

# NW 86<sup>th</sup> Street Access Management Plan: Complexities of Managing Access with Plans, Land Redevelopment, and Street Redesign

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Based on the *NW 86<sup>th</sup> Street and University Avenue Transportation Improvement Plan*  
Completed by Snyder & Associates, Inc. for the City of Clive, Iowa

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## **Abstract**

Access management plans to modify or retrofit developed urban corridors typically outline changes to both public facilities and privately owned accesses. Plans to modify private access points on developed urban corridors can be efficiently accomplished if implemented concurrently with land redevelopment adjacent to the corridor. If the urban corridor is experiencing a high rate of redevelopment or site modification, revising or consolidating private access points as directed in an access management plan can occur naturally through enforced land redevelopment regulations within site plan review. Modifying access on the public street system via corridor redesign simultaneous to the private access modifications can not only control access problems with older development or site designs, but also complement the updated private access designs. However, while public street improvement needs can be addressed in a relatively straightforward manner, improvements for privately owned property, particularly commercial properties, can pose problems for planners and engineers with access management and corridor safety as their forefront concern.

NW 86th Street extends through the central business district for the City of Clive, Iowa. Clive is a suburb of Des Moines, Iowa, and has been experiencing rapid growth during the last few decades. However, as a suburb, most of its central business district development occurred since the 1970's and primarily consists of strip development and stand-alone commercial buildings. The corridor also has several chain commercial uses that are in older, smaller facilities than what would be newly constructed today. It was a City goal to keep the aging corridor vital through redevelopment and upgrades. The City commissioned the NW 86th Street Corridor Plan to plan the complete redevelopment of the corridor through individual parcel redevelopment. The land use plan established the vision for the central business district and the corridor itself, identifying the need for the future economic viability and livability of the corridor, with transportation efficiency and safety as a major goal within the vision.

This case study reviews a transportation improvement plan completed by Snyder & Associates, Inc. for the NW 86th Street corridor in Clive, Iowa. The transportation improvement plan was developed to complement the NW 86th Street Corridor Plan, a redevelopment and land use plan for the NW 86th Street corridor. The transportation

improvement plan included traffic history and projections, crash analysis, proposed roadway alignments, an access management plan, and a hydrology plan. The access management plan developed for this project was closely tied to the existing and projected traffic operations of the corridor with expected land development based on the NW 86th Street Corridor Plan. The goal of the NW 86th Street and University Boulevard Transportation Improvement Plan was to complete needed background studies to move forward with roadway design; the need for uniform roadway design throughout the corridor that would be in balance with the proposed corridor redevelopment plan was recognized early in the project. The transportation plan would be implemented as the corridor redeveloped, parcel by parcel.

NW 86th Street is an urban principal arterial roadway extending through the Des Moines suburbs of Johnston, Urbandale, Clive, and West Des Moines. The study area is primarily within the City of Clive; however, the extreme northern end of the corridor is within the City of Urbandale's jurisdiction. Within the study area, NW 86th Street exhibits a combination of cross-sections, ranging from an older four-lane undivided roadway, a five-lane roadway with a two-way left turn lane, and a four-lane divided roadway with left turn lanes. As a principal arterial roadway within the central business district, the corridor is frequently broken up by traffic signals. Distance between traffic signals within the study area is less than a quarter of mile. Commercial land uses typically front NW 86th Street, as this is the central business district. Medium and single-family residential uses are typically immediately adjacent to the commercial land. It was recognized that NW 86th Street serves a mix of users ranging from metro area through-travelers, neighborhood homeowners, and retail traffic; retail traffic on the corridor is also a mix of drive-by users typically associated with impulse purchasing (fast food restaurants, convenience stores, gas stations) as well as retail traffic for the various specialty or destination businesses on the corridor.

NW 86th Street extends through the central business district; its short blocks, existing land development patterns and frequently turning vehicles made it difficult to adhere to more typically recommended access management recommendations, particularly access spacing and signal spacing. It was recognized that while NW 86th Street is an arterial roadway, the City wished NW 86th Street within the central business district to move traffic efficiently as an arterial road, but provide a high degree of interaction and accessibility as a collector road.

To this end, the access management plan was atypical in that it was developed much like a traffic impact study. The corridor land use plan was used to estimate future traffic growth for the corridor through traffic impact analysis. In addition to the future year traffic projections, an impact analysis was completed for the corridor to determine potential traffic control needs and vehicle queuing patterns on the corridor. The access management plan, including access control types, access spacing, and joint access recommendations, was developed given the projected traffic patterns for the corridor with land redevelopment, balanced with a crash and safety analysis for the study area. While the access management plan was atypical from most, it proved to be a useful format given that Snyder & Associates would also be the design engineer for the NW 86th Street corridor reconstruction projects. Upon the completion of the NW 86th Street Transportation Improvement Plan, it was hoped the access recommendations were immediately carried over into the design process. In addition to the

access management plan, a plan to replace all overhead utilities with underground utilities would remove the current safety hazards posed by utility pole obstructions.

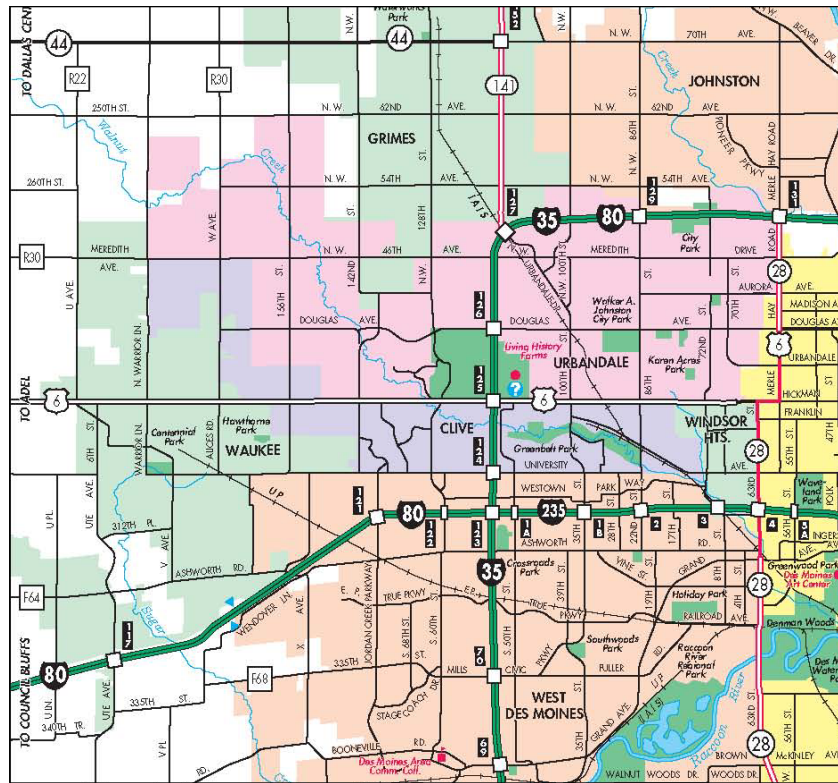
Although Snyder & Associates also is the design engineer for the NW 86th Street improvements, the implementation of the access management plan through corridor redesign proved to be a difficult process. Revisions to the access management plan became common as the larger retailers along the corridor leveraged their positions to either negotiate recommended changes to their sites or request additional items to benefit their businesses. Several chain businesses along the corridor are in older, smaller buildings than what would be newly constructed, and to stay competitive with newer, larger businesses, businesses recognize that transportation improvements may be a key to staying competitive. While this case study outlines a real-world, traffic-based methodology to develop a corridor access management plan, it also provides a reality check for transportation professionals looking to retrofit an aging corridor.

## **Introduction and Background**

A retrofit corridor may have a multitude of conflicting priorities, and for this reason access management principles may be compromised in the roadway redesign process. Although a “perfect” access control scenario may not always be accomplished, the professional should strive for increasing safety wherever possible, and recognize that tradeoffs will likely occur in a retrofit project.

