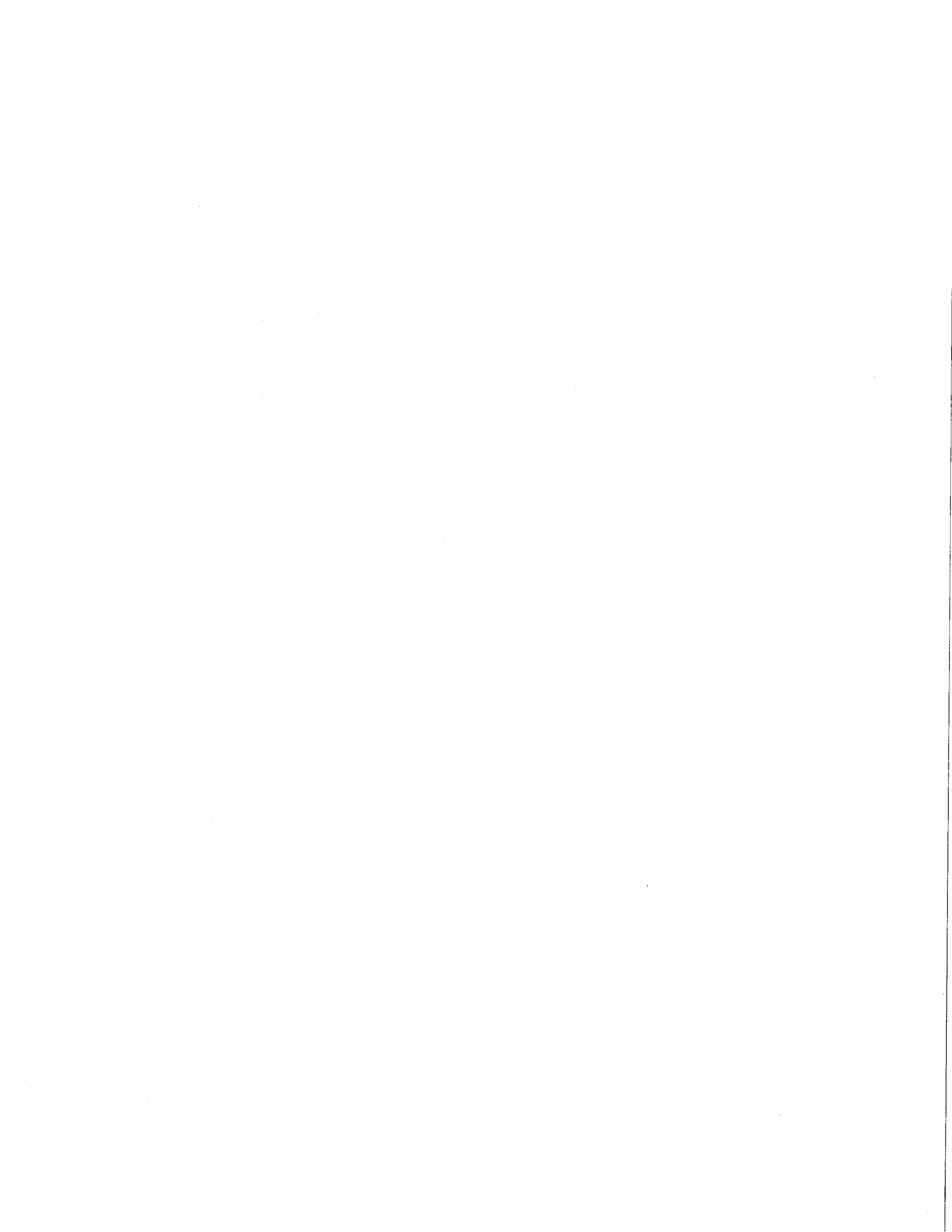




# Lincoln Road Corridor Study

prepared for





Lincoln Road Corridor Study  
Lincoln, North Dakota

Certification



I hereby certify that this report was prepared by me, or under my direct supervision, and that I am a duly registered professional engineer under the laws of the State of North Dakota.

