Executive Summary

Existing CR 28/TH 149 intersection.

Report Purpose

The purpose of this report is to present the process and recommendations associated with the future County Road (CR) 28 Extension roadway corridor in the communities of Eagan and Inver Grove Heights, Minnesota. Dakota County, the Cities of Eagan and Inver Grove Heights, and the Minnesota Department of Transportation (Mn/DOT) participated in the development of the CR 28 Corridor Study. The study was initiated to determine if a need exists for an east-west roadway connection of CR 28 (Yankee Doodle Road) between Trunk Highway (TH) 149 in Eagan and TH 3 in Inver Grove Heights, and if so, which preliminary concept alignment developed for the project best satisfies the need to become the preferred alternative. The preferred alternative is then recommended for detailed feasibility and environmental studies, and ultimately design and construction.

Existing CR 28/TH 3 intersection.

Proposed Project

The proposed project involves the extension of CR 28 between TH 149 and TH 3 in northern Dakota County. CR 28 is an east-west roadway with termini at TH 13 in Eagan and CR 56 (Concord Boulevard) in Inver Grove Heights. With the exception of the missing segment between TH 149 in Eagan and TH 3 (South Robert Street) in Inver Grove Heights, the roadway extends the distance between the western and eastern Dakota County lines.

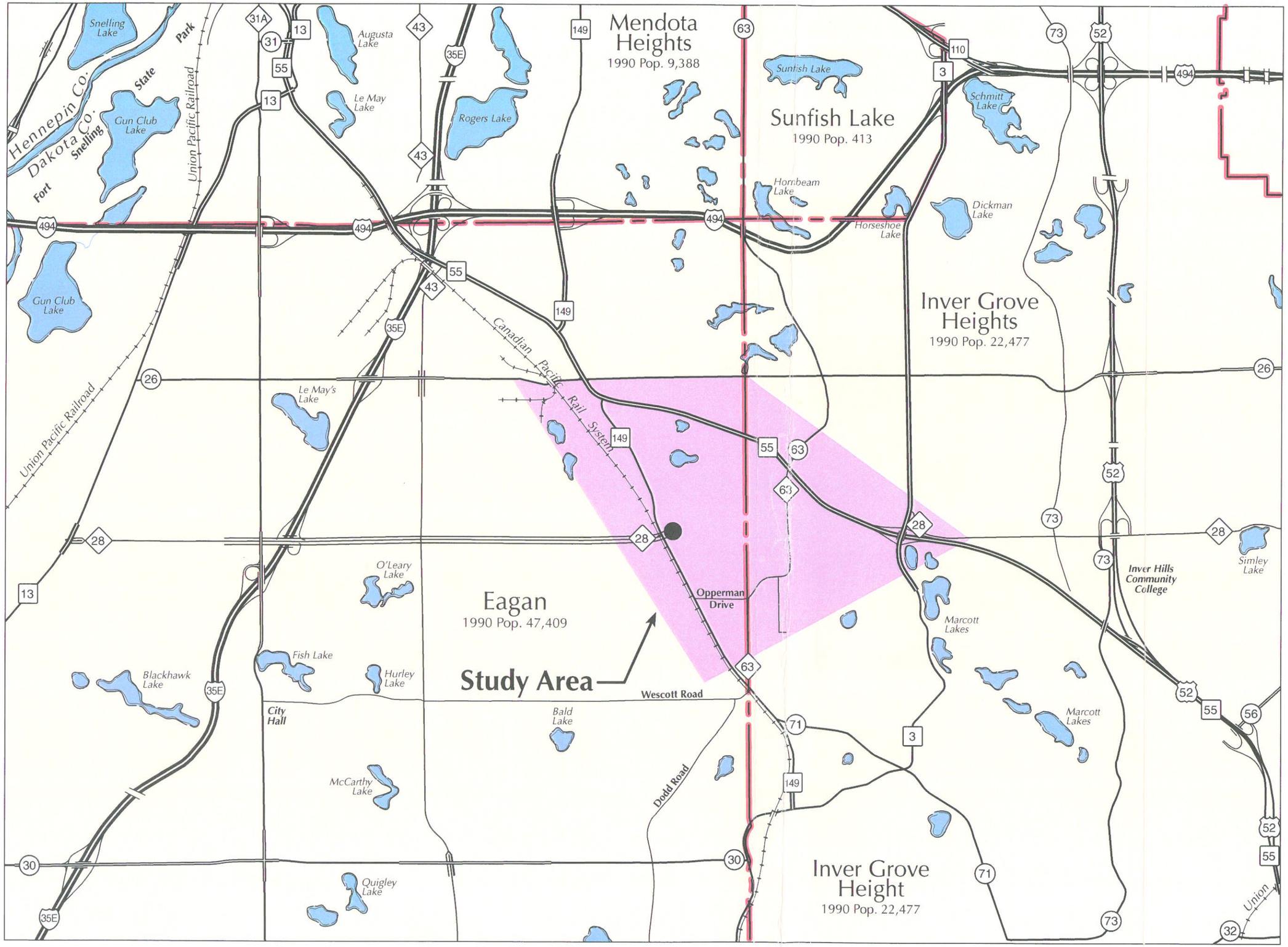
Preliminary concept alignments were developed to complete the missing segment. These concepts were based on engineering evaluation, environmental constraints, community input, and neighborhood involvement.

Study Area

The CR 28 study area includes all the key roadways and intersections that would have the potential to experience a significant change in traffic demand due to the proposed CR 28 extension. The study area is bounded by Lexington Avenue in Eagan to the west, Babcock Trail in Inver Grove Heights to the east, Lone Oak Road (CR 26) to the north, and Wescott Road to the south. Key roadways, intersections, and the study area boundaries are illustrated on Figure ES-1.

Purpose and Need

The purpose of this study is to analyze traffic operating conditions on roadways surrounding the proposed CR 28 extension and identify a preferred solution that the public, state, regional, and local agencies can support.



County Road 28

Corridor Study

Figure ES-1

Study Area

city of eagan

ESEH

May 2000

Local trips are often forced onto higher speed, east-west roadways, such as TH 55.

The existing traffic volumes, derived from a number of count sources between 1996 and 1998, indicate that the study area roadways have experienced substantial growth over the past several years. The field observations and existing Level of Service (LOS) analyses indicate that the area roadway system is currently accommodating relatively heavy traffic volumes at unacceptable levels of operation.

Northern Dakota County contains few continuous east-west roadways. Currently, there is an eight-mile gap between the two existing east-west roadways connecting I-35E and TH 52. Additionally, these roadways lack traffic carrying capacity and land access. Local trips are often forced onto the higher speed, east-west roadways within northern Dakota County, contributing to acceleration/deceleration and resulting lower operating speeds along short segments. This speed differential limits capacity and is a major contributing factor to accident potential.

The Cities of Eagan and Inver Grove Heights continue to develop.

As the Cities of Eagan and Inver Grove Heights continue to develop, the need for cross county access will grow as well. The location of CR 28 is well positioned to appropriately serve the east-west travel originating from the center of these cities, provide access to the existing land in the study area, and improve access to the overall surrounding roadway system.

Public Involvement

Initiated at the onset of the study process, public and agency involvement have been essential in developing and screening alternatives for the future CR 28 extension. The involvement program has been structured around the technical group meetings and public outreach elements listed below:

- Formation of a Project Management Team (PMT) to actively guide and participate in the development of the Corridor Study;
- Two project newsletters used to provide project information to the affected public;
- Two public meetings (the first to review the study process and gather input on the alternatives being considered, and the second to present the preferred alternative);
- A joint Council workshop between the Cities of Eagan and Inver Grove Heights; and
- A Dakota County Physical Development Committee meeting held to discuss initial study findings and potential solutions.

Development and Initial Screening of Alternatives

A full range of alternatives were developed for CR 28 between TH 149 in Eagan and TH 3 in Inver Grove Heights to provide options for a potential solution to the growing traffic congestion and accessibility

issues identified in the study area. An initial screening of these alternatives was based on public and agency feedback, and system planning issues (confusing geometrics, excessive cost, significant construction, and environmental impacts). Alternatives 1B, 6B, and 7 were retained for consideration after the initial screening evaluation process was completed. Alternative 7 was later dismissed by the PMT prior to completion of traffic forecasts as it became apparent that this alternative would have the least potential to satisfy east-west traffic demands. Alternative 9 was then developed as a hybrid of Alternatives 1B and 7 and became the third alternative retained for further study.

Existing Argenta Trail/TH 55 intersection.

Future Conditions

Three planned or programmed roadway improvements in the vicinity of the study area were considered in the estimation of future traffic volumes for the CR 28 Corridor Study. These projects include:

- Widening of CR 26 (Lone Oak Road) to a four-lane, divided roadway from TH 55 to Babcock Trail;
- Extension of CSAH 32 from CSAH 71 to TH 52/55; and
- Permanent signal installation at the intersection of TH 55 and CR 63 (Argenta Trail). Future traffic control for this intersection will depend on the recommendations of the CR 28 Corridor Study.

Future traffic volumes were prepared for the 2020 No Build and Build Alternative conditions. The forecasted traffic volumes were based on a typical reconstructed four-lane divided roadway design (the actual roadway design will be determined during preliminary design). Future traffic volumes were then utilized in the operational analyses of the study area intersections. A summary of the future traffic volume and operational analyses results are listed below:

- Year 2020 traffic volumes indicate substantial traffic volume growth on study area roadways (with an average annual growth rate of 3 percent to 4 percent depending on roadway facility and segment location).
- Build Alternatives with direct connections attracted higher traffic volumes (Alternatives 1B and 9); those with indirect connections attracted lower traffic volumes (Alternatives 6B and 7).
- The quality of operations at most of the key study area intersections is expected to be over capacity (LOS "F") under Year 2020 No Build and Build Alternative conditions.

Because of the above results, the future condition operational analysis does not provide a valuable comparison between alternatives, but does indicate the inadequacy of the existing/programmed roadway network to accommodate future travel demands.

Technical Evaluation of Alternatives

A set of evaluating criteria was established by the PMT to reflect the key issues within the study area and to provide the technical means for screening the remaining alternatives. The technical evaluation process consisted of applying the evaluation criteria against the three remaining alternatives to aid in the selection of the preferred alignment.

Alternative 9 was selected as the preferred alternative for the CR 28 extension (Figure ES-2). It optimizes system planning objectives and minimizes impacts upon the built environment. However, due to funding limitations, implementation of the preferred alignment can be staged over time, with the first stage providing a connection from TH 149 to CR 63. Therefore, at the request of Mn/DOT, traffic volume projections and operational analyses of the TH 55/CR 63 intersection have been performed for the staged preferred alternative for the year 2010. These analyses indicate that improvements are needed to provide for acceptable levels of service at the intersection.

Summary of Study Recommendations

1. **Select the Preferred Alternative**
   It is recommended that local, regional, and state agencies approve the recommended design concept - **Alternative 9** - which provides for a four-lane, divided roadway extending from TH 149 to TH 3.

2. **Preservation of Right-of-Way**
   It is recommended that the Cities of Eagan and Inver Grove Heights, and Dakota County secure funding to acquire the necessary right-of-way for the CR 28 Corridor. Early right-of-way acquisition would maximize the ability to plan future development in the area and minimize impacts on existing property owners who would otherwise be uncertain as to the long term status of their property. In addition, the cost of acquiring the land will be less if it is purchased in advance of any further development. This can be accomplished under the official mapping process, direct purchase or through the platting process.

3. **Develop Funding Strategies**
   There are a number of funding strategies that will lead to the implementation of the preferred alternative. A staged construction plan will spread the cost and sequencing of the project according to the magnitude of needs.

   The cost (based on a four-lane, divided roadway design) and recommended staging plan is listed as follows:


Stage 1 - TH 149 to Argenta Trail.

Stage 1 – 2002-2003 – TH 149 to Argenta Trail – $3,000,000
This first stage will make the logical connection to Argenta Trail and will provide access to TH 55. It is also recommended that upgrading the TH 55/CR 63 intersection include two shared through traffic lanes (northbound and southbound) in the first stage of project construction. The cost for this upgrade (not included in the $3 million above) is estimated to be $750,000 (based upon a ¼-mile new four-lane construction length). This cost will be further refined during the preliminary design phase.

An application for Federal Surface Transportation Program funds was submitted by Dakota County in September 1999. Stage 1 of the project was approved for funding by the Transportation Advisory Board. This stage of the project will be funded with a combination of 80 percent federal funds ($2,400,000) and match of 20 percent with Dakota County, City of Eagan, and City of Inver Grove Heights funding contributions.

Stage 2 – 2002-2003 – Argenta Trail to TH 3 – $2,300,000
The second stage will likely be timed with the development of the property in the northwest quadrant of the intersection of TH 55 and

TH 3. When completed, this stage will provide a continuous route from TH 149 to TH 3 with a signalized intersection at TH 55.

Stage 3 – 2003 or later – TH 55 Interchange – $4,200,000
This final stage will occur as traffic volumes increase and the capacity of the TH 55 intersection is exceeded. Funding for this stage will rely on Mn/DOT participation and regional funding through a TEA-21 funding application.

Relocations – $1,100,000
Five to six relocations will be necessary for the project.

It is recommended that representatives from each agency on the PMT continue to meet to address funding mechanisms and implementation strategies. Local agencies should place the preferred alternative in official Capital Improvement Programs (CIP) or in Transportation Plans to make them eligible for funding. In addition, cost participation strategies will need to be made by Mn/DOT's Cost Participation Scoping Committee so the Cities, County, and Mn/DOT will need to determine appropriate levels of participation.

It is also recommended that Dakota County pursue TEA-21 funding for Stage 3, the TH 55 interchange.

Corridor Study

County Road 28

Dakota County, Minnesota

SEH No. A-DAKOT9504.02

July 2000

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1.0 Project Background

1.1 Report Purpose

The purpose of this report is to present the process and recommendations associated with the future County Road (CR) 28 Extension roadway corridor in the communities of Eagan and Inver Grove Heights, Minnesota. Dakota County, the Cities of Eagan and Inver Grove Heights and the Minnesota Department of Transportation (Mn/DOT) participated in the development of the CR 28 Corridor Study. The study was initiated to determine if a need exists for an east-west roadway connection of CR 28 (Yankee Doodle Road) between Trunk Highway (TH) 149 in Eagan and TH 3 in Inver Grove Heights, and if so, which preliminary concept alignment developed for the project best satisfies the need to become the preferred alternative. The preferred alternative is then recommended for detailed feasibility and environmental studies, and ultimately design and construction.

Dakota County first identified the need for an east-west CR 28 connection in its 1974 Thoroughfare Plan and later in its 1982 Comprehensive Plan. In 1994, the County and Cities began discussing the possibility of constructing the missing segment of CR 28. A public open house was held to kick off the project and receive public input. It was determined that the purpose and need for the project would have to be more clearly defined to communicate and implement a solution to the problem. A partnership was formed between Dakota County, the Cities of Eagan and Inver Grove Heights, and Mn/DOT in 1995 to define the purpose and need for the project and develop alignment alternatives for CR 28. In 1996, Short Elliott Hendrickson Inc. (SEH) was hired to conduct the study.

CR 28 is an east-west roadway that begins at TH 13 in Eagan and ends at CR 56 (Concord Boulevard) in Inver Grove Heights. With the exception of the missing segment between TH 149 in Eagan and TH 3

(South Robert Street) in Inver Grove Heights, the roadway extends from the west county line to the east county line.