The City of Clive, Iowa is a suburb in the Des Moines metropolitan area. Figure 1 shows the proximity of Clive in relation to the Des Moines metro area. The figure also shows jurisdictional boundaries of Clive, Urbandale to its north, and West Des Moines to its south. These cities have been continually growing to the west, and the City of Clive has been growing in a linear pattern, with future opportunities for annexation reduced due to the annexation patterns of Urbandale and West Des Moines. Therefore, reinvestment in existing areas of Clive could maintain the city’s positive image and provide competition for the other suburbs. Like Urbandale and West Des Moines, Clive is a growth oriented suburb. Clive has been steadily growing since its inception in the 1950’s, as shown in the population tables below, which includes a 2006 population estimate.

Figure 1  
Des Moines Metro Area – Northwest Suburban Area



Source: Iowa Department of Transportation

Table 1  
Clive Population Growth

Year	Population (persons)
1950	0
1960	752
1970	3,005
1980	6,064
1990	7,462
2000	12,855
2006 population estimate	14,062

Source: Iowa Data Center ([www.iowadatacenter.org](http://www.iowadatacenter.org)), with U.S. Census data

Table 2  
Western Subarea Population and Employment Projections

	Year 2000	Year 2030
Population Estimate and Projection (persons)	22,500	88,600
Employment Estimate and Projection (jobs)	41,100	154,100

Source: Des Moines Metropolitan Planning Organization LRTP 2030

Clive is one of the western suburbs of Des Moines, and is included in what the Des Moines Area Metropolitan Planning Organization (DMAMPO) categorizes as the “Western Subarea” of the metro. In its 2030 Long Range Transportation Plan (LRTP), the DMAMPO projects the Western Subarea to have the largest increases in population and employment of any

subareas in the Des Moines metro area. Table 2 contains population and employment projections for the Western Subarea, as listed in the DMAMPO LRTP.

NW 86<sup>th</sup> Street is a north-south major arterial roadway connecting the cities of Johnston, Urbandale, Clive, and West Des Moines (as 22<sup>nd</sup> Street) in the Des Moines metropolitan area. NW 86<sup>th</sup> Street has developed as a primarily commercial corridor in Johnston, Urbandale, and Clive. NW 86<sup>th</sup> Street/22<sup>nd</sup> Street has become a metrowide commuter route due to its proximity to high activity areas of Johnston, Urbandale, and Clive. NW 86<sup>th</sup> Street also directly connects to Interstate-35/80 to the north and Interstate-235 to the south. Merle Hay Road, an arterial east of NW 86<sup>th</sup> Street, ends north of I-235, and therefore has very little continuity. NW 2<sup>nd</sup> Avenue, a principal arterial through central Des Moines, extends to the metro's CBD, and to the south, but only directly services the city of Des Moines. Other arterial roadways of NW 6<sup>th</sup> Avenue and Martin Luther King, Jr. Parkway, do not have both roadway continuity from north of I-35/80 to the CBD and an interchange on I-35/80. NW 100<sup>th</sup> Street is a diagonal route through the northwest metro area, and provides a similar route to NW 86<sup>th</sup> Street. The major street network in the NW Des Moines metropolitan area is shown in the figure below.

Figure 2  
Major Roads in Northwest Des Moines Metro Area



Source: Des Moines Area Metropolitan Planning Organization

The NW 86<sup>th</sup> Street corridor in Clive extends from Hickman Road/US 6 to University Avenue in West Des Moines, both principal arterial roadways extending through the Des Moines metro area. The NW 86<sup>th</sup> Street corridor here is the original central business district for the City of Clive, and includes a variety of land uses and building types.

Figure 3  
NW 86<sup>th</sup> Street Aerial Photograph



Source: Polk County, Iowa

Clive's central business district is located on NW 86<sup>th</sup> Street between Hickman Road and University Avenue. Clive was established in 1956, and primarily developed in the 1960's. Commercial buildings in the Clive CBD are a mix of strip mall developments or standalone commercial buildings. The corridor also has large building setbacks and a proliferation of paved front parking lots. There are virtually no mixed-use buildings in the Clive CBD, a traditional focus of many CBD's. The City of Clive commissioned the development of the NW 86<sup>th</sup> Street Corridor Plan to develop the vision of the redevelopment of the NW 86<sup>th</sup> Street corridor into a more traditional CBD with increased commercial sustainability.

To support the NW 86<sup>th</sup> Street vision, the City Council directed city staff to review NW 86<sup>th</sup> Street to assess the corridor's long term infrastructure needs. Snyder & Associates, Inc. was retained to assist City staff in reviewing long-term traffic and infrastructure needs of the corridor. The NW 86<sup>th</sup> Street Transportation Improvement Plan was developed as a summary of the analysis, and recommended infrastructure improvements, project programming, and potential funding sources for the improvements. The transportation improvement plan included transportation and storm sewer infrastructure improvement recommendations, as well as provide opportunities to implement recommendations made in the visioning plan for the corridor.

The corridor visioning plan and the transportation improvement plan were linked by land use and transportation. The land use vision developed in the corridor plan would generate traffic and increased land development, both accommodated through infrastructure improvements recommended in the transportation improvement plan. The existing condition of NW 86<sup>th</sup> Street posed a challenge for the transportation improvement plan. NW 86<sup>th</sup> Street is a growing transportation corridor, but it also has suburban-type development with poor driveway spacing and increasing safety issues. The transportation improvement plan needed to identify opportunities to accommodate the planned redevelopment of the corridor, increase safety within corridor, and improve traffic flow on NW 86<sup>th</sup> Street to support increasing traffic volumes. A traffic analysis and access management plan was developed within the transportation improvement plan to assist in achieving this goal.

## **Objective**

This case study is an overview of a transportation improvement plan completed by Snyder & Associates, Inc. for the NW 86<sup>th</sup> Street corridor in Clive, Iowa. The transportation improvement plan was developed to complement the NW 86<sup>th</sup> Street Corridor Plan, a redevelopment and land use plan for the NW 86<sup>th</sup> Street corridor. The transportation improvement plan included traffic history and projections, crash analysis, proposed roadway alignments, an access management plan, and a hydrology and utilities plan. The access management plan developed for this project was closely tied to the existing and projected traffic operations of the corridor with expected land development based on the NW 86<sup>th</sup> Street Corridor Plan.

The access management plan developed within the transportation improvement plan was developed much like a traffic impact study, with traffic projections and modeling balancing

with access management principles, existing development constraints in the corridor, and community and business input.

## **NW 86<sup>th</sup> Street Corridor Plan and Existing Corridor Conditions**

The NW 86<sup>th</sup> Street Corridor Plan was developed as a visioning plan for the future of the NW 86<sup>th</sup> Street corridor. The plan established the need to redevelop the corridor to increase commercial sustainability, improve aesthetics, and increase civic pride. As cited in the plan, “The NW 86<sup>th</sup> Street Corridor Plan is intended to provide a vision for future development and establish a positive presence for the City of Clive along a metropolitan corridor that connects several communities. It is important to note that while the corridor is not in a dilapidated or blighted condition, there is a transition taking place in regard to the prominence of the corridor as a commercial destination within the context of the western Des Moines marketplace.”<sup>1</sup>

The City of Clive recognized the value of NW 86<sup>th</sup> Street as the central business district of its evolving city. The NW 86<sup>th</sup> Street Corridor Plan would be a visioning plan to transform the corridor into a more traditional central business district, as it was originally planned. In addition, the increasing traffic volumes on NW 86<sup>th</sup> Street could be capitalized upon to improve the corridor and City tax base through market-driven development. As Des Moines metro suburbs grow westward, away from the city center, older commercial areas and corridors experience higher vacancy rates and business turnover, as is occurring on NW 86<sup>th</sup> Street. Reinvestment in the corridor was hoped to establish a more stable commercial environment, in addition to developing a traditional CBD and improving aesthetics and civic pride. This combination of benefits could result in a more sustainable corridor over time.