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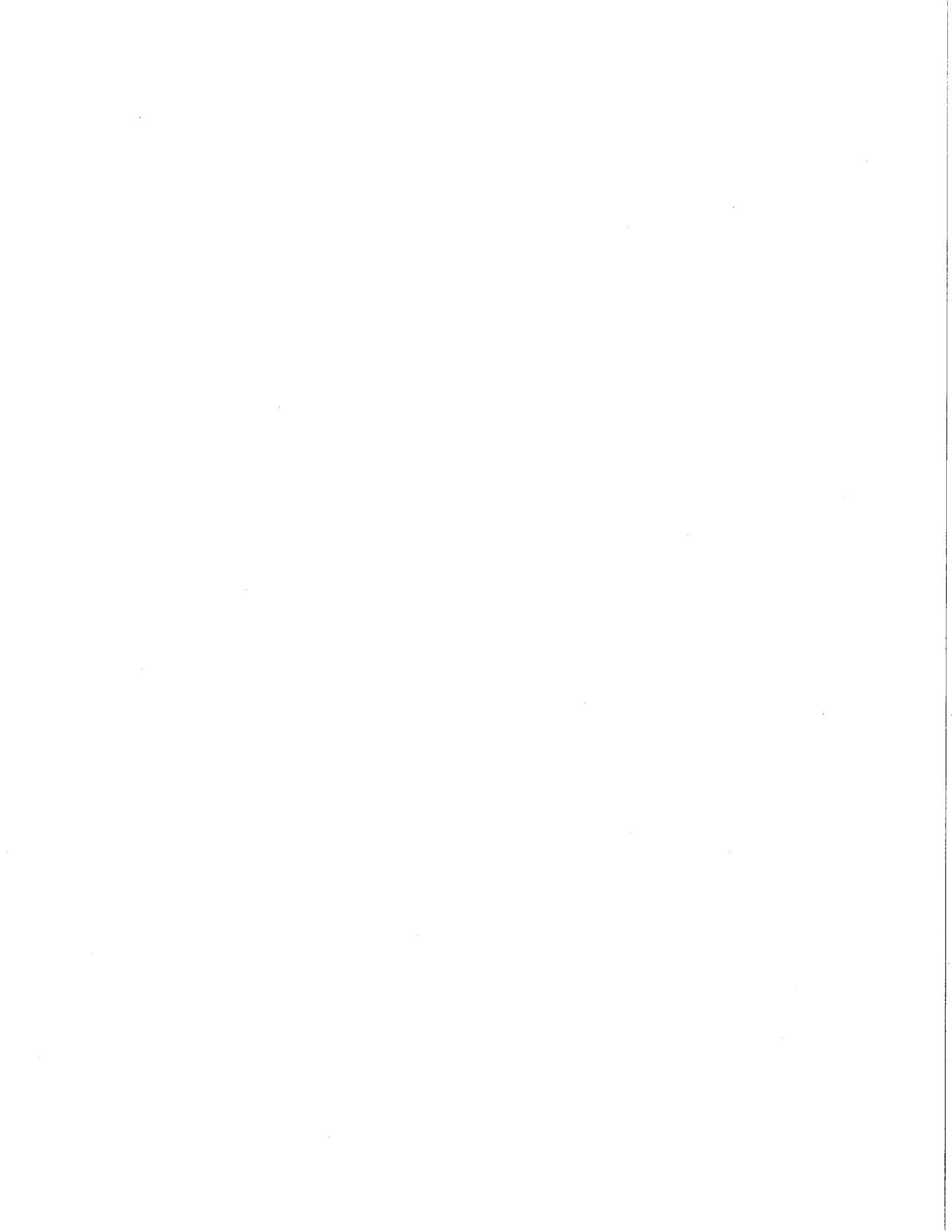
On Behalf of the  
Bismarck-Mandan  
Metropolitan Planning Organization

