4.0 DESIGN CONCEPT ALTERNATIVES

The development of the design concept alternatives began with determining the location of the corridor. Then options were developed in segments of the corridor including the Loop 303 system TI, the BNSF Webb Spur, the Agua Fria River Bridge, 115th to 103rd avenues, 103rd to 91st avenues, and Grand Avenue intersection. The recommended options for each segment were combined to form the Northern Parkway alternatives, which are described and evaluated in this chapter.

4.1 SR 303L/NORTHERN PARKWAY SYSTEM INTERCHANGE OPTIONS

The SR 303L/Northern Parkway System Interchange is part of the SR 303L/Estrella Freeway (Loop 303) project planned for construction between the years 2011 and 2015 according to the MAG RTP. The configuration of the system interchange effects the western most portion of Northern Parkway and the configuration and location of the Sarival GSI. Several options have been developed and are summarized in the following subsections.

4.1.1 SR 303L – I-10 to US 60 DCR Option

The Loop 303/Northern Parkway System Interchange is included in the SR 303L –I-10 to US 60 preliminary draft DCR prepared for MCDOT in February 2006. The interchange concept in this report would form a "T" with Loop 303 and provide the beginning of Northern Parkway (see Figure 4-1). The interchange would be located midway between Olive Avenue and Northern Avenue and consist of one-lane free flow directional ramps. Olive Avenue interchange with Loop 303 would be a one-half-diamond with ramps to the north while Northern Avenue would be a one-half-diamond with ramps to the south. The Northern ramps and Olive ramps would be connected with two-lane one-way frontage roads. Options for the configuration and location of the system interchange were described and evaluated in a Technical Memorandum called SR 303L/Northern TI Alternatives Evaluation Technical Memorandum and Recommendation of Preferred Alternative dated June 9, 2003 (see Appendix A).

This system interchange was included in the MAG regional traffic forecast model and 2030 volumes indicate the need for two-lane ramps. With this option, the NB-EB and SB-EB ramps would converge together forming a four-lane eastbound roadway on Northern Parkway that would taper to three lanes prior to the Sarival Avenue GSI. WB Northern Parkway would widen to four lanes west of the Sarival Avenue bridge and then split into the two-lane WB-SB ramp and the two-lane WB-NB ramp. Sarival Avenue would be shifted approximately 0.25 mile east of its current location as approved in the Woolf Crossing planned development. Sarival Avenue would not have an EB off-ramp or WB on-ramp due to the proximity of the system interchange ramps.

4.1.2 Woolf Crossing Option

The adjacent developer proposed adding the west ramps to Sarival Avenue. Several options were evaluated; however, only a braided ramp option appeared to be able to provide satisfactory traffic movements (see Figure 4-2) but the cost would be very high. Due to the cost and ADOT concerns, this option is currently not being pursued.

4.1.3 ADOT Loop 303 Frontage Road Option

ADOT took over responsibility of Loop 303 in July of 2006. They have hired a consultant to prepare 30% design plans for SR 303L from Thomas Road to Peoria Avenue by January 2008. These plans include the SR 303L/Northern Parkway Interchange. They have developed several options which impact Northern Parkway. ADOT is proceeding with the option shown in Figure 4-3. It consists of extending a frontage road connection from Sarival Avenue to the west including connections to the Loop 303 NB and SB frontage roads. The frontage would be at-grade and would add another level to the system interchange making four total levels. The Sarival interchange would be placed at the existing Sarival Avenue location. The developer plans for this area are not active at this time. If the ADOT plans are approved, modifications to the Northern Parkway concept in this DCR would need to be revised.