The NW 86<sup>th</sup> Street Corridor Plan established development areas to better direct the development goals of the corridor. Figure 4, used in the transportation improvement plan, details the development areas created in the corridor plan, also utilized in the transportation improvement plan.

Each development area noted in the corridor plan is unique, with different development patterns and land uses. The discussion below is a summary of each area, its land uses and development goals as noted in the NW 86<sup>th</sup> Street Corridor Plan, with more specific land use projections developed by the City for the transportation improvement plan, and access management problems as noted in the transportation improvement plan.

### **The North-End Area**

The North-End Area of the NW 86<sup>th</sup> Street corridor is at Hickman Road, and is primarily commercial and office uses. A big box grocery store is located in this area, as well as suburban office uses and some drinking establishments. In this area, NW 86<sup>th</sup> Street is a four-lane corridor with left turn lanes at one unsignalized intersection. The corridor has a raised median at the Hickman intersection, and it does not extend south or restrict any left turning traffic at driveways. The driveway design for the grocery store parcel an enter-only

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<sup>1</sup> NW 86<sup>th</sup> Street Corridor Plan, Gould Evans Goodman, LLC. Page 1-2, 2003.

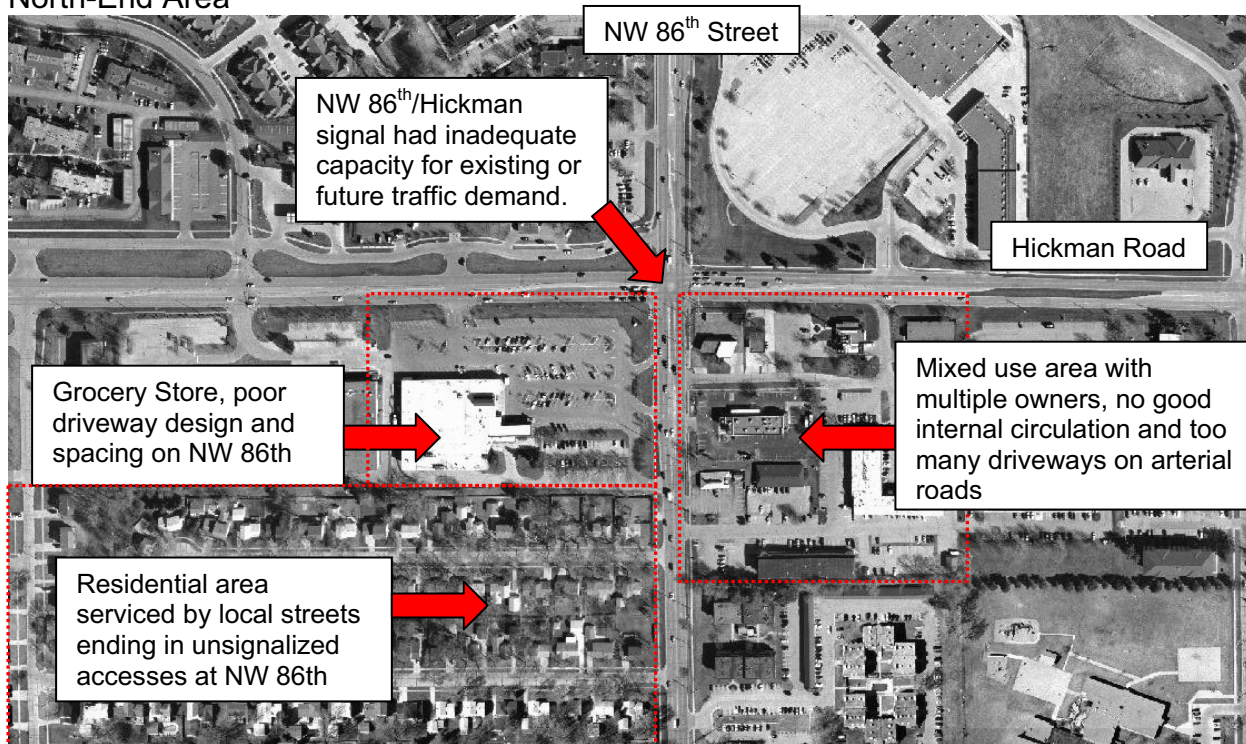




NW 86th Street Corridor Plan Overlay

and exit-only driveway pair, inadequately spaced and incorrectly used by patrons. The east side of the street has closely spaced driveways.

Figure 5.  
North-End Area



The goal for the corridor as established in the corridor plan is “to reinforce the establishment of quality commercial services in a well-designed and comfortable environment that serves the local residents and a larger community area.” The corridor plan outlines the need to keep quality businesses at this end of the corridor while improving the area by attracting additional business, the beautification and aesthetic treatment of the roadway corridor, and the installation of a gateway marker in this area. The City of Clive projects that the North-End Area will keep the existing grocery store, but the east side office/commercial and drinking establishments could redevelop into a mix of fast-food restaurants, convenience stores, and bank uses.

#### The Summit/Alice Area

The Summit/Alice Area is single-family and multi-family residential development, with some commercial uses. The majority of residential development in this area was constructed in the mid 1960’s. Several older apartment buildings are located along the east side of NW 86<sup>th</sup> Street in this area, and are planned to redevelop. Single-family residential is on the west side of NW 86<sup>th</sup> Street, and is accessed by several local streets, all of which connect to NW 86<sup>th</sup> Street and are spaced a few hundred feet apart, Summit Avenue, Franklin Avenue, Sunny Hill Drive, and Primrose Lane. However, this street network is not continuous, and forces residential traffic back to NW 86<sup>th</sup> Street via multiple unsignalized access points, creating poor traffic flow. Franklin Avenue has a signalized intersection at NW 86<sup>th</sup> Street but ends in a “T” intersection at NW 86<sup>th</sup> Street. Commercial development within this area is located on

the east side of the street and is typically standalone commercial buildings with large setbacks and large paved parking areas in front of the building.



Summit/Alice Area



Summit/Alice Area



Summit/Alice Area

North of Franklin, NW 86<sup>th</sup> Street is a four-lane corridor with no left turn lanes. There are no driveways on the west side of NW 86<sup>th</sup> Street within the residential area; most residential parcels are accessed off the closely-spaced side streets. On the east side of NW 86<sup>th</sup> Street, there is only one driveway. South of Franklin, NW 86<sup>th</sup> Street is four lanes with a two-way left turn lane. The east side of NW 86<sup>th</sup> Street south of Franklin has several standalone commercial buildings with individual driveways spaced about 50' apart, but the lots have connected parking areas.

Figure 6.  
The Summit-Alice Area



The goal for the corridor as established in the corridor plan is “to diversify housing types and promote residential development in stable developed neighborhoods in Clive.” The single-family homes in this area are primarily well-maintained and should be preserved, but the multi-family residential and commercial uses are planned to be eventually redeveloped into zero-setback buildings. Corridor beautification and aesthetic treatment along NW 86<sup>th</sup> Street was also recommended. The City of Clive projects that the single-family residential uses will be preserved, but the multi-family residential and mixed commercial uses could redevelop to townhomes.

#### The Harbach Commercial Area

The Harbach Commercial Area is the core commercial area of the NW 86<sup>th</sup> Street corridor. The Harbach area consists of mixed use development, including retail commercial, office, civic, and multi-family residential uses. Along NW 86<sup>th</sup> Street, the buildings are a mix of standalone suburban buildings (individual building pad sites) and strip commercial developments. There are a number of public or civic uses east of NW 86<sup>th</sup> Street, including a public safety building and a park.