November 2011

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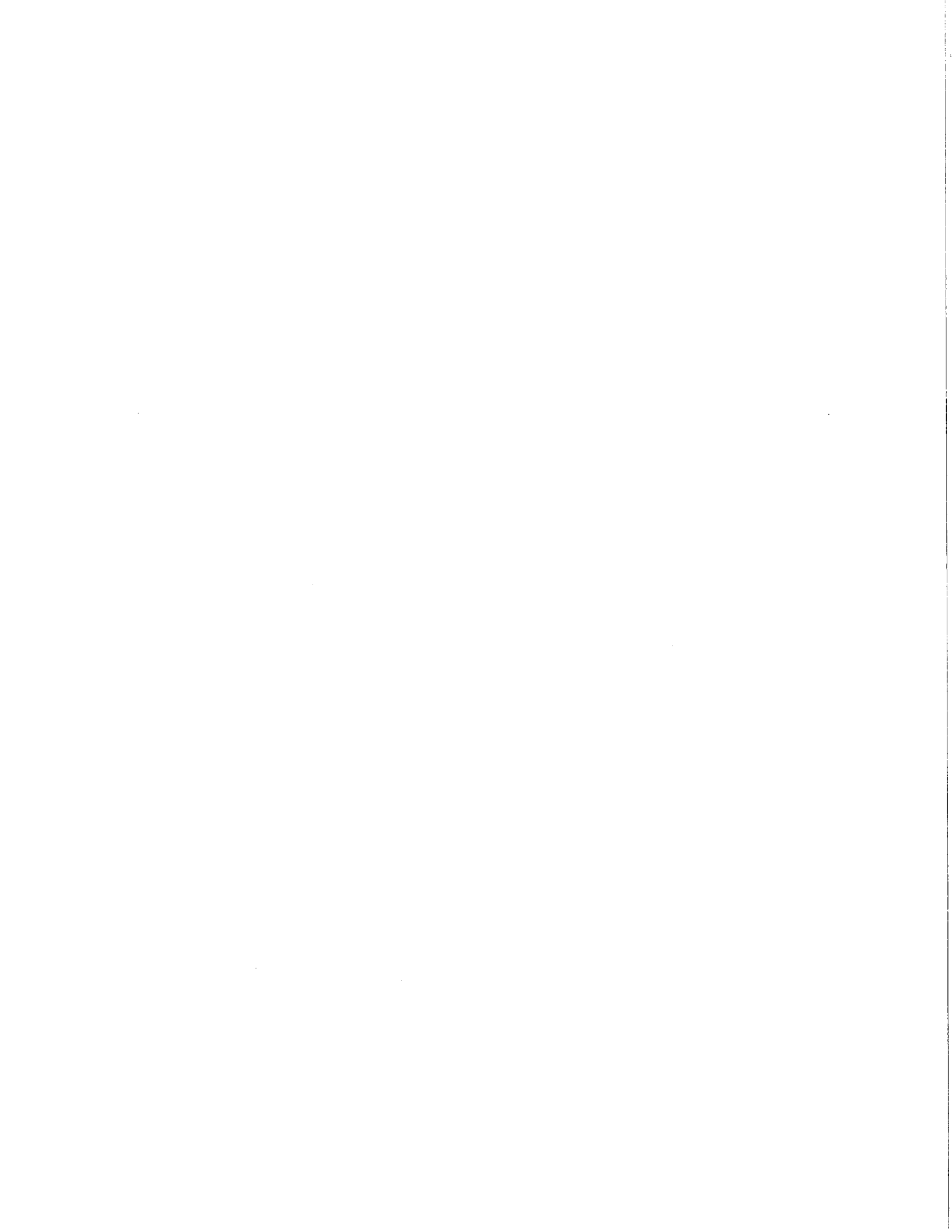
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## **1.0 Introduction**

### **1.1 Study Background and Objective**

Lincoln Road serves as much more than a mover of cars. It is part of the community's identity. It is a gathering place for walkers, joggers, bicyclists, horseback riders and others. And as the City of Lincoln is growing, activity on Lincoln Road has increased.

With increased traffic and general activity along Lincoln Road, traffic safety and congestion issues have become more pronounced. Burleigh County owns and maintains Lincoln Road. Therefore, both Burleigh County and the City of Lincoln have seen reason to place a high priority on making improvements to Lincoln Road.

At their request, the Bismarck-Mandan Metropolitan Planning Organization (MPO) has undertaken this Study. This study focuses on the two mile segment of Lincoln Road that extends from Airway Avenue to 66<sup>th</sup> Street. The objective of this Study is to identify recommendations to safely and efficiently move all modes of travel along and across the corridor, with specific focus on the Airway Avenue, 52<sup>nd</sup> Street SE and 66<sup>th</sup> Street SE intersections.