The City of Eagan is in the process of updating its Comprehensive Plan. The City of Inver Grove Heights' Comprehensive Plan has recently been completed. These plans provide guidance for local development through the year 2020 and provide additional useful information for the Corridor Study. The outcome of the CR 28 Corridor Study correlates with the Comprehensive Plans for the cities.

1.2 Study Purpose and Need

Local trips are often forced onto higher speed, east-west roadways, such as TH 55.

The purpose of the study was to analyze traffic operating conditions on roadways surrounding the proposed CR 28 extension to identify a preferred solution that the public, state, regional, and local agencies could support.

Northern Dakota County contains few east-west roadways that provide a continuous east-west path. Most of these roadways lack traffic carrying capacity and land access. Currently, there is an eight-mile gap between the two existing east-west roadways connecting I-35E with TH 52. Local trips are often forced onto the higher speed roadways to utilize the closest, east-west roadway. Localized trips contribute to acceleration/deceleration and lower speeds over short segments of these roadways. This speed differential limits capacity and is a major contributing factor to accident potential.

The proposed CR 28 connection will provide access to the existing land uses in the study area. The Comprehensive Plans for the Cities of Eagan and Inver Grove Heights reflect an expansion of the Metropolitan Urban Service Area (MUSA) line and future development for the study area. This extension of CR 28 would provide access to adjacent properties and improve access to the overall surrounding roadway system.

As the Cities of Eagan and Inver Grove Heights continue to develop, the need for local and regional access will grow as well. CR 28 is well positioned to appropriately serve the east-west travel originating from the center of these cities.

1.3 Public Involvement

Public and agency participation was an important element of the CR 28 Corridor Feasibility Study. A Project Management Team (PMT) was established early in the study and met frequently to provide direction and input into the study process. The PMT included members from Dakota County, the City of Inver Grove Heights, the City of Eagan, and Mn/DOT. In addition, a Joint Council meeting between the Cities of Eagan and Inver Grove Heights, and a Dakota County board meeting was held to discuss initial study findings and potential alternatives.

Two public meetings were held during the study. The first was held Thursday, March 18, 1999 to review the study process and gather input on the alternatives being considered. In an attempt to maximize public participation in the project, study newsletters were mailed to residents within the potentially affected area. Approximately 100 people attended the meeting, and 49 comments were received. The primary concerns expressed were related to potential residential and environmental impacts. In addition to the 49 comment cards received, a letter signed by 27 Inver Grove Heights and Eagan residents was submitted on March 28, 1999. In addition to the previously stated concerns, these residents expressed support for an alternative submitted by a fellow resident, Mr. Dean Franke. A summary of the comments from this meeting is included as Appendix H.

Mr. Franke's alternative was reviewed and studied to determine its feasibility. His alignment rerouted CR 28 to follow TH 149 north to TH 55, then crossing over and paralleling TH 55 east to TH 3. While this alternative would have the benefit of completely avoiding the Rolling Hills neighborhood, there are many disadvantages and technical issues associated with Mr. Franke's proposal. (The evaluation of this alternative is profiled in Section 3.4 of this report. A complete review is included in accompanying Appendix B).

The second public meeting was held on August 18, 1999, with approximately 100 people attending. Input from both meetings was helpful in defining an exhaustive range of project alternatives.

A third public meeting will be scheduled in summer 2000 to specifically discuss the preferred alternative (Alternative 9).

County Road 28 Corridor Study

Figure ES–2: Preferred Alternative Stages

07/18/00

SCALE: 1" = 700'

400 0 400

scale feet

SEH

Stage 1

Stage 2

Stage 3

Tight Half-Diamond Interchange

Courthouse Blvd.

Eagan

Inver Grove Heights

149

55

3

28

63

Legend

- Alternative 9 Stage 1
- Alternative 9 Stage 2
- Alternative 9 Stage 3
- 150–foot Right–of–Way

2.0 Existing Conditions

2.1 Land Use and Population Growth Trends

The Cities of Eagan and Inver Grove Heights continue to develop.

Land use and area growth trends in the corridor were investigated to help determine potential traffic volume changes and assess possible development impacts in the study corridor.

Both the Cities of Eagan and Inver Grove Heights have experienced strong growth rates during the past 18 years, with significant growth percentages during the 1980s. Data from the U.S. Census shows that Inver Grove Heights grew by nearly 31.0 percent during the 1980s, while Eagan more than doubled its population, growing by 129.0 percent.

Estimates compiled by the Metropolitan Council in 1999 show that second and third tier developing suburban communities have continued to experience substantial population gains during the first half of the 1990s. Population in Inver Grove Heights grew from 22,477 in 1990 to 29,151 in 1998, while Eagan's population during those years grew from 47,409 to 60,073. Inver Grove Heights, although expected to experience a slight slowdown during the first 20 years of the next decade, is forecasted to experience stable growth of 20 percent each decade over the next 20 years. This is due primarily to the substantial amount of land remaining available for housing development. Eagan, which experienced very rapid growth during the 1980s, is projected to plateau during the 2000s because of the diminishing supply of land for new residential development. Approximately 95 percent of the residentially zoned lands are developed. As such, the population of Eagan will continue to grow, but at a slower rate than previously experienced. Overall, population growth is forecast to increase at an average annual rate of 3 percent from the year 2000 to 2020. This compares with a 200 percent increase from 1980 to 2000.

A portion of the growth in the area will occur adjacent to the CR 28 extension corridor. Much of the land in this area is comprised of undeveloped commercial/industrial zoned parcels and low density residential areas. The large parcel north of TH 55 between Argenta Trail and TH 3 is currently used as a gravel mine and is zoned for commercial/industrial use. The CR 28 extension would provide access to many of these parcels.

2.2 Traffic Operations Analysis

Detailed documentation of the traffic operations analysis, including traffic volume development, is provided in the Traffic Operations Analysis Report[1] conducted for the study. Key components of this study

[1] CR 28 Corridor Study, Traffic Operations Analysis Report, prepared by SEH, April 1999.

are documented in this report. The complete study is appended to this document in Appendix C.

2.2.1 Existing Traffic Volumes

Several sources have been used to derive 1999 existing p.m. peak hour traffic volume conditions which represent a reasonable operational analysis condition for the CR 28 Corridor Study. These sources include the following:

- Weekday p.m. peak period counts conducted by SEH in September-October 1996.
- Weekday p.m. peak hour traffic volumes from the TH 55 Access Management Study conducted by SRF.
- Mn/DOT tube counts conducted in 1997 and 1998.
- Mn/DOT daily volumes from the 1996 traffic flow maps.

The above information indicates that the study area roadways have been experiencing substantial traffic volume growth in recent years, emphasizing the importance of deriving the most current volumes possible for analysis in this report. Figure 1 shows current Average Daily Traffic (ADT) levels.

2.2.2 Observed Operating Conditions

Field observations of existing traffic operations were conducted during the p.m. peak period to gain insight into actual traffic operations. This technique is used to ensure the operational analysis software tools are calibrated to correlate with actual field operating conditions.

Generally, area roadways currently accommodate existing traffic volumes adequately with only minor congestion. All vehicles waiting on red were observed to pass through the intersections on a single signal cycle. This indicates that signalized intersections of the area accommodate fairly heavy traffic volumes during the peak hour with relative efficiency.

There are a number of observed operational deficiencies on study area roadways that could deteriorate as traffic volumes increase in the future. These deficiencies are described as follows:

1. TH 149: This road is a two-lane, "A" minor arterial road with wide shoulders and average pavement conditions (bituminous).

   Observed Deficiencies:
   Speeds were in the range of 45 mph. The offset intersections of Wescott Road and Baffin Road, with TH 149 create multiple turning movement paths to travel between these two facilities (i.e., those turning north onto 149 from Wescott Road immediately turn right onto Baffin Road to continue north on Argenta Trail). Long delays were observed for vehicles accessing TH 149 from these side streets.

   The intersection of TH 149 and TH 55 was observed to process heavy traffic volumes including the following movements: the northbound left turn from TH 149 to TH 55 westbound, and the southbound right turn from TH 149 eastbound to TH 149 southbound.

2. Opperman Drive: This street is a two-lane, neighborhood collector that serves as a major access for the UPS regional distribution center, the YMCA, and access to West Publishing.

   Observed Deficiencies:
   Opperman Drive was observed to experience steady traffic activity, especially for the eastbound traffic turning left to Argenta Trail northbound. Backup queues in the range of five vehicles were noted for this movement. The Opperman Drive and TH 149 intersection processes heavy volumes on all four approaches.

Argenta Trail - Winding/rolling alignment, limited sight distance.

3. CR 63 (Argenta Trail): This street is a two-lane, neighborhood collector with a winding/rolling alignment and narrow shoulders, steep ditch slopes, deteriorating pavement condition (bituminous with seal coat), and limited sight distance along curves. Residential access drives are prevalent north of Opperman Drive. These factors result in low operating speeds. Speeds were observed in the 45 mph range.

   Observed Deficiencies:
   Several deficiencies were observed at the intersection of Argenta Trail with TH 55. Single lane approaches on Argenta Trail limit side street capacity at the TH 55 traffic signal. This creates long vehicle queues on the Argenta Trail approaches. Right turns bypass on gravel shoulders (especially northbound), as evidenced by existing worn turf areas adjacent to the pavement. The intersection pavement is in poor condition. The crest vertical curve on TH 55 to the west of the intersection inhibits sight distance especially for the northbound Argenta Trail right turn movement. The traffic signal is a temporary installation with cable and wood pole span mounts (see subsequent planned improvement discussion).

Existing Argenta Trail intersection. Note absence of right turn lane.

TH 55.

4. TH 55: This road is a four-lane, principal arterial divided highway, with good pavement condition (concrete), and designed for high speed (55 to 65 mph). East of Argenta Trail, TH 55 becomes an expressway facility with grade-separated intersections. From Argenta Trail to the west, TH 55 is characterized by signalized control at major intersections.

   Observed Deficiencies:
   None noted.

5. TH 3: Two-lane, "A" minor arterial with good pavement condition in the TH 55 interchange area and in the segment to the north.

   Observed Deficiencies:
   South of TH 55, the TH 3 pavement condition is poor. The roadway experiences variable speeds (40 to 55 mph) caused by the winding alignment and vertical curves that limit sight distance. In addition, this segment of TH 3 has steep side slopes and guard rails that also limit operating speeds and sight distance.

2.2.3 Level of Service Analysis

Level of Service (LOS) is a concept that describes how well an intersection or corridor operates. It is described in terms of letters that range from LOS "A", indicating the best traffic operation with vehicles experiencing minimal delays, to LOS "F", indicating over capacity or a breakdown of traffic flow. LOS ratings "A" through "D" are considered acceptable for operational analysis purposes. An "E" rating indicates that the intersection or corridor is operating at or very near capacity and that vehicles may experience substantial delays. The existing conditions intersection operational analysis results are summarized in Table 1. As indicated by Table 1, all of the signalized intersections operate at LOS "D" or better.

Table 1
Operational Analysis Summary for the Proposed County Road 28 Extension
1999 Existing P.M. Peak Condition

Signalized Intersection	Average Delay (sec/veh)	Intersection LOS*
TH 55 & TH 149	14.4	B
CR 28 (Yankee Doodle Road) & TH 149	27.2	D
Opperman Drive & TH 149	25.2	D
TH 55 & CR 63 (Argenta Trail)	15.8	C

* Level of Service
Note: Delay calculation is meaningless for volumes exceeding capacity by more than 20 percent.

Unsignalized Intersection	Average Delay (sec/veh)	Intersection LOS*
TH 55 EB & TH 3 (South Robert Trail)	1.0	C
TH 55 WB & TH 3 (South Robert Trail)	0.4	C
Rolling Hills Drive & TH 149	1.2	F
TH 149 & Baffin Road	6.0	F
Wescott Road & TH 149	28.8	F
CR 28 (Yankee Doodle Road) & TH 3 (South Robert Trail)	0.2	B
CR 26 & CR 63 (Argenta Trail)	8.7	B
77th Street & CR 63 (Argenta Trail)	0.3	B
Opperman Drive & CR 63 (Argenta Trail)	5.1	C

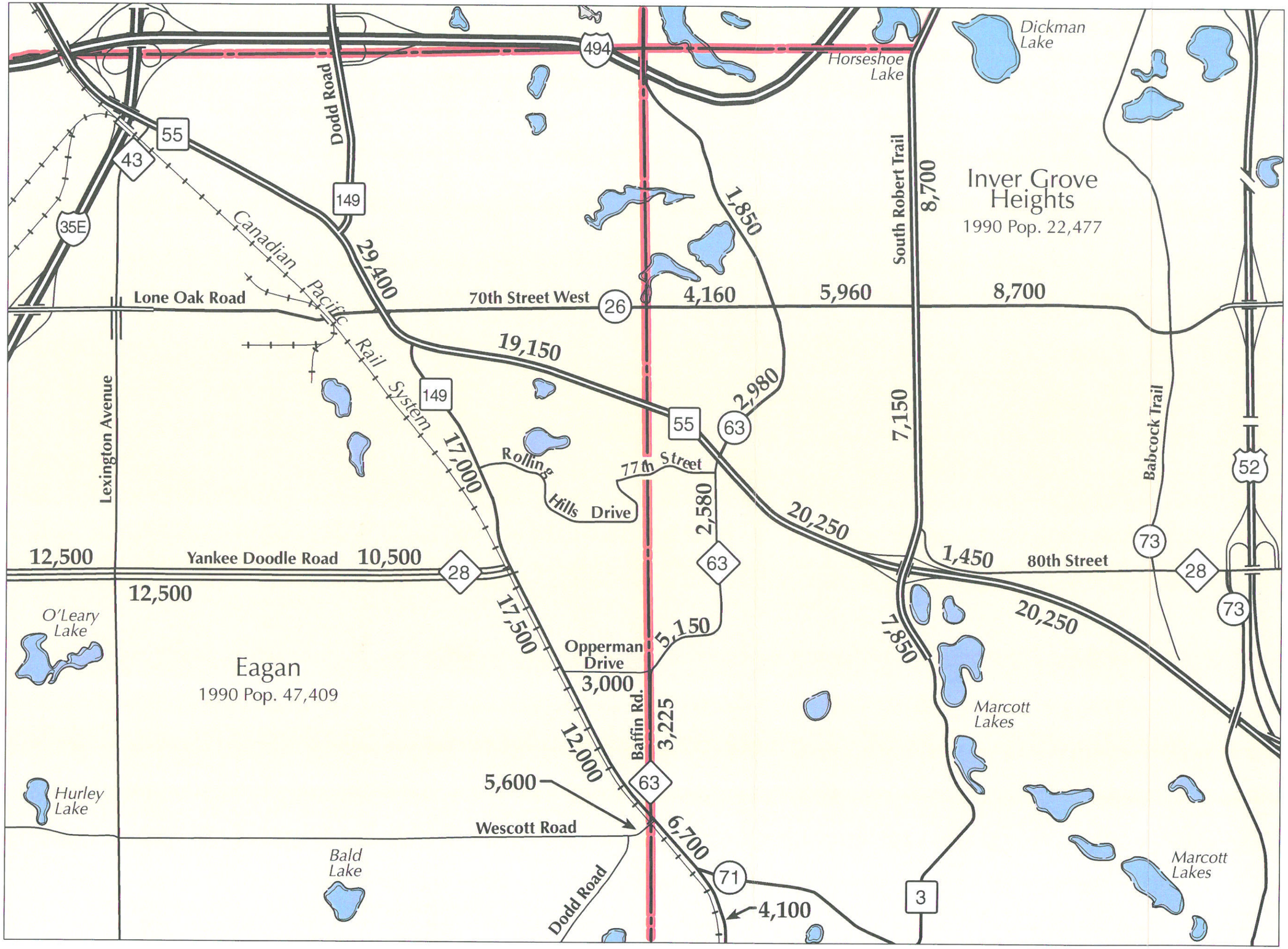
* Level of Service
Note: The calculated value was greater than 999.9 sec/veh.

