 1
Dick Webb	Nebraska Department of Roads
Amy Zlotsky	EA Engineering, Science, and Technology

Note: Invited organizations that were not represented include the Federal Transit Authority, Environmental Protection Agency, Nebraska State Historical Society, Lincoln/Lancaster County Health Department, Burlington Northern Railroad, Union Pacific Railroad, Nebraska Natural Resources Commission, People's Natural Gas, Williams Pipeline Company, Nebraska Public Power District and CableVision.

Utilities. The City of Waverly wells would be hard to relocate because of contamination problem to the north. Relocations would have to be further south, or would have to hook into City of Lincoln water. The project should consider the existing long-range plans of Lincoln Water System and Lincoln Electric System.

Land Use. A new regional shopping center is proposed north of Highway 2 between 84th and 98th Streets. The center will encompass 350 ac. and has the potential for more than 6 million square feet of mixed use space (probably retail and residential).

Secondary impacts on land use should be considered, such as urbanization within drainage corridors. The urban versus rural character of the transportation facility, and its connectivity to the urban transportation system should also be considered.

Cultural Resources. Historic and archaeological sites within the corridor, especially the Schrader archaeological site.

Procedural Issues. Comments were made regarding the following procedural issues.

- Notice of Intent for project needs to be prepared ASAP.
- Agencies and organizations that were invited but did not attend this meeting should be encouraged to attend future meetings, especially FTA.
- Procedural requirements of the NEPA\404 process were clarified. Early on, the project proponents agreed to create a "merged committee" to merge the 404 and NEPA process. The merged committee consists of representatives from FHWA, the Corps, NDOR, EPA, FWS, NDEQ, and NGPC. There are four points at which their concurrence is required in order for the project to proceed. These are: (1) Purpose and Need Statement, (2) Alternatives to Be Carried Forward, (3) Preferred Alternative, and (4) Mitigation. These agencies should be added to the Technical Advisory Committee.
- The consultant noted that all concerned agencies will be solicited for input, not just those on the merged committee.
- The County Ecological Advisory Committee should be included in the planning process.
- Concept of "environmental justice" may apply. Can't take cheaper home and spare more expensive ones. Consider ways to make the project better from an environmental point of view.
- It will be important to purchase land for a full interchange at US 77.

OTHER AGENCY COORDINATION

USDA United States Department of Agriculture

Natural Resources Conservation Service

Nebraska NRCS State Office
Federal Building, Room 152
100 Centennial Mall North
Lincoln, NE 68508-3866

RECEIVED
JUL 0 7 2000
OLSSON ASSOCIATES

July 6, 2000

Dale R. Vagts
Environmental Scientist
Olsson Environmental Sciences
1111 Lincoln Mall
P.O. Box 84608
Lincoln, NE 68501-4608

Dear Mr. Vagts:

The Natural Resources Conservation Service has completed Parts II, IV, and V of the enclosed Form AD1006, Farmland Conversion Impact Rating, for the proposed improvements to South and East Beltways study, Lancaster County, Nebraska.

This completes the Natural Resources Conservation Service requirements under the Farmland Protection Policy Act.

Sincerely,

STEPHEN K. CHICK
Acting
State Conservationist

Enclosure

U.S. DEPARTMENT OF AGRICULTURE — Form AD-1006

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	1. Date of Land Evaluation Request *3 July 2000*	2. Sheet 1 of 1
3. Name of Project *Lincoln South and East Beltways DEIS*	4. Federal Agency Involved *Federal Highway Administration*	
5. Proposed Land Use *Highway*	6. County and State *Lancaster, Nebraska*	7. Type of Project: Corridor ☒ Other ☐
PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS *07/05/00*	2. Person Completing the NRCS parts of this form *Roger Kanable*

3. Does the site or corridor contain prime, unique ,statewide or local important farmland? Yes ☒ No ☐ (If no. the FPPA does not apply - Do not complete additional parts of this form)	3. Acres Irrigated *14.000*	5. Average Farm Size *305*
6. Major Crop(s) *Corn*	7. Farmable Land in Government Jurisdiction Acres: *460,666* *85%*	8. Amount of Farmland As Defined in FPPA Acres: *252,900* *47%*
9. Name of Land Evaluation System Used *LESA-NRCS*	10. Name of Local Site Assessment System *None*	11. Date Land Evaluation Returned by NRCS *July 6, 2000*

PART III *(To be completed by Federal Agency)*	Alternative Corridor Rating			
	SM-4 / EC-1	*SM-4 / EM-1*	*SM-4 / EF-1*	
A. Total Acres To Be Converted Directly	*1749.45*	*1623.81*	*1717.02*	
B. Total Acres To Be Converted Indirectly, Or To Receive Services	*0*	*0*	*0*	
C. Total Acres in Site	*1749.45*	*1623.81*	*1717.02*	
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime and Unique Farmland	*1139*	*1152*	*1221*	
B. Total Acres Statewide and Local Important Farmland	*0*	*0*	*0*	
C. Percentage of Farmland in County or Local Govt. Unit to be Converted	*0.323*	*0.300*	*0.317*	
D. Percentage of Farmland in Govt. Jurisdiction with Same or Higher Relative Value	*45*	*38*	*38*	
PART V *(To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland to be Serviced or Converted (Scale of 0 - 100 Points)*	*68*	*71*	*71*	

PART VI *(To be completed by Federal Agency) Corridor or Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b & c))*	Max. Points Corridor	Other				
1. Area in Nonurban Use	15	15	*14*	*14*	*14*	
2. Perimeter in Nonurban Use	10	10	*9*	*9*	*8.5*	
3. Percent of Site Being Farmed	20	20	*16*	*16.5*	*16.5*	
4. Protection Provided by State and Local Government	20	20	*3*	*3*	*3*	
5. Distance from Urban Built-up area	0	15	*0*	*0*	*0*	
6. Distance to Urban Support Services	0	15	*0*	*0*	*0*	
7. Size of Present Farm Unit Compared to Average	10	10	*5*	*5*	*5*	
8. Creation of Non-Farmable Farmland	25	10	*3*	*3*	*3*	
9. Availability of Farm Support Services	5	5	*5*	*5*	*5*	
10. On-Farm Investments	20	20	*12*	*12*	*12*	
11. Effects of Conversion on Farm Support Services	25	10	*1*	*1*	*1*	
12. Compatibility with Existing Agricultural Use	10	10	*4*	*4*	*4*	
TOTAL CORRIDOR OR SITE ASSESSMENT POINTS		160				
PART VII *(To be completed by Federal Agency)*						
Relative Value of Farmland (from Part V above)		100	*68*	*71*	*71*	
Total Corridor or Site Assessment (From Part VI above or a local site assessment)		160	*72*	*72.5*	*72*	
TOTAL POINTS *(Total of above 2 lines)*		260	*140*	*143.5*	*142*	

PART VIII *(To be completed by Federal Agency after final alternative is chosen)*

1. Corridor or Site Selected:	2. Date of Selection:	3. Was A Local Site Assessment Used? Yes ☐ No ☐

4. Reason For Selection:

Signature of person completing the Federal Agency parts of this form:	DATE 3 July 2000

Wisconsin substitute form AD-1006 6-9-97 Completion instructions: http://www.wi.nrcs.usda.gov/soil/prime/prinotes.html

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

RECEIVED
OCT 17 1995
EA Engineering, Science, and Technology
Lincoln, NE

October 12, 1995

Ms. Amy Zlotsky
Project Manager
EA Engineering, Science & Technology
121 South 13th Street, Suite 701
Lincoln, NE 68508

Dear Ms. Zlotsky:

This responds to your October 11, 1995, request for comments from the U.S. Fish and Wildlife Service regarding the preparation of an Environmental Impact Statement for the proposed South and East Beltways Project, City of Lincoln, Lancaster County, Nebraska (EA# 13094.01). These comments are provided as technical assistance and predevelopment consultation and do not constitute a Service report under authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) on any required Federal environmental review or permit.

In accordance with Section 7(c) of the Endangered Species Act 1973, we have determined that the following federally listed species may occur in the vicinity of the proposed project:

Listed Species	Expected Occurrence
Peregrine falcon (Falco peregrinus)	Migration
Bald eagle (Haliaeetus leucocephalus)	Migration, winter resident
American burying beetle (Nicrophorus americanus)	Resident, grasslands
Western prairie fringed orchid (Plantanthera praeclara)	Tall-grass prairie, and wet meadows

Peregrine falcons are generally associated with wetlands and open areas, such as cropland and grassland. Most observations in Nebraska are in January, late April to early May, and September. Sightings are occassionally reported at or in the vicinity of the State Capitol building.

Bald eagles migrate statewide and utilize mature riparian timber near streams, lakes, and wetlands. The primary bald eagle migration and wintering period is mid-November to April 1. Migrating eagles may pass through the project area, however, there does not appear to be anything (e.g., potential feeding sites) which would attract them to the area.

The American burying beetle may occur anywhere in the eastern two-thirds of the state. In Nebraska it has been collected in grassland, mixed grassland/cropland, and riparian woodland. Past surveys have not found any beetles in the Lincoln area, and a survey would not be required by the Service.

The western prairie fringed orchid was listed as a threatened species on September 28, 1989. Populations have been confirmed in Seward, Sarpy, Lancaster, Hall, and Cherry counties, and may occur at other sites in Nebraska. It is an inhabitant of tall-grass calcareous silt loam or sub-irrigated sand prairies. Any tracts of the aforementioned prairies should be considered to be potential habitat for this threatened plant. The Service would not require surveys unless tracts of native tall-grass prairie are identified which would be affected by the project.

If the Federal action agency determines that the proposed project may affect listed species, formal Section 7 consultation should be requested from this office. If they determine that there will be no effect, further consultation is unnecessary.

We further recommend that you identify the impacts which the proposed project would have on wetlands and woodland habitat. The most environmentally sensitive areas within the project area are Wilderness Park, Salt Creek, Stevens Creek, and any remnant tracts of tall-grass prairie.

We appreciate the opportunity to review and comment on this proposed project. Should you have questions, please contact Mr. Wally Jobman within our office at (308)382-6468.

Sincerely,

AC

Nebraska Field Supervisor

cc: NGPC; Lincoln, NE (Attn: Mark Brohman)
NDEQ; Lincoln, NE (Attn: John Bender)
EPA; Kansas City, KS (Attn: Tom Taylor)

(7)Beltway.ltr

Nebraska Game and Parks Commission

2200 N. 33rd St. / P.O. Box 30370 / Lincoln, NE 68508-0370 / 402-471-0641 / Fax: 402-471-5528

October 30, 1995

RECEIVED

NOV 1 1995

EA Engineering, Science, and Technology
Lincoln, NE

Ms. Amy Zlotsky
Project Manager
EA Engineering, Sci. & Tech.
121 S. 13th Street, Suite 701
Lincoln, NE 68508

RE: South and East Beltway Project, Lincoln, Nebraska.

Dear Ms. Zlotsky:

Nebraska Game and Parks Commission staff members have reviewed the beltway project noted above and we would reiterate our position as expressed at the October 11th scoping meeting.

Our main concerns with this proposed project are the wetlands and riparian areas along Salt Creek and the Stevens Creek watershed. We would like to see impacts minimized in these areas. Any native grassland or wetlands should be given additional consideration, since this corridor has been heavily farmed and urbanized by acreages and subdivisions. It is also our desire that impacts to Wilderness Park be avoided or mitigated to the satisfaction of all parties involved.

We concur with the US Fish and Wildlife Service's T&E species "may occur" list (Peregrine falcon, Bald eagle, American burying beetle and Western prairie fringed orchid) in their letter dated October 12, 1995. Since the occurrence or disturbance of these species in this corridor is unlikely, we will require no surveys or additional information. If this project is delayed several years and new information about one of these species becomes available, or a new listing occurs, we may require additional information or surveys at that time.

It is our hope that adequate greenspace and city parks are planned in conjunction with this project and future urban sprawl is addressed. We appreciate being involved in the early planning stages and hope to continue to be involved with this project as it progresses. When a final route is selected, we would appreciate the opportunity to provide additional suggestions. If you have any questions, please call me at 471-5422.

Sincerely,

Mark A. Brohman
Environmental Analyst Supervisor

cc: Philip Barnes, John Bender

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Appendix B
AIR QUALITY ANALYSIS

AIR QUALITY ANALYSIS

SOUTH AND EAST BELTWAYS STUDY
LINCOLN, NEBRASKA

PREPARED FOR

FEDERAL HIGHWAY ADMINISTRATION
NEBRASKA DEPARTMENT OF ROADS
LANCASTER COUNTY
CITY OF LINCOLN

OCTOBER 2000
(REVISED 2/01)

AIR QUALITY ANALYSIS
for
South and East Beltways Study
Lincoln, Nebraska

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AIR QUALITY ANALYSIS
for
South and East Beltways Study
Lincoln, Nebraska

1.0 PURPOSE

The Clean Air Act (CAA) and the National Environmental Policy Act (NEPA) require that air quality impacts be assessed for proposed roadway projects. The CAA also requires that the roadway project conform with the State Implementation Plan (SIP) with respect to maintaining compliance with the National Ambient Air Quality Standards (NAAQS).

The Clean Air Act of 1970, as amended in 1977, 1990 and 1997, establishes NAAQS for seven criteria pollutants- $PM_{10,}$ $PM_{2.5}$, Ozone, Sulfur Dioxide, Lead, Nitrogen Oxides and Carbon Monoxide. To determine the significance of the air quality impact of the proposed project, those impacts, together with the existing background air quality levels, must be compared to the national ambient air quality standards (NAAQS) on a regional and project-level basis.

The objective of a regional analysis is to determine the impact the project will have on regional air quality and if the project is in conformance with the State Implementation Plan (SIP). Based upon the most currently published data (Nebraska Air Quality, 1998), the entire State is in compliance with the NAAQS, therefore, a regional analysis is not necessary.

The objective of the project-level analysis is to predict the criteria pollutant concentration proximal to the worst-case (high traffic volume) portions of the project and compare the predicted concentration to the NAAQS. Although there are several criteria pollutants associated with mobile source emissions, the Federal Highway Administration (FHWA) considers carbon monoxide to be the most significant criteria pollutant of concern for a project-level analysis (FHWA Memorandum, 1986). The NAAQS for carbon monoxide are:

- 35 parts per million as a maximum 1-hour concentration not to be exceeded more than once per year.
- 9.0 parts per million as a maximum 8-hour concentration not to be exceeded more than once per year.

2.0 PROJECT DESCRIPTION

The purpose of the South and East Beltways Study has been to conduct a feasibility study and alternatives evaluation for preferred beltway alignments on the south and east fringes of the City of Lincoln to complete a circumferential transportation system. The south beltway would connect US 77 with N-2, while the east beltway would connect N-2 with I-80.

The study area for the south beltway is bounded on the north by Yankee Hill Road, on the south by the half-section line 0.5-mi south of Bennett Road, on the east by the half-section line 0.8 km (0.5-mi) east of 148th Street, and on the west by US 77. The study area for the east beltway is bounded on the west by 98th Street, on the east by the half-section line 0.8 km (0.5-mi) east of 148th Street, on the north by I-80, and on the south by N-2.

The Nebraska Department of Roads Standard Section for a Rural Expressway was used for all beltway alignments. A rural expressway typical section has the following features:

- Approximately 76.2 to 91 m (250 to 300 ft) right-of-way; right-of-way needs vary with topography
- Two 3.7 m (12 ft) driving lanes in each direction
- 2.4 m (8 ft) paved outside shoulders
- 0.9 m (3 ft) paved inside shoulders
- 12 m (40 ft) unpaved depressed median (includes inside shoulders)

3.0 ANALYSIS FRAMEWORK

To determine the significance of the air quality impact of the proposed project, a screening level analysis has been completed. In this analysis, a relatively large degree of "conservatism" is incorporated to provide reasonable assurance that maximum concentrations will not be underestimated.

If the predicted carbon monoxide concentration at receptors located near the worst-case roadways and intersections, when added to the background carbon monoxide concentration, do not exceed the NAAQS, none of the roadway segments should. The background carbon monoxide concentration used in the analysis was 3.9 parts per million for the 1-hour average. This concentration was recorded at the NDEQ's Arlington Street ambient air quality monitoring station located in Lincoln, Nebraska during the1998 monitoring period which is the most recent monitoring period available.

4.0 AIR QUALITY MODELS

The project-level analysis utilized the CAL3QHC (Version 2) and the MOBILE 5A models. The CAL3QHC model is listed in the Guideline on Air Quality Models as an appropriate model. The CAL3QHC model can predict carbon monoxide or other inert pollutant concentrations from both moving and idling vehicles. The model is based upon the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. MOBILE 5A is used to generate traffic source emission factors for input into the CAL3QHC model. Model inputs and assumptions are described in **Appendix B-A.**

5.0 STUDY AREAS

Two roadway segments and two interchanges; representing worst-case conditions, were selected for analysis based upon predicted Average Daily Traffic (ADT) volumes. A description of these roadways and interchanges follow:

- The SM-4 alternative between South 27th Street and South 68th Street (20,711 ADT) and the EC-1 alternative between Adams Street and "O" Street (29,837 ADT). All traffic is under free-flow conditions and travel speeds are estimated to be 105 km/h (65 mph).

- The US 77 and SM-4 interchange (35,539 ADT), and the Interstate 80 and EM-1 interchange (83,600 ADT) . To maintain free-flow traffic conditions, these intersections are a cloverleaf design and incorporate several grade separations. Driving lane widths will vary from two lanes to single lane. Average travel speeds are estimated to be 97 km/h (60 mph) with slower speeds (56 km/h (35 mph)) along tight curves.

6.0 AIR QUALITY IMPACTS

6.1 Traffic

The maximum carbon monoxide concentrations are summarized in **Table B.1** below. Based upon this study, the carbon monoxide contribution together with the background carbon monoxide concentration is within the 1-hour and 8-hour concentration limits established in the NAAQS at all receptors. Since these roadway segments and interchanges are in compliance, it is reasonable to assume that all the interchanges and roadway segments for any of the alternatives will be in compliance with the NAAQS.

6.2 Construction

Construction equipment emissions generated from internal combustion engines and fugitive dust generated during excavation, grading and site preparation will cause a short term impact on ambient air quality. Of these emissions, fugitive dust will be the most predominant. Dust generated from these activities is predominantly large particles which are redeposited in close proximity to the source. However, a fraction of the dust is composed of small particles referred to as PM_{10} which remain airborne for an indefinite period of time. Application of water to construction areas to reduce airborne dust and abatement devices on construction equipment are mitigative measures which will be implemented if necessary.

Table B.1

HIGHEST 1-HOUR AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS

Alternate Analyzed	1-Hour Carbon Monoxide Concentration (ppm)	8-Hour Carbon Monoxide Concentration (ppm)
SM-4 Alternate	7	5
EC-1 Alternate	8	6
SM-4 and US 77 Interchange	6	4
EM-1 and I-80 Interchange	9	6
NAAQS Criteria	**35**	**9**

7.0 REFERENCES

- Nebraska Air Quality 1998, Nebraska Department of Environmental Quality
- Appropriate Level of Highway Air Quality Analysis for a CE, EA/FONSI, and EIS, March 1986.
- Guideline on Air Quality Models, EPA-450/2-78-027R. EPA Office of Air Quality Planning and Standards, Research Triangle Park, NC.
- Breeze Roads, Version 2.0, Trinity Consultants Inc., 1999
- User's Guide to MOBILE 5, EPA, Ann Arbor, MI., 1992.

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Appendix B-A
Model Inputs and Assumptions

Mobile 5A Model

The Mobile 5A program is used to determine vehicle exhaust emission factors. Because more newer cars with better pollution control devices are replacing the older cars, the vehicle mean exhaust emission factors usually decrease faster than the traffic volumes increase each year. Consequently, the projected first year of traffic activity (Year 2020) was used to simulate a worse case situation for the design life span of the project.

Mobile 5A Inputs

Mobile 5A default values for the operating mode (percent of cold starts) and percent of diesel vehicles were used, and a Reid vapor pressure (RVP) of 10 psi was input. Since vehicle exhaust emissions are higher during the colder months, an ambient temperature of -1° C (30° F) (an average temperature for December through February) was input for worst-case conditions. The year 2020 was input into the model for calculation of the exhaust emission factors at various travel speeds (refer to **Attachment B-A-1**, Mobile 5 Output).

Emission Factors

Emission factors for traffic are determined using the Mobile 5A emission output combined with the predicted vehicle mix percentages provided by HWS Consulting Group, Inc. (**Table B-A.1**). Vehicles are grouped into three categories; Light Duty Vehicles (LDV), Light Duty Trucks (LDT) and Heavy Duty Trucks (HDT). Light Duty Trucks include all vehicles having two axles and six wheels, generally having a gross weight greater than 44 000 newton (10,000 pounds) but less than 116 000 newton (26,000 pounds). Heavy Duty Trucks include all vehicles having three or more axles, generally having a gross vehicular weight greater than 116 000 newton (26,000 pounds). Each category includes gasoline and diesel fueled vehicles.

Table B-A.1

VEHICLE MIX PERCENTAGE

ROADWAY	PERCENT CARS	PERCENT MEDIUM CARS	PERCENT HEAVY TRUCKS
SM-4 [1]	90.60	1.07	8.33
EC-1, EM-1, EF-1[1]	96.96	1.29	1.75
I-80 [2]	79	2.1	18.9

[1] Provided by HWS Consulting Group, Inc.
[2] Provided by Nebraska Department of Roads

Free Flow Traffic

The free flow emission factors for the roadway segments analyzed are summarized in **Table B-A.2**. An example calculation is provided below.

Assume vehicle mix on roadway is 96% LDV, 1.07% LDT and 8.3% HDT and travel speed is 105 km/h (65 mph).

Calculate CO emission for each vehicle class. Use Mobile 5A output for CO emissions at 105 km/h (65 mph) and the vehicle-class kilometers (miles) traveled-percentage.

- (LDG vmt % x Exhaust CO) + (LDD vmt % x Exhaust CO) = LDV exhaust g/km (grams/mi)

  (99.7 % x 19.31) + (0 .3 % x .87) = 11.96 g/km (19.25 g/mi)

- (LDGT vmt % x Exhaust CO) + (LDDT vmt % x Exhaust CO) = LDT exhaust g/km (g/mi)

  (98.3 % x 26.55) + (1.6 % x 0.98) = 16.22 g/km (26.11 g/mi)

- (HDGT vmt % x Exhaust CO) + (HDDT vmt % x Exhaust CO) = HDT exhaust g/km (g/mi)

  (28.8 % x 21.89) + (71.2 % x 6.77) = 6.91 g/km (11.12 g/mi)

Calculate composite emission factor based upon vehicle mix % from traffic study.

- 97% LDV x 11.96 g/km (19.25 g/mi) = 11.60 (18.67)
- 1.3 % MDT x 16.22 g/km (26.11 g/mi) = 0.21 (0.34)
- 1.8% HDT x 6.91 g/km (11.12 g/mi) = 0.12 (0.20)

Total.....= 11.93 g/km (19.2 g/mi)

Table B-A.2

COMPOSITE EMISSION FACTORS
FREE FLOW SEGMENTS

ROADWAY	TRAVEL SPEED	EMISSIONS grams/vehicle kilometer (grams/vehicle mile)
SM-4	105 km/h (65 mph)	12.26 (19.73)
EC-1	105 km/h (65 mph)	11.96 (19.25)
US 77 Expressway	105 km/h (65 mph)	12.26 (19.73)
I-80 Freeway	105 km/h (65 mph)	11.15 (17.95)
SM-4 and US 77 Interchange	97 km/h (60 mph)	9.4 (15.1)
EM-1 and I-80 Interchange	97 km/h (60 mph)	11.40 (18.34)
EM-1 and I-80 Interchange (tight curves)	56 km/h (35 mph)	9.73 (15.66)

CAL3QHC Air Dispersion Model

Model Inputs. The following model inputs were used:

1. Meteorology

   The regulatory default values for the following inputs were used:

   Wind Speed: 1 meter/second
   Stability Class: E (stable conditions, rural areas)
   Wind Direction: "Worst Case" wind direction angle (determined using ten degree increments.
   Mixing Height: 1000 meters

2. Emission Factors

   The composite emission factors derived from the MOBILE 5A program were input.

3. Roadway, Intersection and Receptor Parameters

   The geometrics of the roadways and interchanges were derived from the South and East Beltways Study, Interim Report No. 3, June 1997 (revised March 1999). Source heights were input at 0 feet above ground level with the exception of the elevated portions of the interchanges which were input at 7.6 meters (25 feet) above ground. All receptors were input at 1.8 meters (6 feet) above ground level and are located along the roadway at the edge of the mixing zone.

4. Other Site Variables

   A surface roughness factors (Z_o) of 4.0 was input based upon the surrounding land use which is predominantly grassland.

   The settling velocity (V_s) and the deposition velocity (V_d) were set at zero because carbon monoxide is a gaseous emission. All predicted carbon monoxide concentrations are based upon an averaging time of 60 minutes.

5. Traffic Parameters

   Traffic volume was obtained from the Lincoln-Lancaster Planning Department (Lincoln-Lancaster Beltway Alternatives Study Data, memo from Mike Brienzo to Mike Gorman, January 12, 2000) (refer to **Attachment B-A-2)**. The traffic volume used in this study is based upon 2030 projections. Typically, roadway projects are modeled using 20 year traffic projections, however, the 2030 data was developed to correspond to the Build Out Scenario (BOS2) Land Use Plan adopted by the City of Lincoln. This plan assumes a population of 374,630. The peak hour traffic used in the model was assumed to be 10% of the ADT.

ATTACHMENT B-A-1

MOBILE 5A EMISSIONS OUTPUT

```
1 LINCOLN BELTWAY-2020 EMISSION FACTORS.
 MOBILE5a (26-Mar-93)
0
-M 90 Warning:
+               Period 1 RVP reset to  6.5
-M 90 Warning:
+               Period 2 RVP reset to  6.5
0BELT  2020.                          Minimum Temp:  10. (F)        Maximum Temp:  40. (F)
                      Period 1 RVP:  6.5      Period 2 RVP:  6.5      Period 2 Start Yr: 2001
0Total HC emission factors include evaporative HC emission factors.
0
```

0Emission factors are as of Jan. 1st of the indicated calendar year.
0Cal. Year: 2020 I/M Program: No Ambient Temp: 29.9 (F) Region: Low
Anti-tam. Program: No Operating Mode: 20.6 / 27.3 / 20.6 Altitude: 500. Ft.
Reformulated Gas: No

0 Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	65.0	65.0	65.0		65.0	65.0	65.0	65.0	65.0	
VMT Mix:	0.575	0.207	0.089		0.034	0.002	0.005	0.084	0.004	
0Composite Emission Factors (Gm/Mile)										
Exhaust CO:	19.31	26.55	35.68	29.28	21.89	0.87	0.98	6.77	43.19	21.277

0Emission factors are as of Jan. 1st of the indicated calendar year.
0Cal. Year: 2020 I/M Program: No Ambient Temp: 29.9 (F) Region: Low
Anti-tam. Program: No Operating Mode: 20.6 / 27.3 / 20.6 Altitude: 500. Ft.
Reformulated Gas: No

0 Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	60.0	60.0	60.0		60.0	60.0	60.0	60.0	60.0	
VMT Mix:	0.575	0.207	0.089		0.034	0.002	0.005	0.084	0.004	
0Composite Emission Factors (Gm/Mile)										
Exhaust CO:	14.70	20.62	27.71	22.74	17.97	0.77	0.86	5.96	27.93	16.417

0Emission factors are as of Jan. 1st of the indicated calendar year.
0Cal. Year: 2020 I/M Program: No Ambient Temp: 29.9 (F) Region: Low
Anti-tam. Program: No Operating Mode: 20.6 / 27.3 / 20.6 Altitude: 500. Ft.
Reformulated Gas: No

0 Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	35.0	35.0	35.0		35.0	35.0	35.0	35.0	35.0	

VMT Mix:	0.575	0.207	0.089		0.034	0.002	0.005	0.084	0.004
0Composite Emission Factors (Gm/Mile)									
Exhaust CO:	16.24	21.89	29.42	24.15	15.27	0.80	0.89	6.19	17.19
17.605									

ATTACHMENT B-A-2

TRAFFIC VOLUME

Lincoln Beltway Alternatives

Daily Traffic Comparisons

Model Runs for BOS2 Land Use and 30 Year Projected External Trips

December 9, 1999

FIGURE 3

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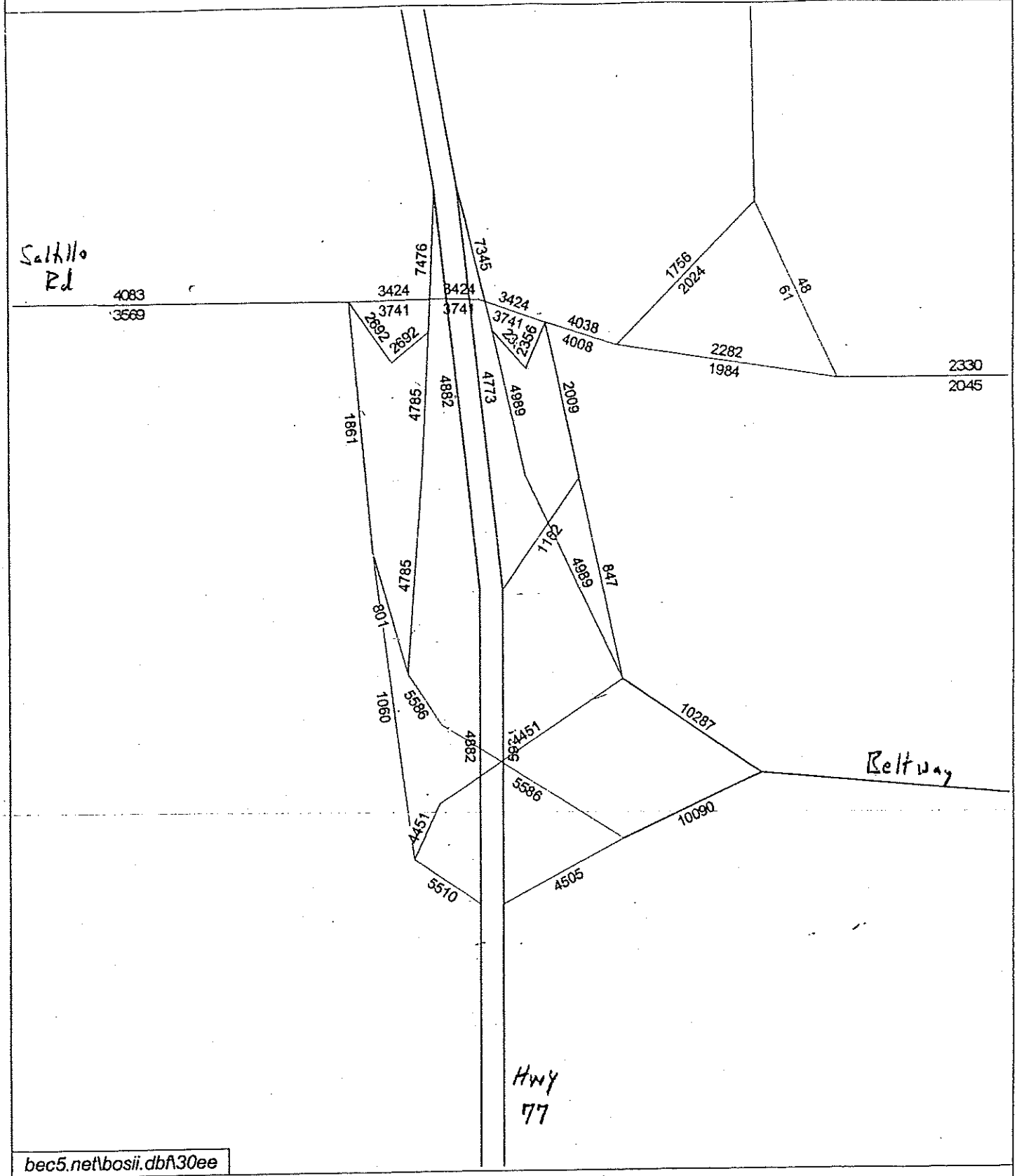
Roadway Segment	No Beltway (2)	East Beltway Alternatives: East-Close (5)	East-Mid (6)	East-Far (7)
West Beltway				
West "O" Street to West Capital Parkway	41,079	41,331	41,650	40,202
West Capital Parkway to Van Dorn Street	30,072	29,838	30,215	29,823
Van Dorn Street to Pioneers Blvd.	25,543	28,781	28,935	28,699
Pioneers Blvd. to Old Cheney Road	27,399	30,960	31,108	30,720
Old Cheney Road to Warlick Road	20,760	24,052	23,916	24,336
Warlick Road to Saltillo Road	19,774	24,476	24,429	24,461
Sum of West Links	**164,627**	**179,438**	**180,253**	**178,241**
South Beltway				
U.S Highway 77 to South 27th Street		20,356	19,441	19,109
South 27th Street to South 68th Street		20,711	19,482	19,068
South 68th Street to South 84th Street		20,074	17,940	17,106
South 84th Street to Nebraska Hwy 2		19,034	15,641	14,723
Sum of South Links		**80,175**	**72,504**	**70,006**
East Beltway				
U.S. 6 to I-80		16,330	18,404	18,994
I-80 to Fletcher Avenue		25,035	23,012	19,957
Fletcher Avenue to Adams Street		23,699	25,444	24,708
Adams Street to "O" Street (U.S. 34)		29,837	28,341	26,468
"O" Street (U.S. 34) to Pioneers Blvd.		29,185	26,150	22,132
Pioneers Blvd. to Pine Lake Road		23,865	21,188	17,363
Pine Lake Road to Nebraska Hwy 2		14,069	14,459	13,828
Sum of East Links		**162,020**	**156,998**	**143,450**

Beltway Alternatives Analysis
Future Network with Beltway South-Mid & East-Close
December 9, 1999



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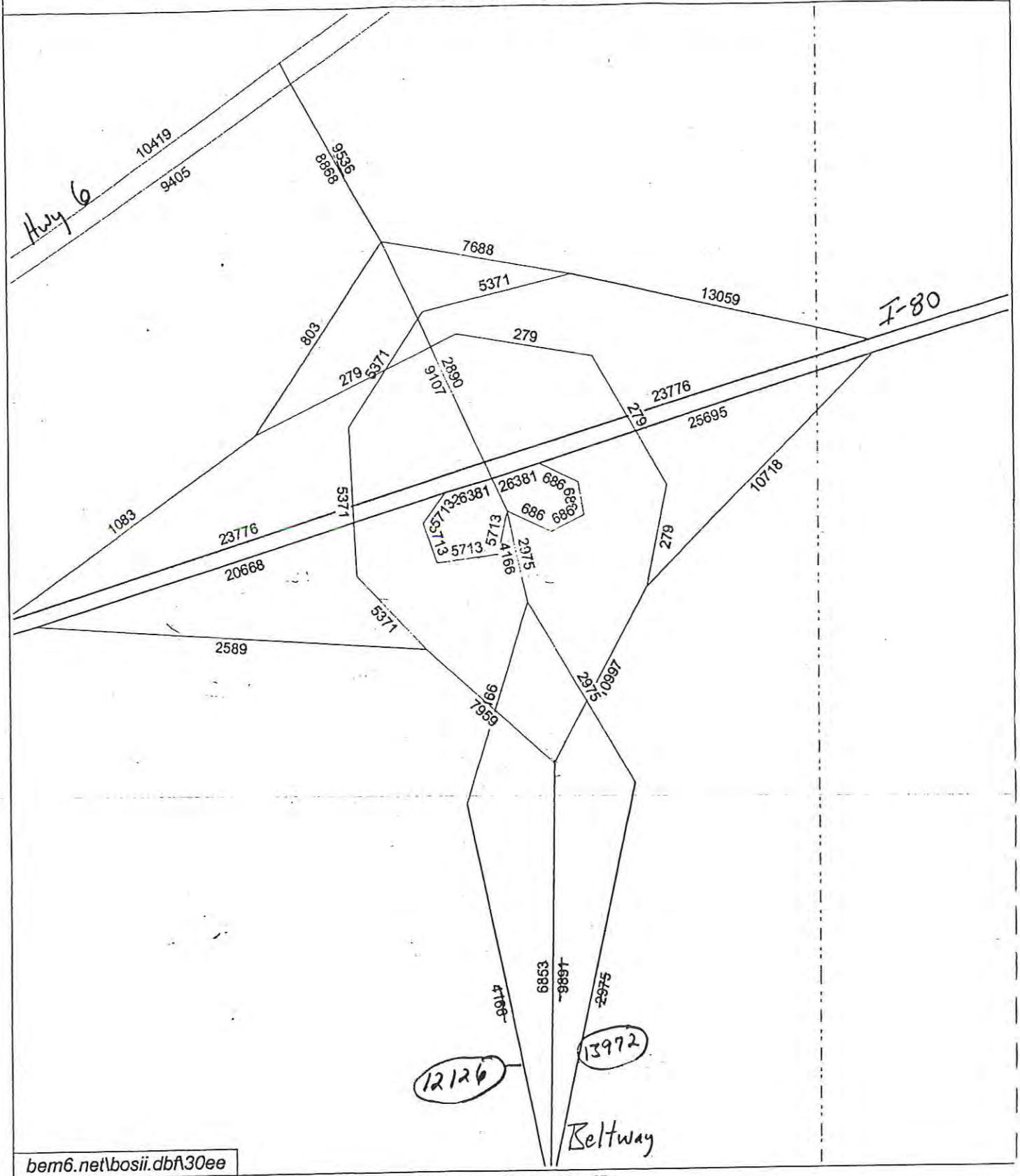
Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

Licensed to Lincoln City-County Planning

Lincoln Beltway Alternatives
Future Network with Beltway South-Mid & East-Mid
December 9, 1999



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Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

Licensed to Lincoln City-County Planning

Appendix B-B
CAL3QHC Air Dispersion Model Output

DATA PROVIDED SEPARATELY TO
NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY.
DATA AVAILABLE ON REQUEST.

Appendix C
NOISE STUDY REPORT

NOISE STUDY REPORT

SOUTH AND EAST BELTWAYS STUDY
LINCOLN, NEBRASKA

PREPARED FOR

FEDERAL HIGHWAY ADMINISTRATION
NEBRASKA DEPARTMENT OF ROADS
LANCASTER COUNTY
CITY OF LINCOLN

OCTOBER 2000
(REVISED 2/01, 11/01, 5/02)

NOISE STUDY REPORT
for
South and East Beltways Study
Lincoln, Nebraska

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NOISE STUDY REPORT
for
South and East Beltways Study
Lincoln, Nebraska

1.0 INTRODUCTION

This report provides a discussion of the potential traffic related noise impacts associated with the South and East Beltways Project. This noise analysis has been conducted in accordance with 23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise" and with "Noise Analysis and Abatement Policy, May 1998" of the Nebraska Department of Roads. Noise levels within the study area are predicted using the Federal Highway Administration, Traffic Noise Model (TNM, Version 1b). Using the model results, predicted noise levels are compared to existing noise levels and the Federal Noise Abatement Criteria (NAC) to determine if there are any project-related noise impacts. Where impacts are predicted to occur, appropriate noise mitigation measures are evaluated, including noise barriers. Mitigation is not considered for the No Build alternative.

2.0 PROJECT DESCRIPTION

The purpose of the South and East Beltways Study has been to conduct a feasibility study and alternatives evaluation for preferred beltway alignments on the south and east fringes of the City of Lincoln to complete a circumferential transportation system. The south beltway alternative would connect US 77 with N-2, while the east beltway alternative would connect N-2 with I-80.

The study area for the south beltway is bounded on the north by Yankee Hill Road, on the south by the half-section line 0.8 km (0.5mi) south of Bennett Road, on the east by the half-section line 0.8 km (0.5 mi) east of 148th Street, and on the west by US 77. The study area for the east beltway is bounded on the west by 98th Street, on the east by the half-section line 0.8 km (0.5 mi) east of 148th Street, on the north by I-80, and on the south by N-2.

The Nebraska Department of Roads Standard Section for a Rural Expressway was used for all beltway alignments. A rural expressway typical section has the following features:

- Approximately 76.2 to 91 m (250 to 300 ft) right-of-way; right-of-way needs vary with topography
- Two 3.7 m (12 ft) driving lanes in each direction
- 2.4 m (8 ft) paved outside shoulders
- 0.9 m (3 ft) paved inside shoulders
- 12 m (40 ft) unpaved depressed median (includes inside shoulders)

Construction of the east beltway alternatives will increase traffic volume on several existing roadways that cross or parallel the beltway alignments (*Interim Report No. 3* (WSA, revised 1999)) and which are not necessarily in the beltway study area. The roadway segments listed below were predicted to have an increase of 50 percent or greater traffic volume dependant upon the beltway alternative selected. Therefore, the following roadway segments have been included in the noise study.

EC-1 Alternative:

- 27th Street between Pine Lake and Yankee Hill
- Van Dorn between 84th and 98th Streets
- Old Cheney between 84th and 98th Streets

EM-1 Alternative:

- Old Cheney between 84th and 98th Streets
- 70th Street between Yankee Hill and Saltillo Road

EF-1 Alternative:

- Old Cheney between 84th and 98th Streets
- 70th Street between Yankee Hill and Saltillo Road
- 70th Street between Old Cheney and N-2

3.0 MEASUREMENT OF SOUND

The Federal Highway Administration (FHWA) has specified that noise be predicted and evaluated in decibels weighted with the A-level frequency response; this unit of measure is referred to as dBA. Measurements in dBA incorporate the human ear's reduced sensitivity to both low frequency and very high frequency noises, thereby correlating well with our subjective impression of loudness. **Table C.1** displays noise levels (in dBA) common to our everyday activities.

Table C.1

COMMON NOISE LEVELS

Common Noise Levels	Distance from Receiver	Noise Level (dBA)
Rock Band	5 m (16 ft)	110
Jet Flyover	300 m (985 ft.)	105
Gas Lawn Mower	1 m (3 ft.)	95
Diesel Truck	15 m (50 ft.)	85
Same Truck	34 m (110 ft.)	80
Gas Lawn Mower	30 m (100 ft.)	70
Normal Speech	1 m (3 ft.)	65
Birds Chirping	--	50
Leaves Rustling	--	40
Very Quiet Soft Whisper	--	30

4.0 TRAFFIC NOISE STANDARDS

The Federal Highway Administration has developed noise abatement criteria based on the A-weighted, equivalent level noise descriptor (Leq(h)). The Leq(h) is the equivalent steady state sound level reported over a period of one hour which contains the same acoustic energy as the time-varying traffic sound level during that same hour. **Table C.2** contains the upper limits of the Leq(h) desirable noise levels that are part of the Noise Abatement Criteria (NAC) established by the FHWA. Any noise levels that approach or exceed these criteria would not be desirable and would be referred to as a noise impact.

Table C.2

NOISE ABATEMENT CRITERIA
HOURLY A-WEIGHTED SOUND LEVEL

Activity Category	Hourly Noise Levels Leq(h) dBA	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, play grounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	----	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

In accordance with the Nebraska Department of Roads policy, a noise impact occurs and abatement measures will be considered for receptors if:

- The predicted future year (year 2030) noise levels approach or exceed NAC criteria of 67 Leq(h) dBA for Activity Category B or 72 Leq(h) dBA for Activity Category C. Approach is defined by the NDOR as 1 dBA less than the noise abatement criteria or;

- The predicted future year (year 2030) noise level exceeds the existing noise level by 15 dBA or more.

The noise impacts predicted to occur within the project area are discussed later in this report.

5.0 PROJECT AREA ACTIVITY CATEGORY

The majority of the project lies within rural areas and the land use is classified as Activity Category "B" or "D" as described in **Table C.2** above. Activity "C" land use is located near the US 77 and SM-4 interchange.

6.0 EXISTING 1999 NOISE LEVELS

Existing noise levels for the receptors adjacent to the beltway alternatives were determined by direct field measurements using a Quest 2800 sound level meter. The measurements were taken along unimproved county roadways near existing residences (generally 30 to 45.7 m (100 to 150 ft) from the centerline of the roadway) at a height of 1.5 m (5 ft) above ground level. The duration of the measurement time ranged from fifteen to thirty minutes. Noise levels for locations where the project roadway intersects an existing highway system were determined by modeling the existing traffic volume (1998 traffic data) as discussed below.

Noise levels ranged in the mid to upper 40 Leq(h) level adjacent to unimproved county roads and ranged in the upper 50 Leq(h) to mid 60 Leq(h), level near existing highways. Noise levels exceeding the FHWA impact criteria currently occur at several residences located adjacent to N-2.

7.0 PREDICTED NOISE LEVELS

7.1 Prediction Methodology

The procedures included in the FHWA Traffic Noise Model perform an analysis of traffic noise in terms of traffic parameters (vehicle type and speed), roadway design and receptor characteristics. These parameters are input into the computer model which provides the noise level estimate. All noise levels referred to in this study are exterior noise levels.

Detailed engineering regarding the exact alignment and grade of the beltway alternatives, cut and fill areas, and intersection design is beyond the scope of the current level of the beltways study. As such, the traffic engineer's best estimates of these parameters have been incorporated into the model, therefore, these results must be considered preliminary. Further analysis of the noise impacts and recommended mitigation should be completed using more detailed design information if any of the Build options are selected.

7.2 Traffic Parameters

Beltway Alternatives. The traffic volume used in this study is based upon 2030-Build projections developed by the Lincoln-Lancaster County Planning Department (refer to Appendix C-A). Typically, roadway projects are modeled using 20 year traffic projections, however, the 2030 data was developed to correspond to the Build Out Scenario (BOS2) Land Use Plan adopted by the City of Lincoln. This plan assumes a population of 374,630. Traffic volumes within the diamond interchanges along the beltway were not modeled by the City and therefore were not available for the noise model. However, noise at the interchanges would not be considered significant due to the low volumes and reduced speeds of traffic within the interchanges in comparison with the high volumes and high speeds through the interchange.

The "peak-hour" traffic parameters used reflect 10 percent of the 2030-Build ADT.

Existing Roadways. The 2020-No-Build traffic volumes from *Interim Report No. 3* (WSA, revised 1999) were compared to the 2030-Build projections developed by the Lincoln-Lancaster County Planning Department.

The "peak-hour" traffic parameters used reflect 10 percent of the 2020 No-Build and 2030- Build ADT.

The following Federal Highway Administration (FHWA) criteria for automobiles, medium trucks and heavy trucks were used in determining the vehicle mix (**Table C.3**) for the study roadways.

- Automobiles: all vehicles with two axles and four tires- primarily designed to carry nine or fewer people (passenger cars, vans) or cargo (vans, light trucks)- generally with gross vehicle weight less than 44 kilonewtons (9,900 lb)
- Medium trucks: all cargo vehicles with three or more axles- generally with gross vehicle weight between 44 kilonewtons (10,000 lb) but less than 116 kilonewtons (26,000 lb)
- Heavy trucks: all cargo vehicles with three or more axles- generally with gross vehicle weight more than 116 kilonewtons (26,000 lb)

Table C.3

VEHICLE MIX PERCENTAGE

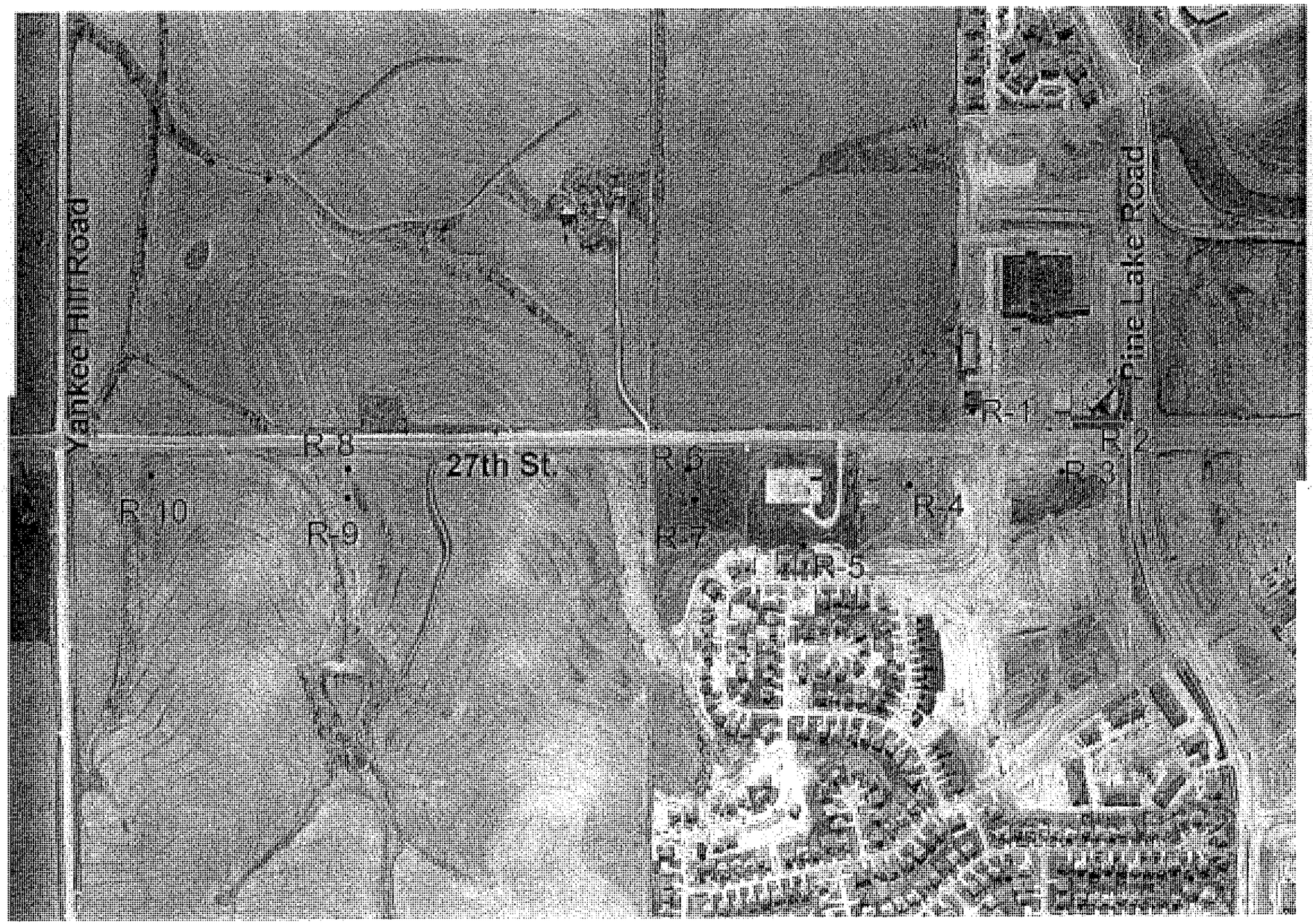
Finalist Alternative	Cars and Pickup Trucks Percentage	Medium Trucks Percentage	Heavy Trucks Percentage
SM-4 [1]	90.60	1.07	8.33
EC-1, EM-1, EF-1 [1]	96.96	1.29	1.75
US 77 [2]	91.7	1.7	6.6
N-2 [2]	87.5	1.25	11.25
US 34 [2]	93	2	5
I-80 [2]	79	2.1	18.9
Existing Roads	95	4.5	0.5

[1] Provided by HWS Consulting Group, Inc.
[2] Provided by Nebraska Department of Roads

7.3 Predicted Noise Levels

Existing Roadway Noise Levels. The east beltway alternatives are projected to cause an increase in traffic volume along certain existing roadways (some of which are not located within the beltway study area). For these locations, the 2030-Build projected traffic Leq(h) noise level at each receptor has been compared to the 2020 No-Build traffic Leq(h) noise level to determine future noise impacts for receptors adjacent to the existing roadways. The analysis indicates that noise levels will generally increase along existing roadways, however, no noise impacts are predicted (refer to **Tables C.4-C.11**). The locations of the receptors are shown in **Figures C-1** to **C-6** which include a base photograph from April 1997.

It should also be noted that some of the 2020 predicted levels for the No-Build scenario were as much as 6 dB lower than the lowest 1999 field measurements of ambient noise. This is most likely due to the fact that the model does not account for other ambient noise in the area.



Legend
- ● Noise Receptor
- R-10 Receptor Identifier

N

November 1st, 2000

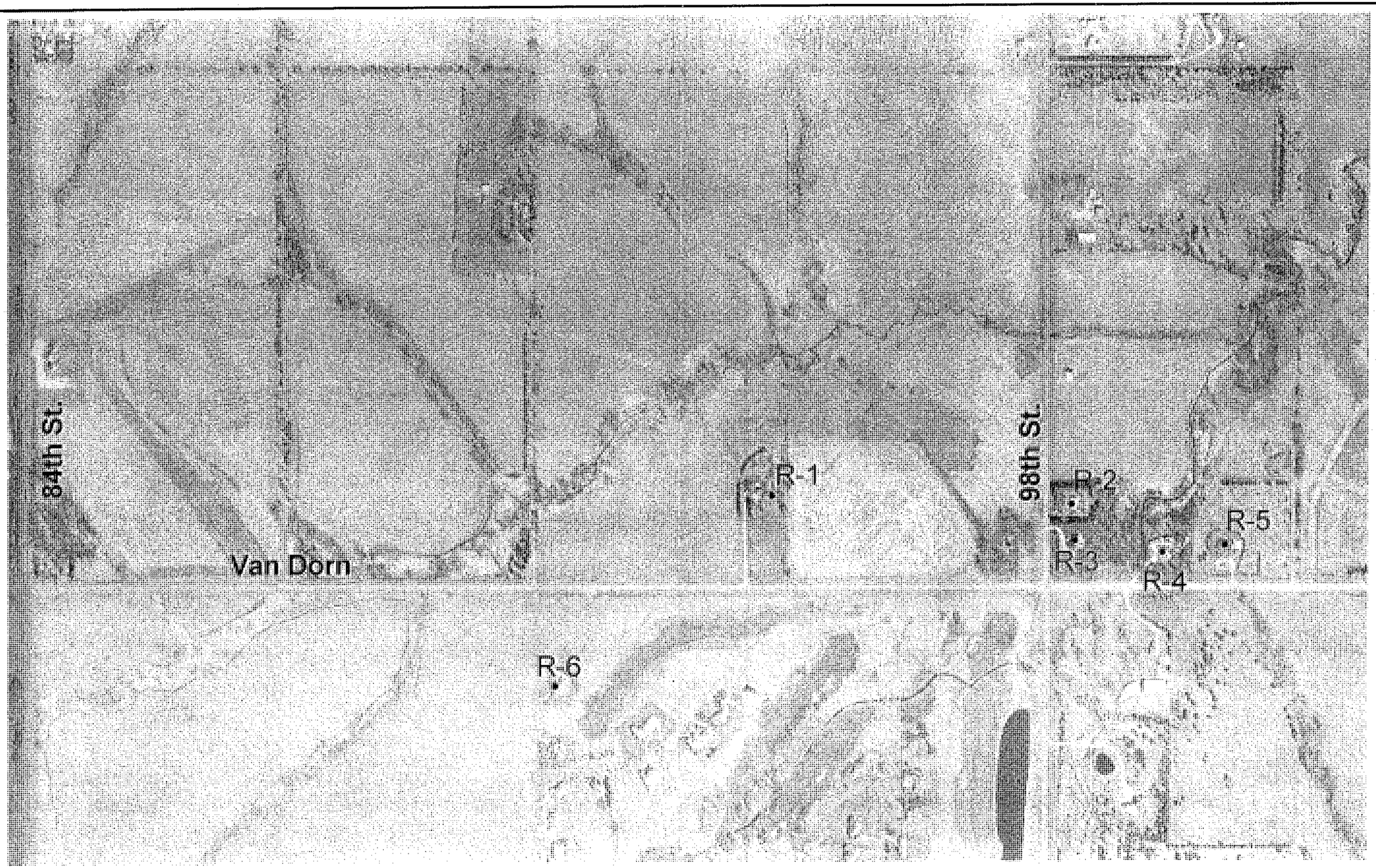
LINCOLN SOUTH AND EAST BELTWAYS ENVIRONMENTAL IMPACT STATEMENT

500 0 500 Feet

100 0 100 Meters

Noise Receptors along 27th St. (Table C.4) from Pine Lake Road to Yankee Hill Road

Figure C-1



Legend

- Noise Receptors
- R-4 Receptor Identifier

N

November 1st, 2000

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

500 0 500 Feet

100 0 100 Meters

Noise Receptors along Van Dorn Street (Table C.5) from 84th Street to 98th Street

Figure C-2

Legend

- Noise Receptors
- R-4 Receptor Identifier

N

November 1st, 2000

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

500 0 500 Feet

100 0 100 Meters

Noise Receptors along Old Cheney Road (Tables C.6, C.7, and C.9) from 84th Street to 98th Street

Figure C-3

Legend
- Noise Receptor
- R-10 Receptor Identifier

N

November 1st, 2000

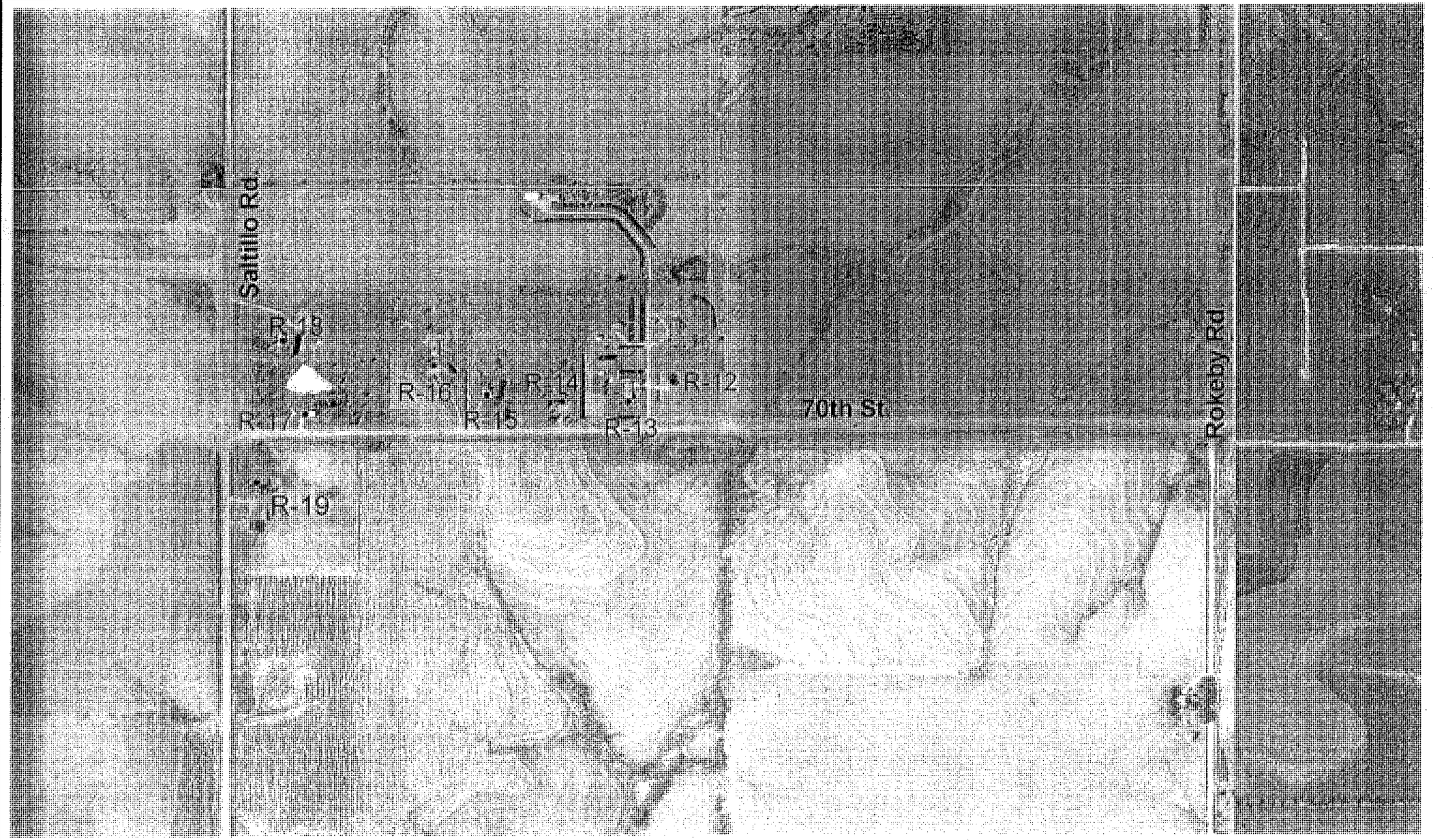
LINCOLN SOUTH AND EAST BELTWAYS ENVIRONMENTAL IMPACT STATEMENT

500 0 500 Feet

100 0 100 Meters

Noise Receptors along 70th St. (Tables C.8 and C.10) from Yankee Hill Road to Rokeby Road

Figure C-4



Legend
Noise Receptor
R-10 Receptor Identifier

N

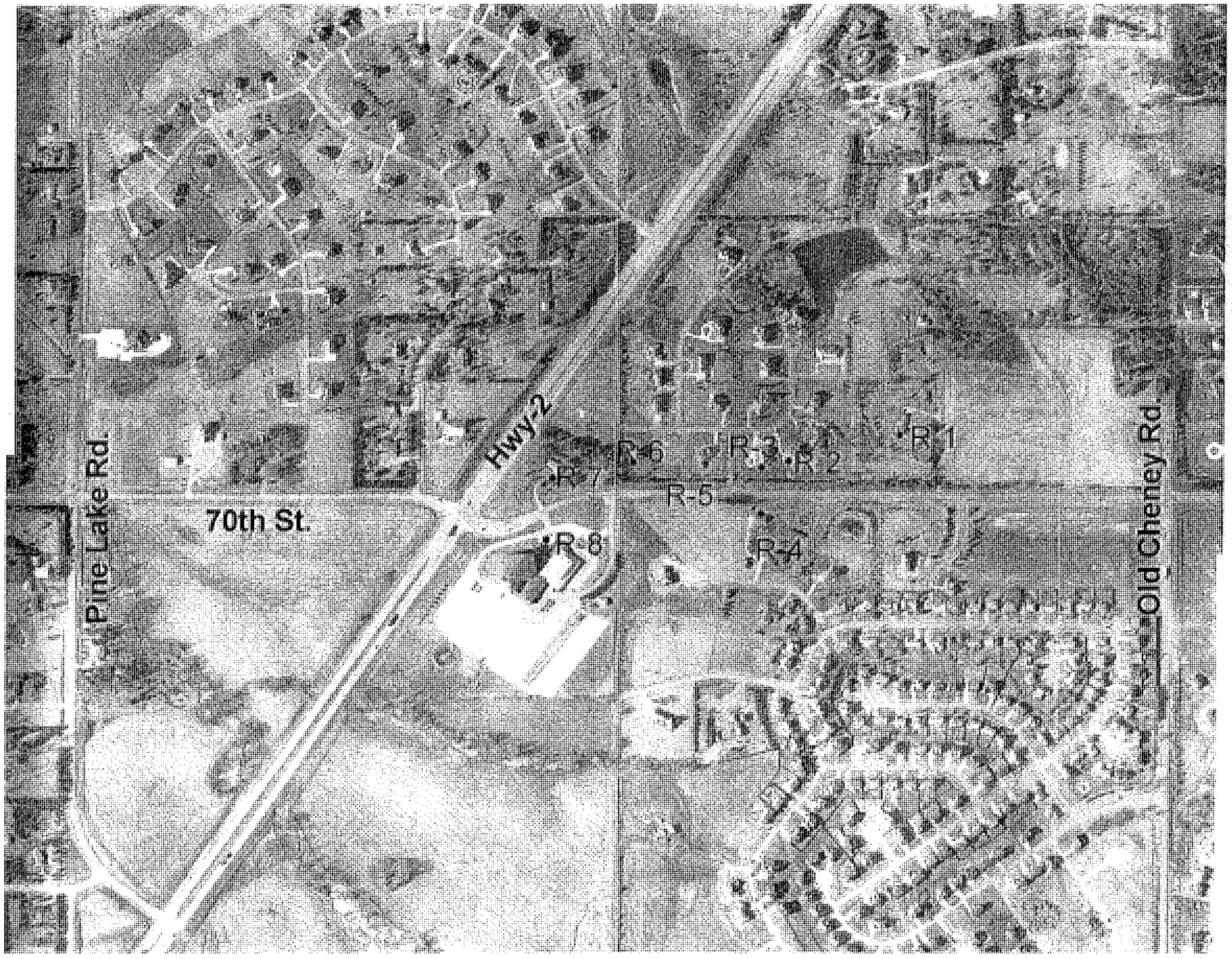
November 1st, 2000

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

500 0 500 Feet
100 0 100 Meters

Noise Receptors along 70th St. (Table C.8 and C.10) from Rokeby Road to Saltillo Road.