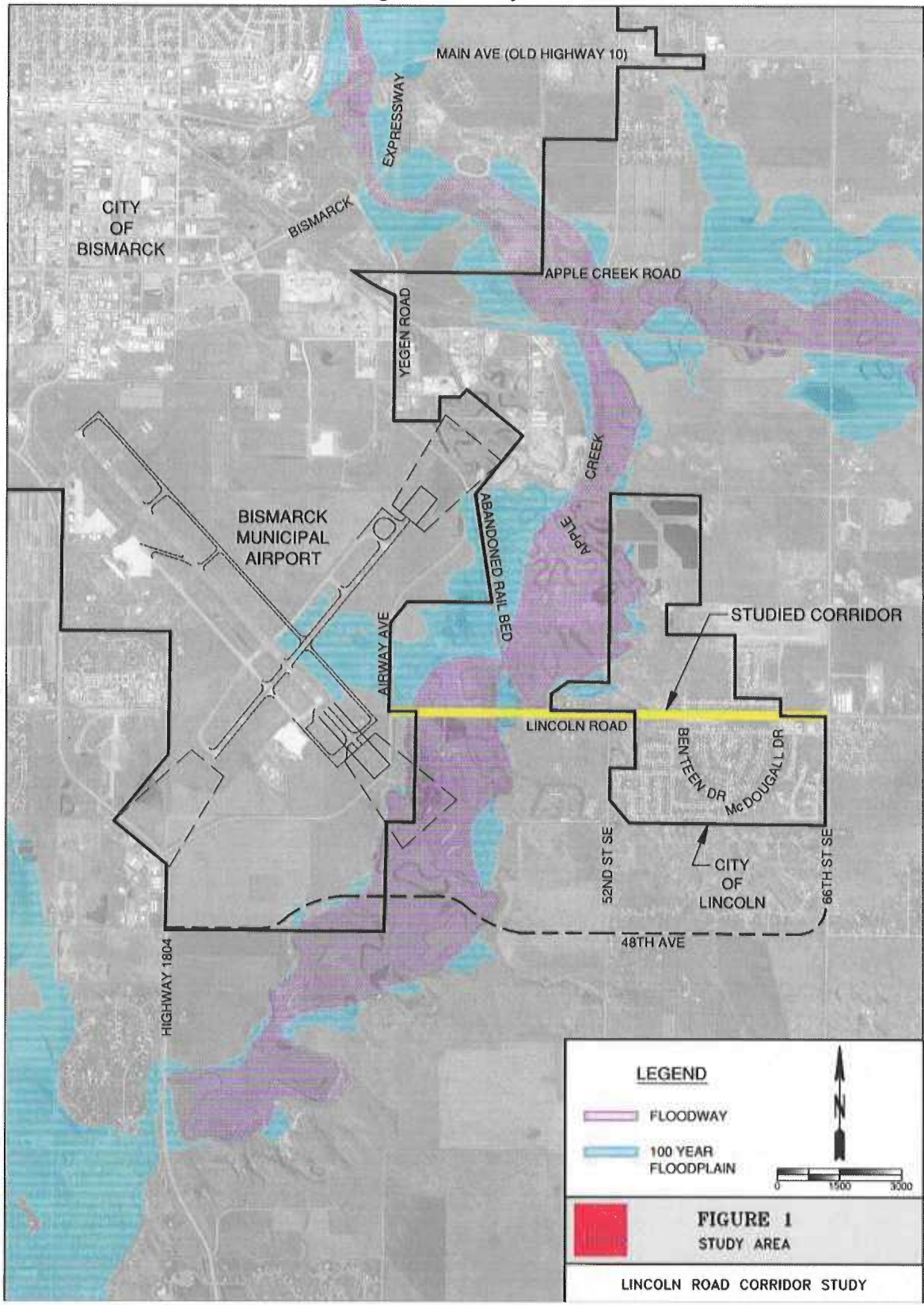
This study objective is consistent with the preliminary purpose and need for corridor improvements. The purpose of the future project is to improve key segments of Lincoln Road from Airway Avenue to 66<sup>th</sup> Street. The future project is needed to address intersection congestion issues at Airway Avenue and 52<sup>nd</sup> Street, upgrade the corridor to Burleigh County design standards, and provide adequate transportation facilities for other modes of travel.

### **1.2 Study Area**

The two mile corridor of Lincoln Road from Airway Avenue to 66<sup>th</sup> Street SE is depicted in Figure 1. This corridor is classified as a minor arterial. As an arterial roadway, it serves as a major route for traffic moving east and west through the area. In addition, Lincoln Road provides important connectivity to 66<sup>th</sup> Street SE and Airway Avenue.

The east mile of Lincoln Road corridor is bounded primarily by residential property, with limited commercial property. The west mile is primarily undeveloped with a few farmsteads and farm buildings present along the corridor. Bismarck Municipal Airport is located off the west end of the corridor. The corridor is used by all modes of traffic; vehicle, pedestrian, all terrain, and even occasional horseback riders.

Figure 1 – Study Area



## **2.0 Previous Studies**

### **2.1 Lincoln to Bismarck Roadway Connection Study, May 2006**

In 2006, the MPO recognized the benefits of an improved connection from the City of Lincoln to the City of Bismarck. The study identified several options for an improved connection between these two communities. The options varied from improvements of existing roads to construction of new routes.

The final recommendations of the study were categorized by short-term (within 5 years) and long-term solutions (11 – 20+ years). The short-term improvements included the reconstruction of numerous existing intersections between the two cities and the long-term recommendation identified 66th Street as the recommended primary connection from the City of Lincoln to the City of Bismarck as it would be in accordance with the MPO's long range plan and is part of the future beltway around metropolitan area.

The 2006 study also recommended a geometric change to the Airway Avenue and Lincoln Road intersection to allow free movements from Lincoln Road to the north leg of Airway Avenue.

Neither, the 66th Street intersection reconstruction nor the Airway Avenue geometric change has been made to date. The complete Lincoln to Bismarck Roadway Connection Study can be found on the MPO's webpage.