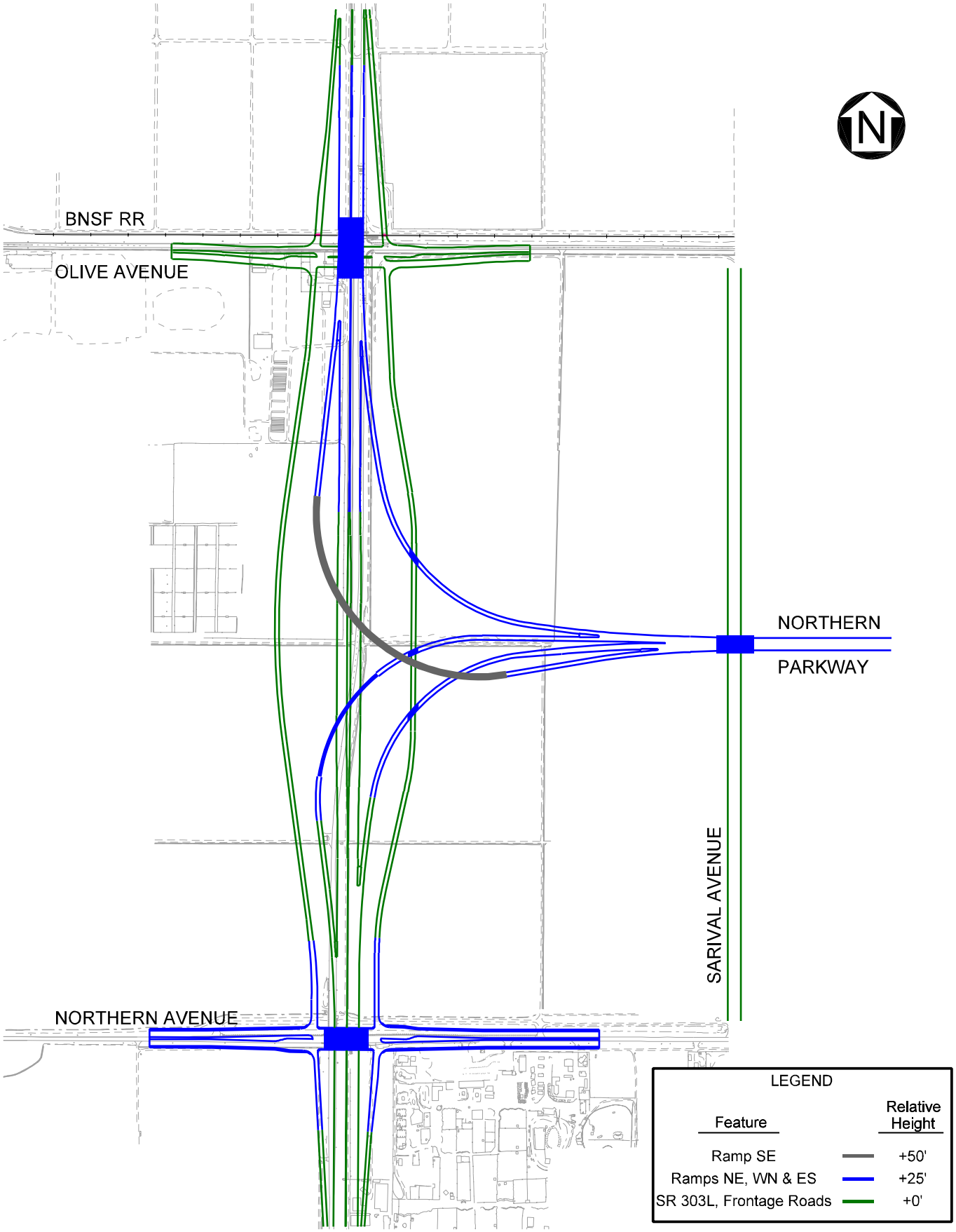

FIGURE 4-1
NORTHERN PARKWAY / SR 303L SYSTEM INTERCHANGE RECOMMENDED CONFIGURATION

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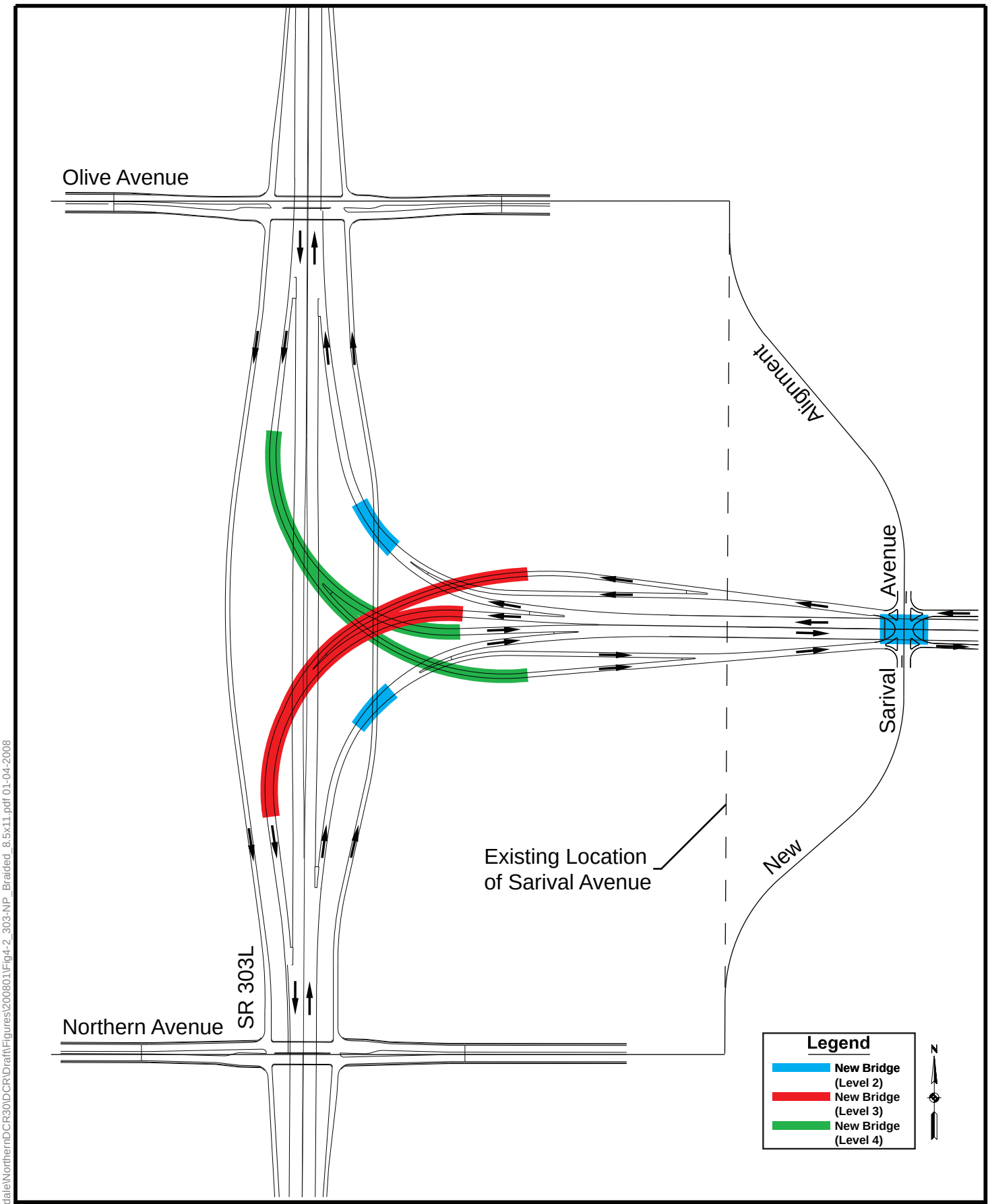