Harbach Commercial Area

NW 86<sup>th</sup> Street in this area is a four-lane corridor with a left turn lane. This area is a mixture of standalone commercial buildings and strip malls. The east side of the street has many driveways spaced less than 50' apart. NW 86<sup>th</sup> Street has a raised median here to control some left turning movements from the proliferation of driveways, but there are many median breaks.

Figure 7.  
The Harbach Commercial Area



The goal for the corridor as established in the corridor plan is “to provide commercial services to the residents and patrons of the corridor in a reconfigured setting that promotes vehicular and pedestrian connections between uses and provides transportation improvements that improve access to and through the corridor.” The commercial and office uses fronting NW 86<sup>th</sup> Street are planned to be redeveloped over time into multi-story mixed-use CBD buildings with zero-setbacks and rear shared parking areas. The City of Clive projects the entire area could be redeveloped with multi-story CBD buildings with a mixture of retail, office, and apartment uses.

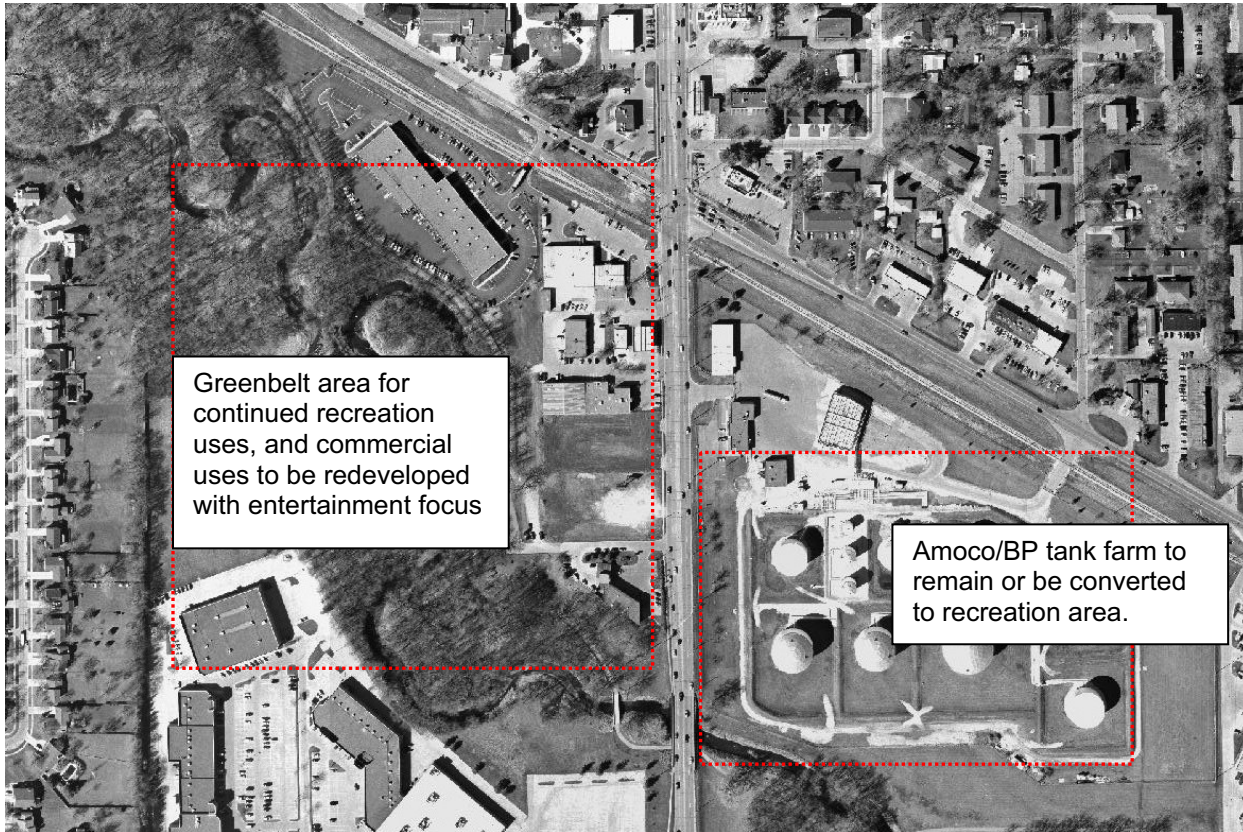
## The South-End Area

The South-End Area is a mixture of commercial and industrial use. The east side of NW 86<sup>th</sup> Street is industrial, with a BP/Amoco storage tank facility. The west side of NW 86<sup>th</sup> Street is a mix of commercial use. NW 86<sup>th</sup> Street in this area is four-lanes with a two-way left turn lane, narrowing to a four-lane road towards West Des Moines.



South-End Area

Figure 8.  
South-End Area



The goal for the corridor as established in the corridor plan is “to develop a commercial district, using the Greenbelt and historic assets as defining elements that will provide recreation/entertainment and employment opportunities to the citizens of Clive and the Des Moines region.” The land use plan for the corridor is planned to evolve into a mixture of office, retail, and service uses, a change from its existing industrial use. The City of Clive projects the entire area could be redeveloped with retail uses focused on entertainment, office uses, and apartment uses.

The NW 86<sup>th</sup> Street Corridor Plan was planned to be implemented through three legal tools: an area wide overlay district, revisions to the zoning ordinance, and the development of a planned urban district (PUD) along the corridor. The NW 86<sup>th</sup> Street overlay in particular would influence access improvements on private property. In addition to the NW 86<sup>th</sup> Street overlay district development, the corridor plan recommended that a capital improvement plan for the NW 86<sup>th</sup> Street corridor be developed to identify and program other needed improvements.

### **NW 86<sup>th</sup> Street Transportation Improvement Plan**

The NW 86<sup>th</sup> Street corridor plan was an impetus for the NW 86<sup>th</sup> Street transportation improvement plan. In addition to recommending a capital improvement plan be developed for the corridor, a goal of the corridor plan was to improve traffic circulation and accessibility on NW 86<sup>th</sup> Street.

The access management plan developed as part of the NW 86<sup>th</sup> Street Transportation Improvement Plan used the corridor vision and land use plan established in the NW 86<sup>th</sup> Street Corridor Plan. The access management plan recommended changes to improve safety on the corridor, with some projects to immediately occur and others to occur as the corridor redeveloped.

The access management plan was unique to typical access management plans. The NW 86<sup>th</sup> Street corridor was projected to redevelop with a higher land use intensity, and the traffic impact of the higher magnitude of land uses was assessed to determine infrastructure needs in the transportation improvement plan. The access management plan therefore was a combination of a traffic impact study to assess public street capacity needs with corridor redevelopment and an identification of access management opportunities with private parcel redevelopment, including improving driveway spacing, design, and internal circulation, adding joint accesses and shared parking, and alternate access points.

The NW 86<sup>th</sup> Street access management plan includes recommendations for two types of improvements, public street improvements (medians for access control and auxiliary lane needs) and private property improvements (access spacing and redesign, shared parking areas behind zero-setback CBD buildings, joint accesses, throat length improvements). Public street improvements were identified, planned and designed through the NW 86<sup>th</sup> Street TIP and subsequent work. In addition, identified projects were programmed into reasonable smaller projects, with cost estimates developed and project funding applied for. Private



improvements were identified but would be implemented through market-driven redevelopment of parcels along NW 86<sup>th</sup> Street. Commercial redevelopment and reinvestment in the NW 86<sup>th</sup> Street corridor was planned in the NW 86<sup>th</sup> Street Corridor Plan to be a private sector development function. However, redevelopment would occur under the City's developed policies for the corridor as addressed in the NW 86<sup>th</sup> Street Corridor Plan.

The following sections detail the development of the NW 86<sup>th</sup> Street access management plan through the development of the transportation improvement plan.