Table 1 indicates that six of the nine unsignalized intersections analyzed currently operate at LOS "C" or better. The analysis indicates that the remaining three intersections all operate at LOS "F". These include all three of the TH 149 intersections under side street stop control; Rolling Hills Drive, Baffin Road, and Wescott Road. The poor operations are due to the difficulty side street movements (especially left turns) have in entering the arterial through traffic flow.

These analysis results match with field observations during which vehicles waited an average of 90 seconds to access TH 149 from Baffin Road and Wescott Road. Operations at Rolling Hill Drive did not appear as poor as the analysis indicates. This may be due to proximity of the CR 28 and TH 55 intersections north and south of Rolling Hills Drive, which create gaps in through traffic flow and provide opportunities for side street vehicles to enter TH 149. In addition, the low traffic demand for the left turn movement of only 20 vehicles during the p.m. peak hour also limits the congestion experienced at this intersection.

It should be noted that it is not unusual for low volume residential street intersection approach traffic to experience significant delays when entering high volume arterial facilities. However, this condition does emphasize the importance of access management strategies for heavily traveled arterial facilities, such as TH 149 with the goal of providing access to land use via major signalized cross streets to the primary facility.

Based upon existing conditions, observations, and operational analysis results, the area roadway system is currently accommodating relatively heavy traffic volumes at acceptable levels of operation. The observations and analysis also indicate that the signalized intersections are nearing capacity with many of the peak hour signal cycles "fully loaded" with vehicle movements. This means that the quality of operations at area intersections will be highly sensitive to traffic volume increases in the future.



County Road 28

Corridor Study

Figure 1

Existing 1999 Daily Traffic Volumes

May 2000

3.0 Development and Initial Screening of Alternatives

This section provides a description of the process used in developing the full range of alternatives for a CR 28 extension.

3.1 Alternatives Development

A full range of alternatives was evaluated to compare the anticipated impacts from construction with the built, social, and natural environments. The screening process for the alternatives was based on technical evaluation and assessment of the public feedback received during the two public information meetings.

The first public meeting was held to review the study process and to gather input on the alternatives being considered. In addition, a joint Eagan/Inver Grove Heights City Council workshop and Dakota County Physical Development Committee meeting was held to discuss initial study findings. The input received at these meetings was helpful in defining an exhaustive range of alternatives.

3.2 Initial Screening Evaluation

In 1997, eight Build Alternatives were proposed. Alternatives 1, 2, 3, and 6 each contained two subalternatives, for a total of 12 Build Alternatives (plus the No Build) for initial review. After reviewing the feedback received during the first public meeting, the Joint Council meeting and the Dakota County Board meeting, the PMT assessed the relative merits of each of the alternatives presented. The PMT initially dismissed nine of these alternatives from further consideration based on public input, confusing geometrics, excessive cost, and significant construction, social and environmental impacts. These 12 Build Alternatives are graphically depicted in Appendix A.

Alternatives 1B and 6B were retained for consideration as part of the technical evaluation. As the result of further work by the PMT, two new alternatives were developed to respond to the issues identified in the initial alternative screening analysis. Alternative 7 was developed as a minimal impact option to minimize land use impacts. Alternative 9 was developed as a hybrid of Alternatives 1B and 7.

Alternative 7 was later dismissed by the PMT prior to completion of traffic forecasts. Due to the lack of east-west continuity with the right angle intersection at Argenta Trail and the north-south curving alignment, it became apparent that this alternative would have the least potential to serve future east-west traffic demands.

Therefore, Alternatives 1B, 6B, and 9 became the final alternatives from which a preferred alternative would emerge.

3.3 Evaluation of a Locally Proposed Alternative

A local resident, Mr. Dean Franke, proposed an alternative which rerouted CR 28 to follow TH 149 north to TH 55, with a crossing and parallel route of TH 55 east to TH 3. The PMT considered Mr. Franke's proposal and requested a study of the alternative to determine its feasibility. While this alternative would have the benefit of completely avoiding the Rolling Hills neighborhood, there are many disadvantages and technical issues associated with Mr. Franke's proposal.

Adjustments to the layout as proposed by Mr. Franke were required to create a safe, constructible design. With these adjustments, it became clear that the Franke proposal would take a greater amount of land than anticipated. Access to adjacent land uses surrounding the TH 55 interchange would become precluded by the grade-separated highways. As proposed, specific findings of the Franke proposal technical analysis included the following:

1. Due to elevation differences, the ramp connection to TH 55 would not be feasible.
2. Direct access to TH 149 would not be feasible between TH 55 and Rolling Hills Drive.
3. The Lone Oak Road connector (as shown in the concept) would not be feasible.
4. The "side by side" arrangement of TH 55 and the proposed connector roadway would be expensive to implement and visually unappealing.
5. The grade separation of Argenta Trail would preclude access to adjacent land uses and 77th Street.
6. A single T-type intersection at existing CR28 (Yankee Doodle Road) and the connector would be more desirable intersection configuration. However, this would reduce the connectivity between CR 28 and TH 149.

This alternative received a similar level of analysis as other alternatives considered. However, due to its numerous deficiencies, it was dismissed from further consideration.

The technical review is included in accompanying Appendix B.

4.0 Future Conditions

4.1 Planned Improvements

Three planned or programmed roadway improvements in the vicinity of the study area were considered in the estimation of future traffic volumes for the CR 28 Corridor Study. These projects include:

- Widening of CSAH 26 (Lone Oak Road) to a four-lane, divided roadway from TH 55 to Babcock Trail;
- Extension of CSAH 32 from CSAH 71 to TH 52/55; and,
- Permanent signal installation at the intersection of TH 55 and CR 63 (Argenta Trail). Future traffic control for this intersection will depend on the recommendations of the CR 28 Corridor Study.

Future traffic volumes were prepared for the 2020 No Build and Build Alternative conditions and are detailed in Appendix C. The forecasted traffic volumes were based on a typical reconstructed four-lane divided roadway design (the actual roadway design will be determined during preliminary design). Future traffic volumes were then utilized in the operational analyses of the study area intersections. A summary of the future traffic volume and operational analyses results are listed below:

- Year 2020 traffic volumes indicate substantial traffic volume growth on study area roadways (with an average annual growth rate of 3 percent to 4 percent, depending on roadway facility and segment location).
- Build Alternatives with direct connections attracted higher traffic volumes (Alternatives 1B and 9); those with indirect connections attracted lower traffic volumes (Alternatives 6B and 7).
- The quality of operations at most of the key study area intersections is expected to be over capacity (LOS "F") under Year 2020 No Build and Build Alternative conditions.

Because of the above results, the future condition operational analysis does not provide a valuable comparison between alternatives, but does indicate the inadequacy of the existing/programmed roadway network to accommodate future travel demands.

The CSAH 26 and CSAH 32 improvements are relevant in their potential affect on study area traffic volumes and were assumed to be in place in the development of future traffic volume conditions.

There are three additional improvements recommended in the Inver Grove Heights Comprehensive Plan related to the MUSA expansion that would have a substantial affect on study area roadway network volumes. Because these recommendations are currently at a preliminary level, they

have not been assumed to be in place in deriving future traffic volumes. The MUSA expansion recommendations include:

- TH 3 widening to four lanes from the TH 55 interchange to Upper 55th Street;
- Access related improvements in the CSAH 26 (70th Street)/TH 3 intersection area; and,
- A new Argenta Trail alignment with interchanges at I-494 and TH 55.

4.2 Year 2020 No Build Traffic Volumes

The year 2020 was chosen by the PMT as the future design year condition and will be used to assess the implications of the project on traffic flow throughout the study area in conformance with a 20-year planning horizon. The No Build condition provides a basis for comparison between the base transportation network and the proposed improvement under future volume conditions.

Growth factors were applied to the existing intersection turning movement volumes to derive the 2020 "No Build" volumes. The growth factors were determined by comparing the existing ADT to the 2020 forecast ADT and computed from the traffic modeling results. The existing and 2020 No Build ADT volumes are summarized in Figures 1 and 2.

In comparing the existing and 2020 No Build daily volumes, it is evident that substantial growth can be expected on CR 28 study area roadways. The 2020 volumes represent an average annual growth rate of 3 to 4 percent depending on roadway link. This is well above the metropolitan area average of 1 to 2 percent and is an indication of the planned land use development for the area.

It should be noted that a detailed analysis of travel path orientation was conducted for traffic expected to use the CR 28 extension links. Adjustments were made based on the PMT's knowledge of regional and study area roadway network operations to provide the most reasonable estimate of traffic volumes possible.

4.3 Year 2020 No Build Operational Analysis Results

The 2020 No Build operational analysis results indicate the quality of operations at virtually every major intersection in the CR 28 study area is expected to be poor, most operating at a LOS "F". In general, minor street left turn movements under unsignalized operations control the LOS of the intersection.

These results illustrate the magnitude of the expected growth in the area and the importance of implementing roadway system network improvements to accommodate future increased traffic volumes.

4.4 Preferred CR 28 Extension Plans

The CR 28 PMT initially selected two of the CR 28 extension alternatives for the traffic operations assessment.

The intent of this selection was to assess two representative alternatives that have varying affects on traffic flow through the study area. The analysis results are then used to assess the remaining alternatives so that the operational analysis results can be factored into the final alternative screening process. Alternatives 1B and 6B provide a range of characteristics in terms of alignment location, east-west continuity and Argenta Trail treatment (i.e., full signalized intersection with TH 55 compared to the elimination of TH 55 access).

Upon its development, Alternative 9 was also chosen for traffic operations assessment. A detailed evaluation of the 2020 traffic forecasts for Alternative 9 appears in Appendix D. Per the staging process identified in the Study Recommendations section of this report, Stage 1 of Alternative 9 was also modeled with 2010 estimated traffic volumes. This analysis also included an operational analysis of the CR 63 and TH 55 intersection. The Stage 1 2010 forecast volumes analysis for Alternative 9 appears in Appendix E.

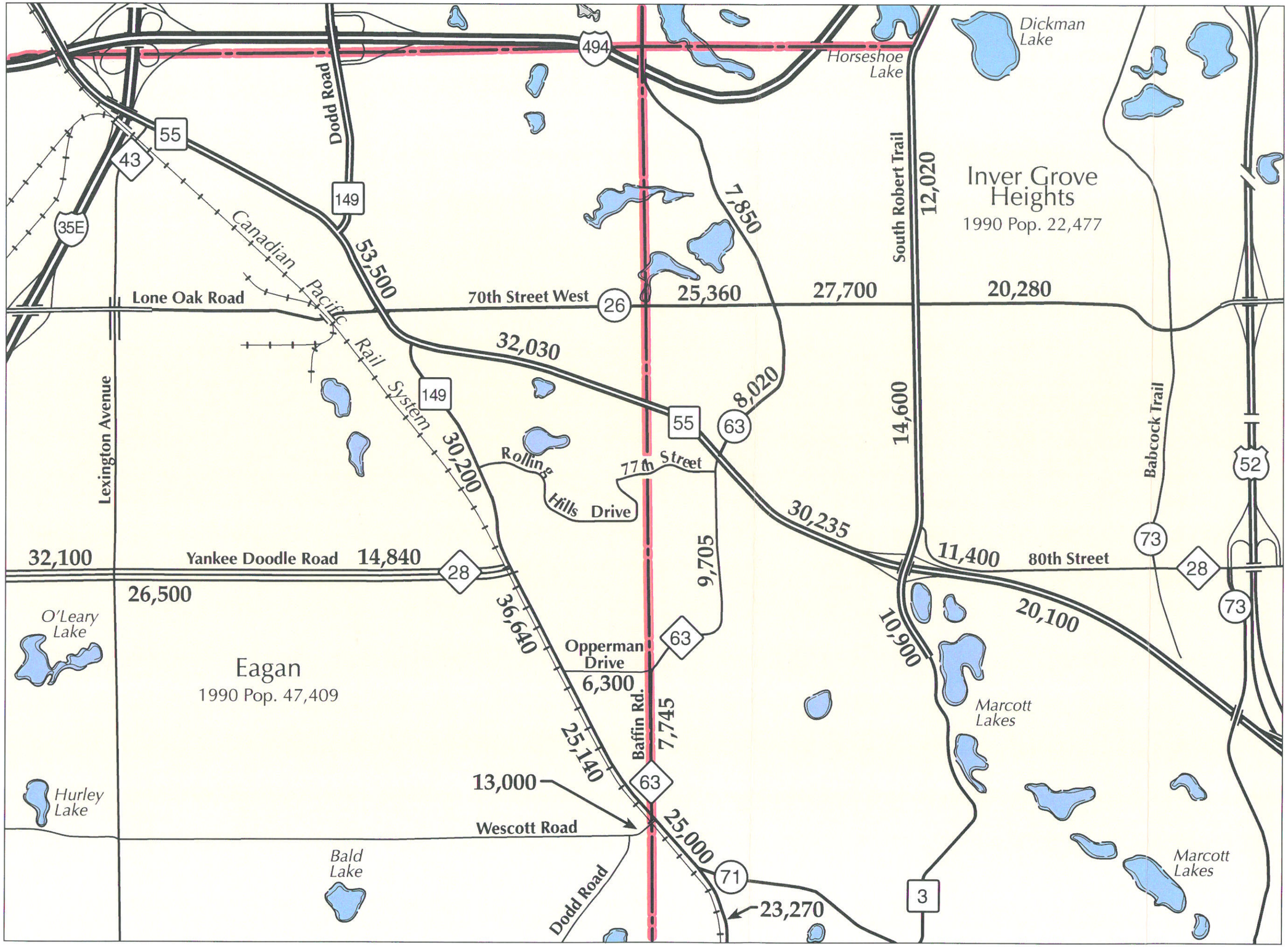
4.5 Year 2020 Build Traffic Volumes

The 2020 Build ADT volumes for the three retained alternatives are shown in Figure 3. The forecasted traffic volumes are based on the recommended four-lane, divided roadway design. The actual roadway design will be determined during preliminary design.

Because of the tremendous growth in the area and its future impact upon the operations of the existing roadway network, the alternatives cannot be compared based upon operational analysis results. The most viable information for comparison, therefore, becomes the forecasted traffic volumes under No Build and Build conditions.

As indicated in Figure 3, all of the Build Alternatives would provide some relief to the surrounding arterial facilities, all of which are expected to experience congested operations in the future. These arterials include TH 55, TH 149, Argenta Trail, and CR 26, as well as I-35E and I-494 (not shown in Figure 3).

Alternative 1B has the greatest potential to attract east-west trips followed by Alternatives 6B and 9. Although Alternative 7 was dismissed prior to an estimate of traffic volumes, it is apparent that Alternative 7 would have the least potential to serve east-west traffic demand. This is due to the combined north-south curving alignment and the break in continuity with the right angle intersection at Argenta Trail.