### **2.2 Bismarck Airport Master Plan**

The Bismarck Airport Master Plan includes the extension of their primary runway; Runway 31. This extension along with other airport improvements would require closure of Airway Avenue south of Lincoln Road (see Figure 1).

### **2.3 Long Range Transportation Plan**

The MPO has identified transportation issues in the Lincoln area within the 2010 – 2035 Bismarck – Mandan Long Range Transportation Plan Report. Some of the more noteworthy issues identified within the report are listed below:

- There are concerns with safety, turning traffic and no shoulders on Lincoln Road between 52<sup>nd</sup> Street and 66<sup>th</sup> Street.
- Lincoln Road between 52<sup>nd</sup> Street and 66<sup>th</sup> Street was identified as a candidate for street reconstruction.
- 66<sup>th</sup> Street is identified as part of the future metropolitan beltway.
- A better connection is needed from the City of Lincoln to the City of Bismarck.
- A trail connection is needed between the City of Lincoln and the existing trail on Highway 1804. A trail connection to the City of Bismarck is also needed.

## **3.0 Existing Conditions**

### **3.1 Street Cross Section and Pavement**

Lincoln Road has a bituminous paved, two-lane rural section over its entire length. There are virtually no shoulders. A formal road surface condition survey was not conducted however from site observations; the road surface was noted to be in fair condition. Frequent areas of surface cracking and some bituminous deterioration were observed.

The ditch inslope varies from 4:1 to 3:1 in most locations. Some ditch locations drain poorly and would benefit from culvert additions or regrading. Ditch maintenance is compromised in some locations by the steep side slopes, poor drainage, and damage from off-road, motorized traffic.

The existing bridge over Apple Creek is structurally sound but has substandard shoulder width. The bridge guard rail may also be substandard. The hydraulic capacity of the bridge was not addressed by this study.

### **3.2 Access**

The entire segment allows full access, though access along the corridor has been managed very well. The current access includes five (5) private drives and five (5) street intersections. The intersections are listed below from west to east:

- Airway Avenue
- 52nd Street SE
- Benteen Drive
- McDougall Drive
- 66th Street SE

### **3.3 Utilities**

#### **3.3.1 Existing Municipal Utilities**

The City of Lincoln owns and operates its own water and sanitary sewer facilities. The City has installed PVC water and sewer lines within the Lincoln Road corridor over the past 30 years. The pipes are well within their useful lifespan and should not be impacted by construction of a new roadway. Hydrants and gate valve boxes will need to be relocated or adjusted.

There are storm water culvert crossings and laterals throughout this corridor. Additions, extensions and other modifications will be required when the corridor is upgraded.

### **3.3.2 Existing Street Lighting**

This corridor does not have street lighting; with the exception of lighting at two of the local street intersections. The lighting units are approximately set-back 90 feet from Lincoln Road at both Benteen Drive and McDougal Drive.

### **3.3.3 Existing Overhead Power**

There is an overhead power line that parallels the north side of Lincoln Road from Airway Avenue to 52<sup>nd</sup> Street SE. The majority of the power line is 35 to 40 feet north of the existing driving surface with the exception of when it nears 52<sup>nd</sup> Street SE. The distance in this location varies from 10 to 25 feet north of the existing driving surface.

There are three (3) overhead crossings; at the abandoned railroad bed, at the farmsteads east of Apple Creek and at the intersection of 52<sup>nd</sup> Street SE.

With street or trail improvements, the overhead power line near 52<sup>nd</sup> Street SE may require relocation.

### **3.3.4 Existing Drainage**

The roadway drainage is provided by ditches of varying width on both sides. The runoff is conveyed to the north side ditch and is directed into an oxbow of Apple Creek. Surface drainage on the intersecting streets is captured by the curb and gutter on the side streets that outfalls to the ditches of Lincoln Road.

## **3.4 Sidewalks and Trails**

There are no pedestrian or bicycle facilities along Lincoln Road. A sidewalk exists along the west side of Benteen Drive that ends short of the Lincoln Road right-of-way.