Figure C-5



Legend
- Noise Receptor
- R-10 Receptor Identifier

N

November 1st, 2000

LINCOLN SOUTH AND EAST BELTWAYS
ENVIRONMENTAL IMPACT STATEMENT

500 0 500 Feet
100 0 100 Meters

Noise Receptors along 70th St.
(Table C.11) from Old Cheney Road to N-2

Figure C-6

Beltway Noise Levels. The 2030-Build projected traffic Leq(h) noise level at each receptor has been compared to the 1999-Existing traffic Leq(h) noise level to determine future noise impacts for receptors adjacent to the beltway alignments. The predicted noise levels for these receptors are summarized in **Tables C.12 to C.17**. **Tables C.12** to **C.14** are the south beltway alternative under different traffic volume assumptions corresponding to connections with EC-1, EM-1 and EF-1. **Tables C.15** to **C.17** are the three east beltway alternatives. The location of the receptors are shown on the **Exhibits** in the main body of the EIS.

Table C.4

EC-1 ALTERNATIVE
PREDICTED NOISE LEVELS
on 27TH Street between Pine Lake Road and Yankee Hill Road

Receptor and Activity Category		2020 Existing Noise Level	2030 Build Noise Level		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC	Increase equal to or greater than 15 dBA
R1	C	57	61	4	No[1]	No
R2	C	60	62	2	No	No
R3	C	53	56	3	No	No
R4	B	51	55	4	No [2]	No
R5	C	45	49	4	No	No
R6	C	57	61	4	No	No
R7	C	51	55	4	No	No
R8	B	57	61	4	No	No
R9	B	51	55	4	No	No
R10	B	62	61	1	No	No

[1] NAC level is 72 Leq(h)
[2] NAC level is 67 Leq(h)

Table C.5

EC-1 ALTERNATIVE
PREDICTED NOISE LEVELS
on Van Dorn Street between 84th Street and 98th Street

Receptor and Activity Category		2020 Existing Noise Level	2030 Build Noise Level		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC	Increase equal to or greater than 15 dBA
R1	B	44	42	2	No	No
R2	B	45	43	2	No	No
R3	B	54	51	3	No	No
R4	B	52	50	2	No	No
R5	B	54	51	-3	No	No
R6	B	43	42	-2	No	No

Table C.6

EC-1 ALTERNATIVE
PREDICTED NOISE LEVELS
on Old Cheney Road between 84th Street and 98th Street

Receptor and Activity Category		2020 Existing Noise Level	2030 Build Noise Level		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC	Increase equal to or greater than 15 dBA
R1	B	62	65	3	No	No
R2	B	52	55	3	No	No
R3	B	61	64	3	No	No
R4	B	56	58	2	No	No
R5	B	64	63	-1	No	No
R6	B	62	61	-1	No	No

Table C.7

EM-1 ALTERNATIVE
PREDICTED NOISE LEVELS
on Old Cheney Road between 84th Street and 98th Street

Receptor and Activity Category		2020 Existing Noise Level	2030 Build Noise Level		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC	Increase equal to or greater than 15 dBA
R1	B	62	65	3	No	No
R2	B	52	55	3	No	No
R3	B	61	64	3	No	No
R4	B	56	59	3	No	No
R5	B	64	63	-1	No	No
R6	B	62	62	0	No	No

Table C.8

EM-1 ALTERNATIVE
PREDICTED NOISE LEVELS
on 70th Street between Yankee Hill Road and Saltillo Road

Receptor and Activity Category		2020 Existing Noise Level	2030 Build Noise Level		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC	Increase equal to or greater than 15 dBA
R1	B	57	65	8	No	No
R2	B	44	52	8	No	No
R3	B	47	55	8	No	No
R4	B	43	49	6	No	No
R5	B	44	51	7	No	No
R6	B	46	53	7	No	No
R7	B	40	46	6	No	No
R8	B	48	56	8	No	No
R9	B	44	51	7	No	No
R10	B	39	46	7	No	No
R11	B	48	56	8	No	No
R12	B	38	50	12	No	No
R13	B	44	56	12	No	No
R14	B	42	54	12	No	No
R15	B	37	45	8	No	No
R16	B	49	59	10	No	No
R17	B	46	50	4	No	No
R18	B	41	52	9	No	No
R19	B	51	50	-1	No	No

Table C.9

EF-1 ALTERNATIVE
PREDICTED NOISE LEVELS
on Old Cheney Road between 84th Street and 98th Street

Receptor and Activity Category		2020 Existing Noise Level	2030 Build Noise Level		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC	Increase equal to or greater than 15 dBA
R1	B	62	65	3	No	No
R2	B	52	55	3	No	No
R3	B	61	64	3	No	No
R4	B	58	59	1	No	No
R5	B	64	64	0	No	No
R6	B	62	62	0	No	No

Table C.10

EF-1 ALTERNATIVE
PREDICTED NOISE LEVELS
on 70th Street between Yankee Hill Road and Saltillo Road

Receptor and Activity Category		2020 Existing Noise Level	2030 Build Noise Level		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC	Increase equal to or greater than 15 dBA
R1	B	57	65	8	No	No
R2	B	44	52	8	No	No
R3	B	47	55	8	No	No
R4	B	43	50	6	No	No
R5	B	44	51	7	No	No
R6	B	46	53	7	No	No
R7	B	40	46	6	No	No
R8	B	48	56	8	No	No
R9	B	44	51	7	No	No
R10	B	39	46	7	No	No
R11	B	48	56	8	No	No
R12	B	38	50	12	No	No
R13	B	44	56	12	No	No
R14	B	42	54	12	No	No
R15	B	37	45	8	No	No
R16	B	49	60	10	No	No
R17	B	46	50	4	No	No
R18	B	41	52	9	No	No
R19	B	51	50	-1	No	No

Table C.11

EF-1 ALTERNATIVE
PREDICTED NOISE LEVELS
on 70th Street between Old Cheney Road and N-2

Receptor and Activity Category		2020 Existing Noise Level	2030 Build Noise Level		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC	Increase equal to or greater than 15 dBA
R1	B	54	56	2	No	No
R2	B	58	61	3	No	No
R3	B	58	60	2	No	No
R4	B	62	65	3	No	No
R5	B	58	60	2	No	No
R6	B	61	61	0	No	No
R7	B	61	60	0	No	No
R8	B	61	62	1	No	No

Table C.12

SM-4/EC-1 ALTERNATIVE
PREDICTED BELTWAY NOISE LEVELS

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EC-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R1	B	62	65	3	No	No
R2	B	46	54	8	No	No
R3	B	50	55	5	No	No
R4	B	55	59	4	No	No
R5	C	60	63	3	No	No
R6	C	59	62	3	No	No
R7	C	56	60	4	No	No
R8	B	46	54	8	No	No
R9	B	47	60	13	No	No
R10	B	47	50	3	No	No
R11	B	44	61	17	No	Yes
R12	B	47	61	14	No	No
R13	B	47	56	9	No	No
R14	B	47	52	5	No	No
R15	B	47	61	14	No	No
R16	B	47	59	12	No	No
R17	B	47	57	10	No	No
R18	B	47	55	8	No	No
R19	B	44	53	9	No	No
R20 (Barn)	B	44	57	13	No	No
R21	B	44	57	13	No	No
R22	B	44	56	12	No	No
R23	B	44	56	12	No	No
R24	B	44	56	12	No	No
R25	B	64	67	3	Yes	No
R26 (Barn)	B	61	65	4	No	No
R27	B	67	70	3	Yes	No
R28	B	66	68	2	Yes	No
R29	B	66	70	4	Yes	No
R30	B	58	62	4	No	No
R31 (Wheeler Relocation)	B	63	67	4	Yes	No

Table C.13

SM-4/EM-1 ALTERNATIVE
PREDICTED BELTWAY NOISE LEVELS

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EM-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R1	B	62	65	3	No	No
R2	B	46	54	8	No	No
R3	B	50	55	5	No	No
R4	B	55	59	4	No	No
R5	C	60	63	3	No	No
R6	C	59	62	3	No	No
R7	C	56	60	4	No	No
R8	B	46	54	8	No	No
R9	B	47	60	13	No	No
R10	B	47	50	3	No	No
R11	B	44	61	17	No	Yes
R12	B	47	61	14	No	No
R13	B	47	56	9	No	No
R14	B	47	52	5	No	No
R15	B	47	61	14	No	No
R16	B	47	58	11	No	No
R17	B	47	57	10	No	No
R18	B	47	55	8	No	No
R19	B	44	53	9	No	No
R20 (Barn)	B	44	57	13	No	No
R21	B	44	57	13	No	No
R22	B	44	56	12	No	No
R23	B	44	56	12	No	No
R24	B	44	58	14	No	No
R25	B	64	67	3	Yes	No
R26 (Barn)	B	61	65	4	No	No
R27	B	67	70	3	Yes	No
R28	B	66	68	2	Yes	No
R29	B	66	70	4	Yes	No
R30	B	58	62	4	No	No
R31 (Wheeler Relocation)	B	63	67	4	Yes	No

Table C.14

SM-4/EF-1 ALTERNATIVE
PREDICTED BELTWAY NOISE LEVELS

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EF-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R1	B	62	65	3	No	No
R2	B	46	54	8	No	No
R3	B	50	55	5	No	No
R4	B	55	59	4	No	No
R5	C	60	63	3	No	No
R6	C	59	62	3	No	No
R7	C	56	60	4	No	No
R8	B	46	54	8	No	No
R9	B	47	60	13	No	No
R10	B	47	50	3	No	No
R11	B	44	61	17	No	Yes
R12	B	47	61	14	No	No
R13	B	47	56	9	No	No
R14	B	47	52	5	No	No
R15	B	47	61	14	No	No
R16	B	47	59	12	No	No
R17	B	47	57	10	No	No
R18	B	47	55	8	No	No
R19	B	44	53	9	No	No
R20 (Barn)	B	44	55	11	No	No
R21	B	44	57	13	No	No
R22	B	44	56	12	No	No
R23	B	44	56	12	No	No
R24	B	44	57	13	No	No
R25	B	64	67	3	Yes	No
R26 (Barn)	B	61	65	4	No	No
R27	B	67	70	3	Yes	No
R28	B	66	68	2	Yes	No
R29	B	66	70	4	Yes	No
R30	B	58	62	4	No	No
R31 (Wheeler Relocation)	B	63	67	4	Yes	No

Table C.15

EC-1 ALTERNATIVE
PREDICTED BELTWAY NOISE LEVELS

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EC-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R1	B	45	58	13	No	No
R2	B	45	56	11	No	No
R3	B	45	52	7	No	No
R4	B	45	50	5	No	No
R5	B	45	40	5	No	No
R6	B	45	51	6	No	No
R7	B	45	51	6	No	No
R8	B	45	51	6	No	No
R9	B	45	49	4	No	No
R10	B	45	62	17	No	Yes
R11	B	45	55	10	No	No
R12	B	55	64	9	No	No
R13 (Barn)	B	57	60	3	No	No
R14	B	58	60	2	No	No
R15	B	52	57	5	No	No
R16	B	51	58	7	No	No
R17	B	49	66	17	Yes	Yes
R18	B	48	54	6	No	No
R19	B	46	66	20	Yes	Yes
R20	B	46	58	12	No	No
R21 (Water Tower)	B	50	63	13	No	No
R22	B	50	58	8	No	No
R23	B	50	54	4	No	No
R24	B	50	53	3	No	No
R25	B	50	53	3	No	No
R26	B	50	52	2	No	No
R27	B	50	54	4	No	No

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EC-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R28	B	54	59	5	No	No
R29	B	54	62	8	No	No
R30	B	47	60	13	No	No
R31	B	47	60	13	No	No
R32	B	47	61	14	No	No
R33	B	47	56	9	No	No
R34	B	49	54	5	No	No
R35 (Osterberg Relocation)	B	49	61	12	No	No
R36 (Barrett Relocation)	B	49	67	18	Yes	Yes
R37 (Rustad Relocation)	B	49	62	13	No	No
R38	B	48	62	14	No	No
R39	B	48	64	16	No	Yes
R40	B	48	65	17	No	Yes
R41	B	48	62	14	No	No
R42	B	48	63	15	No	Yes
R43	B	50	62	12	No	No
R44	B	63	67	4	Yes	No
R45	B	44	61	17	No	Yes
R46	B	44	62	18	No	Yes
R47	B	44	62	18	No	Yes
R48	B	44	56	12	No	No
R49	B	44	57	13	No	No
R50	B	44	58	14	No	No
R51	B	44	59	15	No	Yes
R52	B	44	58	14	No	No
R53	B	52	59	7	No	No
R54	B	52	56	4	No	No
R55	B	52	67	15	Yes	Yes
R56	B	52	68	16	Yes	Yes
R57	B	52	61	9	No	No

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EC-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R58	B	52	55	3	No	No
R59	B	52	63	11	No	No
R60	B	47	59	12	No	No
R61	B	47	56	9	No	No
R62 (Pump station)	B	47	56	9	No	No
R63 (Out-building)	B	57	57	0	No	No
R64	B	58	59	1	No	No
R65	B	60	64	4	No	No
R66	B	47	56	9	No	No
R67	B	47	54	7	No	No

Table C.16

EM-1 ALTERNATIVE
PREDICTED BELTWAY NOISE LEVELS

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EM-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R1	B	44	56	12	No	No
R2	B	44	53	9	No	No
R3 (Evans Relocation)	B	44	56	12	No	No
R4	B	54	57	3	No	No
R5	B	62	65	3	No	No
R6	B	67	67	0	Yes	No
R7	B	66	66	0	Yes	No
R8	B	66	66	0	Yes	No
R9	B	55	58	3	No	No
R10	B	49	54	5	No	No
R11	B	48	51	3	No	No
R12	B	47	55	8	No	No
R13	B	47	50	3	No	No
R14	B	47	60	13	No	No
R15	B	47	53	6	No	No
R16	B	47	56	9	No	No
R17	B	44	64	20	No	Yes
R18 (Empty Lot)	B	44	58	14	No	No
R19	B	44	58	14	No	No
R20 (Empty Lot)	B	44	55	11	No	No
R21	B	44	55	11	No	No
R22	B	44	57	13	No	No
R23 (Golf Course)	B	44	59	15	No	Yes
R24 (Golf Course)	B	44	58	14	No	No
R25 (Golf Course)	B	44	60	16	No	Yes
R26 (Golf Course)	B	44	53	14	No	No

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EM-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R27	B	43	59	16	No	Yes
R28	B	43	56	13	No	No
R29	B	43	54	11	No	No
R30	B	43	55	12	No	No
R31	B	43	58	15	No	Yes
R32	B	50	50	0	No	No
R33 (Microwave Tower)	B	50	62	12	No	No
R34	B	50	58	8	No	No
R35	B	47	63	16	No	Yes
R36	B	47	62	15	No	Yes
R37 (Pump Station)	B	47	57	10	No	No
R38	B	47	59	12	No	No
R39	B	54	65	11	No	No
R40	B	54	58	4	No	No
R41 (Out-building)	B	54	56	2	No	No

Table C.17

EF-1 ALTERNATIVE
PREDICTED BELTWAY NOISE LEVELS

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EF-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R1	B	58	61	3	No	No
R2	B	69	73	4	Yes	No
R3	B	43	55	12	No	No
R4	B	43	58	15	No	No
R5	B	66	71	5	Yes	No
R6	B	66	69	3	Yes	No
R7	B	67	69	2	Yes	No
R8	B	62	66	4	Yes	No
R9	B	65	69	4	Yes	No
R10	B	65	69	4	Yes	No
R11	B	58	62	4	No	No
R12	B	46	63	17	No	Yes
R13	B	46	61	15	No	Yes
R14	B	46	54	8	No	No
R15	B	46	60	14	No	No
R16	B	53	57	4	No	No
R17	B	53	61	8	No	No
R18	B	53	55	2	No	No
R19	B	53	62	9	No	No
R20	B	53	55	2	No	No
R21	B	45	55	10	No	No
R22	B	46	58	12	No	No
R23	B	46	55	9	No	No
R24	B	43	66	23	Yes	Yes
R25	B	43	58	15	No	Yes
R26	B	60	65	5	No	No
R27	B	60	64	4	No	No
R28 (Otley Relocation)	B	50	62	12	No	No
R29	B	47	57	10	No	No
R30	B	47	64	17	No	Yes

Receptor and Activity Category		1999 Existing Noise Level	2030 Build Noise Level SM-4 and EF-1		Type of Impact 2030-Build	
			Noise Level	Increase	Approach or Exceed NAC (67 Leq(h))	Increase equal to or greater than 15 dBA
R32	B	47	60	13	No	No
R33	B	47	58	11	No	No
R34	B	47	55	8	No	No
R35	B	47	56	9	No	No
R36	B	57	57	0	No	No
R37	B	58	59	1	No	No
R38	B	60	64	4	No	No

7.4 Predicted Noise Contours

Based upon review of the noise levels predicted for the existing receptors and by inserting "dummy"receptors along the beltway alignments, the 66 Leq(h) dBA noise contour which represents the residential noise impact level as discussed in Section 4.0 has been estimated. The location of this contour is useful for land-use planning.

The area adjacent to the beltway alignments which will be within the 66 Leq(h) dBA contour will vary depending upon the traffic (volume and type) and topography. Along the SM-4 alternative the contour ranges from 51.8 to 76.2 m (170 to 250 ft) from the roadway centerline, on the EC-1 and EM-1 alignments the contour ranges from 45.7 to 57.9 m (150 to 190 ft) and along the EF-1 alignment the contour is approximately 45.7 m (150 ft) from the centerline. These distances will increase near the major intersections.

8.0 NOISE ABATEMENT

8.1 Noise Mitigation Measures

In accordance with the NDOR Noise Abatement Policy, noise abatement measures must be considered where predicted traffic noise levels approach or exceed the noise abatement criteria, or when the predicted traffic noise levels substantially exceed the existing noise levels (i.e. 15 dBA). The noise mitigation measures considered during this study are summarized below.

8.1.1 Shifting the Roadway Alignment Horizontally

A shift in the horizontal alignment can be incorporated into a project to reduce traffic noise where receptors are typically on one side of the roadway alignment and the topography is acceptable. Since sound intensity decreases with distance, shifting the roadway away from the receptor will reduce noise levels. Shifting the horizontal alignment of the roadway appears to be a feasible method to mitigate the traffic noise at nine of the impacted receptors, however, a cost analysis could not be completed during this level of study. A more detailed analysis to determine the exact distance of the roadway shift, the starting and ending points and the construction costs will be necessary to determine if this mitigation method is reasonable.

8.1.2 Constructed Noise Barriers

A noise barrier, either a wall made of concrete or wood products or an earthen berm, may be constructed to break the line-of-sight to the receptor. To be effective, a noise barrier must be continuous and have substantial length and height. In accordance with the NDOR Policy, a noise barrier must be *feasible* from an engineering standpoint and *reasonable* from a cost, effectiveness, and access standpoint to be considered.

Barrier Feasibility Criteria. Barriers are considered *feasible* if the insertion loss (reduction in traffic noise at a point 3.0 m (10 ft) from the residence) is at least five decibels. The following items are considered to evaluate the *feasibility*:

- Can a barrier be built to fit the topography?
- Is the exposed height of the barrier no more than 4.9 m (16 ft), except for short lengths?

- Can the barrier be located beyond the clear recovery zone or be incorporated into existing highway barriers?
- Are other significant noise sources present?

Barriers not meeting these criteria are not *feasible* and further evaluation is not conducted.

Noise barriers for thirteen locations appear to be feasible based upon the current alignments, therefore, a reasonableness test was conducted for each of these locations.

Barrier Reasonableness Criteria. Reasonableness is judged on a point system based upon the four criteria listed below. Barriers with a point total of 9 or less are judged to be not reasonable.

1. The noise abatement must be cost effective. Cost effectiveness is defined as cost per protected receptor.

   < $18,000/receptor = 4
   $28,000 to $23,000/receptor = 3
   $23,000 to $28,000/receptor = 2
   $28,000 to $30,000/receptor = 1

   (Unit costs for construction of earthen barriers of $3.92 per cubic meter ($3.00 per cubic yard) of soil and $190.00 per square meter ($18 per square ft) for manufactured walls was used in the cost analysis. If the cost per receptor is above $30,000, the barrier will be considered not reasonable).

2. The change in computed noise levels between the design year and the existing will equal or exceed 3 decibels (a barely perceptible change).

   > 3 decibels = 4
   3 decibels = 3
   2 decibels = 2
   < 2 decibels = 1

3. The impacted receptor or platted area preceded the FHWA approval of the environmental document for initial highway construction.

   > 80 percent = 4
   50-80 percent = 3
   30-50 percent = 2
   <30 percent = 1

4. It is considered unreasonable if the barrier provides noise abatement on a highway with partial or no control of access.

   Full access control = 4
   ½ mile access control = 2
   1/4 mile access control = 1
   < 1/4 mile access control = 0

8.2 Noise Abatement Analysis for Impacted Receptors along the SM-4 Alternative

Table C.18

NOISE ABATEMENT FEASIBILITY REVIEW: SM-4 ALTERNATIVE

Finalist Alternative	Receptor Number	Horizontal/Vertical Roadway Alignment Shift Feasibility?[1]	Barrier Feasibility Determination				
			Compatible with Topo	Height[2]	Other Noise Sources[3]	Location	Is Barrier Feasible?
SM-4	R-11	Yes: shift 37 m (120 ft) north	Yes	No	No	OK	No
SM-4	R-25, 27, 28, 29	No	Yes	Yes	No	OK	Yes

Notes: 1 - Alignment shifted to eliminate noise impact (less than 66 Leq(h) dBA or below significant increase of 15 dBa).
2 - Can the exposed height of a barrier be built 4.9 meters (16 feet) or less?
3 - Other noise sources include other roadways that contribute to noise.

Noise barriers for one location appears to be feasible based upon the current alignment of SM-4, therefore, a reasonableness test was conducted for this location.

Barrier Reasonableness Test for SM-4 Receptors 25, 27, 28, 29. A manufactured wall ranging in height of 3.0 to 3.4 m (10 to 11 ft) extending 769.6 m (2,525 ft) in length along the right-of-way was analyzed. Based a cost/receptor in excess of $30,000, as summarized below, the wall is not reasonable and will not be included for further study.

Reasonableness Test Scores for a Manufactured Wall for SM-4 Receptors 25, 27, 28, 29		
Test Parameter		**Score**
Cost per receptor (assumes 6 receptors benefit)	$76,616	0
2030-Build noise level > than 3 dBA above existing		na
Percent of housing preceding project		na
Access control to highway		na
	Total Score	0

8.3 Noise Abatement Analysis for Impacted Receptors along the EC-1 Alternative

Table C.19

NOISE ABATEMENT FEASIBILITY REVIEW: EC-1 ALTERNATIVE

Finalist Alternative	Receptor Number	Horizontal/Vertical Roadway Alignment Shift Feasibility?	Barrier Feasibility Determination				
			Compatible with Topo	Height[2]	Other Noise Sources[3]	Location	Is Barrier Feasible?
EC-1	R-10	No	Yes	No	No	OK	No
EC-1	R-17	No	Yes	Yes	No	OK	Yes
EC-1	R-19	No	Yes	Yes	No	OK	Yes
EC-1	R-39, 40	No	Yes	No	No	OK	No
EC-1	R-42	Yes: shift 15 m (50 ft) west	Yes	No	No	OK	No
EC-1	R-44	No	Yes	No	Yes	OK	No
EC-1	R-45, 46, 47, 51	No	Yes	No	No	OK	No
EC-1	R-55	No	Yes	Yes	No	OK	Yes
EC-1	R-56	No	Yes	Yes	No	OK	Yes

Notes: 1 - Alignment shifted to eliminate noise impact (less than 66 Leq(h) dBA or below significant increase of 15 dBa).
2 - Can the exposed height of a barrier be built 4.9 meters (16 feet) or less?
3 - Other noise sources include other roadways that contribute to noise

Noise barriers for four locations appear to be feasible based upon the current alignment of EC-1, therefore, a reasonableness test was conducted for each of these locations.

Barrier Reasonableness Test for EC-1 Receptor 17. An earthen berm ranging in height of 3.4 to 4.27 m (11 to 14 ft) extending 189.3 m (621 ft) along the right-of-way was analyzed. Based upon the reasonable test summary below, the berm should be included for further study.

Reasonableness Test Scores for an Earthen Berm for EC-1 Receptor 17		
Test Parameter		**Score**
Cost per receptor	$21,000	3
2030-Build noise level > than 3 dBA above existing	17.1 dBA	4
Percent of housing preceding project	> 80%	4
Access control to highway	Full Control	4
	Total Score	15

Barrier Reasonableness Test for Receptor 19. A manufactured wall ranging in height of 3.4 to 4 m (11 to 13 ft) extending 110.3 m (362 ft) in length along the right-of-way was analyzed. Based a cost/receptor in excess of $30,000, as summarized below, the wall is not reasonable and will not be included for further study.

Reasonableness Test Scores for a Manufactured Wall for EC-1 Receptor 19		
Test Parameter		**Score**
Cost per receptor	$74,000	0
2030-Build noise level > than 3 dBA above existing		na
Percent of housing preceding project		na
Access control to highway		na
	Total Score	0

Barrier Reasonableness Test for EC-1 Receptor 55. An earthen berm at a height of 3.7 m (12 ft) extending 132.3 m (434 ft) along the right-of-way was analyzed. Based upon the reasonable test summary below, the berm should be included for further study.

Reasonableness Test Scores for an Earthen Berm for EC-1 Receptor 55		
Test Parameter		**Score**
Cost per receptor	$13,000	4
2030-Build noise level > than 3 dBA above existing	14.8 dBA	4
Percent of housing preceding project	> 80%	4
Access control to highway	Full Control	4
	Total Score	16

Barrier Reasonableness Test for Receptor R-56. An earthen berm at a height of 3.7 m (12 ft) extending 142.6 m (468 ft) along the right-of-way was analyzed. Based upon the reasonable test summary below, the berm should be included for further study.

Reasonableness Test Scores for an Earthen Berm for EC-1 Receptor 56		
Test Parameter		**Score**
Cost per receptor	$13,550	4
2030-Build noise level > than 3 dBA above existing	17.1 dBA	4
Percent of housing preceding project	> 80%	4
Access control to highway	Full Control	4
	Total Score	16

8.4 Noise Abatement Analysis for Impacted Receptors along the EM-1 Alternative

Table C.20

NOISE ABATEMENT FEASIBILITY REVIEW: EM-1 ALTERNATIVE

Finalist Alternative	Receptor Number	Horizontal/Vertical Roadway Alignment Shift Feasibility?[1]	Barrier Feasibility Determination				
			Compatible with Topo	Height[2]	Other Noise Sources[3]	Location	Is Barrier Feasible?
EM-1	R-6, 7, 8	No	Yes	Yes	No	OK	Yes
EM-1	R-17	Yes: shift 91-107 m (300-350 ft) east	Yes	No	No	OK	No
EM-1	R-23, 25	No	Yes	No	No	OK	No
EM-1	R-27	No	Yes	No	No	OK	No
EM-1	R-31	No	Yes	No	No	OK	No
EM-1	R-35, 36	Yes: shift 120 m (400 ft) east	Yes	No	No	OK	No

Notes: 1 - Alignment shifted to eliminate noise impact (less than 66 Leq(h) dBA or below significant increase of 15 dBa).
2 - Can the exposed height of a barrier be built 4.9 meters (16 feet) or less?
3 - Other noise sources include other roadways that contribute to noise

Noise barriers for one locations appears to be feasible based upon the current EM-1 alignment, therefore, a reasonableness test was conducted for this location:

Barrier Reasonableness Test for EM-1 Receptors 6, 7 and 8. A manufactured wall ranging in height of 3.4 to 5.8 m (11 to 19 ft) extending 437.7 m (1,436 ft) in length along the right-of-way was analyzed. Based a cost/receptor in excess of $30,000, as summarized below, the wall is not reasonable and will not be included for further study.

Reasonableness Test Scores for a Manufactured Wall for EM-1Receptors 6, 7 and 8		
Test Parameter		Score
Cost per receptor	$84,200	0
2030-Build noise level > than 3 dBA above existing		na
Percent of housing preceding project		na
Access control to highway		na
	Total Score	0

8.5 Noise Abatement Analysis for Impacted Receptors along the EF-1 Alternative

Table C.21

Noise Abatement Feasibility Review: EF-1 Alternative

Finalist Alternative	Receptor Number	Horizontal/Vertical Roadway Alignment Shift Feasibility?[1]	Barrier Feasibility Determination				
			Compatible with Topo	Height[2]	Other Noise Sources[3]	Location	Is Barrier Feasible?
EF-1	R-2	No	Yes	Yes	No	OK	Yes
EF-1	R-5,6,7, 8,9,10	No	Yes	Yes	No	OK	Yes
EF-1	R-12	Yes: shift 30 m (100 ft) west	Yes	Yes	No	OK	Yes
EF-1	R-13	Yes: shift 7.6-15 m (25-50 ft) west	Yes	Yes	No	OK	Yes
EF-1	R-24, 25	No	Yes	Yes	No	OK	Yes
EF-1	R-30	Yes: shift 61 m (200 ft) east	Yes	No	No	OK	No
EF-1	R-31	Yes: shift 76.2 m (250 ft) east	Yes	No	No	OK	No

Notes: 1 - Alignment shifted to eliminate noise impact (less than 66 Leq(h) dBA or below significant increase of 15 dBa).
2 - Can the exposed height of a barrier be built 4.9 meters (16 feet) or less?
3 - Other noise sources include other roadways that contribute to noise

Noise barriers for five locations appear to be feasible based upon the current alignment of EF-1, therefore, a reasonableness test was conducted for each of these locations:

Barrier Reasonableness Test for EF-1 Receptor 2. A manufactured wall ranging in height of 3.0 to 4.3 m (10 to 14 ft) extending 187.5 m (615 ft) in length along the right-of-way was analyzed. Based a cost/receptor in excess of $30,000, as summarized below, the wall is not reasonable and will not be included for further study.

Reasonableness Test Scores for a Manufactured Wall for EF-1 Receptor 2		
Test Parameter		**Score**
Cost per receptor	$148,840	0
2030-Build noise level > than 3 dBA above existing		na
Percent of housing preceding project		na
Access control to highway		na
	Total Score	0

Barrier Reasonableness Test for EF-1 Receptors 5, 6, 7, 8, 9 and 10. A manufactured wall ranging in height of 2.1 to 2.7 m (7 to 9 ft) extending 860.8 m (2,824 ft) in length along the right-of-way was analyzed. Based a cost/receptor in excess of $30,000, as summarized below, the wall is not reasonable and will not be included for further study.

Reasonableness Test Scores for a Manufactured Wall for EF-1 Receptors 5, 6, 7, 8, 9 and 10		
Test Parameter		**Score**
Cost per receptor	$55,733	0
2030-Build noise level > than 3 dBA above existing		na
Percent of housing preceding project		na
Access control to highway		na
	Total Score	0

Barrier Reasonableness Test for EF-1 Receptor 12 . An earthen berm ranging in height of 2.4 to 3.0 (8 to 10 ft) extending 196.9 m (646 ft) along the right-of-way was analyzed. Based upon the reasonable test summary below, the berm should be included for further study.

Reasonableness Test Scores for an Earthen Berm for EF-1 Receptor 12		
Test Parameter		**Score**
Cost per receptor	$12,740	4
2030-Build noise level > than 3 dBA above existing	16.6 dBA	4
Percent of housing preceding project	> 80%	4
Access control to highway	Full Control	4
	Total Score	16

Barrier Reasonableness Test for EF-1 Receptor 13. An earthen berm ranging in height of 3.4 to 4.6 m (11 to 15 ft) extending 147.2 m (483 ft) along the right-of-way was analyzed. Based upon the reasonable test summary below, the berm should be included for further study.

Reasonableness Test Scores for an Earthen Berm for EF-1 Receptor 13		
Test Parameter		**Score**
Cost per receptor	$22,875	3
2030-Build noise level > than 3 dBA above existing	15 dBA	4
Percent of housing preceding project	> 80%	4
Access control to highway	Full Control	4
	Total Score	15

Barrier Reasonableness Test for EF-1 Receptors 24 and 25. An earthen berm ranging in height of 4.0 to 4.9 m (13 to 16 ft) extending 98.5 m (323 ft) along the right-of-way was analyzed. Based upon the reasonable test summary below, the berm should be included for further study.

Reasonableness Test Scores for an Earthen Berm for EF-1 Receptors 24 and 25		
Test Parameter		**Score**
Cost per receptor	$8,100	4
2030-Build noise level > than 3 dBA above existing	23.1 dBA	4
Percent of housing preceding project	> 80%	4
Access control to highway	Full Control	4
	Total Score	16

9.0 CONSTRUCTION NOISE

Construction noise levels are typically a function of the scale of the project, the phase of construction, the condition of the equipment and its operating cycles, and the number of construction equipment units operating simultaneously. There are several measures that can be adopted to reduce construction noise impacts.

- **Constructing the noise barrier early in construction**
  If the recommended noise barrier is publically acceptable, its construction at an early phase could mitigate potential construction-related noise impacts.

- **Community awareness**
  Letting people know when construction noise may occur and the duration helps the public anticipate it and plan their activities accordingly. This information is generally submitted to the local news media.

- **Design considerations**
  This includes designating haul routes that would avoid sensitive areas and constructing permanent and temporary noise barriers.

- **Controlling noise at the source**
  Source control can be accomplished by specifying proper muffler systems and using wheeled equipment instead of tracked equipment whenever possible. Operation of stationary equipment such as air compressors or generator as far away as possible from sensitive receptors will reduce noise impacts and erection of temporary noise barriers are considerations to mitigate noise. Source control provisions can be included in contract documents.

- **Time and activity constraints**
  This includes limiting work hours so activity is not occurring during the hours of sleep or holidays. Exceptions due to weather, schedule, and a time-related phase of the construction work could occur.

10.0 SUMMARY

Traffic noise impacts are predicted to occur under the 2030-Build scenario for the four proposed beltway alignments. The only noise impacts predicted under the No-Build scenario occur at several residences located adjacent to N-2.

Noise mitigation measures determined to be feasible and reasonable include shifting the horizontal roadway alignment and/or installation of noise barriers. For locations where noise abatement is feasible and reasonable, a public information meeting will be held and benefitted property owners will be given an opportunity to vote according to NDOR Noise Policy. Noise abatement will be provided if 75 percent of the benefitted property owners are in favor of the proposed noise abatement device. The preliminary evaluation indicates noise abatement measures should be considered at 13 locations as summarized below. All proposed barriers provide an insertion loss of a least 5 dBA below the predicted level. Roadway alignment shifts will provide a reduction in the predicted traffic noise level increase to less than 15 dBA over existing conditions.

SM-4 Alternative Receptor R-11. Shift horizontal roadway alignment of roadway north approximately 36.6 m (120 ft).

EC-4 Alternative Receptor R-17. Installation of an earthen berm ranging in height from 3.4 to 4.3 m (11 to 14 ft) and a length of 189.3 m (621 ft).

EC-1 Alternative Receptor R-42. Shift horizontal roadway alignment of roadway west approximately 15 m (50 ft).

EC-1 Alternative Receptor R-55. Installation of an earthen berm at a height of 3.7 m (12 ft) and a length of 132.3 m (434 ft).

EC-1 Alternative Receptor R-56. Installation of an earthen berm at a height of 3.7 m (12 ft) and a length of 142.6 m (468 ft).

EM-1 Alternative Receptor R-17. Shift horizontal alignment of roadway 91 to 107 m (300 to 350 ft) east.

EM-1 Alternative R-35, 36. Shift horizontal alignment of roadway 120 m (400 ft) east.

EF-1 Alternative R-12. Installation of an earthen berm at a height ranging from 2.4 to 3.0 m (8 to 10 ft) and a length of 196.9 m (646 ft). Shift horizontal alignment of the roadway 30 m (100 ft) west.

EF-1 Alternative R-13. Installation of an earthen berm ranging in height from 3.4 to 4.6 m (11 to 15 ft) and a length of 147.2 m (483 ft). Shift roadway alignment 7.6 to 9.1 m (25 to 30 ft) west.

EF-1 Alternative R-24, 25. Installation of an earthen berm ranging in height from 4.0 to 4.9 m (13 to 16 ft) and a length of 98.5 m (323 ft).

EF-1 Alternative R-30. Shift roadway alignment 61 m (200 ft) east.

EF-1 Alternative R-31. Shift roadway alignment 76.2 m (250 ft) east.

There are 25 remaining receptors which are impacted, but for which it appears there are no feasible or reasonable noise abatement measures available. These include 4 on SM-4; 9 on EC-1; 5 on EM-1; and 7 on EF-1. Further evaluation of noise abatement measures should be conducted during final roadway design.

11.0 REFERENCES

Highway Traffic Noise Analysis and Abatement, Policy and Guidance, FHWA, June 1995

Noise Analysis and Abatement Policy, Nebraska Department of Roads, May 1998

23 Code of Federal Regulations (CFR) Part 772, 1982.

South and East Beltways Study, Interim Report No. 3. Wilbur Smith Associates. (Revised March) 1999. Lincoln, Nebraska.

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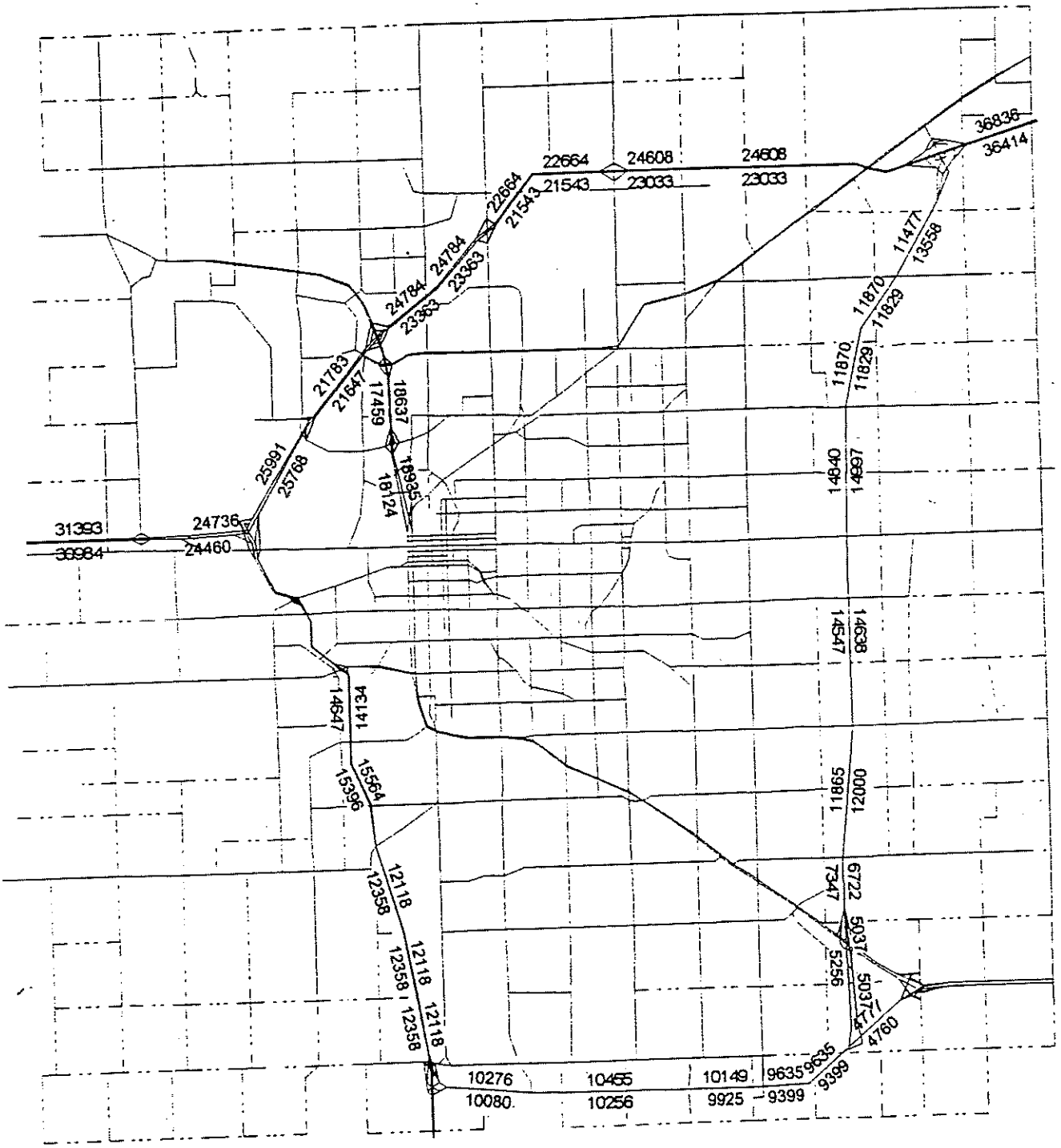
Appendix C-A
2030 Average Daily Traffic Volume

Beltway Alternatives Analysis
Future Network with Beltway South-Mid & East-Close
December 9, 1999



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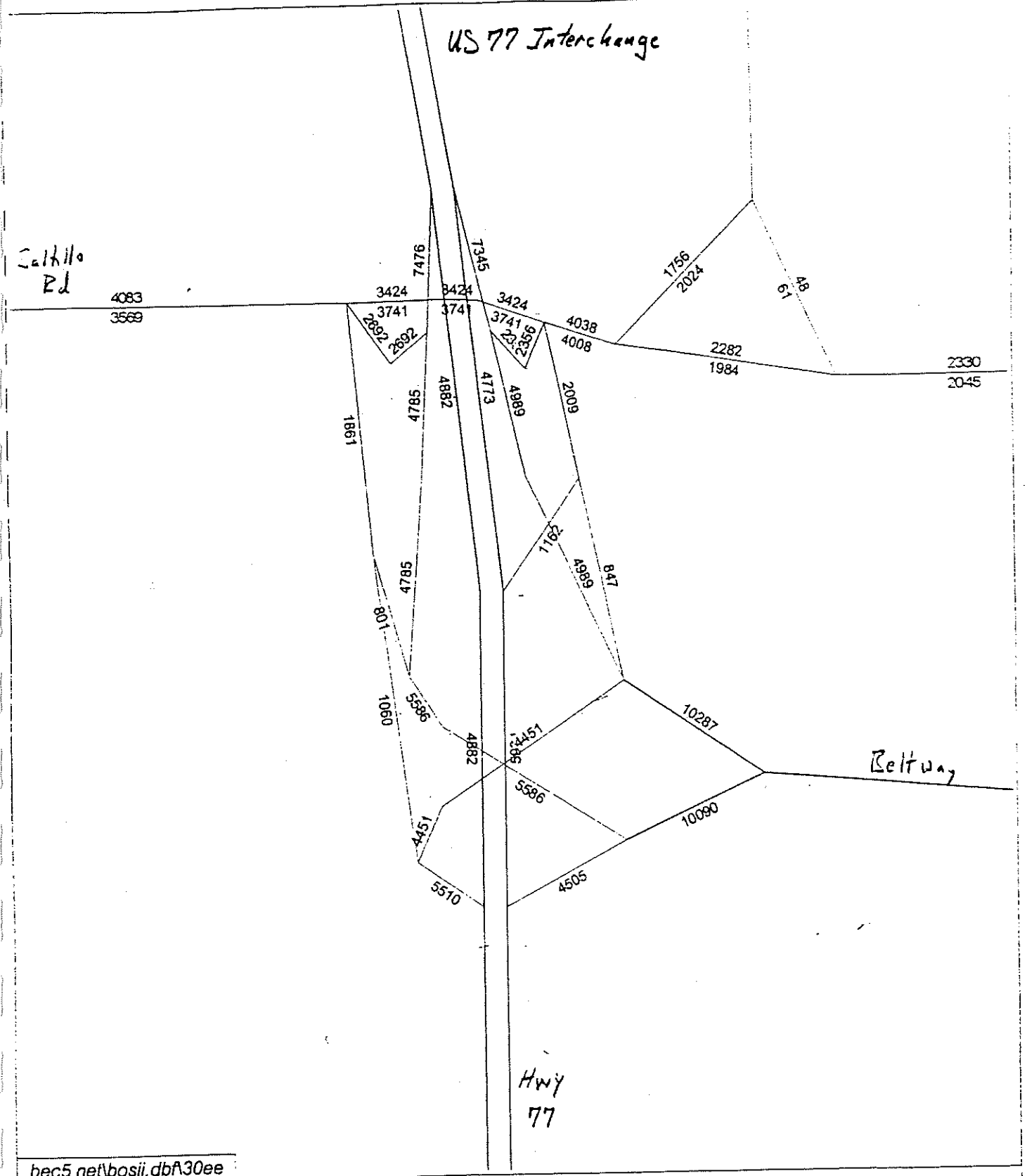
Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

Licensed to Lincoln City-County Planning

Future Network with Beltway South-Mid & East-Close

December 9, 1999



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Average Daily Traffic

External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

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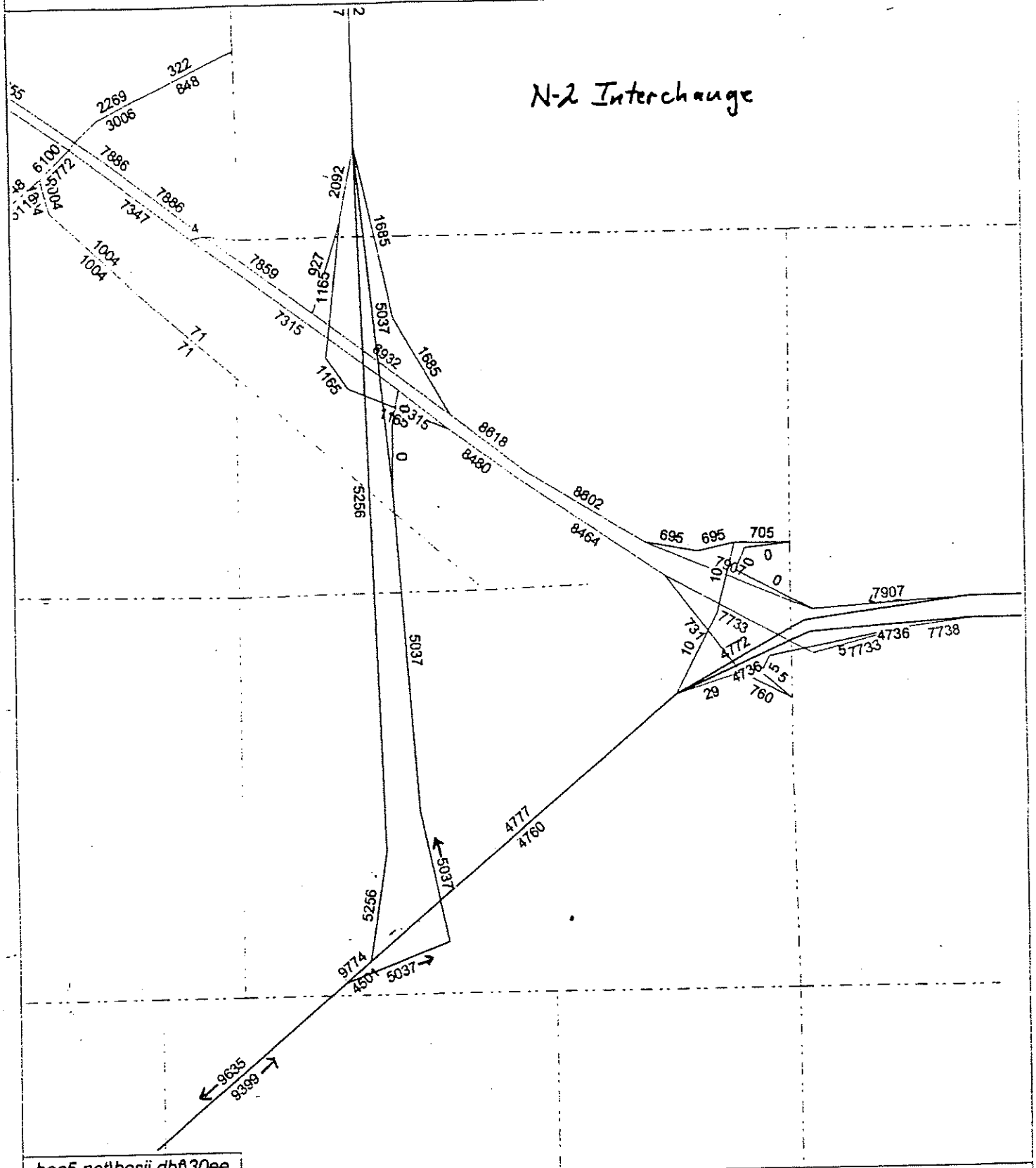
Beltway Alternatives Analysis
Future Network with Beltway South-Mid & East-Close
December 9, 1999



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Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

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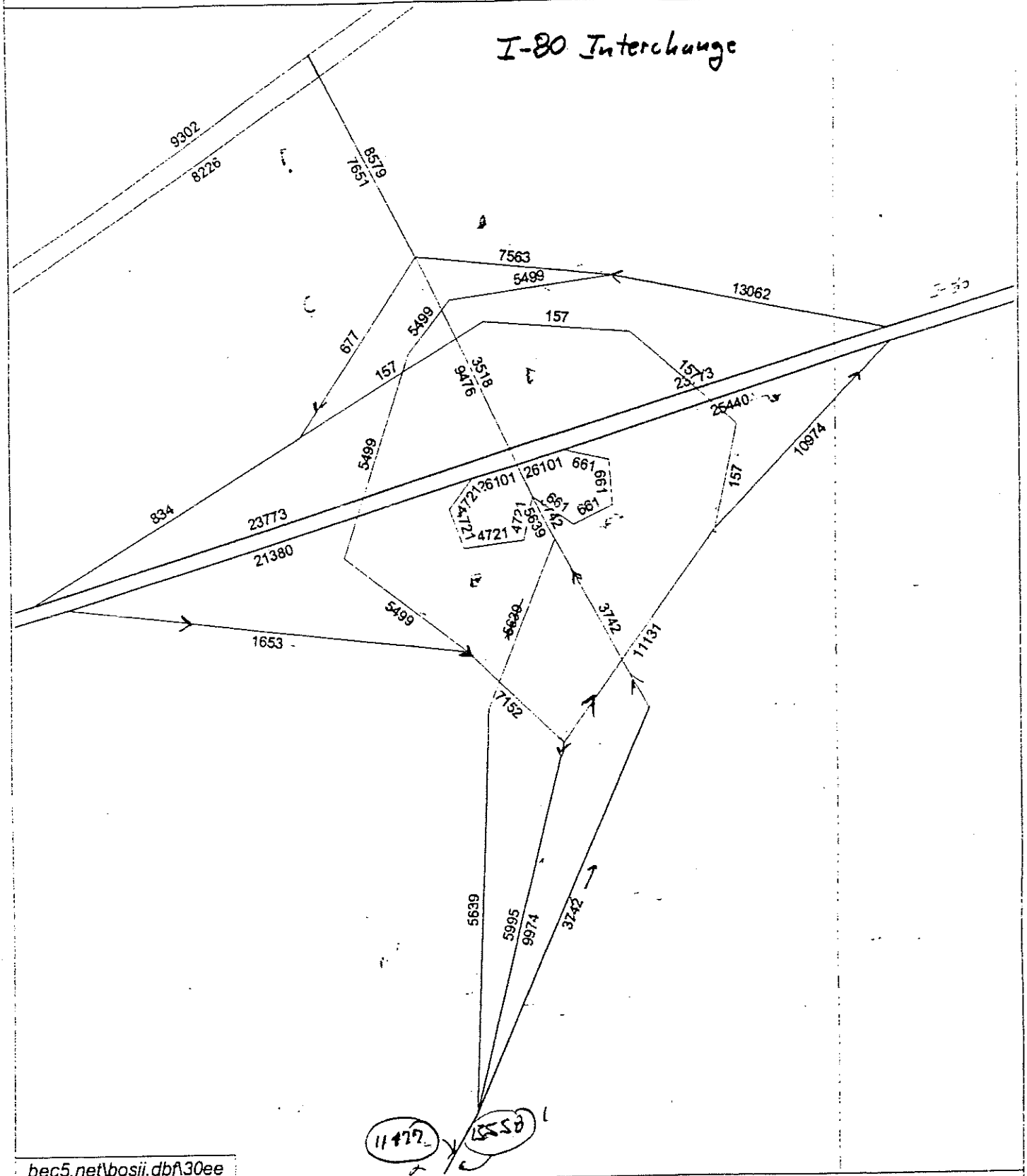
Beltway Alternatives Analysis
Future Network with Beltway South-Mid & East-Close
December 9, 1999



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Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

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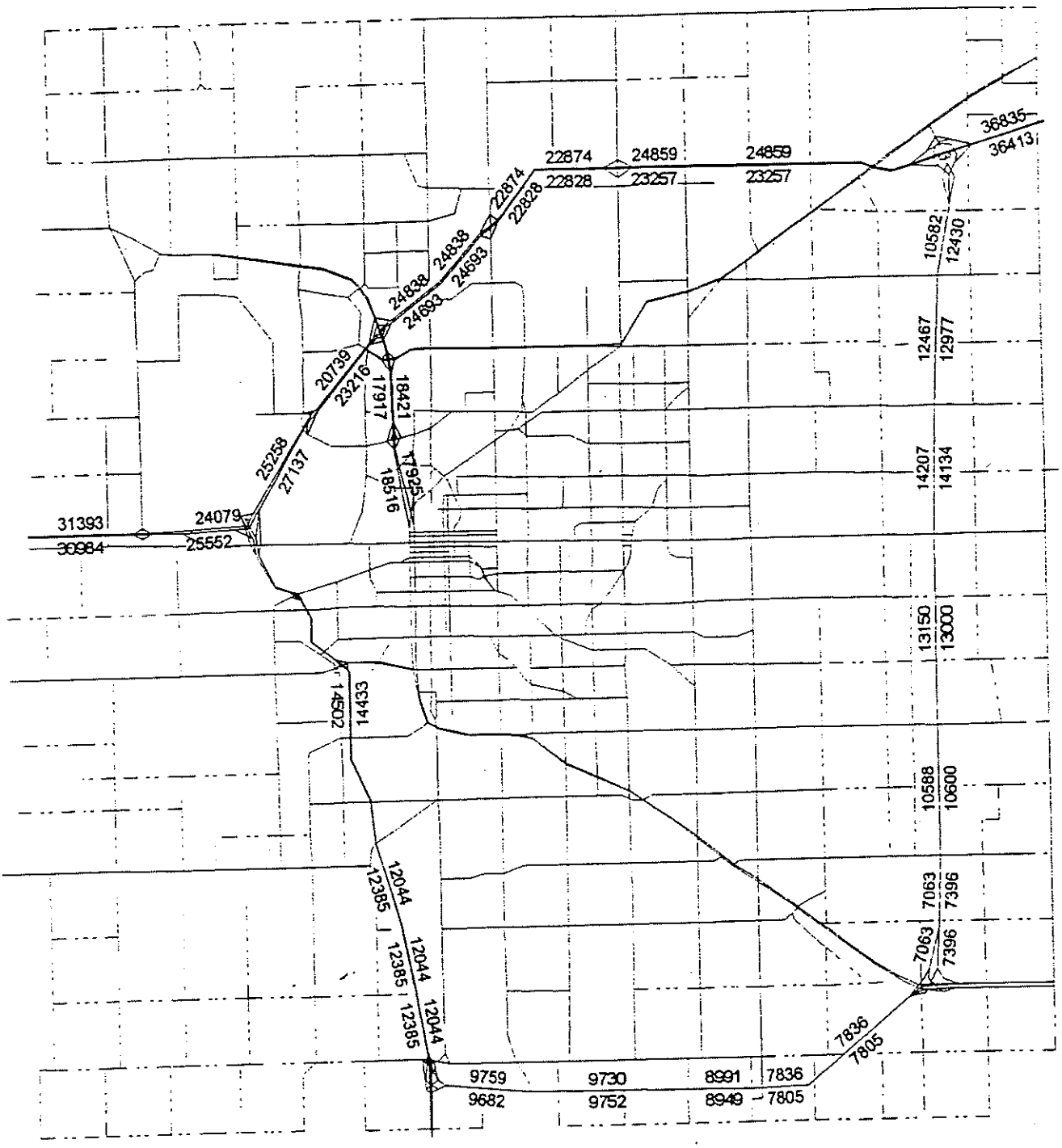
Lincoln Beltway Alternatives
Future Network with Beltway South-Mid & East-Mid
December 9, 1999



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Average Daily Traffic
External Traffic Projections for Year 2030

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Lincoln Beltway Alternatives
Future Network with Beltway South-Mid & East-Mid
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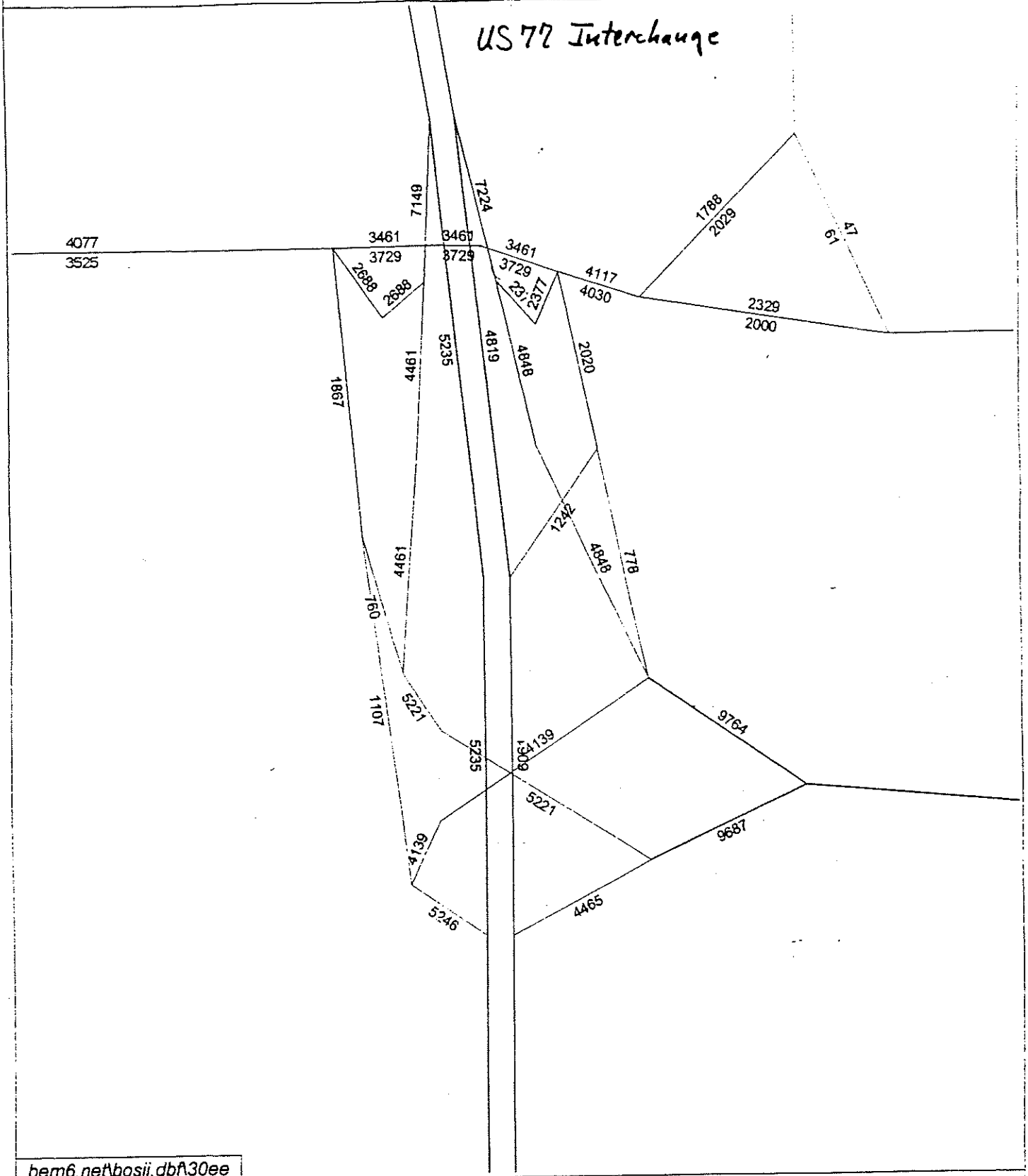

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Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

