APPENDIX B

NORTHERN PARKWAY ALTERNATIVES – 115TH AVENUE TO 103RD AVENUE

TECHNICAL MEMORANDUM
NORTHERN PARKWAY ALTERNATIVES
115TH AVENUE TO 103RD AVENUE

October 20, 2005

PURPOSE

The purpose of this Technical Memorandum is to document the identification and evaluation of alternatives considered in the section of Northern Parkway between 115th and 103rd avenues. The process involved several iterations carried out over several months in 2005. This Technical Memorandum also includes the Southern Alignment Alternative that was suggested at the June Public Meeting. Since this alternative extends from Dysart Road to 91st Avenue, the other alternatives were extended to those same limits for comparison with the Southern Alignment.

The end result of this phase of the study is the selection of two alternatives for further review by the agencies and public. The results of this next phase will be documented in a subsequent Technical Memorandum or in the Design Concept Report (DCR).

BACKGROUND

A DCR was prepared and published in October 2003 for the Northern Parkway. In this DCR, Northern Parkway is proposed to have grade-separated intersections, three through lanes in each direction, an auxiliary lane between grade separations and at signalized intersections with minor streets. For the section between 115th and 103rd avenues, a grade-separated intersection was proposed at 103rd Avenue/Glen Harbor Drive. Two-phased signals were proposed at 111th and 107th avenues, and no left turns from Northern Parkway would be permitted at these locations. A two-way left-turn lane was proposed between 110th and 108th avenues to provide left-turn access to existing residential neighborhoods north and south of Northern Avenue. This two-block section is the only location along the Northern Parkway where left turns would be permitted.

After the passage of Proposition 400 in November 2004 that will provide funding for the Northern Parkway, the City of Glendale launched a new study process to review and update the concept for Northern Parkway and to prepare 30% preliminary engineering plans and an environmental assessment (EA) in cooperation with the Federal Highway Administration. During 2005, the Maricopa Association of Governments (MAG) provided updated traffic forecasts for 2030 based on updated growth forecasts adopted by MAG in 2003. In addition, MAG prepared and adopted the Regional Transportation Plan (RTP) in 2003 that included a four-phase funding plan based on the passage of Proposition 400 and other federal, state, and

local funding sources. The MAG RTP included funds in the 2005 to 2010 Phase I for right-of-way acquisition and initial construction of the Northern Parkway from SR 303 to Dysart Road.

With the early funding provided by Proposition 400, it was determined that acquisition of the right-of-way for the portion of Northern Parkway west of Dysart Road would occur while that land is still in agricultural uses. This western section of Northern Parkway is proposed to be on all new alignment north of the existing Northern Avenue. As a result, it was determined that full access control should be acquired with the purchase of the land. It was further determined that the two previously proposed traffic signals in that section of the Northern Parkway would not be needed: (1) at a direct connection to existing Northern Avenue west of Dysart, and (2) at Bullard Road. With no traffic signals along this 4.5-mile section and full access control, the proposed Northern Parkway would provide free-flow traffic conditions.

Similarly, with the updated traffic forecast by MAG, a review was made of the section between 103rd and 91st avenues (refer to Technical Memorandum dated October 2005). After analysis of the new traffic data, it was determined that the previously recommended eastbound Northern Parkway to northbound Loop 101 flyover would not be needed or would not provide the best solution to accommodate the projected traffic volumes. After identification and evaluation of several alternatives, it was decided that the preferred configuration would maintain existing Northern Avenue (widened to six lanes) between 103rd and 91st avenues to provide access to properties north and south and to provide access to Loop 101 via the existing Loop 101/Northern interchange (expanded to meet future traffic projections). A parallel route for Northern Parkway would be constructed to the south of Northern Avenue and elevated over Loop 101 and 99th Avenue and other collector roads needed to access property. Northern Parkway would have two lanes in each direction and would be fully access controlled with no traffic signals from 103rd to 91st avenues (a distance of 1.5 miles).

With the proposed full access controlled free flow sections of Northern Parkway east and west of the 115th to 103rd avenues section, the two signals and the two-way turn lane appear to provide an inconsistent roadway type. As a result, safety issues may arise. Accordingly, alternative concepts were identified and evaluated for the 115th to 103rd avenues section. Described below are the alternatives identified, the comparative evaluation, and the conclusions reached by the Northern Parkway Management and Technical Advisory teams.