County Road 28

Corridor Study

Figure 2

2020 No-Build Daily Traffic Volumes

May 2000

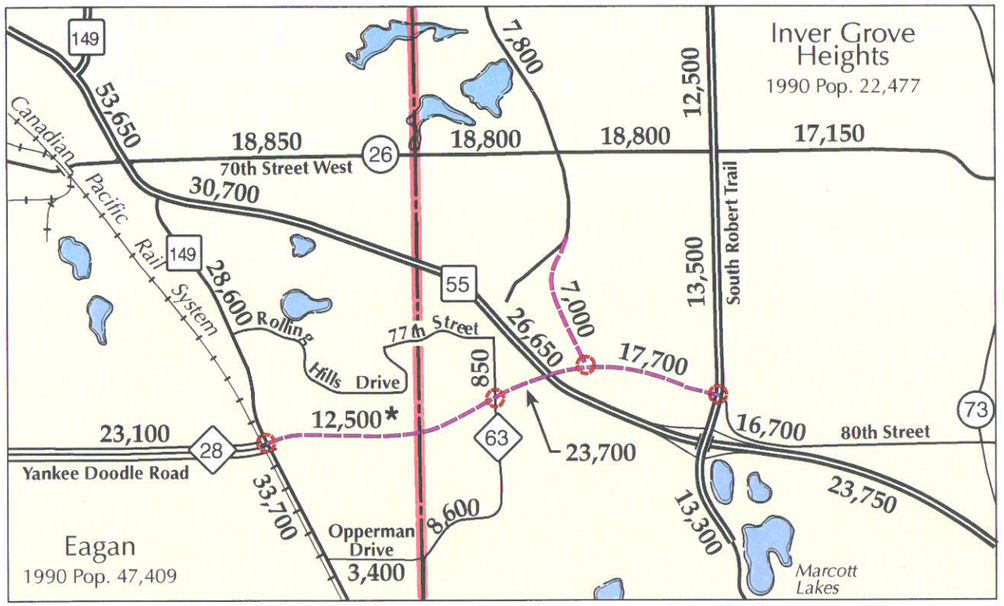
5.0 Evaluation of Final Three Alternatives

The evaluation process for the three final alternatives was a fairly complex blending of the goals, objectives, and responsibilities of the four agencies to balance the safety and mobility needs of the area with the impacts that the CR 28 extension would create.

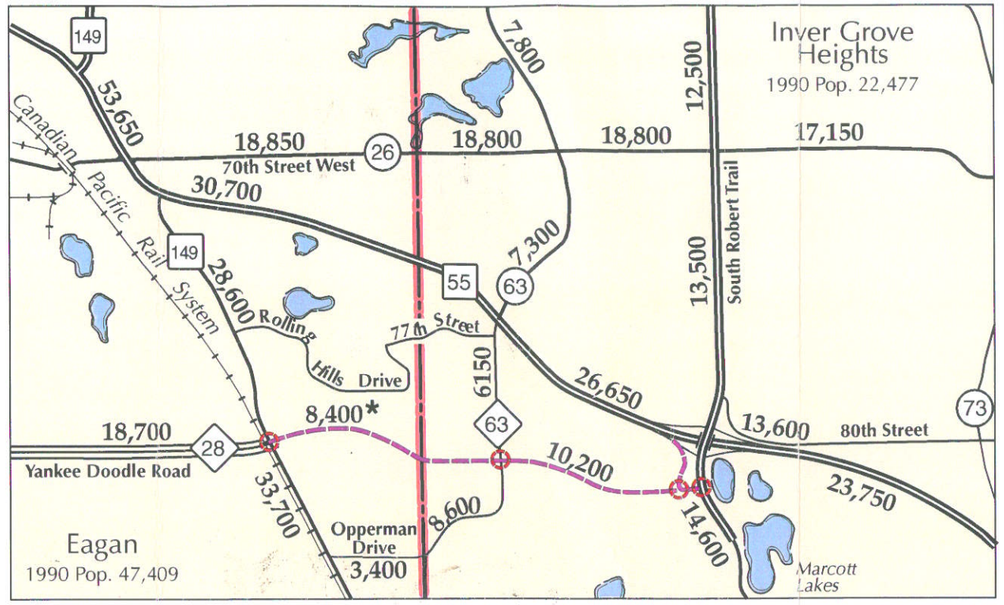
The three finalist alternatives were further screened by listing the comparative advantages and disadvantages of each, using a similar screening process as was completed for the initial alternatives, with supplemental analyses to aid in the selection of a preferred alternative. The evaluation of these alternatives led to the selection of a preferred alternative by the PMT. The key factors that led to the selection of a preferred alternative are presented following Table 2 and Figures 4, 5, and 6.

Table 2
Screening Evaluation of the Three Finalist Alternatives

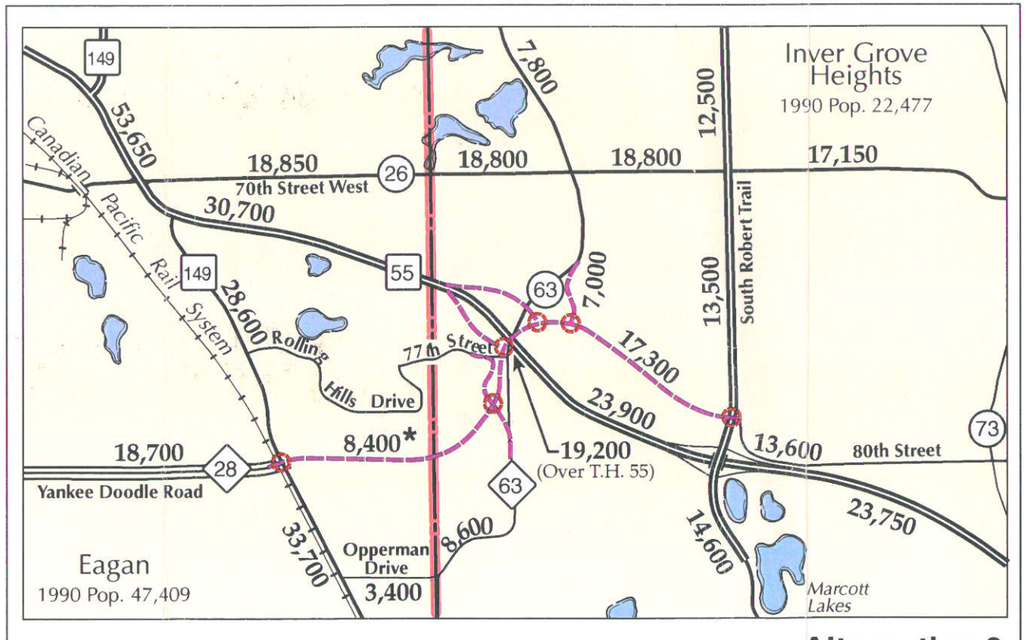
Criterion	Comparative Advantages & Disadvantages CR 28 Finalist Alternatives		
	1B	**6B**	**9**
1. East-west route continuity and capacity	A	D	A/D
2. TH 55 Corridor Integrity/Design Compatibility, Intersection Geometrics	A	D	A
3. Magnitude of Construction	A/D	A	D
4. Planned Land Use Compatibility	D	D	A
5. Accessibility Improvements	A/D	D	A
6. Residential Effects	D	A	D
7. Wetland/Natural Environment Effects	A	D	A
Decision: Retain as Preferred Alternative?	**NO**	**NO**	**YES**
Legend:	*(A) Advantage*	*(D) Disadvantage*	



Alternative 1B



Alternative 6B



Alternative 9

*** NOTE:** Southwest to Northeast trips using C.S.A.H. 32/T.H. 3 and I-35E/I-494 account for differences in C.R. 28 volumes.

County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary

Figure 3

2020 Build Conditions Daily Traffic Volumes

city of eagan

ESEH

May 2000

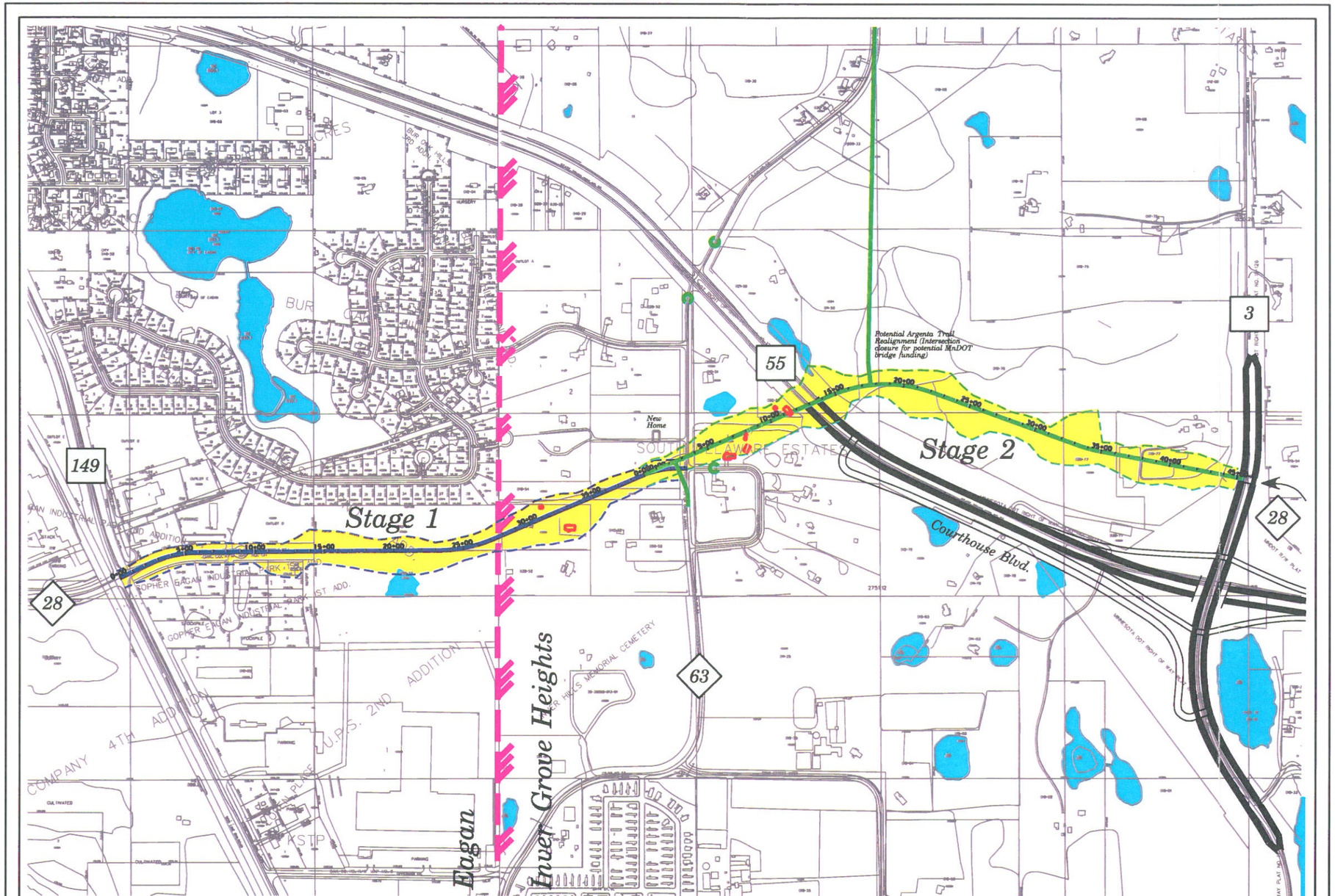
County Road 28 Corridor Study

Figure 4:
Alternative 1B
Stages

07/18/00

SCALE: 1" = 800'
400 0 400
feet

SEH



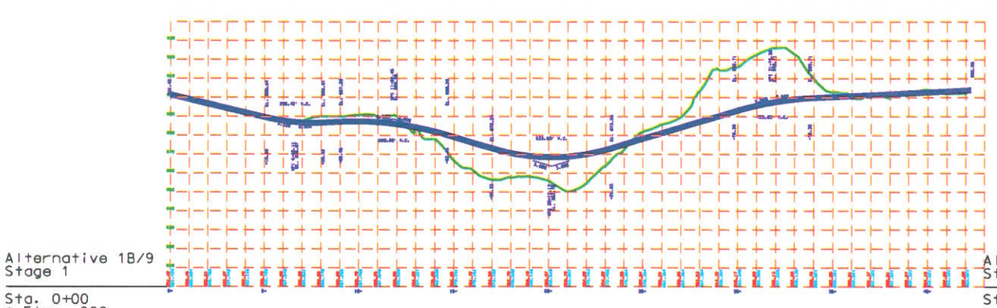
Legend

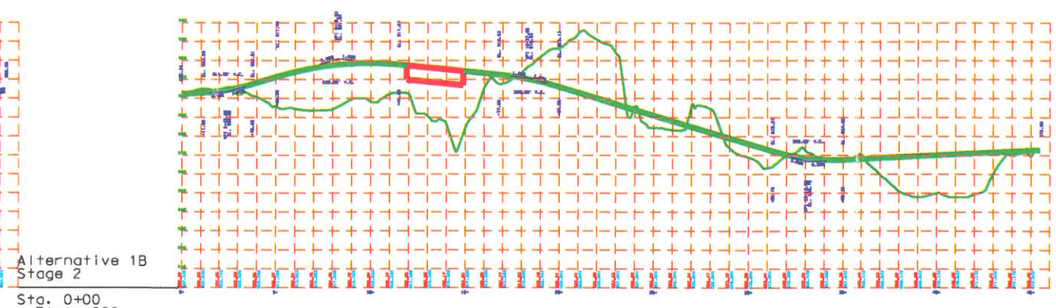
- Alternative 1B Stage 1
- Alternative 1B Stage 2
- Potentially Impacted Structure

Impacts

Alternative 1B/9 Stage 1	2 structures on 1 parcel 1 wetland Parcel impacted in Gopher Eagan Industrial Park
Alternative 1B Stage 2	5 structures on 2 parcels 1 wetland

**NOTE* Design Assumptions:*
Design Speed = 50 mph (30 mph if necessary approaching intersections)
e = 0.04
Maximum grade = 3%
Cross Section width of 130 feet (8' berm, 8' shoulder, 12' lane, 14' lane, 18' median, 14' lane, 12' lane, 8' shoulder, 8' berm, 8' bit. path, 20' berm)
4:1 slopes in cut and fill sections





County Road 28 Corridor Study

Figure 5: Alternative 6B

07/18/00

SCALE: 1" = 800'