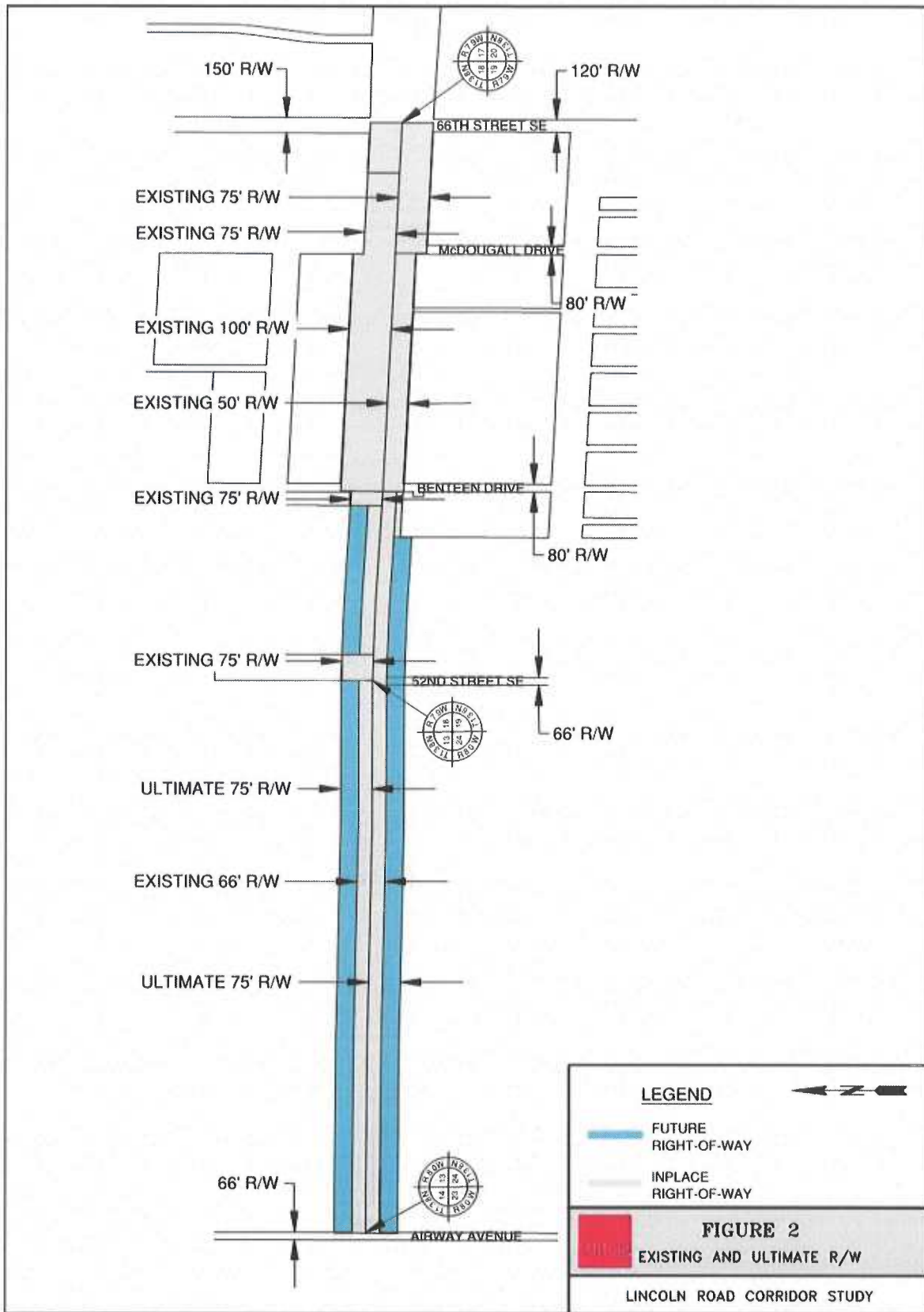
There is an unimproved dirt path that lies primarily in the south ditch-bottom that has been established by use. The use includes pedestrians, all-terrain vehicles (ATVs), motorcycles, snowmobiles, and equestrians (horseback riders).

## **3.5 Right-of-Way**

Based on available plats, the corridor west of Benteen Drive generally has a 66 foot right-of-way and the corridor east of Benteen Drive generally has a 150 foot right-of-way. Figure 2 illustrates the existing right-of-way within this corridor along with the recommended ultimate right-of-way which is discussed in a later section of this study.



Figure 2 – Existing and Ultimate Right-of-Way



### **3.6 Landscaping**

A number of landscape elements already exist within the Lincoln Road corridor. Natural vegetation as well as some planned plantings are located throughout. In addition to the vegetation, other elements include small bench seating areas and several signs. A variety of different site conditions exist along and adjacent to the corridor. A more rural setting exists between Airway Avenue and 52<sup>nd</sup> Street. Between 52<sup>nd</sup> Street and Benteen Drive the corridor transitions from rural to urban settings. The more urban setting then continues to 66<sup>th</sup> Street.

Existing vegetation includes not only natural wooded areas and old farmstead shelterbelts, but also some recent plantings within the more urban corridor sections. One planting area is located adjacent to the park on the south side of the corridor between 52<sup>nd</sup> Street and Benteen Drive. Another is on the north side of the corridor between Benteen Drive and McDougall Drive. The trees in this area have been planted in a staggered pattern to accommodate a multi-use trail. The last section, from McDougall Drive to 66<sup>th</sup> Street, has some plantings on the south side of the corridor along the back of the adjacent properties. The church property on the north side of this segment also has some plantings.