ALTERNATIVES IDENTIFIED

Several alternatives were identified in the early phases of this analyses and some evaluation was completed. The evaluation led to identification of other alternatives. As the iterative process continued, some alternatives were viewed as inferior to others so they were dropped from consideration. The end result of this phase was two alternatives that were then carried into neighborhood and public meetings for review and comment.

Described below are the seven alternatives identified along Northern Avenue. A potential southern alignment was also identified and is discussed later in this Technical Memorandum.

Arterial. This is the "No Build" alternative that would be the result if the Northern Parkway project were not built. Northern Avenue would be constructed as a standard arterial and is proposed by the City of Peoria to have three lanes in each direction and left turns made either in a two-way turn lane or in left-turn pockets. There would be no shoulders, and local street and some driveway access would be allowed per City of Peoria policies. This alternative was not evaluated at this time but is carried as an alternative through the EA process.

Alternative A – 2003 DCR Concept. This concept would have traffic signals at 111th and 107th avenues and a two-way turn lane between 110th and 108th avenues to provide access into the neighborhoods north and south of Northern. No left turns from Northern would be permitted at the two traffic signals. Some new connector roads may be needed to mitigate access issues with some neighborhoods.

Alternative B – No Two-Way Left, Add New Grade Separated Intersection. In order to provide for improved U-turn capability, a graded separated intersection at 113th Avenue would replace the signal at 111th Avenue. This interchange would allow neighborhood access to be made via right turns onto or off of Northern and then a U-turn at 113th or 103rd Avenue in place of left turns. There would be a signal a 107th Avenue, but left turns would not be permitted.

Alternative C – No Signals, No Two-Way Left, New Grade Separated Intersection. This alternative would provide for uninterrupted traffic flow. Right turns on and off of Northern coupled with U-turns at grade separations would provide access to neighborhoods. A pedestrian overpass could be provided at 107th Avenue.

Alternative D – Same as Alternative C except one-lane frontage roads would be provided along Northern Parkway. The frontage roads would remove the right turns into and out of the outside lane of the parkway. The parkway would be depressed under 107th Avenue and the frontage roads would connect to 107th Avenue. Substandard shoulders would be provided in some areas to avoid taking of existing houses.

The four identified alternatives are illustrated in Figure 1. A tabulation of the evaluation was provided to the Northern Parkway Management and Technical Committees on July 21, 2005 and is shown in Table 1 below.

Table 1 – Evaluation of Identified Alternatives

Evaluation Criteria		Alt. A	Alt. B	Alt. C	Alt. D
1	Neighborhoods with Limited Access	7	15	20	4
	Number of New Access Connectors	3	2	2	1
2	Capacity of Northern	80	80	150	160
3	House Takes	1	5	5	9
	Business Takes	0	0	0	1
4	Cost Rank	1	2	3	4
5	Safety Rank	4	3	2	1
6	Constructibility Rank	1	2	3	4
7	Compatibility with Normal Design Standards Rank	1	2	3	4
8	Utilities Rank	1	2	3	4
9	Noise Rank	1	2	4	3
10	Drainage Rank	1	2	3	4
11	Posted Speed Limit	45 mph	45 mph	45 mph	50 mph
12	Not Compatible with	1-B, 2-B	1-A, 2-A	1-A, 2-A	1-A, 2-A
13	Adds Traffic to 103rd Ramps Rank	2	3	4	1
14	Treatment at 107th Avenue	Signal	Signal	Ped Bridge	Grade separation connected to frontage roads

Description of Alternatives:

Alternative A 2003 DCR
Alternative B Grade separated intersection at 113th Avenue
Alternative C Pedestrian bridge at 107th Avenue
Alternative D Depressed

Based on input from the committees, changes were made in the alternatives. Alternatives A and B were combined and called Alternative AB. The idea was to add a new grade separation at 115th Avenue to facilitate U-turns for traffic west of 115th Avenue as well as U-turns for the neighborhoods between 112th and 103rd avenues. The proposed new grade separation was moved west to 115th Avenue so that the signal at 111th Avenue could remain. Alternatives A and B were eliminated and replaced by Alternative AB. In addition, Alternative E was added. Alternative E is similar to Alternative D except that full width shoulders would be provided along with two-lane frontage roads. This alternative would avoid the design exceptions that would be part of Alternative D. The two new alternatives are described below.