FIGURE 4-2
LOOP 303 / NORTHERN PARKWAY SYSTEM TI - BRAIDED RAMP OPTION

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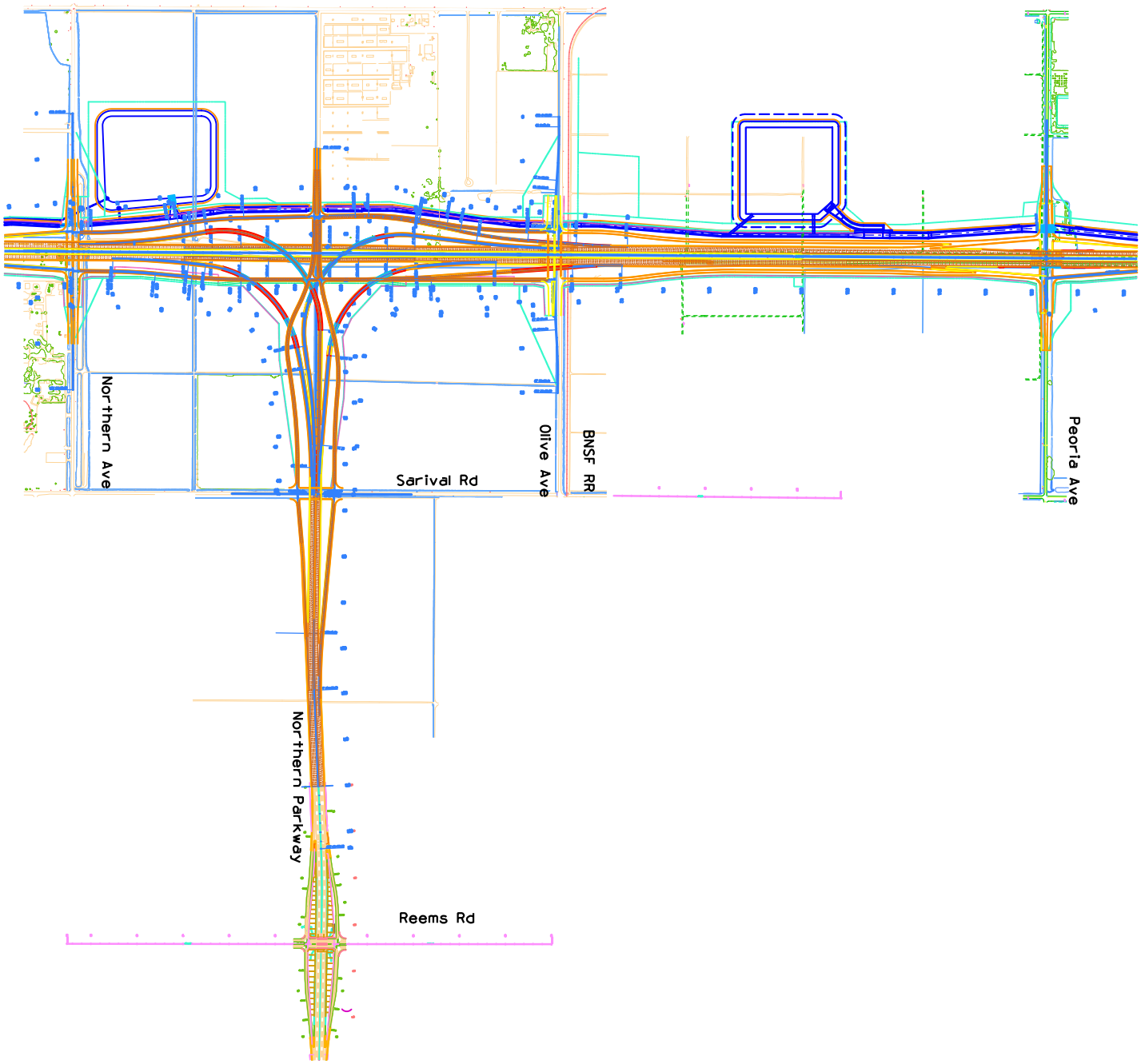