One bench seating area is located in the northeast corner of the intersection with Benteen Drive. This area has a concrete pad and two concrete benches. A second seating area is located on the northwest corner at McDougall Drive. In addition to a concrete bench, this area has a flag pole and a small plaque with dedication signs. A number of commercial signs are located throughout the corridor. In addition to these signs are three wooden "Welcome to Lincoln" entry signs that are located on the south side of the roadway. The first is located on the west side of at Benteen Drive. Low landscaping surrounds it and it has a flag that is illuminated at night. The second entry sign is located on the east side of McDougall Drive. Some landscaping surrounds this one as well, however parts of the sign are concealed due to plant growth. The last City entry sign is located near the City shop on the west side of 66<sup>th</sup> Street. It also is surrounded by some landscaping.

### **4.0 Issues Identification**

There were a number of issues along the Lincoln Road corridor that this Study needed to address. These issues were identified through feedback from the Study Review Committee and the general public (see Section 7.0), and from observations and the technical analysis that was completed. A listing and short explanation of each of the identified issues is provided in the paragraphs that follow.

## **4.1 Traffic Congestion and Travel Delays**

Significant traffic congestion and associated travel delays have been observed at two locations:

- Westbound on Lincoln Road, long delays during the AM peak hour have been experienced at the Airway Avenue intersection. Traffic wanting to turn onto Airway Avenue has been known to queue all the way to 52<sup>nd</sup> Street SE.
- Northbound on 52<sup>nd</sup> Street SE, long queues form for traffic wanting to turn left onto Lincoln Road during the AM peak hour.

## **4.2 Traffic Safety**

Traffic safety is a concern due to the lack of turn lanes, the narrow shoulders and bridge structure, and dips in the roadway profile on either side of the Apple Creek Bridge.

## **4.3 Pedestrian and Bicycle Travel**

### **4.3.1 Travel Safety**

With no off street facilities, pedestrian and bicyclist traffic commonly occurs on the existing dirt path used by ATV's or on the limited shoulders of the street. It is desirable, for safety reasons, to keep ATV's separate from pedestrians and bicyclists. With limited shoulder room, travel on the roadway is also hazardous.

### **4.3.2 Travel Mobility**

Travel mobility is impaired given the presence of no facilities. The ATV dirt path in the bottom of the south ditch is not functional when the ditch bottom is wet. People with disabilities would need a constructed facility in order to travel along the corridor.

## **4.4 ATV and Motorcycle Safety and Noise**

The ATV and motorcycle movements are primarily concentrated along the south ditch. Noise complaints have been received from residents whose property abuts the south roadway ditch. Vehicle/ATV visibility at intersections is limited. Additionally, pedestrians and bicycles commonly use the unimproved ATV trails. This shared use has raised safety concerns.

## **4.5 Equestrian Travel Safety**

Equestrian movements primarily occur on the existing ATV trail.

#### **4.6 Cross Section**

The existing street cross section does not meet the current Burleigh County design standards. The shoulder width does not allow motorists a safe area to pull over. Additionally this limited shoulder does create unsafe pedestrian usages.

#### **4.7 Apple Creek Floodplain**

The western portion of the studied segment of Lincoln Road lies within the Apple Creek floodplain. During the times of high water, particularly during the spring melt, the roadway is often submerged and impassable. Approximately 2,500 feet of the roadway lies at an elevation within the 100-year flood floodplain. This is a regulated floodway; improvements within this area will likely require approval from the ND State Water Commission and a local non-building floodplain permit.

The Flood Insurance Rate Map (FIRM) for this area is included as part of Appendix 1.

#### **4.8 Right-of-Way**

The Lincoln Road right-of-way corridor varies significantly throughout the studied area. Consideration should be given to ultimately obtaining a consistent 150 foot right-of-way through this corridor if improvements are made. The following is a narrative summary of the right-of-way needs and inconsistencies:

- At Airway Avenue, the existing right-of-way ( 33 feet on south side and 75 feet on north side) is likely sufficient for the construction of an additional turn lane.
- The 66 foot right-of-way between Airway Avenue and 52<sup>nd</sup> Street SE is insufficient in width for reconstruction of Lincoln Road at an elevation in excess of the Apple Creek 100 year flood.
- Construction of intersection improvements at 52<sup>nd</sup> Street and at Airway Avenue may require additional right-of-way. The landowner of property along the north side of Lincoln Road through this area has expressed an unwillingness to dedicate the right-of-way that may be needed.
- The right-of-way from 52<sup>nd</sup> Street SE to Benteen Drive is insufficient for the construction of the proposed ATV and multi-use trails.
- The right-of-way between Benteen Drive and McDougall Drive is sufficient.
- The right-of-way between McDougall Drive and 66th Street is also sufficient however it is slightly offset from the right-of-way to the west.