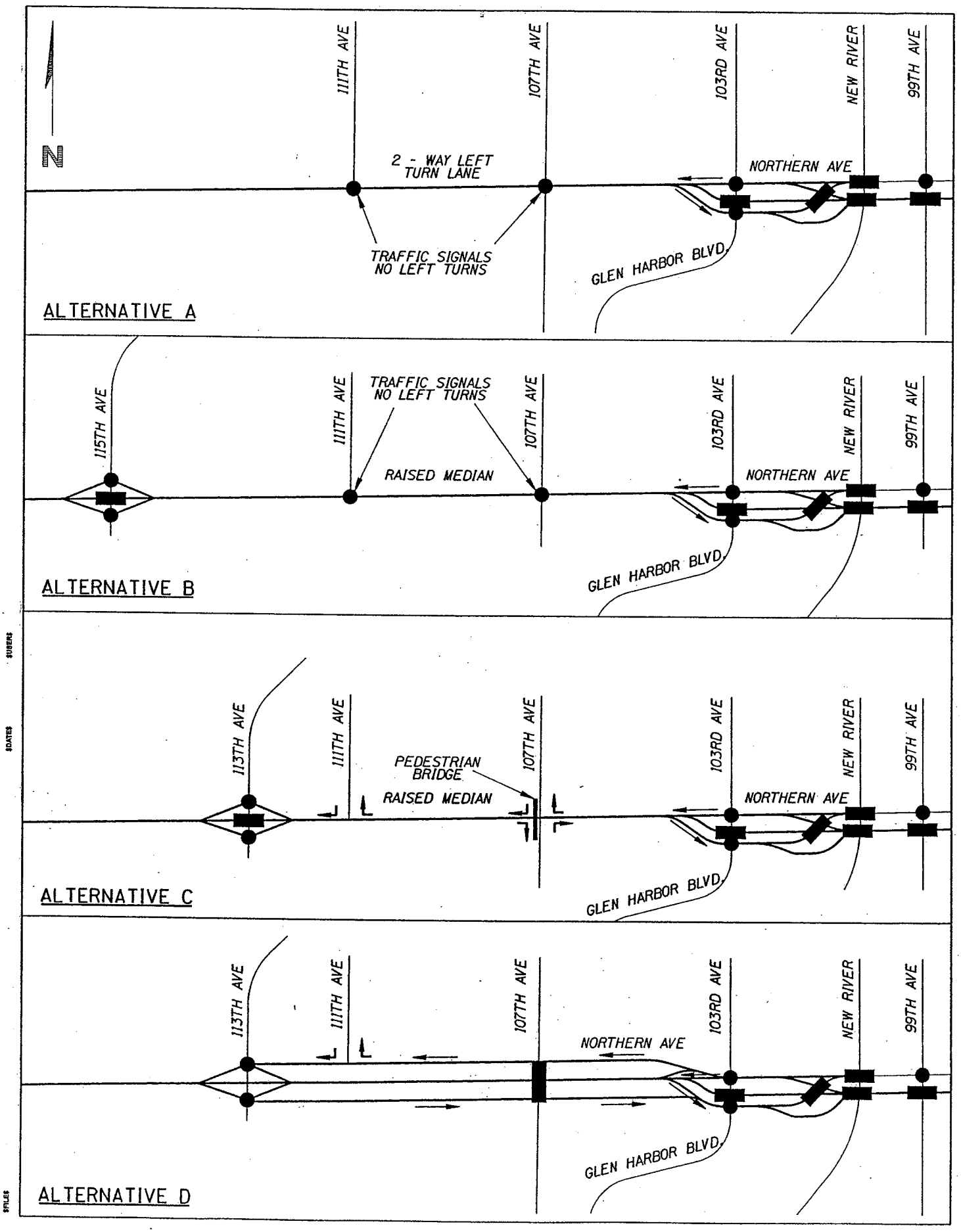

FIGURE 1 - ALTERNATIVES INDENTIFIED A-D

Alternative AB – Same as Alternative A with new grade separation added at 115th Avenue. This alternative would have signals at 111th and 107th avenues and a two-way turn lane in between.

Alternative E – Same as Alternative D except two lane frontage roads and full shoulders would be provided. This alternative would function much like a freeway except it would have a 55 mph design speed.

A comparative evaluation of the remaining four alternatives was prepared and provided to the Northern Parkway Management and Technical Committees on August 18, 2005 as shown in Table 2.