Source: Parsons Brinckerhoff SR 303L/Northern Parkway Interchange Alternative 1 10-04-2007

FIGURE 4-3
LOOP 303 / NORTHERN PARKWAY INTERCHANGE - ALTERNATIVE 1

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4.2 GRADE SEPARATED INTERSECTION OPTIONS

4.2.1 Grade Separated Intersection Concept

The GSI are a critical part of the Northern Parkway concept. They would allow Northern Parkway traffic to operate in a free-flow condition with more capacity while still providing connections to the arterial street system. The grade separation would be achieved by elevating the parkway and allowing the arterial street to remain at-grade, which is more conducive to existing and future development along the intersecting arterial street. The ramps or connecting roadways that would connect Northern Parkway with the arterial street would also be at-grade and could be used to provide access to existing driveways and streets in the east portion of the parkway. Future direct access to the ramps should be avoided if possible.

The ramps would terminate at the intersecting arterial forming either a diamond or SPUI configuration. The SPUI configuration was selected due to its superior traffic operational characteristics, reduced right-of-way requirements, and accommodation of U-turns for large trucks. The diamond interchange configuration was selected for several locations in the west portion of the project where U-turns would not be required, projected traffic volumes are less, left-turn movements are relative low, and where the absence of adjacent development would allow more right-of-way acquisition for embankment slopes near the bridges. Diamond interchanges are also less expensive to construct. Retaining walls would be used at SPUI locations in order to minimize the amount of right-of-way required in more developed areas of the parkway. ADOT guidelines were used to layout the SPUI intersections.

4.2.2 Northern Parkway West

This segment from Sarival Avenue to 115th Avenue would be a fully access controlled facility. Diamond interchanges would be provided at Sarival Avenue (half), Reems Road, and Litchfield Road. SPUI type interchanges would be provided at Dysart and El Mirage roads where U-turns and high volumes of traffic are expected in the future.

4.2.3 Northern Parkway East

SPUI type GSI would be provided at the intersections of 103rd, 93rd (half), 91st (half), 83rd, and 75th avenues due to anticipated high traffic volumes, significant U-turn movements, adjacent development, and large left turn movements.

4.3 BNSF WEBB SPUR CROSSING OPTIONS

The Northern Parkway alignment crosses a railroad spur located 0.5 mile west of Litchfield Road (143rd Avenue). The Webb Spur is owned by BNSF Railway Company. The spur used to provide service to Luke AFB but is now only used to store propane railcars. Luke AFB has indicated that it has no plans to ever use this spur track in the future and has severed its connection at Northern Avenue. In September of 2005, BNSF agreed in principle to abandon the railroad tracks within the proposed Northern Parkway right-of-way and south of the parkway if an equal length of track were provided in another location for railcar storage. This plan would avoid a railroad track crossing at Northern Parkway. Two replacement railcar storage options were presented to BNSF. The first option would build a parallel storage track just west of the existing Webb spur track north of Northern Parkway. This option would maintain an existing railroad crossing at Olive Avenue. The second option would remove the Olive Avenue crossing by constructing the new railroad track storage along the north side the Ennis Spur track which is located along the north side of Olive Avenue.

Subsequent to discussions regarding the abandonment of the Webb Spur, developers approached BNSF about rail access to a large potential industrial development. In August of 2006, BNSF decided to keep the spur in place to service pending potential future industrial development south of Northern Parkway and west of Luke AFB. As a result, several alternatives were investigated at the Webb Spur crossing of Northern Parkway.