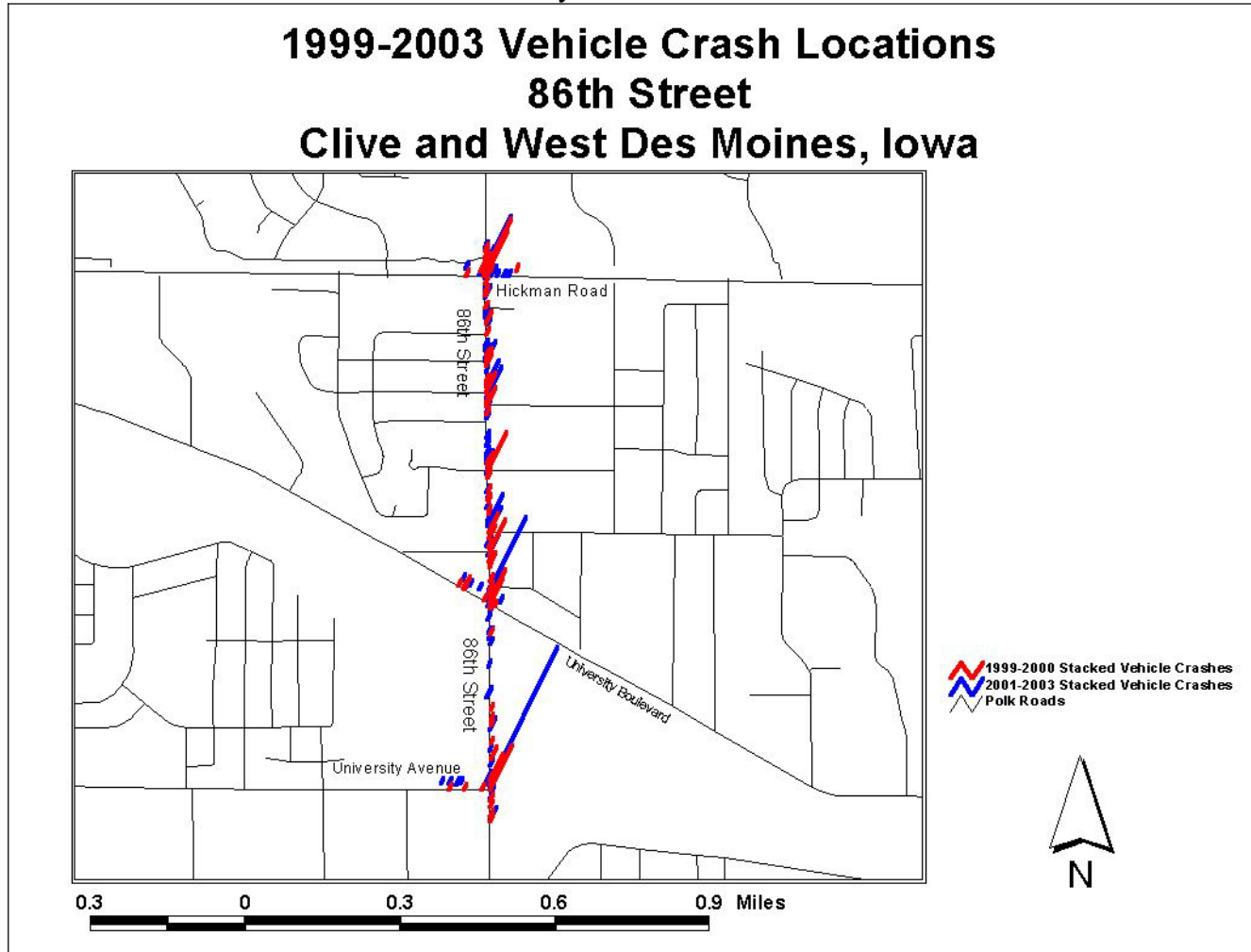
#### *NW 86<sup>th</sup> Street Crash History*

A safety analysis of NW 86<sup>th</sup> Street was conducted within the transportation improvement plan to properly plan for safety-related infrastructure needs. The crash analysis memo developed for the plan detailed five year (1999-2003) crash trends on NW 86<sup>th</sup> Street and its major intersections, and identified related safety deficiencies. Iowa Department of Transportation 1999-2003 GIS crash data was used for this analysis.

Figure 9 is a stacked crash map (1999-2003 crashes) developed for the NW 86<sup>th</sup> Street corridor. As shown in the figure, crashes occurred most frequently at the signalized intersections of Hickman, Alice, Harbach, University Boulevard, and University Avenue.

Crash rates were compared to statewide average crash rates for similar corridors, as compiled by the Iowa Department of Transportation. The statewide average crash rate comparable for the corridor was 467 crashes per hundred million vehicle miles (HMVM), and the average crash rate comparable for intersections was 1 crash per million entering vehicles (MEV).

Figure 9.  
1999 – 2003 NW 86<sup>th</sup> Street Crash History



Source: GIS crash data provided by the Iowa DOT (SAVER)

Notable crash analysis results for the NW 86<sup>th</sup> Street corridor, from Hickman to University Boulevard, included:

- 293 total corridor crashes
- Corridor crash rate of 990 crashes per HMVM, well above average although the corridor is short (0.63 miles)
- Intersection crash rates at intersections on the corridor were average
- Rear-end crashes are the predominant crash type on the corridor, with less right-angle and left-turn collisions
  - Rear-end crashes are typical at signalized intersections
  - The dispersment of rear-end crashes along the corridor reflect the high number of driveways on NW 86<sup>th</sup> Street
- Major contributing causes to the collisions included:
  - Following too closely
  - Failing to yield when making a left turn
  - Failure to have control

- Running a traffic signal

The corridor and intersection crash histories for this section of NW 86<sup>th</sup> Street revealed consistently high numbers of rear-end collisions at signalized intersections and the corridor itself. There were also turning movement crashes dispersed along the corridor. Crash locations were dispersed along the corridor, not just at intersections, which suggests the high number of driveways along NW 86<sup>th</sup> Street are contributing to safety problems. Reducing the number of driveways, installing continuous raised medians to reduce the number of left-turning crashes to direct turning vehicles to the signalized intersections on NW 86<sup>th</sup> Street would likely reduce vehicle conflicts.

Notable crash analysis results for the NW 86<sup>th</sup> Street corridor, from University Boulevard to University Avenue, included:

- 142 total corridor crashes
- Corridor crash rate of 600 crashes per HMVM, well above average
- Intersection crash rate at University Avenue is average
- Rear-end crashes are the predominant crash type on the corridor, with sideswipe, right-angle, and left-turn crashes also seen on the corridor.
- Major contributing causes to the collisions included:
  - Following too closely
  - Failing to yield when making a left turn
  - Inattentive or distracted
  - Speed too fast for conditions

The corridor and intersection crash reports for this section of the corridor yield average or slightly above-average crash rates. There are not many driveways in this location, and most of the crashes in this section occurred at intersections. However, the consolidation of access points (with land redevelopment) in this section of NW 86<sup>th</sup> Street would help to reduce crash potential in this corridor. The intersection of NW 86<sup>th</sup> Street and University Boulevard is skewed, and therefore many sideswipe crashes occurred here.

#### *NW 86<sup>th</sup> Street Traffic Projections and Traffic Modeling*

Future traffic volumes were projected for the NW 86<sup>th</sup> Street corridor and capacity analysis was completed for the corridor to plan for traffic-related infrastructure needs. The corridor traffic projections included a combination of projections based on traffic volume history, and traffic projections based on future redevelopment as outlined in the corridor plan. These two traffic projections were compared to arrive at the final traffic projections for the corridor.