800 0 800 scale feet

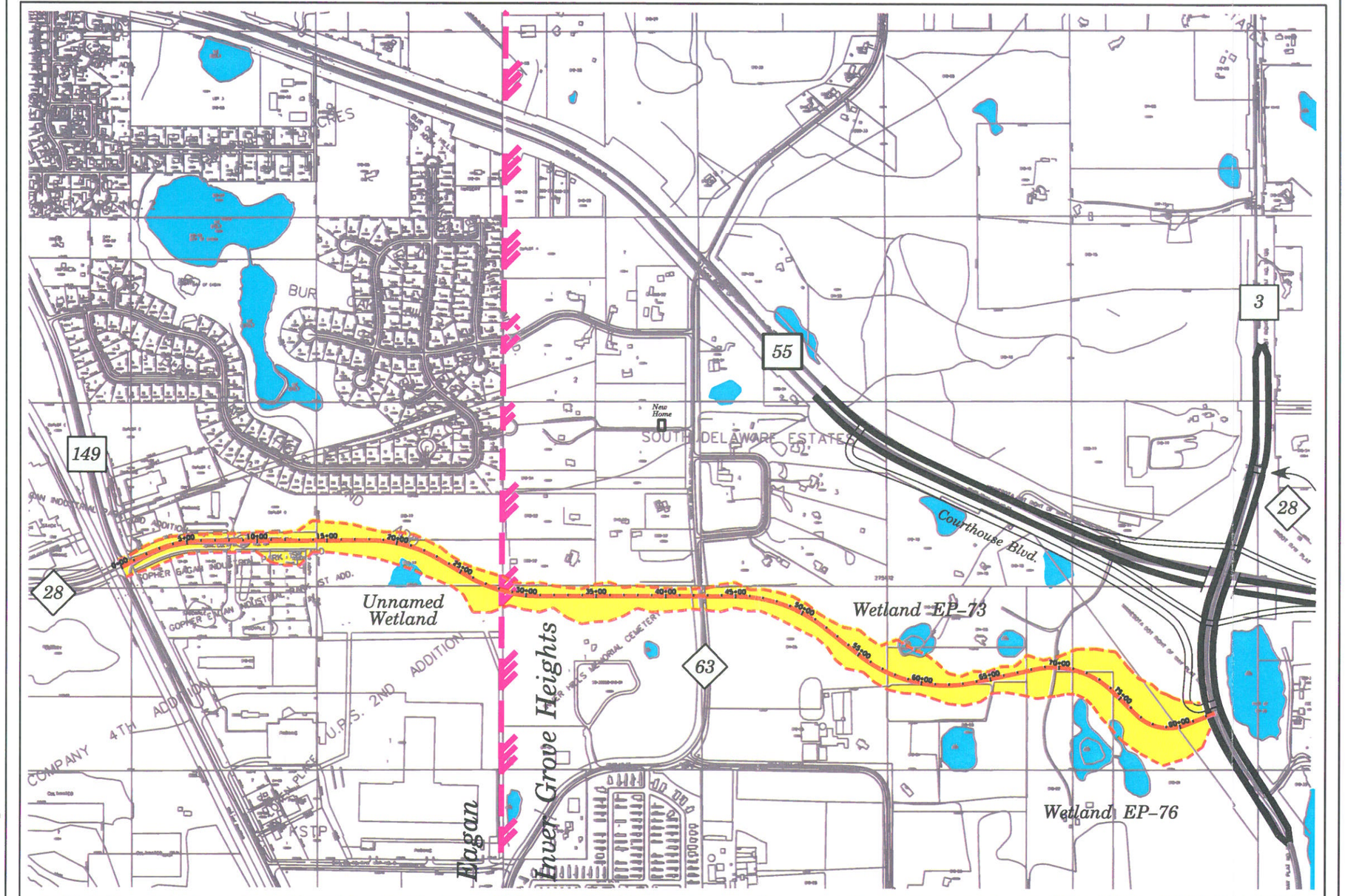
SEH

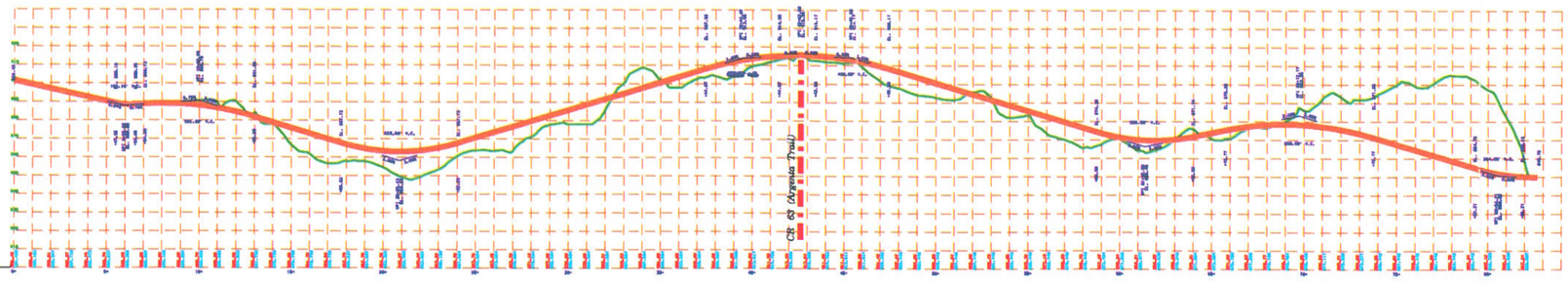
Legend

- Alternative 6B
- Potentially Impacted Structure

Impacts

Alternative 6B	3 wetlands UPS retention pond Parcel impacted in Gopher Eagan Industrial Park Significant cut section limits access to surrounding future development





**NOTE* Design Assumptions:*
Design Speed = 50 mph (30 mph if necessary approaching intersections)
e = 0.04
Maximum grade = 3%
Cross Section width of 130 feet (8' berm, 8' shoulder, 12' lane, 14' lane, 18' median, 14' lane, 12' lane, 8' shoulder, 8' berm, 8' bit. path, 30' berm)
4:1 slopes in cut and fill sections
CR 28 intersection spacing with interchange ramp at TH 3 based on providing a minimum right turn lane length.

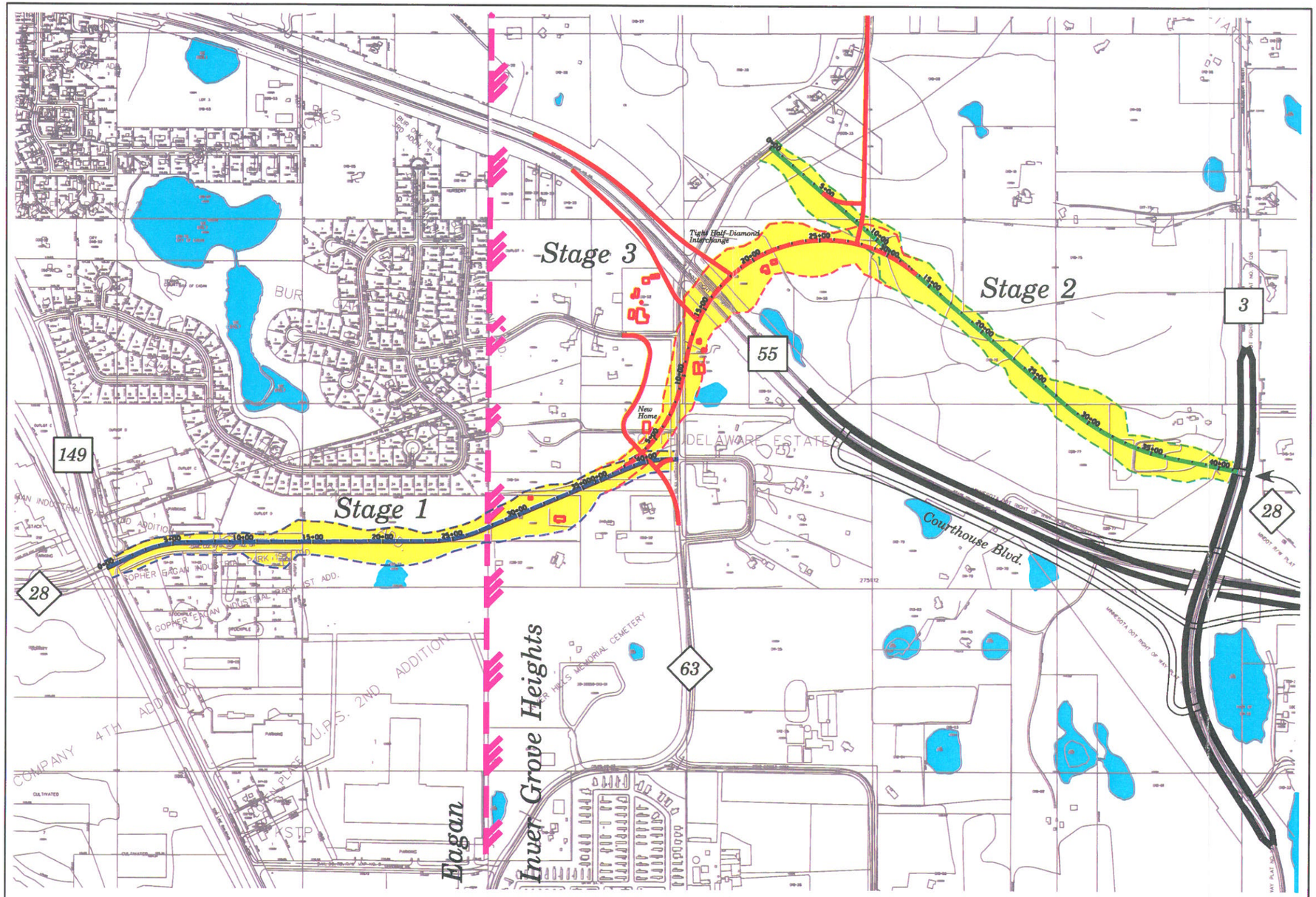
County Road 28 Corridor Study

Figure 6: Alternative 9 Stages

07/18/00

SCALE: 1" = 800'
400 0 400
scale feet

SEH



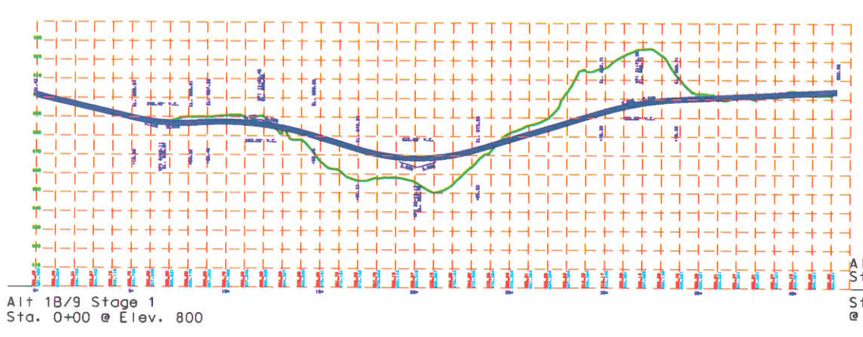
Legend

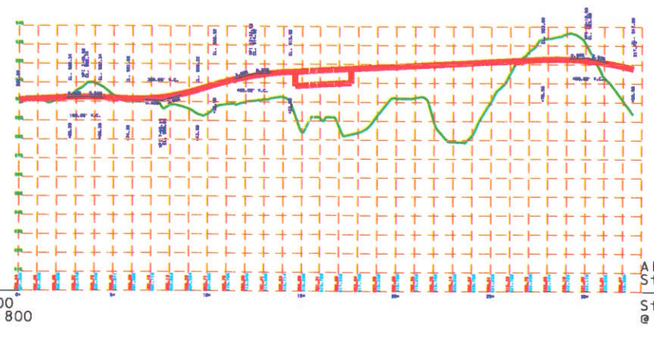
- Alternative 9 Stage 1
- Alternative 9 Stage 2
- Alternative 9 Stage 3
- Potentially Impacted Structure

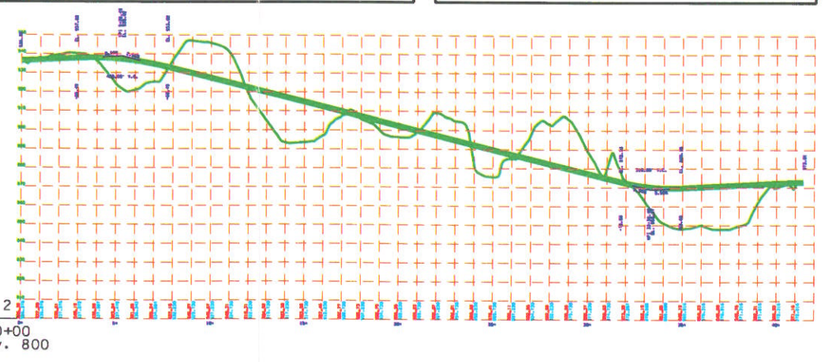
Impacts

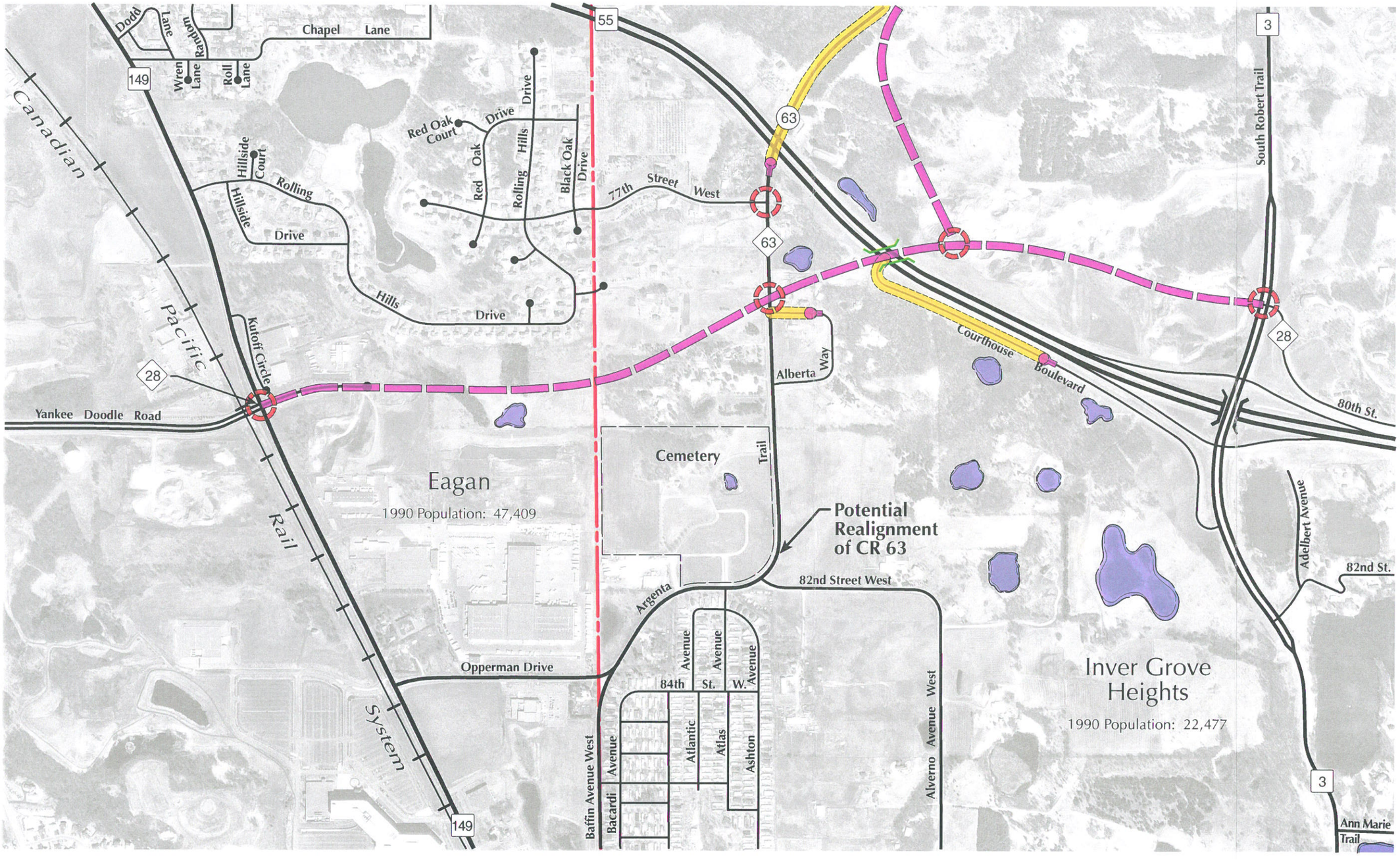
Alternative 1B9 Stage 1	2 structures on 1 parcel 1 wetland Parcel impacted in Gopher Eagan Industrial Park
Alternative 9 Stage 2	No structure or wetland impacts
Alternative 9 Stage 3	6 structures (1 new home) on 3 parcels (with interchange likely 4 structures on 1 parcel)