Providing an at-grade railroad crossing of the access-controlled, high-speed Northern Parkway would not be desirable. However, an at-grade crossing especially on an interim basis may be a feasible alternative considering the funding constraints for the parkway. An at-grade crossing of Northern Parkway would require approval from the Arizona Corporation Commission.

Elevating the parkway over the existing Webb Spur railroad tracks is another option. Since this crossing is very close the Luke AFB Runway 21R Accident Potential Zone One (APZ 1), potential impacts to flying operations at Luke AFB needed to be investigation by Luke AFB staff. Luke AFB and U.S. Air Force staff conducted an extensive evaluation and concluded in July 2007 that an elevated overpass at the BNSF Webb Spur was acceptable as long as the height of the roadway and any street lights or poles did not exceed 1,150 feet above mean sea level (approximately 52 feet above existing ground at the crossing).

4.4 AGUA FRIA RIVER BRIDGE OPTIONS

The Agua Fria River crosses Northern Avenue east of El Mirage Road. The existing road crossing consists of two dip sections. During storm events, the dip crossings are closed due to flooding. During the past five years, there have been five closures averaging 2.8 days per closure. The Agua Fria River is not channelized, and the floodway is about 2,900 feet wide at Northern Avenue. Although the Agua Fria River is not channelized, there is existing soil cement bank protection along the western bank in the vicinity of Northern Avenue. North of the road, there is significant ongoing in-stream gravel mining on the east overbank and floodplain. FEMA has published Floodplain Insurance Rate Maps (FIRM) that show the extent of the 100-year floodplain and the floodway. Several Northern Parkway bridge options for the Agua Fria River were identified and evaluated.

4.4.1 2003 DCR Option

The first option was developed in the previous DCR published in October 2003. It would consist of a 1,015-foot bridge with guide banks upstream and downstream of the bridge, 3 spur dikes to protect the roadway embankment east of the bridge, and six 72-inch pipes to convey water through the east embankment during high flow events.

Preliminary analysis indicates that the 100-year water surface elevation would rise approximately 3.3 feet with this option, which is above the allowable FEMA floodway water surface. This option is not consistent with the Agua Fria Watercourse Master Plan. Further development and analysis would be required to meet the 100-year floodway water surface elevation requirements. If the proposed water surface exceeds the existing 100-year floodplain elevation, a Conditional Letter of Map Revision is required.

4.4.2 Bridge Floodplain Option

A second option would construct a bridge that is 2,400 feet long that would span the entire floodway with no improvements to the river required. This option would be very expensive ($45 million) but would avoid many environmental issues. This option would raise the 100-year water surface elevation slightly due to the bridge piers.

4.4.3 Watercourse Master Plan River Channelization Option

The third option would include channelizing the Agua Fria River by others from at least Glendale Avenue to Olive Avenue per the adopted Agua Fria Watercourse Master Plan developed by FCDMC. The channel section for the master plan consists of a 500-foot wide channel (top width) and a 500-foot wide terrace area with soil cement bank protection. At the

new bridge, the terrace area would be removed while the main channel top width would increase to 600 feet and include a drop control structure. The result would be a 800-foot long bridge at Northern Parkway. In addition, a multi-use path and maintenance vehicle clearance would also need to be provided on both sides of the channelized river at the bridge crossing. A 4-foot drop grade control structure was included just downstream of the new bridge. This option (including the channelization) would reduce the 100-year water surface elevation and contain up to the 500-year flow between the channel banks. This option is based on others constructing the river channelization.

4.4.4 Watercourse Master Plan River Channelization Option – Glendale Avenue to Northern Parkway

The hydraulic analysis of the full channelization option revealed that only the downstream channel improvement reach was necessary to achieve a zero-rise in the 100-year water surface at the new bridge. Upstream of the proposed 645-foot Northern Parkway bridge, training dikes would be constructed to direct the upstream floodplain to flow under the new bridge and to protect the bridge abutments. A separate maintenance vehicle and multi-use path underpass would be provided west of the bridge crossing. As with the full channelization hydraulic model, a 4-foot drop grade control structure was included. The downstream channel would be constructed per the Agua Fria Watercourse Master Plan (main channel and terrace). The channel would terminate at the existing Glendale Avenue Bridge. The estimated cost for this option if it was included in the Northern Parkway costs would be approximately $32 million including $16 million in right-of-way costs.

Several other variations to this option were explored that involved shortening the length of downstream channelization. The new channel would transition into the existing streambed. Although most of these variations would not raise the 100-year water surface at the new bridge, the new channels could not contain the 100-year flow. The existing streambed downstream of the channelized reach would cause a significant backwater that extended for thousands of feet upstream. If the new channel banks were overtopped, this could cause significant damage or destruction of the new channel banks.