Based on comments received from the committees, Alternative D was eliminated because it would not be consistent with design standards and practices. The one-lane frontage roads would be too narrow to allow a large truck (such as a moving van) to enter or leave the frontage road at a local street. The reduction in shoulder widths at some locations to avoid house takes would violate design standards and create a liability risk for the owner-operator of Northern Parkway. The more narrow roadway footprint would not provide adequate space for relocation of existing utilities outside of the depressed roadway sections. Handling traffic during construction would also be very difficult.

The major stakeholders also agreed to eliminate Alternative E because of its cost and impacts to the existing neighborhoods.

SOUTH ALIGNMENT

During the public meeting held June 1, 2005, suggestions were made to consider an alignment that would swing south near Loop 101 toward Glendale Avenue and then return to the Northern Alignment near El Mirage or Dysart roads. Such an alignment would avoid some of the neighborhood issues found on the alternatives described above.

Based on recent aerial photography and field visits, alternative alignments were identified. Alignments would need to be south of the Orangewood mid-section line to avoid the Country Meadows neighborhood located south of Northern Avenue between 107th and 111th avenues. The Glen Harbor Industrial Park and the City of Glendale landfill extend from Northern to Glendale on either side of the Country Meadows neighborhood. It was determined that the only feasible alignment would have to swing south to Glendale Avenue to avoid these existing major land uses.

Table 2 – Evaluation of Refined Alternatives

	Evaluation Criteria	Alt. AB	Alt. C	Alt. D	Alt. E
1	**Traffic Capacity (ADT)**	80,000	150,000	160,000	160,000
2	**Posted Speed (mph)**	45	45	50	50
3	**Traffic Signals on Parkway**	2	0	0	0
4	**Neighborhood Access**				
	Number of Out of Direction Movements	8	19	9	9
	Number of Connector Roadways	4	3	2	3
	One Direction Frontage Road			1-lane	2-lane
	Rank	3	4	1	2
5	**House Impacts**	1	4	13	29
6	**Business Impacts**	0	0	0	1
7	**Utility Impacts**				
	EPNG "pig-launcher"	Yes	Yes	Yes	Yes
	Transmission Towers	No	Yes	No	Yes
	City of Peoria Lift Station	Yes	Yes	Yes	Yes
	Length of Depressed Section (mi)	0.3	0.3	0.8	0.8
	Rank	1	2	4	3
8	**Right-of-Way Width (ft)**	150	150	150-161	260
9	**Impact to Glendale Landfill**	Yes	Yes	No	No
10	**Constructability Rank**	1	2	4	3
11	**Safety**				
	Direct Access to Parkway	Yes	Yes	No	No
	Continuous Two-Way Left-Turn Lanes	Yes	No	No	No
	Shoulder Width	Aux Lane	Aux Lane	2 to 10	8 to 10
	Rank	4	2	3	1
12	**Compatibility with Adjacent Segments**				
	Rank	4	3	2	1
13	**Cost Rank**	1	2	3	4

Description of Alternatives:

Alternative AB 2003 DCR plus grade separated intersection at 115th Avenue

Alternative C Original concept with signals removed and replaced with continuous raised median, grade separated intersection at 113th Avenue

Alternative D Full access control with one-lane frontage roads, substandard shoulders, depressed

Alternative E Full access control, standard typical section, two-lane frontage roads, depressed

An alignment was sketched out that would have a system interchange on Loop 101 half-way between Glendale and Northern avenues' service interchanges. This new system interchange would require modifications to the existing interchanges and would require braiding the system interchange ramps with the service interchange ramps. The alignment would then continue

southwesterly to just north of the northern end of the runway at Glendale Airport and then follow along Glendale Avenue from approximately Glen Harbor Drive to El Mirage Road.

Existing Glendale Avenue would be converted to a westbound frontage road with the new roadway south of Glendale Avenue. A new eastbound frontage road would be constructed on the south side of the new roadway. Interchanges would be provided at each end of this section of new roadway so that Glendale Avenue traffic could continue along the frontage roads.

At El Mirage Road, the new roadway would curve to a northwesterly alignment cutting across a large parcel owned by El Paso Natural Gas Company (EPNG). The alignment would rejoin Northern at Dysart Road.

The south alignment was viewed as a freeway because of the out-of-direction travel required. A roadway with traffic signals would not divert sufficient traffic from the Northern alignment to justify the new roadway.