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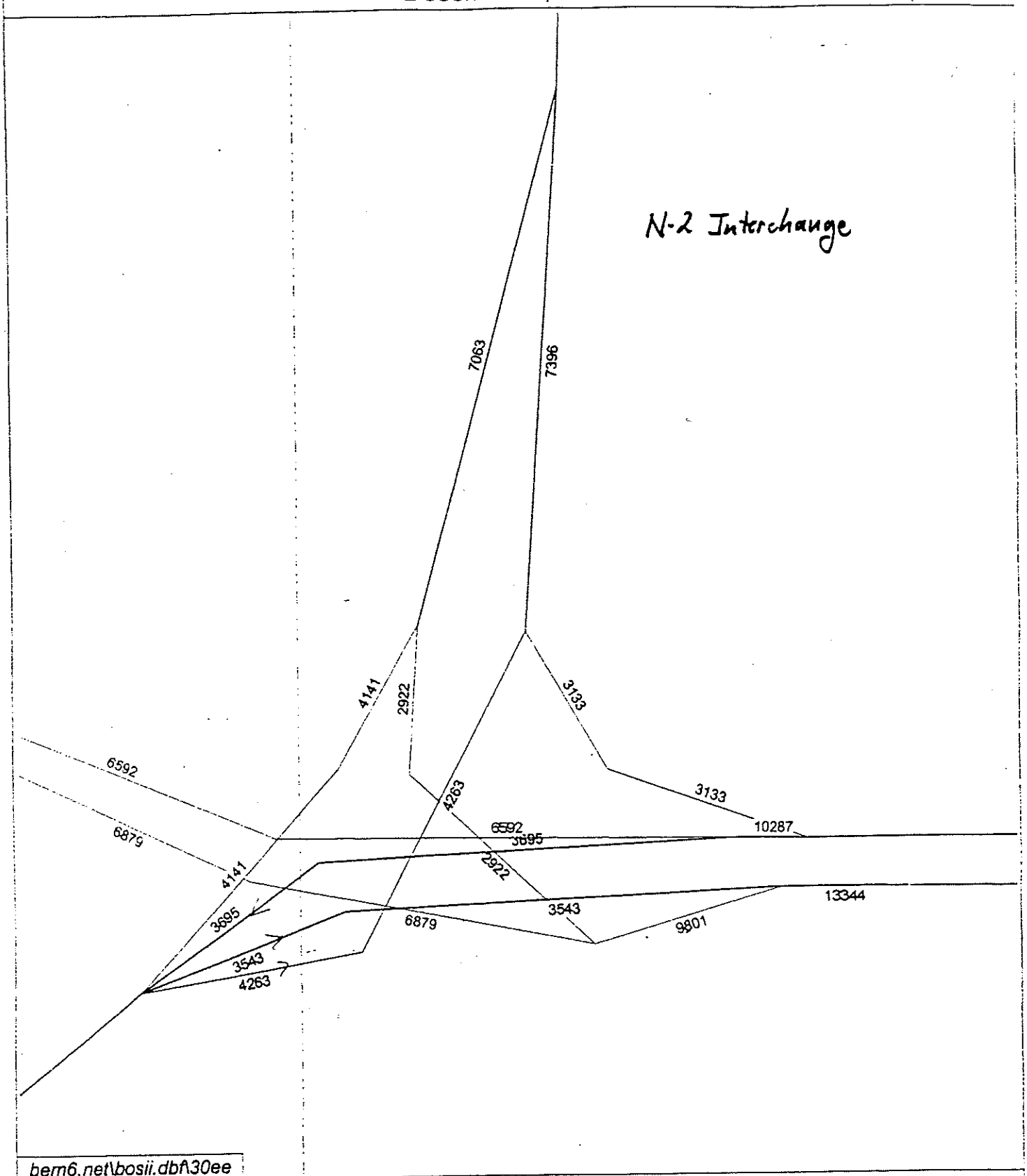
Lincoln Beltway Alternatives
Future Network with Beltway South-Mid & East-Mid
December 9, 1999

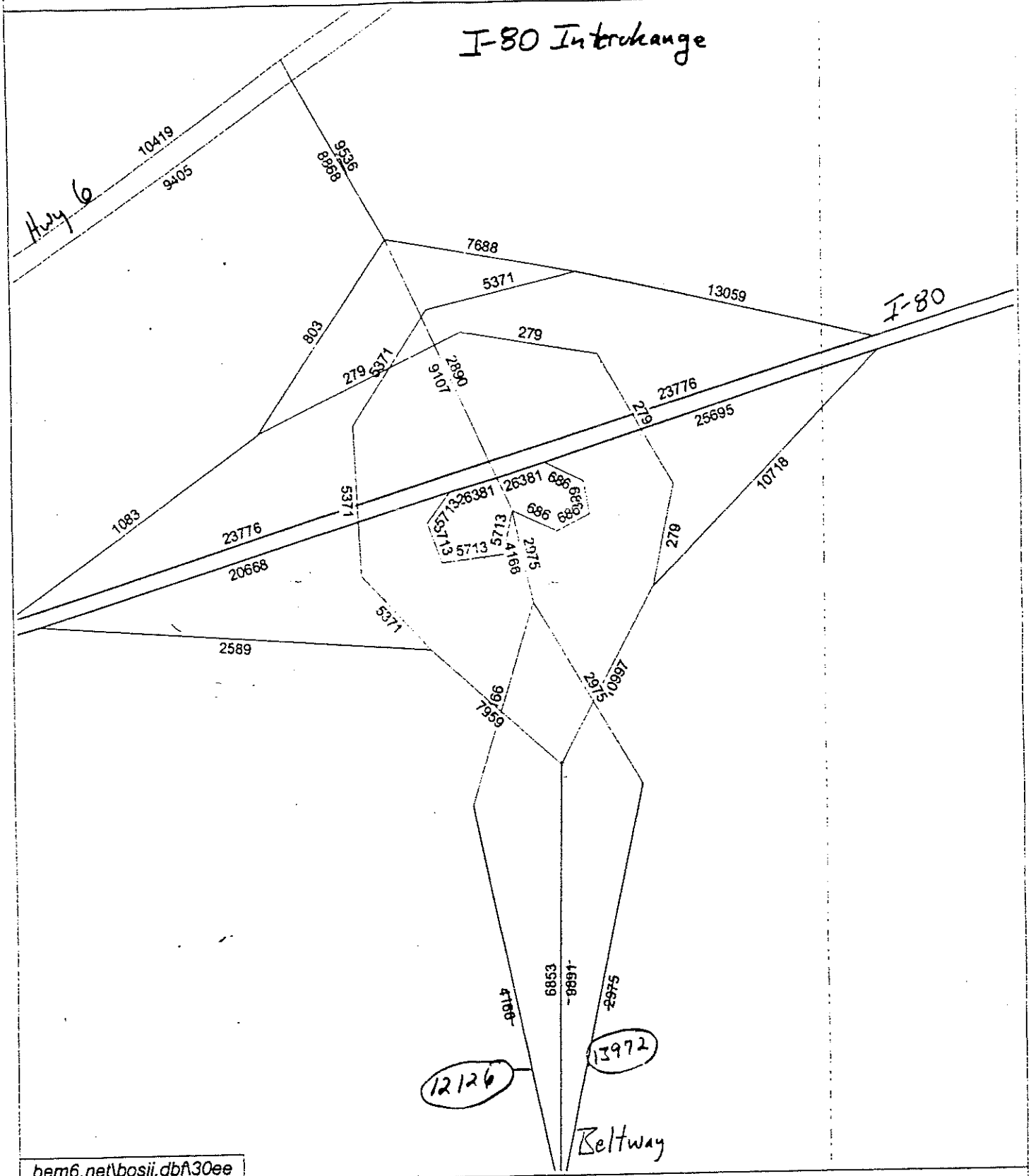


Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

Licensed to Lincoln City-County Planning

Lincoln Beltway Alternatives
Future Network with Beltway South-Mid & East-Mid
December 9, 1999



Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group
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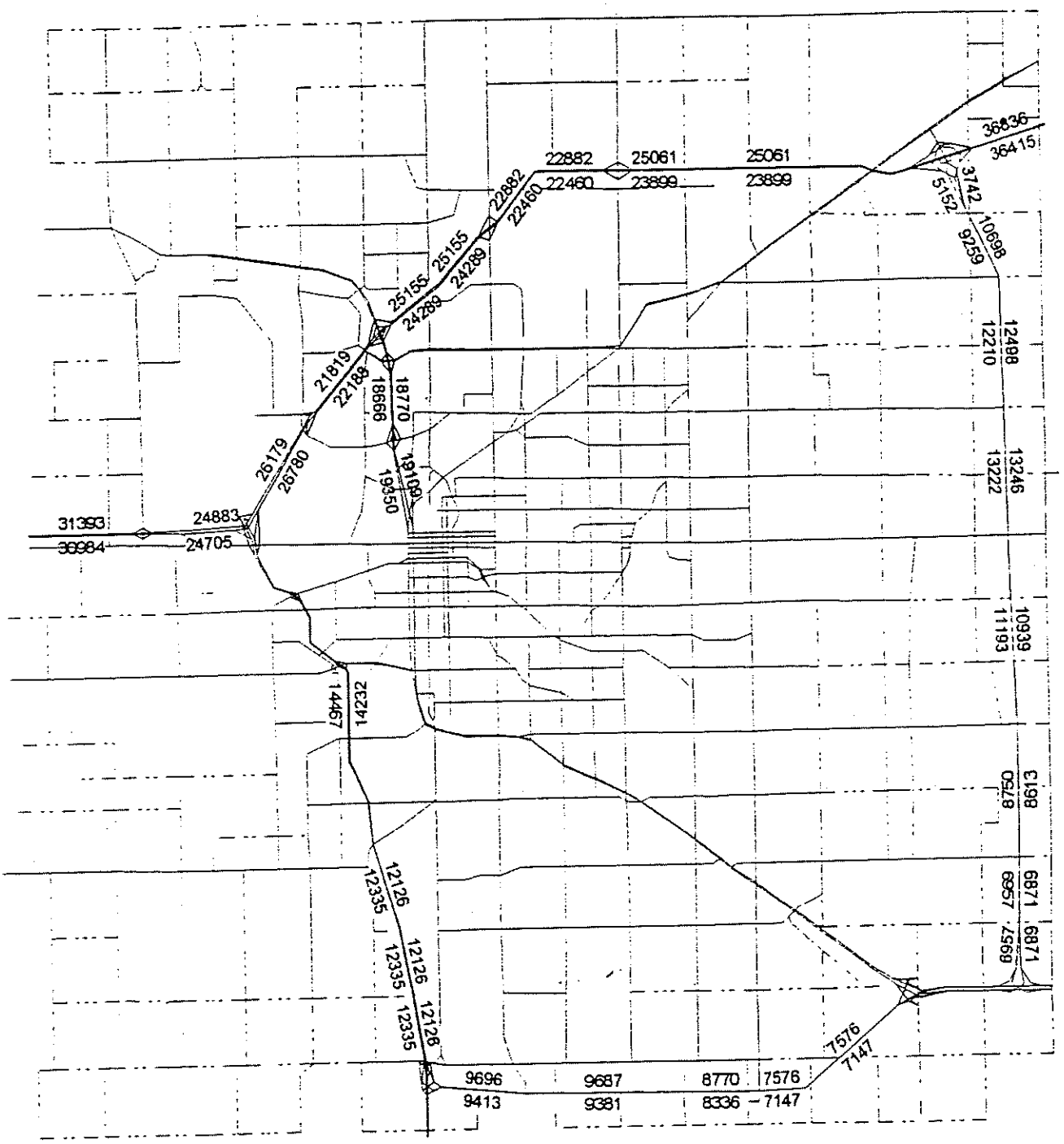
Lincoln Beltway Alternatives
Future Network with Beltway South-Mid & East-Far
December 9, 1999



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Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

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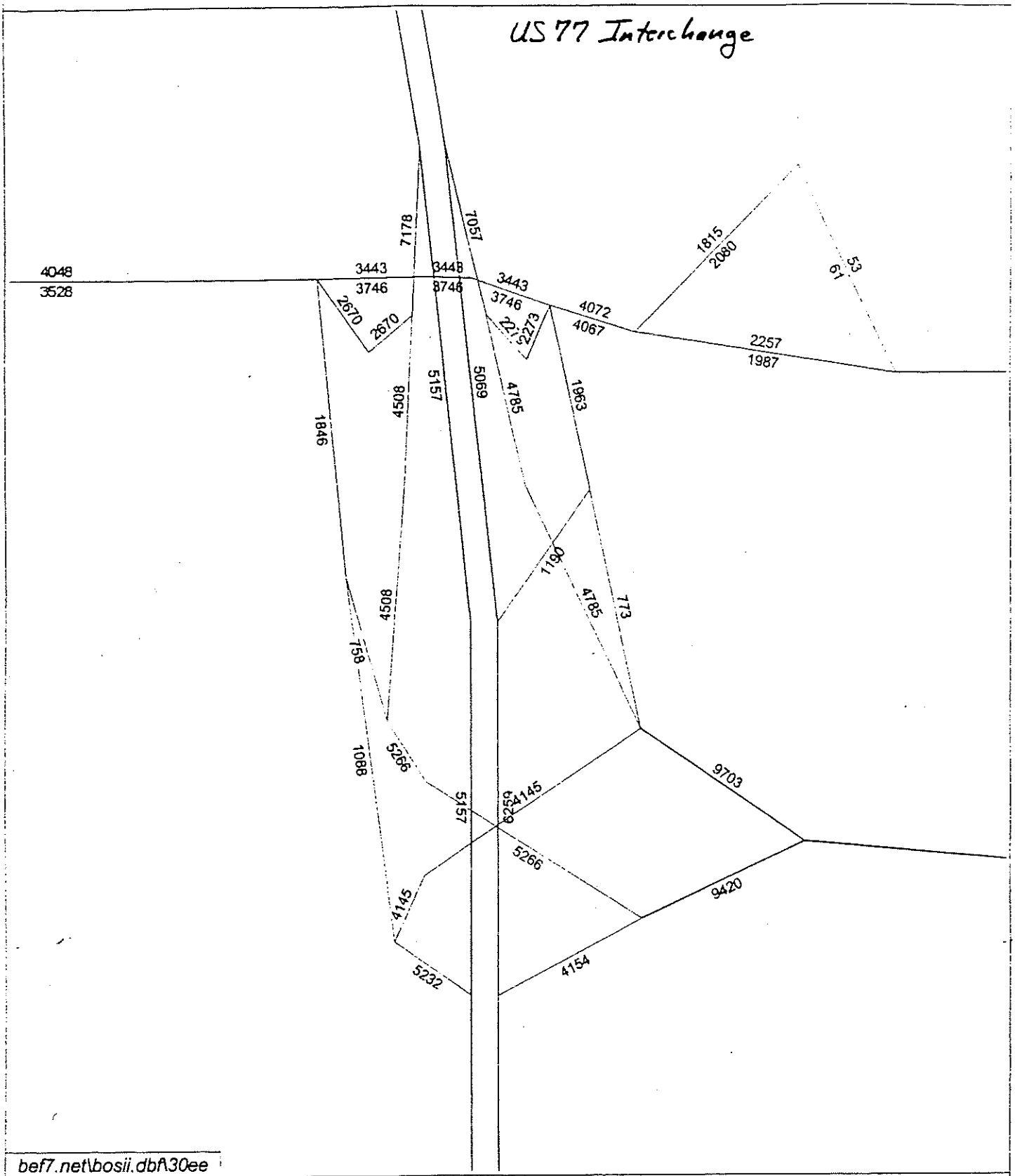
Lincoln Beltway Alternatives
Future Network with Beltway South-Mid & East-Far
December 9, 1999



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Average Daily Traffic
External Traffic Projections for Year 2030

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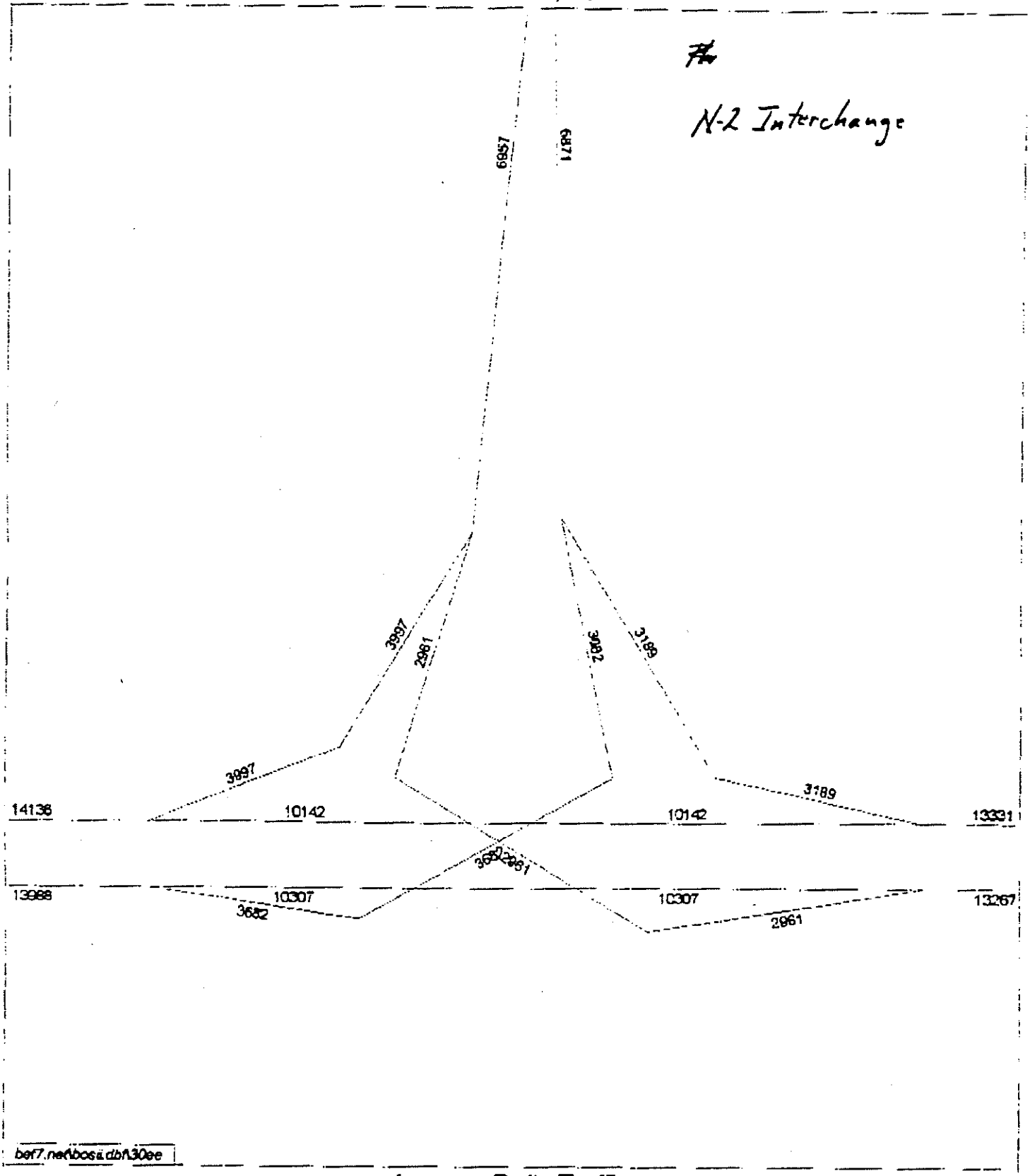

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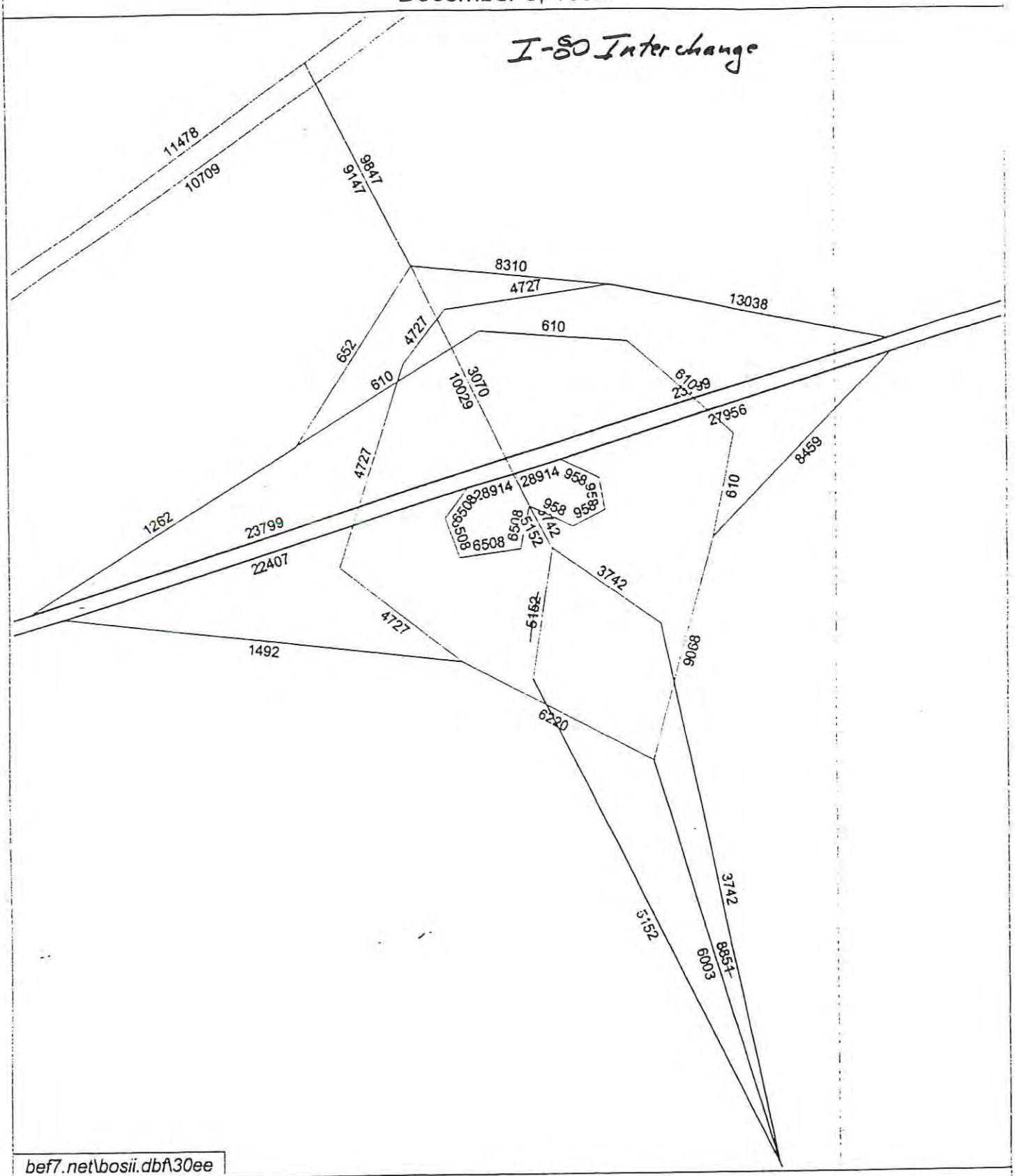

Average Daily Traffic
External Traffic Projections for Year 2030

Viper Software by The Urban Analysis Group

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Appendix D
WETLAND DELINEATION REPORT

WETLAND DELINEATION REPORT

SOUTH AND EAST BELTWAY
LINCOLN, NEBRASKA

PREPARED FOR

FEDERAL HIGHWAY ADMINISTRATION
NEBRASKA DEPARTMENT OF ROADS
LANCASTER COUNTY
CITY OF LINCOLN

OCTOBER 2000
(REVISED 2/01)

WETLAND DELINEATION REPORT
for
South and East Beltways Study
Lincoln, Nebraska

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WETLAND DELINEATION REPORT
for
South and East Beltways Study
Lincoln, Nebraska

1.0 BACKGROUND

The Lincoln South and East Beltways Study is being conducted to evaluate potential transportation improvements for the south and east fringes of the City of Lincoln, Nebraska. The study, initiated in 1995, is being undertaken by the City of Lincoln, Lancaster County, Nebraska Department of Roads and the Federal Highway Administration. Proposed improvements may include the construction of a beltway along the south and/or east fringes of Lincoln.

2.0 REGULATORY FRAMEWORK

Construction of the beltway will require a permit for activities that impact wetlands or other waters of the United States (waters) as regulated by the US Army Corps of Engineers (Corps) Section 404 Permit program. Under Section 404 of the Clean Water Act, any project that requires the placement of dredged or fill material into wetlands or waters must obtain a permit from the Corps prior to initiation of construction. As part of this permit, the project would be reviewed by the Nebraska Department of Environmental Quality for Section 401 Water Quality certification.

The construction of the Beltway will require Individual Section 404 permits due to the length and extensive nature of the project. These permits will cover each segment of the project as it is constructed, including impacts to waters at bridge and culvert locations (even if wetlands are not present).

Due to these requirements, all potential wetlands and waters within the 90 m (300 ft) rights-of-way along the total 83.7 km (52 mi) of the four finalist alternatives, the inside areas of the interchanges, and approximately 0.4 km (0.25 mi) surrounding the interchanges were included in this delineation.

The purpose of the wetland delineation was to determine the nature and extent of any wetlands or waters. The delineation included (A) field surveys of the alternatives (B) photographing existing conditions, (C) marking wetland locations on aerial photography, and (D) documentation of existing conditions. Data collected documents the presence/absence of hydrophytic vegetation, hydric soils, and wetland hydrology for use in establishing Corps jurisdictional requirements. Based on the ground truthing and aerial photo interpretation, wetland boundaries were delineated on Farm Service Agency (FSA) aerial photographs and transferred to City 1997 digital aerial photography.

3.0 PROJECT LOCATION

The four finalist beltway alternatives are located along the south and east edges of the City of Lincoln (see **Figure 2.25** of DEIS). SM-4 begins at US 77, 0.8 km (0.5 mi) south of Saltillo Road and extends 12.9 km (8 mi) west to the approximate intersection of Nebraska Highway 2 (N-2) and 120th Street. EC-1 begins near the approximate intersection of the SM-4 and 105th Street, and extends north generally along the half section line to Havelock Road, where it turns northeast and intersects Interstate 80 (I-80) approximately 0.8 km (0.5 mi) east of the US Highway 6 (US 6) interchange. EM-1 begins near the approximate intersection of N-2 and 127th Street, and extends generally along the half section line north to I-80 approximately 0.8 km (0.5 mi) east of the US 6 interchange. EF-1 begins near the approximate intersection of N-2 and 141st Street and extends north generally along the half section line to Fletcher Road, where it turns to the northwest for 3.2 km (2 mi) and intersects I-80 0.8 km (0.5 mi) east of the US 6 interchange.

4.0 REVIEW OF EXISTING RESOURCES

Several published resources were reviewed as part of the wetland evaluation, including:

1. U.S. Geological Survey (USGS) Topographic 7.5-Minute Maps, Bennett, Roca, Walton and Waverly Quadrangles

2. USDA Natural Resources Conservation Service (NRCS, formerly Soil Conservation Service) Soil Survey for Lancaster County (1980)

3. NRCS Hydric Soils List for Lancaster County, Nebraska (1998)

4. US Fish and Wildlife Service (FWS) National Wetland Inventory (NWI) Maps, Bennett, Roca, Walton and Waverly Quadrangles

5. Farm Services Agency (FSA) land classification maps for Lancaster County (1980 photography)

6. Interagency Resource Categorization of Nebraska's Eastern Saline Wetlands Map, Roca and Waverly Quadrangles (Gilbert and Stutheit, 1994)

7. City of Lincoln 1997 Digital Aerial Photographs of Lancaster County

Topography. The four alternatives cross gently rolling hills and flood plains with elevations ranging from a low of 344.4 m (1130 ft) mean sea level (msl.) near the north end of the east alternatives to a high of 442.0 m (1450 ft) msl near the intersection of SM-4 and EM-1. One of the primary drainage features is Salt Creek which crosses SM-4 east of 25th Street. Another is Stevens Creek which parallels the three east alternatives. It crosses EC-1 south of Adams Street, and EM-1 south of O Street and north of Yankee Hill Road. Other less prominent drainage features include tributaries to Little Nemaha River.

Soils. The Lancaster County list of hydric soils and the Lancaster County Soil Survey list several soils that are considered hydric or that contain hydric inclusions. **Table D.1** provides a list of the hydric soils occurring along the four alternatives.

Table D.1

HYDRIC SOILS IN THE BELTWAY STUDY AREA

HYDRIC SOIL NAME	PORTION CONSIDERED HYDRIC	LOCATION
Colo silty clay loam	Soils with a seasonal high water table as inclusions	Lower areas
Colo-Nodaway silt loam	Colo part	NA
Kennebec silt loam	Colo soils as inclusions	Lower areas
Nodaway silt loam	Colo soils as inclusions	Lower areas and old stream channels
Nodaway silt loam, channelled	Colo soils and soils that pond as inclusions	Lower areas and old stream channels
Zook silt loam	Soils with a seasonal high water table as inclusions	Lower areas
Zook silty clay loam	Soil with a seasonal high water table as inclusions	Lower areas

It should be noted that not every portion of these soil units are considered hydric. It should also be noted that soils not classified as hydric or as not containing hydric inclusions, may contain hydric inclusions. The wetlands identified during the field survey were generally located on areas mapped as having hydric soils.

Wetlands. Based on the NWI and the field surveys, there are numerous wetlands, streams and ponds along the four finalist alternatives. Wetlands generally occur along Salt Creek and its tributaries, Stevens Creek and its tributaries, and tributaries to the Little Nemaha River, as well as in isolated depressions (natural and excavated) throughout the study area. Some of these tributaries are devoid of wetland vegetation, and only meet the criteria to be classified as waters. Some of the impounded tributaries are deep enough and do not support rooted vegetation and are therefore classified as ponds, or deepwater habitats. Based on field observations, wetlands along the alternatives were classified into several types based on vegetation type, water regime and location in the landscape (**Table D.2**).

Table D.2

WETLAND TYPES IN THE BELTWAY STUDY AREA

WETLAND TYPE	GENERAL LOCATION
Riverine Wetlands	Within high banks of main channels of Salt Creek, Stevens Creek and larger tributary channels
Forested Drainage Wetlands	Above high banks of larger tributaries and across channels of smaller tributaries
Scrub-shrub Drainage Wetlands	Fringe areas of Forested Wetlands and smaller tributaries
Emergent Drainage Wetlands	Smaller tributaries
Impounded Drainage Wetlands	Behind impoundments on tributaries and fringe areas of ponds
Isolated Wetlands	Depressions, both natural and excavated
Farmed Wetlands	Depressions in farm fields

5.0 FIELD SURVEY

OES staff conducted wetland field surveys during July and August 1999. Data collected was used to document the presence of wetland hydrology, hydric soils, and hydrophytic vegetation according to guidelines established by the U.S. Army Corps of Engineers and described in the 1987 Wetland Delineation Manual. Wetlands were classified according to Cowardin, *et al.* (1979).

Each site was assigned a number according to its position along the four alternatives. EM-5, for example, indicates the a site along the east mid alignment. S-19 would indicate a site along the south alignment. The wetland and stream crossing locations are shown in the **Exhibits** to the DEIS. Photographs of the wetlands were taken to document observed conditions at all wetland locations. Photographs of selected locations are included in the Photolog **(Appendix D-A)** to illustrate the wetland types in the study area. Routine Wetland Determination Data Forms were completed for each of the sites investigated **(Appendix D-B)**.

Of the approximately 116 sites investigated, six sites were assessed solely using aerial photographs and maps (S-1, S-4A, S-5, S-5A, EF-3A and EF-21). These properties were not surveyed on foot for one or more of the following reasons: permission was denied, the landowners could not be contacted, or the site was difficult to access. Where possible, public roads were used to validate map observations. If the final alternative affects any of these sites, they will be reinvestigated during final design.

6.0 FINDINGS OF THE WETLAND DELINEATION

Several types of wetlands occur along the four finalist alternatives. **Table D.3** provides a list of each wetland type and the common plant species associated with them.

Table D.3

TYPICAL WETLAND TYPES AND COMMON PLANT SPECIES IN THE BELTWAY STUDY AREA

WETLAND TYPE	COMMON NAME	SCIENTIFIC NAME
Riverine	Reed canarygrass	*Phalaris arundinacea*
	Stinging nettle	*Urtica dioica*
Forested Drainage	Cottonwood	*Populus deltoides*
	Peach-leaf willow	*Salix amygdaloides*
	Sandbar willow	*Salix exigua*
	Elderberry	*Sambucus canadensis*
	Reed canarygrass	*Phalaris arundinacea*
	Prairie cordgrass	*Spartina pectinata*
Scrub-Shrub Drainage	Cottonwood (saplings)	*Populus deltoides*
	Peach-leaf willow (saplings)	*Salix amygdaloides*
	Elderberry	*Sambucus canadensis*
	Green ash (saplings)	*Fraxinus pennsylvanica*
Emergent Drainage	Narrowleaf cattail	*Typha angustifolia*
	Broadleaf cattail	*Typha latifolia*
	Reed canarygrass	*Phalaris arundinacea*
	Prairie cordgrass	*Spartina pectinata*
	Curly dock	*Rumex crispus*
	Smartweeds	*Polygonum spp.*
	Sedges	*Carex spp.*
	Softstem bulrush	*Scirpus validus*
	Hardstem bulrush	*Scirpus acutus*
	Green bulrush	*Scirpus atrovirens*
	Spikerushes	*Eleocharis spp*
	Indian hemp dogbane	*Apocynum cannabinum*
	Barnyard grass	*Echinochloa crusgalli*
	Torrey's rush	*Juncus torreyi*
	Toad rush	*Juncus bufonius*
	Giant foxtail	*Setaria faberi*
	Wild bergamot	*Monarda fistulosa*
Impounded Drainage	Cottonwood	*Populus deltoides*
	Peach-leaf willow	*Salix amygdaloides*
	Sedges	*Carex spp.*
	Arrowhead	*Sagittaria cuneàta*
	Reed canarygrass	*Phalaris arundinacea*
	Rushes	*Juncus spp.*
	Prairie cordgrass	*Spartina pectinata*
	Narrowleaf cattail	*Typha angustifolia*
	Broadleaf cattail	*Typha latifolia*

WETLAND TYPE	COMMON NAME	SCIENTIFIC NAME
Isolated	Reed canarygrass	*Phalaris arundinacea*
	Prairie cordgrass	*Spartina pectinata*
	Switchgrass	*Panicum virgatum*
	Green bulrush	*Scirpus atrovirens*
	Narrowleaf cattail	*Typha angustifolia*
	Broadleaf cattail	*Typha latifolia*
	Marshpepper smartweed	*Polygonum hydropiper*
	Pennsylvania smartweed	*Polygonum pennsylvanicum*
	Lady's Thumb	*Polygonum lapathifolium*
	Curly dock	*Rumex crispus*
	Foxtail barley	*Hordeum jubatum*
	Kentucky bluegrass	*Poa pratensis*
	Scouring rush	*Equisetum hyemale*
	Arrowhead	*Sagittaria cuneàta*
	Sedges	*Carex spp.*
	Spikerushes	*Eleocharis spp.*
	False pimpernel	*Lindernia dubia*
	Ditch stonecrop	*Penthorum sedoides*
	Bugleweed	*Lycopus americanus*

Riverine Wetlands. Riverine wetlands occur within the main channel and larger tributary channels of Salt Creek and Stevens Creek. They are confined within the high banks of the channels and are typically devoid of vegetation from scouring flows. In general, riverine wetlands are not jurisdictional wetlands under the Corps 404 regulatory program. However, these areas are jurisdictional waters and are regulated as rivers and streams.

Salt Creek is classified as R2UBG (riverine lower perennial unconsolidated bottom intermittently exposed wetlands). Stevens Creek is classified in various locations as R4SBF (riverine intermittent streambed semi-permanently flooded wetlands), R4SBC (riverine intermittent streambed seasonally flooded wetlands), and R4SBA (riverine intermittent streambed temporarily flooded wetlands). Some tributaries observed during the field survey are classified as R4SBA and R4SBJ (riverine intermittent streambed intermittently flooded wetlands).

Forested Drainage Wetlands. Forested drainage wetlands occur along many drainages along the four alternatives. These wetlands occur above the high banks of the larger channels and across the drainage of the smaller channels. These areas are classified as PFOA (palustrine forested temporarily flooded wetlands) and PFOAx (palustrine forested temporarily flooded excavated wetlands). Dominant species within these wetlands include cottonwood, peachleaf willow, sand bar willow, elderberry, reed canarygrass and prairie cordgrass.

Scrub-Shrub Drainage Wetlands. Scrub-shrub drainage wetlands occur along the smaller drainages and along the edge of forested drainage wetlands. Included in this category are those wetlands classified as PSSA (palustrine scrub-shrub temporarily flooded wetlands). These wetlands tend to be dominated by willow, cottonwood and green ash saplings and elderberry.

Some of these wetlands have been created through excavation or have been excavated to improve drainage. These wetlands are jurisdictional under the Corps regulatory program as described in the 1995 "Ditch" Regulatory Guidance Letter. This guidance states that excavated wetlands that carry a pre-existing waterway or that are constructed on a hydric soil and continue to be influenced by groundwater are jurisdictional. Some occurrences of this type of wetland are along the Burlington Northern Santa Fe and Union Pacific railroad tracks near Salt Creek along SM-4, along the Mo-Pac Trail near Walton along EC-1, and in the vicinity of the proposed I-80 interchange.

Emergent Drainage Wetlands. Emergent drainage wetlands occur within the tributaries to Salt Creek, Stevens Creek, and Little Nemaha River. These wetlands are classified as PEMA (palustrine emergent temporarily flooded wetlands), PEMC (palustrine emergent seasonally flooded wetlands) and PEMF (palustrine emergent semi-permanently flooded wetlands). Dominant species include narrowleaf cattail, broadleaf cattail, reed canarygrass, prairie cordgrass, curly dock, smartweed, sedges, rushes, green bulrush and spikerush.

Some of these wetlands have also been created by excavation or modified to improve drainage. Once again, if the wetland carries a previously existing waterway, or was constructed on hydric soils, and is presently ditched or excavated, it remains jurisdictional under the Corps regulatory program.

Impounded Drainage Wetlands. Impounded drainage wetlands occur along many of the tributaries to Salt Creek, Stevens Creek and Little Nemaha River. They were generally created as farm ponds or shallow impoundments. Some of the impoundments have been breached and now only maintain shallow water depths. These are classified as PEMCh (palustrine emergent seasonally flooded impounded wetlands) and PEM2Fh (palustrine emergent non-persistent permanently flooded impounded wetlands). Others continue to retain water at greater depth and are devoid of rooted emergent vegetation. These deepwater habitats are not generally jurisdictional under the Corps 404 regulatory program and are classified as PUBFh (palustrine unconsolidated bottom semi-permanently flooded impounded wetlands). The emergent impounded wetlands are generally dominated by narrowleaf cattail, broadleaf cattail, arrowhead, reed canarygrass, prairie cordgrass, sedges and rushes. Some of the deepwater wetlands have a vegetated shelf several feet wide surrounding them with similar plant species, while others are devoid of any vegetated margin.

Isolated Wetlands Isolated wetlands occur in isolated depressions and excavations along the four alternatives. These wetlands are classified as PEMA and PEMC. Dominant species in these wetlands include prairie cordgrass, switchgrass, curly dock, marsh pepper smartweed, Pennsylvania smartweed, Lady's Thumb, reed canarygrass, narrowleaf cattail, broadleaf cattail, green bulrush, and arrowhead.

Saline Wetlands. The interagency study team (Gilbert and Stutheit, 1994) mapped only a small number of Category IV freshwater wetlands occurring on non-saline soils in the vicinity of the I-80 interchange. No saline wetlands, or freshwater wetlands occurring on saline soils, were mapped along the four alternatives. The closest saline wetlands occur about 1.6 km (1.0 mi) west of the proposed I-80 interchange near the intersection of North 98th Street and Cornhusker Highway.

Farmed Wetlands. The Farm Service Agency (FSA) Land Classification maps indicate one farmed wetland along the East Mid alignment near "A" Street. Farmed wetlands are considered jurisdictional under the Corps 404 regulatory program if they have not been drained. This wetland did not appear to be drained or ditched and was dominated by sedges and spikerush. Therefore, this wetland would be considered jurisdictional.

Another type of farmed wetlands occurs in upland terraces created for erosion control and terrace farming. If these areas are not farmed for 5 years, and they exhibit wetland characteristics they become jurisdictional. One terrace wetland was identified during the field survey along the EM-1alternative was located in a field that had been enrolled in CRP for over five years. This wetland therefore, is jurisdictional.

7.0 IMPACTS OF THE PROPOSED ALTERNATIVES

Most of the wetlands and waterways identified during the field surveys will be impacted by various configurations of the four alternatives. The impacts include actual Beltway crossings, interchanges, bridges, exit and entrance-ramps and access roads. **Table D.4** provides a summary of the estimated wetland impacts for the four finalist alternatives. **Table D.5** provides more detail about each of the identified wetlands and waterways, and indicates whether they are considered jurisdictional under the Corps 404 regulatory program, their classification based on field observations, and the alternatives that will impact them. Each site is referenced in **Table D.5** by Section, Township and Range for greater ease in locating them. Those classifications in the table that have an (NWI) next to them indicate the sites that were assessed from aerial photography and maps. The classification for these sites is from the NWI.

Table D.4

SUMMARY OF ESTIMATED WETLAND IMPACTS ALONG THE FOUR FINALIST ALTERNATIVES

WETLAND IMPACTS	ALTERNATIVE			
	SM-4	EC-1	EM-1	EF-1
Number of Wetlands	19	33	17	22
Wetland Impacts - hectares (acres)	7.3 (18.0)	16.9 (41.8)	8.8 (21.8)	8.3 (20.4)

8.0 PROPOSED MITIGATION

Mitigation has been proposed to replace the wetlands at a minimum ratio of 1:1 replacement-to-loss. Wetland mitigation sites may be located along the proposed project route at feasible sites, or may be located in the City of Lincoln's Wetland Mitigation Bank, currently under development.

C:\My Documents\Beltway\DEIS\wetland.201.wpd
11Feb01

Table D.5

WETLAND LOCATIONS AND IMPACTS ALONG THE FOUR FINALIST ALTERNATIVES

Location (Section-Township-Range)	Site No.	Waters of the United States	Wetland	Wetland Classification	Comments	Beltway Alternative			
						SM-4	EC-1	EM-1	EF-1
2-8-6	S-1	Yes	Yes	PFOA (NWI)	Forested Drainage	Yes	No	No	No
1-8-6	S-2	Yes	No	R4SBC	Stream	Yes	No	No	No
	S-3	Yes	Yes	PEMCh	Impounded Drainage	Yes	No	No	No
	S-4	Yes	No	R2UBG	Salt Creek	Yes	No	No	No
6-8-7	S-4A	Yes	Yes	PFOAx (NWI)	Railroad Ditches	Yes	No	No	No
	S-5	Yes	Yes	PSSAx (NWI)	Scrub-Shrub Drainage	Yes	No	No	No
	S-5A	Yes	Yes	PEMCx, PFOAx (NWI)	Railroad Ditches	Yes	No	No	No
	S-6	Yes	No	R4SBA	Stream	Yes	No	No	No
5-8-7	S-7	Yes	Yes	PEMA	Emergent Drainage	Yes	No	No	No
4-8-7	S-8	Yes	Yes	PEMA	Emergent Drainage	Yes	No	No	No
	S-9	Yes	Yes	PEMA	Isolated Emergent	Yes	No	No	No
	S-10	Yes	Yes	PFOA	Forested Drainage	Yes	No	No	No
	S-11	Yes	Yes	PEMA	Emergent Drainage	Yes	No	No	No
	S-12	Yes	Yes	PEMC	Emergent Drainage	Yes	No	No	No
3-8-7	S-13	Yes	No	R4SBA	Stream	Yes	No	No	No
2-8-7	S-14	Yes	No/Yes	PUBFh/PEMF	Impounded Drainage w/ Emergent Margin	Yes	No	No	No
	S-15	Yes	Yes	PEMA	Emergent Drainage	Yes	No	No	No

Table D.5

WETLAND LOCATIONS AND IMPACTS ALONG THE FOUR FINALIST ALTERNATIVES

Location (Section-Township-Range)	Site No.	Waters of the United States	Wetland	Wetland Classification	Comments	Beltway Alternative			
						SM-4	EC-1	EM-1	EF-1
	S-16	Yes	No	R4SBJ	Stream	Yes	No	No	No
	S-17	Yes	No	R4SBJ	Stream	Yes	No	No	No
	S-18	Yes	No	R4SBJ	Stream	Yes	No	No	No
	S-19	Yes	Yes	PEMA	Emergent Drainage	Yes	No	No	No
1-8-7	S-20	Yes	Yes	PFOA	Forested Drainage	Yes	No	No	No
36-9-7	S-21	Yes	Yes	PEMA	Emergent Drainage	No	Yes	No	No
	S-22	Yes	Yes	PEMA	Emergent Drainage	Yes	Yes	No	No
	S-23	Yes	Yes	PFOA	Forested Drainage	Yes	No	No	No
31-11-8	EC-1	Yes	No	R4SBC	Stream	No	Yes	No	No
12-10-7	EC-2	Yes	Yes	PFOA/PEMA	Forested and Emergent Drainage	No	Yes	No	No
13-10-7	EC-3	Yes	Yes	PEMC	Emergent Drainage	No	Yes	No	No
	EC-4	Yes	No	R4SBF	Stevens Creek	No	Yes	No	No
	EC-5	Yes	Yes	PFOA/PEMA	Forested and Emergent Drainage	No	Yes	No	No
24-10-7	EC-6	Yes	Yes	PEMA	Emergent Drainage	No	Yes	No	No
	EC-7	Yes	Yes	PFOA	Forested Drainage	No	Yes	No	No
	EC-7A	Yes	No	R4SBC	Stream	No	Yes	No	No

Table D.5

WETLAND LOCATIONS AND IMPACTS ALONG THE FOUR FINALIST ALTERNATIVES

Location (Section-Township-Range)	Site No.	Waters of the United States	Wetland	Wetland Classification	Comments	Beltway Alternative			
						SM-4	EC-1	EM-1	EF-1
25-10-7	EC-8	Yes	Yes	PFOA/PEMA	Forested and Emergent Drainage	No	Yes	No	No
	EC-9	Yes	Yes	PFOA	Forested Drainage	No	Yes	No	No
36-10-7	EC-10	Yes	Yes	PFOA	Forested Drainage	No	Yes	No	No
	EC-11	Yes	No	PUBFh	Impounded Drainage (no emergent margin)	No	Yes	No	No
	EC-12	Yes	No	R4SBC	Stream	No	Yes	No	No
	EC-13	Yes	Yes	PFOA/PEMA	Forested and Emergent Drainage	No	Yes	No	No
1-9-7	EC-14	Yes	Yes	PEMA	Emergent Drainage	No	Yes	No	No
12-9-7	EC-15	Yes	Yes	PFOA	Forested Drainage	No	Yes	No	No
	EC-16	Yes	No	R4SBA	Stream	No	Yes	No	No
	EC-16A	Yes	Yes	PEMA	Emergent Drainage	No	Yes	No	No
	EC-17	Yes	Yes	PEMC	Isolated Emergent	No	Yes	No	No
	EC-18	Yes	Yes	PFOA	Forested Drainage	No	Yes	No	No
13-9-7	EC-18A	Yes	Yes	PFOA	Forested Drainage	No	Yes	No	No
	EC-19	Yes	Yes	PFOA/PEMA	Forested and Emergent Drainage	No	Yes	No	No
	EC-20	Yes	Yes	PFOA/PEMA	Forested and Emergent Drainage	No	Yes	No	No

Table D.5

WETLAND LOCATIONS AND IMPACTS ALONG THE FOUR FINALIST ALTERNATIVES

Location (Section-Township-Range)	Site No.	Waters of the United States	Wetland	Wetland Classification	Comments	Beltway Alternative			
						SM-4	EC-1	EM-1	EF-1
24-9-7	EC-21	Yes	No	R4SBA	Stream	No	Yes	No	No
	EC-22	Yes	Yes	PEMC	Emergent Drainage	No	Yes	No	No
	EC-23	Yes	Yes	PEMA/PEMC	Emergent Drainage	No	Yes	No	No
25-9-7	EC-24	Yes	Yes	PEMC	Emergent Drainage	No	Yes	No	No
	EC-25	Yes	Yes	PFOA (NWI)	Forested Drainage	No	Yes	No	No
	EC-26	Yes	Yes	PEMC	Emergent Drainage	No	Yes	No	No
	EC-27	Yes	Yes	PEMC	Emergent Drainage	Yes	Yes	No	No
36-9-7	EC-28	Yes	Yes	PFOA	Forested Drainage	Yes	Yes	No	No
	EC-29	Yes	Yes	PFOA	Forested Drainage	Yes	Yes	No	No
	EC-30	Yes	Yes	PEMC	Emergent Drainage	Yes	Yes	No	No
	EC-31	Yes	Yes	PSSA/PEMA	Scrub-Shrub and Emergent Drainage	Yes	Yes	No	No
5-10-8	EM-1	Yes	Yes	PEMAx	Emergent Drainage	No	No	Yes	No
	EM-2	Yes	Yes	PFOA	Forested Drainage	No	No	Yes	No
8-10-8	EM-3	Yes	Yes	PFOA	Forested Drainage	No	No	Yes	No
17-10-8	EM-4	Yes	No	R4SBC	Stream	No	No	Yes	No
20-10-8	EM-5	Yes	Yes	PFOA	Forested Drainage	No	No	Yes	No
29-10-8	EM-6	Yes	No	R4SBF	Stevens Creek	No	No	Yes	No

Table D.5

WETLAND LOCATIONS AND IMPACTS ALONG THE FOUR FINALIST ALTERNATIVES

Location (Section-Township-Range)	Site No.	Waters of the United States	Wetland	Wetland Classification	Comments	Beltway Alternative			
						SM-4	EC-1	EM-1	EF-1
	EM-7	Yes	Yes	PEMA	NRCS Designated Farmed Wetland	No	No	Yes	No
	EM-7A	Yes	Yes	PEMA	Isolated Emergent	No	No	Yes	No
32-10-8	EM-8	Yes	Yes	PEMA	Isolated Emergent	No	No	Yes	No
	EM-9	Yes	Yes	PEMA	Isolated Emergent	No	No	Yes	No
5-9-8	EM-10	Yes	No	R4SBC	Stream	No	No	Yes	No
8-9-8	EM-11	Yes	Yes	PEMA	Isolated Emergent (Terraced)	No	No	Yes	No
	EM-12	Yes	No	R4SBA	Stream	No	No	Yes	No
17-9-8	EM-13	Yes	Yes	PEMC/PEMA	Emergent Drainage	No	No	Yes	No
	EM-14	Yes	Yes	PEMC	Emergent Drainage	No	No	Yes	No
	EM-15	Yes	Yes	PEMA	Emergent Drainage	No	No	Yes	No
20-9-8	EM-16	Yes	No	R4SBC	Stream	No	No	Yes	No
	EM-17	Yes	Yes	PEMA	Emergent Drainage	No	No	Yes	No
	EM-18	Yes	No	R4SBC	Stream	No	No	Yes	No
	EM-19	Yes	No	R4SBC	Stream	No	No	Yes	No
29-9-8	EM-20	Yes	Yes	PEMA/PFOA	Forested and Emergent Drainage	No	No	Yes	No
	EM-21	Yes	Yes	PFOA	Forested Drainage	No	No	Yes	No
	EM-22	Yes	Yes	PEMC	Emergent Drainage	No	No	Yes	No

Table D.5

WETLAND LOCATIONS AND IMPACTS ALONG THE FOUR FINALIST ALTERNATIVES

Location (Section-Township-Range)	Site No.	Waters of the United States	Wetland	Wetland Classification	Comments	Beltway Alternative			
						SM-4	EC-1	EM-1	EF-1
29-9-8	EM-23	Yes	Yes	PFOA	Forested Drainage	No	No	Yes	No
	EM-24	Yes	No	R4SBA	Stream	No	No	Yes	No
	EM-25	Yes	Yes	PEM2F	Impounded Emergent	No	No	Yes	No
32-11-8	EF-1	Yes	Yes	PEMA	Emergent Drainage	No	No	No	Yes
33-11-8	EF-2	Yes	Yes	PFOA/PEMA	Forested and Emergent Drainage	No	No	No	Yes
4-10-8	EF-3	Yes	Yes	PEMA	Emergent Drainage	No	No	No	Yes
9-10-8	EF-3A	Yes	Yes	PFOA (NWI)	Forested Drainage	No	No	No	Yes
	EF-4	Yes	No	R4SBA	Stream	No	No	No	Yes
16-10-8	EF-5	Yes	Yes	PEMA	Emergent Drainage	No	No	No	Yes
	EF-6	Yes	Yes	PEMA	Emergent Drainage	No	No	No	Yes
21-10-8	EF-7	Yes	Yes	PFOA	Forested Drainage	No	No	No	Yes
28-10-8	EF-8	Yes	No	R4SBC	Stream	No	No	No	Yes
33-10-8	EF-9	Yes	Yes	PFOA/PEMA	Forested and Emergent Drainage	No	No	No	Yes
	EF-10	Yes	No	R4SBC	Stream	No	No	No	Yes
4-9-8	EF-11	Yes	No	R4SBC	Stream	No	No	No	Yes
	EF-12	Yes	Yes	PFOA	Forested Drainage	No	No	No	Yes
	EF-13	Yes	No	R4SBC	Stream	No	No	No	Yes

Table D.5

WETLAND LOCATIONS AND IMPACTS ALONG THE FOUR FINALIST ALTERNATIVES

Location (Section-Township-Range)	Site No.	Waters of the United States	Wetland	Wetland Classification	Comments	Beltway Alternative			
						SM-4	EC-1	EM-1	EF-1
	EF-14	Yes	No	R4SBC	Stream	No	No	No	Yes
	EF-15	Yes	No	R4SBA	Stream	No	No	No	Yes
9-9-8	EF-16	Yes	Yes	PEMA	Emergent Drainage	No	No	No	Yes
	EF-17	Yes	Yes	PEMC	Emergent Drainage	No	No	No	Yes
	EF-18	Yes	Yes	PFOA	Forested Drainage	No	No	No	Yes
	EF-19	Yes	Yes	PFOA	Forested Drainage	No	No	No	Yes
21-9-8	EF-20	Yes	Yes	PEMC	Emergent Drainage	No	No	No	Yes
28-9-8	EF-21	Yes	?	PEMA?	Emergent Drainage?	No	No	No	Yes
	EF-22	Yes	Yes	PFOA	Forested Drainage	No	No	No	Yes
	EF-23	Yes	Yes	PEMC	Emergent Drainage	No	No	No	Yes
	EF-24	Yes	Yes	PFOA	Forested Drainage	No	No	No	Yes
	EF-25	Yes	No	PUBFh	Impounded Drainage (no emergent margin)	No	No	No	Yes
20-11-8	INT-1	Yes	Yes	PSSAx	Scrub-Shrub Drainage	No	Yes	Yes	Yes
29-11-8	INT-2	Yes	Yes	PEMAx	Emergent Drainage				
	INT-3	Yes	Yes	PEMA	Several impounded emergent wetland surrounding INT-4	No	Yes	Yes	Yes
	INT-4	Yes	No	PUBFh	Impounded Drainage	No	Yes	Yes	Yes
	INT-5	Yes	No	R4SBA	Stream	No	No	Yes	No

APPENDIX D-A
Photolog

Photo 1: Example of a Riverine Wetland. Shown is site EC-4, Stevens Creek, with a riparian corridor of walnut and maple trees with smooth brome and nettles.

Photo 2: Example of a Riverine Wetland. Shown is site EF-8, a stream with a riparian corridor consisting mainly of smooth brome and cottonwoods.

Photo 3: Example of a Forested Drainage Wetland. Shown is site S-23, dominated by peach-leaf willows and reed canarygrass.

Photo 4: Example of a Scrub-Shrub Drainage Wetland. Shown is EC-31 (on left of photo). Dominant vegetation includes elderberry and willow, cottonwood and green ash saplings.

Photo 5: Example of an Emergent Drainage Wetland. Shown is site S-11, a PEMA wetland dominated by cattails and reed canarygrass.

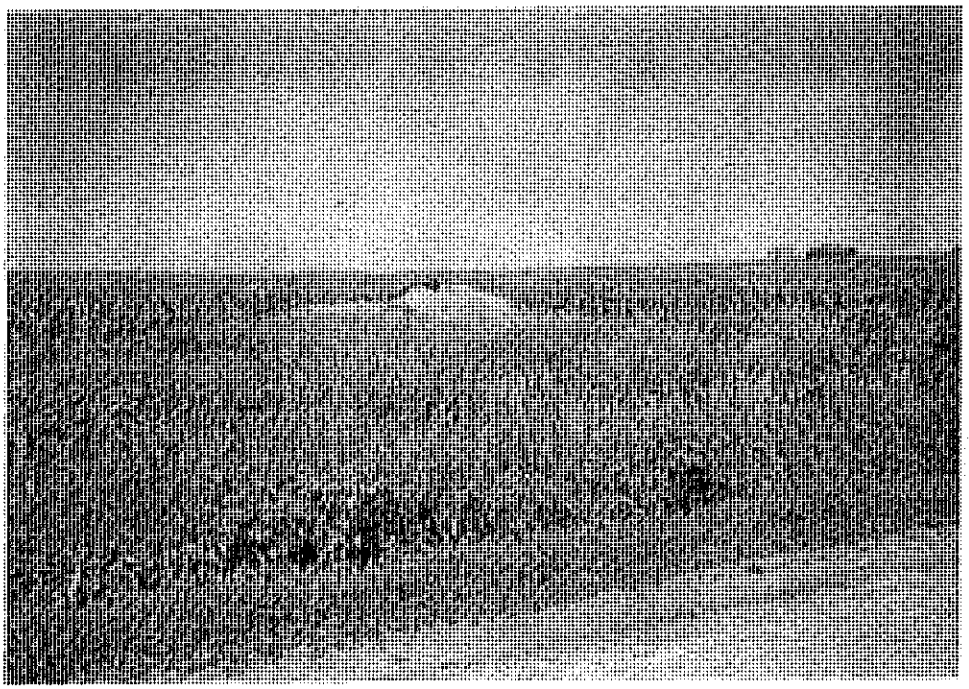

Photo 6: Example of an Emergent Drainage Wetland. Shown is site S-22, a PEMA wetland dominated by reed canarygrass.

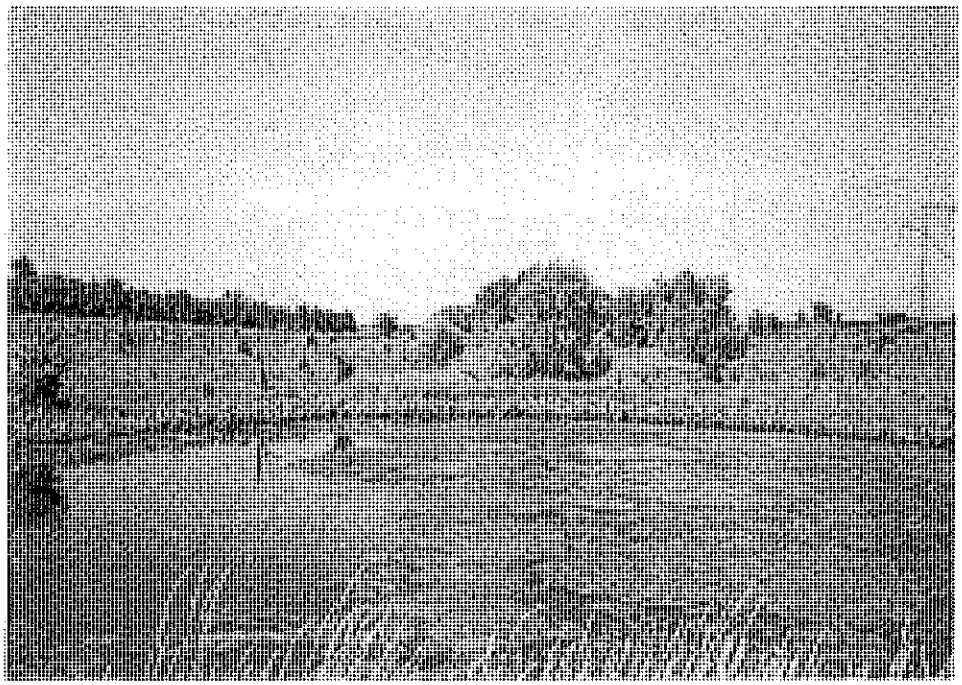

Photo 7: Example of an Impounded Drainage Wetland. Shown is site S-14, a PUBFh wetland with an emergent margin of common arrowhead.

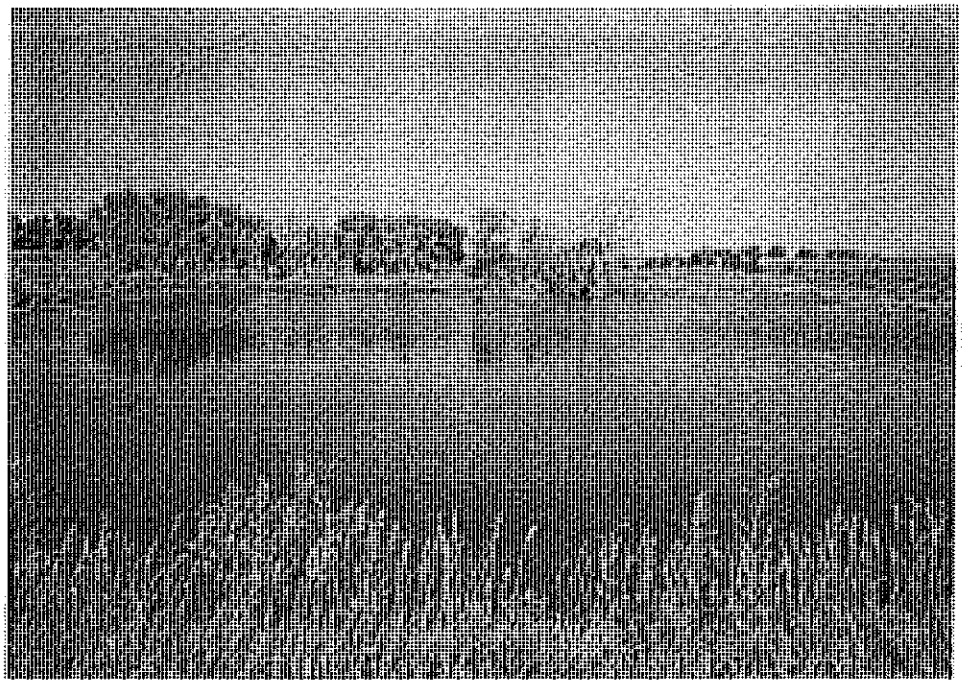

Photo 8: Example of an Impounded Drainage Wetland. Shown is site EF-25, a PUBFh wetland with little-to-no emergent margin.

Photo 9: Example of an Isolated Wetland. Shown is site EM-17, a PEMC isolated wetland dominated by cattails, Torrey's rush, soft rush, foxtail barley, American bugleweed, and green bulrush.