4.4.5 Minimum Channelization Option – Glendale Avenue to Northern Parkway

This option is similar to the previous watercourse master plan option except terraced areas in the master plan would be eliminated resulting in a 600-foot top width channel from Glendale Avenue to Northern Parkway. This channel would be located along the existing stabilized west bank of the river and would accommodate a 645-foot bridge. This option would most likely

occur if the watercourse master plan is not implemented in a timely manner and the cost of approximately $15 million is included in the Northern Parkway project.

4.4.6 Low Flow Option

Another option considered was an interim low flow crossing that would provide an all-weather crossing for a storm frequency of 10 years. Culverts would be installed under a new roadway. These improvements would be "throwaway" if a bridge is built at a later date. This option would raise the 100-year water surface level more than is acceptable. A similar variation that would provide protection for the 2-year storm flow (smaller culverts) would cause an even higher rise in 100-year water surface.

4.4.7 Recommendation

The River Channelization Option would provide the best solution for the 645-foot, 5-span Northern Parkway bridge, for flood control, and for adjacent property owners and jurisdictions.

It was decided that for the purposes of this DCR to assume that the Agua Fria River would be channelized by others at the time the bridge is constructed. There are two possible implementation alternatives for channelizing the Agua Fria River. The first option would involve developing a CIP request to FCDMC with various agencies as partners to channelize the Agua Fria River from Northern Parkway to Glendale Avenue.

The other option would be to form a Recreational Corridor Channelization District as provided for in a recently approved state statute. The district would be formed with property owners along the river with the approval of the County Board of Supervisors and adjacent municipalities. The district could assess property owners to implement the channelization plan that would result in some properties being removed from the floodplain thus enhancing development potential. The FCDMC has been approached by a group of property owners along the Agua Fria River regarding the formation of a channelization district. Initial discussions indicated that the channelization district would construct the bank stabilization and the FCDMC would construct the drop structures and obtain the 404 permit from the U.S. Army Corps of Engineers. FCDMC would like approximately 5 miles of the river to be included in the district.

The timing of the channelization improvements is critical to the construction of the parkway bridge. According to the watercourse master plan, construction would occur over the next 20 to 30 years through a partnership of landowners, municipalities, FCDMC, and the mining industry. Sand and gravel operators would construct discrete segments of the channel between grade control structures at bridges as part of their reclamation plan contained in their mining permits. According to the current phasing and funding plan, the Northern Parkway bridge of the Agua

Fria River would be constructed in 2019. The Northern Parkway Management Committee should take an active role to encourage the timely completion of channelization and construction of the bridge.

4.5 MEDIAN OPTIONS

Medians are an important feature of the Northern Parkway Concept. They would provide an access control feature limiting access to right-in and right-out movements from streets and driveways in the partial access control segment east of 115th Avenue. Medians would also provide separation between opposing traffic and can provide protection against cross over traffic.

4.5.1 Sarival Avenue to 115th Avenue

Several median treatment options were considered in the access controlled segment of the parkway from Sarival Avenue to 115th Avenue. A wide graded and landscaped median was considered to give the Northern Parkway a park-like feel. Concerns were expressed regarding potential for crossover accidents, need for cable barrier, and landscape maintenance access to the median area under high traffic conditions. For the western segment, a concrete median barrier with paved shoulders was selected to enhance safety, and landscaping would be limited to areas along the parkway between the roadway and right-of-way line.

4.5.2 115th Avenue to Grand Avenue

The concrete median barrier would continue east of 115th Avenue and transition to a curbed landscaped median west of 112th Avenue. The curbed landscaped median would continue east to 103rd Avenue providing an urban arterial setting for the parkway in the more developed areas. At 103rd Avenue, the landscaped median would end and be replaced by a concrete median barrier and shoulder through the bypass segment. East of 91st Avenue, the median type will alternate between a raised median between the GSI and concrete barrier on the approaches to the GSI and on the Grand Avenue flyover. The median landscaping will be minimal. Barriers on the GSI help to reduce the median width on the bridge structures.

4.6 TRAFFIC SIGNAL OPTIONS

4.6.1 Initial Concept

The 2003 Northern Parkway Design Concept included eight traffic signals. The general concept was to provide GSI at one-mile arterial streets and to provide traffic signals at 0.5-mile collector streets. To maximize capacity, the signalized intersections contained four through lanes in each direction for Northern Parkway, and left turns were prohibited from Northern Parkway. The principal purpose of the signals was to facilitate local access. It was also recognized that signals would help control speeds.