East of Loop 101, the roadway could be extended probably as a lower roadway type and rejoin the Northern alignment at 91st Avenue. Access to the planned commercial development area east of Loop 101 and south of Northern could be provided by a signalized intersection or an interchange.

The proposed alignment is shown in Figure 2.

A comparison of the South Alignment with Alternatives AB, C, and E is shown in Table 3. The South Alignment would provide a freeway connection between two other freeways (Loop 303 and Loop 101). The roadway could be built to standards consistent with other urban freeways. Since Northern Avenue would remain as a street west of Loop 101 and Glendale Avenue would be accommodated via frontage roads, the alignment would add more capacity to the corridor than alternatives along Northern Avenue. The concept would also place the “regional traffic” on a freeway, and leave Northern Avenue for more localized arterial traffic.

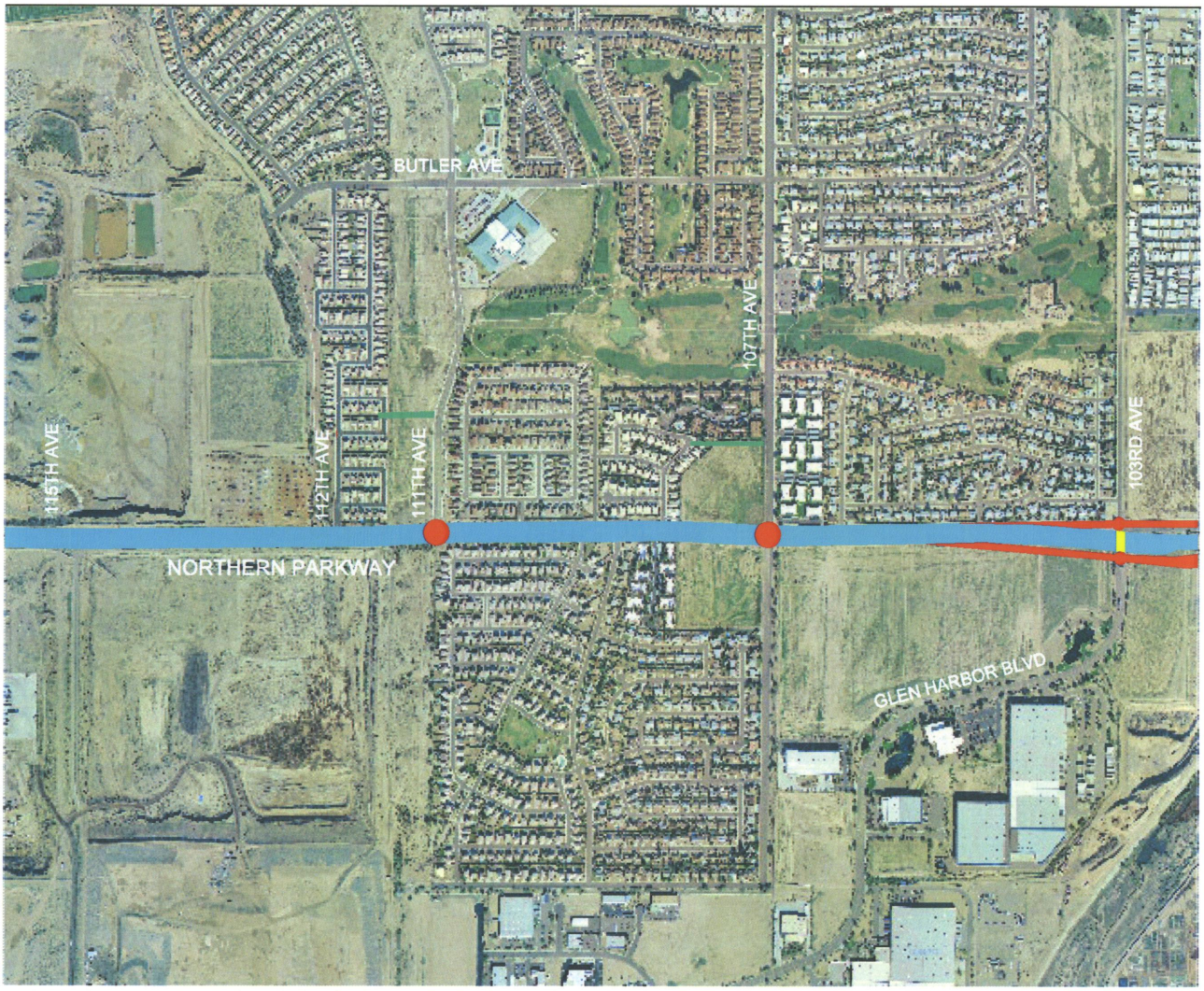

FIGURE 2
ALTERNATIVE A

Table 3 – Northern Avenue Alternatives Compared to Southern Alignment

	Evaluation Criteria	Alt. A	Alt. C	Alt. E	Southern Alignment
1	**Traffic Capacity (ADT)**	80K	120K	160K	160K
2	**Posted Speed (mph)**	45	45	50	50
3	**Traffic Signals on Parkway**	2	0	0	0
4	**Neighborhood Access**				
	Number of Out of Direction Movements	8	19	9	0
	Number of Connector Roadways	4	3	3	0
	Rank	3	4	2	1
5	**House Impacts**	4	4	32	1
6	**Business Impacts**	8	8	9	6
7	**Utility Impacts**				
	EPNG "pig-launcher"	Yes	Yes	Yes	No
	Transmission Towers	No	No	Yes	No
	City of Peoria Lift Station	Yes	Yes	Yes	No
	Length of Depressed Section (mi)	0.3	0.3	0.8	0.8
	Well Sites	0	0	0	1
	Water Recharge Facility	No	No	No	Yes
	Rank	1	3	4	2
8	**Right-of-Way Width (Mainline) (ft)**	150	150	200-285	150-280
9	**Impact to Glendale Landfill**	Yes	Yes	No	No
10	**Constructability Rank**	1	2	4	3
11	**Safety**				
	Direct Access to Parkway	Yes	Yes	No	No
	Continuous Two-Way Left Turn Lanes	Yes	No	No	No
	Shoulder Width (ft)	Aux Lane	Aux. Lane	8 to 10	8 to 10
	Rank	4	3	2	1
12	**Glendale Airport Impact**	No	No	No	RPZ
13	**Cost**	$164 million	$166 million	$211 million	$276 million

Description of Alternatives:

Alternative A	DCR Option (Revised) – Original DCR concept plans (10/2003) revised to include grade separated intersection at 115th Avenue and bypass from 103rd Avenue to 91st Avenue.
Alternative C	DCR Option with No Signals – Original DCR Concept plans (10/2003) revised to eliminate traffic signals at 111th Avenue and 107th Avenue, eliminate two-way left turns between 110th Avenue and 108th Avenue, grade separated intersection at 113th Avenue, and bypass from 103rd Avenue to 91st Avenue.