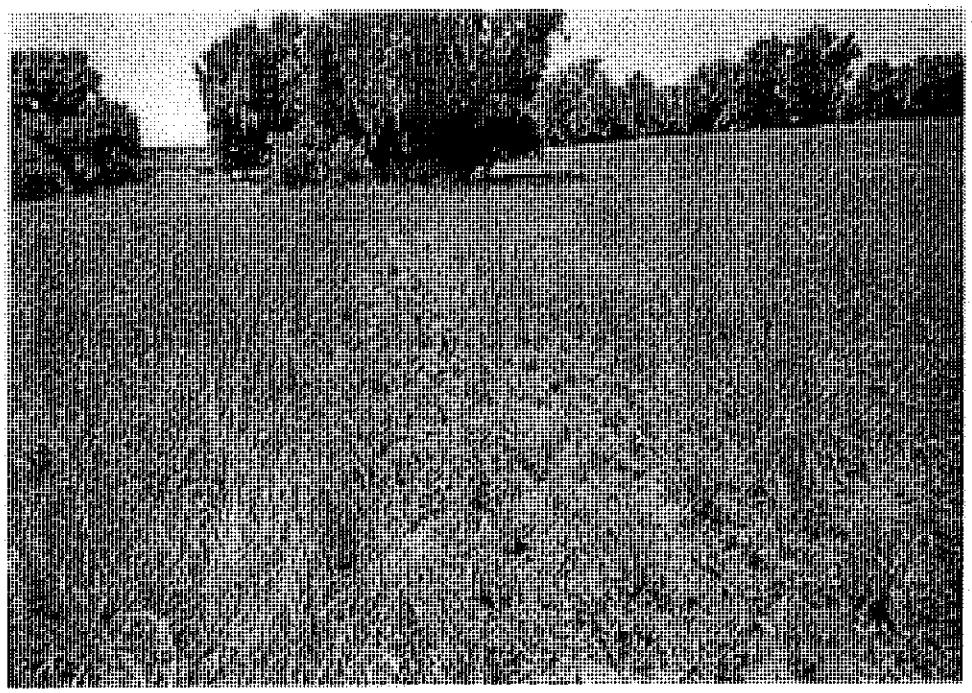

Photo 10: Example of a Farmed Wetland. Shown is site EM-11, a terraced PEMA wetland dominated by smartweed and foxtail barley.

APPENDIX D-B

Routine Wetland Determination Data Forms

SAMPLE DATA FORM IS PROVIDED.
FULL APPENDIX PROVIDED SEPARATELY TO US ARMY CORPS OF ENGINEERS.
DATA AVAILABLE ON REQUEST.

SAMPLE DATA FORM

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: *Lincoln South and East Beltways* Date: *7-6-99*

Applicant/Owner *Bernelse* County: *Lancaster*

Investigator: *Craig Mielke, Scott Dicke* State: *NE*

Do Normal Circumstances exist on this (Yes) No Community ID: *PEMC*

Is the site significantly disturbed (Atypical) Yes (No) Transect ID: *Sec 4-8-7*

Is the area a potential Problem Area? Yes (No) Plot ID: *S-12*

(If needed, explain on reverse)

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Phalaris arundinacea*	H	FACW	9.		
2. *Salix amygdaloides*	T	FACW	10.		
3. *Scirpus atrovirens*	H	OBL	11.		
4. *Eleocharis spp*	H	fac-obl	12.		
5. *Scirpus validus*	H	OBL	13.		
6. *Spartina pectinata*	H	FACW	14.		
7. *Typha angustifolia*	H	OBL	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) ? *100%*

Remarks: *7 of 7 = 100%*

HYDROLOGY

x Recorded Data (Describe in Remarks):

_____ Stream, Lake, or Tide Gauge

x Aerial Photographs

_____ Other

_____ No Recorded Data Available

Field Observations:

Depth of Surface Water: ---- (In.

Depth of Free Water in Pit: --- (In.

Depth of Saturated Soil: *3"* (In.

Wetland Hydrology Indicators:

Primary Indicators:

_____ Inundated

x Saturated in Upper 12 Inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more Required):

X Oxidized Root Channels in upper 12"

_____ Water-Stained Leaves

_____ Local Soil Survey Data

x FAC-Neutral Test

Other (Explain in Remarks)

Remarks: *FSA aerial photo and 1997 City of Lincoln aerial photo both shows "wet signature"*

FAC Neutral Test (assume that Eleocharis is FAC in this case) 6 of 6 are wetter than FAC (passes test)

SOILS

Map Unit Name

(Series and Phase): *WtD3* Drainage *moderately well*

Field Observations

Taxonomy (Subgroup): Confirm Mapped Yes No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Structure, etc.
0-18"	*A*	*N 2.5/*			

Hydric Soil

_____ Histosol

_____ Histic Epipedon

_____ Sulfidic Odor

_____ Aquic Moisture Regime

X Reducing Conditions

x Gleyed or Low-Chroma

_____ Concretions

_____ High Organic Content in Surface Layer in

_____ Organic Streaking in Sandy Soils

_____ Listed on Local Hydric Soils List

_____ Listed on National Hydric Soils List

_____ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No

Wetland Hydrology Present? (Yes) No

Hydric Soils Present? (Yes) No

Is this sampling point a wetland? (Yes) No

Remarks:

Approved by HQUSACE 3/92

Appendix E
SECTION 106 CONSULTATION

SECTION 106 CONSULTATION
for
South and East Beltways Study
Lincoln, Nebraska

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MEMORANDUM OF AGREEMENT
BETWEEN THE FEDERAL HIGHWAY ADMINISTRATION, THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND THE NEBRASKA STATE HISTORIC PRESERVATION OFFICER REGARDING THE LINCOLN SOUTH AND EAST BELTWAY PROJECT

WHEREAS, the Federal Highway Administration, Nebraska Divisions (FHWA) has determined that the Lincoln South and East Beltway Project (undertaking) may have an adverse effect on historic properties which are listed in or eligible for the National Register of Historic Places, and has consulted with the Nebraska State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. Section 470f); and

WHEREAS, FHWA has chosen the proposed SM-4/EM-1 alignment for the South and East Beltways, which generally is located 0.5 miles south of Saltillo Road and 0.5 miles east of 120th Street in Lancaster County, Nebraska, as its preferred alternative pursuant to analysis under the National Environmental Policy Act; and

WHEREAS, FHWA has consulted with the City of Lincoln, the Nebraska Department of Roads (NDOR), and the National Trust for Historic Preservation (NTHP) regarding the effects of the undertaking on historic properties and has invited them to sign this MOA as concurring parties; and

WHEREAS, in accordance with 36 CFR Section 800.6(a)(1), FHWA has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation and the ACHP chose to participate in the consultation pursuant to 36 CFR Section 800.6(a)(1)(iii);

NOW, THEREFORE, FHWA, ACHP and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

FHWA shall ensure that the following measures are carried out:

I. STEVE JOHNSON FARMYARD (LC00:E-52)

A. Prior to the implementation of the undertaking, NDOR, in consultation with the SHPO, shall design a landscape site plan to screen the view of the beltway from the farmyard, and shall ensure that the area is landscaped in accordance with the approved plan. The plan shall consist at a minimum of a screen, large shrub, or hedge planting along the west side of the farmyard, extending north from Yankee

Hill Road to the north end of the corral. This is anticipated to consist of one row (hedge) of lilacs or similar large shrub. Further refinement of plant types and spacing will be addressed in the plan as part of the final design.

B. In order to implement the landscape site plan, NDOR shall obtain an easement or agreement with the property owners of the Steve Johnson Farmyard or adjacent property owners to the west.

C. Prior to the implementation of the undertaking, should an event such as a fire, storm, other natural disaster or similar occurrence, render the Steve Johnson Farmyard no longer eligible for the National Register of Historic Places, the parties to this MOA shall consult to determine if the MOA should be amended or terminated in accordance with Stipulation VIII or IX herein.

II. **HENRY WUNIBALD FARMYARD (LC00:S-143)**

A. Prior to the implementation of the undertaking, NDOR, in consultation with the SHPO, shall design a landscape site plan to screen the view of the beltway from the farmyard, and shall ensure that the area is landscaped in accordance with the approved plan. The plan shall consist at a minimum of a windbreak planting along the north and west sides of the farmyard in the general area of the original windbreak. This may include up to three rows: shrubs, cedar trees, and possibly deciduous trees such as cottonwoods. Further refinement of plant types and spacing will be addressed in the plan as part of the final design.

B. In order to implement the landscape site plan, NDOR shall obtain an easement or agreement with the property owners of the Henry Wunibald Farmyard or adjacent property owners to the west.

C. Prior to the implementation of the undertaking, should an event such as a fire, storm, other natural disaster, or similar occurrence, render the Henry Wunibald Farmyard no longer eligible for the National Register of Historic Places, the parties to this MOA shall consult to determine if the MOA should be amended or terminated in accordance with Stipulation VIII or IX herein.

III. **EASEMENTS.** In order to address the potential cumulative effects on historic properties in the Area of Potential Effect for the Lincoln South and East Beltway Project, the National Trust for Historic Preservation and other consulting parties agree to assist owners of such historic properties who may be interested in donating historic preservation or conservation easements. Such assistance may include conducting workshops on easements, providing information on potential easement-holding organizations in the local area, and serving as a resource for technical assistance in developing easement documents.

IV. **DURATION.** This agreement will be null and void if its terms are not carried out within ten (10) years from the date of its execution. Prior to such time, FHWA may consult with the other

signatories to reconsider the terms of the agreement and amend in accordance with Stipulation VIII below.

V. **POST REVIEW DISCOVERIES.** If historic properties are discovered or unanticipated effects on historic properties are found during project construction, the FHWA shall comply with Section 800.13(b) of ACHP's regulations.

VI. **MONITORING AND REPORTING.** No later than May 1st each year following the execution of this agreement until the terms in stipulations I-III are carried out or the MOA is terminated, FHWA shall provide all parties to this agreement a written summary report detailing work undertaken pursuant to its terms. If no activities have been carried out pursuant to this MOA, the report shall so indicate. If implementation of the undertaking has begun, such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in FHWA's efforts to carry out the terms of this agreement. Failure to provide such summary report may be considered noncompliance with the terms of this MOA pursuant to Stipulation VIII, below.

VII. **DISPUTE RESOLUTION.** Should the FHWA, Council or SHPO object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, FHWA shall consult with the objecting party(ies) to resolve the objection. If FHWA determines, within 30 days, that such objection(s) cannot be resolved, FHWA will:

A. Forward all documentation relevant to the dispute to the ACHP. Upon receipt of adequate documentation, the ACHP shall review and advise FHWA on the resolution of the objection within 30 days. Any comment provided by the ACHP, and all comments from the parties to the MOA, will be taken into account by FHWA in reaching a final decision regarding the dispute.

B. If the ACHP does not provide comments regarding the dispute within 30 days after receipt of adequate documentation, FHWA may render a decision regarding the dispute without needing to wait any further for the ACHP to comment. In reaching its decision, FHWA will take into account all comments regarding the dispute from the parties to the MOA.

C. FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged. FHWA will notify all parties of its decision in writing before implementing that portion of the undertaking subject to dispute under this stipulation. FHWA's decision will be final.

VIII. **AMENDMENTS AND NONCOMPLIANCE.** If FHWA, ACHP, or the SHPO determines that its terms will not or cannot be carried out or that an amendment to its terms must be made, that party shall provide a written explanation for such a determination to all signatories and immediately consult with the other signatories to develop an amendment to this MOA. The amendment will be effective on the date a copy is signed by FHWA, ACHP, and the SHPO. If FHWA, ACHP, and the SHPO cannot agree to appropriate terms to amend the MOA, any one of

these parties unilaterally may terminate the agreement in accordance with Stipulation IX, below.

IX. **TERMINATION.** If an MOA is not amended following the consultation set out in Stipulation VIII., it may be terminated unilaterally by FHWA, ACHP or the SHPO. In the case of termination, FHWA either will initiate consultation to execute an MOA with the signatories under 36 CFR §800.6(c)(1) or request the comments of the ACHP under 36 CFR §800.7(a) and proceed accordingly. Within 30 days following termination FHWA will notify the signatories as to which of these two compliance courses it will pursue.

Execution of this Memorandum of Agreement by FHWA, SHPO, and ACHP, and implementation of its terms evidence that FHWA has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

Federal Highway Administration, Nebraska Division

_____ Date 4/26/02

Nebraska State Historic Preservation Officer

_____ Date 4/23/02

Advisory Council on Historic Preservation

_____ Date 5/8/02

CONCURRING PARTIES:

Nebraska Department of Roads

_____ Date April 22, 2002

City of Lincoln

Date 4-22-2002

National Trust for Historic Preservation

Date 5-24-2002

JAN 3 1 2002

U.S. Department of Transportation
Federal Highway Administration

100 Centennial Mall North, Room 220
Lincoln, NE 68508-3851
Nebraska.FHWA@FHWA.DOT.GOV

January 10, 2002

COPY

In Reply Refer To:
HRW-NE

RECEIVE
JAN 14 2002
NSHS/STATE
HISTORIC PRESERVATION OFFICE

NEBRASKA DIVISION FHWA

Mr. Robert Puschendorf
State Historic Preservation Office
Nebraska State Historical Society
Box 82554
Lincoln, Nebraska 68501-2554

9509-052-01

Dear Mr. Puschendorf:

Request for Concurrence Additional Acreage for Stevens Creek Stock Farm
South and East Beltways, Lincoln, Nebraska

FHWA would like to request the concurrence of the SHPO regarding the eligibility and assessment of adverse effect on two properties in the study area for the Lincoln South and East Beltways.

In a letter dated 7 November 2001 from AZ Environmental, your office was provided a package of updated information regarding the additional 320 acres that the owners of Stevens Creek Stock Farm (SCSF) believed should be included in the historic boundaries of the site that is on or eligible for the National Register of Historic Places (NRHP). FHWA reviewed this information and determined that two of the properties were in close enough proximity to the preferred east beltway alternative (EM-1) to warrant further evaluation. Based on the information provided by the consultant, FHWA has determined that the following two properties are eligible for the NRHP.

1. W1/2 NE1/4 5-9-8 This is the 80-ac N-S parcel west of and contiguous to the original 240 ac site.

2. NE1/4 SE1/4 5-9-8 & NW1/4 SW1/4 4-9-8 This is the 80-ac E-W parcel south of and contiguous to the original 240 ac site.

While the properties are strictly "associated agricultural acreage" and contain no historic structures, either Charles Retzlaff or his son George acquired them within the period of significance for the SCSF. The Retzlaff family has assisted by providing additional information about the SCSF acreage. Your concurrence on eligibility would enlarge the historic boundary of the SCSF, adding an additional 160-ac to the current 240-ac site that is either on or eligible for the NRHP.

FHWA has also determined that the east middle route would have no adverse effect on the SCSF, including the additional 160-ac, for the following reasons:

The East Middle route requires no right-of-way from properties on or eligible for the NRHP.

1. A large visual intrusion, an LES electric transmission line, is located between the East Middle route and the properties on or eligible for the NRHP.

2. The NRHP-eligible property closest to the east middle route contains a significant visual intrusion: a modern log-cabin structure. This property was subdivided in 1996, and a 6-acre lot containing the log cabin was sold outside the Retzlaff family.

3. The period of significance for the SCSF includes the amassing of lands and the corresponding success of a large-scale cattle operation (and other stock). Charles Retzlaff acquired close to 1,000-ac of prairie grasslands, which were used for cattle range and pasture. The properties in question are in agricultural row crops (as are most of the other properties on the 320-ac list) and include modern agricultural features of grassed waterways and a small dam (see aerial photographs in the DEIS on page G.3 and Exhibit EM1-3).

4. The Assessment of Adverse Affects (see PFEIS, Appendix F) includes the information that the EM-1 route has no visual, atmospheric or audible impacts because the standing structures are well buffered visually and physically by their orientation to the east, trees, and Stevens Creek.

If you have any questions or require additional information, please feel free to call me.

Sincerely yours,

Edward W. Kosola
Realty/Environmental Officer

cc:
Jim Linderholm
Roger Figard
Amy Zlotsky

CONCUR

~~NEBRASKA~~ STATE HISTORIC PRESERVATION OFFICER

DATE 1/30/02

NEBRASKA STATE HISTORICAL SOCIETY
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February 1, 2001

Mr. Edward Kosola
Federal Highway Administration-Nebraska Division
Federal Building, Room 220
100 Centennial Mall North
Lincoln, NE 68508

RE: Lincoln South and East Beltways- Draft *Defining Boundaries of NRHP-Eligible Properties Located Within the South and East Beltway Study Area* (October 31, 2000)

Dear Mr. Kosola:

We have reviewed the referenced draft report, which has incorporated our comments on the draft dated October 17, 2000. We concur with the findings and editorial changes made for the October 31 2000 report.

We believe that this letter, along with our November 27, 2000 letter, should make our comments on all materials related to the Preliminary Draft Environmental Impact Statement (November 13, 2000) up to date. Please let us know if you disagree.

Thank you once again for the opportunity to comment on these documents. If you have any questions, please call Bill Callahan at 471-4788.

Sincerely,

L. Robert Puschendorf
Deputy State Historic Preservation Officer
Nebraska State Historic Preservation Office

Cc: Roger Figard
Cindy Veys
Ed Zimmer
Amy Zlotsky

NEBRASKA STATE HISTORICAL SOCIETY
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November 27, 2000

Mr. Edward Kosola
Federal Highway Administration-Nebraska Division
Federal Building, Room 220
100 Centennial Mall North
Lincoln, NE 68508

RE: Lincoln South and East Beltways- Draft *Defining Boundaries of NRHP-Eligible Properties Located Within the South and East Beltway Study Area* (October 17, 2000)

Draft *Assessment of Adverse Effects to NRHP and NRHP-Eligible Sites, Lincoln South and East Beltways Study, Lincoln, Nebraska* (October, 2000)

Preliminary Draft Environmental Impact Statement and 4(f) Statement-South and East Beltways, Lincoln, NE (November13, 2000)

Dear Mr. Kosola:

We have reviewed the referenced draft reports which follow up on comments received by consulting parties in response to the *Preliminary Assessment of Adverse Effects* dated December, 1999. We have recently provided Olsson Environmental Sciences with editorial comments on the *Defining Boundaries* report. These comments are not substantive in terms of the report's findings however, hopefully, they will clarify some of the more arcane National Register evaluation issues.

We understand the *Defining Boundaries* report to be an addendum to the various cultural resources survey reports that have been provided to us and to which we have concurred upon over the past three years. We believe an accounting of the reports produced to identify historic properties for the Beltways project includes:

- *Lincoln South and East Beltways Historic Survey Report* (Elliott and Dirr, 1998)
- *Evaluation of the Hulda Otto House for Eligibility to the National Register Of Historic Places* (Stupka-Burda, 1999. This report includes, in addition to the Otto House, evaluations of the Guenzel Farmstead and the Wunibald Farmstead)
- *Archeological Inventory and Evaluation of Lincoln's South and East Beltway: Investigation Along the Southern Route SM-4, Lancaster County, Nebraska* (Parks and Stupka-Burda, January, 1998)

- *Archeological Inventory and Evaluation of Lincoln's South and East Beltway: Investigation and Testing Along the Eastern Routes EF-1, EM-1, EC-1. Lancaster County, Nebraska* (Parks and Stupka-Burda, November 1998)

- *Archeological Inventory and Testing of Lincoln's South and East Beltway Alternatives SM-4, EC-1, EM-1and EF-1 Lancaster County Nebraska*, (Parks and Stupka-Burda, 2000).

After taking into account all the documentation provided and after careful review of the draft *Defining Boundaries* report, we concur with the findings therein. In addition, we have been provided copies of memos from UN-L (Stupka-Burda) to Olsson Environmental Sciences (Zlotsky) dated 9/19/00, 10/13/00 and 10/17/00. These memos clarify and reevaluate previous assessments made by Parks/Stupka-Burda and Elliot/Dirr on archeological properties and standing structures. The clarifications and reevaluations were made in accordance with comments and inquiries from consulting parties, and we concur with both memo's findings.

After taking into account the findings of the additional documentation provided in the *Defining Boundaries* report and the UN-L memos, we concur with the findings of the October, 2000 draft *Assessment of Adverse Effects*.

Our concurrence with these findings is given with the understanding that our edits on the draft *Defining Boundaries* report will be taken into account when the final draft is produced.

Finally, we appreciate the opportunity to review and comment upon the Preliminary Draft Environmental Impact Statement (PDEIS). We understand this document to be a work in progress, and is for internal review only.

In Appendix E we notice that copies of our letters dated June 10 1997 and July 22 1997 to the City of Lincoln have been omitted. In order to reflect an accurate synopsis of Section 106 consultation, we believe those letters should be made part of the public record. Similarly, in Appendix F we note that the October 13, 2000 UN-L memo to Olsson Environment Sciences referenced above has been omitted, and should be included in this appendix.

We concur with the findings of the main body of the PDEIS (current Section 3.23) and, with the exception of comments above as appropriate, we concur with the findings of the appendices as they relate to Section 106 consultation.

Thank you once again for the opportunity to comment on these documents. If you have any questions, please call Bill Callahan at 471-4788.

Sincerely,

L. Robert Puschendorf
Deputy State Historic Preservation Officer
Nebraska State Historic Preservation Office

Cc: Roger Figard
Cindy Veys
Ed Zimmer
Amy Zlotsky

U.S. Department
of Transportation
Federal Highway Administration

100 Centennial Mall North, Room 220
Lincoln, NE 68508-3851
Nebraska.FHWA@FHWA.DOT.GOV

November 14, 2000

In Reply Refer To:
HRW-NE

NEBRASKA DIVISION FHWA

Mr. Robert Puschendorf
Deputy State Historic Preservation Officer
Nebraska State Historical Society
P. O. Box 82554
Lincoln, NE 68501

Dear Mr. Puschendorf:

Preliminary Draft Environmental Impact Statement (DEIS) - South and East Beltway, Lincoln - Projeet DPU-3300(1)

Attached is a copy of the Preliminary DEIS for the subject project. We are attaching a copy of the letter we sent to various other state and Federal agencies requesting their concurrence in the alternatives carried forward.

We would like your early review of the Preliminary DEIS so that we can proceed toward completion and circulation of a DEIS. If you have any questions please contact me at 437-5973. We appreciatc the time and effort you and your staff have the invested in this project to date.

Sincerely yours,

Edward W. Kosola
Environmental/Realty Officer

Enclosures

cc: Len Sand, Nebraska Department of Roads
Amy Zlotsky, Olsson Associates

U.S. Department
of Transportation

Federal Highway Administration

SEP 27 2000

OCT 12 2000

Nebraska Division Office
Federal Building, Room 220
100 Centennial Mall North
Lincoln, NE 68508-3851
Nebraska.FHWA@FHWA.DOT.GOV

copy to Sand + Zlotsky 10-19-00

September 26, 2000

NEBRASKA DIVISION

In Reply Refer To:
HRW-NE

Mr. Robert Puschendorf
State Historic Preservation Office
Nebraska State Historical Society
P.O. Box 82554
Lincoln, Nebraska 68501-2554

0009-077-01

Dear Mr. Puschendorf:

Concurrence on No Adverse Effect with conditions
for NRHP-Eligible Site: LC00: E-118 (Road Sign at 112th and Adams)
DPU-3300(1) South and East Beltways Study, Lincoln, Nebraska

In compliance with Section 106 of the National Historic Preservation Act, the Federal Highway Administration identified 34 sites in the Lincoln South and East Beltways Study area which are either listed in or eligible for listing in the National Register of Historic Places and the SHPO has concurred upon their eligibility. A concrete directional road sign located at 112th and Adams (LC00: E-118) was one property the SHPO and FHWA agreed was eligible.

During the assessment of adverse effects for the beltway project, it was determined that LC00: E-118 would not be adversely affected by the Beltway project if the following conditions are met:

If either alternative EM-1 or EF-1 is selected as the preferred alternative, LC00:E118 will be protected from damage during construction of the Beltway and repaving and upgrade of Adams Street.

Additionally, in consultation with the SHPO, LC00:E-118 will be repositioned about 20 feet from the upgraded road and as near its current location as is practicable (assuming the County roads have not been upgraded prior to beltway construction). These conditions will be incorporated into the Draft Environmental Impact Statement and Draft 4(f) Statement for the project.

Because the historic boundaries of the road signs have been recommended as a 5-foot radius around the sign, the beltway alternatives will require incorporation of land from a historic property and must therefore be addressed in the Draft 4(f) Statement.

We are requesting your concurrence that implementing the conditions described will result in "no adverse effects" to the historic property LC00:E-118.

Sincerely yours,

Edward W. Kosola
Realty/Environmental Officer

cc:
Amy Zlotsky, OES
Jim Linderholm, HWS
Roger Figard, City of Lincoln
Len Sand, NDOR

CONCUR

DEPUTY STATE HISTORIC PRESERVATION OFFICER

DATE: 10/5/00

NEBRASKA STATE HISTORICAL SOCIETY
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June 2, 2000

Mr. Ed Kosola
Federal Highway Administration-Nebraska Division
Federal Building, Room 220, 100 Centennial Mall North
Lincoln, NE 68508

RE: Review of Final Archeological report, South and East Beltways (Parks, Stupka-Burda-Jan. 2000)

Dear Mr. Kosola:

We have reviewed the referenced document, which included additional testing of sites and geomorphological testing requested by our office. We apologize as, although the SHPO archeologist responded verbally and in memo form in February, we have yet to respond to the report's findings in writing. We trust our late response will cause a minimum of inconvenience.

We concur with the findings of the report, as follows:

We agree that archeological sites 25LC115, 25LC143, 25LC144, 25LC157, 25LC158 and 25LC160 are not eligible for listing on the National Register of Historic Places. We agree that 25LC147 is eligible for listing on the National Register under criterion D. We note that 25LC159 was not further investigated, as it falls outside the project APE. All other sites within the report have previously been reviewed and commented upon by our office.

The report's upland sample indicates that there is low probability of significant sites being found in this topographic situation. Therefore, further survey is not recommended for upland areas of the final project route. However, the report points out that there remain some areas, due to landowner permission problems, that were not surveyed. We recommend that any areas of the final selected route that cross stream courses which have not been surveyed be surveyed for archeological resources. This should include the report's recommended subsurface testing in Trench areas 3 and 6, if the project includes these areas in the final route selection. We also concur with the report's recommendation that all future borrow areas be surveyed as appropriate. Finally, we once again reiterate the need for the development and implementation of a monitoring and contingency plan for on-site monitoring during construction.

If you have any questions, please do not hesitate to call me at 471-4788.

Sincerely,

L. Robert Puschendorf
Deputy State Historic
Preservation Officer

Cc: Amy Zlotsky
Cindy Veys
Roger Figard
Ed Zimmer

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U.S. Department
of Transportation

Federal Highway Administration

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OCT 08 1999
OLSSON ASSOCIATES

Nebraska Division Office
Federal Building, Room 220
100 Centennial Mall North
Lincoln, NE 68508-3851
Nebraska.FHWA@FHWA.DOT.GOV

October 7, 1999

NEBRASKA DIVISION

In Reply Refer To:
HRW-NE

Mr. Bob Puchendorf
State Historic Preservation Office
Nebraska State Historical Society
P.O. Box 82554
Lincoln, NE 68501-2554

Dear Mr. Puchendorf:

Concurrence on Historic Properties
South and East Beltway Study, Lincoln, Nebraska

In compliance with Section 106 of the National Historic Preservation Act, the Federal Highway Administration has identified 34 sites in the Lincoln South and East Beltways Study area which are either on or eligible for listing on the National Register of Historic Places (see attached Table 1). This list of sites is based on the recommendations of the Historic Survey Report, Archeological Evaluation, and supplemental investigations requested by the State Historic Preservation Office (SHPO) for this project. These include 30 historic and four (4) archeological sites. Your office has already concurred with the recommendations of eligibility found in these reports (letters dated 3 June 1998, 11 June 1998, 7 December 1998, and 7 September 1999).

Based on our determination, these 34 sites will be evaluated for adverse effects as part of the Section 106 consultation for the Lincoln South and East Beltways Study.

Sincerely yours,

Edward W. Kosola
Realty Officer

Attachment

cc:
Amy Zlotsky, OES
Jim Linderholm, HWS
Roger Figard, City of Lincoln
Len Sand, NDOR
Cindy Veys, NDOR

Table 1
LIST OF SITES ON OR ELIGIBLE FOR
THE NATIONAL REGISTER OF HISTORIC PLACES
Lincoln South and East Beltways Study

FARMYARDS

LC00: S-15	Del O'Brien Farmyard
LC00: S-143	Henry Wunibald Farmstead
LC00: E-52	Steve Johnson Farmyard
LC00: E-53	Penterman Farmyard, "Penterman Farm"
LC00: E-56	Michael Smith Farmyard
LC00: E-61	Elaine and Owen Herter Farmyard
LC00: E-62	Joel and Kathy Sartore Farm, "Herter's-Hagaman Farm"
LC00: E-69	Arthur Monahan Farmyard, "Haeger Dairy"
LC00: E-72	Lyle and Maverne Mayer Farmyard
LC00: E-87	Theresa Retzlaff Farmyard, "Forest Brook Farm"
LC00: E-88	Stevens Creek Stock Farm, Mardale Farm
LC00: E-134	Laura Reed Farmyard, "Reed Homestead"

BARNS

LC00: S-6	David McEwen Gable Roof Barn
LC00: S-31	Steve Speidel Gothic Arch Roof Laminated Truss Barn
LC00: S-47	Margene Zachek Gable Roof Connected Barn
LC00: S-127	Ehler's Round Barn
LC00: E-57	Elton Haase Gable Roof Mortise and Peg Barn, "Haase Farm"
LC00: E-67	Shirley Retzlaff Gable Roofed Banked Barn and Silos, "Retzlaff Farm"
LC00: E-102	Donna Keane Gambrel Roof Barn, "Kettlehut Farm"
LC00: E-132	Lynn Lenhoff Gambrel Roof Concrete Block Barn

RESIDENCES

LC00: S-23	Forest Nicely Residence, "Jensen Homeplace"
LC00: E-81	Chuck Hobka Residence, "Jacoby Homestead"
LC00: E-99	Norma and Bob Lemke Residence, "Karl Lemke Farm"
LC00: E-141	William Fagen Residence, "Fagen's Acres"

SCHOOL

LC00: S-41	"Cheney School"

GRAIN ELEVATORS

LC00: S-40	Circle 4 Feed and Grain Elevator, Cheney
LC00: E-106	Farmers Coop Grain Elevator, Walton

ROAD SIGNS

LC00: S-42	Road Sign at 1st and 91st, Cheney
LC00: S-135	Road Sign at Saltillo and 56th
LC00: E-118	Road Sign at 112th and Adams

ARCHEOLOGICAL SITES

25LC1	Schrader Site–Small Late Prehistoric Village, Smokey Hill Phase
25LC125	Lithic Scatter
25LC129	Lithic and Ceramic Scatter
25LC147	Euroamerican Trail, ca. 1860-1880

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NEBRASKA STATE HISTORICAL SOCIETY
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September 7, 1999

Edward Kosola-Realty Officer
Federal Highways Administration
100 Centennial Mall North, Rm. 220
Lincoln NE 68508-3851

RE: South and East Lincoln beltways, additional evaluation for NRHP eligibility:
Hulda Otto House; John Guenzel Farmstead; Wunibald Farmstead

Dear Mr. Kosola:

We have reviewed additional documentation provided by the City for the referenced properties, and have visually inspected all three. We concur with the findings of the City's report. In our opinion, the Hulda Otto house is not significantly associated with any person, event or pattern of events that may make it eligible for listing on the National Register. Additionally, in our opinion, the Otto house does not embody the distinctive characteristics of a construction type, period or method of construction nor does it retain sufficient physical historic integrity to allow consideration of Register eligibility for design or construction.

The Guenzel Farmstead, in our opinion, is not a good candidate for listing on the Register for reasons identical to the Otto house. Several of the outbuildings on the Guenzel Farmstead appear to have good physical historic integrity (although the main house does not), but do not embody sufficiently distinctive design or construction characteristics to allow for their consideration individually.

In our opinion, the Wunibald Farmstead is eligible for listing on the National Register. The main house and outbuildings embody the distinctive characteristics of an early 20th century farmstead with good historic integrity. The farmstead also reflects the evolution of farming practices from the construction of the earliest building (the house, c. 1901) to the latest, a mid-century quonset-style machine shed. In our opinion, all of the extant structures on the farmstead contribute to the historic character of the complex. Additionally, the setting of the Wunibald Farmstead is a significant feature of the historic property. The farmstead's isolation, its location in mid-section and its commanding viewshed of the surrounding countryside not only contributed to its inadvertent exclusion from the original Beltway study, but also demonstrates a conscious effort of the Wunibald family to locate the farmstead to allow for such visual and physical characteristics.

If you concur with our findings, the Wunibald Farmstead should be included in consultation about project effects to historic properties. Additionally, we believe all consulting parties should be made aware of the addition of the Wunibald Farmstead to the list of eligible properties located within the boundaries of the Beltway study area.

If you have any questions, please do not hesitate to call me at 471-4769 or Bill Callahan at 471-4788.

Sincerely,

L. Robert Puschendorf
Deputy State Historic
Preservation Officer

Cc: Amy Zlotsky
Ed Zimmer
Cindy Veys
Roger Figard

AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

3300(3)
Plan Doc FEB 19

NEBRASKA STATE HISTORICAL SOCIETY
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(402) 471-3270 Fax: (402) 471-3100 Museum Fax: (402) 471-3314 NSHS@inetnebr.com

February 17, 1999

Mr. Ed Kosola
Federal Highway Administration-Nebraska Division
Federal Building, Room 220, 100 Centennial Mall North
Lincoln, NE 68508

RE: Lincoln Beltway-National Trust for Historic Preservation request for determination of eligibility-Hulda Otto House

Dear Mr. Kosola:

We have received a copy of a letter to you from the National Trust regarding the referenced property. In order to assist the FHWA in determining the eligibility of the Hulda Otto House, we suggest the City of Lincoln provide the following information:

1) Current, clear photographs of the property, including perspectives from all four facades, representative detail shots and photos of any associated outbuildings. If possible, representative interior photos should be included. The photographs should be labeled and keyed to a site plan, and a floor plan if interior photos are taken. The photos may be in either color or black and white.
2) A map locating the property on an East Beltway map that will place the Otto house in geographic context with the EF-1 corridor and previously identified historic properties.
3) A history of the house including its construction date, builder if known and whether George Retzlaff did, indeed give the property to Hulda Otto. This history should take into account the Stevens Creek Stock Farm National Register nomination, and place the Otto house in context with properties included in that nomination.
4) The City should ask the Trust where it received its information about the Otto House and pursue that avenue of inquiry. The City should find out as much as possible about Hulda Otto herself, as well as the circumstances by which the house was built for her. This investigation should take into account the Trust's statement concerning: "...the role of women in the establishment of the Stevens Creek Stock Farm and the development of the first permanent agricultural community in the Lancaster County area."

FHWA, of course, will make the determination of eligibility for the Otto house. However, since our office is required to be consulted in determinations of this nature, we respectfully submit the above requirements in order that we may make informed comments to FHWA. If you have any questions, please do not hesitate to call me at 471-4788.

Yours Truly,

Bill Callahan
Public Programs and Resource
Planning Program Associate

Cc: NTHP-Rob Nieweg
Roger Figard
Amy Zlotsky

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December 7, 1998

Post-it® Fax Note 7671	Date 12/7/98	# of pages ▶ 2
To	From Bob Puschendorf	
Co./Dept.	Co. Nebr. SHPO	
Phone #	Phone #	
Fax # 474-5160	Fax #	

Advance copy

Mr. Roger Figard, City Engineer
Lincoln Public Works and Utilities Dept.
555 South 10th Street
Lincoln, NE 68508

RE: East Beltway Archeological Survey draft report review

Dear Mr. Figard:

We have completed our review of the referenced document. We generally concur with the findings of the report. We agree that sites 25LC125 and 25LC129 are eligible for listing on the National Register of Historic Places. In our opinion, however, site 25LC147 is also eligible for listing on the Register. Excepting the four sites discussed below, we concur that none of the other archeological sites identified in this investigation are eligible for the National Register.

In our opinion, sites 25LC115, 25LC143 and 25LC144 require further testing in order to determine whether they are eligible for listing on the National Register. The testing required for these sites would require a great deal of ground disturbance, consisting of blading strips of topsoil below the plow zone. As this type of testing is very intrusive and is also quite costly, we agree that testing of this nature may be delayed until a single corridor is chosen for further study. Our reasoning in this instance is the same as that in regards to geomorphological testing. The cost and intrusive nature of this type of testing do not justify their implementation until a single corridor is chosen. If these three sites lie within a corridor chosen for further study, then this more extensive testing will be necessary.

Similarly, we are sympathetic with the difficulties that have arisen with the identification and location of archeological features possibly associated with the Shirley Road Ranch (AKA Shirley Station). We believe that further work should be completed in an attempt to pin down where or if there are archeological features associated with this property. If a corridor is chosen for further study that may affect features associated with this resource, more intensive efforts will be necessary to identify their existence and location.

EM EF

If you agree to the addition of 25LC147 as a National Register eligible site, and if you agree to complete testing and investigation on 25LC115, 143, 144 and the Shirley Station as discussed, we will concur with the findings of the report. As we have discussed, the final report should be made public, with the precise locations of the inventoried sites withheld per archeological protection laws.

EC

For the purposes of Section 106 review, and with the exception of standard pre-construction archeological monitoring and investigation, the City has completed its cultural resources inventory of the proposed Lincoln Beltway area of potential effect. We have previously concurred with the findings of the standing historic structures report completed by On Site Photography and Preservation, and with the South Beltway archeological investigation completed by UNL Department of Anthropology. The City and the Federal Highways Administration have now completed the first crucial step in insuring that the Section 106 review process may proceed smoothly and effectively. The next step of the process, assessing the effects of the project on known cultural resources, will begin once a final corridor is chosen for study.

If you have any questions, please do not hesitate to call me at 417-4769 or Bill Callahan at 471-4788.

Sincerely,

L. Robert Puschendorf
Associate Director\Deputy State
Historic Preservation Officer

Cc: Ed Kosola
Ed Zimmer
Amy Zlotsky
Jim Linderholm

LINCOLN

DEPARTMENT OF PUBLIC WORKS
DEPARTMENT OF PUBLIC UTILITIES

NEBRASKA'S CAPITAL CITY

MIKE JOHANNS, MAYOR

September 17, 1998

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SEP 21 1998
OLSSON ASSOCIATES

Mr. L. Robert Puschendorf
Associate Director/Deputy State Historic Preservation Officer
Nebraska State Historical Society
1500 'R' Street
Lincoln, NE 68501-2554

RE: South and East Beltway Study

Dear Mr. Puschendorf:

Thank you for your July 31, 1998, letter regarding the final draft of the East and South Beltway Historic Building Survey report. We appreciate your concerns and will certainly respect your wishes regarding characterizations of formal comments about the report prior to its release. We agree that a period of public review is needed before any action is taken as a result of the report.

Your letter also mentioned the next step in the 106 process which is to complete a programmatic agreement. At our August 13, 1998, meeting with the FHWA and representatives from your office, it was agreed that instead of using a programmatic agreement, we will continue consultation with your office on a case by case basis. The fact that the beltway corridors and potential impacts have been fairly well defined would indicate that each site can be examined individually. Please let me know if this is not consistent with your understanding of the most appropriate approach.

Thank you again for your continued support.

Sincerely,

Roger A. Figard
Project Manager

C: Beltway Management Committee
Ed Kosala
Ed Zimmer
Beltway Consultants

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AUG 04 1998
OLSSON ASSOCIATES

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July 31, 1998

Mr. Roger Figard, City Engineer
Lincoln Public Works and Utilities Dept.
555 South 10th Street
Lincoln, NE 68508

RE: Final Draft, East and South Beltway cultural resources survey

Dear Mr. Figard:

As you know, we recently reviewed a second draft of the cultural resources inventory completed by On Site Preservation and Photography. This draft was significantly different from the first draft: it was limited to a discussion of the Section 106 process, historic building survey methodology, and the results of applying National Register evaluation criteria to properties discovered by the On Site survey. The second draft report eliminated all but the most cursory discussion of the effects potential beltway construction would have on historic properties. This major change in the focus of the report was, as you know, done at our request. For a number of reasons it was and is still premature for formal discussions of beltway effects on historic properties.

Foremost, the cultural resources inventory completed by On Site is only part of the total inventory required by Section 106. Archeological investigation of the beltway corridor is ongoing, and any discussion of effects the project may have on historic properties or possible mitigation of effects would be premature prior to the completion of the full scope of cultural resource investigation. Second, although we have given preliminary comment on the On Site report, we have not seen a final draft, and have not given the City of Lincoln our formal comments on the On Site report. Any characterization of our formal comments prior to their release should be avoided. Third, as we have discussed many times, the fully completed final draft of the On Site report should be made available for public review and comment prior to any formal discussion or action taken as a result of the findings of the report. We look forward to receiving public comment on the report, and to reviewing it ourselves.

As we have indicated in meetings and previous correspondence, the next step in the 106 process should be to complete a programmatic agreement that will allow the City to continue its planning process while taking into account effects the beltway project may have on historic properties. We urge the City to begin work with our office on a programmatic agreement that will prevent any further delays in the beltway planning process. If you have any questions, please do not hesitate to call me at 417-4769 or Bill Callahan at 471-4788.

Sincerely,

L. Robert Puschendorf
Associate Director\Deputy State
Historic Preservation Officer

Cc: Ed Kasola
Ed Zimmer
Amy Zlotsky
Jim Linderholm

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June 11, 1998

Ms. Amy Zlotsky
Olsson Environmental Sciences
1111 Lincoln Mall
Lincoln, NE 68508

RE: Review of 2nd draft historic buildings survey final report-East and South Beltways

Dear Ms. Zlotsky:

Thank you for giving us the opportunity to review the referenced 2nd draft. Overall, we concur with the findings of the draft report. I have enclosed marked-up copies of the draft. My comments are in pencil, and the pages have been marked with yellow stick-ons. Generally, the draft is in good shape. The inclusion of extensive methodology sections, discussion of National Register and survey evaluation criteria and an overview of the Section 106 process should make the report self-explanatory.

The only outstanding determination of eligibility is for LC00:E-141. Please note our comments on this property on all three appropriate appendices. In short, without further explanation of the "irreversible" deterioration, in our opinion, given the information we have, the site is a good candidate for listing on the Register. Additionally, the survey form for E-99 seems to indicate that the property is eligible for the National Register, however Appendix B indicates that it is not. Given the information we have been provided, we feel the building is a good candidate for the Register under criterion C. Once these issues are rectified, and our comments and your comments are incorporated along with the City of Lincoln's comments, we feel the report will be ready for wider review.

If you have any questions, please do not hesitate to call me at 471-4788.

Yours Truly,

Bill Callahan
Public Programs and Resource
Planning Program Associate

Cc: Ed Zimmer

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June 3, 1998

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JUN 08 1998
OLSSON ASSOCIATES

Ms. Amy Zlotsky
Olsson Environmental Sciences
1111 Lincoln Mall
Lincoln, NE 68508

RE: Review of "Archeological Inventory and Evaluation of Lincoln's South and East Beltway: Investigation along the South route SM-4, Lancaster County, NE-by Stan Parks and Stacy Stupka-Burda"

Dear Ms. Zlotsky:

Thank you for providing us the referenced report. We concur with the findings of the report: sites 25LC93, 25LC94, 25LC95, 25LC96 and 25LC97 are not eligible for listing in the National Register of Historic Places. Site SOAP97-2 will require further testing to determine whether it is a good candidate for the Register. Additionally, we concur with the report's recommendation for geomorphological studies of the stream valleys for the potential of buried cultural resources.

Our concurrence and comment on this report apply only to the subjects of the report. All outstanding archeological and geomorphological investigations are still subject to our review. If you have any questions, please do not hesitate to call me at 471-4769 or Terry Steinacher at 308-665-2918.

Yours Truly,

L. Robert Puschendorf
Deputy State Historic
Preservation Officer

Cc:Terry Steinacher

CITY ENGINEERS OFFICE
FEB 2[illegible]
Lincoln, Neb.

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February 19, 1998

Mr. Roger Figard. City Engineer
Lincoln Public Works and Utilities Dept.
555 South 10th Street
Lincoln, NE 68508

RE: Review of draft historic buildings survey final report-East and South Beltways

Dear Mr. Figard:

Thank you for giving us the opportunity to review the referenced draft. Our comments on federally assisted projects are required by Section 106 of the National Historic Preservation Act, and implementing regulations of 36 CFR Part 800. Section 106 is a consultation process by which federal agencies are required to seek ways to avoid or reduce adverse effects their undertakings may have on historic properties; and to afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking. The first requirement of the Section 106 process is to identify historic properties in the area of project effect. Part 800 requires this step to be completed in consultation with our office. This draft report was developed in response to our request for the identification of historic properties within the Beltway project area.

Generally speaking, we believe this report adequately documents historic properties in the project area. In fact, in many ways, the report exceeds our expectations, and we appreciate the efforts of the City of Lincoln and its consultants in developing the document. There are, however, some significant issues to be addressed prior to our concurrence with the findings of the report. These issues are as follows:

Report definition

The report should include a fairly detailed description of its purpose. This "introduction" should tell who wrote the report, who paid for it, why it was written, and what the anticipated federal assistance will be. It is crucial that a fairly detailed definition and explanation of the Section 106 process be included. The introduction should emphasize that 106 applies to properties eligible for listing on the National Register of Historic Places, as well as those that are listed; and should explain how the Register criteria are used in the 106 process. A definition of Register evaluation criteria and aspects of physical integrity is necessary. These definitions may be quoted directly from National Register Bulletin 15. Additionally, it may be prudent to discuss criteria considerations as defined in Bulletin 15. For example, according to the report, no churches are considered eligible, however a grave site\cemetery may be eligible for the Register.

Reconnaissance survey methodology

There needs to be a clearer definition of the reconnaissance survey methodology. This is very important to both the consulting party's and the public's understanding of the 106 process. The methodology definition should include a clear delineation of the survey area (which already exists in the report), how it was physically investigated. a discussion of the Secretary's Standards for survey and evaluation, and the type and scope of preliminary research completed. The methodology should clearly explain (in lay terms) why so many properties were *not* surveyed. why so many were and why. of those properties surveyed, relatively few are considered eligible for the Register.

This section should define the procedures used to compare farmsteads, residences and barns when determining which were considered eligible, and which were not. There needs to be a more detailed contextual explanation of why one farmstead. barn or residence is a "better" example than another. This section should also explain how neglect and deterioration of a property as well as inappropriate additions or intrusions are evaluated. and what

effect these factors have on whether or not a property is considered eligible for the Register. This comparative discussion should be rather detailed, but may use generic examples. It is not necessary to explain, building by building, how these evaluations are made. If the explanation of the methodology is sufficiently clear, a reader may be referred back to this section when comparative issues arise.

When discussing survey methodology, include the extensive public input and participation that was part of the process. Besides being a key tool of the survey methodology, Part 800 requires that a federal agency and the State Historic Preservation Office seek and consider the views of the public when taking steps to identify historic properties, evaluate effects on historic properties, and when developing alternatives to adverse effects (800.1[2]{iv}). The City's effort to provide the public an opportunity to assist in the identification of historic properties helped satisfy both the letter and intent of Section 106. Additionally, this effort to include the public in the process from the beginning helps create a working foundation and an atmosphere of trust through which later public participation may be more easily achieved. Always the most difficult aspect of Section 106 to accomplish satisfactorily, we commend the City on its commitment to date to include the public in the Section 106 process.

Intensive survey methodology

In addition to defining the methodology of the reconnaissance survey of the report, it is necessary to further define the methodology of the intensive survey of the Steven's Creek Bottoms area. Besides reiterating much of the above, it is necessary to define the reasons for intensively surveying the area, and to explain the methods used to identify and evaluate possible historic properties there. We are somewhat concerned since there is no mention whatever of cultural landscapes in the report, and we specifically asked for an evaluation of the area as a cultural landscape or rural historic district. Additionally, the evaluation of the properties within the intensive survey area appears to miss the point of evaluating the area as a cultural landscape or rural historic district.

Although individual buildings and farmsteads within the intensive survey area may contribute to the significance of a cultural landscape or rural historic district, they do not necessarily define it. Further, in the context of a landscape or rural district, individual buildings need not be individually eligible for the Register. Though potentially contributing elements, buildings would not be the only components in a cultural landscape or rural district...they may not even be the most important. Cultivation patterns, windbreaks, road and trail patterns, tree plantings, farmstead orientation and visible waterway alterations should all be considered when evaluating the area as a cultural landscape or rural historic district.

In order to evaluate the intensive survey area in this context, it is imperative to: a) establish the historic context of early settlement in the area (which is already well done); b) using the historic context, establish a period of significance and physical boundary; c) establish whether these historic settlement patterns are *significant* in National Register terms; d) identify potential cultural elements that remain from the period of significance; e) if these elements remain, evaluate them using Register evaluation criteria, and then; f) evaluate the physical integrity of those elements using the Register aspects of integrity, keeping in mind that the elements need not be individually eligible. In order to accomplish d-f above, it is necessary, at minimum, to review GLO maps, plat maps, USGS maps and aerial photography. Of course, written archival and documentary material should also be reviewed, but it appears many of those resources have been studied. If the evaluation for the intensive survey area has taken place as described above, that needs to be documented. If not, then it must be done in order to satisfactorily complete the document.

Assessment of effects and the next step

Finally, it is premature to assess the Beltway project effects on individual historic properties, possible mitigation strategies and especially route selection. Completion of the Beltway planning process: environmental review, details of funding opportunities, route selection, engineering studies and eventual construction are sufficiently distant in time to make this level of evaluation, at this point in the 106 process, unnecessary and inadvisably inflexible. We may assume, of course, that a project of this magnitude may have adverse effects on historic properties. The next step in the 106 *process* should be to develop a programmatic memorandum of agreement (PMOA) that will allow project planning to continue while taking into account all historic properties.

A PMOA will define procedures that will allow the consulting parties as well as the public to take into account historic properties as the planning process continues. It is during the consultation process defined by the PMOA that we will identify and discuss alternatives to adverse effects on individual historic properties. We remind the City

that historic properties include those with archeological significance. Although archeological investigation of the project area has begun, it has not been completed, and archeological properties must be taken into account when developing the PMOA.

Although it is premature to discuss project effects on an individual property basis, is timely to define project effects in the broader context of Section 106 compliance. The report should explain and define what is meant by no effect, no adverse effect and adverse effect, using the definitions at 800.9. Generic examples are probably useful as an instructional tool but, as before, specific examples using surveyed properties are not necessary at this time. We do, however, appreciate the effort put forward in an attempt to identify individual property effects. We believe using this section of the report as a starting point in the context of a PMOA would be a prudent use of resources, and save time during future consultation.

We have forwarded an informal memo that highlights some of the issues discussed above, some issues of detail we noticed in the report, and a marked-up copy of the report to your consultants. Portions of the memo may seem redundant, as it was developed during real-time review of the report. If you wish a copy of these materials, please let us know.

We would like to emphasize once again that the National Historic Preservation Act, and specifically Section 106 of that act, was passed to provide the public an opportunity to have a voice in how federally assisted projects affect historic properties in their communities. Public participation, seeking the views of the public and at times requesting public involvement in the consultation process is required throughout Part 800. This process is designed to give the public voice in a sometimes unsympathetic bureaucratic process, and it is imperative the public be given that voice *at least* when called for in regulation. In expectation of continued public cooperation and input, we hope that this document will be made available to the public at large, and specifically to those groups and individuals that have expressed a desire to participate in the 106 consultation process.

Part 800 requires that the Section 106 process be initiated early in the planning stages of the undertaking, when the widest feasible range of alternatives is open for consideration. Last year at this time, we were very concerned that the Beltway planning process was far outstripping Section 106 review, and was possibly foreclosing on FHWA's opportunity to comply with 106. Given the current status of project planning as we understand it, and provided archeological investigations are completed as planned, and provided the remainder of the 106 process is adhered to, we believe consultation may now proceed concurrently with project planning without risking non-compliance. We commend the City for its efforts at "catching up" the 106 process with the remainder of project planning, and look forward to continuing the consultation process.

Sincerely,

L. Robert Puschendorf
Deputy State Historic
Preservation Officer

cc: Ed Kosola-FHWA
Art Yonkey-DOR
Ed Zimmer
Amy Zlotsky-Olsson Environmental
Jim Linderholm-HWS
Melissa Dirr-On Site
Claudia Nissely-ACHP

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July 22, 1997

Mr. Roger Figard, City Engineer
Lincoln Public Works and Utilities Dept.
555 South 10th Street
Lincoln, NE 68508

RE: East and South Beltway Study, Section 106 review-Draft Interim Report #3

Dear Mr. Figard:

We last wrote your office June 10, 1997 (copy enclosed) concerning Federal Section 106 regulatory requirements. That letter was to inquire as to the status of the City's responsibilities as outlined in our April 1996 letter to you (copy enclosed). To date, we have received no response from the City. The City's consultant, apparently responding to our June letter, did forward copies of Beltway study documents. This was the first opportunity our office has had to review these documents, some over one year old. On July 21 of this year we received the above referenced document from the consultant as part of a mass mailing.

We are extremely disappointed in draft Interim Report #3. This document affirms that the City has not taken into account its Section 106 obligations. To begin, Chapter 5, pp. 4-5 indicates that the consultant has used the City's GIS system to identify cultural resources in the project area. We know, from dealing with the City on other issues, that cultural resources are not included in the GIS system. To then therefore claim in table 5-1 that virtually no cultural resources exist in the project area is specious to the point of being dishonest.

The three paragraphs devoted to Section 106 review on pages 5\12-13 are insufficient to address the complexity of this project and its potential to effect cultural resources. These paragraphs also appear to misrepresent our position regarding this issue. The March 1996 meeting referenced at page 5-12 addressed significantly broader issues than the single issue referenced in the draft report #3 (see our April 1996 letter). The draft report also references known cultural resources. The entire point of both our previous letters was to address unknown cultural resources. As we indicated in our April 1996 letter, neither our office nor anyone else has a clear idea of the number or nature of cultural resources in the potential area of project effect.

Additionally, as we stated in both our April 1996 and June 1997 letters, limiting a cultural resources investigation to a 1\4 mile wide corridor for a project of this nature is woefully insufficient. If the City had deigned to inquire, this reasoning is quite clear. In relation to cultural resources, the City's selection of a project corridor is arbitrary. An arbitrarily defined 1\4 mile wide corridor does not, cannot, and will not ever sufficiently address long term, indirect and aggregate effects a project of this size and complexity will have on cultural resources. We based the boundaries for cultural resource investigation on

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the City's own study area (our April, 1996 letter). We know of no other logical, defensible criteria for a project with such enormous potential for long term, indirect and aggregate adverse effects to cultural resources (4\96).

Finally, the draft report seems to imply that Section 106 consultation has begun in regard to this project, and that the City has "coordinated" with our office. We have never, throughout the life of this project, received communication from the City of Lincoln. In the past year and one-half we have met with the consultant's sub-contractor twice, and have very recently had an informal meeting with FHWA and NDOR. As referenced, we have twice asked the City, in writing, to begin addressing Section 106 issues and have received no response. We do not view events to date as "coordination with the SHPO." We have attempted, in good faith, to assist the City with its Section 106 obligations in a timely, methodical, defensible and professional manner. We attempted to do so in order to prevent a situation that would cause lengthy, costly and potentially contentious project delays. By being unresponsive, the City has come to the brink of self-inflicting just such a situation; of foreclosing on the Advisory Council and Historic Preservation's opportunity to comment on this project; and to preclude the ability of the project's sponsors to comply with federal law.

There is still opportunity for the City to comply with the intent and letter of Section 106 and Part 800. We advise the City to scrap the inaccurate and potentially damaging cultural resource evaluation in the draft Interim Report #3, and to immediately begin good faith, defensible and coordinated consultation with this office, FHWA and NDOR. Additionally, we request that this letter, as well as our letters of April 23, 1996 and June 10, 1997 be included in the final Interim Report #3 to ensure an accurate public record of our desire to address this issue.

We reiterate that consultation with the State Historic Preservation Office has not been initiated, and that failure to do so may lead to foreclosure of the ability of a federal agency to assist the project. Our obligation remains to aid FHWA and the City with their Section 106 responsibilities. We urge the City to accept this assistance while all parties are still in a position to move forward.

Yours Truly,

L. Robert Puschendorf
Deputy State Historic
Preservation Officer

cc: FHWA-Ed Kosola
NDOR-Bill Hurst
HWS-Jim Linderholm
Olsson Environmental-Amy Zlotsky
Hon. Mike Johanns-w\encl.
Claudia Nissley-Advisory Council
on Historic Preservation-w\encl.

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June 10, 1997

Mr. Roger Figard, City Engineer
Lincoln Public Works and Utilities Dept.
555 South 10th Street
Lincoln, NE 68508

RE: East and South Beltway Study, Section 106 review

Dear Mr. Figard:

In April of last year we provided your office our comments (copy enclosed) on Interim Report Number One for the referenced project. We provided additional comments regarding the larger issues and difficulties inherent in a project the magnitude of the East and South Beltway. These comments were copied to the Federal Highway Administration, EA Engineering and staff from the Lincoln\Lancaster Planning department. Our comments are required on federally assisted, licensed or funded undertakings pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the Section 106 implementing regulations, 36 CFR Part 800.

The bulk of our April 1996 letter outlined the documentation our office would require in order to adequately comment on the Beltway project as required by 800.4(a)(ii). Interim Report Number One, provided to our office in March of 1996, illustrated a large project study area which included a number of broadly defined potential corridors for the Beltway project. At that time, our office indicated that the FHWA or its designee, presumably the City of Lincoln, should undertake cultural, historical and archeological investigations of the entire project area. The scope of these investigations were detailed in our April letter. To date, we have received no response of any kind to our letter from the City, EA Engineering or the FHWA. We have, however, received a number of calls and letters from citizens concerned about the potential of the Beltway to adversely effect significant cultural properties.

We have been made aware, through local media, of progress made by the City and its consultant regarding the Beltway corridor selection process. According to published reports, the City and the consultant have eliminated all but three (one southern and two eastern) alternatives for the Beltway corridor, including elimination of the no-build alternative. To our knowledge, the selection process has not addressed the potential for effects on cultural resources. No consultation has taken place with our office since our April 1996 correspondence, as required by Section 106 regulations. If these reports are accurate, and significant cultural resources exist within the proposed corridors, it may be extremely difficult for our office to assist the FHWA in completing their responsibilities pursuant to Section 106. Unfortunately, that circumstance may foreclose the Advisory Council on Historic Preservation's opportunity to comment on the project, and preclude FHWA's compliance with federal law.

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As indicated in our April 1996 letter, our office desires to assist the FHWA and the City in completing their responsibilities pursuant to Section 106. It is difficult for our office to provide that assistance if we are not consulted as part of the process, and if our recommendations have not been addressed. If the City or FHWA has completed the cultural resource inventories requested by our office last year, we would appreciate being provided the conclusions and recommendations of those inventories. If all but one project alternative has been eliminated, and the recommended cultural inventories have not been completed, please inform us how the City and FHWA intend to complete their Section 106 responsibilities without consultation with this office and the Advisory Council on Historic Preservation.

Yours Truly,

L. Robert Puschendorf
Deputy State Historic
Preservation Officer

cc: Amy Zlotsky-EA Engineering
Phil Barnes-FHWA
Claudia Nissley-Advisory Council
on Historic Preservation

LRP\WJC

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April 23, 1996

Mr. Roger Figard, City Engineer
Lincoln Public Works and Utilities Dept.
555 South 10th Street
Lincoln, NE 68508

RECEIVED
APR 25 1996
EA Engineering, Science, and Technology
Lincoln, NE

RE: East and South Beltway Study: cultural resource review,
Interim Report No. 1

Dear Mr. Figard:

We have reviewed the referenced document. We understand this interim report to be a preliminary effort at providing data and analyses about the feasibility of and alternatives to the beltway project; and to document work completed as the study advances. We also understand this preliminary process is intended, in part, to determine what levels of investigation would be required to satisfy local, state and federal approvals for this project, if the project is determined to be feasible and necessary. Although we understand that the City of Lincoln is the primary contact, we assume that the Federal Highway Administration is providing funding, and will be the lead federal agency for this project.

The intent of this letter is to assist the City of Lincoln in determining what preliminary steps are necessary to begin the Section 106 review process. Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations, 36 CFR Part 800 (copy enclosed) requires, among other things, that Federal agencies:

1) Identify historic properties within the area of an undertaking's area of potential effects (APE);

2) Determine what effects an undertaking may have on historic properties within the APE, and;

3) Seek ways to avoid or reduce adverse effects an undertaking may have on historic properties.

Section 106 and Part 800 also require that Federal agencies consult with the State Historic Preservation Office throughout the 106 process, and provide the federal Advisory Council on Historic Preservation an opportunity to comment on the undertaking. In Nebraska, the Preservation Division of the State Historical Society is the SHPO.

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Part 800 defines a federal undertaking as a federally assisted or licensed project (800.1). Historic properties are those listed on or eligible for listing on the National Register of Historic Places (800.2{e}). APE is the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties (800.2{c}). Adverse effects to historic properties are defined at 800.9.

In order for the Section 106 process to begin for the beltway project, historic properties within the APE must be identified. This requirement should be fulfilled as early in the planning process as is feasible. Early identification of significant historic, architectural and archeological properties can help avoid lengthy, costly delays in later project planning and approval. To date, EA Engineering has identified previously surveyed archeological properties and properties already listed on the National Register of Historic Places. In order to completely satisfy the identification needs of the Section 106 process, the following additional investigations should be completed:

1) A complete architectural\historic building survey of the entire study area, planned and completed in consultation with this office.

Rural Lancaster County has never been completely surveyed for historic properties with architectural or historic significance. In order to understand what historic properties may be affected by the project, we require a complete accounting of potentially significant properties. Additionally, indirect and long term effects of the beltway undertaking must be taken into account. Therefore, the entire project area should be surveyed and not limited to a narrow area identified as potential right-of-way.

2) An intensive historic survey of the Stevens Creek bottoms area. This survey should take into account the potential for a rural historic district and\or a cultural landscape district. This survey should also be planned and completed in consultation with this office.

The Stevens Creek bottoms area was the first part of Lancaster county to be settled by Euro-Americans. Except for the Stevens Creek Stock Farm, which is listed on the National Register, we have little information about the existence and\or integrity of structures that may be associated with early settlers. With the Stevens Creek Farm as our only example, there appears to be the potential for a rural historic district in the area.

Historic cultural landscapes are those that have been shaped by cultural forces. Again, we have little information as to the existence or integrity of potentially significant cultural landscape features created during the settlement era.

3) An archeological investigation of the entire study area, planned and completed in consultation with this office.

A literature and records search concerning archeological properties has been completed (Barton,

1996). We recommend that an intensive survey of all potential stream crossings from valley margin to valley margin should be completed, and that a ten-percent sample of all upland areas should be intensively surveyed.

It is necessary to perform the surveys described in 1&2 above for the entire beltway study area. In the long term, waiting until a preferred route is chosen before completing these surveys could result in lengthy, costly delays. At minimum, to seek alternatives to potential adverse effects; or to determine if there are feasible and prudent alternatives to adverse effects (Section 4(f) also applies to historic properties), the entire beltway study area should be considered the APE.