Base traffic projections were developed using 1984-2000 traffic volumes as recorded by the Iowa Department of Transportation. The DOT traffic volumes showed that traffic on NW 86<sup>th</sup> Street was steadily increasing, and the volumes were summarized as:

- NW 86<sup>th</sup> Street, south of Hickman: Volumes ranged from 20 – 24,000 vpd from 1988 – 2000
- NW 86<sup>th</sup> Street, north of University Boulevard: Volumes ranged from 26 – 27,500 vpd, from 1988 – 2000

- NW 86<sup>th</sup> Street, north of University Avenue: volumes ranged from 27 – 31,500 vpd from 1984 – 2000

Traffic growth observed on NW 86<sup>th</sup> Street was averaged over the corridor to arrive at an average traffic growth rate of 0.79% per year for the corridor, with a growth rate factor of 1.21.

However, future traffic growth on the NW 86<sup>th</sup> Street corridor would likely not follow historic trends because the corridor was planned to be completely redeveloped over time, with more intensive land uses. The traffic impact of the redeveloped corridor must be factored into the traffic projections. To estimate the traffic impact of the land use plan proposed in the NW 86<sup>th</sup> Street Corridor Plan, a comparison was made between calculated trip generation for the existing land uses in the corridor versus calculated trip generation for projected land uses if the corridor were to redevelop.

The existing land use and trip generation analysis for the NW 86<sup>th</sup> Street corridor, assuming that all businesses were in operation, projected the corridor to generate over 28,000 daily trips and over 3,300 PM peak hour trips. The existing land use for the corridor included over 615,000 square feet in building gross floor area and 91 dwelling units.

The projected land use and trip generation analysis for the NW 86<sup>th</sup> Street corridor assumed that all land uses projected in the corridor plan would be developed and replace the existing land uses. It was projected that the future land use plan could generate over 47,000 daily trips and over 4,100 PM peak hour trips, a large increase from the existing land use. The future land use for the corridor assumed over 814,000 square feet in building gross floor area and 1,451 dwelling units. Table 3 summarizes the land use changes projected for the corridor, with a 30% increase in non-residential development and 15 times more residential units than exist today.

Table 3.  
NW 86<sup>th</sup> Street Land Use Projections

Land Use Type	Current Size (DU or sq ft)	Redevelopment (DU or sq ft)	Overall Change
Non-Residential	615,383 sq ft	814,620 sq ft	199,237 sq ft
Residential	91 DU	1,451 DU	1,360 DU

The future land use analysis found the majority of land use change would occur in the North-End Area and the South-End Area, as shown in the corridor plan and through City’s more detailed projections.

Table 4 details estimated Year 2030 traffic projections developed for the NW 86<sup>th</sup> Street corridor, assuming the corridor redevelops as planned. Based on regional through trip patterns, as well as a major expansion of I-235 south of this area, it was concluded that the rate of historic traffic growth, if continued, could accommodate traffic growth from increased development on the corridor. Year 2030 traffic projections developed by the Des Moines Area Metropolitan Planning Organization (DMAMPO) were compared to the traffic projections developed. The corridor projections between Hickman and University Boulevard are similar

to the DMAMPO volumes, but the plan projected slightly higher traffic volumes for the corridor between University Boulevard and Avenue.

Table 4  
Year 2030 Traffic Projections

Corridor	Estimated 2004 ADT (vpd)	Estimated 2030 ADT (vpd)
NW 86 <sup>th</sup> Street (Hickman to Univ Blvd)	25,500	30,800
NW 86 <sup>th</sup> Street (Univ Blvd to Univ Ave)	30,000	36,300

Capacity analysis was completed for existing volumes and projected future traffic volumes using Synchro 7. Various capacity constraints were noted at signalized and unsignalized intersections along the corridor. Public street capacity needs were balanced against available space and need to provide access elsewhere on the corridor, and are detailed below.

*Types of Recommended Public Street Improvements*

The NW 86<sup>th</sup> Street transportation plan recommended various public street improvements to facilitate improved traffic flow and accommodate projected traffic volumes:

Signalized Intersection Improvements. Traffic models in Synchro 7 were developed to determine capacity needs at signalized intersections along the corridor. Peak hour traffic queues were also estimated, and recommended auxiliary lane vehicle storage was compared to existing vehicle storage.

Raised Median Installation. The transportation improvement plan recommended that raised medians be installed on NW 86<sup>th</sup> Street to reduce left-turning conflicts. However, the City pledged to not construct a raised median until adjacent parcels had redeveloped and reconfigured their NW 86<sup>th</sup> Street access, in order to maintain good relations with the existing corridor businesses.

Two-Way Left-Turn Lanes. Various locations along the corridor were considered for two-way left turn lanes as an alternative to a raised median. A two-way left turn lane would provide left turning capacity, and would allow for improved through traffic flow. However, a two-way left turn lane would only be considered as an alternative to a raised median if access points were properly spaced.

*Types of Recommended Private Improvements*

The NW 86<sup>th</sup> Street transportation plan recommended modifications to many private access points on NW 86<sup>th</sup> Street through market-driven private redevelopment. It was expected that NW 86<sup>th</sup> Street would experience a high rate of redevelopment in this corridor, therefore it was determined that access control and design could be controlled by the City through the site plan review process and the overlay district regulations for NW 86<sup>th</sup> Street. The NW 86<sup>th</sup> Street overlay district proposed in the corridor plan and the review of each site through the site review process is how the private property transportation improvements would be implemented.

The overlay district recommended in the corridor plan and the transportation improvement plan both included a variety of private parcel transportation improvements.

*Driveway Spacing.* The overlay district stated that curb cuts should be kept to a minimum on NW 86<sup>th</sup> Street, and that no curb cut should be allowed within 150' of a street intersection. The transportation improvement plan included a recommendation to reduce driveways where possible; however, the plan also stated that although a raised median will be installed and restrict left-turning movements, that right turns would still be allowed and therefore driveways should be spaced properly. The access management plan also includes recommendations for right-in, right-out driveway spacing. Due to the numerous existing closely-spaced driveways on NW 86<sup>th</sup> Street, it was recommended that right-in, right-out driveways be spaced at least 200' from the nearest access point, with preference for joint driveways and rear access over single-business driveways. It was recommended that only one right-in, right-out access point be present between each of the signalized intersections of Franklin, Alice, Summit, and University Boulevard, something that would be implemented after corridor properties were redeveloped.

*Corner Clearance.* Corner clearance was determined for minor and major street intersections. Corner clearance from NW 86<sup>th</sup> Street on the minor streets of Franklin, Alice, and Harbach will directly impact queue interaction with driveway traffic. 100' right turn lanes were recommended for these minor street approaches; because of this, it was recommended that no upstream driveways be located within the right turn lane or the auxiliary lane tapers. To allow vehicles time to assess a minor road driveway after entering the minor street from NW 86<sup>th</sup> Street, it was recommended that downstream driveways be located 150 – 200' from NW 86<sup>th</sup> Street on the minor road. Because the proposed corridor redevelopment plan utilizes village-style rear entries on the minor street, most minor streets should comply with the corner clearance recommendations.

Corner clearance for the major street intersections of NW 86<sup>th</sup> Street and University Boulevard were analyzed, with recognition of property redevelopment constraints and joint access constraints. The area downstream of the NW 86<sup>th</sup> Street and Hickman intersection was found to be the largest corner clearance problem in the corridor.

*Shared Driveways and Easements.* The overlay district stated that to minimize curb cuts, site access may be made via cross easements. The transportation improvement plan assumed that as parcels redeveloped, all efforts would be made to combine driveways and connect parking areas through cross-easements.

*Shared Parking Areas.* The corridor plan shows the Harbach commercial area to redevelop into zero-setback mixed-use CBD buildings with rear shared parking areas. The transportation improvement plan also assumed the Harbach area would redevelop with rear shared parking, and access from side streets, not NW 86<sup>th</sup> Street.