**NOTE* Design Assumptions:*
Design Speed = 50 mph (30 mph if necessary approaching intersections)
e = 0.04
Maximum grade = 3%
Cross Section width of 130 feet (8' berm, 8' shoulder, 12' lane, 14' lane, 18' median, 14' lane, 12' lane, 8' shoulder, 8' berm, 8' bit. path, 20' berm)
4:1 slopes in cut and fill sections









County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

Alternative 1B

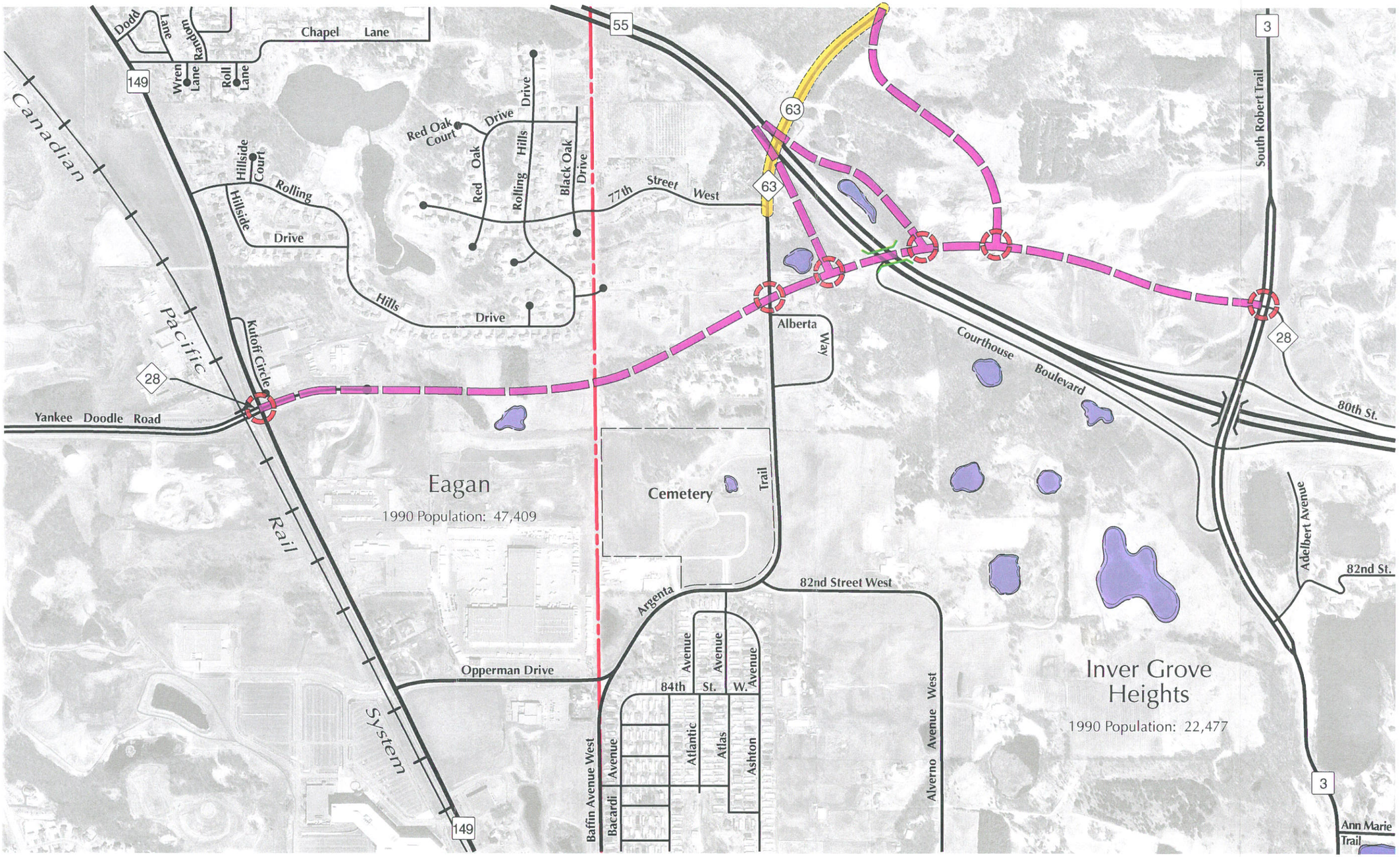
0 100 200 400 Feet

North

city of eagan

ESEH

May 1999



County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

Alternative 2A

0 100 200 400 Feet

North

March 1999

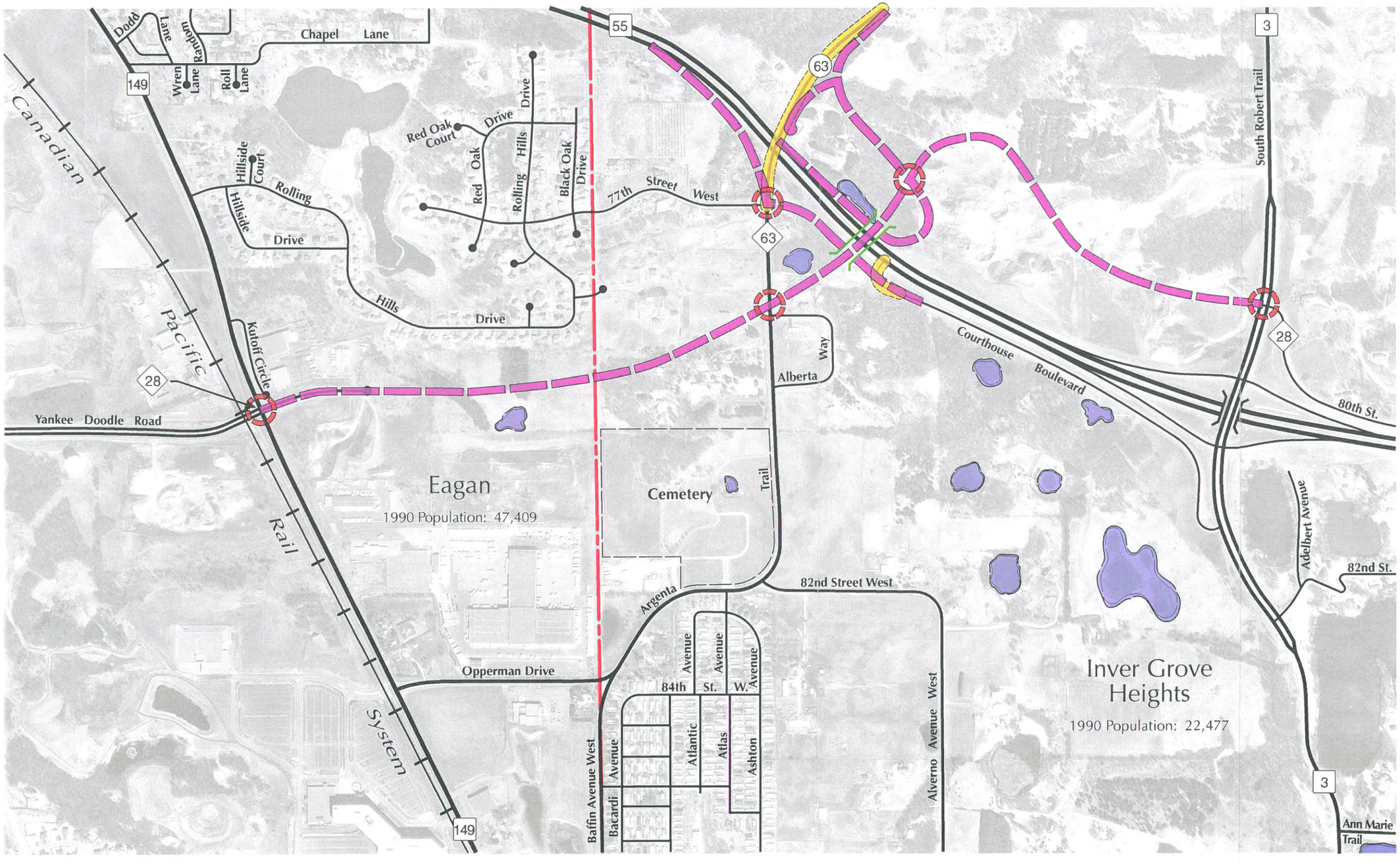
Comparative Advantages

- East-West Continuity for C.R. 28
- Compatible with Planned Development North of T.H. 55
- C.R. 63/T.H. 55 Intersection Eliminated for Better T.H. 55 Operation
- Ramps Provide High Type Access to/from the North

Comparative Disadvantages

- Higher Construction Cost/Impacts
- Land Impacts with C.R. 63 Realignment/Ramps
- Closely Spaced Intersections Along C.R. 28
- Includes Bridge Structure Over T.H. 55

*Eliminated from Further Study Due to Confusing Geometrics



County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

Alternative 2B

0 100 200 400 Feet

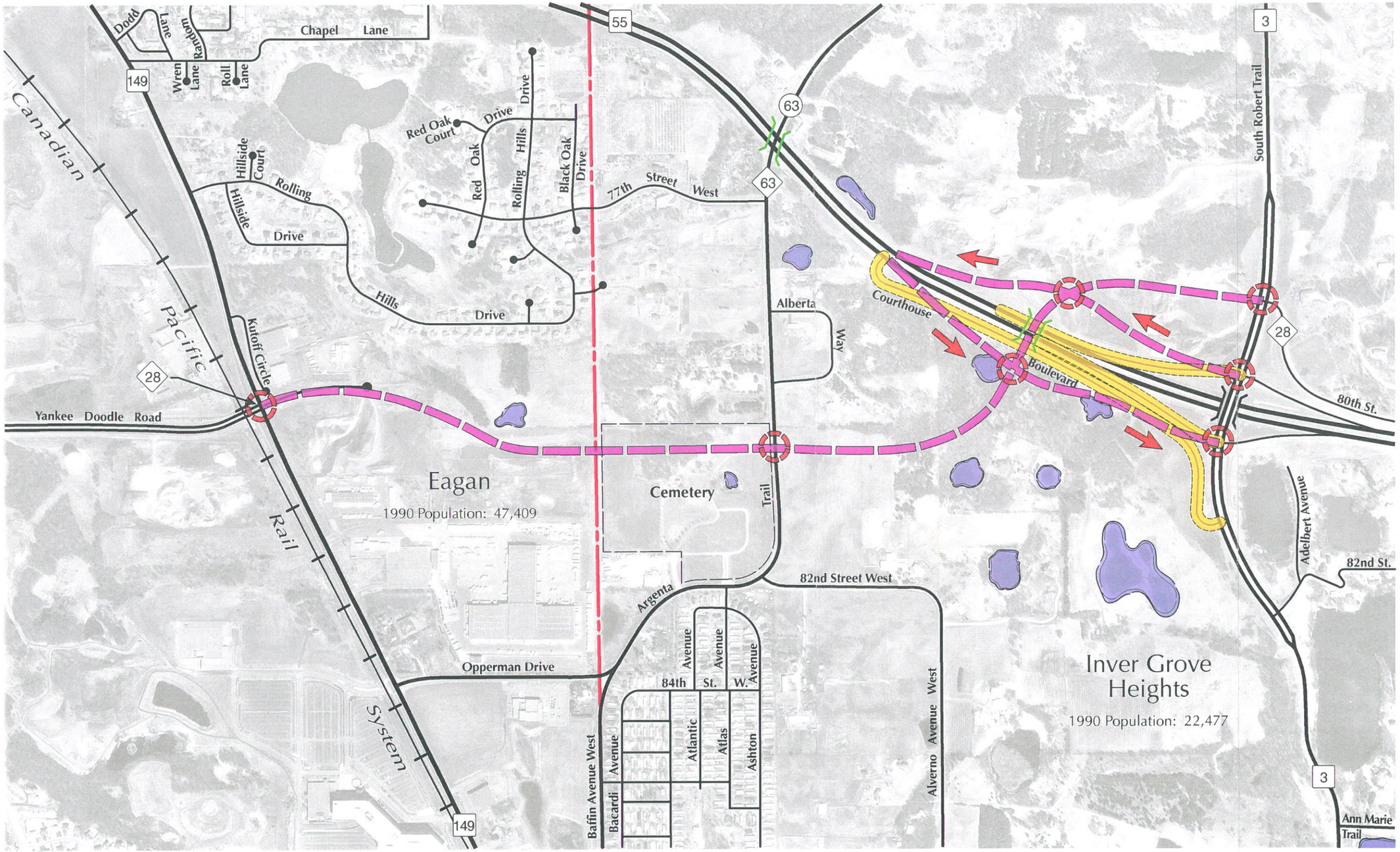
North

city of eagan

SEH

March 1999

* Eliminated from Further Study Due to Severe Environmental Impacts Along Courthouse Boulevard



County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

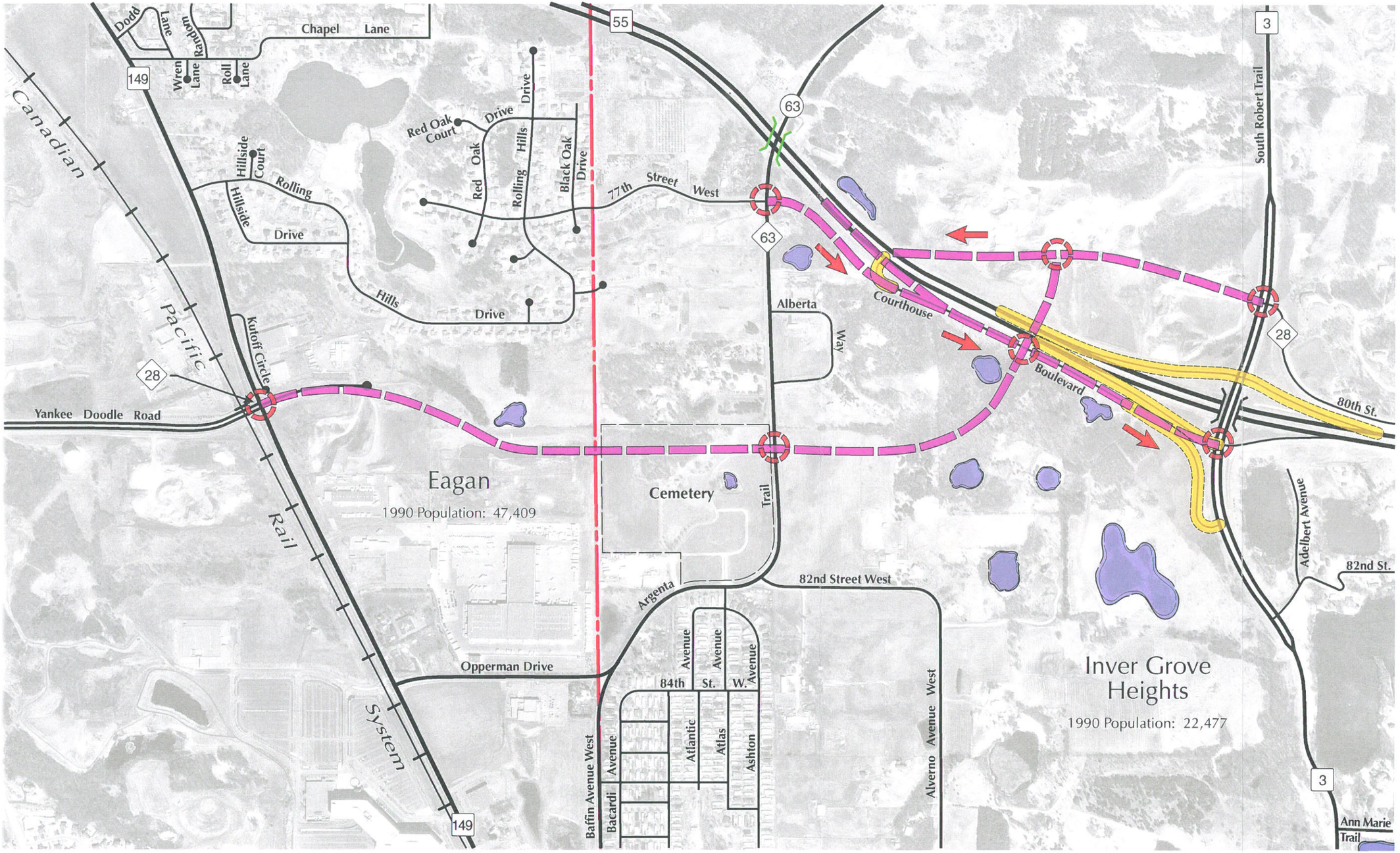
Alternative 3A

0 100 200 400 Feet

North

March 1999

* Eliminated from Further Study Due to Severe Environmental Impacts Along Courthouse Boulevard