Additionally, as indirect and long term effects of a project of this magnitude must be taken into account, a large study area must be examined. Issues such as visual effects, long-term changes in land use and associated transportation upgrades must be considered. This can only be accomplished by identifying an area of potential effects at least as large as the entire study area.

Thank you for allowing us to review interim report No. 1. We would be pleased to meet with you or your representatives to discuss the methodology, scope and need of the survey requirements discussed above. If you have any questions, about the architectural\historical components of this letter, or would like to set up a meeting, please do not hesitate to call me at 471-4788. For questions about the archeological components, please call Terry Steinacher, 308\665-2918.

Yours Truly,

Bill Callahan
Historic Buildings Survey
Program Associate\National
Register Coordinator

cc: Amy Zlotsky
Phil Barnes
Ed Zimmer
Mike Rindone
Terry Steinacher

potential easement-holding organizations in the local area, and serving as a resource for technical assistance in developing easement documents.

Archeological Site 25LC129. Based on discussions during the site visit on 17 October 2001, further engineering refinements were evaluated (see **Section 9.3**). From the reanalysis, it appears possible to completely avoid impacts to the archeological site by incorporating a retaining wall on the west side of the beltway right-of-way. No additional mitigation is proposed.

Additional Cultural Resource Management Activities. Other activities will include:

- Completion of an archeological survey of bottomlands where access has been previously denied.
- Use of NDOR standard provisions regarding previously unsuspected archeological remains that provide for cessation of work and notification of the SHPO
- Use of NDOR standard provisions regarding monitoring of archeological sites.
- A historic marker located at Saltillo Road and the abandoned South 14th Street right-of way will need to be relocated. The marker commemorates the Nebraska City to Fort Kearny Road, "The Great Central Route to the Gold Fields" which crossed near this location. There are no remnants of the trail known within or near the SM-4 right-of-way.

10.0 STATUS OF SECTION 106

In November 2000, the SHPO reviewed the Preliminary Draft Environmental Impact Statement (PDEIS), and concurred with the findings of the PDEIS and the findings of the appendices (specifically the Assessment of Adverse Effects and the Determination of Boundaries report) as they related to Section 106 consultation (see **Appendix E**, letters dated 1 February 2001 and 27 November 2000).

Following the close of the comment period on the DEIS, comments on historic issues were compiled. These issues were investigated further and the current status is documented in this Appendix and in **Chapter 9** of the FEIS. Based on the additional investigations, the list of sites which were determined to be adversely affected was updated to reflect the fact that archeological site 25LC129 could be avoided on EM-1 (**Table F.2**). The list of adverse affects (**Table F.3**) was also updated for publication of the FEIS based on the additional evaluations.

Consultation with the SHPO has been ongoing to resolve the final issues. The SHPO concurred with FHWA determinations on the additional Stevens Creek Stock Farm parcels by signature dated 30 January 2002 (**Appendix E**). The SHPO concurred with the mitigation plan by signature to the MOA (**Appendix E**).

ASSESSMENT OF ADVERSE EFFECTS TO NRHP AND NRHP-ELIGIBLE SITES

SOUTH AND EAST BELTWAYS STUDY
LINCOLN, NEBRASKA

PREPARED FOR

FEDERAL HIGHWAY ADMINISTRATION
NEBRASKA DEPARTMENT OF ROADS
LANCASTER COUNTY
CITY OF LINCOLN

OCTOBER 2000
(REVISED 2/01, 11/01, 5/02)

ASSESSMENT OF ADVERSE EFFECTS TO NRHP AND NRHP-ELIGIBLE SITES for South and East Beltways Study Lincoln, Nebraska

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ASSESSMENT OF ADVERSE EFFECTS TO NRHP AND NRHP-ELIGIBLE SITES for South and East Beltways Study Lincoln, Nebraska

1.0 BACKGROUND

This report has been prepared in compliance with Section 106 of the National Historic Preservation Act which requires Federal agencies to take into account the effects of their undertakings on historic properties. Based on the recommendations of the Historic Survey Report, Archeological Evaluation, and supplemental investigations requested by the SHPO for this project, there were 34 sites in the Lincoln South and East Beltways Study area which were either on or eligible for listing on the National Register of Historic Places (NRHP). These included 30 historic and 4 archeological sites.

The SHPO concurred with the recommendations of eligibility for historic and archeological sites; all other sites were determined not eligible.

Since that time, two additional cast concrete road signs were identified within the study area in June 2000 (Appendix G) and have been included in this assessment.

2.0 METHODOLOGY

A preliminary assessment of adverse effects to NRHP sites was conducted by a team of technical persons who have been involved in the Beltway project over the course of several years. For the historic sites, the team included:

Bill Callahan	Nebraska State Historical Society, SHPO
Ed Kosola	Federal Highway Administration, NEPA Coordinator
Cindy Veys	Nebraska Department of Roads, Environmental Supervisor
Len Sand	Nebraska Department of Roads, Environmental Analyst Supervisor
Ed Zimmer	City-County Planning Department, Historic Planner
Roger Figard	City Engineer
Virendra Singh	City Public Works Department, Long-Range Planning Supervisor
Kelly Sieckmeyer	City Public Works Department, Engineer
Jim Linderholm	HWS, Principal-in-Charge
Mike Gorman	HWS, Project Manager, Transportation Engineer
Lisa Richardson	HWS, Transportation Engineer
Amy Zlotsky	OES, Environmental Scientist

For the archeological sites, the team included:

Terry Steinacher	Nebraska State Historical Society, SHPO
Stan Parks	University of Nebraska, Research Archeologist
Stacy Stupka-Burda	University of Nebraska, Research Archeologist
Mike Gorman	HWS, Project Manager, Transportation Engineer
Lisa Richardson	HWS, Transportation Engineer
Amy Zlotsky	OES, Environmental Scientist

Methodology for the assessment followed 36 CFR Part 800.5, as described in the revised guidance dated 18 May 1999. The preliminary assessment of effects included three levels of screening.

3.0 RESULTS OF LEVEL 1 SCREENING

The original 34 sites and the two new sites (road signs) were reviewed to determine which beltway corridors could potentially affect them (**Table F.1**). However, only the four remaining beltway corridors were considered in the evaluation; these are SM-4, EC-1, EM-1 and EF-1. Based on this review, 3 historic sites and 1 archeological site were determined not to be affected by any of these four corridors. Eliminated from further consideration were sites LC00: S-6, LC00: S-31, LC00: S-47 and 25LC1.

4.0 RESULTS OF LEVEL 2 SCREENING

The remaining 32 sites (29 historic and 3 archeological) were compared with the most recently refined corridor concepts. Materials available to the reviewers included site survey data forms, descriptions, maps, and photographs of the sites. For each corridor, materials available included recent aerial photography, existing and future contour maps, revised centerline concepts and cut and fill information.

Using the list of examples of adverse effects found in 36 CFR Part 800.5 (a) (2), a matrix of potential adverse effects was determined for each site along each corridor. Of the seven example types of effects, five were considered possible with the beltway project. In addition, other types of effects were considered, but none were identified as appropriate to this project. The types of effects evaluated were:

1. Physical destruction of or damage to all of part of the property [800.5 (a) (2) (i)].

   An example would be where the EC-1 route crosses wagon ruts from an EuroAmerican trail (site 25LC147).

2. Removal of a property from its historic location [800.5 (a) (2) (iii)].

   An example would be the possible need to reposition the Road Sign at 112th and Adams (site LC00: E-118) by an estimated 6.1 m (20 ft) when Adams Street is paved and upgraded to current standards.

Table F.1

SITES ON OR ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES BY NEAREST BELTWAY CORRIDOR LOCATION [1]
(X indicates potential effects)

SITE NUMBER	SITE NAME	CORRIDOR						
		SC-1	SC-4	SF-1	SM-4	EC-1	EM-1	EF-1
FARMYARDS								
LC00: S-15	Del O'Brien Farmyard				X			
LC00: S-143	Henry Wunibald Farmyard				X			
LC00: E-52	Steve Johnson Farmyard						X	X
LC00: E-53	Penterman Farmyard, "Penterman Farm"							X
LC00: E-56	Michael Smith Farmyard							X
LC00: E-61	Elaine and Owen Herter Farmyard							X
LC00: E-62	Joel and Kathy Sartore Farmyard, "Herter's-Hagaman Farm"							X
LC00: E-69	Arthur Monahan Farmyard, "Haeger Dairy"							X
LC00: E-72	Lyle and Maverne Mayer Farmyard						X	X
LC00: E-87	Theresa Retzlaff Farmyard, "Forest Brook Farm"							X
LC00: E-88	Stevens Creek Stock Farm, Mardale Farm						X	X
LC00: E-134	Laura Reed Farmyard, "Reed Homestead"					X	X	
BARNS								
LC00: S-6	David McEwen Gable Roof Barn		X					
LC00: S-31	Steve Speidel Gothic Arch Roof Laminated Truss Barn	X						
LC00: S-47	Margene Zachek Gable Roof Connected Barn	X						
LC00: S-127	Ehler's Round Barn				X			
LC00: E-57	Elton Haase Gable Roof Mortise and Peg Barn, "Haase Farm"							X

Table F.1
(continued)

SITE NUMBER	SITE NAME	CORRIDOR						
		SC-1	SC-4	SF-1	SM-4	EC-1	EM-1	EF-1
LC00: E-67	Shirley Retzlaff Barns and Silo "Retzlaff Farm"							X
LC00: E-102	Donna Keane Gambrel Roof Barn, "Kettlehut Farm"						X	
LC00: E-132	Lynn Lenhoff Gambrel Roof Concrete Block Barn					X		
RESIDENCES								
LC00: S-23	Forest Nicely Residence, "Jensen Homeplace"				X			
LC00: E-81	Chuck Hobza Residence, "Jacoby Homestead"						X	X
LC00: E-99	Norma and Bob Lemke Residence, "Karl Lemke Farm"						X	X
LC00: E-141	William Fagen Residence, "Fagen's Acres"					X		
SCHOOL								
LC00: S-41	"Cheney School"				X	X		
GRAIN ELEVATORS								
LC00: S-40	Circle 4 Feed and Grain Elevator, Cheney				X	X		
LC00: E-106	Farmers Coop Grain Elevator, Walton					X	X	
ROAD SIGNS								
LC00: S-42	Road Sign at 1st and 91st, Cheney				X	X		
LC00: S-135	Road Sign on at Saltillo and 56th				X			
LC00: S-145	Road Sign at Saltillo and approx 112th			X				
LC00: E-118	Road Sign at 112th and Adams						X	X
LC00: E-146	Road Sign at Yankee Hill and approx 116th						X	
ARCHEOLOGICAL SITES								
25LC1	Schrader Site--Small Late Prehistoric Village, Smokey Hill Phase			X				
25LC125	Lithic Scatter						X	
25LC129	Lithic and Ceramic Scatter						X	
25LC147	Euroamerican Trail, ca. 1860-1880					X		

[1] List includes two additional road signs identified in June 2000.

3. Change of character of property's use or physical features within the property's setting that contribute to historic significance [800.5 (a) (2) (iv)].

   An example would be where the SM-4 route crosses near the Henry Wunibald farmyard (site LC00: S-143) requiring (1) construction of a new lane to access the farmstead, and (2) changing the previous isolation of the property by placing it within 300 m (1,000 ft) of the beltway.

4. Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant features [800.5 (a) (2) (v)].

   An example would be where EF-1 crosses within 180 m (600 ft) of the Penterman farmyard creating visual impacts.

5. Neglect of a property which causes its deterioration (exception for Indian tribes) [800.5 (a) (2) (vi)].

   After Level 3 Screening, no examples of this type of effect were found.

Among other things, the teams evaluated the physical characteristics of and type of historic site; the distance between the property and the beltway; the topography in between the property and the beltway; any existing screening; whether the beltway was in a cut or fill section; whether the property was already affected by other transportation facilities; and any changes in access.

Based on the matrix, sites were either determined to be (a) not adversely affected by the beltway project, (b) adversely affected, or (c) possibly adversely affected, but needed field verification.

5.0 RESULTS OF LEVEL 3 SCREENING

In Fall 1999, a field investigation was conducted by the team members to survey the sites in question. The field trip included viewing sites from the corridor centerlines and viewing the centerlines from the sites. Based on the field review, the team finalized the preliminary assessment of adverse effects. Seven sites were determined to be impacted by the four routes. These were:

- one historic site on SM-4
- one archeological site on EC-1
- one historic and one archeological site on EM-1 (however, in December 2002 refinements to the EM-1 alignment allowed this archeological site to be avoided).
- three historic sites on EF-1

A summary of the seven adversely affected sites is provided in **Table F.2**. More detailed information from the assessment of adverse effects is provided in **Table F.3**.

Table F.2

SUMMARY OF NRHP SITES ADVERSELY AFFECTED BY THE BELTWAY ALTERNATIVES

SM-4	EC-1	EM-1	EF-1
LC00: S-143 Henry Wunibald Farmyard	25LC147 Euroamerican Trail	LC00: E-52 Steve Johnson Farmyard	LC00: E-53 Penterman Farmyard
		25LC129[1] Lithic and Ceramic Scatter	LC00: E-87 Teresa Retzlaff Farmyard
			LC00: E-88 Stevens Creek Stock Farm

[1] In December 2002 refinements to the EM-1 alignment allowed this archeological site to be avoided.

Table F.3
LIST OF ADVERSE EFFECTS
TO SITES ON OR ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES
Lincoln South and East Beltways Study

SITE INFORMATION		ADVERSE EFFECTS (36 CFR Part 800.5, 18 May 1999)					
SITE NUMBER SITE NAME DATE OF CONSTRUCTION	SIGNIFICANCE COMPONENTS	(i) Physical destruction of or damage to all or part of the property	(iii) Removal of a property from its historic location	(iv) Change of character of property's use or physical features within the property's setting that contribute to historic significance	(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant features	(vi) Neglect of a property which causes its deterioration	Notes
FARMYARDS							
LC00: S-15 Del O'Brien Farmyard 1910s-1920	Significant, under Criterion A, as a complex of buildings associated with agricultural development. 2-story house with Craftsman features hollow tile chicken house, gambrel roof barn, polygonal granary, windmill.	NO	NO	NO	NO, already visual intrusion of busy paved road & powerline. Topography also screens proposed alignment since road is on other side of ridge.	NO	SM-4 is 0.8 km (0.5 mi) away, separated from farmyard by Saltillo Road, and screened to a large degree by topography. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: S-143 Henry Wunibald Farmyard 1900-1960s	Significant, under Criterion A, as a complex of buildings associated with agricultural development, and under Criterion C, for the house, barn and shed (former kitchen). 1 ½-story farmhouse with 1917 addition, mortise and tenon gable roof barn, hollow clay tile coop, shed (former kitchen), metal quonset-style shed.	NO	NO	YES, change in access & change in previous isolation.	YES, visual, but no noise impact.	NO	SM-4 is 91 m (300 ft) from associated agricultural acreage and 300 m (1,000 ft) away from closest structure. Despite good faith effort, site was missed in initial survey. Site is on ridge surrounded by vegetation. For mitigation, consider berms, could put interchange at Saltillo Rd, but moving beltway to north won't do much to mitigate.
LC00: E-52 Steve Johnson Farmyard 1890s-1900	Significant, under Criterion A, as a complex of buildings associated with agricultural development, and under Criterion C, as typical example of Folk Victorian architecture in house and outbuildings. Folk Victorian house, garage (summer kitchen) large gable roof barn, two-pen granary, chicken coop and outhouse.	NO	NO	NO	YES, adverse visual effect--looking down onto EM-1, but no noise impact.	NO	EM-1 is 300 m (1,000 ft) from associated agricultural acreage & 701 m (2,300 ft) from farmyard and will have adverse visual affect on farmyard. EF-1 is 1 280 m (4,200 ft) away, in cut, on other side of creek. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-53 Pentorman Farmyard, "Penterman Farm" 1920s	Significant, under Criterion A, as a complex of buildings associated with agricultural development. Small bungalow house with matching garage, gambrel roof barn with intact horseyard, two small sheds.	NO	NO	NO	YES, visual intrusion, but no noise impact.	NO	EF-1 is 180 m (600 ft) away from closest building in fill section. For mitigation, could move road to east and take residence on south side of road, consider depressing road.
LC00: E-56 Michael Smith Farmyard 1912-14	Significant, under Criterion C, as Craftsman style house typifies period of construction.Outbuildings contribute to size and formality of site. 2.5-story Craftsman house, garage, large gable end barn, chicken coop, machine shed.	NO	NO	NO	NO	NO	EF-1 is 579 m (1,900 ft) away and site faces 148th St. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-61 Elaine and Owen Herter Farmyard Pre 1900	Significant, under Criterion A, as a complex of buildings associated with agricultural development, and under Criterion C as an excellent example of a turn-of-the-century farmstead in study area. Large Folk Victorian farmhouse, gable roof barn, concrete block garage, granary, coop, windmill.	NO	NO	NO	NO	NO	EF-1 is 1 200 m (4,000 ft) away separated by 148th St and site is well hidden by trees. Alternative will not diminish characteristics that make this property eligible for NRHP.

Table F.3
(Continued)

SITE INFORMATION		ADVERSE EFFECTS (36 CFR Part 800.5, 18 May 1999)					
SITE NUMBER **SITE NAME** **DATE OF CONSTRUCTION**	**SIGNIFICANCE** **COMPONENTS**	**(i) Physical destruction of or damage to all or part of the property**	**(iii) Removal of a property from its historic location**	**(iv) Change of character of property's use or physical features within the property's setting that contribute to historic significance**	**(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant features**	**(vi) Neglect of a property which causes its deterioration**	**Notes**
LC00: E-62 Joel and Kathy Sartore Farm, "Herter's-Hagaman Farm" 1895	Significant, under Criterion A, as a complex of buildings associated with agricultural development, and under Criterion C, as it typifies Folk Victorian building style. Victorian house, large gambrel roof barn, hollow tile smokehouse, gambrel roof granary, pig house, sheds, root cellar with arched roof.	NO	NO	NO	NO	NO	EF-1 is 792 m (2,600 ft) away in cut section, and site is well hidden by trees. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-69 Arthur Monahan Farmyard, "Haeger Dairy" 1910s-20s	Significant, under Criterion A, as a complex of commercial dairy buildings, and under Criterion C for architectural styles and evolution of site. Turn-of-century house, bungalow house, large dairy barn with concrete block silo, Tudor influenced hollow tile milk house, two small hog sheds.	NO	NO	NO	NO	NO	EF-1 is 335 m (1,100 ft) away from interchange, but site is already on busy US 34. Addition of beltway will not introduce elements out of character with property's current configuration.
LC00: E-72 Lyle and Maverne Mayer Farmyard 1900s-1910	Significant, under Criterion C, as representative type of small scale vernacular farmstead with innovative buildings. Folk Victorian house, gable roof barn, granary, chicken coop.	NO, already on busy US 34 with likely impacts from planned widening prior to beltway.	NO	NO, already on busy US 34.	NO, already on busy US 34. EM-1 in cut west of powerline, down hill, on other side of ridge. EF-1 is very far away.	NO	EM-1 is 488 m (1,600 ft) away and EF-1 is 945 m (3,100 ft) away. Site is already affected by visual and audible intrusions caused by US 34. Addition of beltway will not introduce elements out of character with property's current configuration.
LC00: E-87 Theresa Retzlaff Farmyard, "Forest Brook Farm" 1890s-1920	Significant, under Criterion C, as excellent example of vernacular building types. Stone Tudor style cottage, gable roof barn, granary, hog house, small polygonal shed.	NO	NO	NO	YES, visual due to close proximity, elevated road/bridge & removal of trees, but no noise impact.	NO	EF-1 is 150 m (500 ft) from farmyard. For mitigation, could consider moving road farther east (would affect additional archeological sites) or to west (would affect Stock Farm).
LC00: E-88 Stevens Creek Stock Farm, Mardale Farm 1867-1970s	On NRHP. Significant to the early settlement of the county and the development of agriculture in Nebraska. Several structures, individually and collectively, represent a distinctive entity significant in Nebraska architecture. Compact grouping of 18 buildings in excellent condition representing extended courtyard arrangement. 3 houses, 4 barns, numerous sheds and pole buildings. Includes 65 ha (160 ac) plus additional 32 ha (80 ac) of farmground to the east determined eligible. More recently, 32 ha (80 ac) of farmground to the west and 32 ha (80 ac) of farmground to the south determined eligible.	NO	NO	For EM-1: NO	For EM-1: NO, buildings and west boundary of NRHP farmground well buffered visually & physically by orientation to east, trees, creek, etc.	NO	EM-1 is 488 m (1,600 ft) from edge of property therefore no physical intrusion, farmground not harmed by visual impact.
				For EF-1: YES, Introduction of large transportation facility is out of character with setting. Beltway would be adjacent to farmground eligible for NRHP.	For EF-1: YES, Can see 1891 house & top of cupolas & silos from centerline near Van Dorn. No noise impacts.		EF-1is at edge of farmground, 610 m (2,000 ft) from the 1891 & closest barn, 792 m (2,600 ft) from ranch house. Potential for development is considered greater since site is located west of (w/in) beltway.

Table F.3
(Continued)

SITE INFORMATION		ADVERSE EFFECTS (36 CFR Part 800.5, 18 May 1999)					
SITE NUMBER SITE NAME DATE OF CONSTRUCTION	SIGNIFICANCE COMPONENTS	(i) Physical destruction of or damage to all or part of the property	(iii) Removal of a property from its historic location	(iv) Change of character of property's use or physical features within the property's setting that contribute to historic significance	(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant features	(vi) Neglect of a property which causes its deterioration	Notes
LC00: E-134 Laura Reed Farmyard, "Reed Homestead" 1900s-10	Significant, under Criterion A, as a complex of buildings associated with agricultural development in the area. Small 1-story house, twin gambrel roof barns, hollow tile silo, granary, hog house, small shed (summer kitchen).	NO	NO	NO, although few trees around house, road would be in valley below & no line of sight on north or west, and no interchanges at this location.	NO, audible or visual.	NO	EC-1 is 671 m (2,200 ft) away, separated by 112th St. EM-1 is 1 370 m (4,500 ft) away and separated by ridge and creek. Alternative will not diminish characteristics that make this property eligible for NRHP.
BARNS							
LC00: S-6 David McEwen Gable Roof Barn 1910s	Significant, under Criterion C, as excellent example utilizing architectural details in barn construction. Large gable roof barn with cupolas and formal cornice returns.	NO	NO	NO	NO	NO	Along SC-4 corridor which was eliminated from consideration.
LC00: S-31 Steve Speidel Gothic Arch Roof Laminated Truss Barn 1932/1936	Significant, under Criterion C, as illustrating a method of construction for laminated truss system for large Gothic arched roof. Large Gothic arched roof barn.	NO	NO	NO	NO	NO	Along SC-1 corridor which was eliminated from consideration.
LC00: S-47 Margene Zachek Gable Roof Connected Barn 1910s-20s	Significant, under Criterion C, as excellent example of innovative agricultural construction. Large connected barn complex with gable roof barn connected to machine shed by low birthing shed.	NO	NO	NO	NO	NO	On SC-1 corridor which was eliminated from consideration.
LC00: S-127 Ehler's Round Barn 1922-1924	On NRHP. Significant, under Criterion C, in the area of architecture as a well-preserved example of a true round barn. Hollow tile and frame barn with stepped conical roof.	NO	NO	NO	NO	NO	SM-4 is 1 160 m (3,800 ft) away. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-57 Elton Haase Gable Roof Mortise and Peg Barn, "Haase Farm" 1915	Significant, under Criterion C, as excellent example of innovative construction for joinery system. Mortise and peg gable roof barn with limestone foundation.	NO	NO	NO	NO	NO	EF-1 is over 0.8 km (0.5 mi) away and would be separated from barn by already busy 148th Street. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-67 Shirley Retzlaf Barns and Silo, "Retzlaf Farm" 1890s-1900	Significant, under Criterion C, as excellent example of banked barn construction with raised stone foundation. Large gable roof banked barn, smaller gambrel roof barn, and hollow tile silo.	NO	NO	NO	NO	NO	EF-1 is 549 m (1,800 ft) away. Alternative will not diminish characteristics that make this property eligible for NRHP.

Table F.3
(Continued)

SITE INFORMATION		ADVERSE EFFECTS (36 CFR Part 800.5, 18 May 1999)					
SITE NUMBER **SITE NAME** **DATE OF CONSTRUCTION**	**SIGNIFICANCE** **COMPONENTS**	**(i) Physical destruction of or damage to all or part of the property**	**(iii) Removal of a property from its historic location**	**(iv) Change of character of property's use or physical features within the property's setting that contribute to historic significance**	**(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant features**	**(vi) Neglect of a property which causes its deterioration**	**Notes**
LC00: E-102 Donna Keane Gambrel Roof Barn, "Kettlehut Farm" 1916	Significant, under Criterion C, as excellent example of this type of dairy barn construction. Larger gambrel roof barn with attached gambrel roof milking shed.	NO	NO	NO	NO	NO	EM-1 is 610 m (2,000 ft) away in cut section, with visual barrier of conifers, & existing intrusions of acreage homes. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-132 Lynn Lenhoff Gambrel Roof Concrete Block Barn 1930s	Significant, under Criterion C, typifying new type of construction with modern materials, and under Criterion A, as an example of evolving farm technology. Large gambrel roof concrete block barn.	NO	NO	NO	NO, could only see very top of roof from centerline.	NO	EC-1 is 610 m (2,000 ft) away, and about 5 m (15 ft) difference in grade. Alternative will not diminish characteristics that make this property eligible for NRHP.
RESIDENCES							
LC00: S-23 Forest Nicely Residence, "Jensen Homeplace" 1936	Significant, under Criterion C, representing a type of small neo Tudor style house in study area. Small neo Tudor house with gable roof.	NO	NO	NO	NO	NO	Site is about 1.2 km (0.75 mi) from SM-4 along diagonal no longer under consideration, and already adjacent to busy Saltillo Road. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-81 Chuck Hobza Residence, "Jacoby Homestead" 1910s	Significant, under Criterion C, typifying new type of construction and building materials locally manufactured. Large 4-square box house constructed of concrete block with ornamental molding.	NO	NO	NO	NO	NO	EM-1 is 732 m (2,400 ft) away with significant grade difference, no interchange at Havelock & site surrounded by trees. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-99 Norma and Bob Lemke Residence, "Karl Lemke Farm" 1930s	Significant, under Criterion C, as good example of Colonial Revival style. Colonial Revival brick house with simple rectangular plan	NO	NO	NO	NO, beltway would be on west side of powerline, no line of sight due to trees and ridges.	NO	EM-1 is 610 m (2,000 ft) away in cut section with no interchange at Old Cheney. Alternative will not diminish characteristics that make this property eligible for NRHP.
LC00: E-141 William Fagen Residence, "Fagen's Acres" 1890s	Significant, under Criterion C, as interesting example of Italianate design. Simple box plan house with Folk Italianate features.	NO	NO	NO, separated from road by at least 2 shelterbelts, house completely surrounded by mature trees.	NO	NO	EC-1 is 1 490 m (4,900 ft) away, ridge between site and road, access is from 98th St not Fletcher. Alternative will not diminish characteristics that make this property eligible for NRHP.
SCHOOL							
LC00: S-41 "Cheney School" 1910s-20s	Significant, under Criterion A, for rural educational development, and under Criterion C, as representative type of Arts and Crafts building. 2-story clapboard sided school with pyramidal roof.	NO	NO	NO	NO	NO	Neither EC-1 nor EM-1 will adversely affect historic properties located within the Village of Cheney.

Table F.3
(Continued)

SITE INFORMATION		ADVERSE EFFECTS (36 CFR Part 800.5, 18 May 1999)					
SITE NUMBER SITE NAME DATE OF CONSTRUCTION	SIGNIFICANCE COMPONENTS	(i) Physical destruction of or damage to all or part of the property	(iii) Removal of a property from its historic location	(iv) Change of character of property's use or physical features within the property's setting that contribute to historic significance	(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant features	(vi) Neglect of a property which causes its deterioration	Notes
GRAIN ELEVATORS							
LC00: S-40 Circle 4 Feed and Grain Elevator, Cheney 1910s-20s	Significant, under Criterion C, under umbrella of multiple property nomination to cover local elevators in history of the county's agricultural development. Grain elevator with steeply pitched tin covered gable roof.	NO	NO	NO	NO	NO	Neither EC-1 nor EM-1 will adversely affect historic properties located within the Village of Cheney.
LC00: E-106 Farmers Coop Grain Elevator, Walton 1910s	Significant, under Criterion C, under umbrella of multiple property nomination for local elevators in history of the county's agricultural development. Grain elevator with tin covered gable roofs.	NO	NO	NO	NO	NO	EC-1 is 1.2 km (0.75 mi) away. Site is historically associated with transportation corridor, and alternative will not diminish characteristics that make this property eligible for NRHP.
ROAD SIGNS							
LC00: S-42 Road Sign at 1st & 91st, Cheney 1920s	Significant, under Criterion C, under umbrella of multiple property nomination for early Lancaster County concrete road signs as contribution to broad transportation patterns. Cast concrete directional sign.	NO	NO	NO	NO	NO	Sign is over 0.8 km (0.5 mi) from SM-4/EC-1, w/in street grid of Cheney & already buffered from beltway by existing buildings & trees. Transportation facility not in-compatible w/ sign's historic function.
LC00: S-135 Road Sign at Saltillo & 56th 1920s	Significant, under Criterion C, under umbrella of multiple property nomination for early Lancaster County concrete road signs as contribution to broad transportation patterns. Cast concrete directional sign.	NO	NO	NO	NO	NO	Road sign is about 0.8 km (0.5 mi) from SM-4, is already on busy Saltillo Road. Transportation facility is not incompatible with sign's historic function.
LC00: S-145 Road Sign at Saltillo & approx 112th 1920s	Significant, under Criterion C, under umbrella of multiple property nomination for early Lancaster County concrete road signs as contribution to broad transportation patterns. Cast concrete directional sign.	NO	NO	NO	NO	NO	Road sign might have been impacted by SF-1, but is about 0.8 km (0.5 mi) east of SM-4. Sign is already on busy Saltillo Road which is already paved. No beltway inter-change is proposed on Saltillo Rd. Transportation facility is not incom-patible with sign's historic function.
LC00: E-118 Road Sign at 112th & Adams 1920s	Significant, under Criterion C, under umbrella of multiple property nomination for early Lancaster County concrete road signs as contribution to broad transportation patterns. Cast concrete directional sign.	NO, provided construction near sign is monitored.	NO, however may need to reposition about 20 ft from road.	NO	NO	NO	EM-1 & EF-1 would have inter-changes at Adams with Adams St improved. But, sign is 18 m (60 ft) from CL of Adams which is planned for paving & upgrade to current standards w/ or w/o beltway. Trans-portation facility not incompatible with sign's historic function.
LC00: E-146 Road Sign at Yankee Hill & approx 166th 1920s	Significant, undor Criterion C, under umbrella of multiple property nomination for early Lancaster County concrete road signs as contribution to broad transportation patterns. Cast concrete directional sign.	NO	NO	NO	NO	NO	Road sign is about 0.8 km (0.5 mi) west of EM-1. No beltway inter-change is proposed on Yankee Hill Rd. Sign was moved previously. Transportation facility is not incom-patible with sign's historic function.

Table F.3
(Continued)

SITE INFORMATION		ADVERSE EFFECTS (36 CFR Part 800.5, 18 May 1999)					
SITE NUMBER SITE NAME DATE OF CONSTRUCTION	SIGNIFICANCE COMPONENTS	(i) Physical destruction of or damage to all or part of the property	(iii) Removal of a property from its historic location	(iv) Change of character of property's use or physical features within the property's setting that contribute to historic significance	(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant features	(vi) Neglect of a property which causes its deterioration	Notes
ARCHEOLOGICAL SITES							
25LC1 Schrader Site	On NRHP. Significant, under Criterion D, for its ability to yield information important in prehistory. Small Late Prehistoric Village, Smokey Hill Phase	NO	NO	NO	NO	NO	Along SF-1 corridor which was eliminated from consideration.
25LC125	Significant, under Criterion D, for its ability to yield information important in prehistory. Lithic Scatter	NO	NO	NO	NO	NO	Cut section for EM-1 is 61 to 84 m (200-275 ft) from edge of delineated site.
25LC129	Significant, under Criterion D, for its ability to yield information important in prehistory. Lithic and Ceramic Scatter	NO	NO	NO	NO	NO	NO, EM-1 alignment refined in Dec 2001 to avoid this site.
25LC147	Significant, under Criterion A for relevance to early transportation and settlement, and Criterion D for its ability to yield information important in history. Site is part of discontinuous archeological district also including (1) wagon ruts east of Stevens Creek considered to be Road 324 from 1866 map, and (2) Shirley Road Ranch. Wagon ruts from Euroamerican trail, ca. 1860-1880.	YES, EC-1 would cross assumed trail location no matter how a shift is made & shift could impact cemetery or Indian burial if move too far up hill. However, no wagon ruts are visible in area of EC-1 ROW.	NO	YES, EC-1 crosses discontinuous archeological district.	NO	NO	As required by SHPO, further archeological investigation is necessary if this alternative is selected. Trail is presumed to exist in area of EC-1, although no trail ruts are visible.

6.0 PUBLIC COORDINATION

The Preliminary Assessment of Adverse Effects to NRHP and NRHP-Eligible Sites was made available for review and comment by the consulting parties and general public. A total of 32 letters were received, including 20 which mentioned being members of CARS–Citizens for for Accountable Route Selection.

Comments were reviewed, summarized and discussed by the teams listed above. Additional investigations were conducted, and information from the comments and investigations was incorporated into (1) this Assessment of Adverse Effects to NRHP and NRHP-Eligible Sites to be submitted to the SHPO, and (2) the Draft Environmental Impact Statement, where appropriate.

7.0 ADDITIONAL INVESTIGATIONS

As recommended in the consulting party/public comments, several additional investigations were conducted.

7.1 Determination of Boundaries

Boundaries were determined for all historic properties eligible for the NRHP. Boundaries were delineated in a report prepared by the University of Nebraska-Lincoln (UNL) and reviewed by the SHPO (Appendix G). In particular, the determination included an evaluation of agricultural acreage (crop and pasture land) as a potential contributing component of eligible farmsteads.

7.2 Evaluation of Stevens Creek Stock Farm 320 Hectares (800 Acres)

The boundary for the Stevens Creek Stock Farm was assumed to be the 65 ha (160 ac) listed on the NRHP plus the additional 32 ha (80 ac) of cropland immediately east of the NRHP site (for a total of 97 ha (240 ac)). It does not include the remaining 227 ha (560 ac) which Charles Retzlaff reportedly had acquired by 1888, and which the SHPO considered eligible for listing in a letter dated 18 September 1995. Additional investigation of these parcels (32 ha (80 ac) in Section 3, Stockton Township and 194 ha (480 ac) in Section 34, Stevens Creek Township) revealed that they are at least 1.6 km (1.0 mi) away and not contiguous with the original homesteader's property and buildings (located in Sections 4 and 5, Stockton Township). Consultation with the SHPO indicated that it was not appropriate to have a discontinuous site.

7.3 Evaluation of Sartore (Herter) Farmyard 40 Hectares (100 Acres)

Since initiation of the historic boundaries evaluation, the Sartore property was listed on the NRHP. The NRHP site is defined as a 8.1 ha (20 ac) parcel and corresponds to the independently delineated boundary in the UNL report (Appendix G). However, the NRHP nomination form contains language which allows for increasing the size of the NRHP site, pending completion of the evaluation of an additional 40 ha (100 ac). Based on review of the UNL report, the SHPO indicated that the remaining 40 ha (100 ac) of the Sartore property would not be considered eligible for listing due to (a) agricultural terracing which has altered the natural contours of landscape, and (b) a portion of the land is overgrown with numerous exotic trees such as Chinese elm and no longer contributes to the knowledge or understanding of the Herter Farmstead.

7.4 Noise Evaluation

A noise evaluation (Appendix C) was conducted for all sensitive receptors in the beltway study area, including three residences on or eligible for the NRHP (Henry Wunibald, Penterman and Teresa Retzlaff) . None of the other historic residences are located within the 300 m (1000 ft) range of accuracy for the noise model, and therefore were not modeled. Noise impacts generally occur within 76 m (250 ft) of the edge of pavement.

None of the three historic residences were predicted to have noise impacts based on guidelines and criteria established by FHWA (June 1995) which define noise impacts as predicted future noise levels of 66 dbA or greater, or an increase in noise of over 15 decibels.

7.5 Evaluation of Urban Sprawl

As recommended in the consulting party/public comments, an assessment was made regarding the potential for the beltway project to cause urban sprawl. A discussion of this topic is included in Sections 3.2 and 3.31 of the DEIS. Based on this discussion, it was determined that it is the Lincoln-Lancaster County planning process and policies that will dictate whether urbanization will occur in the beltway corridors. The presence of a beltway does not necessarily equate to urban sprawl when growth follows a locally approved plan. Toward that end, the City has already begun work on the Stevens Creek Basin Planning Initiative with the goal of preparing a long range conceptual plan for inclusion in the Comprehensive Plan update process. It is expected that any urbanization of the basin and other fringe areas will occur according to approved Subarea Plans.

7.6 Reevaluation/Evaluation of Other Sites

Several of the consulting party/public comments listed additional sites for consideration on the NRHP. All of the sites within the beltways study area were reinvestigated by UNL.

Of the properties mentioned with standing structures, four had already been evaluated, determined not eligible by experienced professionals in the field, and had received concurrence by the SHPO as not eligible. These were the Maahs Barns (LC00: E-68), Williss Farm (LC00: E-80); Want Schoolhouse (LC00: E-101), and Hulda Otto House (LC00: E-144). It should be noted that the investigators for the original historic survey (On Site, 1998) did visit the entire Willis Farm; however, only the barn was described in the report because the historic integrity of the other structures was compromised. Despite previous evaluation, UNL reinvestigated these properties, and determined that the original findings were still appropriate (**Appendix F-A**, memo from UNL dated 17 October 2000). To be eligible for the NRHP, properties must possess both significance and integrity.

> Maahs Barns. In addition to the conclusions in the On Site report (no architectural significance, loss of historic association, setting and fabric, neglect), UNL noted that the setting had been highly impacted by the intrusion of five large steel grain bins and a modern house.

Williss Farm. In addition to the conclusions in the On-Site report, UNL noted that the house lacks historic integrity considering the many modern alterations including the west addition; replacement windows; replacement siding; addition of shutters; replacement entrance over the east door is not in keeping with the architectural style or feel of the house; and it appears that the original chimney has been removed.

Want Schoolhouse. In addition to conclusions in the On Site evaluation (plug holes from blown in insulation, house likely moved to this location), UNL noted that the building sits on a new poured concrete foundation; one door has been replaced with an insulated steel door; and full-light French patio doors have been added on the south facade. None of these features are in keeping with the architectural style of the school. Intrusions of a modern house within 12 m (40 ft) and a trailer park within 15 m (50 ft) affect the integrity of the setting as well.

Otto House. Reconsideration of the Otto house had been previously requested and addressed due to suggestions by owners of the Stevens Creek Stock Farm that there was potential significance relative to an individual. Neither significance nor integrity could be established, and the SHPO concurred with the recommendation of not eligible. Despite previous documentation, the property was revisited by UNL investigators who concluded that the original evaluation was solid.

Many other older properties were visited during the historic survey, but were not considered to have retained a sufficient degree of historic integrity to warrant inclusion in the original historic survey report. The Otley farmstead and Speidel barn, were two such properties. Nevertheless, the properties were revisited by UNL investigators who again concluded that they did not meet the minimum standards to be included in a survey.

Otley Farmstead. The integrity of the Otley farmstead and surrounding farmyard is no longer intact. Specifically, the original porch supports have been replaced with wrought iron supports; the house has been clad in wide lap siding; two additions have been constructed including a new entrance to the structure; the windows have been replaced with no original molding remaining; and the chimney has been removed. The assertion of the uniqueness of indoor plumbing is not considered germane to NRHP eligiblity. Of the other buildings in the farmyard, the only intact historic structures were the two granaries; however, these were not considered to be outstanding examples in the study area.

Speidell Barn. The integrity of the Speidell barn is no longer intact. In particular, the board and batten siding and decorative scalloping has been replaced with corrugated metal on two sides; and the agricultural setting has been altered to a park-like setting with many exotic trees planted around the building.

Three properties were mentioned as having archeological sites. These were the Otley, Wagoner and Skoda properties.

Otley Sites. The Otley archeological site was investigated by UNL; found to be located outside of the study area (approximately 300 m (1,000 ft) from the edge of the project right-of-way); and was recommended not eligible for the NRHP. A site form has been completed for the site and submitted to the SHPO for their records (Site Number 25LC162).

While in the field, Mr. Rod Otley mentioned another Euroamerican archeological site on Edwin Otley's property. The site, located in an upland setting, encompasses approximately 0.1 ha (0.25 ac), and consists of red brick, redware (crockery) and flatglass within an agricultural field). In addition, there appeared to have been a couple of dumping episodes along an intermittent drainage, including tin cans, a barrel stay, more red brick, automotive body pieces from a circa 1920 car body, and unidentifiable metal pieces. UNL recommended that the site was not eligible for the NRHP. A site form has been completed for the site and submitted to the SHPO for their records (Site Number 25LC163).

Wagner Site. The Wagner property was reported to contain a buried "old Indian well" in an island of trees. According to the UNL investigators who spoke with the owner, the reported location is not within the project right-of-way and, since the site was buried prior to acquisition, there are many islands of trees in the area, and there is no way to determine its exact location (**Appendix F-**A, memo from UNL dated 17 October 2000).

Skoda Site. It has been reported by Mr. Rod Otley that another person living in the SW1/4 Section 21, T10N, R8E Stevens Creek Township told him that "something" had been found during excavation for the Skoda house in the late 1990's, and that "Indians came out and held a ceremony" after which construction was completed. UNL investigators were unable to verify any of this information through the SHPO, local Native American community, or other local authorities. Permission for access to the Skoda property was denied to the study team on more than one occasion. See **Appendix F-A**, memo from UNL dated 19 September 2000.

7.7 Reevaluation of a Historic District

One of the properties requested for evaluation, the German/Trinity Lutheran Church (located near 162nd Street and Old Cheney Road), is not in the defined study area and therefore was not surveyed. The church is 2.4 km (1.5 mi) east of the farthest east beltway alignment, and is considered outside the scope of the beltways project.

A request was made for reevaluation of a historic district centered on the German/Trinity Lutheran Church. Such an evaluation was not conducted because:

(a) The reconnaissance survey for the beltways study already identified all resources for a distance of 1.6 km (1.0 mi) beyond the farthest east alignment. The church is yet another 0.8 km (0.5 mi) farther east.

(b) The intensive survey for the beltways study already documented the local trends that resulted in the lack of resources to support a rural historic district centered around the Stevens Creek bottoms (which was the area of earliest settlement in Lancaster County due to the available natural resources). These trends include century long changes in agricultural operations; a poor agricultural economy resulting in abandonment of farmsteads; increasing consolidation of farm units; and urban pressure from the growing Lincoln community. These trends have resulted in urban and agricultural intrusions in the overall physical context, including suburban acreages, rural and municipal water distribution systems, radio and communication towers; transmission lines and electrical substations; a private airstrip, golf courses, recreational trails, and commercial and industrial

enterprises. Certainly, the contributions of early settlers were important; however, similar patterns occurred in counties throughout Nebraska. In contrast to eastern Nebraska, there are millions of acres in the western part of the state where modern impacts are much less intrusive than they are in the beltway study area.

(c) Whether or not resources exist to support a rural historic district for the German Evangelical Lutheran community extending beyond the beltway study area, those resources have already been documented to be extremely sparse in the area impacted by the beltway alternatives.

(d) A religious property cannot be eligible for the NRHP simply because it was the place of religious services for a community or was the oldest structure used by a religious group in a local area. In fact, the historic significance of a religious property must be based on "architectural or artistic values, or for important historic or cultural forces that the property represents (NR Bulletin 15). In addition, the original 1883 church burned and was replaced in 1917 with the current structure and although over 50 years old, the integrity of the 1917 structure has been significantly compromised due to modern overlay siding and additions placed on the front and rear of the structure.

7.8 Resolution of Other Issues

Some of the consulting party/public comments listed additional features missing from the beltway constraints map such as prairies, wetlands, transmission lines, etc. This map has been updated in the DEIS (see **Figures 2.1** and **2.25**).

Other consulting party/public comments are addressed in **Chapter 3** of the DEIS. These comments related to noise (**Section 3.13**), lighting (**Section 3.14**), wildlife (**Sections 3.17** and **3.22**), visual aethetics (Section **3.25**), indirect effects (Section **3.31**) and cumulative effects (Section **3.32**).

7.9 Reevaluation of Effects for Publication of the DEIS

Based on the consulting party/public comments and additional investigations, the list of eligible sites remained unchanged from that determined by FHWA in a letter dated **7** October 1999, and for which concurrence was obtained by the SHPO in letters dated 3 June 1998, 11 June 1998, 7 December 1998, 7 September 1999 and 2 June 2000. The only exception was the addition of the two more recently identified road signs which are considered eligible for the NRHP.

Based on the additional investigations, sites on or eligible for the NRHP were reevaluated and **Table F.3** was updated for publication of the DEIS. However, the list of sites which were determined to be adversely affected remained unchanged from the December 1999 preliminary assessment.

8.0 DEIS COMMENTS AND RESOLUTION OF HISTORIC ISSUES

Comments on the DEIS, including written comments and oral testimony, were compiled and summarized. Comments regarding historic issues primarily concerned the following issues:

(a) Secondary and Cumulative Impacts. The most frequent comment on historic properties was regarding secondary and cumulative impacts, and specifically, the likelihood of the beltway to cause development and urban sprawl to the point of having an adverse effect on historic structures, and specifically on the Stevens Creek Stock Farm. Comments of the National Trust for Historic Preservation, Environmental Law and Policy Center, and landowners in the beltway study area have focused concerns about secondary and cumulative impacts to historic properties on the EF-1 route. While the Preservation Association of Lincoln (PAL) raised the issue for all east routes in their letter dated 15 June 2001, they changed their opinion in testimony at the City/County Public Hearing on 15 August 2001 where the president of PAL urged that the preferred alternative be the EM-1 route.

(b) Boundaries of the Historic Properties. Several letters from historic preservation organizations and landowners stated that the boundaries of the historic properties were delineated too narrowly. With the exception of PAL, all comments focused on the EF-1 route only. In general, the commentors felt that most of the properties should be defined as the original parcel of land containing the historic structure, or in the case of the Stevens Creek Stock Farm, all agricultural land holdings of the property owners during the period of significance. Documentation was provided for changing the boundaries of the Theresa Retzlaff (Forest Brook) Farmyard and Sartore (Herter-Hagaman) Farmyard. Various acreage amounts or descriptive requests were made for the Stevens Creek Stock Farm, Retzlaff Farms, Penterman Farmyard, Haeger Dairy, and Michael Smith Farmyard.

(c) Additional Historic Property. Two letters stated that the Wenzl Farmyard/Barn had not been considered as a historic site.

(d) Assessment of Adverse Affects. Several property owners and PAL stated that the Assessment of Adverse Affects did not adequately assess all impacts to the properties, including noise, visual, lighting, traffic impacts, fuel smells, trash and crime. With the exception of PAL, all comments focused on the EF-1 route only.

(e) Advisory Council on Historic Preservation (ACHP). The ACHP requested that FHWA seek a formal determination from the Keeper of the National Register for the boundaries of seven historic properties on the EF-1 route consisting of the Herter-Hagaman Farm, Forest Brook Farm, Penterman Farm, Michael Smith Farmyard, Haeger Dairy, Alan and Shirley Retzlaff Farm, and Stevens Creek Stock Farm.

8.1 Field Trip on Historic Issues.

A field trip was conducted on 17 October 2001 to (1) revisit the historic properties, (2) visit an additional 320 ac requested for inclusion in the Stevens Creek Stock Farm, (3) revisit the Wenzl Farm on EC-1, and (4) discuss potential mitigation strategies for historic sites with adverse affects along the SM-4 and EM-1. Participants included:

Bill Callahan	Nebraska State Historical Society, SHPO
Stacy Stupka-Burda	Nebraska State Historical Society, SHPO
Ed Kosola	Federal Highway Administration, NEPA Coordinator
Rod O'Sullivan	Federal Highway Administration,
Len Sand	Nebraska Department of Roads, Environmental Analyst Supervisor
Ed Zimmer	City-County Planning Department, Historic Planner
Scott Cockrill	City Engineering, Senior Engineering Specialist
Jim Linderholm	HWS, Principal-in-Charge
Brian Ray	HWS, Transportation Engineer
Amy Zlotsky	AZ Environmental, Environmental Scientist
Stan Parks	University of Nebraska, Research Archeologist

8.2 Secondary and Cumulative Impacts.

A discussion of secondary and cumulative impacts to historic properties has been added to the FEIS (see **Section 9.6**).

8.3 Boundaries of the Historic Properties.

The Herter-Hagaman Farm, Forest Brook Farm, Penterman Farm, Michael Smith Farmyard, Haeger Dairy, and Alan and Shirley Retzlaff Farm are all located on EF-1. Since this alternative is not being developed, FHWA has determined that no additional analysis of the property boundaries is necessary at this time. In addition, an important reason why the EM-1 route was selected was because it minimized impacts to these historic resources.

8.4 Evaluation of the Additional Acres for the Stevens Creek Stock Farm

A consulting party had previously requested that an additional 560 ac be added to the 240 ac already on or eligible for the NRHP--for a total of 800 ac–which were owned by Charles Retzlaff by 1888 (defined by NSHS letter dated 18 September 1995). With the additional information that none of the 560 ac were contiguous with the 240 ac, the SHPO stated that the 560 ac were not considered eligible. Following receipt of this second request for consideration of the 560 ac, the SHPO again stated that the 560 ac were not considered eligible because they were not contiguous to the original 240 ac.

This consulting party further requested that an additional 320 ac, not previously requested for consideration, be considered eligible for the NRHP because these were part of the Stevens Creek Stock Farm during the period of significance. Therefore, research was conducted in the Registrar of Deeds records to determine ownership history of these parcels. The information was provided to the consulting party for their review, and then was provided to the SHPO. All of the parcels were acquired by Charles Retzlaff or his son George by 1909 which predates construction of some of the historic structures. Most, but not all of the parcels are contiguous with the 240 ac which are on or eligible for the NRHP, or they are contiguous with each other.

Of the parcels in the additional 320 ac, two are in close proximity to the preferred alternative, EM-1. Assessment of adverse affects to these two properties relative to the preferred alternative were discussed during a field trip conducted on 17 October 2001.

The first parcel is west of the Stevens Creek Stock Farm (West Half of the Northeast Quarter of Section 5, Township 9 Range 8). FHWA has determined that at least a portion of the west parcel would be eligible for the NRHP because (1) it was acquired by Charles Retzlaff during the period of significance (between 1858 and early 1920s, based on personal communication between Amy Zlotsky and David Murphy, Nebraska SHPO) and (2) at least the southern portion of the property retains enough integrity to contribute to the rural landscape of the Stevens Creek Stock Farm (the parcel has serious integrity problems in the northwest and west portions of the property, including a modern log cabin residence and high voltage transmission line).

The second parcel is located south of the Stevens Creek Stock Farm (Northeast Quarter of the Southeast Quarter of Section 5, Township 9 Range 8 and Northwest Quarter of the Southwest Quarter of Section 4, Township 9 Range 8). FHWA has determined that the second parcel is eligible for the NRHP because (1) it was acquired by George Retzlaff during the period of significance and (2) at least the east portion of the parcel retains enough integrity to contribute to the rural landscape of the Stevens Creek Stock Farm (there is a non-historic dam and pond on the west side of the parcel).

The SHPO concurred with the FHWA determinations by signature dated 30 January 2002 (Appendix E).

8.5 Additional Historic Property.

The Wenzl Farm was revisited during the field trip, and the SHPO restated that neither the barn nor the farmstead had the significance or integrity to be eligible for the NRHP. Specifically, the barn was not individually architecturally significant, and it had been subject to many alterations, including the addition of an I-beam lean-to, replacement windows, and a newer corrugated metal roof. In addition, the setting was no longer intact with a modular home on the property.

8.6 Assessment of Adverse Affects.

All of the comment letters which comment on the assessment of adverse affects are in regards to properties on EF-1, and none of these properties are affected by the preferred alternative–SM-4/EM-1. A reassessment of adverse affects was conducted only for the preferred alternative. In consultation with the SHPO, FHWA determined that there were no additional adverse affects to properties on the preferred alternative. The noise evaluation was also checked, and no noise impacts were identified at the historic sites.

Further, FHWA has determined that the EM-1 alternative will have no adverse affects on the first additional Stevens Creek Stock Farm parcel because (1) EM-1 is located approximately 300 ft west of the parcel and takes no land from the parcel for either the beltway or overpass, (2) there is a high-voltage transmission line located between the parcel and EM-1, (3) the property has been subdivided with a modern log cabin and tree-lined driveway constructed on a 6-ac lot in the northwest portion of the property, and (4) the historic structures of the Stevens Creek Stock Farm are already screened from the EM-1 route by the tree line of Stevens Creek.

FHWA has also determined that the EM-1 alternative will have no adverse affects on the second additional Stevens Creek Stock Farm parcel because (1) EM-1 is located more than 0.25 mi west of the parcel and takes no land from the parcel, (2) there is a high-voltage transmission line located between the parcel and EM-1, and (3) the historic structures of the Stevens Creek Stock Farm are already screened from the EM-1 route by the tree line of Stevens Creek.

The SHPO has concurred with the FHWA determinations of no effect by signature dated 30 January 2002 (**Appendix E**).

8.7 Advisory Council on Historic Preservation.

Since receipt of the ACHP letter, the SM-4/EM-1 route has been identified as the preferred alternative. Since all of the properties listed in the ACHP letter are on the EF-1 route and none are affected by the EM-1 route, FHWA made the decision that it was not necessary to seek a determination from the Keeper of the National Register.

An additional 320 ac were evaluated for the Stevens Creek Stock Farm to determine if the EM-1 alternative would affect any of the property. Based on this evaluation, two additional parcels (west and south of the original 240 acre site) were considered eligible for the NRHP; however, FHWA determined that EM-1 would have no adverse affect on the additional parcels, or on the original 240 ac of the historic site. The SHPO concurred with these determinations.

At a meeting conducted in February 2002 with the ACHP and the National Trust for Historic Preservation (NRHP), these agencies stated that it was reasonably foreseeable that the EM-1 beltway could potentially cause adverse secondary and cumulative affects on some historic properties, and specifically the Stevens Creek Stock Farm. They felt that a beltway would induce "development", potentially changing the timing and character of development near historic properties. It was suggested that appropriate mitigation should be offered to the owners of the historic properties. Their main recommendation for mitigation was to establish conservation easements on the historic properties.

In regards to the proposed mitigation, it was pointed out that the owners of the Stevens Creek Stock Farm, as well as the Preservation Association of Lincoln, had previously expressed written opposition to the use of conservation easements. Copies of their letters were provided to ACHP and NRHP. Upon additional discussion with FHWA, the owners of the Stevens Creek Stock Farm again stated their opposition to pursuing conservation easements with FHWA.

In regards to the beltway inducing development, it is not reasonably forseeable to assume that the EM-1 beltway route will have potential adverse secondary and cumulative effects on the Stevens Creek Stock Farm or other historic sites. This statement is based on analysis of local conditions and the facts of the specific EM-1 route, such as (1) the City of Lincoln has a unique and long history of managed, contiguous growth, (2) the community contemplates development in the Stevens Creek basin--with or without a beltway, (3) the community's proposed plans are to develop in the Stevens Creek area, prior to the construction of the beltway, thus the beltway will not change the timing of the planned growth, (4) while interchanges may change the character of development nationwide, interchanges in the EM-1 route have been planned to avoid roads (specifically Van Dorn Street which is adjacent to the Stock Farm) which could impact historic properties, thus the beltway will not change the character of the development near historic properties, and (5) development is proposed to be restricted in the floodplain areas (greenspace) which cover much of the Stevens Creek Stock Farm and vicinity.

9.0 MITIGATION PLAN FOR HISTORIC PROPERTIES ALONG SM-4/EM-1

A mitigation plan has been developed to cover the two historic properties which are adversely affected by the preferred SM-4/EM-1 alternative. These are the Henry Wunibald Farmyard on SM-4 and the Steve Johnson Farmyard on EM-1. Modification of the EM-1 alignment made it possible to avoid archeological site 25LC129. The mitigation plan is based on observations and discussions from the field trip, recommendations by the SHPO, input from a professional landscape architect, and meetings with the property owners.

A Draft Memoranda of Agreement was developed to implement the mitigation plan. The document, along with a draft version of Chapter 9 of this FEIS, was provided to the property owners and consulting parties, including the ACHP and NTHP. A public meeting on historic mitigation was conducted for the property owners and consulting parties on 12 February 2002.

Approximately 24 people attended the meeting, including representatives of the ACHP, NTHP, SHPO and Preservation Association of Lincoln. Seven written comments were received over the 10-day comment period. Comments related to historic issues covered the following topics:

(f) Two landowners on EM-1 objected to the revised boundary of the Stevens Creek Stock Farm as it included their properties. The boundary changes were made without their permission. One owner expressed concern that they would now be subject to federal permits or stipulations on receiving federal subsidies.

(g) The owner of the non-historic log cabin residence (located on the additional NRHP-eligible parcel west of the Stevens Creek Stock Farm) expressed concern about noise impacts from EM-1.

(h) The owner of the Henry Wunibald Farmyard expressed concern that their non-historic farmyard would be more adversely affected by noise impacts from SM-4 that the NRHP eligible property.

(i) The FEIS should address the impacts on the Stevens Creek Stock Farm from additional traffic on 138th which is traveling from the EF-1 interchange on Pioneers Boulevard to Van Dorn Street.

(j) Certain consulting parties felt that properties along all the routes should be studied for possible boundary changes.

(k) The NTHP believes that the beltway will have the potential for cumulative and indirect effects on historic properties, and suitable mitigation strategies should be developed.

(l) Certain consulting parties felt that the FEIS should contain a statement that the EF-1 alternative is eliminated from any future consideration. They did not feel that selection of EM-1 was strong enough assurance that the EF-1 route would never be reconsidered.

Based on comments, the MOA was finalized (Appendix E). The mitigation plan, as described in the MOA, is as follows.

Henry Wunibald Farmyard. The primary emphasis of the mitigation proposal is to screen the view of the beltway from the house and yard. Presently, the north and west sides of the property are lined with many mature deciduous trees (cottonwood, mulberry, walnut) which extend up to the house. While the existing trees screen the view from the house and yard during the growing season, the beltway would be visible during winter. The period of significance for this site is 1901-1950 which includes the period when shelterbelts and windbreaks were a part of the farm culture. Some existing trees on the property appear to be remains of old windbreaks to the north and west of the residence.

Prior to implementation of the undertaking, NDOR, in consultation with the SHPO, shall design a landscape site plan to screen the view of the beltway from the farmyard, and shall ensure that the area is landscaped in accordance with the approved plan. The plan shall consist at a minimum of a windbreak planting along the north and west sides of the farmyard in the general area of the original windbreak. This may include up to three rows: a shrub, cedar trees, and possibly a deciduous tree, such as cottonwood. Further refinement of plant types and spacings will be addressed as part of final design.

In order to implement the landscape plan, NDOR shall obtain an easement or agreement with the property owners of the Henry Wunibald Farmyard or adjacent property owners to the west.

Steve Johnson Farmyard. The primary emphasis of the mitigation proposal is to screen the view of the beltway from the house and yard. South of Yankee Hill Road, the beltway would be hidden by a hill across the road and to the east of the site. North of Yankee Hill Road, the beltway would be visible to a point about 0.25 mi north of the road; further north it is hidden by another hill. There is a small creek with trees within 100 to 300 ft of the beltway--between the beltway and the house. On the property itself, there is a line of mature cedar trees along the driveway, and a number of scattered shrubs and deciduous tree west of the tree line. These trees hide the view of the beltway from the house itself, but not from the yard west of the drive.

The period of significance for this property is 1890-1936. While windbreaks, for the most part, are outside of this historic period, it is reasonably in context with the site to add a lilac or similar large shrub hedge.

Prior to implementation of the undertaking, NDOR, in consultation with the SHPO, shall design a landscape site plan to screen the view of the beltway from the farmyard, and shall ensure that the area is landscaped in accordance with the approved plan. The plan shall consist at minimum of a screen, large shrub, or hedge planting along the west side of the farmyard, extending north from Yankee Hill Road to the north end of the corral. This is anticipated to consist of one row (hedge) of lilacs or similar large shrub. Further refinement of plant types and spacings will be addressed as part of final design.

In order to implement the landscape plan, NDOR shall obtain an easement or agreement with the property owners of the Steve Johnson Farmyard or adjacent property owners to the west.

Easements. In order to address the potential cumulative effects on historic properties in the Area of Potential Effect for the Lincoln South and East Beltways Project, the National Trust for Historic Preservation and other consulting parties agree to assist owners of such historic properties who may be interested in donating historic preservation or conservation easements. Such assistance may include conducting workshops on easements, providing information on

potential easement-holding organizations in the local area, and serving as a resource for technical assistance in developing easement documents.

Archeological Site 25LC129. Based on discussions during the site visit on 17 October 2001, further engineering refinements were evaluated (see **Section 9.3**). From the reanalysis, it appears possible to completely avoid impacts to the archeological site by incorporating a retaining wall on the west side of the beltway right-of-way. No additional mitigation is proposed.

Additional Cultural Resource Management Activities. Other activities will include:

- Completion of an archeological survey of bottomlands where access has been previously denied.
- Use of NDOR standard provisions regarding previously unsuspected archeological remains that provide for cessation of work and notification of the SHPO
- Use of NDOR standard provisions regarding monitoring of archeological sites.
- A historic marker located at Saltillo Road and the abandoned South 14th Street right-of way will need to be relocated. The marker commemorates the Nebraska City to Fort Kearny Road, "The Great Central Route to the Gold Fields" which crossed near this location. There are no remnants of the trail known within or near the SM-4 right-of-way, and the marker is not considered an historic site.

10.0 STATUS OF SECTION 106

In November 2000, the SHPO reviewed the Preliminary Draft Environmental Impact Statement (PDEIS), and concurred with the findings of the PDEIS and the findings of the appendices (specifically the Assessment of Adverse Effects and the Determination of Boundaries report) as they related to Section 106 consultation (see **Appendix E**, letters dated 1 February 2001 and 27 November 2000).

Following the close of the comment period on the DEIS, comments on historic issues were compiled. These issues were investigated further and the current status is documented in this Appendix and in **Chapter 9** of the FEIS. Based on the additional investigations, the list of sites which were determined to be adversely affected was updated to reflect the fact that archeological site 25LC129 could be avoided on EM-1 (**Table F.2**). The list of adverse affects (**Table F.3**) was also updated for publication of the FEIS based on the additional evaluations.