### *NW 86<sup>th</sup> Street Access Management Plan: Recommendations*

It was determined that the projected traffic volumes for NW 86<sup>th</sup> Street could be accommodated with the existing four lanes for through traffic. However, the corridor has suffered from traffic delays due to poor access management and inadequate left-turn capacity throughout the corridor. Public street improvements for the corridor focused on auxiliary lane, two-way left turn lane, and median construction. Queuing needs at signalized intersections was assessed in *Synchro 7* software. Private parcel improvements, to be completed over time with parcel redevelopment

#### The North-End Area

The North-End Area has some strong existing businesses, such as the grocery store, but reinvestment could occur on the east side of NW 86<sup>th</sup> Street. The existing driveways in the North-End Area do not have optimal spacing, and the raised median on NW 86<sup>th</sup> Street here does not extend far enough south to prevent dangerous left turns across traffic that frequently is queued past this point from the Hickman signal. Access spacing and driveway design at the grocery store site was another concern.

#### North-End Public improvements.

- NW 86<sup>th</sup> Street and Hickman Intersection Reconstruction: The intersection at NW 86<sup>th</sup> and Hickman was found to have inadequate queue storage and lane capacity, as well as an antiquated signal that needed additional signal phases. The intersection was planned for complete reconstruction, a joint project with the City of Urbandale north of Hickman Road. The project would increase left turn queue storage and add right turn lanes with right turn overlap phasing for all intersection approaches.
- Raised median reconstruction and extension: This section of NW 86<sup>th</sup> Street has short sections of raised medians. These medians are planned to be redesigned and reconstructed to allow more queue storage at the Hickman intersection, reduce full-access driveways in this area, and provide more queue storage for another intersection.
- Grocery Store corner parcel (Southwest corner of NW 86<sup>th</sup>/Hickman) Access Removal: Although this is a privately owned land parcel, access improvements here were made under a public improvement project because the grocery store was not expected to redevelop. Improvements included the removal of directional travel driveways onto NW 86<sup>th</sup> Street with poor corner clearance, driveways that would have become right-in, right-out driveways with the reconstruction of the NW 86<sup>th</sup> Street intersection.
- Parcel acquisition: The City of Clive acquired a parcel on the east side of NW 86<sup>th</sup> Street in this area for redevelopment purposes, and removed its NW 86<sup>th</sup> Street driveway in hopes for future joint or shared access.

#### North-End Private Improvements.

- The City of Clive hopes the entire southeast quadrant of the NW 86<sup>th</sup>/Hickman intersection will redevelop over time as one development, to improve access spacing.

#### The Summit/Alice Area

The Summit/Alice area is comprised of single-family and medium-density residential and standalone commercial buildings. Three residential streets intersect NW 86<sup>th</sup> Street in this

area. Various redesign strategies to combine the streets into a single intersection at NW 86<sup>th</sup> Street were considered but were not recommended due to the amount of homes that would need to be relocated. Through traffic flow could be improved in this area by providing auxiliary lanes. The standalone commercial buildings in this area each have access to NW 86<sup>th</sup> Street, and a plan to reduce access points was needed.

#### Summit/Alice Public Improvements.

- Raised Median Installation or Two-Way Left Turn Lane Extension: North of Franklin Avenue, NW 86<sup>th</sup> Street is four lanes with no auxiliary lanes. To reduce traffic congestion caused by turning vehicles at Franklin, NW 86<sup>th</sup> Street from Hickman to Franklin was planned to be widened to include a southbound left turn lane at Franklin Avenue.

#### Summit/Alice Private Improvements.

- Driveway reduction or consolidation through parcel redevelopment. One right-in, right-out access point was recommended between each of the signalized intersections of Franklin, Alice, Summit, and University Boulevard, the only permitted full access points. Based on the corridor plan, the redeveloped parcels should have shared access, back parking lots, and back access where possible to support the single right-in, right-out driveway.

#### The Harbach Commercial Area

The Harbach Commercial Area is planned to be completely redeveloped into a more traditional CBD area. Harbach Boulevard is a jogged intersection at NW 86<sup>th</sup> Street. A light industrial use west of NW 86<sup>th</sup> Street uses the unsignalized leg of Harbach, and would benefit from a continuous Harbach Boulevard at this location.

#### Harbach Public Improvements.

- Realignment of Harbach Boulevard: To provide better minor street continuity, Harbach Boulevard was planned to be realigned to a single signalized intersection as redevelopment occurs.
- Reconstruct Raised Median: The raised median on NW 86<sup>th</sup> Street should be reconstructed to close existing median breaks, allowing full access only at signalized intersections. The raised median reconstruction would be part of the reconstruction of the NW 86<sup>th</sup> and University Boulevard intersection.

#### Harbach Private Improvements.

- Driveway reduction or consolidation through parcel redevelopment. One right-in, right-out access point was recommended between each of the signalized intersections of Franklin, Alice, Summit, and University Boulevard, the only permitted full access points. Based on the corridor plan, the redeveloped parcels should have shared access, back parking lots, and back access where possible to support the single right-in, right-out driveway.





Example of a redeveloped Harbach-area parcel in compliance with overlay regulations

### The South-End Area

The South-End Area has limited potential for redevelopment due to a BP/Amoco tank farm on the east side of NW 86<sup>th</sup> Street. Uses on the west side of the corridor are planned to redevelop into entertainment-focused uses. This section of the corridor has fewer access control problems and has adequate lane capacity south of University Boulevard. However, the skewed intersection of University Boulevard and NW 86<sup>th</sup> Street is experiencing greater levels of turning traffic using University Boulevard to University Avenue to the south, and the intersection is experiencing delay.

### South-End Public Improvements.

- No left turn lanes improvements needed; this area already had a two-way left turn lane.
- Reconstruction of NW 86<sup>th</sup> Street and University Boulevard intersection
  - Increase the capacity of the single left turn lanes, including the southbound left turn lane (aided by the median break closure on NW 86<sup>th</sup>), and the eastbound left turn lane.
  - The westbound approach should be widened to add a second left turn lane to support the heavy University traffic pattern and a new right turn lane.
  - A large northbound right turn lane would be added to support the heavy University traffic pattern.

### South-End Private Improvements.

- Parcel redevelopment on the west side of NW 86<sup>th</sup> Street is recommended to have two consolidated access points along this part of the corridor.

### *Comparison to Access Management Standards*

NW 86<sup>th</sup> Street will be a corridor in transition for years to come. The corridor is planned to redevelop over time, through market-driven influence, and transportation and access improvements are planned to occur as individual parcels are redeveloped. It was recognized

that access improvements would occur through parcel redevelopment to keep existing businesses as viable as possible on the busy corridor. However, the access management plan was a context-sensitive plan, and while access and safety would be improved on the corridor with implementation of the plan, it would likely never meet many of the access management suggestions listed in the *TRB Access Management Manual*.<sup>2</sup>

The *Access Management Manual* cites an example of suburban street access spacing showing principal arterial roads could have median openings no closer than 2640', or 1320' on a minor arterial street.<sup>3</sup> The closest-spaced signalized intersections/planned median openings on NW 86<sup>th</sup> Street are 500' – 600' feet apart. This distance is closer than the ½-mile spacing distance noted in the *Access Management Manual* to reduce vehicle delay,<sup>4</sup> but due to the existing traffic patterns and level of development, these signal locations help the corridor function, as long as they are properly timed to allow for maximum progression potential on NW 86<sup>th</sup> Street.