County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

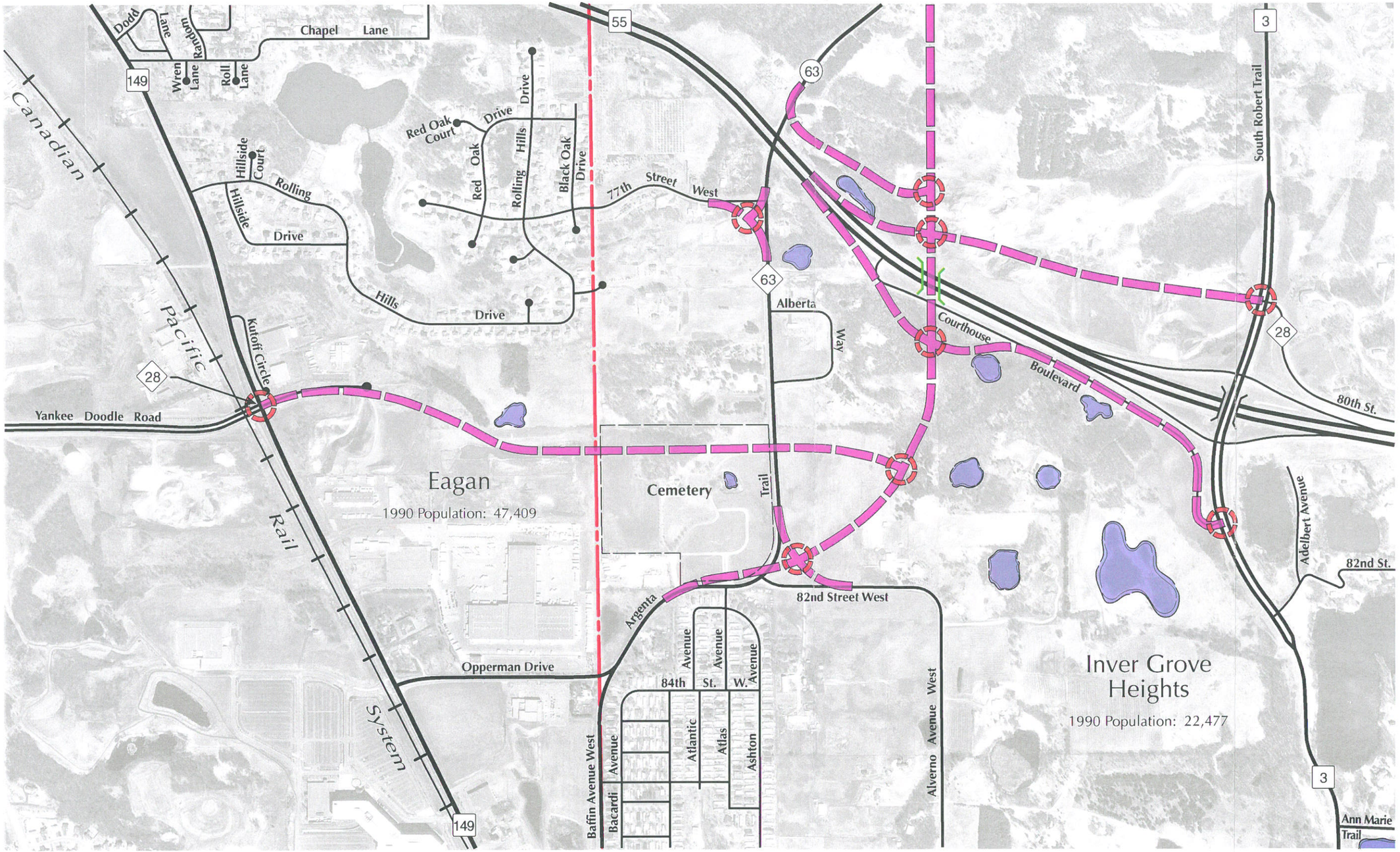
Alternative 3B

0 100 200 400 Feet

North

March 1999

* Eliminated from Further Study Due to Excessive Cost and Construction Impacts



County Road 28

Corridor Study

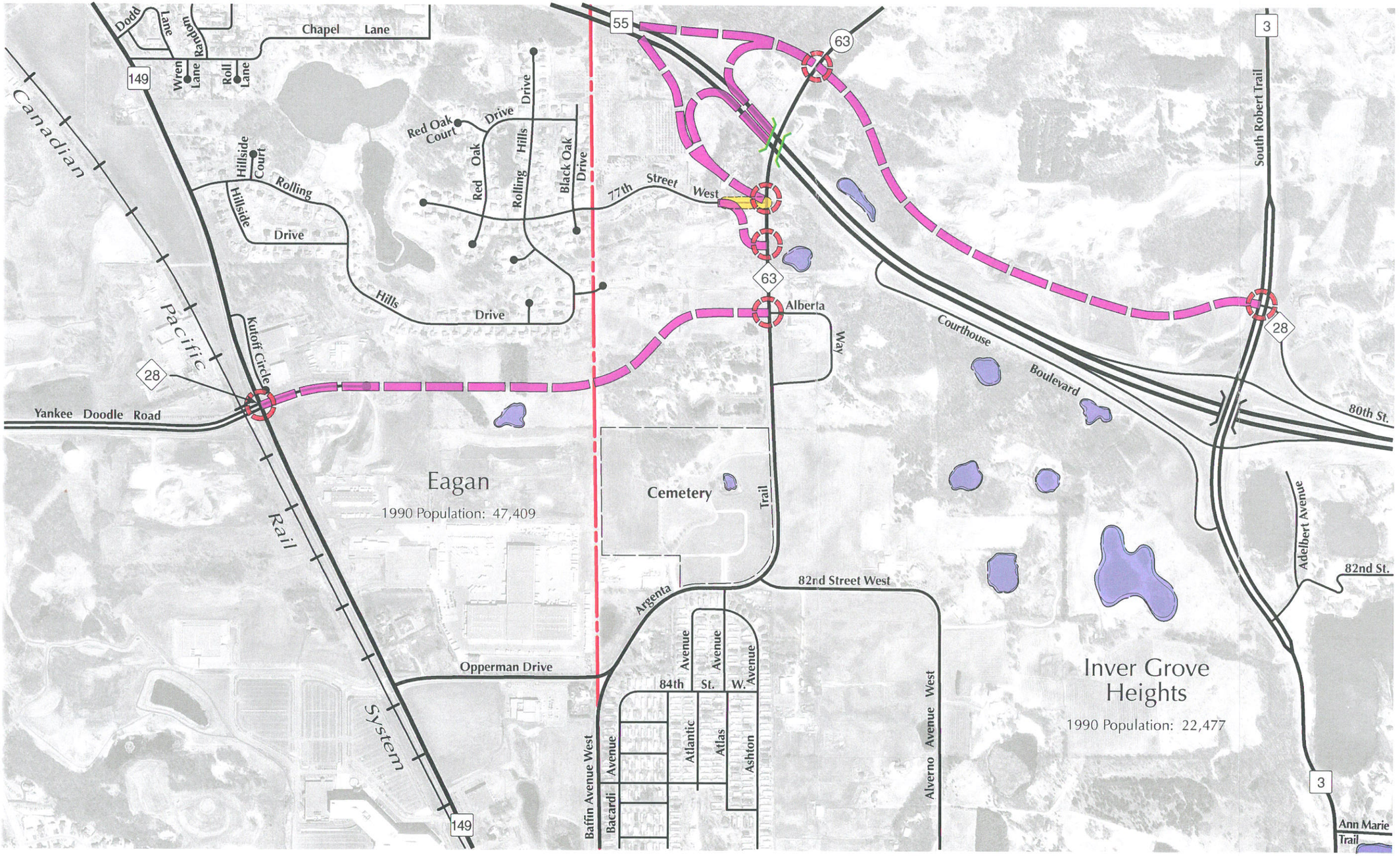
- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

Alternative 4

0 100 200 400 Feet

North

March 1999



County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

Alternative 5

0 100 200 400 Feet

North

March 1999

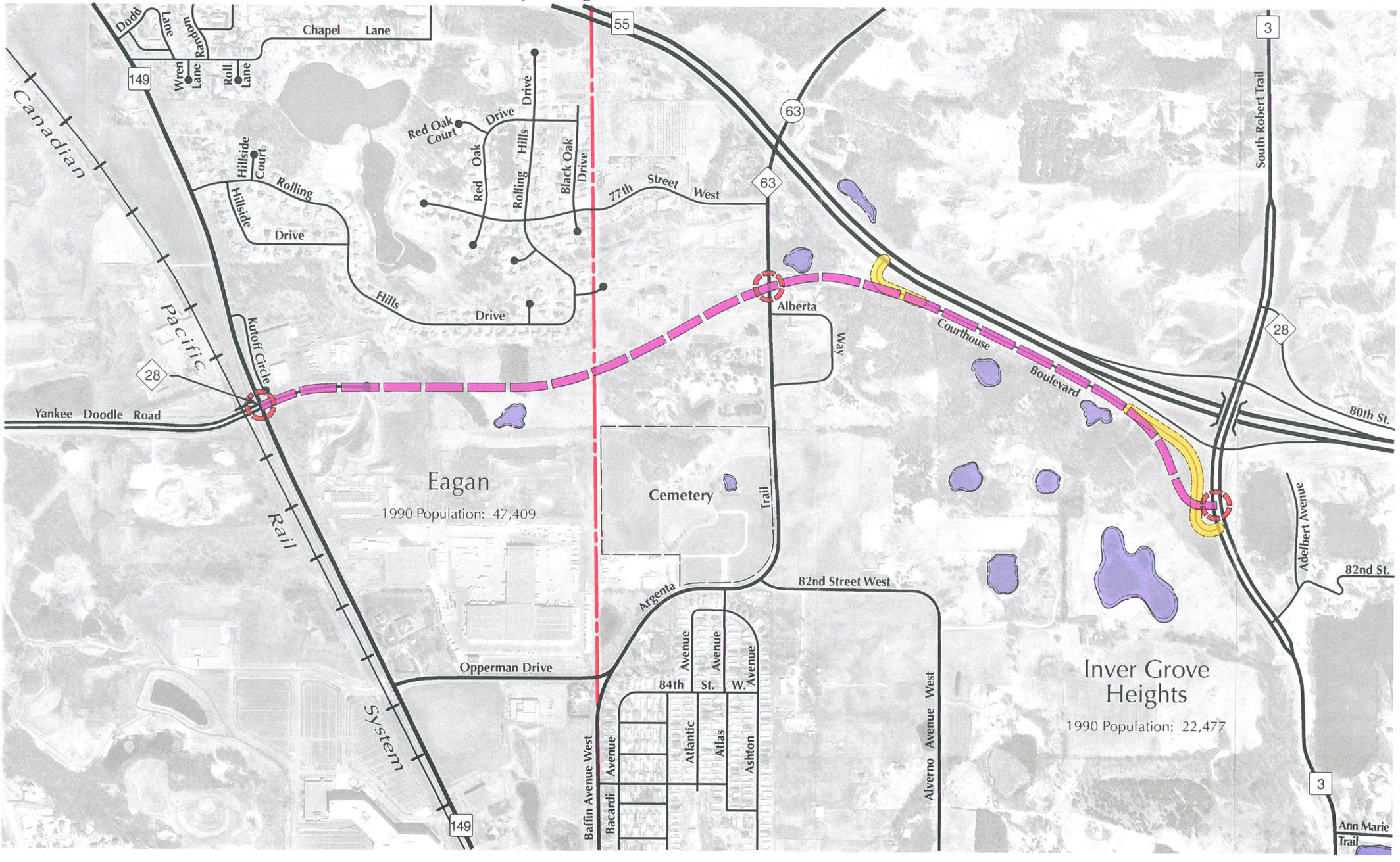
Comparative Advantages

- Full Interchange at Argenta
- Compatible with Planned Development North of T.H. 55

Comparative Disadvantages

- Poor C.R. 28 East-West Continuity
- Poor Intersection Spacing Along Argenta
- Land Impact with Folded Diamond Interchange
- Includes Bridge Structure Over T.H. 55