Consultation with the SHPO has been ongoing to resolve the final issues. The SHPO concurred with FHWA determinations on the additional Stevens Creek Stock Farm parcels by signature dated 30 January 2002 (**Appendix E**). The SHPO concurred with the mitigation plan by signature to the MOA (**Appendix E**).

Appendix F-A
Documentation of Additional Investigations

University of Nebraska Lincoln

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Memo

To: Amy Zlotsky

From: Stacy Stupka-Burda SSB

CC: Stan Parks, Bill Callahan, Rob Bozell

Date: 9/19/00

Re: South and East Beltway: Possible Archeological Site on Ron Skoda's property

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Amy,

As we discussed in early August 2000, during discussions with Rod Otley, Mr. Otley mentioned that another person living in the SW ¼ of Section 21, T10N, R8E relayed to him that "something" had been found during excavations related to construction activities on this property. Mr. Otley stated that he was told "Indians came out and held a ceremony" after which construction was completed.

While we had no first hand knowledge of the situation we operated under the assumption that there was a possibility that human remains were discovered. Therefore, we felt it was important to try and determine what, if anything had been discovered. As you are undoubtedly aware LB340 and NAGPRA mandate that the discovery of human remains be handled in a very specific manner.

We discussed this situation with Rob Bozell of the Nebraska State Historical Society to determine whether or not his office had ever been notified about the discovery of human remains in the area in question. Mr. Bozell assured us that his office has not been notified of any discovery of human remains in that area.

We also checked with the local Native American community, who indicated that they had no knowledge of anything discovered in the area in question. Furthermore, our contacts indicated members of the local Native American community would handle any situation involving the discovery of human remains in accordance with State and Federal law.

On numerous occasions during fieldwork conducted relative to the South and East Beltway Study, the UNL Department of Anthropology attempted to gain permission to conduct archeological investigations in the area in question. We were repeatedly, and quite firmly denied access.

In summary, it is not clear what, if anything was found on the property described above. It is clear, however, that no local authorities were notified. If human remains were discovered and not reported, it would be violation of both State and Federal Law.

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Memo

To: Amy Zlotsky

From: Stacy Stupka-Burda SSB

CC: Stan Parks

Date: 10/13/00

Re: Addendum: Archeological Inventory and Testing of Lincoln's South and East Beltway: Alternatives SM-1, EC-1, EM-1, and EF-1 Lancaster County, Nebraska Volumes I and II.

This memo is prepared as an Addendum to the report entitled, Archeological Inventory and Testing of Lincoln's South and East Beltway: Alternatives SM-1, EC-1, EM-1 and EF-1 Lancaster County, Nebraska Volumes I and II, prepared by Stan Parks and Stacy Stupka-Burda of the UNL Department of Anthropology (January 2000).

As a result of public comments received regarding the Preliminary Assessment of Adverse Effects, researchers from the UNL Department of Anthropology investigated three locations which were reported by property owners to be archeological sites not previously recorded during the archeological inventory of the South and East Beltway alternatives conducted in 1996 and 1998 (Parks and Stupka-Burda 2000). Through these additional investigations, two previously unrecorded archeological sites were documented. A fourth locale, reported as a potential archeological site is addressed in a separate memo dated 09/19/2000.

25LC162 (EBAP2000-01)

This site is located in the [redacted] Township. Descriptively, this site is located approximately [redacted]. Site 25LC162 is a lithic scatter located in an upland setting and is estimated to encompass [redacted]. Lithic material types noted included Nehawka chert, white chalcedony, red quartzite and brown chert. A total of 12 flakes were noted on the ground surface, and all of these appeared to be secondary decortication or tertiary flakes. No formal or expedient tools were noted. The property owner indicated that artifacts had been collected from this site, but these artifacts could not be located for examination by UNL researchers. The property owner indicated that they had not collected any projectile points. The site area is under agricultural cultivation, and ground surface visibility in mid-August 2000 was 75-80%. The site is located approximately 300 meters east of the eastern most survey boundary for the [redacted] alternative inventoried by UNL in 1998 and occurs outside the project right-of-way.

University of Nebraska–Lincoln University of Nebraska Medical Center University of Nebraska at Omaha University of Nebraska at Kearney

Given the paucity of artifacts observed on the ground surface, the absence of diagnostic or patterned tools, and the upland setting associated with this site, 25LC162 is recommended not eligible to the National Register of Historic Places (NRHP). No additional investigation is recommended.

25LC163 (EBAP2000-02)

The site, 25LC163 is located in the [redacted] Township. Descriptively, this site is approximately [redacted]. 25LC163 is a non-Native American site, commonly referred to as a Euroamerican or historic site. The site area is estimated to cover [redacted] and extends from an area currently under agricultural cultivation to an area dominated by scrubby tree growth. Ground surface visibility ranged from 95% in the agricultural field to 15% within the trees. Artifacts noted on the ground surface included red brick, flatglass and stoneware. Within the trees, UNL researchers observed more red brick, tin cans, a barrel stay, automotive body pieces from a ca. 1920 car body, and unidentifiable ferrous metal pieces. The artifacts located in the trees appear to be of secondary deposition, and are either the result of clearing the agricultural field, household refuse disposal, or most probably, some combination thereof. This site is located in an upland setting within the original survey corridor of the [redacted] alternative. This area was not inventoried by UNL researchers in 1998 because NeSHPO approved survey design of the archeological inventory of the South and East Beltway alternatives dictated that only 10% of the upland areas were to be surveyed (Parks and Stupka-Burda 2000). This sampling was obtained in upland settings scattered throughout each survey corridor. Inventory of the parcel where site 25LC163 is located was arbitrarily not selected to complete the 10% sample of alternative [redacted].

The type of information afforded by site 25LC163 is available in archival sources. Beyond locational information already recorded, the archeological research potential of this site is severely limited. Therefore, this site is recommended not eligible to the NRHP. No additional investigation is recommended.

Additional archeological inventory

UNL also inventoried an area located in the [redacted] Township. This location was described as a potential archeological site by the property owner. This area is an upland setting approximately [redacted]. The most recent agricultural crop at this locale was wheat. Ground surface visibility was approximately 35%. No artifacts were noted on the ground surface, and no archeological site was recorded.

enclosures:
NSHS site form – 25LC162
NSHS site form – 25LC163
Topographic map illustrating areas surveyed as discussed above } omit in EIS for confidentiality

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Memo

To: Amy Zlotsky

From: Stacy Stupka-Burda

CC: Stan Parks

Date: 10/17/00

Re: South and East Beltway: Reevaluation of historic properties in response to public comment

---

This memo was prepared in response to public comments received regarding the Preliminary Assessment of Adverse Effects. Researchers from the UNL Department of Anthropology investigated seven locations reported by property owners to be historic properties potentially eligible to the National Register of Historic Places (NRHP) or archeological sites. In some cases, public comment suggested that these locations were not previously evaluated during investigations conducted by On Site Photography and Preservation (1998) or were not recorded by the archeological inventory of the South and East Beltway alternatives conducted in 1996 and 1998 (Parks and Stupka-Burda 2000). In addition, concerned property owners requested that two locations be reevaluated regarding their potential NRHP eligibility.

UNL Researchers revisited each locale in question and found that the original evaluations and recommendations provided by On Site (1998) were valid. In the case of two properties not included in the On Site report (1998), the Otley Farmstead and the Speidell Barn, UNL determined that these properties did not retain sufficient integrity and did not meet minimum evaluation considerations outlined in the Nebraska Historic Buildings Survey (NeHBS) Manual (July 9, 1997), and were not included in the original inventory conducted by On Site (1998).

The NRHP eligibility of the Hulda Otto House was examined and detailed in Evaluation of the Hulda Otto House for Eligibility to the National Register of Historic Places (Stupka-Burda 1999).

One locale, reported as a potential archeological site, is addressed in a separate memo dated 09/19/2000. Two archeological sites recorded as a result of additional investigation are detailed in a memo dated 10/13/00.

Maahs Barns

Recommendation: Not Eligible.

Numerous modern intrusions are present on this property. There are 5 steel grain bins present, three of which are very large and dwarf the barns. A modern house has been placed on site. There is no integrity of setting, feeling or association remaining at this site.

Otley Farmstead

Recommendation: Not eligible.

The integrity of this structure and the surrounding farmyard is no longer intact. The house lacks integrity, and does not meet minimum evaluation considerations outlined in the Nebraska Historic Buildings Survey (NeHBS) Manual (July 9, 1997). The original porch supports on the house have been replaced with wrought iron supports, and the house has been clad in wide lap siding. At least two additions, one to the north and one to the east, and a new entrance have been added. All of the windows that UNL could see from the public right-of-way have been replaced, and no original molding exists around the windows. The chimney has been removed. The presence of indoor plumbing is not germane to the question of NRHP eligibility. The setting of the yard is intact, but the house retains little integrity.

In the farmyard itself, there is an older corrugated metal building (ca. 1950-60) plus two new metal quonsets. There are two small granaries (which look to be the only intact historic buildings on site, but still are not the best representations of such structures in the study area).

This house and the surrounding farmyard have been substantially altered and cannot be considered eligible to the NRHP. Especially when compared to other eligible properties in the study area.

The Bud and Joan Speidell Barn

Recommendation: Not eligible.

The barn is clad in board and batten siding with decorative scalloping, and the haymow door faces north. While the barn looks intact on the north and west sides from public right-of-way, the integrity of this gable roof barn is not intact. On the east side, the board and batten siding has been replaced with corrugated metal. The lower portion of the board and batten siding has been replaced with corrugated metal on the north side.

In addition, the agricultural setting originally associated with this barn has been significantly altered. The setting is now park like, with bluegrass and many exotic trees planted all around the barn. This barn is not the best representative of such a barn in the study area. Other structures on site are modern.

This property does not meet minimum evaluation considerations outlined in the Nebraska Historic Buildings Survey (NeHBS) Manual (July 9, 1997).

The Want Schoolhouse (LC00:E-101)

Recommendation: Not eligible.

In addition to On Site's comments (Elliott and Dirr 1998), the building sits upon a new poured concrete foundation, one door has been replaced with an insulated steel door, and full-light French patio doors have been added on the south facade. These additions and insertions are not in keeping with the architectural style of the school. A modern house is positioned approximately 12 m (40 ft) west of the schoolhouse, and a trailer park is located approximately 15 m (50 ft) east. The integrity of this structure is no longer intact, and modern intrusions have impacted the integrity of setting and feeling.

Williss Farm (LC00:E-80):

Recommendation: Not eligible.

UNL supports On Site's recommendation, this property is not eligible to the NRHP On Site (1998) did assess the entire farm, but found that the integrity of the house was compromised and thus did not evaluate it for NRHP eligibility.

The house lacks integrity, and does not meet minimum evaluation considerations outlined in the Nebraska Historic Buildings Survey (NeHBS) Manual (July 9, 1997). Specifically, an addition has been placed on the west, and many windows have been replaced. The house has been resided, and shutters have been added. The entrance over the east door has been replaced and is not in keeping with the architectural style or feel of the house. There is no brick chimney visible, so one can assume that it has been removed. While this house is well maintained, too many modern alterations have occurred to recommend it eligible to the NRHP.

German/Trinity Lutheran Church

As has been pointed out, this church is well outside the study area. The church itself has been re-sided, and has an addition on the front and one on the rear. These additional and alterations impact the integrity of the structure. Generally, religious properties are considered ineligible for listing on the NRHP. Exceptions to this include those properties that derive significance from architectural or artistic distinction. This church does not appear to be architecturally or artistically distinctive. According to information provided by the Trust, "the historic church was founded by pioneers of Lancaster County in April 1880 as the German Evangelical Lutheran Church of Stockton Precinct...The original church, completed in 1883, later burned. However, the current church building was dedicated in 1917" (letter dated 11/2/99). The fact that there was an earlier church plays no bearing on eligibility. A structure can only be eligible for significance obtained after its construction date (NR Bulletin #15, p. 28). So inferring that this building is significant because of some connection with early pioneers of Lancaster County and an 1883 building that no longer exists is irrelevant. National Register Bulletin #15 points out that "A religious property cannot be eligible simply because [it] was the place of religious services for

a community, or was the oldest structure used by a religious group in a local area." (p.27).

The Trust (letter dated11/2/99), suggested that a potential historic district be studied using the German/Trinity Lutheran Church as a center point. When considering this potential historic district, by the time you reach 148th Street and the study area, the same impacts and loss of integrity that precluded the creation of a Stevens Creek Historic District are present relative to a historic district centered on the German/Trinity Lutheran Church.

Wagner site (Old Indian Well)

It isn't clear from Mr. Wagner's description of the old Indian well where it is as there are many "islands of trees" there now. We spoke to June Garrett when gaining permission to do nearby archeological surveys (Summer 1998). Mrs. Garrett informed us that they had always been told that there was an old Indian well on their property near the center of the ¼ section (SE ¼ Section 9 T9N, R8E). Relying on this information, we determined that this would be located outside our survey corridor and outside the project right-of-way. Mr. Wagner describes the site as buried in 1978. Conventional survey methods, visually inspecting areas by walking along evenly spaced transects, would not allow us to identify such a buried site.

It is our opinion, that if the site described by property owners is cultural, or man-made, then it may be an early non-Native American (Euroamerican) well. Another possibility is that this was the location of a natural spring that has carried away the subterranean loess creating an empty void, which then may have collapsed. Such features occur in the dissected loess plains of Eastern Nebraska.

We did not attempt to find this site, for a variety of reasons. Primarily, the location, as described to us is outside UNL's survey corridor and it was reportedly buried a number of years ago. In addition to its location, it is unlikely that such a site, as described, exists in this region. Native Americans on the Plains are not known to have dug wells, but instead relied on available surface water.

Appendix G

DEFINING BOUNDARIES

of NRHP and NRHP-Eligible Properties

During the reconnaissance survey conducted by On Site, the South and East Beltways Study Area was surveyed section by section in an effort to include each man-made structure or object in the survey (Elliott and Dirr 1998). The comparative nature of this study dictated that On Site initially consider hundreds of man-made structures and objects. Through a process based on the Secretary of the Interior's Standards for Identification and Evaluations and on evaluation considerations outlined in the *Nebraska Historic Buildings Survey (NeHBS) Manual* (July 9, 1997), professional judgment and experience; Elliott and Dirr (1998) identified 141 sites that met minimum historic property survey criteria.

Of the 141 historic properties so identified, two properties, the Stevens Creek Stock Farm (**Figure G.1**) and Ehlers Round Barn (**Figure G.2**) were already listed in the NRHP (Elliott and Dirr 1998). Further, in consultation with the NeSHPO, the City of Lincoln Preservation Planner, and in accordance with appropriate National Register bulletins, physical integrity evaluation and comparative analysis, Elliott and Dirr (1998) recommended an additional 25 sites eligible to the NRHP (see Figure 3.3 in main body of DEIS). The NeSHPO concurred with these recommendations. Since the completion of the investigations completed by On Site, one of the historic properties considered eligible for listing, the Herter Farmstead (also known as the Herter-Hagamen Farm) has been listed on the NRHP (form on file, NSHS). Also, two additional 32 ha (80 ac) parcels (to the west and south) have been determined eligible as part of the Stevens Creek Stock Farm.

Within the intensive-level survey of the Stevens Creek Bottoms area, Elliott and Dirr (1998) developed a context within which to examine the area as a cultural landscape/rural historic district and to evaluate its eligibility for the NRHP. Although a broad pattern of nineteenth century immigrant settlement was identified within this context, Elliott and Dirr (1998) considered only one additional site within the bottoms area, the Karl Lemke Farm, eligible for the NRHP (in addition the NRHP listed Stevens Creek Stock Farm). Primarily due to physical integrity issues and later/new construction within the boundaries of the study area, Elliott and Dirr (1998) were unable to identify any cultural landscapes or historic districts. Elliott and Dirr (1998) postulated that the low incidence of NRHP-eligible properties located within the Stevens Creek Bottoms was due to the ever changing and evolving demands of agriculture. These forces continually erode the historic integrity of landscapes and structures associated with early settlement in Lancaster County. Again, the NeSHPO concurred with these recommendations.

In 1999, UNL evaluated three historic properties: one inadvertently omitted by On Site (Site LC00: S-143, Wunibald Farmyard); one previously considered outside the study area (Site LC00 S-142, Guenzel Farmyard); and one previously considered to lack sufficient integrity to be considered for listing on the NRHP (Site LC00: E-144, Hulda Otto House). These investigations were conducted under the guidelines established by the On Site researchers (1998). As a result of this additional work, one historic property (Wunibald Farmyard) was recommended eligible to the NRHP. The NeSHPO concurred with this recommendation (letter dated June 1999).

Defining Historic Boundaries

Although not routine for Section 106 purposes, well-defined historic property boundaries can assist in determining the effects of Federal undertakings. Additionally, as stated previously, the boundaries of the historic properties discussed in this report were defined at the request of FHWA subsequent to public comment, as was the evaluation of associated agricultural acreage to NRHP or NRHP eligible properties.

DEFINING BOUNDARIES OF NRHP and NRHP-ELIGIBLE PROPERTIES Located Within the South and East Beltway Study Area

November 2000
(Revised 2/01, 11/01, 5/02)

In December 1999, the Federal Highway Administration (FHWA) requested comments from consulting parties on the preliminary Assessment of Adverse Effects to NRHP and NRHP-eligible sites for the Lincoln South and East Beltways study. The preliminary assessment of adverse effects was prepared and a request for comments was made as part of FHWA's process to comply with 36 CFR Part 800, the regulations that govern Section 106 of the National Historic Preservation Act of 1966.

This report has been completed in partial response to consulting party comments, and addresses two of the more challenging issues raised by public comment. The first issue is to identify specific boundaries for properties within the South and East Beltways Area of Potential Effect (APE) that are considered eligible for listing in the National Register of Historic Places (NRHP). The second issue addresses whether large agricultural acreages should be considered contributing elements to smaller properties eligible for or listed in the NRHP.

Under agreement with Olsson Environmental Sciences (OES), the University of Nebraska-Lincoln, Department of Anthropology (UNL) conducted evaluations to define the historic boundaries of 30 NRHP-eligible properties located within the South and East Beltways Study. The inclusion of associated agricultural acreage was also assessed as appropriate. These evaluations were conducted at the request of FHWA subsequent to public comment. During the evaluation, UNL identified two additional NRHP-eligible directional signs within the study area (LC00:S-145 and LC00: E-146).

The boundaries of three NRHP eligible archeological sites, 25LC125, 25LC129, 25LC147, were defined by Parks and Stupka-Burda (2000). The boundaries of a fourth archeological site, 25LC1, were determined by the Nebraska State Historical Society (on file, NSHS).

The boundaries of two additional NRHP properties, the Stevens Creek Stock Farm–Mardale Farms (LC00: E-88; NeHBS #LC00-22) and Ehlers Round Barn (LC: S-127; NeHBS #LC00-035) were defined on their respective National Register of Historic Places Registration Forms (on file, NSHS) and, for the Stock Farm, in additional correspondence from the Nebraska State Historic Preservation Office (NeSHPO).

Previous Investigations

In 1997, On Site Photography and Preservation (On Site) conducted a reconnaissance-level historical survey within the 210 km^2 (80 mi^2) South and East Beltways Study Area and an intensive-level survey of the Stevens Creek Bottoms (Elliott and Dirr 1998). Elliott and Dirr (1998) surveyed potential historic resources, evaluated each of these historic resources using NRHP Criteria, and made recommendations for NRHP eligibility based upon those evaluations.

DEFINING BOUNDARIES OF NRHP ELIGIBLE PROPERTIES LOCATED WITHIN THE SOUTH AND EAST BELTWAYS STUDY AREA

November 2000

A Cultural Resources Management Repc..
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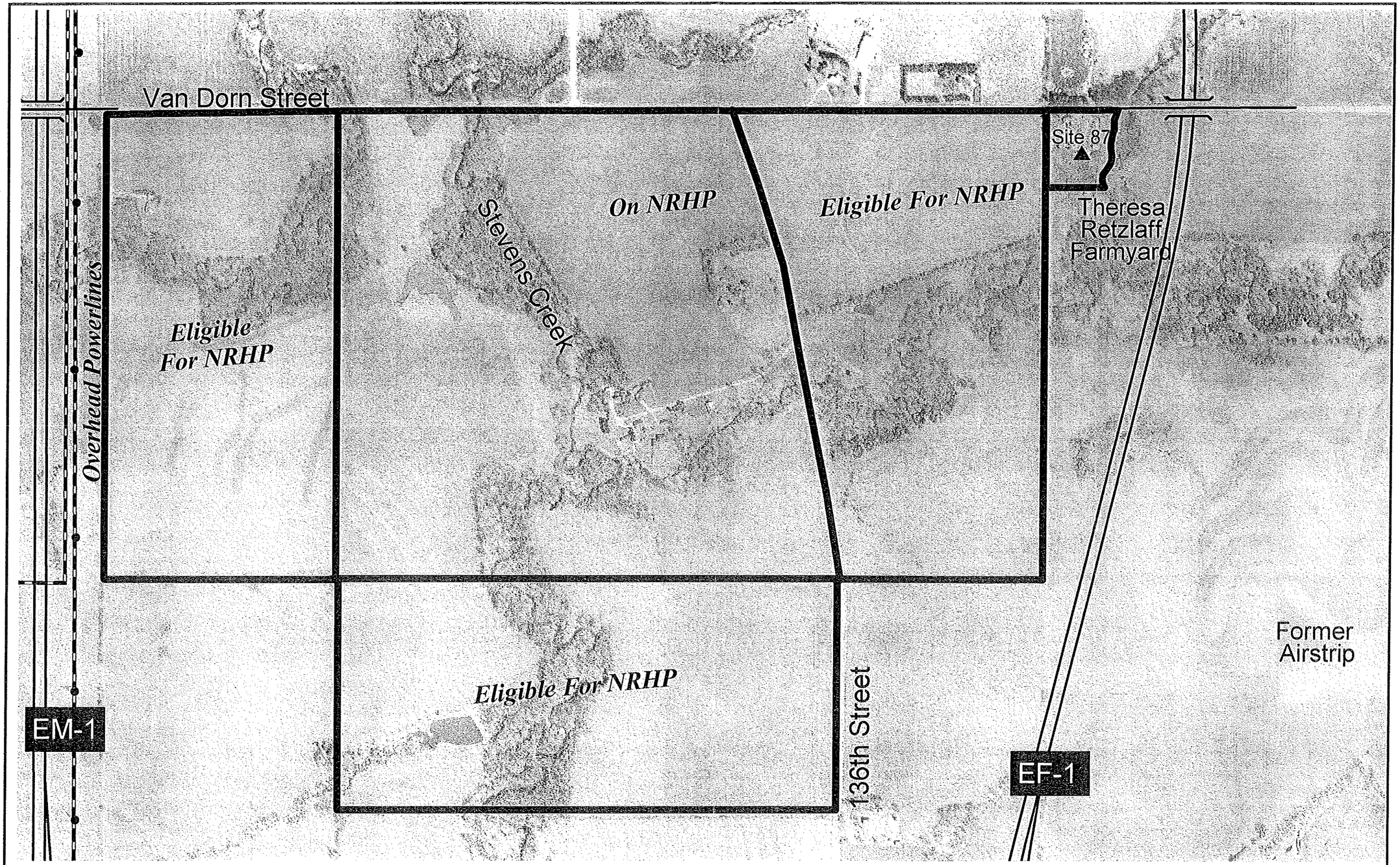
Van Dorn Street
Site 87
Theresa Retzlaff Farmyard
Overhead Powerlines
Stevens Creek
On NRHP
Eligible For NRHP
Eligible For NRHP
Eligible For NRHP
Former Airstrip
136th Street
EM-1
EF-1
LINCOLN SOUTH AND EAST BELTWAYS STUDY
N
500 0 500 Feet
200 0 200 Meters
Boundary of NRHP Site and NRHP - Eligible Property
Site LC00: E-88
Stevens Creek Stock Farm
May 2nd, 2002
G-1

G.3

Saltillo Road

Airstrip

S. 110th St.

LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

300 0 300 Feet

100 0 100 Meters

Boundary of NRHP Site:
Site LC00:S-127
Ehler's Round Barn

June 9, 2000

G-2

Boundaries are selected based on the historic property's significance, integrity and physical setting (NR Bulletins #21 and #30). According to NR Bulletin #21, these boundaries "should define the limits of the eligible resource...and usually include the immediate surroundings and encompass the appropriate setting" (p. 2). Resources or areas that do not contribute directly to a property's significance are excluded (NR Bulletin #21). When defining historic boundaries, researchers should consider:

1. **Integrity:** The majority of the property must retain integrity of location, design, setting, feeling and association to be eligible. The essential qualities that contribute to an eligible property's significance must be preserved. Activities that often compromise integrity include new construction or alterations to the resource or its setting. Natural processes that alter or destroy portions of the resource or its setting, such as fire, flooding, erosion, or disintegration of the historic fabric, may compromise integrity.

2. **Setting and Landscape Features:** Consider the setting and historically important landscape features. Natural features of the landscape may be included when they are located within the district or were used for purposes related to the historical significance of the property.

3. **Use:** Consider the historic use of the property when selecting the boundary. The eligible resource may include open spaces, natural land forms, designed landscapes, or natural resources that were integral to the property's historic use. Modern use may be different, and some modern uses alter the setting or affect built resources.

4. **Research Potential:** For properties eligible under Criterion D, define boundaries that include all resources with integrity that have the potential to yield important information about the past.

(NR Bulletin #21)

Boundaries can be aligned with the distribution of resources (both above ground and subsurface); can follow legal boundaries; can correspond with boundaries as illustrated on historic maps; and can be based on natural features or cultural features. Cartographic features and arbitrary limits may be used when necessary (NR Bulletin #21). Any combination of these may be utilized as necessary.

South and East Beltway Historic Boundaries

Based on the information described above, information obtained from the NeSHPO, and that from additional research, several observations regarding the definition of the boundaries of historic properties located within the South and East Beltway Study area can be stated. These observations were used as guidelines when considering boundary definitions for this report.

Associated Agricultural Acreage

The amount of acreage that can even be considered for inclusion within the boundary of a historic property is dependent upon the NRHP significance of the property. For example, properties significant to the NRHP under Criterion A may have associated agricultural acreage included within their historic boundaries. This property must retain "the essential physical features that made up

its character or appearance during the period of its association with the important event, historical pattern, or person(s)" (NR Bulletin #15). This associated agricultural acreage must retain its integrity relative to the NRHP eligible property's period of significance (Bill Callahan, NeSHPO, personal communication). The integrity of associated acreage is irrespective of current ownership.

However, those properties determined eligible to the NRHP under Criterion C generally do not include associated agricultural production acreage. Properties considered eligible under Criterion C are eligible due to their physical design, such as architecture (NR Bulletin #15). Associated agricultural acreage does not contribute to Criterion C evaluation. However, boundaries defined for properties determined eligible under Criterion C should still consider the historic setting of the property and should include those features that contribute to the overall integrity, setting and feeling of the property.

According to Guidelines for Evaluating and Documenting Rural Historic Landscapes (NR Bulletin #30) changes that may reduce the historic integrity of a rural landscape include:

- widening and resurfacing of roadways
- changes in land use and management that alter vegetation, change the size and shape of fields, erase boundary demarcations, and flatten the contours of land
- introduction of nonhistoric land uses (quarries; tree farms; sanitary landfill; recreational areas; limited access highways and interchanges; power plants; wastewater treatment plants, and other public utilities; subdivision for residential, commercial, or industrial development)
- deterioration, abandonment, and relocation of historic buildings and structures
- substantial alteration of buildings and structures (remodeling, siding, additions)
- construction of new buildings and structures

Within the South and East Beltways APE, the evolution of agricultural and conservation practices, the removal of agricultural acreage from cultivation, and the expansion of public infrastructure have led to a variety of activities that have negatively impacted the integrity of historic properties and affects the integrity of associated agricultural acreage. These practices include subdivision, construction of modern buildings and structures, agricultural and conservation terracing, channel modification, dam construction, windbreaks, and road widening and paving.

Some of these features and modifications can be dated to general periods of time, which assists in determining whether or not the feature was present during the historic property's period of significance.

Conservation Terracing

Conservation or agricultural terracing can be described within a framework spanning the last 65 years and three types of terrace construction. These three terrace types offer a relative dating technique of agricultural terraces in Lancaster County.

The Dust Bowl of the late 1930's left an important legacy of soil conservation across the United States, but particularly on the Plains (Christy 1940; Worster 1979). The Soil Conservation Service (SCS) was established in 1935 (Helms 1990). Two ways in which the SCS advocated conservation of the soil was by contour cultivation of agricultural fields, and contour furrows on rangeland (Helms 1990). Some of this early conservation contouring employed laborers of the Civilian Conservation

Corps (CCC), stationed in Lancaster County near Denton. The conservation terraces created by the CCC were dug by hand and are easily recognizable.

According to sources at the Lower Platte South Natural Resources District (LPSNRD) based in the Lancaster County Natural Resources Conservation Service (NRCS) field office, some of the features of these early terraces include an uneven appearance; the terraces are closely spaced and the tops of the terraces are very low. In addition, these terraces were not constructed across ridge tops and the ends of CCC terraces constructed across waterways are unlikely to align (NRCS). A few such terraces still exist within Lancaster County, preserved in pasture or grasslands.

The second period of conservation terrace construction began after World War II when a record number of acres were converted to plowed fields. These terraces were built by machine and characterized by even terrace tops. The terraces are evenly spaced and fields are characterized by grassed waterways. Agricultural fields continued to be terraced in this manner into the mid-1970's (NRCS). These terraces are also obviously much more massive than the hand-dug CCC terraces.

By the mid to late 70's a third method of terrace construction was beginning to emerge. These conservation terraces maintain the characteristics of the machine built terraces of the 1950's, 1960's and early 1970's. The major difference is the addition of tile pipe outlets to control water drainage. With the addition of tile pipe outlets, grassed waterways became unnecessary, allowing farmers to farm more of their fields. By the early 1980's, tile pipe outlets became very popular, and today, The NRCS estimates that 99% of the fields that are (Lancaster County NRCS) terraced contain tile pipe outlets.

Channel Modification and the Construction of Small Dams

The Flood Control Acts of 1936 and 1944 initiated the most comprehensive examination of agriculture's relationship to flooding to that time (Helms 1988). The information gained during this examination laid the foundation for future water resources in the United States Department of Agriculture (USDA) and for the Flood Prevention Act of 1954 (Helms 1988).

Beginning in 1936, and continuing to the present day, flood control projects have used combinations of channel modification, small dams, and other engineering works to reduce flooding along small streams (Helms 1988).

Channel modification or stream straightening aided in draining the field, reduced the tendency for stream migration, and gave farmers more useable agricultural acreage. In addition, straightening the borders of small creeks and intermittent drainages simplified cultivation by allowing straight crop rows.

The construction of small dams not only retained storm water in the event of a flood episode but also provided water retention for livestock, wildlife habitat enhancement, recreation, and irrigation.

Trees

Soon after the arrival of non-Native Americans on the Plains, planting trees became important. Settlers planted orchards, woodlots, shelterbelts and hedges (Isaacson 1999). State and Federal laws passed in the late 1860's and early 1870's gave tax exemptions to those who planted trees. Laws such as the Timber Culture Act of 1873 provided that any person who planted 40 acres of

timber, planted not more than 12 feet apart, would be entitled to the ¼ section of which the timber was a part (Dick 1975). However, in the eastern part of Nebraska, there was little government land available by the time this act was passed and there are no known extant timber claim plantings within the Beltways study area.

Passed in 1924, the Clarke-McNary Act, encouraged tree planting and made it possible for landowners to purchase trees for windbreaks at low cost (Dick 1975). This legislation motivated people in many states to plant trees. However, it was only after the Dustbowl years of the 1920's, the Great Depression of the 1930's that windbreaks became widespread in the Great Plains (Isaacson 1999).

The shelterbelt program of 1935-1942, known after 1937 as the Prairie States Forestry Project, was confined to the zone between the tall grass prairie and the short grass prairie, roughly following the ninety-ninth meridian (Dick 1975). In Nebraska, the eastern boundary of the shelterbelt zone stretched from Boyd County, through Wheeler, Valley, Custer, Phelps, and Harlan Counties. The shelterbelts were forested strips planted along ¼ section lines in the interior of the section rather than along established roads, and were generally 40 m (132 ft) wide (Dick 1975). According to Dick (1975) "the ideal shelterbelt was rooflike in cross section." The center was comprised of tall deciduous trees with successively shorter trees, conifers, tall shrubs, and finally low shrubs on either side (Dick 1975).

Windbreaks are smaller than shelterbelts, and are normally placed to protect the farmyard from the effects of wind. As they occur in the study area, they are generally comprised primarily of evergreen trees evenly spaced along the north and western edges of farmyards. These plantings are not part of a large scale, systematic program of tree planting, though they may have been facilitated by legislation such as the Clarke-McNary Act. Many are the result of local or regional efforts of the Soil Conservation and Survey after 1942.

In summary, tree growth within the Beltway study area does not appear to be part of an historic context or framework which would include systematic, government-sponsored programs. Windbreaks within the study area appear to be the result of ad hoc planting. The visual evidence appears to indicate that these windbreaks date, for the most part, outside the period of historic significance represented in the area: 1890-1936. These windbreaks may now also contain volunteer tree growth Indeed, some of these windbreaks appear to be the result of encouraged volunteer growth, as they exhibit none of the characteristics of a planned shelterbelt. Therefore, windbreaks in the study area are not themselves considered to be historic elements which contribute to the significance of historic farmyards.

Within the study area, sufficiently dense windbreaks are considered to define the physical and visual boundaries of historic properties (i.e. Sartore and Herter Farmyards). Additionally, they are one of several elements considered in the evaluation of whether agricultural acreages contribute to the National Register eligibility of the property (see above). In some instances, the windbreaks are not considered to be sufficiently dense to constitute a visual or physical boundary to associated agricultural acreages (i.e. Del O'Brien and Steve Johnson Farmyards). For the majority of the historic farmyards evaluated as part of this report, however, windbreaks constitute either a physical and visual boundary of an historic property.

Table G.1
NRHP-ELIGIBLE PROPERTIES
INVESTIGATED RELATIVE TO BOUNDARY DEFINITION
(information adapted from Elliott and Dirr 1998)

NeSHPO No.	Resource Type	Construction Date	Historic Name	Current Owner	NRHP Criteria
LC00: S-6	Barn	ca. 1910	--	David McEwen	C
LC00: S-15	Farmyard	1910's-20's	--	Del O'Brien	A
LC00: S-23	Residence	1936	Jensen Homeplace	Forrest Nicely	C
LC00: S-31	Barn	1932-36	--	Steve Speidell	C
LC00: S-40	Grain Elevator	1910's-20's	--	Circle 4 Feed and Grain	A
LC00: S-41	School	1910's-20's	Cheney School	City of Cheney	A and C
LC00: S-42	Directional Sign	1920's	--	Lancaster County	A
LC00: S-47	Barn	1910's-20's	--	Margene Zachek	C
LC00: E-52	Farmyard	1890's-1900's	--	Steve Johnson	A and C
LC00: E-53	Farmyard	1920's	Penterman Farm	George & Deborah Lockyer	A
LC00: E-56	Farmyard	1912-1914	--	Michael Smith	C
LC00: E-57	Barn	1915	Haase Farm	Elton Haase	C
LC00: E-61	Farmyard	pre 1900	--	Elaine and Owen Herter	A
LC00: E-62	Farmyard	1895	Herter's Hagaman	Joel and Kathy Sartore	A and C
LC00: E-67	Barns and Silo	1890's-1900's	Retzlaff Farm	Alan and Shirley Retzlaff	C
LC00: E-69	Farmyard	1910's-20's	Haeger Dairy	Arthur Monahan	A and C
LC00: E-72	Farmyard	1900's-1910	--	Bob Campbell	C
LC00: E-81	Residence	1910's	Jacoby Homestead	Chuck Hobaz	C
LC00: E-87	Residence	1890's-1920's	Forest Brook Farm	Teresa Retzlaff	C
LC00: E-99	Residence	1930's	Karl Lemke Farm	Norma and Bob Lemke	C
LC00: E-102	Barn	1916	Kettlehut Farm	Donna Keane	C
LC00: E-106	Grain Elevator	1910's	Farmer's Co-op	Farmers Co-op	A
LC00: E-118	Directional Sign	1920's	--	Lancaster County	A
LC00: E-132	Barn	1930's	--	Lynn Lenhoff	A and C
LC00: E-134	Farmyard	1900's-10	Reed Homestead	Laura Reed Estate	A
LC00: E-135	Directional Sign	1920's	--	Lancaster County	A
LC00: E-141	Residence	1890's	Fagan's Acres	William Fagan	C
LC00: S-143	Farmyard	1901-1905	Wunibald Farmstead	Greg Savage	A and C
LC00: S-145*	Directional Sign	1920's	--	Lancaster County	A
LC00: E-146*	Directional Sign	1920's	--	Lancaster County	A

The lack of trees in the area that now includes Nebraska was a daunting prospect to the earliest non-Native American explorers and settlers. In fact, it was a widely held belief that the area west of the Missouri River was a desert, and was uninhabitable by anyone but nomads. While explorers like Major Stephan K. Long noted tracts of fertile land, Long stated that the scarcity of wood and water was almost uniformly prevalent, and would deter settlement (Dick 1975). Early non-Native American pioneers wisely settled along streams where water and timber was available, though this timber supply was quickly exhausted.

In Nebraska, there has been a long history of both State and Federal programs which supported and encouraged tree planting, ranging from the tax exemptions and land grants during the 1860's –1870's, the Clarke-McNary Act of 1924, and the Shelterbelt Program from 1935 to 1942. While the period of significance of all historic properties considered in this report, 1890–1936, is potentially represented, these tree planting activities would have varying degrees of identifiable characteristics today.

Investigators were able to discern intentionally planted trees on many of the historic properties. Windbreaks consisting of evergreen trees were noted most frequently, but fruit trees and ornamental trees were also observed in several farmyards. No areas that could be interpreted as early woodlots or tree claims were noted associated with these historic properties. The lack of tree claims is consistent with the observation made by Dick (1975) that by the passage of the Timber Culture Act in 1873, there was very little vacant land in the eastern portion of the State. No large scale shelterbelts, such as those planted with the assistance of the forest service were noted.

A distinction was made between windbreaks and treelines while preparing this report. A windbreak consists of evenly spaced multiple rows of trees intentionally planted to provide shelter from the elements and to assist in soil conservation. In contrast, a treeline is defined in this report as a group of volunteer trees allowed to grow along fencelines and other nonproductive areas. Treelines often consist of quick growing, scrubby tree species.

The distinction between windbreaks and treelines is important because treelines, as described above, would not have been present during the period of significance for the historic properties evaluated during the course of this investigation. Therefore, the presence of a treeline is intrusive and impacts the integrity of setting and feeling.

Results

Physical alterations to the landscape, such as subdivisions, agricultural terracing, stream straightening and dam construction, scrubby tree growth and treelines, when taken individually, may seem minor. However, when taken as a whole, the cumulative effect on the landscape is significant. Modern activities have impacted or destroyed the integrity of setting and feeling in agricultural lands contiguous to nearly all of the NRHP properties and NRHP eligible properties located in the study area.

Of the 11 farmyards determined eligible to the NRHP, four were considered to possess contiguous agricultural acreage that could be associated with the period of significance of the NRHP eligible property, the Del O'Brien Farmyard (LC00:E-15), the Steve Johnson Farmyard (LC00:E-52), the Arthur Monahan Farmyard (LC00:E-69) and the Henry Wunibald Farmyard (LC00:S-143). The remaining historic farmyard properties were assigned boundaries that generally coincide with the extent of the farmyard, bounded by obvious visual boundaries whose definitions were guided by NR Bulletin #21. **Table G.1** is the list of properties for which boundaries were defined.

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The NRHP eligible barns, residences, grain elevators and directional signs were assigned boundaries that conformed to the guidelines outlined by NPS (NR Bulletin #21) and that are visually reasonable. Careful attention was given to the seven aspects of integrity (location, design, setting, materials, workmanship, feeling and association) relative to each property and the definition of their historic boundary.

Descriptions and justifications of the historic boundary definitions are provided on the following pages. The architectural descriptions included with each discussion rely heavily on the Elliott and Dirr (1998) report. References and a glossary of terms are included following the discussion of individual properties.

NRHP Eligible Farmyards

Site LC00: S-15 - Del O' Brien Farmyard
7900 Saltillo Rd
Lincoln, NE

The Del O'Brien Farmyard includes a house, a gambrel roof barn, chicken house, polygonal grainery and a windmill. The house is located on the west side of the farmyard and is separated from the outbuildings by a driveway. The farmyard is eligible for the NRHP under Criterion A for its ability to convey significance in the area of agricultural development as a historically functioning farm.

This property is associated with four parcels of land acquired by James O'Brien between 1872 and 1884. These parcels are still owned by heirs of James O'Brien. On Site (1998) defined the period of significance for this farmyard as 1910's-20.

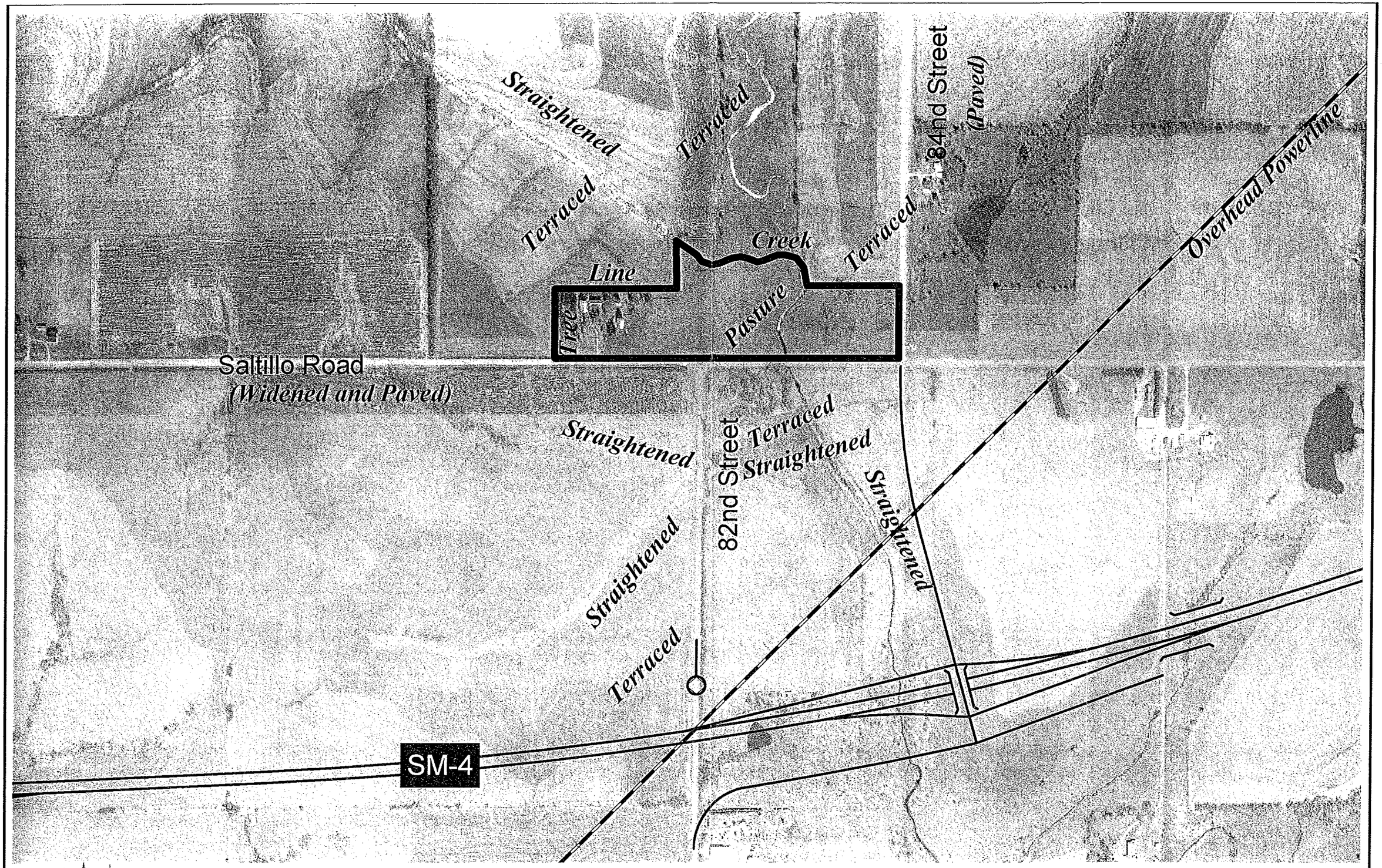
Verbal Boundary Description. The location of the farm yard is as follows according to the USGS quadrangle map, Bennet, Nebraska (1966): SE ¼, SW ¼, SE ¼ of Section 34, T9N, R7E Grant Township, Lancaster County, Nebraska. The boundary of this historic property includes the farmyard proper and several hectares located in the E ½ of the SE ¼ of Section 34, that are contiguous to the farmyard. Specifically, the boundary can be described as the windbreak on the west side of the farmhouse; the windbreak on the north side of the farmhouse; north on the quarter-line from the north windbreak to an intermittent drainage; east on the drainage to the west end of a east-west fenceline; east on the east-west fenceline to the west edge of the 84th Street right-of-way; south on the 84th Street right-of-way to the north edge of the Saltillo Road right-of-way; west on the north edge of Saltillo Road to the windbreak (**Figure G.3**).

Boundary Justification. The farmyard is part of a parcel of 32 hectares (80 acres) (W ½ of the SE ¼ of Section 34, T9N, R7E Grant Township, Lancaster County, Nebraska) purchased in 1872. Beyond the farmyard, much of this parcel has been agriculturally terraced, changing the natural contours of the land. In addition, an intermittent drainage crossing this parcel has been channelized. These land alterations significantly alter the historic integrity of the landscape, thereby precluding inclusion of the majority of this parcel within an historic boundary associated with the historic farmyard.

James O'Brien purchased a second parcel of 32 hectares (80 acres) (E ½ of the SE ¼ of Section 34, T9N, R7E Grant Township, Lancaster County, Nebraska) in 1882. This parcel includes portions of two intermittent drainages with an associated green belt. This grassy area has always been pasture according to Mr. O'Brien (personal communication May 2000). It is a portion of one of the drainages that delineates the northern boundary of this historic property. Although a green belt is still intact surrounding the remainder of the drainage to the north within this green belt, land on either side has been agriculturally terraced. This terracing is an intrusion when viewed from the historic farmyard and significantly alters the historic integrity of the landscape. Therefore, only an area contiguous to the farmyard, east to 84th Street retains sufficient integrity to be included within the historic boundaries of the farmyard. This area is included within the historic boundary described above.

The third parcel (NE ¼, Section 3, T8N, R7E) was acquired in 1884 and consists of 65 hectares (160 acres) immediately south of Saltillo Road. Much of this parcel has been agriculturally terraced, thereby reducing the integrity of this parcel to the farmyard. In addition, the presence of a high-voltage power transmission line crossing the southeastern corner of this property and the widening of Saltillo Road has further diminished the integrity of this property relative to the original farmstead.

James O'Brien owned a fourth parcel of land located south of Saltillo Road and east of 82nd street by 1903. This property is separated from the original homestead by two roads, each of which has been widened, thus diminishing the integrity of this parcel.



LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

500 0 500 Feet

200 0 200 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-15
Del O'Brien Farmyard

June 9, 2000

G-3

Site LC00:E-52 – Steve Johnson Farmyard
13200 Yankee Hill Rd
Cheney, Nebraska

This historic farmyard was determined eligible to the NRHP under Criterion A for its contribution to the agricultural development of the area as an early dairy barn, and under Criterion C as a typical example of Folk Victorian architecture in the residence and in the outbuildings. The period of significance defined for this farmyard is the 1890's to 1900's (On Site, 1998). This property is associated with a ¼ section of property acquired by A.W. Baade sometime after June 1882, but prior to 1902.

Verbal Boundary Description. The location of the buildings associated with this property is as follows according to the USGS quadrangle map, Bennet, Nebraska (1966): SW ¼, SW ¼, SE ¼, SE ¼ of Section 20, T9N, R8E Stockton Township, Lancaster County, Nebraska. **Figure G-4** best illustrates the boundaries of this property.

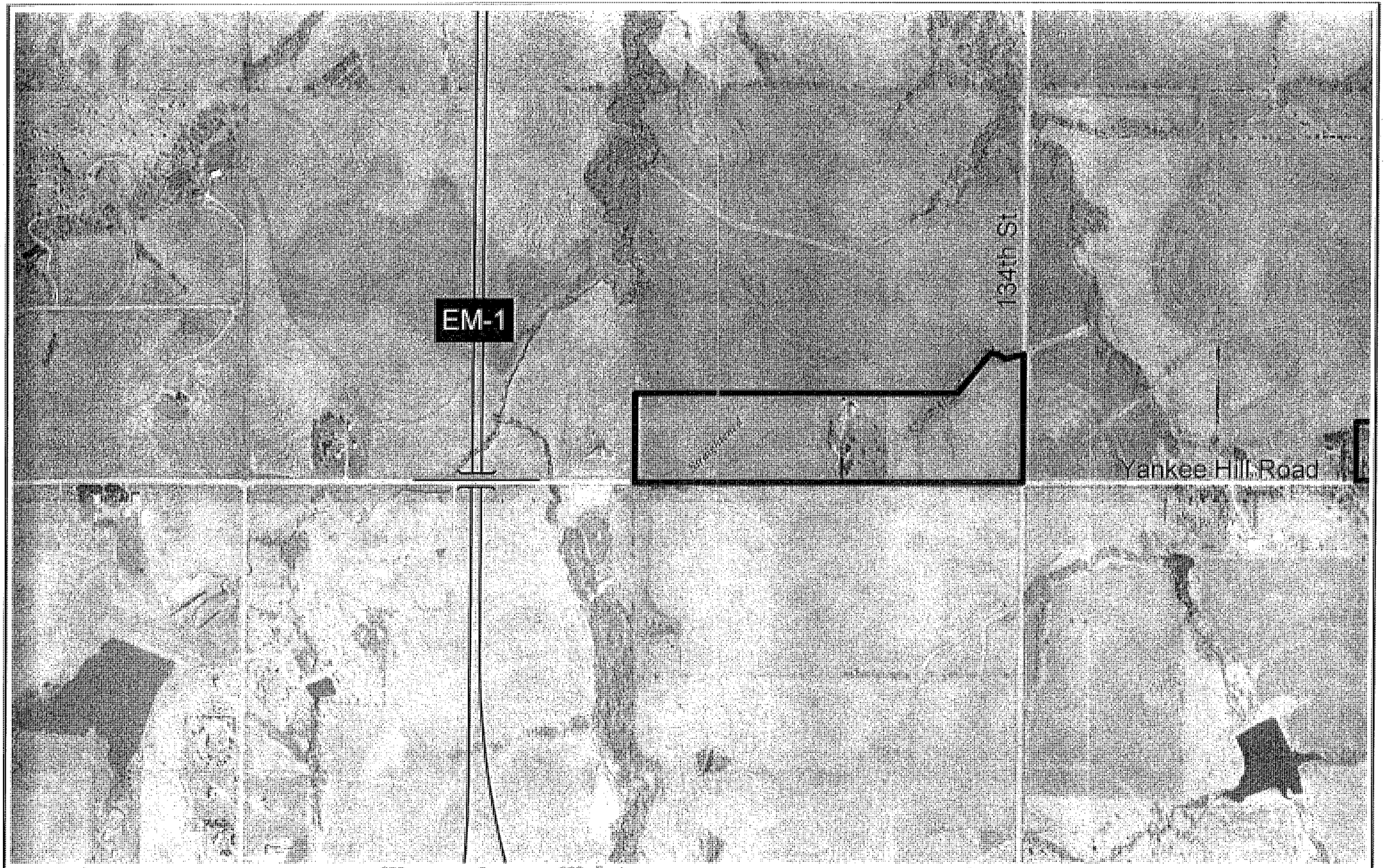
Boundary Justification. The boundary described above encompasses all NRHP eligible resources located within the farmyard and includes adjoining agricultural acreage both east and west of the farmyard. The Baade family purchased this property after June 1882, but prior to 1902. These dates fall within the period of significance for this farmyard. The remainder of the parcel originally purchased by Baade has been significantly impacted by modern activity, including agricultural terracing, dam construction and the straightening of a large intermittent drainage. These modern impacts diminish the integrity of that portion of the parcel not included in the boundary description.

Site LC00:E-53 - Penterman Farmyard (Penterman Farm)
13800 Yankee Hill Rd
Cheney, Nebraska

Historic structures in this farmyard consist of a one-story bungalow with matching one stall garage, a gambrel roof barn and two small sheds. This farmyard was considered eligible to the NRHP under Criterion A for its association with the development of small 20-century farms, and retains a high degree of integrity. This property's period of significance is the 1920's (On Site 1998).

Verbal Boundary Description. The location of this property is as follows according to the USGS quadrangle map, Bennet, Nebraska (1966): SE ¼, SE ¼, SW ¼, of Section 21, T9N, R8E Stockton Township, Lancaster County, Nebraska. The boundaries of this property can be specifically described as the windbreak on the north; the fenceline on the east; the north edge of the Yankee Hill Road right-of-way on the south; and the treeline along the driveway located west of the one-story bungalow (**Figure G.5**). A sewage lagoon located south of the barn near Yankee Hill Road is a non-contributing element.

Boundary Justification. These boundaries include all NRHP eligible resources and a livestock corral located west and south of the barn. Associated farm ground owned by the Spatz family during the period of significance of the farmyard has been subdivided to the west. A modern house has been constructed on one of the subdivisions, in addition to numerous other modern intrusions, including a second sewage lagoon, a man made pond, and trenching to provide water. The remainder of the surrounding agricultural acreage associated with this farmyard has been agriculturally terraced, therefore, the natural contours of the land have been altered, diminishing the historic integrity of this property. This terracing excludes this acreage from consideration as an associated historic property.



LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

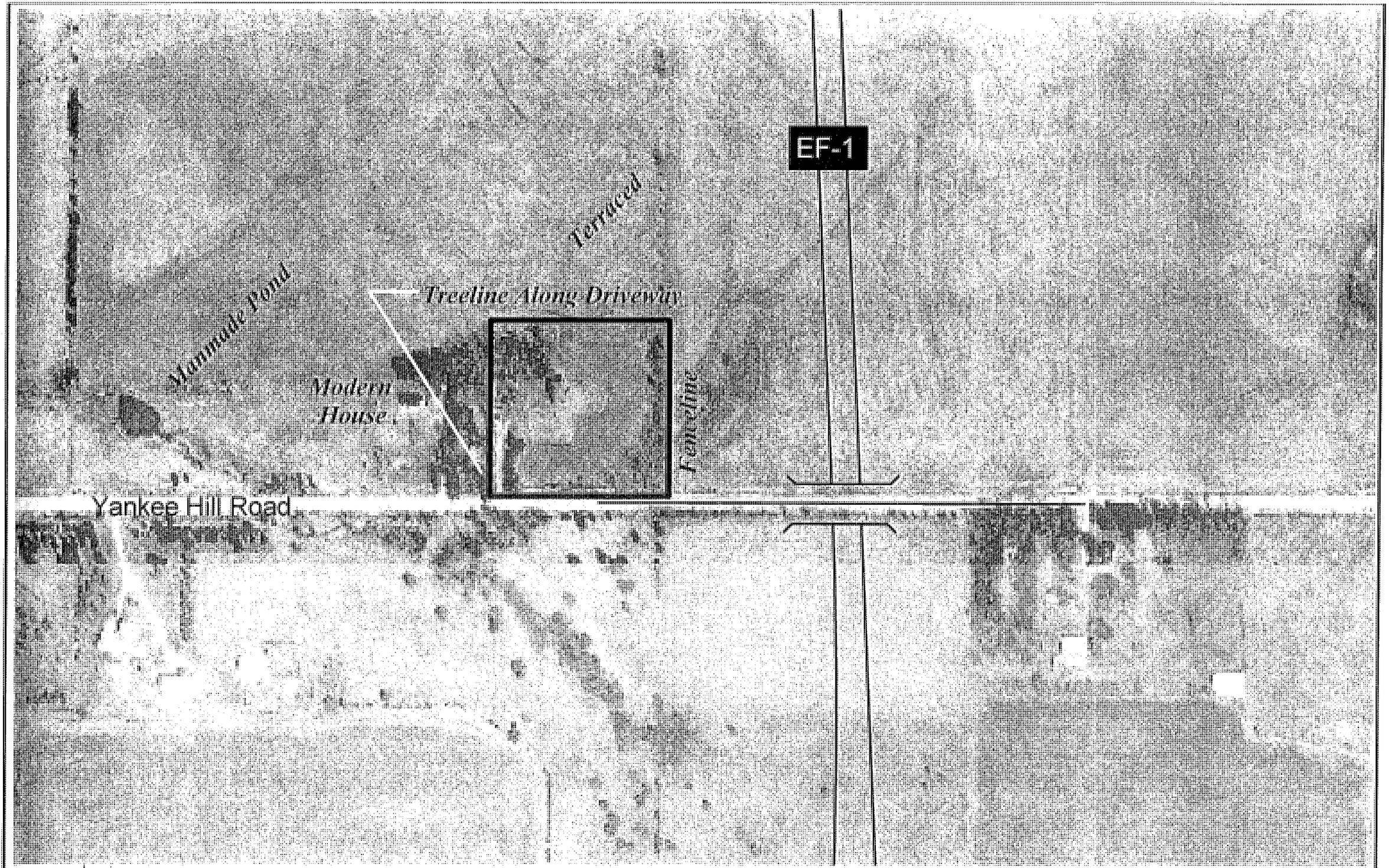
600 0 600 Feet

200 0 200 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-52
Steve Johnson Farmyard

June 9, 2000

G-4



LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

200 0 200 Feet

50 0 50 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-53
Penterman Farmyard

Nov. 19th, 2001

G-5

Site LC00:E-56 – Michael Smith Residence
8205 S 148th
Bennet, Nebraska

The house in this farmyard was determined eligible for the NRHP under Criterion C because it typifies the Craftsman style of construction. When initially evaluated in 1997, On Site described 5 structures, including the Craftsman style house, a barn and three outbuildings as resources that contributed to the NRHP eligibility this property. On Site noted however, that the "remaining contributing NRHP eligible resources on this site are unused outbuildings that while neglected, still retain a high degree of historic integrity" (Elliott and Dirr 1998). The period of significance for this property is 1912-14.

During the course of the investigation to define the boundary of this historic property, UNL observed that the contributing resources described by On Site (1998) have further deteriorated. In particular, a large portion of the gable end barn has collapsed. In consultation with the NeSHPO, UNL re-evaluated this property and recommends that only the Craftsman style house remains eligible, under Criterion C, to the NRHP. The barn is no longer eligible to the NRHP as the integrity of design, workmanship, materials, feeling and association has been severely impacted by the collapse of most of the structure. The three remaining minor outbuildings are in fair to poor condition, and while they contribute to the overall feeling, association and setting the of the property, they are not themselves individually eligible to the NRHP.

Verbal Boundary Description. The location of this property is as follows according to the USGS quadrangle map, Bennet, Nebraska (1966): NE ¼, SE ¼, SE ¼, of Section 21, T9N, R8E Stockton Township, Lancaster County, Nebraska. Specifically, the historic boundaries of this property can be described as the treeline on the north; the west edge of the 148th Street right-of-way on the east; the southern edge of the trees lining the driveway on the south; the western edge of a north-south driveway continuing as an imagining line to the northern boundary (**Figure G.6**). All other buildings located on this property, including a modern, corrugated steel shed located west of the barn are non-contributing.

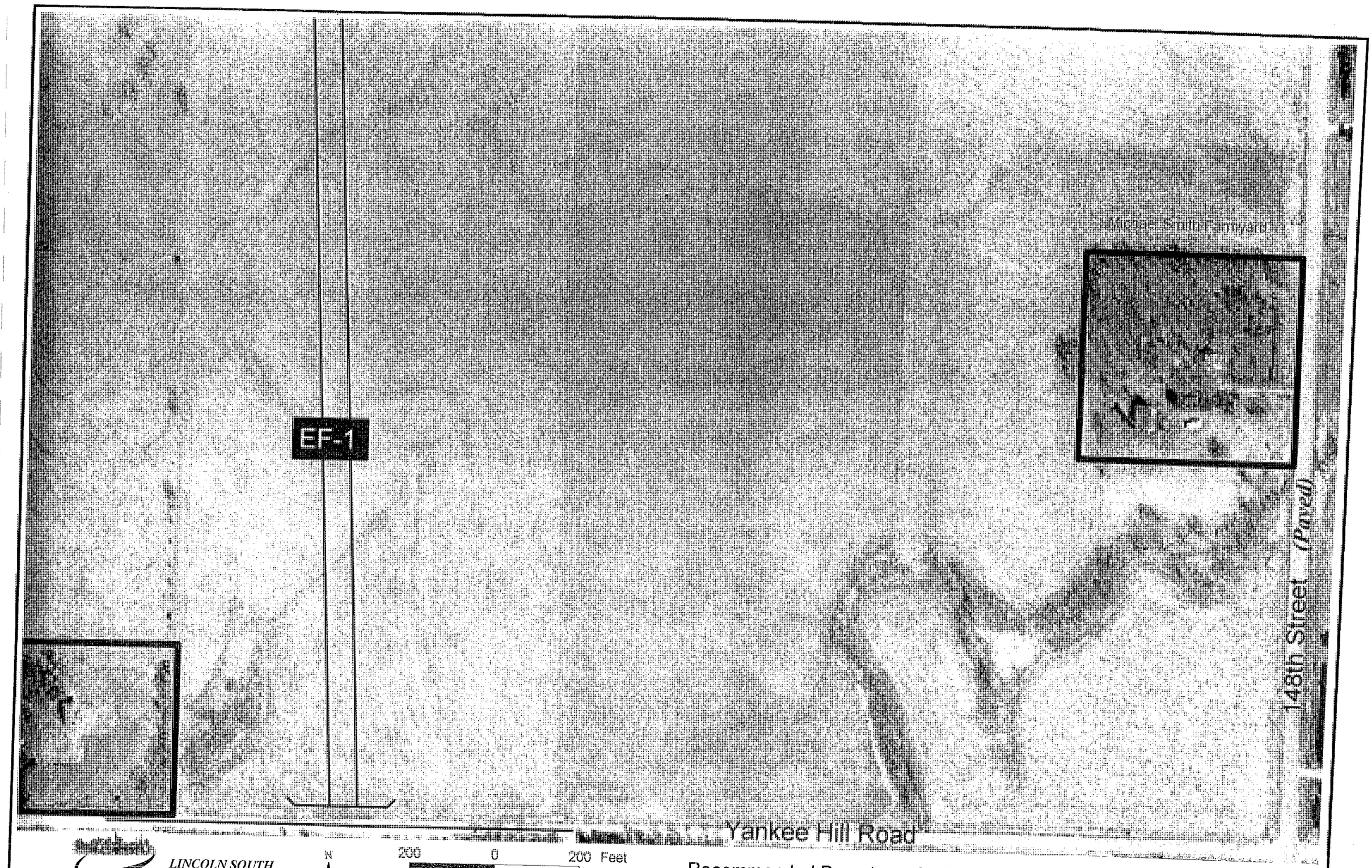
Boundary Justification. The boundaries described above include an area surrounding the eligible resource, including a formal yard and a tree lined driveway. The 65 hectares (160 acres) (SE ¼ 21-9-8) of land initially associated with this farmyard are not considered eligible for inclusion within the historic boundaries of this property. The general character and feeling of the period of significance for this property (1912-14) is no longer reflected in the outbuildings and or in the 65 hectares (160 acres) initially associated with this farmhouse. The historic integrity of this property is diminished by the deterioration of the large barn and the overgrowth vegetation on this property.