Alternative E	Full Access Control Option – Includes frontage roads, grade separated intersection at 115th Avenue, grade separation at 107th Avenue, depressed section between 107th Avenue and 103rd Avenue, and bypass from 103rd Avenue to 91st Avenue.
Southern Alignment Option	Free flow access controlled roadway with an alignment shift to Glendale Avenue and system TI at Loop 101

The South Alignment was reviewed with the Management and Technical Committees and in separate meetings with the major agency stakeholders. A number of disadvantages to the South Alignment were identified and are listed in Table 4.

Table 4 – Disadvantages of Southern Alignment Alternative

• The cost of the Southern Alignment is $60 to $100 million more than alignments along Northern Avenue
• The cost of the Southern Alignment would exceed projected funding available from the Proposition 400 and associated local match.
• The entire roadway from Loop 101 to Dysart would have to be constructed in its entirety for the roadway to be functional. This large project is not fundable under the phased funding program in the MAG RTP.
• The alignment would cut diagonally through major developable properties near Loop 101 and adversely affect economic development opportunities.
• The alignment would lie in the Glendale Airport clear zone.
• The system interchange at Loop 101 would be between two existing service interchanges at Glendale and Northern avenues. Modifications to these existing interchanges would be needed, and the system ramps would have to be braided with the service ramps. The new system interchange could adversely affect traffic flow on Loop 101 and as a minimum would require adding lanes and modifications to Loop 101.
• The Southern Alignment is a significant departure from the corridor configuration shown on the Glendale ballot in 2002 and the Proposition 400 ballot in 2004.
• A motorist traveling from 91st Avenue to Dysart Road (a distance of 5 miles) would have to travel approximately 1 mile further (an increase of 20%) on the Southern Alignment compared to alignments along Northern.
• Property acquisition for the alignment would likely be difficult due to the property ownership.
• Due to the cost and freeway-nature of the Southern Alignment, revision to the MAG RTP may be required and implementation may have to be carried out by ADOT. Major changes would be needed to the current program.