Another example is right-in, right-out driveways. The manual lists that these driveways could be spaced no closer than 1320' apart on a principal arterial, or 330' on a minor arterial.<sup>5</sup> The access management plan recommended one right-in, right-out driveway between the signalized intersections of Franklin, Alice, Harbach, and University Boulevard. The closest spaced signals among these were 500' – 600' apart (Harbach to Franklin). A right-in, right-out driveway between these signals would be short of the manual's 330' spacing suggestion, but was within the calculated stopping sight distance for a vehicle traveling at 40-mph on this street (305').<sup>6</sup>

#### *Business and Property Owner Priorities*

At the beginning of the NW 86<sup>th</sup> Street TIP process, many business owners did not react positively to the potential access changes that could occur on NW 86<sup>th</sup> Street. However, through coordination with the City of Clive, participation in public meetings for the project, and general understanding of the proposed changes, many business owners began to understand that access needed to be managed to improve roadway capacity, and it could ultimately benefit their businesses by improving the corridor's health. Communication with business owners was one reason for business owner acceptance of the plan, and adding flexibility in the access management plan to support existing businesses was another. The access management plan and transportation improvement plan projects that directly impacted private parcels, such as the removal of driveways and the installation of raised medians, were planned to be implemented as parcels redeveloped. Staging this work as land use changed reduced business owners' concerns about lost or reduced public street access to their businesses, and many owners began to accept and support the proposed transportation improvement projects.

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<sup>2</sup> Although it was realized the *Access Management Manual* guidelines are not access management standards, the guidelines were still used as a benchmark for this project.

<sup>3</sup> Transportation Research Board. *Access Management Manual*, 2003. Page 156.

<sup>4</sup> Transportation Research Board. *Access Management Manual*, 2003. Page 144.

<sup>5</sup> Transportation Research Board. *Access Management Manual*, 2003. Page 156.

<sup>6</sup> Transportation Research Board. *Access Management Manual*, 2003. Page 151.

While project staging alleviated some business owners' concerns regarding the project, other businesses vacated the corridor, and one business leveraged proposed access improvements to their advantage, as detailed below.

#### Business Vacancies

The NW 86<sup>th</sup> Street Corridor Plan's vision included a range of commercial uses in the redeveloped central business district, but did not promote the preservation or construction of new fast food or convenience store uses in the corridor. However, there were several fast food and convenience store buildings along the corridor during the planning process, and their reactions to the access management plan may have accelerated their business decisions to leave the NW 86<sup>th</sup> Street corridor.

Two major fast food chains along the corridor were opposed to the access management plan, primarily due to planned driveway reductions and the installation of a raised median in the Harbach Commercial Area. One of these chains ultimately relocated in order to have a more adequately-sized site elsewhere. The other chain publicly opposed the reduction of its full access point on NW 86<sup>th</sup> Street, but ultimately left the NW 86<sup>th</sup> Street corridor because it needed to update its site, which the NW 86<sup>th</sup> Street overlay would not allow due to site constraints.

One fast food chain at the intersection of NW 86<sup>th</sup> Street and University Boulevard was purchased by the City of Clive in order to rebuild the NW 86<sup>th</sup>/University Boulevard intersection. The franchise was understood to be very successful due to its prime location, but the planned transportation improvements resulted in the business losing half its parking stalls. The City plans to construct the beginning of a temporary access road in this parcel to provide access to University Boulevard businesses, for University Boulevard east of NW 86<sup>th</sup> Street is planned to be widened soon.

A pizza chain located in the North-End Area was purchased by the City of Clive and demolished to begin redistributing parcels in the North-End Area for redevelopment. In addition, a parcel in the southeast quadrant of the NW 86<sup>th</sup> Street and Hickman intersection was impacted by the proposed intersection reconstruction and access improvements, and the City purchased the rights to the parcel.

#### New Traffic Signal at Grocery Store

The grocery store in the southwest quadrant of the NW 86<sup>th</sup> Street/Hickman intersection was opposed to the transportation improvement and access management plan. The access management plan called to remove the store's two directional travel driveways on NW 86<sup>th</sup> Street, keeping one NW 86<sup>th</sup> Street driveway approximately 550' from Hickman Road. The two directional driveways had poor design and would be reduced to right-in, right-out access once intersection improvements at the Hickman intersection were made. The driveways were determined to have poor corner clearance from Hickman, another reason they were removed in the plan.

The grocery store, upset about the loss of two driveways, requested a traffic signal at its remaining NW 86<sup>th</sup> Street access, threatening to leave the corridor without a signal. The site

is a corner parcel and would not have been recommended for a traffic signal based on pure access management principles. However, the City wanted to keep the grocery store at this location on NW 86<sup>th</sup> Street, for it was a vital piece of the future corridor plan. The parcel had indirect access to a signal on Hickman Road through several other parcels' parking lots, but the business wanted its own traffic signal, thinking it would help to draw in more pass-by traffic. To fully respond to this request, the City requested the impacts of a potential signal to be analyzed, and design engineers for street project worked with the grocery store parcel to determine how the site could be improved with the reconstruction of NW 86<sup>th</sup> Street.

The traffic signal requested by the grocery store would be spaced approximately 550' from the major intersection with Hickman Road. The Access Management Manual suggests that traffic signals on arterial roadways could be spaced approximately ½-mile' apart for reduced travel delay and travel time benefits. As stated, a few signals in the corridor were spaced as close as 500-700' apart. Because the corridor had a precedent for closely-spaced signals, an analysis to determine potential safety or traffic flow impacts of a signal at this location. To determine traffic flow impacts, the signal was included in traffic models for the NW 86<sup>th</sup> Street corridor to determine if the signal could fit into the time-space diagram for the corridor. It was determined that the signal addition may not impact corridor progression if the signal were timed off the Hickman signal, and have a short side street green time. Traffic may queue in the store site due to the decreased green time, but NW 86<sup>th</sup> Street would not have reduced traffic flow. A PM peak hour time-space diagram developed in *Synchro 7*, including the proposed signal at the grocery store. It was found that although the traffic signal was much closer to the Hickman signal than desired, a short green time for the side street would not impact traffic progression on NW 86<sup>th</sup> Street. Because of this, the City allowed the traffic signal at this location; while the signal would not be recommended from an access management standpoint, it was deemed necessary to keep the largest retailer on the corridor in place.

## **Conclusions and Lessons Learned**

The redevelopment of an urban corridor is a complex undertaking, and in the case of NW 86<sup>th</sup> Street, compounded by the goals to provide improved local and regional transportation and to improve the CBD and the corridor's business environment. The City found that commitment to its vision for NW 86<sup>th</sup> Street was key in its redevelopment progress. Instead of being reactive to development, the City took the initiative to plant the seeds for redevelopment, following the corridor's vision. The City's sponsoring of the transportation improvement plan also demonstrated the City's commitment to improving transportation on the NW 86<sup>th</sup> Street corridor.

The NW 86<sup>th</sup> Street Transportation Improvement Plan outlined corridor improvements to accommodate the corridor plan and future redevelopment, as well as projected traffic volumes. The transportation improvement plan also included programming for the infrastructure projects, in addition to listing potential funding sources for the projects. At this time, the recommended improvements from Hickman Road to south of the grocery store (Sunny Hill Drive) are occurring on NW 86<sup>th</sup> Street.

Access management plans to retrofit or redesign an urban corridor must balance managing public infrastructure investments and modifications to private land. The sponsoring jurisdiction usually is put in the difficult position of placating existing business requests, fostering a positive environment for new businesses, nurturing the corridor to increase civic pride and livability, and redesigning the corridor to increase safety and improve traffic flow.

The concept of managing access through site plan review was a beneficial tool for NW 86<sup>th</sup> Street, for it was expected to have a large amount of redevelopment. To provide a basis for site plan review, a plan showing corridor driveway modifications, access changes, joint access or shared driveway locations, or shared parking areas could be developed. The Planning and Zoning Commission would need to be kept involved to ensure compliance and correct interpretation of the access management goals.

Retaining quality businesses while attracting new business is usually a large focus of a corridor redevelopment project, and may lead to tradeoffs between the engineering needs of safety and design and the business needs, perceived or real, of good access and visibility. Plans can be amended if businesses threaten to leave the corridor or if additional benefits can be realized for business owners. An access management plan for an older corridor should have a real-world perspective to be able to work with businesses to determine the reasonability of business owner requests in perspective with the overall needs and trends of the corridor.