Site LC00:E-61 – Elaine and Owen Herter Farmyard
5300 S 148th St
Cheney, Nebraska

This isolated farmyard, set back from nearby 148th Street by almost 0.4 km (¼ mi), is eligible to the NRHP under Criterion A, for its contribution to agricultural development in the area. The farmyard is described as one of the best intact turn-of-the-century farmsteads within the study area, and includes 6 NRHP resources.

Verbal Boundary Description. According to the USGS quadrangle map, Walton, Nebraska (1964), the location of this property is: NE ¼, NW ¼, SW ¼, of Section 10, T9N, R8E Stockton Township, Lancaster County, Nebraska. The specific boundaries of this property are described as the treelines surrounding the farmyard on all sides (**Figure G.7**).

Boundary Justification. This farmyard is situated away from 148th Street, and the trees surrounding the farmyard offer both an obvious visual and physical boundary. The Herter Family purchased the farm ground associated with this farmyard in 1878. While there is a long historical association between the farmyard and the surrounding farm ground, the farm ground has been terraced. Terracing changes the natural contour of the land, thereby significantly altering the historic integrity of the landscape, making these terraced acres ineligible for inclusion within the historical boundaries of the farmyard.



LINCOLN SOUTH AND EAST BELTWAYS STUDY

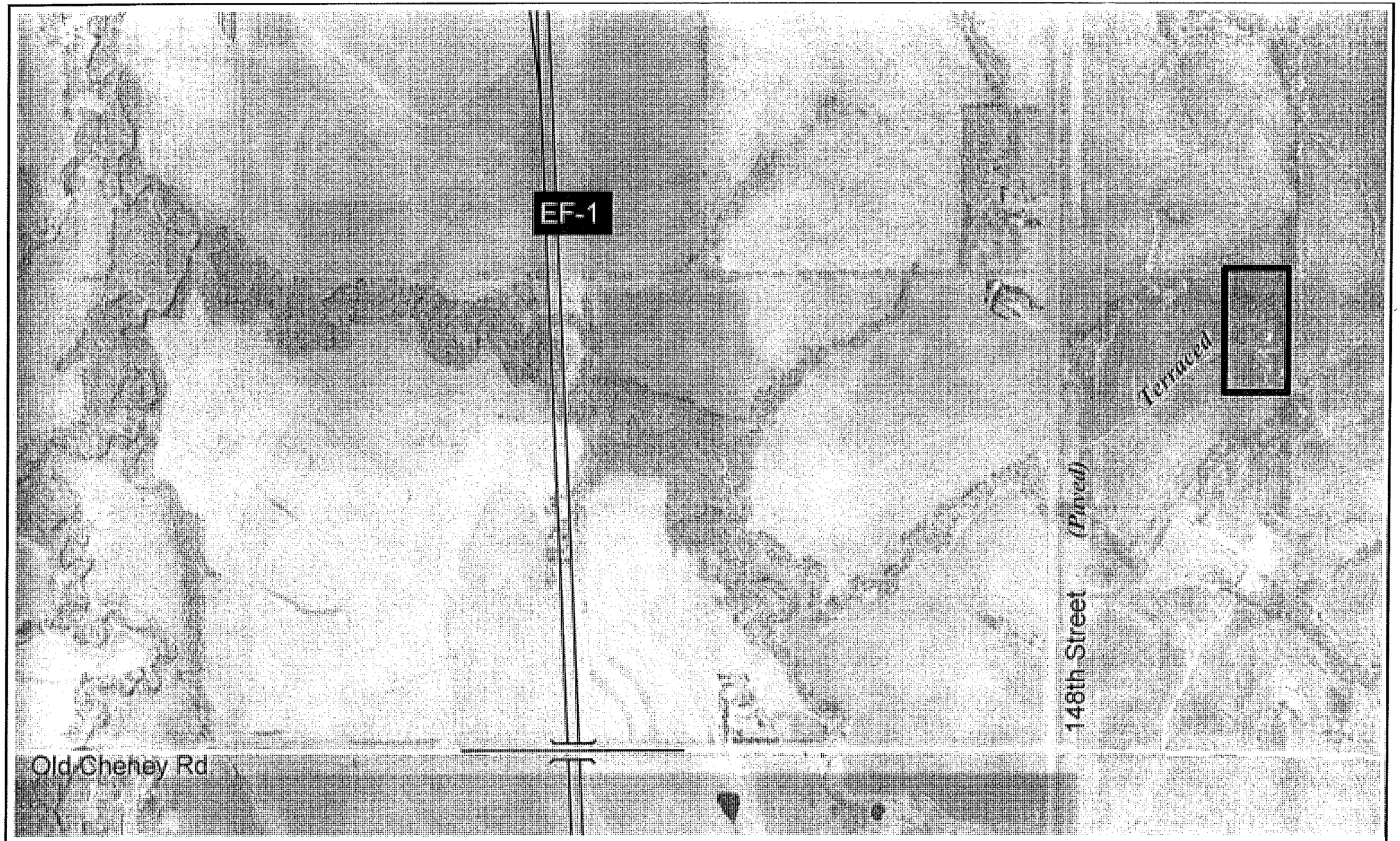
N

200 0 200 Feet

50 0 50 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-56
Michael Smith Farmyard

June 9, 2000



LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

500 0 500 Feet

200 0 200 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-61
Elaine and Owen Herter Farmyard

June 9, 2000

G-7

Site LC00:E-62 – Joel and Kathy Sartore Farmyard ("Herter-Hagaman Farm")
4949 S 148th St
Cheney, Nebraska

The site of a former dairy operation, this late 1890's site is listed on the NRHP and was determined eligible under Criterion A for it's contribution to agricultural development in the area, and under Criterion C as the buildings typify the Folk Victorian architectural style. The period of significance for the farm is 1885-1930, which encompasses the farm origins through construction of all its outbuildings, and the completion of the house.

Verbal Boundary Description. The location of this property is as follows according to the USGS quadrangle map, Walton, Nebraska (1964): SE ¼, SE ¼, NE ¼, of Section 9, T9N, R8E Stockton Township, Lancaster County, Nebraska. The specific boundaries of this property can be described as the west edge of the treeline on the west (coinciding with the western property boundary); the north treeline on the north (coinciding with the northern property boundary); the west edge of the 148th Street right-of-way on the east; and the fenceline on the south (coinciding with the southern property boundary) **(Figure G.8)**.

Boundary Justification. The boundary described above includes the entire farmyard. Much of the surrounding land with an historical association to the farmyard has been agriculturally terraced, which alters the natural contours of the landscape. A portion of land north of the farmyard boundary to Pioneers Blvd on the east side of a small drainage is not currently under cultivation. However, this parcel of land is overgrown with numerous trees such as Chinese Elm. This overgrowth would not have been present during the period of significance for this property and is a visual intrusion not in keeping with the historical integrity of the remainder of this property.

Since initiation of the historic boundaries evaluation, this property was listed on the NRHP. The NRHP site is defined as a 8.1 ha (20 acre) parcel and corresponds to the independently delineated boundary in this report.

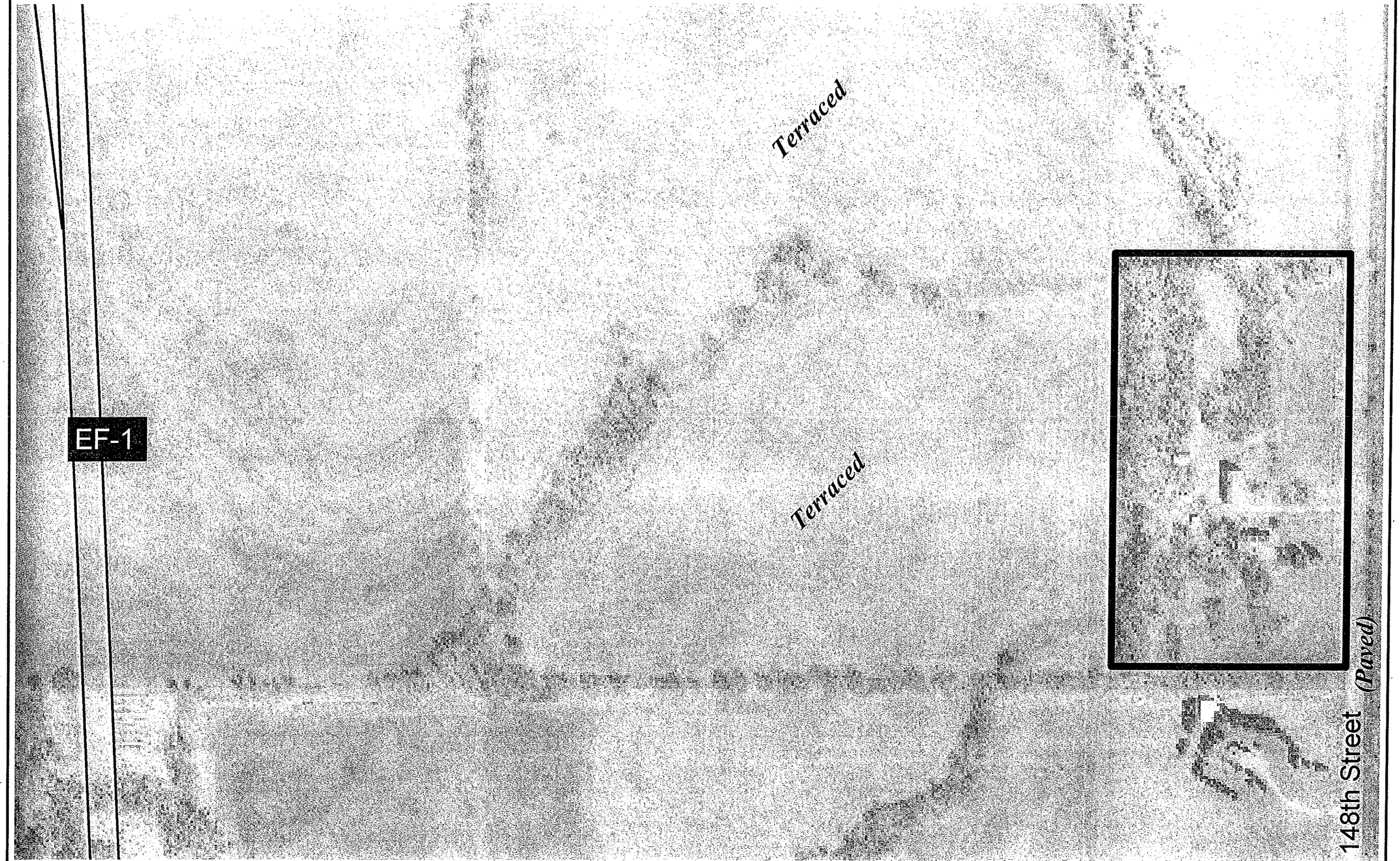
Site LC00:E-69 – Arthur Monahan Farmyard ("Haeger Dairy")
14300 O St
Lincoln, Nebraska

This large historic site known as the Haeger Dairy, supplied milk to nearby Lincoln residents during the early part of the 20th century. This site was determined eligible under Criterion A as a commercial dairy and its contribution to the development of agriculture in the area, and under Criterion C for the integrity of the architectural styles, which document the evolution of the site. All buildings located on site, a total of nine, contribute to this eligibility. The period of significance for this property is ca. 1900 – 1920.

The 65 hectares (160 acres) originally associated with this historic property was purchased by Anthony Reed in 1893. In 1929, the Reed family sold this property to Jimmie Haeger. I.F. Kurszer purchased the property in 1945. Arthur Monahan purchased the west 80 acres and the associated NRHP eligible buildings in 1956 and converted the dairy to a cattle operation.

Verbal Boundary Description. The location of this property is as follows according to the USGS quadrangle map, Walton, Nebraska (1964): SE ¼, SW ¼, SE ¼, of Section 21, T10N, R8E Stevens Creek Township, Lancaster County, Nebraska. Specifically, these boundaries can be described as the north-south fenceline that runs along the ¼ section line on the east, an east-west fenceline located approximately 305 m (1000 ft) north of the 'O' Street right-of-way on the north, a north-south fenceline located immediately west of the shelterbelt on the west, and the 'O' Street right-of-way on the south (**Figure G.9**).

Boundary Justification. The boundaries described above include the entire the farmyard, livestock pens associated with the barn and a portion of pasture located to north of the farmstead. The remainder of the 65 hectares (160 acres) originally purchased by Reed is excluded from these boundaries due to the construction of a modern residential subdivision on the site, man-made ponds and small flood control dams. In addition, a commercial subdivision located in the SW ¼ Section 21 is visible from the Monahan property. These modern impacts intrude upon the integrity of setting, feeling and association when considering the remainder of the 65 hectares (160 acres) originally associated with this historic property. The general character and feeling of the period of significance for this property (1900 - 20) is no longer reflected in the 65 hectares (160 acres) initially associated with this historic property.



LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

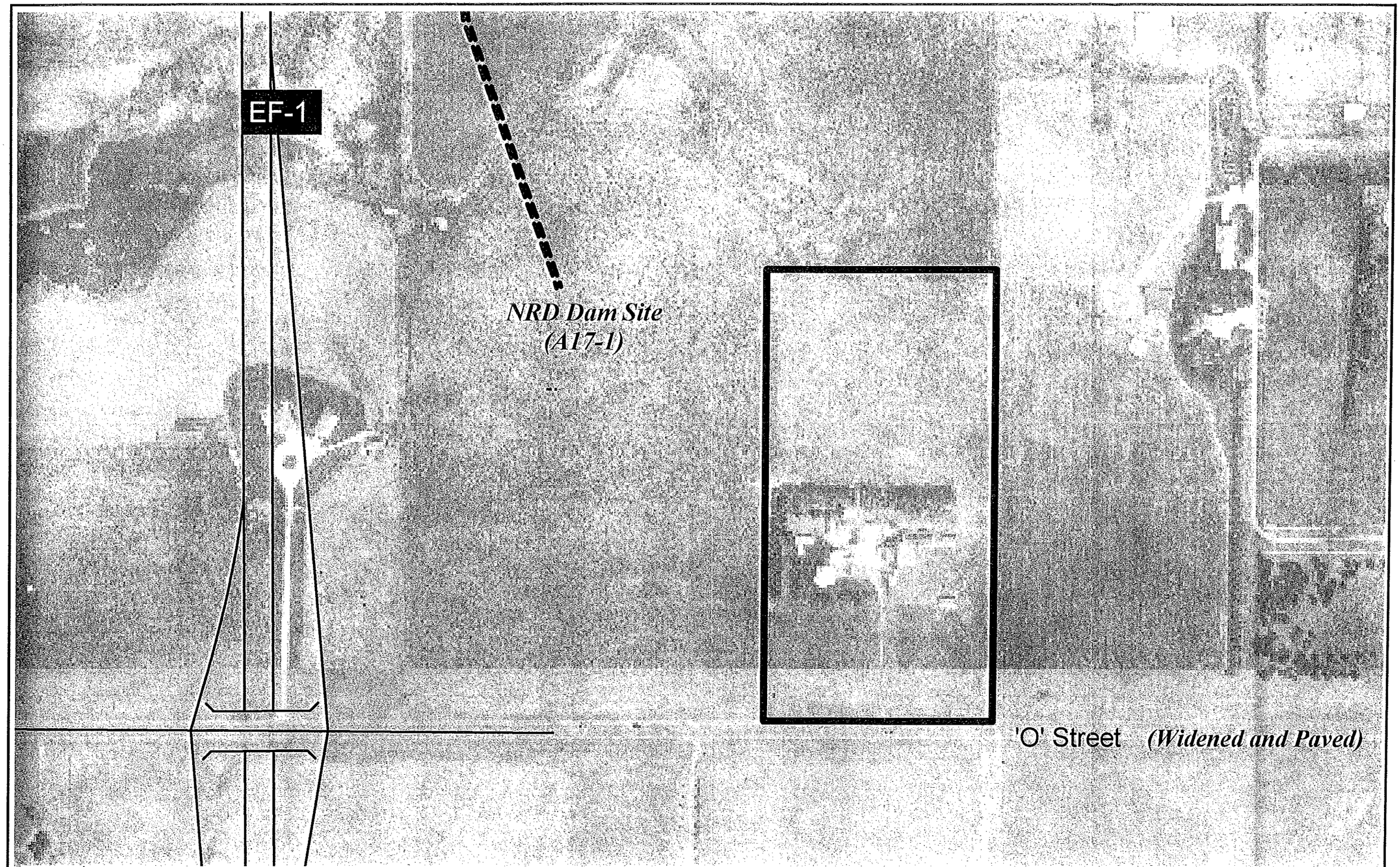
200 0 200 Feet

50 0 50 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-62
Joel and Kathy Sartore Farmyard

June 9, 2000

G-8


EF-1
NRD Dam Site
(A17-1)
'O' Street (Widened and Paved)
LINCOLN SOUTH
AND EAST
BELTWAYS STUDY
N
200 0 200 Feet
50 0 50 Meters
Recommended Boundary of NRHP-Eligible Property
Site LC00: E-69
Arthur Monahan Farmyard
June 9, 2000
G-9

Site LC00:E-72 – Lyle and Maverne Mayer Farmyard

The Mayer Farmyard was determined eligible to the NRHP under Criterion C as a representative type of small-scale vernacular farmstead. The buildings located on site are described as innovative and retain a high degree of integrity. The period of construction for this property is ca. 1900 – 10.

Verbal Boundary Description. According to the USGS quadrangle map, Walton, Nebraska (1964), the house and some of the outbuildings of this farmyard are situated in different ¼ ¼ ¼'s. The house, the garage and a shed are in the SE ¼, SE ¼, SW ¼ SE ¼ of Section 20, T10N, R8E Stevens Creek Township, Lancaster County, Nebraska. The barn and a chicken coop are in the SW ¼, SW ¼, SE ¼ SE ¼, of Section 20, T10N, R8E Stevens Creek Township, Lancaster County, Nebraska. The specific boundaries can be described as the windbreak on the north; the fenceline on the east; the north edge of the 'O' Street right-of-way on the south; and the windbreak on the west (**Figure G.10**).

Boundary Justification. The boundary described above includes the entire farmyard. The windbreaks and fenceline provide an obvious visual boundary for this property.

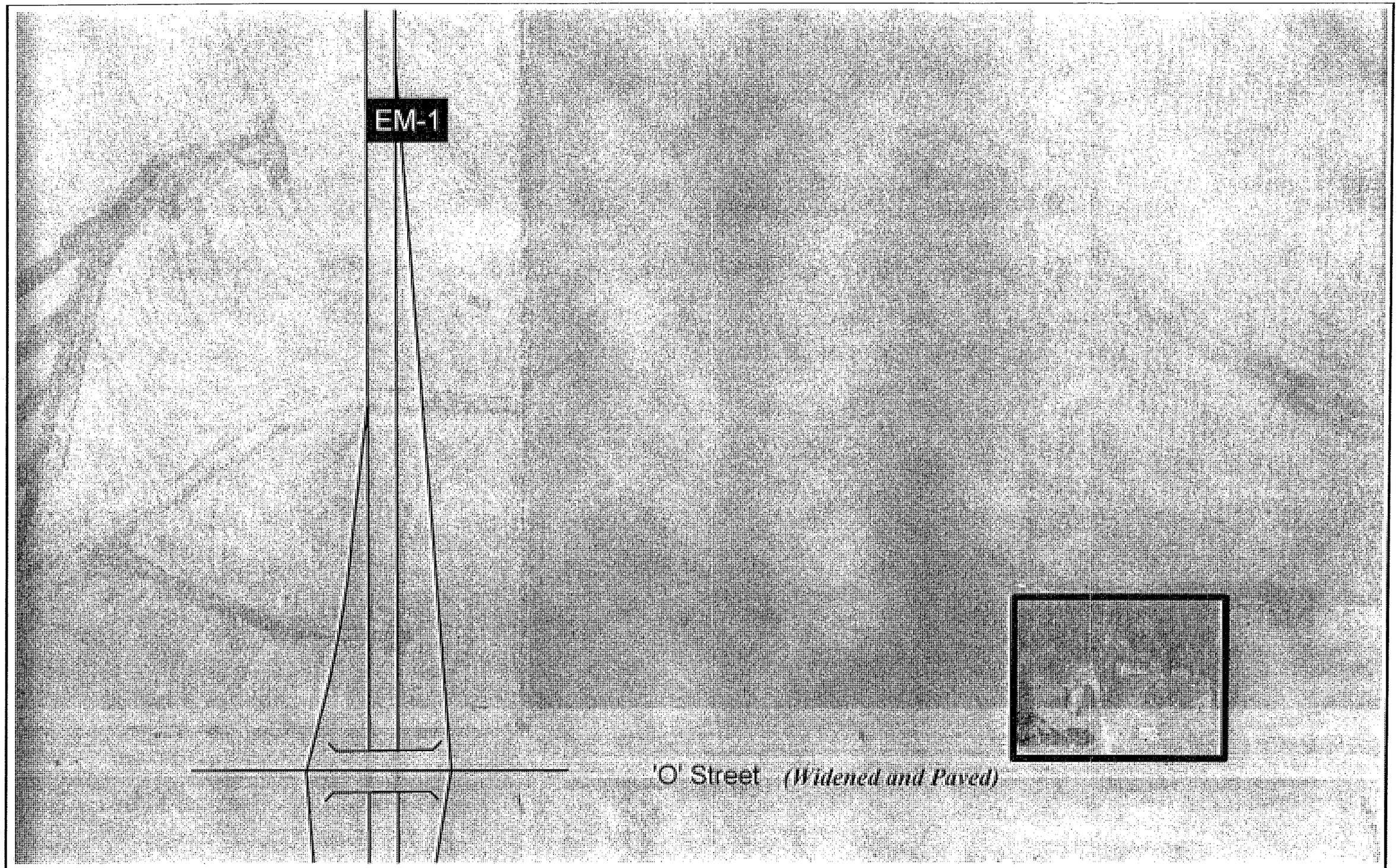
Site LC00:E-87 – Theresa Retzlaff Farmyard ("Forest Brook Farm")
13905 Van Dorn St
Walton, Nebraska

This historic farmyard is an excellent example of vernacular building types and is considered eligible to the NRHP under Criterion C for its ability to convey significance through the use of local materials and individual adaptation of architectural styles. The period of significance is ca. 1890–1920.

The farmyard is located within a 32 hectare (80 acre) parcel of land purchased by Wilhem Francke from the US Government in 1887. Fred Retzlaff purchased this parcel from Francke in 1914. Fred Retzlaff also acquired an additional 32 hectares (80 acres) located immediately north of Van Dorn Street in 1914. This property was then transferred to Fred Retzlaff's son Elmer, husband to Theresa Retzlaff, the current owner of the property.

Verbal Boundary Description. The location of the farmyard is as follows according to the USGS quadrangle map, Walton, Nebraska (1964): NW ¼, NW ¼, NW ¼, NE ¼ of Section 4, T9N, R8E Stockton Township, Lancaster County, Nebraska. The boundary of this farmyard can be described as the fenceline on the west; the south edge of the Van Dorn Street right-of-way on the north; the west bank of the unnamed creek on the east; and the treeline on the south (**Figure G.11**). This boundary encompasses all structures determined eligible to the NRHP, including the Tudor-style cottage, the gable roof barn with stone foundation, the hog house, a granary with stone foundation, and a small polygonal shed. All other structures located within this boundary description are non-contributing.

Boundary Justification. The boundaries described above provide obvious and highly visible cultural and natural boundaries. The effect of modern activities on the historical integrity of this property has been significant. These effects include terracing, a man-made dam, the widening of Van Dorn Street and an overgrowth of trees. These features would not have been present during the period of significance for this property and are a visual intrusion not in keeping with the historical integrity of this property.



LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

200 0 200 Feet

50 0 50 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-72
Lyle and Maverne Mayer Farmyard

June 9, 2000

G-10

EF-1

Manmade Pond

Prairie

Terraced

Van Dorn Street
(Widened)

Steven's Creek Stock Farm

Fenceline

Creek

Treeline

LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

200 0 200 Feet

50 0 50 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-87
Theresa Retzlaff Farmyard

June 9, 2000

G-11

Site LC00:E-134 – Laura Reed Farmyard ("Reed Homestead")
112th & Havelock
Lincoln, Nebraska

This historic farmyard was determined eligible for the NRHP under Criterion A for its contribution to agricultural development in the area. The house and the outbuildings retain a high degree of integrity and their period of significance is their construction date, ca. 1900 -10.

Verbal Boundary Description. According to the USGS quadrangle map, Walton, Nebraska (1964), the location of this property is: SW ¼, SW ¼, SW ¼ of Section 6 (correction section), T10N, R8E Stevens Creek Township, Lancaster County, Nebraska. The specific boundaries of this site can be described as an imaginary east-west line 30 m (100 ft) north of the north driveway; an imaginary north-south line 30 m (100 ft) east of the eastern-most outbuilding; the north edge of the Havelock Avenue right-of-way on the south; and the east edge of the 112th Street right-of-way on the west (**Figure G.12**).

Boundary Justification. The boundaries as described above encompass the entire farmyard. The land associated with this farmyard has been impacted by modern activity, including agricultural terracing, and the removal of the Chicago Rock Island and Pacific Railway line, which significantly diminishes the historic integrity of the associated acreage.

Site LC00:E-143 – Henry Wunibald Farmyard
8907 Saltillo Rd
Lincoln, Nebraska

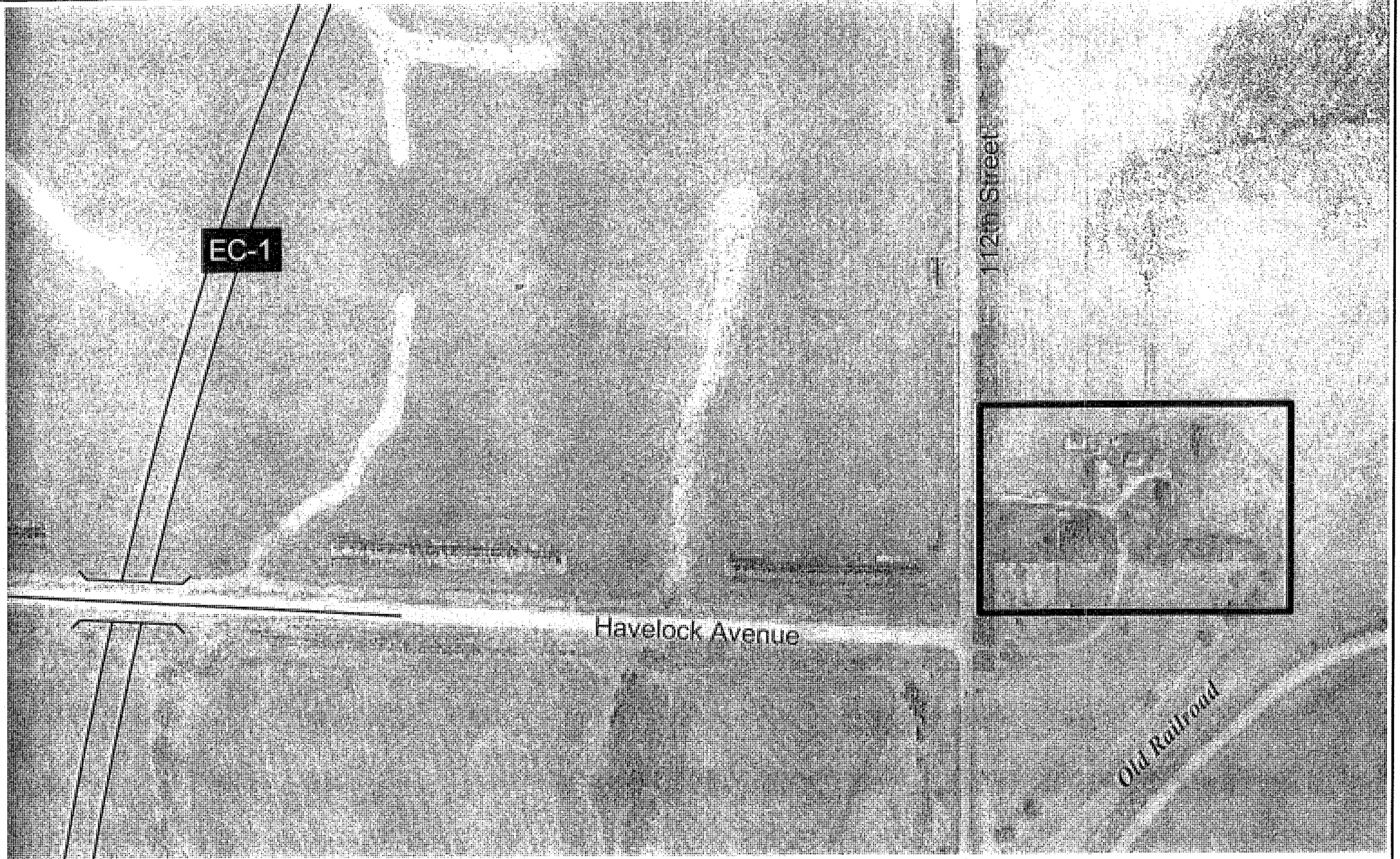
This historic farmyard located near the center of a section, was determined eligible to the NRHP under Criterion A for its contribution to agricultural development in the area, and under Criterion C as an excellent example of an early 20th century vernacular wood-frame farmhouse with some Italianate details and good historic integrity. The period of significance for this property is ca. 1901–50. In addition to the house, a mortise-and-tenon barn, and a former kitchen turned shed are eligible resources. A metal Quonset-style shed constructed in 1962 contributes to the overall significance of this property.

This farmyard is associated with a parcel of 219 hectares (540 acres) originally purchased by the Wunibald brothers, Auke, Henry, and Weirt in 1896. Around 1901, the Wunibalds divided the land among themselves. Construction began on the current house in 1901 and was completed sometime around 1905. The large barn on site was completed by 1906. The property was transferred to Helmer and Estella Wunibald in 1958. The farmyard (lots 5 & 8, NE ¼, NE ¼, NE ¼, SW ¼ of Section 2, T8N, R7E Saltillo Township, Lancaster County, Nebraska) was sold to Greg Savage in 1992.

Verbal Boundary Description. According to the USGS quadrangle map, Bennet, Nebraska 1964, the topographic location of this property is: NE ¼, NE ¼, NE ¼, SW ¼ of Section 2, T8N, R7E Saltillo Township, Lancaster County, Nebraska. The enclosed map best illustrates the boundaries of this property (**Figure G.13**).

Boundary Justification. This boundary includes the Wunibald Farmyard, and portions of property originally held by Henry Wunibald. Numerous physical changes to the landscape surrounding the Wunibald Farmyard have occurred, including conservation terracing, construction of small dams, channel straightening and the placement of large powerline structures. These alterations to the landscape have impacted the integrity of setting and feeling with regard to the agricultural acreage surrounding this historic property.

The boundary described above includes portions of the original Wunibald owned acreage that speaks to the historic character of the farmyard and retains the integrity of setting and feeling.



LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

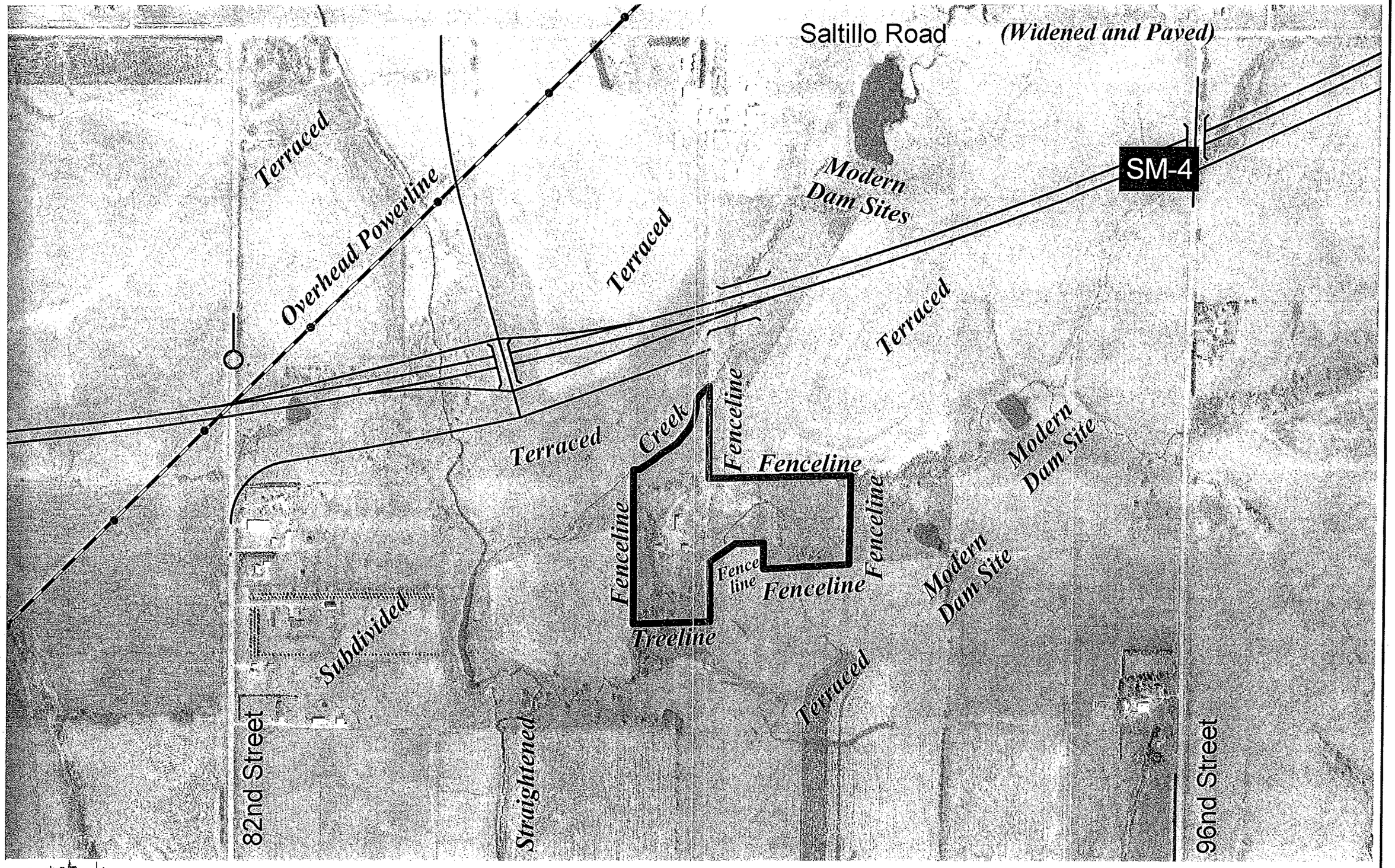
200 0 200 Feet

50 0 50 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: E-134
Laura Reed Farmyard

June 9, 2000

G-12



LINCOLN SOUTH AND EAST BELTWAYS STUDY

N

500 0 500 Feet

100 0 100 Meters

Recommended Boundary of NRHP-Eligible Property
Site LC00: S-143
Henry Wunibald Farmyard

May 2nd, 2002

G-13

NRHP Eligible Barns

Site LC00:S-6 – David McEwen Gable Roof Barn

3801 Rokeby Road
Roca, NE

A large gable roofed barn with formal cornice returns on the main north facing façade. This barn is the only historic building on the property and as such is individually eligible under Criterion C as an example of utilizing architectural details in barn construction. The period of significance is the construction date of the barn, ca. 1910. According to the current property owner, this barn was moved to its current location a number of years ago.

Verbal Boundary Description. The location of this property is as follows according to the USGS quadrangle map, Roca, Nebraska (1964): NE¼, NE ¼ of Section 31, T9N, R7E Grant Township, Lancaster County, Nebraska. The specific property boundary is described as an imaginary line extending 3 m (10 ft) from the envelope of the building.

Boundary Justification. The boundary of the nominated property includes only an area immediately surrounding the historic building, as the integrity and setting of property surrounding this barn are not intact.

Site LC00:S-31 – Steve Speidel Gothic Arch Roof Barn

7800 S 40th
Lincoln, NE

This large Gothic arch roof barn was constructed in 1932 and is individually eligible to the NRHP under Criterion C as illustrative of the laminated truss system for the large Gothic arched roof. The period of significance for this structure is the date of construction, 1932. The remaining structures located on site are not eligible for the NRHP.

Verbal Boundary Description. The location of this barn is as follows according to the USGS quadrangle map, Roca, Nebraska (1964): NW ¼, NW ¼, SW ¼ of Section 20, T9N, R7E Grant Township, Lancaster County, Nebraska. The specific property boundary is described as an imaginary line extending 3 m (10 ft) from the envelope of the building.

Boundary Justification. The boundary of the nominated property includes only an area immediately surrounding the historic building, as the integrity and setting of property surrounding this barn are not intact.

Site LC00:S-47 – Margene Zachek Gable Roof Connected Barn
70th & Yankee Hill Rd
Lincoln, Nebraska

This large connected barn complex is eligible to the NRHP under Criterion C as an excellent example of innovative agricultural construction. A gable roof barn connected to a machine shed represents vernacular efforts and techniques employed to improve the farm. The construction date, ca. 1910-20's, is the period of significance for this historic property. Although other structures are present on site, this connected barn is the only structure eligible to the NRHP.

Verbal Boundary Description. The location of this property is as follows according to the USGS quadrangle map, Bennet, Nebraska (1966): SE ¼, NW ¼, NW ¼, SW ¼ of Section 22, T9N, R7E Grant Township, Lancaster County, Nebraska. The specific boundary of this property can be described as the northern edge of the driveway on the north; the treeline on the east; an imaginary line 6 m (20 ft) south of the barns; intersecting with the west edge of the driveway on the west; and back to the point of beginning. The concrete block silo is a non-contributing structure.

Boundary Justification. Due to modern alterations, these connected barns are the only structures on this site eligible to the NRHP. The boundary described above includes an associated corral and driveways used to access the historic buildings that contribute to the feeling and association of the architecturally significant property.

Site LC00:E-57 – Elton Haase Gable Roof Mortise and Peg Barn ("Haase Farm")
8000 S 148th St
Cheney, Nebraska

This barn was recommended eligible under Criterion C as an excellent example of mortise and peg construction located within the South and East Beltway study area. The construction date of 1915 is the period of significance for this structure.

Verbal Boundary Description. According to the USGS quadrangle map, Bennet, Nebraska (1966) The location of this property is as follows: SW ¼, NW ¼, SW ¼, of Section 22, T9N, R8E Stockton Township, Lancaster County, Nebraska. The boundary of this historic property can be described as an imaginary line beginning at a point 3 m (10 ft) north of the barn; intersecting with an imaginary line 3 m (10 ft) east of the barn; intersecting with an imaginary line 11 m (35 ft) south of the barn; intersecting with an imaginary line 20 (65 ft) west of the barn back to the point of beginning.

Boundary Justification. The boundary described above includes the historic barn, and an associated livestock corral on the west and south sides of the barn that contribute to the feeling, setting and association of the architecturally significant property.

Site LC00:E-67 – Shirley Retzlaff Barns & Silo ("Retzlaff Farm")
1905 S 148th St
Walton, Nebraska

Historic structures on the Retzlaff Farm include a large gable roof barn, a smaller gambrel roof barn, and a hollow tile silo. The gable roof barn was built upon a cut stone foundation, contains distinctive ornamental shingles and is slightly banked on one side. The barns and silo were recommended eligible to the NRHP under Criterion C, for methods and type of construction. The period of significance for this historic property is the date of construction, ca. 1890's – 1900's.

Verbal Boundary Description. According to the USGS quadrangle map, Walton, Nebraska (1964), the location of this property is: NW ¼, SE ¼, SE ¼, NE ¼ of Section 33, T10N, R8E Stockton Township, Lancaster County, Nebraska. Separate boundaries have been assigned to each the barns. The boundary of the gable roof barn can be described as an imaginary line beginning at a point 6 m (20 ft) west of the barn; intersecting with an imaginary line 3 m (10 ft) north of the barn; intersecting with the eastern edge of the driveway on the east side of the barn; intersecting with an imaginary line 6 m (20 ft) south of the gable roof barn; back to the point of beginning.
The boundary of the gambrel roof barn is an imaginary line 3 m (10 ft) from the envelope of the building on the north, west, and south sides; the imaginary line is extended to 8 m (25 ft) on the east side of the barn to include the hollow tile silo.

Boundary Justification. The boundary of the gable roof barn described above includes a livestock corral associated with barn and a driveway on the east side of barn. This eastern boundary insures inclusion of the east facing entrance, which contributes to the feeling and association of the architecturally significant property. The boundary of the gambrel roof barn encompasses only the building and a nearby silo due to many modern intrusions on this farm and surrounding acreage. These intrusions include a modern ranch style house, a flood control dam and a sewage lagoon, which diminish the historic integrity of this property.

Site LC00:E-102 – Donna Keane Gambrel Roof Barn ("Kettlehut Farm Homestead")
12160 Van Dorn St
Walton, Nebraska

This large gambrel roof barn is banked on the west façade, and is nicely detailed. This barn retains a high degree of integrity and was determined eligible under Criterion C for its architectural significance.

Verbal Boundary Description. The location of the barn is as follows according to the USGS quadrangle map, Walton, Nebraska (1964): SW ¼, SW ¼, SW ¼, SW ¼ of Section 32, T10N, R8E Stevens Creek Township, Lancaster County, Nebraska. The historic boundary can be described as an imaginary east-west line 6 m (20 ft) north of the barn; an imaginary north-south line 6 m (20 ft) east of the barn; the north edge of the Van Dorn Street right-of-way on the south; and the east edge of the driveway on the west side of the barn.

Boundary Justification. The boundary described above uses obvious visual edges, as well as imaginary lines to include an area surrounding the barn. This area includes mature trees that contribute to the integrity and feeling of the barn.

Site LC00:E-132 – Lynn Lenhoff Gambrel Roof Barn
2000 N 98th St
Walton, Nebraska

This large gambrel roof concrete block barn was determined eligible to the NRHP under Criterion C as typifying a new type of construction through use of modern materials, and under Criterion A as an example of evolving technology in the adaptation of such materials.

Verbal Boundary Description. The location of the barn is as follows according to the USGS quadrangle map, Walton, Nebraska (1964): SE ¼, SW ¼, NW ¼, SW ¼ of Section 13, T10N, R7E Lancaster Township, Lancaster County, Nebraska. The specific boundary of this historic property can be described as an imaginary east-west line located 3 m (10 ft) north of the barn; the wooden fence of a livestock corral 12 m (40 ft) east of the barn; an imaginary east-west line 3 m (10 ft) south of the barn; an imaginary north-south line 3 m (10 ft) west of the barn.

Boundary Justification. The boundary described above includes a livestock corral associated with the barn that contributes to the historic setting of the barn. The remainder of the property has been impacted by modern intrusions which diminish the historic integrity of this property.

NRHP Eligible Residences

Site LC00:S-23 Forest Nisley Residence (Jensen Homeplace)
11601 S 120th St
Bennet, NE

This small-scale neo-Tudor house was built in 1936 and exemplifies its type within the study area and is therefore eligible to the NRHP under Criterion C. The residence is bounded on the south by a graveled drive, which also serves to separate the residence from the "working" farmyard. The remainder of the farmyard is not considered NRHP eligible due to numerous alterations and new intrusions.

Verbal Boundary Description. The location of this historic residence is as follows according to the USGS quadrangle map, Bennet, Nebraska (1966): NE ¼, NE ¼, NE ¼ of Section 6, T8N, R8E Nemaha Township, Lancaster County, Nebraska. The boundary of this property begins at an imaginary point located five ft south of the southern-most stone column at the driveway entrance continuing north-northwest on an imaginary line to the southern edge of a circular drive; from the top of the circular driveway to a point that intersects a windbreak to the west; continuing to the windbreak located at the northern edge of the property; and finally to the windbreak along the eastern edge of the property to the point of beginning. All structures included in this boundary, except the historic residence, are considered non-contributing elements.

Boundary Justification. The graveled circular driveway provides a highly visible cultural boundary for the property, as do the mature trees located on the north, west and east sides of the residence. The integrity of the large yard surrounding the home is intact and contributes to the historic location, feeling, and association of the architecturally significant property. Modern intrusions and alterations, including recent construction of a garage near the residence preclude inclusion of the remainder of the farmyard.

Site LC00:E-81 – Chuck Hobza ("Jacoby Homestead")
13200 Havelock Ave
Lincoln, NE 68527

This large foursquare house, constructed of concrete block, was recommended eligible for the NRHP under Criterion C. This historic residence typifies a type of construction new to the area at the time of its construction with the use of concrete block with materials locally manufactured.

Verbal Boundary Description. The location of this property is as follows according to the USGS quadrangle map, Walton, Nebraska (1964): SE ¼, SE ¼, SE ¼, SE ¼ of Section 5, T10N, R8E Stevens Creek Township, Lancaster County, Nebraska. Specifically, the boundary of this historic residence is described as an imaginary east-west line 8 m (25 ft) north of the structure; the windbreak on the east; the north edge of the Havelock Avenue right-of-way on the south; and an imaginary line 15 m (50 ft) west of the structure.

Boundary Justification. The windbreak and the north edge of Havelock Ave provide obvious visual boundaries. The boundaries on the north and west were selected to include those portions of the yard that contribute to the overall feeling and association of the property. In addition, these boundaries include a half circle drive located south of the structure. This drive contributes to the location, feeling and association of this architecturally significant property.

Site LC00:E-99 – Norma and Bob Lemke Residence ("Karl Lemke Farm")
13000 Old Cheney Rd
Walton, Nebraska

This brick house, constructed during the 1930's, was recommended eligible to the NRHP under Criterion C as an example of Colonial Revival architectural style.

Verbal Boundary Description. According to the USGS quadrangle map, Walton, Nebraska (1964), the location of this property is: NE ¼, SW ¼, NE ¼, SW ¼ of Section 9, T9N, R8E Stockton Township, Lancaster County, Nebraska. The boundary of this property can be described as the south edge of a driveway north of the residence; the west edge of a driveway on the east side of the residence; an imaginary east-west line located 15 m (50 ft) south of the residence; and a treeline west of the residence.

Boundary Justification. The driveways and the treeline provide an obvious visual boundary. The boundary described above includes a large front yard, decorative rock walls, and numerous mature trees which contribute to the location, feeling and association of this architecturally significant property.

Site LC00:E-141 – William Fagan Residence ("Fagan's Acres")
0.32 km (0.2 mile) north of 98th and Fletcher Ave
Lincoln, NE

This house, featuring a folk Italianate architectural style was determined eligible to the NRHP under Criterion C for its architectural significance and was constructed in the 1890's.

Verbal Boundary Description. The location of this residence is as follows according to the USGS quadrangle map, Walton, Nebraska (1964): NW ¼, NW ¼, SW ¼, SW ¼ of Section 36, T11N, R7E Waverly Township, Lancaster County, Nebraska. Specifically the boundary of this historic property can be described as the existing fenced yard.

Boundary Justification. The fence surrounding the house offers an obvious visual and cultural boundary for this property. The boundary described above includes a large front yard, which contributes to the location, feeling and association of this architecturally significant property.

NRHP Eligible Grain Elevators

Site LC00:S-40 – Circle 4 Feed and Grain Elevator

4th & Shower St
Cheney, Nebraska

This early 20th century grain elevator is considered eligible to the NRHP under Criterion A for its contribution to broad agricultural development. Grain elevators located throughout Lancaster County represent important facilities in an earlier era of smaller-scale, locally based agricultural commerce.

Verbal Boundary Description. The location of this grain elevator is as follows according to the USGS quadrangle map, Bennet, Nebraska (1966): SE ¼, NW ¼, NE ¼ of Section 26, T9N, R7E Grant Township, Lancaster County, Nebraska. The specific boundary of this historic property is described as the southern edge of the railroad right-of-way on the south; to an imaginary line 12 m (40 ft) west of the building; north to the right-of-way of Breagan Road, east to an imaginary line 12 m (40 ft) from building; south to point of beginning at railroad right-of-way.

Boundary Justification. The boundary of the nominated property includes only an area immediately surrounding the historic building, as the integrity of setting and association of the property surrounding this grain elevator are no longer intact.

Site LC00:E-106 – Farmer's Coop Elevator – Walton

Walton Nebraska

This grain elevator and coop located adjacent to the abandoned Missouri and Pacific Railway Line was determined eligible to the NRHP under Criterion A for its contribution to broad agricultural development. Grain elevators located throughout Lancaster County represent important facilities in an earlier era of smaller-scale, locally based agricultural commerce.

Verbal Boundary Description. The location of this elevator is as follows according to the USGS quadrangle map, Walton, Nebraska (1964): SE ¼, NW ¼, NE ¼, NW ¼, of Section 31 (correction section), T10N, R8E Stevens Creek Township, Lancaster County, Nebraska. Specifically, the boundary of this historic property can be described as the north edge of the original railroad siding, an imaginary line approximately 7.5 m (25 ft) east of the elevator on the east, the northern edge of the driveway to the south, an imaginary line approximately 12 m (40 ft) west of the elevator.

Boundary Justification. Present setting does not contribute to the significance of this historic property. The railway line originally serving this grain elevator has been abandoned and the rails have been removed. The abandoned railway line now serves as a popular hiker / biker trail.

NRHP Eligible School

Site LC00:S-41 – Cheney School
2nd & Smith St
Cheney, Nebraska

This historic school, constructed ca. 1910 – 1920 was determined eligible to the NRHP under Criterion A for rural educational development and under Criterion C as representative of the Arts and Crafts architectural style as evidenced around the main entrance to the building.

Verbal Boundary Description. The topographic location of this property is as follows according to the USGS quadrangle map, Bennet, Nebraska (1966): NW ¼, NE ¼, NW ¼, NE ¼ of Section 26, T9N, R7E Grant Township, Lancaster County, Nebraska. The specific boundary of this historic school is described as an imaginary line enveloping the footprint of the building.

Boundary Justification. This boundary description includes only an area immediately surrounding the building due to a wide range of modern alterations and additions that have impacted the integrity of setting and of feeling. These modern alterations include the addition of a handicapped entrance and sidewalk on the west side of the building, placement of 2 non-historic buildings, and a modern, paved playground.

NRHP Eligible Directional Signs

Site LC00:S-42 – Directional Sign
1st St, at 91st
Cheney, Nebraska

This cast concrete directional sign was determined eligible for the NRHP under Criterion A for its contribution to the broad transportation patterns evident in Lancaster County. With directional arrows, this sign informs travelers "Lincoln 11 miles / Bennet 7 miles". This sign has been moved, or at the very least, rotated 180 degrees (presumably for the benefit of motorists traveling along 91st Street) which makes the directional arrows incorrect. These concrete signs, placed throughout Lancaster County, offer us a snapshot of early vehicular travel in the county, and convey a sense of feeling regarding a time when travel was being revolutionized by the automobile.

Verbal Boundary Description. According to the USGS quadrangle map, Bennet, Nebraska 1966, the location of this site is as follows: NW ¼, NW ¼, NW ¼, NW ¼ of Section 26, T9N, R7E Grant Township, Lancaster County, Nebraska. The specific boundary of this property is an imaginary circle with a 1.5 m (5 ft) radius around the base of the sign.

Boundary Justification. Other than that immediately surrounding the directional sign, it is not necessary to include any additional property in the boundary designation.

Site LC00:E-118 – Directional Sign
112th & Adams

This cast concrete directional sign was determined eligible for the NRHP under Criterion A for its contribution to the broad transportation patterns evident in Lancaster County. With a directional arrow, this sign informs travelers "Prairie Home 4 miles". These concrete signs, placed throughout Lancaster County, offer us a snapshot of early vehicular travel in the county, and convey a sense of feeling regarding a time when travel was being revolutionized by the automobile.

Verbal Boundary Description. According to the USGS quadrangle map, Walton, Nebraska 1964, the location of this site is as follows: SW ¼, SW ¼, SW ¼, SW ¼ of Section 7 (correction section), T10N, R8E Grant Township, Lancaster County, Nebraska. The specific boundary of this property is an imaginary circle with a 1.5 m (5 ft) radius around the base of the sign.

Boundary Justification. Other than that immediately surrounding the directional sign, it is not necessary to include any additional property in the boundary designation.

Site LC00:E-135 – Directional Sign
56th & Saltillo
Lincoln, Nebraska

This cast concrete directional sign was determined eligible for the NRHP under Criterion A for its contribution to the broad transportation patterns evident in Lancaster County. With a directional arrow, this sign informs travelers "Lincoln 11 miles". These concrete signs, placed throughout Lancaster County, offer us a snapshot of early vehicular travel in the county, and convey a sense of feeling regarding a time when travel was being revolutionized by the automobile.

Verbal Boundary Description. According to the USGS quadrangle map, Roca, Nebraska 1964, the location of this site is as follows: SW ¼, SW ¼, SW ¼, SW ¼ of Section 33, T9N, R7E Grant Township, Lancaster County, Nebraska. The specific boundary of this property is an imaginary circle with a 1.5 m (5 ft) radius around the base of the sign.

Boundary Justification. Other than that immediately surrounding the directional sign, it is not necessary to include any additional property in the boundary designation.

Site LC00:E-145 – Directional Sign
Saltillo Road, 0.80 km (0.5 mile) west of 120th St
Lincoln, Nebraska

This cast concrete directional sign was determined eligible for the NRHP under Criterion A for its contribution to the broad transportation patterns evident in Lancaster County. With a directional arrow, this 2 –sided sign informs travelers "Lincoln 14 miles". These concrete signs, placed throughout Lancaster County, offer us a snapshot of early vehicular travel in the county, and convey a sense of feeling regarding a time when travel was being revolutionized by the automobile.

Verbal Boundary Description. According to the USGS quadrangle map, Bennet, Nebraska 1964, the location of this site is as follows: SE ¼, SE ¼, SW ¼, SW ¼ of Section 31 (correction section), T9N, R8E Stockton Township, Lancaster County, Nebraska. The specific boundary of this property is an imaginary circle with a 1.5 m (5 ft) radius around the base of the sign.

Boundary Justification. Other than that immediately surrounding the directional sign, it is not necessary to include any additional property in the boundary designation.

Site LC00:E-146 – Directional Sign
2.25 km (1.4 miles) east of Cheney on Yankee Hill Road
Lincoln, Nebraska

This cast concrete directional sign is recommended eligible for the NRHP under Criterion A for its contribution to the broad transportation patterns evident in Lancaster County. With a directional arrow, this 2 –sided sign informs travelers "Cheney 1 mile". This sign is not in its original location, but rather was moved to this location in 1999. These concrete signs, placed throughout Lancaster County, offer us a snapshot of early vehicular travel in the county, and convey a sense of feeling regarding a time when travel was being revolutionized by the automobile.

Verbal Boundary Description. According to the USGS quadrangle map, Bennet, Nebraska 1964, the location of this site is as follows: NW ¼, NW ¼, NE ¼, NW ¼ of Section 30 (correction section), T9N, R8E Stockton Township, Lancaster County, Nebraska. The specific boundary of this property is an imaginary circle with a 1.5 m (5 ft) radius around the base of the sign.

Boundary Justification. Other than that immediately surrounding the directional sign, it is not necessary to include any additional property in the boundary designation.

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Glossary of Terms

Association. Link of a historic property with a historic event, activity, or person. Also, the quality of integrity through which a historic property is linked to a particular past time and place.

Eligible. Properties that meet the National Register of Historic Places (NRHP) Criteria for nomination and listing on the NRHP.

Evaluation. Process by which the significance and integrity of a historic property are judged and eligibility for NRHP listing is determined.

Feeling. Quality of integrity through which a historic property evokes the aesthetic or historic sense of past time and place.

Historic Context. The concept used to group related historic properties based upon a theme, a chronological period, and/or a geographic area.

Integrity. Authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic period.

National Register of Historic Places (NRHP). The official federal list of districts, buildings, sites, structures, and objects significant in American history, architecture, archeology, engineering, and culture that are important in the prehistory or history of their community, state or nation. The program is administered through the National Park Service by way of State Historic Preservation Offices.

National Register of Historic Places Criteria. Established criteria for evaluating the eligibility of properties for inclusion in the NRHP.

Noncontributing. A building, site, structure, or object that does not add to the historic architectural qualities or historic associations for which a property is significant. The resource was not present during the period of significance; does not relate to the documented significance of the property; or due to alterations, disturbances, additions, or other changes, it no longer possesses historic integrity nor is capable of yielding important information about the period.

Object. An artistic, simple and/or small-scale construction not identified as a building or structure; i.e. historic signs, markers, and monuments.

Period of Significance. Span of time in which a property attained the significance for which it meets the NRHP criteria.

Property. A building, site, structure, and/or object situated within a delineated boundary.

Setting. Quality of integrity applying to the physical environment of a historic property.

Shelterbelt. A long narrow windbreak of trees planted to protect adjoining fields. The shelterbelts planted by the Forest Service consist generally of ten rows of trees preferably not less than one-half mile in length. The tree rows are usually ten feet apart which requires a strip land approximately seven rods wide.

Significance. Importance of a historic property as defined by the NRHP criteria in one or more areas of significance.

Site. The location of a prehistoric or historic event.

Vernacular. A functional, simplistic building or structure without stylistic details. Vernacular form buildings were usually designed by the builder, not by an architect.

Windbreak. A body of trees planted to provide protection from the prevailing wind. Usually these trees are evenly spaced, but are less massive than the shelterbelts planted with the assistance of the Forest Service.

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FINAL SECTION 4(F) STATEMENT

SOUTH AND EAST BELTWAYS STUDY
LINCOLN, NEBRASKA

PREPARED FOR

FEDERAL HIGHWAY ADMINISTRATION
NEBRASKA DEPARTMENT OF ROADS
LANCASTER COUNTY
CITY OF LINCOLN

OCTOBER 2000
(REVISED 2/01, 11/01, 5/02)

FINAL SECTION 4(f) STATEMENT
for
South and East Beltways Study
Lincoln, Nebraska

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FINAL SECTION 4(f) STATEMENT
for
South and East Beltways Study
Lincoln, Nebraska

1.0 PROJECT BACKGROUND

The City of Lincoln, Lancaster County and the Nebraska Department of Roads, in cooperation with the Federal Highway Administration (FHWA), are proposing to construct a beltway around the south and east sides of the City of Lincoln, Nebraska. The south and east beltways would complete a circumferential transportation system by linking with U.S. Highway 77 (US 77) on the west and Interstate 80 (I-80) on the north. The approximately 13 km (8 mi) long south beltway would connect US 77 with Nebraska Highway 2 (N-2), while the 21 km (13 mi) long east beltway would connect N-2 with I-80.

The beltway system is viewed as an essential component of the regional transportation network that would move through traffic around the congested urban area, as well as reduce delay and improve traffic flow on the existing urban street system. The south and east beltways could be constructed together, completing the loop around the City, or separately as stand alone projects with independent utility.

1.1 Final Environmental Impact Statement

This Final Section 4(f) Statement is being circulated as part of the Final Environmental Impact Statement (FEIS) for the South and East Beltways Study as required by the National Environmental Policy Act (NEPA). The Draft Section 4(f) Statement was previously circulated as part of the Draft Environmental Impact Statement (DEIS). Comments received on the DEIS and Draft 4(f) Statement have been addressed and incorporated into the FEIS and this Final 4(f) Statement. A summary of these comments is provided in Chapter 9.

Other chapters of the FEIS provide more detailed information on the beltways study, including purpose and need (Chapter 1), and evaluation of a universe of beltway alternatives as well as non-beltway and no build alternatives. The process used to screen all of the alternatives is fully described in Chapter 2, including selection of the four finalist beltway alignments approved by FHWA as the alternatives to be carried forward. Evaluation of the four finalist alternatives (SM-4, EC-1, EM-1 and EF-1) and the no build alternative is detailed in Chapter 3. The no build alternative is considered in the FEIS analyses as a baseline alternative and in the Section 4(f) Statement as an avoidance alternative. Selection of the preferred alternative, the EM-4/EM-1 alignment, is described in Chapter 4.

1.2 Applicability of Section 4(f)

Section 4(f) of the US Department of Transportation (DOT) Act of 1966 provides that the Secretary of the DOT shall not approve any program or project that requires land from a public park, recreation area, or wildlife or waterfowl refuge of national, state or local significance, or land of a historic (including archeological) site of national, state or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such program or project includes all possible planning to minimize harm resulting from the use.

The word "use" in this case means property that is acquired for construction of a permanent transportation facility or, if not acquired, that proximity impacts are so severe that the activities, features or attributes that make that site significant are substantially impaired. Substantial impairment would only occur when the utility of the resource in terms of prior significance is substantially diminished or destroyed. More specifically, not all impacts invoke protection under 4(f), but rather those that affect the present value of the property to the public and the public uses of that property. Any inconvenience to property owners, from whatever source, is not relevant to Section 4(f). In general, temporary occupancy of land for construction easements are not a use under Section 4(f) so long as it is of temporary duration, involves only minor work, has no permanent adverse physical impacts, and includes full restoration of the land to preconstruction conditions. The Section 4(f) criteria of substantial impairment is considered a higher standard than the Section 106 criteria of adverse affect.

For archeological sites, Section 4(f) applies only to sites on or eligible for the National Register of Historic Places (NRHP) that warrant preservation in place. Section 4(f) does not apply if the FHWA and SHPO determine that the archeological resources are important chiefly because of what can be learned by data recovery and have minimal value for preservation in place.

Additionally, when proposed mitigation measures are used in a constructive use determination, only the net impact need be considered in the analysis.

1.3 Beltway Alternatives

The FEIS evaluation of project alternatives is based on the results of six years of data collection, analysis, and public and agency scrutiny. The study considered a wide range of alternatives. These alternatives were evaluated and those considered most practical and with the least environmental impact were carried forward to more detailed levels of analysis. The planning process included four levels of analysis, each representing a more comprehensive and rigorous evaluation. The overall process was envisioned as a funnel, with the alternatives continually being reduced in number until the best candidates remained to be carried forward in the DEIS analysis. These were identified as the four finalist alternatives, and included one south beltway alternative (SM-4) and three east beltway alternatives (EC-1, EM-1 and EF-1). Based on detailed evaluations of benefits and impacts, and consideration of public comments on the DEIS, the SM-4/EM-1 alignments were identified as the preferred alternative.