A consensus of the major stakeholders indicated that the South Alignment should be eliminated from further consideration.

ALTERNATIVES SELECTED FOR FURTHER STUDY AND PUBLIC REVIEW

Three alternatives were selected to carry into further neighborhood and public meetings and evaluation. These alternatives were refined and presented to the Management and Technical Advisory Committees prior to meeting with affected neighborhoods and holding a public meeting.

Alternative A was derived from Alternative AB. The modifications included elimination of the two-way turn lane between 111th and 107th avenues and replacing it with a raised median or barrier. Left turns would be permitted at the signals at 111th and 107th avenues with a protected

left-turn phase. This phase would also accommodate U-turns. The additional grade separation at 115th Avenue was also eliminated from this alternative due to high cost and low benefit. Two neighborhood connector streets are proposed as shown in Figure 3 to aid access to neighborhoods north of Northern.

Alternative C was also modified. There would be no traffic signals at 111th or 107th Avenue and a raised median or barrier would be provided throughout the section. 107th Avenue would be grade-separated from the Parkway to allow north-south traffic between the neighborhoods and to provide for right-turn access to the Parkway. A grade-separated intersection would be provided at 113th or 115th Avenue. The 115th Avenue location appears to be favored slightly because it is a section line and could be extended to the south in the future if desired. The alternative is shown in Figure 4.

The **No Build** alternative will continue to be carried and evaluated through the evaluation process.