Additionally, temporary easements in various locations throughout the corridor may be required for various construction purposes.

The recommended ultimate right-of-way is shown Figure 2.

## **4.9 Landscaping**

Based on a review of current conditions, a number of issues have been identified:

- No corridor definition or identity: Some areas have landscaping while others have none. Areas that have landscaping have different styles (i.e. rows vs. staggered trees).
- No clear entry into the City of Lincoln: The City has three different signs and landscaping styles in three different locations.
- No Pedestrian facilities: Two small plazas with benches exist, however no sidewalk or trails lead to them. The path between them is inadequate and there is no connection to the nearby park.

The Lincoln Road corridor has constraints but offers a number of opportunities for future landscaping. The primary constraint to installing additional landscaping is available space. The proposed roadway, drainage ditches, pedestrian facility configurations, and utilities are key factors in determining preferred corridor landscaping. A unified look for the corridor can be achieved. Options for formal entries to the City can be evaluated and incorporated into the designs. Pedestrian connections with existing and potential future plazas may also be constructed.

## **4.10 Drainage and Utilities**

Drainage within the existing ditches is poor in some locations. This issue may be improved by installing culverts at some of the cross-streets, as well as by regrading the ditch bottom in some locations. Some overhead power lines may need to be relocated if they are impacted by the proposed improvements.

## **4.11 Bismarck Municipal Airport Runway 31 Extension**

Improvement of the Lincoln Road/Airway Avenue intersection and the extension of 48th Avenue from Highway 1804 to 52nd Street could help to offset the impacts of runway extension.

Drainage within the existing ditches is poor in some locations and Lincoln Road is located within the floodway of Apple Creek. Any elevation change on Lincoln Road would need to be evaluated and mitigated to prevent the inundation of runways at Bismarck Municipal Airport.

Future street lighting at Airway Avenue would also need to be evaluated.

## 5.0 Analysis of Existing and Forecasted Traffic

### 5.1 Existing Traffic Volumes

According to the 2009 Traffic Volume Map prepared by the North Dakota Department of Transportation, the average daily traffic (ADT) on Lincoln Road (east to west) ranges from 1,605 to 3,775 vehicles per day.

AM and PM peak hour traffic and pedestrian counts were recorded during September of 2010 at the Lincoln Road intersections of 52<sup>nd</sup> Street SE, Benteen Drive, McDougall Drive, and 66<sup>th</sup> Street SE. These counts are summarized in Figures 3 and 4. The pedestrian counts may not be peak pedestrian volumes due to the weather conditions and the time of day that the counts were taken.

Figure 3 – September 2010 AM Traffic Counts

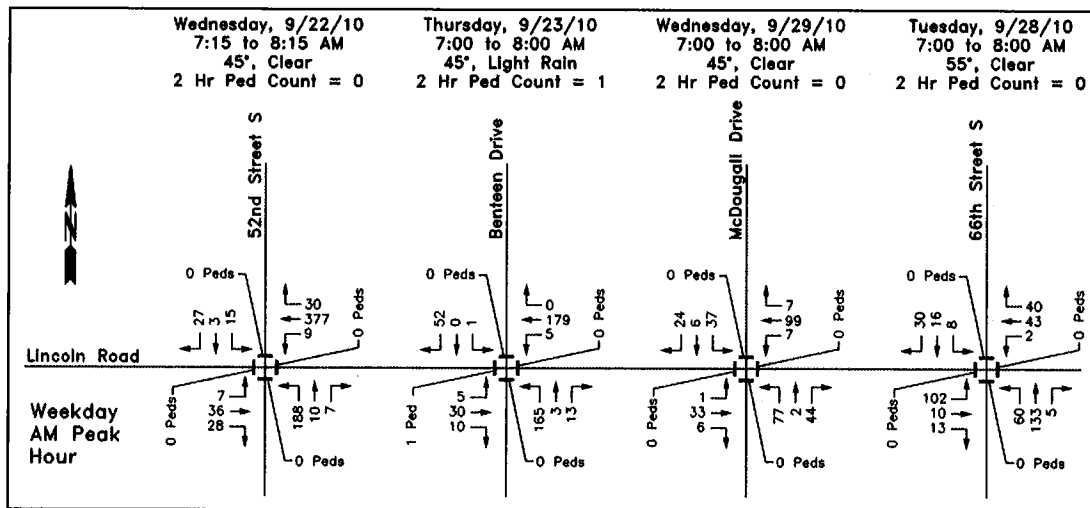


Figure 4 – September 2010 PM Traffic Counts