The avoidance of impacts to, or use of, resources protected under Section 4(f) was a consideration in the beltway alternative evaluation process. The four finalist alternatives represented previous efforts to minimize Section 4(f) uses. In particular, all south beltway alternatives were previously eliminated which impacted Wilderness Park and its trails. On both the south and the east beltways, site-specific shifts in alignments were made to avoid impacts to historic properties.

Feasibility. All of the build alternatives served the project purpose, provided a solution to the traffic needs, and were considered feasible. Although the SM-4 alternative was the only remaining recommended south alternative, EC-1, EM-1 and EF-1 represented different alternatives for an east beltway, each with different benefits and trade-offs.

The no build alternative did not serve the project purpose and need, and was not considered feasible.

Prudence. Of the finalist alternatives, only SM-4 and EM-1 were determined to be prudent. SM-4 was considered prudent because it offered transportation functions and minimized impacts on natural resources. While the route does impact some homes and businesses, these impacts have been minimized to the extent possible.

Of the east alternatives, EC-1 was not considered prudent because of the unacceptable impact on existing urban and rural neighborhoods, including noise and visual impacts. The EF-1 alternative was not considered feasible because of the impact to historic sites along the route, including the NRHP-listed Stevens Creek Stock Farm.

EM-1 was considered prudent because it aided in completing a circumferential roadway and providing a new truck route without the less efficient "backtracking" at the north end of EC-1 and EF-1. In comparison to EC-1, EM-1 minimized impacts to rural and urban neighborhoods, and had the least number of relocations of any of the east alternatives. While EM-1 and EF-1 were similar in environmental impact, EM-1 minimized impacts to historic properties. At the same time, EM-1 had less impact to prairies than EF-1, relatively low impact to wetlands compared to EC-1, and required 150 ac less right-of-way than the other alternatives. While the EM-1 crossing of Stevens Creek was the longest of the three east alternatives, it could be built to minimize impacts to the floodplain. In consideration of these resources, the EM-1 route protected and preserved the environment to the greatest extent, and was considered the most compatible with the goals, objectives and values of *Lincoln/Lancaster County Comprehensive Plan*.

The EM-1 route also had the greatest potential as a multi-use corridor for trails, open space, utilities and other transportation alternatives, had greater travel savings than EF-1, and was less expensive to build than EC-1. While EM-1 was more expensive than EF-1, EM-1 may provide future cost savings as a multi-use corridor, and it uses less land than the other two routes.

Other than the proposed future roadway network improvements, the no build alternative did not address the problem of increasing traffic on the south and east fringes of the City of Lincoln, nor did it specifically address reduction of traffic on major urban arterial streets, or high truck use and through traffic on certain rural roadways on the fringe of the metropolitan area. Therefore, the no build alternative was not considered prudent.

1.4 Section 4(f) Resources Likely to be Impacted by Beltway Alternatives

Public Parks, Recreation Areas, or Wildlife or Waterfowl Refuges. The only public parks, recreation areas, or wildlife or waterfowl refuges within the rights-of-way of the beltway alternatives are two publicly-owned recreational trails. The MoPac East Trail would be crossed by all three east alternatives, and the David Murdock Trail would be crossed by EC-1. There are no other such recreational resources within approximately 0.8 km (0.5 mi) of any of the beltway alternatives.

It should be noted that the City of Lincoln is considering two new park areas within the beltway study area which could result in the beltway crossing future public recreation land; however, the parks are only in the conceptual stages of planning and no formal plans have been developed. The first location is the Salt Valley Greenway Corridor which would extend from Wilderness Park south to Hickman, and which would be crossed by SM-4. The second is a new park location in the vicinity of Stevens Creek and the MoPac East Trail which would be crossed by EM-1. If the future park lands are concurrently planned with the proposed roadway project, they would not be considered 4(f) properties in the future. Right-of-way for the beltway will be acquired prior to or separate from any acquisition for future parks.

Historic Sites. As part of Section 106 consultation for the beltway study, exhaustive surveys were completed for identifying and evaluating historic standing structures and archeological resources within the beltway study area (see FEIS, **Section 3.23**). Based on the findings, 32 historic standing structures and four archeological sites were determined to be on or eligible for the National Register of Historic Places (NRHP). These 36 sites were then assessed for adverse effects from the beltway alternatives (**Appendix F**). Five historic standing structures and two archeological sites were considered to be adversely affected by beltway routes. In letters dated 27 November 2000 and 1 February 2001 (**Appendix E**), the SHPO concurred with the findings of the Assessment of Adverse Effects, as well as the Determination of Boundaries report (**Appendix G**).

In addition, there is one historical directional sign (LC00:E-118) which may require protection during construction and nearby repositioning, if it is not moved prior to the beltway project for County road widening. Although the SHPO has indicated that the beltway project will have no adverse effect on the sign (with the condition of protection during construction and repositioning nearby), the site is evaluated herein as a 4(f) resource because the historic boundary for the sign has been defined as a 1.5 m (5 ft) diameter circle of land around the sign (Appendix I). Use of the land beneath the sign requires consideration of this property as a 4(f) resource.

The potential Section 4(f) resources for all of the finalist beltway alternatives are listed in **Table H.1**. Locations of the trails are shown in **Figure 2.25** of the FEIS. Location of the historic sites are shown in **Figure 3.3** of the FEIS. Six of these resources occur along the preferred alternative–SM-4/EM-1.

2.0 DESCRIPTION AND USE EVALUATION OF SECTION 4(f) RESOURCES

This section contains a brief description of the six Section 4(f) resources which are located along the preferred alternative SM-4/EM-1, as well as an evaluation of the potential use of those resources for determining Section 4(f) applicability. More detailed descriptions of the historic sites can be found in the references cited in **Section 3.23.1**. For historic resources that could be evaluated for constructive use, a section is included describing the activities, features or attributes which make that resource of value to the public.

2.1 MoPac East Trail

Description. The MoPac Trail, which follows the old Missouri Pacific Railroad line, originates within urban portions of the City of Lincoln, extends east through suburban developments, and continues east into agricultural areas. The trail is owned by the City of Lincoln to 150 m (500 ft) east of 84th Street. From this point east, the MoPac East Trail is owned by the Lower Platte South Natural Resources District (LPSNRD) and extends to Elmwood; future plans include extending the route to Omaha. In the east beltway area, the trail is located in the vicinity of A Street (see **Figure 2.25**).

The MoPac East Trail was developed along abandoned railroad rights-of-way, and is not in the rail conservancy program. The trail has a 30 m (100 ft) right-of-way. Roadway intersections have been variously treated with both at-grade and grade separated crossings. Visually, the trail occurs in open settings. The MoPac East Trail has two trailheads in the study area at 98th Street and in Walton. The trail has a rock treadway, with a screened limestone surface, on the old rail bed for pedestrian and bicycle traffic. A second trail, for equestrian use, is located on one side of the rail bed or the other. This trail has been cleared of brush, and has an earth surface.

Table H.1

SECTION 4(f) RESOURCES LIKELY TO BE IMPACTED BY BELTWAY ALTERNATIVES

RESOURCE	LOCATION	OWNER	NOTES
MoPac East Trail	EC-1 EM-1 EF-1	Lower Platte South Natural Resources District	Publicly-owned Recreational Trail. ROW required.
David Murdock Trail	EC-1	City of Lincoln	Publicly-owned Recreational Trail. ROW required.
Henry Wunibald Farmyard LC00: S-143	SM-4	Private	NRHP Eligible Site. Determined to be adversely affected under 106. No ROW required.
Steve Johnson Farmyard LC00: E-52	EM-1	Private	NRHP Eligible Site. Determined to be adversely affected under 106. No ROW required.
Penterman Farmyard LC00: E-53	EF-1	Private	NRHP Eligible Site. Determined to be adversely affected under 106. No ROW required.
Teresa Retzlaff Farmyard LC00: E-87	EF-1	Private	NRHP Eligible Site Determined to be adversely affected under 106. No ROW required.
Stevens Creek Stock Farm LC00: E-88	EM-1	Private	NRHP Listed Site and Additional NRHP Eligible Land Determined to be not adversely affected under 106. No ROW required.
	EF-1	Private	NRHP Listed Site and Additional NRHP Eligible Land Determined to be adversely affected under 106. No ROW required.
Road Sign at 112th & Adams LC00: E-118	EM-1 EF-1	Lancaster County	NRHP Eligible Site Determined to be conditionally not adversely affected under 106. ROW required, but relocation of sign acceptable to SHPO under 106.
Lithic and Ceramic Scatter (archeological site) 25LC129	EM-1	Private	NRHP Eligible Site. Determined to be adversely affected under 106. Originally thought that ROW would be required. Does not warrant preservation in place.
Euroamerican Trail (wagon ruts) 25LC147	EC-1	Private	NRHP Eligible Archeological District. Determined to be adversely affected under 106. ROW required, through discontinuous district. Wagon ruts warrant preservation in place.

Use of the trail is limited to daylight hours. Through the east beltway study area, both hiker/biker and equestrian usage is considered very heavy according to LPSNRD.

Use Evaluation. All of the east beltway alternatives cross the MoPac East Trail requiring use of the trail right-of-way. Use of the land requires evaluation of the property as a 4(f) resource.

2.2 Henry Wunibald Farmyard (LC00: S-143)

Description. The NRHP-eligible Henry Wunibald Farmyard consists of a 1 ½ story farmhouse, mortise and tenon gable roof barn, hollow clay tile coop, shed (former kitchen) and metal quonset-style shed. The period of significance is 1900-1960s. This property is considered significant under Criterion A as a complex of buildings associated with agricultural development, and under Criterion C for the house, barn and shed (former kitchen).

Current and Primary Activities, Features or Attributes. The historic standing structures occur on an approximately 7.3 ha (18 ac) private residential acreage, with the associated pasture belonging to three different adjacent landowners. Because this site is privately owned, the primary value to the public is the preservation of the physical features of the site–those being the historic standing structures and associated agricultural acreage within the site boundary.

Use Evaluation. The SM-4 alternative will be 300 m (1,000 ft) from the farmhouse and 91 m (300 ft) from the associated agricultural acreage which defines the property boundary. Based on the Assessment of Adverse Effects (**Appendix F**), the SM-4 alternative will have an adverse visual effect on the farmyard, but no noise impact based on guidelines and criteria established by FHWA (June 1995). A Memorandum of Agreement (MOA) for the project has been developed and includes mitigation measures to screen the beltway from the farmyard (see **Section 9.5.9** and **Appendix E**).

Although the SM-4 route adversely affects the property, it would not make the property ineligible for the NRHP. The associated agricultural acreage is not harmed by visual impact and there is no noise impact under Section 4(f). The visual intrusion to the farmyard does not diminish the characteristics that make this property eligible for the NRHP. At approximately 300 m (1,000 ft) distance, the beltway will look similar to a section line road on the horizon. Therefore, the property is not considered substantially impaired which is the threshold for constructive use under Section 4(f).

2.3 Steve Johnson Farmyard (LC00: E-52)

Description. The NRHP-eligible Steve Johnson Farmyard consists of a Folk Victorian house, garage (summer kitchen), large gable roof barn, two-pen granary, chicken coop and outhouse. The period of significance is 1890s-1900. This property is considered significant under Criterion A as a complex of buildings associated with agricultural development, and under Criterion C as a typical example of Folk Victorian architecture in the house and outbuildings.

Current and Primary Activities, Features or Attributes. The historic standing structures are located on an approximately 2 ha (5 ac) private residential acreage, with the remaining associated cropland belonging to an adjacent landowner. The farmyard faces and is very close to Yankee Hill Road–a major county road providing access for rural areas. Because this site is privately owned, the primary value to the public is the preservation of the physical features of the site–those being the historic standing structures and associated agricultural acreage within the site boundary.

Use Evaluation. None of the east beltway alternatives require incorporation of land from this site. The EM-1 alternative will be 701 m (2,300 ft) from the farmhouse and 300 m (1,000 ft) from the associated agricultural acreage which defines the property boundary. Based on the Assessment of Adverse Effects, the EM-1 alternative will have an adverse visual effect on the farmyard, but no noise impact based on guidelines and criteria established by FHWA (June 1995). The MOA for the project includes mitigation measures to screen the beltway from the farmyard (see **Section 9.5.9** and **Appendix E**).

The EF-1 alternative is 1 280 m (4,200 ft) away, located in a cut on the other side of a creek, and is not considered to have an adverse effect under Section 106. Since there is no adverse effect, it is not considered to substantially impair the property under Section 4(f).

Although the EM-1 route adversely affects the property, it would not make the property ineligible for the NRHP. At approximately 0.6 km (0.4 mi) distance, the beltway will look similar to a section line road on the horizon and will not dominate the view from the buildings. The associated agricultural acreage is not harmed by visual impact; and there is no noise impact. Therefore, the property is not considered substantially impaired which is the threshold for constructive use under Section 4(f).

2.4 Stevens Creek Stock Farm (LC00: E-88)

Description. The NRHP-listed Stevens Creek Stock Farm consists of a compact grouping of 18 buildings in excellent condition representing an extended courtyard arrangement. The period of significance for the site is 1850 to 1924 (according to the National Park Service data base). This property is considered significant under Criterion A representing early settlement of the county and the development of agriculture in Nebraska. Several structures are significant under Criterion C representing a distinctive entity in Nebraska architecture.

In addition to the original 160-acre parcel listed on the NRHP, and additional 80-acre parcel of farmground was determined eligible by the SHPO. As part of the recent evaluation of an additional 320 acres, two additional parcels located west and south of the Stevens Creek Stock Farm have been determined eligible (**Section 9.5.5** and **Appendix F**).

Current and Primary Activities, Features or Attributes. The site is the farmyard and all of the contiguous agricultural acreage of a working family farm. Some of the historic standing structures are in active use, including some of the residences. An attribute of note is the relative isolation of the farmyard in the center of the property. Because this site is privately owned, the primary value to the public is the preservation of the physical features of the site–those being the historic standing structures and associated agricultural acreage within the site boundary. The owners have stated that they host school children, university students and others who are interested in history, farming and preservation.

Use Evaluation. None of the beltway alternatives require incorporation of land from this site. The EM-1 alternative will be 945 m (3,100 ft) from the 1867 farmhouse, and 92 m (300 ft) to 488 m (1,600 ft) from the associated agricultural acreage which defines the property's west boundaries. Based on the Assessment of Adverse Effects, the EM-1 alternative will have no adverse effect on the property since the property is well buffered visually and physically by Stevens Creek, trees, and the orientation of the buildings to the east. Additionally, the associated agricultural acreage is not harmed by visual impact. The SHPO has concurred with this determination (**Appendix E**). Since the EM-1 route has no adverse effect under Section 106, it is not considered to substantially impair the property under Section 4(f).

The EF-1 alternative is 610 m (2,000 ft) from the 1891 farmhouse and closest barn, 792 m (2,600 ft) from the 1950s ranch house, and 61 m (200 ft) from the associated agricultural acreage which defines the property's east boundary. Based on the Assessment of Adverse Effects, the EF-1 alternative will adversely affect the property by changing the character of the setting by introducing a large transportation facility, and by being visible from certain buildings (1891 house, top of barn cupolas and silo). There is no noise impact based on guidelines and criteria established by FHWA (June 1995).

Although the EF-1 route adversely affects the property under Section 106 criteria, it is not considered to substantially impair the site under Section 4(f). The beltway will have no effect on the historic significance of site, although it will impact the integrity of the setting. However, the beltway will not dominate the view from the buildings; the associated agricultural acreage is not harmed by visual impact; and the there is no noise impact under Section 4(f). The buildings are relatively isolated in the middle of the 97 ha (240 ac) site and surrounded on all but the north side by trees and creeks (the beltway would not be visible to the north). With 0.6 km (0.4 mi) distance or more from the buildings, the beltway will look similar to a section line road on the horizon and will not dominate the view from the buildings. Therefore, the property is not considered substantially impaired which is the threshold for constructive use under Section 4(f).

2.5 Road Sign at 112th and Adams (LC00: E-118)

Description. The NRHP-eligible Road Sign is a cast concrete directional sign from the 1920s. This sign is considered significant under Criterion C under an umbrella of multiple property nominations for early Lancaster County concrete road signs as a contribution to broad transportation patterns.

Current and Primary Activities, Features or Attributes. The site is a small directional sign located at the intersection of two gravel County roads, and located within the County road right-of-way. The primary value to the public is the preservation of the sign itself.

Use Evaluation. The road could be impacted by either the EM-1 or EF-1 alternatives. The road sign may require protection during construction and nearby repositioning, if it is not moved prior to the beltway project for County road widening. Although the SHPO has indicated that the beltway project will have no adverse effect on the sign (with the condition of protection during construction and repositioning nearby), the site is evaluated herein as a 4(f) resource because the historic boundary for the sign has been defined as a 1.5 m (5 ft) diameter circle of land around the sign (**Appendix G**). Use of the land beneath the sign requires consideration of this property as a 4(f) resource.

2.6 Lithic and Ceramic Scatter (25LC129)

Description. Site 25LC129 is an artifact scatter of lithic material and pottery covering more than 20,000 m^2 (215,000 sq ft) along a terrace slope above the Stevens Creek floodplain. Numerous projectile points were located at the site, as well as grit -tempered, cord-marked pottery and fire-cracked rock. The projectile points suggest that the site dates to the Central Plains Tradition (1000 - 600 years ago). Subsurface testing confirmed the presence of buried cultural material, and also suggests the presence of buried features.

Use Evaluation. The footprint of the EM-1 alternative, as shown in the DEIS, extended across a portion of the area mapped as Site 25LC129. Consultation with the SHPO indicated that appropriate mitigation of this site would include excavation and recordation for data recovery

purposes. As such, the site does not warrant preservation in place and would not meet the criteria to be evaluated as a 4(f) resource. Since this time, refinements made to the EM-1 alternative (including use of a retaining wall) have resulted in avoidance of the archeological site (see **Section 9.5.9**).

3.0 IMPACTS OF THE PREFERRED ALTERNATIVE ON SECTION 4(f) RESOURCES AND MEASURES TO MINIMIZE HARM

Based on the above use evaluation and the criteria of Section 4(f), two of the resources would be adversely impacted by the preferred SM-4/EM-1 beltway alternative. These are listed in **Table H.2**.

Table H.2

SECTION 4(f) RESOURCES
IMPACTED BY THE PREFERRED SM-4/EM-1 BELTWAY ALTERNATIVE

RESOURCE	LOCATION	USE	MITIGATION
MoPac East Trail	EM-1	ROW required.	Construction of grade separated crossing, according to requirements of the Lower Platte Natural Resources District.
Road Sign at 112th & Adams LC00: E-118	EM-1	ROW required and relocation of sign.	Protection during construction and relocation of sign, according to requirements of the State Historic Preservation Office.

3.1 MoPac East Trail

Impacts. The right-of-way requirement for each of the EM-1 crossings of the MoPac East Trail is 0.3 ha (0.8 ac). The impacted location is shown in FEIS Exhibit EM1-3. Such a crossing would require construction of a grade separation as part of the beltway project to provide for trail continuity.

Construction of the beltway will introduce a new roadway element into this segment of the trail, and may adversely impact the visual and audible experience of the trail users for a short distance. However, these impacts on the trail are considered negligible considering the trail is part of an urban trail system that already crosses many roadways (approximately 1 per 1.6 km (1 mi)), and considering the length of the trail (over 14 km (9 mi)).

Coordination. The consulting team has coordinated with the owner of the trail to discuss project impacts and measures to minimize harm. A letter from LPSNRD is included in **Appendix H-A** of this Section 4(f) Statement documenting their concerns and recommendations for appropriate mitigation measures.

Measures to Minimize Harm. For the MoPac East Trail, design of the beltway/trail intersections will include (1) a grade separation to safely accommodate the trail, (2) separate access through confined areas for the hiker/biker and equestrian trails (or a physical divider), and (3) an underpass for the equestrian trail crossing since horses are hesitant to use overpasses. Design of the trails will follow AASHTO and ADA trail guidelines, and will be coordinated with LPSNRD. Specific details on the crossings will not be determined until final design.

Net Impacts. Since replacement trail crossings will be provided, there will be no adverse impact on existing pedestrian, bicycle and equestrian accommodations.

3.2 Road Sign at 112th and Adams (LC00: E-118)

Impacts. The road sign may require protection during construction and nearby repositioning, if it is not moved prior to the beltway project for County road widening. Repositioning the sign is a minor impact, required for operation and safety of an existing roadway.

Coordination. The SHPO has concurred that the beltway project will have no adverse effect on the sign, with the condition of protection during construction and repositioning nearby (see letter dated 26 September 2000, **Appendix H-A** of this Section 4(f) Statement).

Measures to Minimize Harm. Conditions for protection and repositioning of the sign have been defined by the SHPO. The road sign will be protected from damage during construction of the beltway, and upgrade and paving of Adams Street. The sign will be repositioned about 6.1 m (20 ft) from the upgraded road and as near its current location as is practicable (assuming the County roads have not been upgraded prior to beltway construction).

Net Impacts. With the condition of protection during construction and repositioning nearby, there will be no adverse impact on the road sign.

4.0 IMPACTS OF AVOIDANCE ALTERNATIVES

4.1 MoPac East Trail

Because of the length of the MoPac East Trail and its orientation perpendicular to the east beltway study area, any east beltway alternative (remaining or previously eliminated) will require crossing the trail. The only avoidance alternative is the no build alternative.

No Build Alternative. Although the no build alternative will have no impacts on the MoPac East Trail that can be identified at this time, there will be impacts to the trail as County roads are hard surfaced to accommodate a growing suburban population (as part of the proposed future roadway network improvements). An example would be the recent paving of 148th Street across the MoPac East Trail. Additional information on impacts of the no build alternative is detailed in Chapter 3 of the FEIS.

4.2 Road Sign at 112th and Adams (LC00: E-118)

The EC-1 alternative avoids impacts to the road sign, as does the no build alternative. Impacts of these alternatives are detailed in Chapter 3 of the FEIS, and a summary comparison of the impacts of the east alternatives is provided in Chapter 4.

EC-1. The EC-1 alternative meets the project purpose and need, and avoids impacts to the road sign, but still impacts two other Section 4(f) resources--the MoPac East Trail and David Murdock Trail.

No Build Alternative. The no build alternative will have no impact on the road sign. However, the no build alternative will not meet the project purpose and need.

4.3 Comparison of the Alternatives

A summary comparison of the alternatives is provided in **Table H.3**, based on the above Section 4(f) considerations.

Table H.3

COMPARISON OF IMPACTS TO SECTION 4(f) RESOURCES BY BELTWAY ALTERNATIVE

ALTERNATIVE	FEASIBLE AND PRUDENT	USES SECTION 4(f) LAND
SM-4	Feasible: Yes Prudent: Yes	None
EC-1	Feasible: Yes Prudent: No	MoPac East Trail David Murdock Trail
EM-1	Feasible: Yes Prudent: Yes	MoPac East Trail Road Sign
EF-1	Feasible: Yes Prudent: No	MoPac East Trail Road Sign
No Build	No[1]	MoPac East Trail (likely) David Murdock Trail (likely) Road Sign (likely)

[1]Does not meet project purpose and need.

Based on a comparison of impacts to Section 4(f) resources, all of the east alternatives have relatively low net impacts after mitigation. While all of the east alternatives are considered feasible, only the SM-4 and EM-1 alternatives are considered prudent.

5.0 SUMMARY

Based on the Section 4(f) evaluation, it is determined that there are no feasible or prudent alternatives to the use of the land from the MoPac East Trail or Road Sign at 112th and Adams. The proposed action, to construct the SM-4/EM-1 beltway alternative, includes all possible planning to minimize harm to the recreational uses of the trail and the historic attributes of the road sign.

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07May02

Appendix H-A
Coordination Letters

U.S. Department of Transportation
Federal Highway Administration

RECEIVED
SEP 27 2000

OCT 12 2000

Nebraska Division Office
Federal Building, Room 220
100 Centennial Mall North
Lincoln, NE 68508-3851
Nebraska.FHWA@FHWA.DOT.GOV

September 26, 2000

NEBRASKA DIVISION

In Reply Refer To:
HRW-NE

Copy

Mr. Robert Puschendorf
State Historic Preservation Office
Nebraska State Historical Society
P.O. Box 82554
Lincoln, Nebraska 68501-2554

0009-077-01

Dear Mr. Puschendorf:

Concurrence on No Adverse Effect with conditions
for NRHP-Eligible Site: LC00: E-118 (Road Sign at 112th and Adams)
DPU-3300(1) South and East Beltways Study, Lincoln, Nebraska

In compliance with Section 106 of the National Historic Preservation Act, the Federal Highway Administration identified 34 sites in the Lincoln South and East Beltways Study area which are either listed in or eligible for listing in the National Register of Historic Places and the SHPO has concurred upon their eligibility. A concrete directional road sign located at 112th and Adams (LC00: E-118) was one property the SHPO and FHWA agreed was eligible.

During the assessment of adverse effects for the beltway project, it was determined that LC00: E-118 would not be adversely affected by the Beltway project if the following conditions are met:

If either alternative EM-1 or EF-1 is selected as the preferred alternative, LC00:E118 will be protected from damage during construction of the Beltway and repaving and upgrade of Adams Street.

Additionally, in consultation with the SHPO, LC00:E-118 will be repositioned about 20 feet from the upgraded road and as near its current location as is practicable (assuming the County roads have not been upgraded prior to beltway construction). These conditions will be incorporated into the Draft Environmental Impact Statement and Draft 4(f) Statement for the project.

Because the historic boundaries of the road signs have been recommended as a 5-foot radius around the sign, the beltway alternatives will require incorporation of land from a historic property and must therefore be addressed in the Draft 4(f) Statement.

We are requesting your concurrence that implementing the conditions described will result in "no adverse effects" to the historic property LC00:E-118.

Sincerely yours,

Edward W. Kosola
Realty/Environmental Officer

cc:
Amy Zlotsky, OES
Jim Linderholm, HWS
Roger Figard, City of Lincoln
Len Sand, NDOR

CONCUR

DEPUTY STATE HISTORIC PRESERVATION OFFICER

DATE: 10/5/00

Lincoln Nebraska's Capital City

RECEIVED
AUG 07 200
HWS

August 3, 2000

Michael N. Gorman, Project Manager
East Beltway Study
HWS Consulting Group, Inc.
P. O. Box 80358
Lincoln, NE 68501-0358

Dear Mr. Gorman:

Thank-you for the opportunity to meet with your staff regarding the proposed East Beltway alignments in Lancaster County and their impacts on the Murdock Trail. As identified in our meeting, the only alternative that would impact the Murdock Trail would be the EC-1 alternative.

The recommendation for mitigating the impact of this trail by designing the beltway/trail intersection with an overpass would be satisfactory. This would provide continuity for the trail as well as separation between the pedestrian/bicycle trail and vehicles. We also understand that the design of the beltway/trail intersection would follow AASHTO and ADA trail guidelines and that any costs associated with the mitigation of these requirements would be a part of the project cost and not a separate expense to the City.

Sincerely,

Lynn Johnson
Director

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To Amy Hotsky	From Mike G.
Co.	Co.
Dept.	Phone # FYI
Fax #	Fax #

Parks and Recreation Department / James P. Morgan, Director
2740 A Street / Lincoln, Nebraska 68502 / Phone: 402-441-7847 / Fax: 402-441-8706 / Website: www.ci.lincoln.ne.us
"Making Lincoln a better place to live"

LOWER PLATTE SOUTH
NATURAL RESOURCES DISTRICT

3125 Portia St., Box 83581, Lincoln NE 68501-3581
(402) 476-2729 • FAX (402) 476-6454

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JUL 05 2000
HWS

July 3, 2000

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JUL 20 2000
OLSSON ASSOCIATES

Michael N. Gorman, Project Manager
East Beltway Study
HWS Consulting Group, Inc.
P.O. Box 80358
Lincoln, NE 68501-0358

Dear Mr. Gorman:

I have reviewed your letter dated June 27, 2000, following our meeting on the proposed East Beltway alignments in Lancaster County and its impacts on the Mo Pac East and the planned Stevens Creek Connector Trail.

The approach contained in your letter would appear to satisfactorily mitigate potential adverse impacts to the trail corridors. The stipulations include maintaining the trail corridors' continuity, maintaining separation between the pedestrian/bicycle trail treadway and the equestrian trail treadway, minimizing the distance of any relocations, the types of crossings for the trail, and the design standards.

The only additional requirements would be reestablishment of vegetation and landscaping as may be needed and appropriate for the respective crossings. Furthermore, we assume that the costs related to these mitigation requirements would not be a cost of the District as the trail owner.

Sincerely,

Glenn D. Johnson
General Manager

GDJ/gdj

pc: Dan Steinkruger, Chair
Dick Powell, RF&W Subcmte Chair

RECORD OF DECISION

South and East Beltways
Lincoln, Nebraska
Project No. DPU-3300(1)

A. DECISION

The City of Lincoln, Lancaster County and the Nebraska Department of Roads (NDOR), in cooperation with the Federal Highway Administration (FHWA), have studied a wide-range of alternatives, evaluated them and selected a preferred alternative for constructing a beltway around the south and east sides of the City of Lincoln. The purpose of the project is to complete the circumferential (encircling) transportation network around Lincoln which currently exists only on the north and west sides. The project would move through traffic around Lincoln's congested urban area, and improve traffic flow on the existing urban street system.

The proposed action is construction of a 4-lane roadway designed to freeway standards, similar to Interstate 80 (I-80). A freeway design would have complete access control (no at-grade crossings) and would typically require a 250 to 300-foot (ft) wide right-of-way. Beltway interchanges would be spaced approximately 2 miles (mi) apart along the existing grid network. Roadways which cross the beltway may or may not be improved as part of the federal project. However for cost estimating purposes of this study, it was assumed that ultimately all unpaved county roads at beltway interchanges would be upgraded to 4-lane paved roadways. County roads which cross the beltway overpasses were assumed to be upgraded to 2-lane paved roadways.

The south beltway would provide an alternative connection between US Highway 77 (US 77) in the southwest and Nebraska Highway 2 (N-2) at the southeast edge of Lincoln. The selected alignment, SM-4, intersects with US 77 approximately 0.5 mi south of Saltillo Road, and extends east to N-2 at approximately 120th Street. Access points are proposed at 27th, 68th and 84th Streets.

The east beltway would connect N-2 at the southeast edge of Lincoln with I-80 in the northeast. The selected alignment, EM-1, extends north from N-2 in the vicinity of 120th, and generally follows 127th Street to connect with I-80 at the Waverly interchange. Access points are proposed at Pine Lake Road, Pioneers Boulevard, US 34 (O Street), Adams Street, Fletcher Avenue and US 6 (Cornhusker Highway).

The beltways could be constructed together, completing the loop around the City, or separately as stand alone projects with independent utility (*i.e.*, they would be usable and a reasonable expense even if only one is built without the other).

B. ALTERNATIVES CONSIDERED

The Final Environmental Impact Statement (FEIS) document contains an evaluation of project alternatives based on the results of six years of data collection, analysis, and public and agency review. Although the document includes the step by step evaluation process, the final evaluation represents an analysis of all that is known at this time. The study considered a wide range of alternatives, including non-beltway and no build alternatives. These alternatives were evaluated and those considered most practical and with the least environmental impact were

carried forward to more detailed levels of analysis. The planning process included four levels of analysis, each representing a more comprehensive evaluation. The overall process was envisioned as a funnel, with the alternatives continually being reduced in number until the best candidates remained to be carried forward in the analysis. These were identified as the four finalist alternatives, and included one south beltway alternative (SM-4) and three east beltway alternatives: close, mid and far (EC-1, EM-1 and EF-1). The no build alternative was carried forward throughout the entire evaluation process.

Assessment of Transportation Benefits. Comparison of the four finalist beltway alternatives indicates that all of the alternatives served the project purpose and need, and all of the alternatives are considered feasible and cost-effective solutions. The location of the east beltway in terms of the close, mid or far alignment does not seem to have a significant effect on the amount of traffic it is expected to carry or the benefits obtained. The east beltway provides relief to traffic coming into or through Lincoln from the northeast (Omaha) and the southeast (Nebraska City). This traffic will use the east beltway regardless of which alternative is selected. The major differences between the east alternatives involve the interchanges at I-80, N-2 and the south beltway. The EC-1 and EF-1 requires diagonal routing to connect to an interchange at I-80, and requires two separate interchanges for N-2 and the south beltway. EM-1 requires a single, but more complicated interchange at N-2 and the south beltway. These differences are best reflected in the construction cost estimates and right-of-way impacts; however, they have little effect on system performance.

Assessment of Environmental Impacts. This FEIS contains an assessment of environmental, social and economic impacts, and includes proposed mitigation to avoid, minimize or compensate for project impacts to the extent possible. Comparison of the project impacts indicates that all of the finalist alternatives have relatively low impact considering the length of the segments. This is due to the primarily rural setting and the great effort made to minimize impacts throughout the beltway planning process. However, all of the east routes have impacts to Section 4(f) resources.

Overall differences between the east alternatives are relatively minor. EC-1 and EF-1 have greater right-of-way requirements than EM-1; and therefore, have greater land use impacts. EC-1 has slightly more impact to suburban type land uses such as residential and commercial acreage and impacts to trails due to its closer proximity to Lincoln. In contrast, EF-1, which is 2.5 mi more distant from the city than EC-1, has slightly more impact to rural uses such as farmland, prairie, historic structures, and actual number of residences. EM-1 and EC-1 have slightly more impact to natural resources such as streams, floodplains and floodways, and wetlands due to their closer proximity to Stevens Creek, where as EF-1 has slightly less impact to natural resources due to its general location along the ridgeline.

Selection of the Preferred Alternative. Following receipt and consideration of comments on the DEIS, the SM-4/EM-1 alternative was selected as the preferred alternative.

SM-4 was selected because:

1. Transportation Functions. A south beltway would aid in completing a circumferential roadway in the Lincoln area. The route is within 0.5 mi of the future service limit and would reduce the amount of through traffic that otherwise would be on N-2. The route has potential as a multi-use corridor for future trails, open space, utilities and other transportation alternatives.

2. Environmental Impact. SM-4 minimizes impact on natural resources in that it has relatively little impact on wetlands, no impact on native prairie, does not cross the existing boundaries of Wilderness Park, and could be built in a manner to minimize the floodplain impact on Salt Creek. While the route does impact some homes and businesses, these impacts have been minimized to the extent possible.

EM-1 was considered the best east alternative compared to EC-1 and EF-1 because:

1. Transportation Functions. The EM-1 route would aid in completing a circumferential roadway and provide a new truck route without the less efficient "backtracking" found in the EC-1 and EF-1 options.

2. Environmental Impacts. EM-1 minimizes environmental impacts to those resources that are considered most valuable by the local community. In comparison to EC-1, the EM-1 route minimizes impacts to rural and urban neighborhoods, including noise and visual impacts to residences. It also has the least number of residential and business relocations of any of the east alternatives due to right-of-way requirements. While EM-1 and EF-1 are similar in environmental impact; EM-1 minimizes impacts to historic properties. At the same time, EM-1 has less impact to prairies (versus EF-1), relatively low impact to wetlands (versus EC-1), and requires 150 ac less in right-of-way than the other alternatives. While the EM-1 crossing of Stevens Creek is the longest of the three east alternatives, it could be built to minimize impacts to the floodplain. In consideration of these resources, the EM-1 route protects and preserves the environment to the greatest extent, and is considered the most compatible with the goals, objectives and values of *Lincoln/Lancaster County Comprehensive Plan.*

3. Multi-Use Corridor Potential. The EM-1 route has the greatest potential as a multi-use corridor for trails, open space, utilities and other transportation alternatives. It could be integrated well with a possible trail in Stevens Creek and then tie into possible trails along the South Beltway route to Wilderness Park trails. The potential as an open space corridor is high given that it is within 0.5 mi of Stevens Creek for over a 6-mi stretch. EM-1 also parallels an existing LES transmission line with a 150-ft easement which would allow some overlap of a joint utility and road corridor for over 8 mi.

4. Travel Time. EM-1 has greater travel savings than EF-1.

5. Cost. While EM-1 is more expensive than EF-1 or EC-1, EM-1 may provide future cost savings as a multi-use corridor, and it uses less land than the other two routes.

The selection of the preferred alternative was unanimously approved on 15 June 2001 by the Beltway Management Committee representing the four project sponsors–the City of Lincoln, Lancaster County, NDOR and FHWA.

Local Preference Decision. The SM-4 and EM-1 alternatives were approved by the Lincoln City Council and the Lancaster County Board of Supervisors, in separate actions, on 22 August 2001 for amendment to the *Lincoln/Lancaster Comprehensive Plan*. With the Mayor of Lincoln's signature on 30 August 2001, the alternatives were officially adopted into the plan.

C. SECTION 4(f)

The FEIS document includes the Final Section 4(f) Statement (Appendix H). Based on the Section 4(f) evaluation, the proposed action would impact two Section 4(f) resources along the EM-1 alignment. These are the MoPac East Trail and a historic road sign at 112th and Adams Streets (LC00: E-118).

MoPac East Trail. The EM-1 crossing has a footprint of 0.8 ac across the MoPac East Trail. The crossing requires construction of a grade separation to provide for trail continuity. Construction of the beltway will introduce a new roadway element into this segment of the trail, and may adversely impact the visual and audible experience of the trail users for a short distance. However, these impacts are considered negligible considering the trail is part of an urban trail system that already crosses many roadways (approximately one per mile), and considering the length of the trail (over 9 mi).

Coordination. The consulting team has coordinated with the Lower Platte South Natural Resources District (LPSNRD), the owner of the trail, to discuss project impacts and measures to minimize harm. Their concerns and recommendations were used to develop appropriate mitigation measures.

Measures to Minimize Harm. For the MoPac East Trail, design of the beltway/trail intersections will include (1) a grade separation to safely accommodate the trail, (2) separate access through confined areas for the hiker/biker and equestrian trails (or a physical divider), and (3) an underpass for the equestrian trail crossing since horses are hesitant to use overpasses. Design of the trails will follow AASHTO and ADA trail guidelines, and will be coordinated with LPSNRD.

Net Impacts. Since replacement trail crossings will be provided, there will be no adverse impact on existing pedestrian, bicycle and equestrian accommodations.

Road Sign at 112th and Adams (LC00: E-118). The road sign may require protection during construction and nearby repositioning, if it is not moved prior to the beltway project for County road widening. Repositioning the sign is a minor impact, required for operation and safety of an existing roadway.

Coordination. In a letter dated 26 September 2000, the Nebraska State Historic Preservation Office (SHPO) concurred that the beltway project will have no adverse effect on the sign, with the condition of protection during construction and repositioning nearby.

Measures to Minimize Harm. Conditions for protection and repositioning of the sign have been defined by the SHPO. The road sign will be protected from damage during construction of the beltway, and upgrade and paving of Adams Street. The sign will be repositioned about 20 ft from the upgraded road and as near its current location as is practicable (assuming the County roads have not been upgraded prior to beltway construction).

Net Impacts. With the condition of protection during construction and repositioning nearby, there will be no adverse impact on the road sign.

Impacts of Avoidance Alternatives. Impacts to the MoPac East Trail cannot be avoided because of the length of the trail and its orientation perpendicular to the east beltway study area. Any east beltway alternative requires crossing the trail. The only avoidance alternative is the no build alternative which was not considered feasible as it does not serve the project purpose and need. Although the no build alternative will have no impacts on the MoPac East Trail that can be identified at this time, there will be impacts to the trail as County roads are hard surfaced to accommodate a growing suburban population (as part of the proposed future roadway network improvements). An example would be the recent paving of 148th Street across the MoPac East Trail.

Impacts to the road sign can be avoided with the EC-1 alternative and the no build alternative. The EC-1 alternative meets the project purpose and need, and avoids impacts to the road sign, but still impacts two other Section 4(f) resources--the MoPac East Trail and David Murdock Trail. In addition, EC-1 is not considered prudent because of the unacceptable impact on existing urban and rural neighborhoods. The no build alternative will have no impact on the road sign; however, it is not considered feasible as it does not meet the project purpose and need.

D. COMMENTS ON THE FINAL EIS

Eleven comment letters were received on the Final EIS.

Three of the letters were from reviewing agencies. The Nebraska Department of Environmental Quality stated that they had no comments regarding any of their programs or jurisdiction. The Environmental Protection Agency stated that they have no objections to the project and suggested wetland monitoring of impacted wetlands. The US Army Corps of Engineers made suggestions regarding certain details of wetland mitigation.

Eight letters were received from consulting parties for the Section 106 process (consultation on historic resources), six of these letters were from private landowners with interests on the EF-1 route (which was not selected as the preferred alternative). Letters were also received from two groups that had been supportive of EF-1 landowners--the Preservation Association of Lincoln and the National Trust for Historic Preservation. In general, the consulting party letters covered a similar group of points. Comments are summarized in Table 1.

Table 1

SUMMARY OF COMMENTS ON THE FEIS

NO.	SUMMARY OF COMMENT	RESPONSE
1	NDEQ had no comments regarding any impact within their programs or jurisdiction.	No response necessary.
2	EPA stated that the FEIS adequately supplements information needs and addresses previous concerns. They had no objections to the project.	No response necessary.
3	EPA recommends that impacted wetlands be monitored during construction, and after completion, to assess effectiveness of mitigation measures.	Wetland mitigation sites will be monitored until the US Army Corps of Engineers (USACE) determines that the sites have become established as wetlands, consistent with requirements of the Section 404 permit.
4	USACE suggests that the preferred alternative be identified in the introduction with cross-reference to Chapter 4 where it is described in detail.	Based on comments on the DEIS, the information in Chapter 4 was repeated in the Introduction of the FEIS. There is no more detail in Chaper 4.
5	USACE suggests inclusion of (1) schedule of availability of credits/pre-credits at the Lincoln wetland bank site, (2) anticipated number of credits/pre-credits to be debited for this project, and (3) contingency plan in the event that an acceptable bank is not available or utilized.	Construction of the bank began in 2000. It is reasonable to expect that credits will be available. The project will require an estimated 18.0 acres (and an equivalent amount of credits) for SM-4, and 21.9 for EM-1. Regarding a contingency plan, the FEIS already states that mitigation may be located along the route at feasible sites.
6	USACE suggests deleting the statement that "a minimum of a 1:1 mitigation ratio" because pre-credits from a bank would require 1.5:1, as would mitigation along the roadway.	The statement in the FEIS does not preclude a higher ratio, but it does allow for a ratio lower than 1.5:1 if credits are available, which is likely (see Item. 5).
7	Five consulting party letters stated that they agree with the selection of the EM-1 route.	No response necessary.
8	Six consulting party letters stated that the EF-1 route should never have been considered, should have been eliminated, or was the least desirable route.	No response necessary.
9	Two consulting party letters stated that EF-1 (and EC-1) were not evaluated to the same level as EM-1. If they had been, EF-1 would have been even less desirable.	The DEIS included an evaluation of all three east routes to the same level of detail. Based on the DEIS and comments, the EM-1 route was selected as the preferred alternative, primarily because it minimized impacts to historic properties.
10	Three consulting party letters stated that the reexamination of the boundaries of the Stevens Creek Stock Farm should have been extended to include areas beyond the preferred route. They state that this would be no different than reexamination of the Wenzl property on the EC-1 route.	Based on the DEIS and comments, the EM-1 route was selected as the preferred alternative, primarily because it minimized impacts to historic properties. When additional evaluation was requested to revise the boundaries of historic properties along the EF-1 route, it was determined not necessary since the EF-1 route was not being developed and the sites had already been identified as historic. Regarding the Wenzl site on EC-1, this site was reexamined because questions were raised that the site had been omitted from consideration.

NO.	SUMMARY OF COMMENT	RESPONSE
11	One consulting party letter stated that the document doesn't resolve the concern for preservation of prairies, especially the Reed prairie.	Although prairies are not regulated, impacts to these areas will be avoided or minimized to the extent possible. Based on the preliminary alignment, there are 3.2 ac of prairie impacted along EM-1, and none along SM-4. The Reed prairie is located on EF-1, which is not being developed.
12	Two consulting party letters stated that many of the comments made by Citizens for Accountable Route Selection (CARS) members or their attorney (the organization representing landowners along EF-1) and others were not considered or adequately addressed in the FEIS.	The FEIS addressed and considered all comments received on the DEIS, as well as comments from the consulting parties to the Section 106 process. The FEIS was revised to the satisfaction of all reviewing and regulatory agencies, including the State Historic Preservation Office (SHPO), the agency authorized to oversee historic resource compliance.
13	Six consulting party letters stated that they were not given more opportunities in the 106 process; were never contacted directly as a group or individually as the consulting party status requires; had to present their concerns at meetings designed for the general public, and should have had the opportunity to help prepare, review, comment and concur in the MOA rather than just being notified of opportunities for comment.	Consulting parties were (1) provided individual invitations to public meetings and hearings for the NEPA process, (2) provided draft/advance copies of the Preliminary Assessment of Adverse Effects, Chapter 9 of the FEIS (which addressed their comments) and the MOA for historic properties, and (3) invited to a special meeting held for the consulting parties and owners of historic properties impacted by the preferred alternative. The FHWA, SHPO and cultural resource consultants were available at all the meetings to receive comments and answer questions. A number of the consulting parties were contacted directly to help in providing additional information on specific historic properties.
14	One consulting party letter from two consulting parties stated that they were never involved in specific discussions of their concerns.	These particular consulting parties were specifically contacted regarding the location of prairies. Consultation included a meeting with project consultants, as well as phone conversations.
15	Four consulting party letters stated that they did not feel that the public hearing on 23 and 24 April 2001 was really a public hearing since there were no public officials present, they didn't get to hear all the comments, and they only got to speak to a court reporter and moderator.	The public hearing format used for the beltway study is in common use by FHWA throughout the country. The format has been used successfully on other projects in Lincoln. All comments, written and oral, were provided to public officials. In addition, several public officials did attend the hearings. The FHWA, NDOR, City, SHPO and cultural resource consultants were available at all the meetings to receive comments and answer questions. Comments were made available, and continue to be available at several locations for public review.
16	One consulting party letter stated that the FEIS should have noted that citizens concerns about the study process was an area of controversy.	This information is included in Chapter 6, Section 6.8 which includes summaries of the public meetings. It is also noted on page 9.3, Item 26.
17	Four consulting party letters stated either that there is no discussion in the FEIS of the role of the consulting parties, or there is no reference to the consulting parties in Chapter 6 or Chapter 9, or that not all of the consulting parties are listed in the document.	Chapter 6 describes agency and public involvement as required by the NEPA process. Consulting parties were parties to the Section 106 process which only addresses historic resources. Consultation activities with the consulting parties are mentioned numerous times in Chapter 9, as well as Appendix F, the Assessment of Adverse Effects. Although all of the consulting parties were sent copies of the DEIS & FEIS, a list of their names was not included in the documents.

NO.	SUMMARY OF COMMENT	RESPONSE
18	PAL states that the opinions expressed by the President of the PAL during the Public Hearing on 15 August 2002 were his personal opinions and not the opinion of the organization.	Comment noted.
19	PAL stated that the list of references includes a number of reports by the University of Nebraska-Lincoln, and that there is confusion concerning which references were contracted with UNL and which were contracted with private individuals associated with UNL. This confusion places a shadow over scholarly research.	All of the work was conducted by the UNL Department of Anthropology Archeological Laboratory, and was contracted through the UNL Office of Sponsored Programs. Every reference to this work has always been identified as being conducted by the UNL Department of Anthropology.
20	PAL stated that the boundaries determination report did not adequately reference technical material available from the National Park Service.	All of the reports related to historic resources were reviewed by the Nebraska SHPO, the agency authorized to oversee historic resource compliance. The reports were revised to reflect the comments and concerns of the SHPO, and the SHPO has concurred with the findings of all of the reports.
21	PAL stated that the boundaries determination report did not completely examine early conservation practices utilized before current terracing techniques were adopted.	See Item 20 above.
22	PAL stated that the glossary in the boundaries determination report did not define treeline, terrace or contour cultivation, concepts which are mentioned in the text.	While missing from the glossary, these terms are defined in the text.
23	PAL stated that the boundaries determination did not evenly apply the same evaluation criteria for all studied properties on the three east routes.	See Item 20 above.
24	PAL stated that the boundaries determination report does not correctly list the period of significance for the Theresa Retzlaff Farmyard–which should be extended from 1890-1920, to 1950.	Comment noted. The property is located on EF-1, an alternative that was not selected.
25	PAL and NTHP stated that their requests for determination of additional NRHP eligible properties on the EF-1 route should have been forwarded to the Keeper.	See Item 10 above.
26	NTHP states that the FEIS document falls short of directly acknowledging that the beltway will have an indirect effect on historic properties through potential impacts of growth and sprawl development.	The FEIS includes an extensive evaluation of indirect effects (Chapter 9). Following the Lincoln/Lancaster County Comprehensive Plan, the rural landscape of the entire beltway study area could be converted to an urban form over the planning period. FHWA has no legal tools to direct the local planning process.
27	NTHP requests that the FEIS be revised to remove the statement that the owners of the Stevens Creek Stock Farm had "previously expressed written opposition to the use of conservation easements". NTHP says this is incorrect, and that the owners are opposed only to public ownership of a conservation easement.	The FEIS discussion was intended to relate to public ownership of easements.

E. MEASURES TO MINIMIZE HARM

Impacts from the proposed action have been evaluated and minimized to the extent possible. Mitigation has been proposed for the remaining impacts and will consist of those measures in the Environmental Commitments Listing (Table 2).

All practical measures to minimize harm have been incorporated into the project.

Table 2

ENVIRONMENTAL COMMITMENTS LISTING

AREA OF CONCERN	PAGE/ PARAGRAPH IN FEIS	COMMITMENT/MITIGATION
Access	9.8, 9.9, 9.17, 9.18, 9.21, 9.22	Options for provision of access will be discussed with landowners during final design.
Acquisitions and Relocations	3.17/6 through 3.20/3	Right-of-way acquisition will be handled in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended. Relocation assistance for all eligible residential and business relocatees will be provided without discrimination, through the Nebraska Relocation Assistance Act as required by federal and state laws (Neb. Rev. Stat. Section 76-1214 *et seq.*).
Air Quality	3.31/3-4	If objectionable dust levels occur during construction, dust will be controlled by timely applications of water and temporary seeding to the areas of construction.
Air Space Considerations	3.10/1 9.28	Air space considerations will be reviewed during final design with FAA. Construction methods will be reviewed with FAA 30 days prior to construction.
Construction Impacts	3.76/7 through 3.77/3	Provision of Access. For minor intersections, motorists will be rerouted to nearby parallel streets. Delay will be minimized and adequate signage provided. For major intersections, construction phasing plans will be prepared to address traffic handling operations. Private landowners will be provided access to their property at all times. Dust Supression. If objectionable dust levels occur, dust will be controlled by timely applications of water and temporary seeding to the construction areas. Erosion and Sedimentation Control. Mitigation measures for construction-related erosion and sedimentation control will include dikes, dams, sediment basins, fiber mats, temporary and permanent seeding, straw mulch, plastic liners, slope drains, and other devices which would intercept and trap transported sediments during construction. Noise Controls. Construction noise levels are typically a function of the scale of the project, the phase of construction, the condition of the equipment and its operating cycles, and the number of construction equipment units operating simultaneously. Measures that may be employed to reduce objectionable construction noise include designating haul routes away from sensitive receptors, controlling noise at the source, and limiting construction activities to certain hours of the day.

AREA OF CONCERN	PAGE/ PARAGRAPH IN FEIS	COMMITMENT/MITIGATION
Cultural Resources	3.67/4-5, 9.42/1-9.44/3, F.25/1-F.27/3	Proposed mitigation follows the guidelines of the Nebraska SHPO and is included in the Assessment of Adverse Effects (Appendix F of the FEIS). Memorandums of Agreement were developed to implement mitigation for the two historic properties which are adversely affected by the preferred SM-4/EM-1 alternative (Henry Wunibald and Steve Johnson Farmyards), and include provisions for screening the two properties. Modification of the EM-1 alignment made it possible to avoid archeological site 25LC129. Other cultural resource management activities will include: 1. Completion of an archeological survey of bottomlands where access has been previously denied. 2. Use of NDOR standard provisions regarding previously unsuspected archeological remains that provide for cessation of work and notification of the SHPO. 3. Use of NDOR standard provisions regarding monitoring of archeological sites during construction. 4. A historic marker located at Saltillo Road and South 14th Street will be relocated.
Environmental Risk Sites	3.72/1 through 3.73/2	Contaminated media may be encountered in or near areas of identified releases and could include contaminated soil and/or sediment and ground water. Mitigation measures include avoidance, removal of the contaminated media or on-site treatment. Selection of an appropriate mitigation strategy will depend on the type and concentration of the contaminant and the type and quantity of media contaminated. Avoidance. If possible, contamination should be avoided by realignment of the beltway feature. This approach is difficult because the contamination occurs in the subsurface and the surface extent is typically uncertain. Furthermore, right-of-way acquisition may preclude realignment. Removal. Contaminated soil and sediment may be removed and managed off-site in accordance with requirements of the State of Nebraska for special waste or hazardous waste. If contaminated soil meets the classification of a special waste then the most common management option involves disposal at a licensed Subtitle D landfill in accordance with NDEQ Title 132. If contaminated soil is classified as a hazardous waste, disposal must be at a licensed hazardous waste disposal site in accordance with NDEQ Title 128. On-Site Treatment. Contaminated water generated from any de-watering activities may require treating prior to discharge. Cost of treatment would vary depending on the type and concentration of contaminant, receiving waterway, volume of discharge and treatment system required. Permits issued by NDEQ may be required for this option for water discharges in accordance with NDEQ Title 119 and contaminant emissions to ambient air in accordance with NDEQ Title 129.
Farmland	3.14/4	Right-of-way will be limited to that necessary for transportation uses and any required mitigation.

AREA OF CONCERN	PAGE/ PARAGRAPH IN FEIS	COMMITMENT/MITIGATION
Floodplains	3.51/1 through 3.52	Floodplain Development. Through Lancaster County's participation in the National Flood Insurance Program, it is a local requirement that floodplain development permits be obtained from the City/County. This requires that any developments within designated floodways must include certification from a registered professional engineer that the proposed development will result in no increase along the floodway water surface profiles. The City/County are both sponsors of the project and are aware of floodplain management requirements. The proposed project will comply with or exceed the current minimum requirements of the City/County floodplain management ordinance. There are no additional mitigation measures above what is already required by the City/County program. Channel Realignment. According to the US Army Corps of Engineers requirements, if channel straightening is proposed for any of the crossings, it will be necessary to demonstrate that there are no other practicable alternatives. SM-4 Alternative. It is anticipated that all major crossings in this alternative will allow channels to remain in their existing configurations. EM-1 Alternative. The Stevens Creek tributary crossing south of Pine Lake Road cuts across two existing channel meanders. There are several options for the crossing. The channel can be aligned to provide a relatively straight section of channel at the bridge location, and the meanders upstream and downstream can be reconfigured to enable the total channel length to remain the same as before the realignment. Other options would be to straighten the channel (with the effect of shortening the channel approximately 73 m (240 ft), or extending the bridge approximately 38 m (125 ft) to span the meanders. The Stevens Creek tributary crossing between Van Dorn Street and Pioneers Boulevard may require minor channel realignment at two existing channel meanders due to encroachment of the channel by the roadway embankment. Stevens Creek Farm Ponds. The EM-1 alternative will require continued coordination with LPSNRD, as well as modifications to the roadway design to reduce conflicts with the proposed farm ponds. EM-1 will require (1) the A2-1 spillway to be relocated on the east side of the dam, and (2) adequate protection of the roadway embankment at the same site. Stevens Creek Conservation Easements and Trail. For EM-1, proposed development in the Stevens Creek mainstem floodplain between the Murdock Trail and the MoPac East Trail would be required to comply with the terms of the conservation easements to be acquired by LPSNRD relative to the Stevens Creek watershed plan; however, these terms will not prohibit construction of a beltway facility.
Landscaping	3.39/4 9.24	Landscape treatments will be considered to screen freeway lighting if sufficient right-of-way is included outside the lateral obstacle clearances. Landscaping options will be discussed with landowners during final design.

AREA OF CONCERN	PAGE/ PARAGRAPH IN FEIS	COMMITMENT/MITIGATION
Lighting	3.39/4	Lighting features will be determined during final design. Location and choice of specific lighting structures will likely be determined by surrounding land uses. It is expected that the beltway will only be lighted at the intersections and within the City limits, if it extends to the beltway at the time of construction. There are a wide variety of lighting options available to minimize light intrusion on adjacent properties. To the extent possible, the location and choice of specific lighting structures will be designed to minimize light intrusion on adjacent properties. In addition, landscape treatments will be considered to screen freeway lighting if sufficient right-of-way is included outside the lateral obstacle clearances.
Noise	3.36/1 through 3.38/3	Based on a preliminary evaluation of the current alignments for SM-4 and EM-1, noise abatement measures (consisting of alignment shifts and/or barriers) were determined feasibility and reasonable, and should be considered, at four receptors. These locations are R-11 on SM-4; and R-17, R-35 and R-36 on EM-1; all are alignment shifts. Further evaluation of noise abatement measures should be conducted during final roadway design. Reasonableness of barriers will be reassessed prior to construction based on costs at that time; if earthwork costs or right-of-way acquisition are too high, the noise barrier could be considered unreasonable at that time. For locations where noise abatement is feasible and reasonable, a public information meeting will be held and benefitted property owners will be given an opportunity to vote according to NDOR Noise Policy. Noise abatement will be provided if 75 percent of the benefitted property owners are in favor of the proposed noise abatement device. In addition to traffic noise, the project area would experience temporary noise increase during construction. Construction noise levels are typically a function of the scale of the project, the phase of construction, the condition of the equipment and its operating cycles, and the number of construction equipment units operating simultaneously. Measures that may be employed to reduce objectionable construction noise include designating haul routes away from sensitive receptors, controlling noise at the source, and limiting construction activities to certain hours of the day.
Pedestrian and Bicycle Accommodations	3.29/4 through 3.30/2	Existing Trails. For the MoPac East Trail, design of the beltway/trail intersections will include (1) grade separations to safely accommodate the trail, (2) separate access through confined areas for the hiker/biker and equestrian trails (or a physical divider), and (3) underpasses for all equestrian trail crossings since horses are hesitant to use overpasses. The hiker/biker trail may be designed as an overpass or underpass. Proposed Trails. SM-4 crosses the abandoned UP line just north of the half-section line within the Jamaica North segment for which the City has filed for rail banking. If a trail has already been built in this location, the beltway project will provide an appropriate crossing over the trail right-of-way. If the Homestead Trail is built prior to the beltway and prior to the Jamaica North Trail (or other connector), the beltway project will provide a bicycle/pedestrian trail (and appropriate trail crossing) to connect the south end of Wilderness Park with the north end of the Homestead trail. The beltway project will also be designed to accommodate the proposed Stevens Creek Connector. Design. Design of the trails will follow AASHTO and ADA trail guidelines, and will be coordinated with the trail owner, LPSNRD. Specific details on the crossings will not be determined until final design.

AREA OF CONCERN	PAGE/ PARAGRAPH IN FEIS	COMMITMENT/MITIGATION
Permits	3.77	The following permits and approvals will be obtained for the project: 1. Section 404 Permit from the US Army Corps of Engineers 2. Section 401 Water Quality Certification from the Nebraska Department of Environmental Quality 3. National Pollution Elimination Discharge Permit from the Nebraska Department of Environmental Quality 4. Floodplain Development Permit from Lancaster County
Railroads	3.23/3	All beltway/railroad crossings will include grade separations over any active railroad lines.
Threatened and Endangered Species	3.57/8	Since construction is not expected for several years, surveys for the threatened prairie fringed orchid will be updated, as appropriate. Although prairies are not regulated, impacts to these areas will be avoided or minimized to the extent possible.
Transportation Safety	3.12/8	The project will include fencing of the freeway right-of-way and lighting at interchanges.
Utilities	3.23/4	Utility relocations will be determined during final design. Any approvals for relocations will be obtained from the affected utility at that time.
Visual Aesthetics	3.74/1-2	As part of final design, consideration will be given to visual impacts on residential properties. Measures to screen the road from the residence will be evaluated including landscaping, berming and fencing which can be accomplished within the road right-of-way or on additional road right-of-way acquired for this purpose. There is also an opportunity to apply a 'Green' concept to the beltway corridor–similar to Lincoln's 'Boulevard' concept. Accommodating landscaping and open space would have a clear benefit to adjacent properties, but is likely to require the acquisition of additional right-of-way or easements and will need to be weighed against the additional loss of private property.
Water Body Modification and Wildlife	3.47/1 9.3	Mitigation measures will be implemented for construction-related erosion and sedimentation control and include, as appropriate, dikes, dams, sediment basins, fiber mats, temporary and permanent seeding, straw mulch, plastic liners, slope drains, and other devices which would intercept and trap transported sediments during construction. In addition, the project will require a National Pollution Discharge Elimination System (NPDES) permit from NDEQ which is needed for all sites greater than 2 ha (5 ac) in size. The permit will require incorporation of erosion and sedimentation control measures during construction. Any need for wildlife crossings will be evaluated with appropriate resource agencies during final design. To the extent practicable clearing and grubbing activities will be scheduled to avoid nesting birds. In accordance with the Migratory Bird Treaty Act and NDOR Standard Specifications for Highway Construction, if tree removal will occur from April 1 to July 15 (the primary nesting season of migratory birds), an initial survey for nesting birds within the project area shall be conducted. Any presence of eggs or young will be reported immediately to the Fish and Wildlife Service. Based on consultation as a result of this contact, appropriate mitigation will be implemented.

AREA OF CONCERN	PAGE/ PARAGRAPH IN FEIS	COMMITMENT/MITIGATION
Water Quality	3.42/8 through 3.43/1	Groundwater. Roadway designers will consider storm water drainage patterns in the vicinity of the Wellhead Protection Areas; however, there are no land use restrictions in the areas except within 90 m (300 ft) of a well. Surface Water. Mitigation measures will be implemented for construction-related erosion and sedimentation control and include, as appropriate, dikes, dams, sediment basins, fiber mats, temporary and permanent seeding, straw mulch, plastic liners, slope drains, and other devices which would intercept and trap transported sediments during construction. All heavy equipment will be refueled and serviced away from water courses to prevent accidental contamination of surface waters with petroleum products. Only clean fill material will be used in construction in the waters and wetlands. Special consideration will be given to erosion and sedimentation control measures in the vicinity of the tributary to Wagon Train Lake.
Wetlands	3.44/1, 9.29	Mitigation has been proposed to replace all impacted wetlands, whether jurisdictional or not, at a minimum ratio of 1:1 replacement-to-loss. Wetland mitigation sites may be located along the proposed project route at feasible sites, or may be located in the City of Lincoln's Wetland Mitigation Bank, currently under development. Wetland impacts are estimated at 18.0 ac for SM-4 and 21.9 ac for EM-1).

A. CONCLUSION

Based on the analysis and evaluation contained in the Final Environmental Impact Statement for the South and East Beltways, and after careful consideration of all the social, economic, and environmental factors and input from the public involvement process, it is my decision to adopt the recommended SM-4/EM-1 Alternative as the Proposed Action for this project.

9/19/02
Date

Approving Official
Federal Highway Administration