*Eliminated from Further Study Due to Close Spacing Between T.H. 55 and C.R. 28



County Road 28

Corridor Study

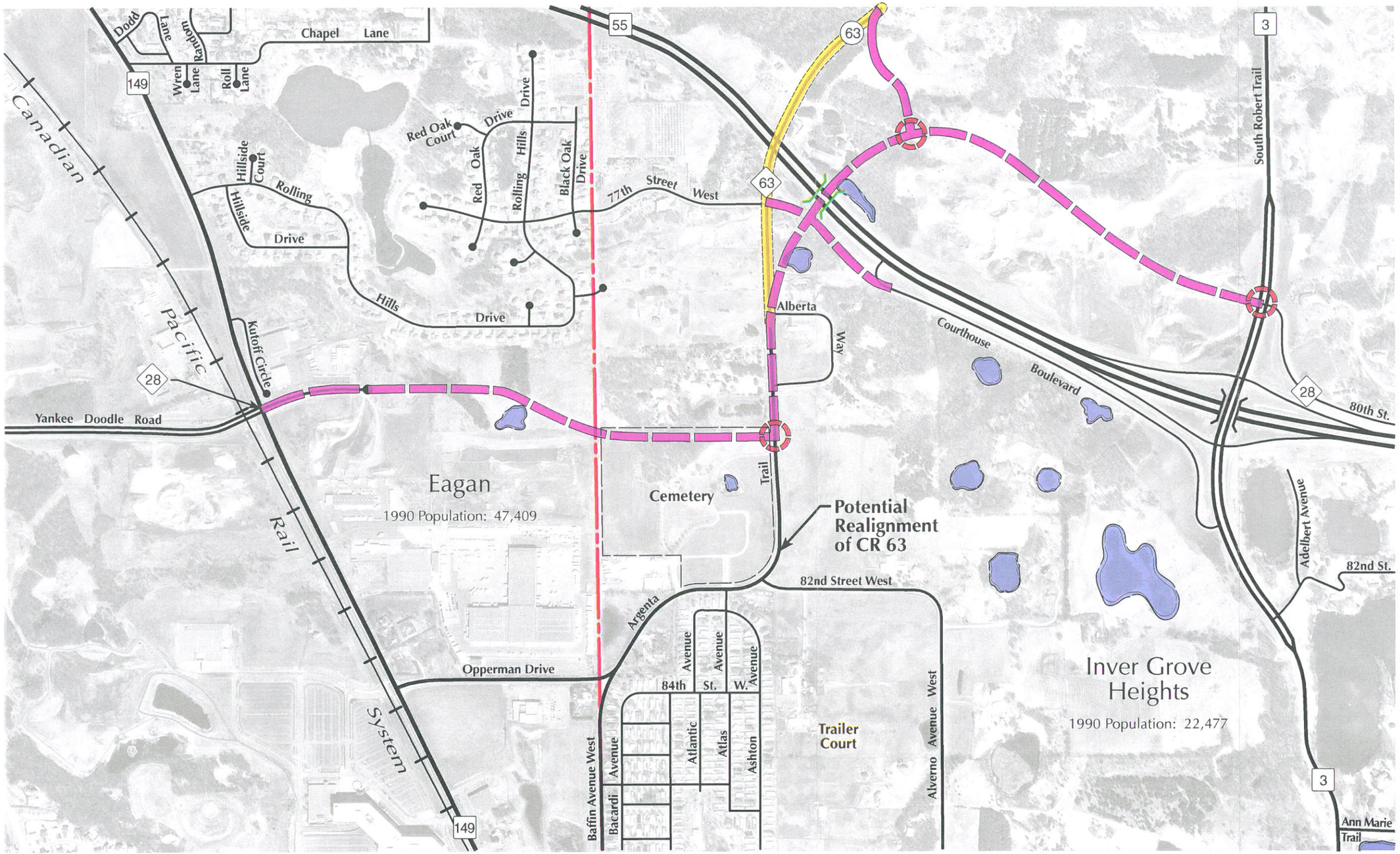
- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

Alternative 6A

0 100 200 400 Feet

North

March 1999



County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

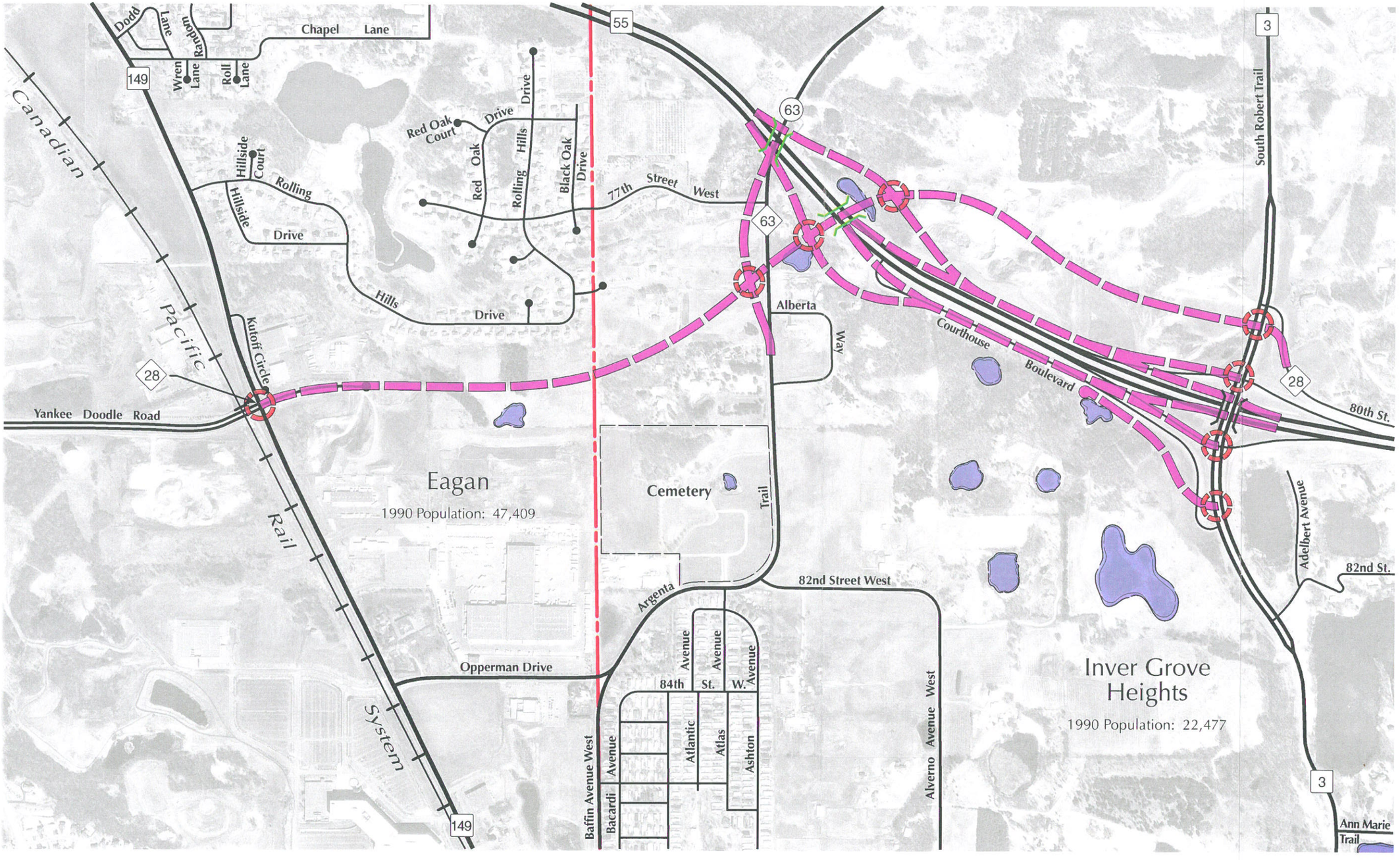
Alternative 7

0 100 200 400 Feet

North

May 1999

* Eliminated from Further Study Due to High Construction Cost



County Road 28

Corridor Study

Intersections

Overpasses

Wetlands

City Boundary

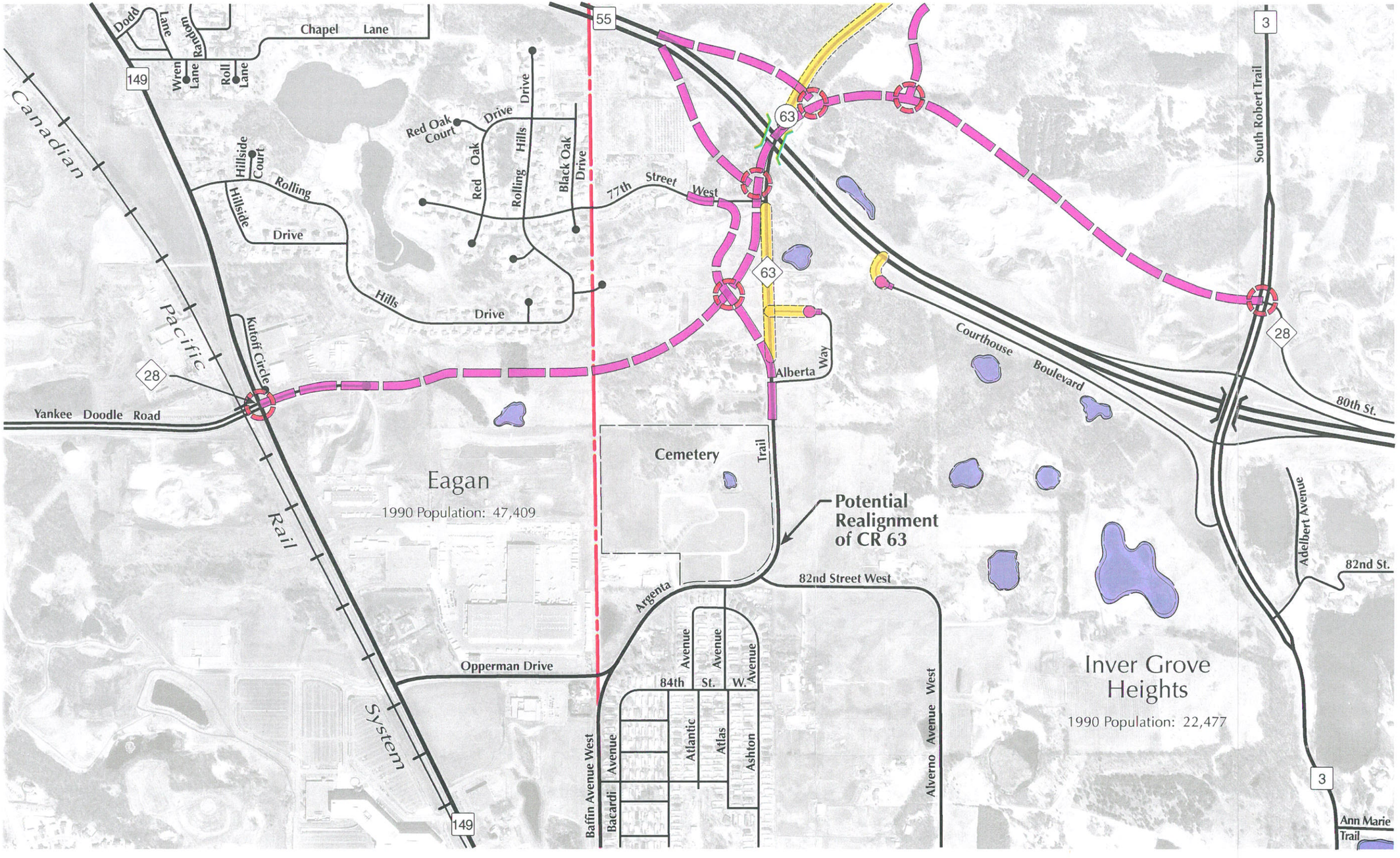
Removals

Alternative 8

0 100 200 400 Feet

North

March 1999



County Road 28

Corridor Study

- Intersections
- Overpasses
- Wetlands
- City Boundary
- Removals

Alternative 9

0 100 200 400 Feet

North

city of eagan

SEH

May 1999

5.1 Alternative 1B

Due to the designation of TH 55 as a principal arterial and the general policy of Mn/DOT to eliminate signalized intersections on principal arterials where possible, the elimination of the existing temporary signal at Argenta Trail and TH 55 was viewed as preferable. Furthermore, Mn/DOT would participate in funding the construction of the CR 28 overpass associated with Alternative 1B if its policy regarding signalized intersections on principal arterials was met. As a result, while Alternative 1B provided the best direct east-west connectivity and potential to serve east-west traffic demand, it did not replace Argenta Trail access to TH 55. In addition, Alternative 1B also impacted residential parcels east of Argenta Trail, and the location of its alignment through the property in the northwest quadrant of the TH 55 and TH 3 intersection was not compatible with future development.

5.2 Alternative 6B

Substantial elevation difference at TH 3 results in cut sections that severely impact wetlands.

Alternative 6B was the Build Alternative preferred by members of the public due to its avoidance of the Rolling Hills residential area. However, problems associated with this alternative include its reduced potential to serve travel demand, its lack of east-west continuity, and its potential to increase congestion through the TH 3 interchange.

Severe wetland impacts, including impacts to a DNR-protected wetland, are also expected with this alternative as a result of the elevation difference between the extension roadway's intersection with TH 3 and the wetlands. A wetland assessment was completed for Alternative 6B. The results of this report are included as Appendix F.

5.3 Alternative 9

This alternative was developed as a compromise between Alternatives 1B and 7. It provides an acceptable level of east-west continuity. It also replaces some of the Argenta Trail access to TH 55 with a half diamond interchange to the west. Other benefits include avoidance of land use impacts east of Argenta Trail, improved safety along TH 55 with the elimination of the Argenta Trail signalized intersection, and compatibility with future development in the gravel pit area. This alternative will require the relocation of five to six buildings.

5.4 Recommended Improvement

Alternative 9 was selected as the preferred alternative for the CR 28 extension (Figure 6). The recommendation is based on how well it meets the criteria used in the evaluation. It optimizes system planning objectives while minimizing impacts to the built environment.

6.0 Study Recommendations

The goal of the study was to develop and assess potential CR 28 extension alternatives and to identify a preferred solution that the public, state, regional, and local agencies could support. Immediately following the identification of the preferred solution, right-of-way acquisition funds can be secured to prevent further development of parcels in the corridor. The recommendations are as follows:

- It is recommended that local, regional, and state agencies approve the preferred alternative - **Alternative 9** - as a four-lane, divided roadway from TH 149 to TH 3.
- Construction of the corridor should be staged to spread out the need for funds. The cost (based on a four-lane, divided roadway design) and recommended staging plan is shown below.

Stage 1 - TH 149 to Argenta Trail.

Stage 1 – 2002-2003 – TH 149 to Argenta Trail – $3,000,000
This first stage will make the logical connection to Argenta Trail and will provide access to TH 55. It is also recommended that upgrading the TH 55/CR 63 intersection include two shared through/turning traffic lanes (northbound and southbound) in the first stage of project construction. The cost for this upgrade (not included in the $3 million above) is estimated to be $750,000 (based upon a ¼-mile new four-lane construction length). This cost will be further refined during the preliminary design phase.

An application for Federal Surface Transportation Program funds was submitted by Dakota County in September 1999. Stage 1 of the project was approved for funding by the Transportation Advisory Board. This stage of the project will be funded with a combination of 80 percent federal funds ($2,400,000) and match of 20 percent with Dakota County, City of Eagan, and City of Inver Grove Heights funding contributions.

Stage 2 – 2002-2003 – Argenta Trail to TH 3 – $2,300,000
The second stage will likely be timed with the development of the property in the northwest quadrant of the TH 55 and TH 3 interchange. When completed, this stage will provide a continuous route from TH 149 to TH 3 with a signalized intersection with TH 55.

Stage 3 – 2003 or later – TH 55 Interchange – $4,200,000
This final stage will occur as traffic volumes increase and the capacity of the TH 55 intersection is exceeded. Funding for this stage will rely on Mn/DOT participation and regional funding through TEA-21. Dakota County should plan to prepare a TEA-21 funding application for this stage in the near future.

Relocations – $1,100,000
Five to six relocations will be necessary for the project.

- It is recommended that the local governments and Dakota County secure funding to acquire the necessary rights-of-way for the corridor. Early right-of-way acquisition would maximize the ability to plan future development in the area and minimize impacts on existing property owners, who would otherwise be uncertain as to the long term status of their property. In addition, the cost of acquiring the land will be less if purchased in advance of any further development. This can be accomplished under the official mapping process, direct purchase, or through the platting process.
- Representatives from each agency on the PMT should continue to meet to address funding mechanisms and implementation strategies. Local agencies should place the preferred alternatives in official Capital Improvement Programs (CIP) or in Transportation Plans to make them eligible for funding. In addition, cost participation strategies will need to be made by Mn/DOT's Cost Participation Scoping Committee so the Cities, County, and Mn/DOT will need to determine appropriate levels of participation.

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