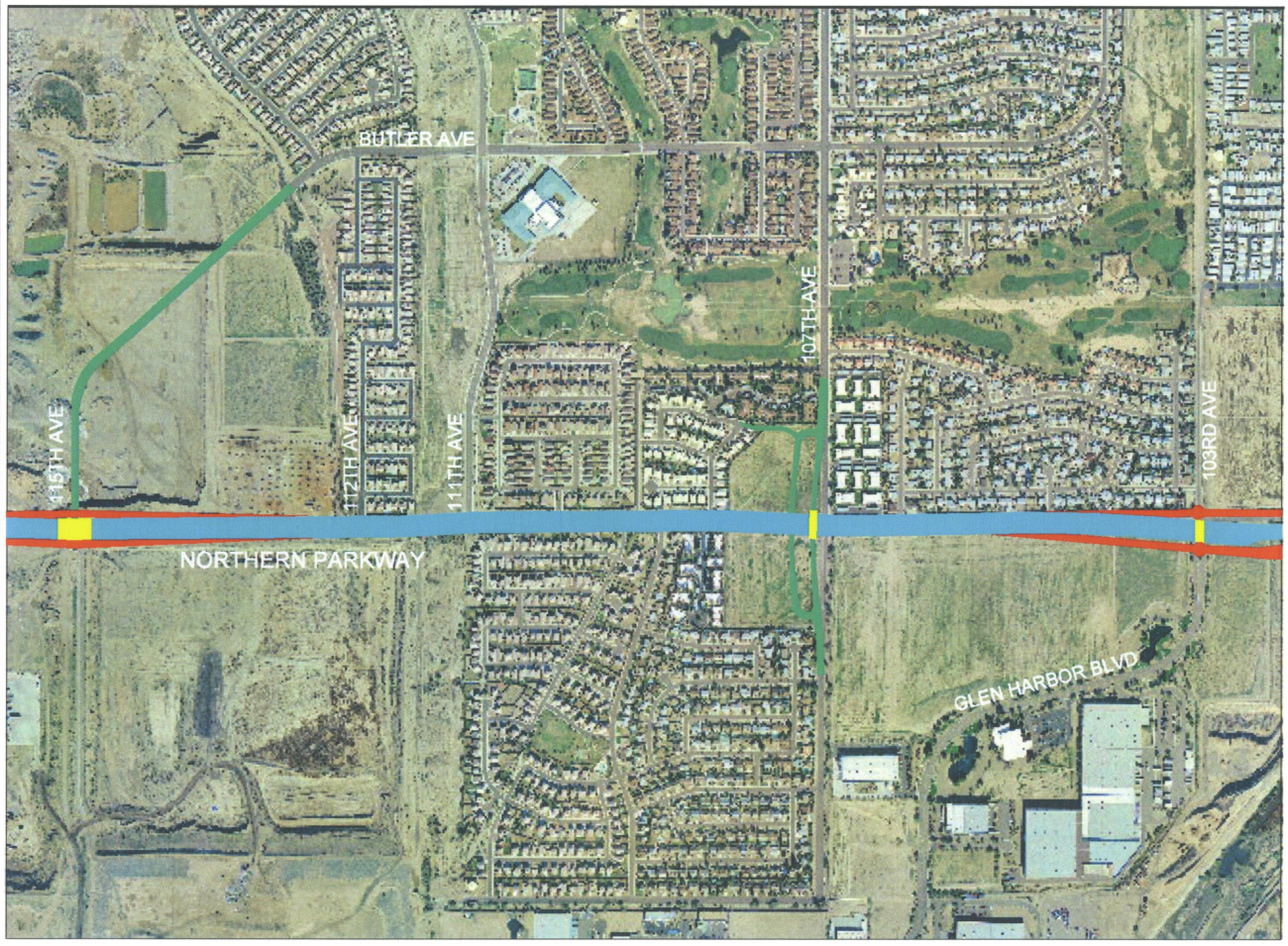

FIGURE 3
ALTERNATIVE C

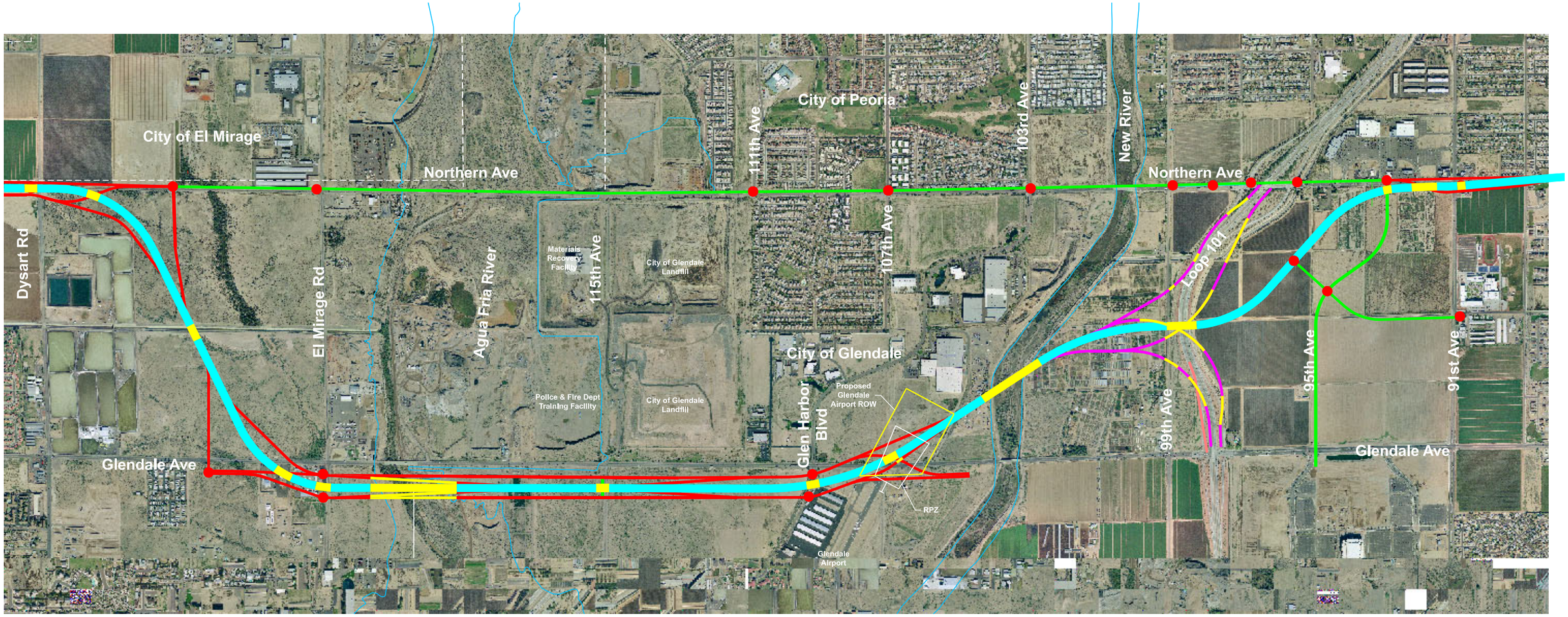

FIGURE 4
SOUTHERN ALIGNMENT OPTION

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