4.6.2 2006 Concept

After the passage of Proposition 400 in 2004 the timing and availability of funding for the Northern Parkway became clearer. As part of the process to update the initial concept, there was increasing concern about the number of traffic signals in the initial concept for the following reasons:

- The prohibited left-turn concept at signals would create out of direction travel and might not be a sustainable solution in the arena of public opinion.
- Proposed signals may create high accident rates.
- With the estimated high cost of the parkway, cost effectiveness became an increasing concern. It was recognized that reducing the number of signals would expand capacity and decrease travel times.
- With regional funding committed over a 20-year period, the staged nature of the facility became more apparent. Traffic signals will be needed initially at arterial intersections and grade separations can be constructed later at these locations as funding becomes available.

With these concerns in mind, the nature of the Northern Parkway was reassessed with particular reference to traffic signals. The results are summarized as follows:

- **Loop 303 to Dysart**: The initial concept had two traffic signals—one at future Bullard Avenue and another at a proposed connection to existing Northern Avenue 0.5 mile west of Dysart Road. It was decided that a traffic signal was not needed at Bullard because there is no existing road and future needs appear limited. A future GSI when needed and requested by adjacent property owners would be funded by the private sector. The connection to Northern Avenue west of Dysart could be served through the Litchfield

GSI. Traffic destined for Luke AFB could also use Litchfield GSI. Accordingly, this signal and intersection were removed from the concept.

- **Dysart to El Mirage Road**: The initial concept did not include signals on the parkway in this section. However, it was recognized that industrial land uses in the area would need special accommodations for trucks. As a result, frontage roads were included in the concept between Dysart and El Mirage.
- **El Mirage Road to 115th**: The initial concept did not include signals in this section because local access needs are limited due to the flood plain of the Agua Fria River.
- **115th to 103rd**: The 2003 concept included signals at 111th Avenue and 107th Avenue and permitted two-way left turns between these two signalized intersections but not at the signal. Safety concerns were raised regarding the two-way left-turn lane along the parkway because it would be the only place along the parkway that would permit left turns. The concept for this segment includes two options: Option 1 includes traffic signals at 107th and 111th (with left turns permitted) to maximize local access and potentially minimize neighborhood impacts and the removal of the continuous two-way left-turn lane. Option 2 would have no traffic signals – it includes a grade separation at 107th and a GSI at 115th to provide local access while addressing capacity and mobility concerns. Both options include a GSI at 103rd.
- **103rd to 91st**: The initial concept included four traffic signals in this section and the need for additional access was noted. New traffic forecasts indicated that the initial plan was not adequate to serve traffic volumes at SR 101L/Agua Fria Freeway (Loop 101) and 99th Avenue. After many alternatives were identified and evaluated, a free flow bypass was recommended. Access to 99th, Loop 101 and development activities would be via the existing Northern Avenue.
- **91st to Grand**: The initial design concept included traffic signals at 87th Avenue and 79th Avenue at 0.5-mile alignments. 79th Avenue does not exist and 87th Avenue will not be a through street. Alternative local streets have been included between 91st and 89th avenues and between 87th and 83rd avenues (see Sections 4.9.7 and 4.9.8).

4.6.3 El Mirage Concept

Subsequent to consensus by the Northern Parkway Management Committee in February 2006, the El Mirage representative proposed an alternative concept for Northern Parkway near El Mirage. This concept includes three new permanent traffic signals: One at Dysart Road, one at El Mirage Road and one traffic signal at the half-mile collector street alignment between Dysart Road and El Mirage Road.

The El Mirage proposal was modeled by MAG and evaluated for its impacts to the parkway. For the following technical reasons, the El Mirage proposal for three traffic signals on the Northern Parkway is not being carried forward as an ultimate solution.

- These signals will reduce capacity, increase travel times and thus reduce the effectiveness of other investments in the corridor.
- 15 percent decrease in Northern Parkway volumes
- LOS F at the intersections of Dysart and El Mirage Road
- This is an emerging industrial area. Truck access at the one-half-mile traffic signals creates safety concerns. The plan concept with frontage roads between Dysart and El Mirage is preferred
- The future El Mirage Parkway would intersect the Northern Parkway at El Mirage Road. A high capacity GSI is desirable at this location.
- Dysart Road is a designated principal arterial street with high projected future traffic volumes. Delays could be significant at this major intersection with a standard 4-phase traffic signal.

However, it is recognized that on an interim basis traffic signals may be needed at Dysart and El Mirage roads. A traffic signal is currently planned for Northern Avenue and El Mirage Road in 2008.

4.7 115TH AVENUE TO 103RD AVENUE OPTIONS

This segment of Northern Parkway is one of the most challenging due to the proximity of existing residential neighborhoods. Six alternatives were considered in this segment as described and evaluated in the technical memorandum prepared in October 2005. A copy of this document is included in Appendix B. The technical memorandum resulted in two alternatives being carried forward (Alternative A and C). These alternatives became Option 1 and Option 2 and are described in the following subsections.

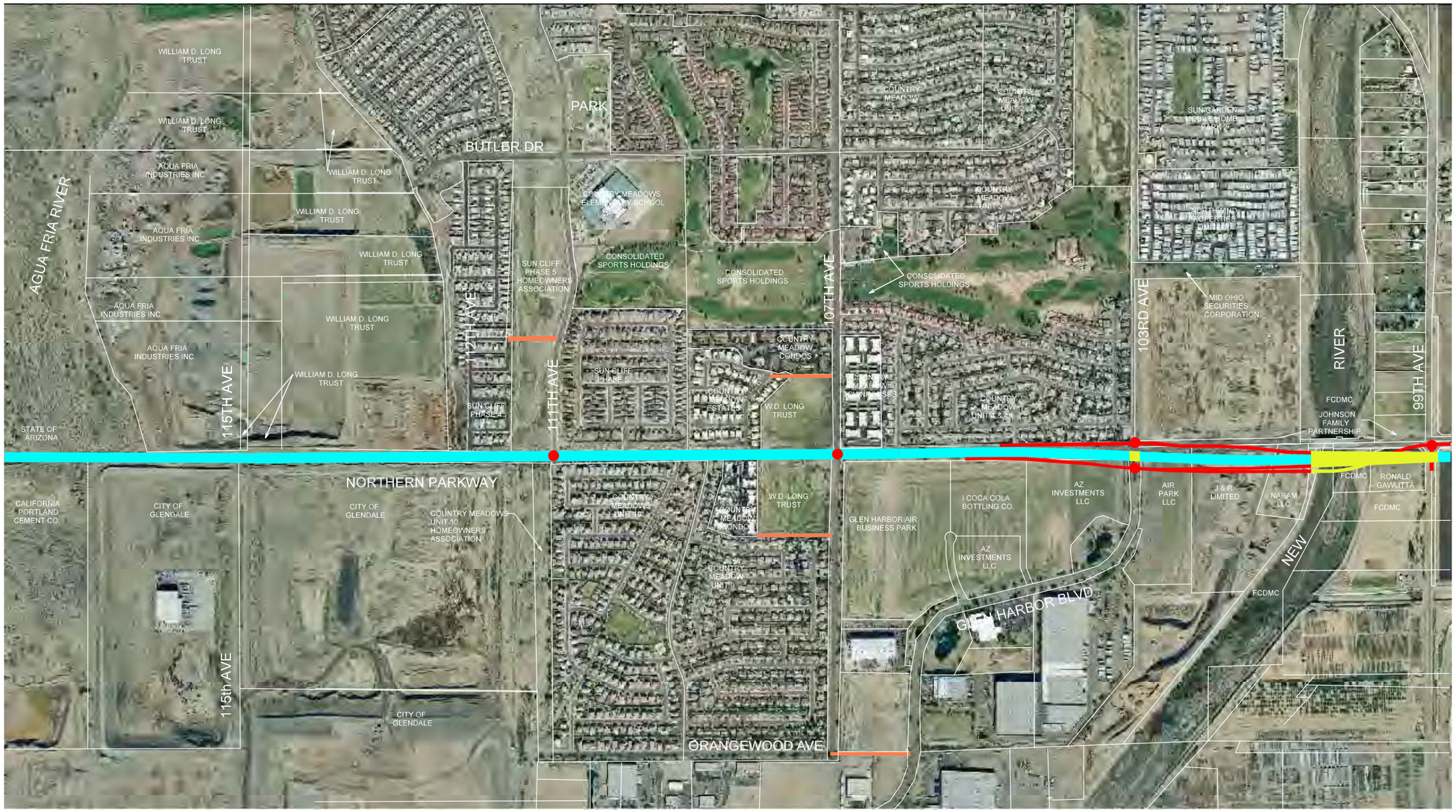
4.7.1 Option 1

Option 1 consists of an urban street section with three through lanes plus a continuous auxiliary lane in each direction separated by a continuous landscaped raised median (see Figure 4-4). The auxiliary lane provides for direct right-in/right-out traffic from local streets and driveways and provides a fourth through lane at the signalized intersections. Three-phase traffic signals would be provided at 111th and 107th avenues including a protected left-turn phase for Northern

Parkway that would also accommodate U-turn movements. Left-turn movements from 107th Avenue would share green time with through movements on 107th Avenue. Pedestrians would also share the 107th Avenue and 111th Avenue green time, which would have to be extended to accommodate pedestrians due to the width of the parkway. Pedestrian crossings of Northern Parkway at locations other than at these signalized intersections would present safety concerns. Physical barriers placed in the median may be advisable at locations where pedestrians currently cross Northern Avenue to prevent unprotected pedestrian crossings of the parkway. Pedestrian volumes and circulation patterns in this area should be analyzed further in the 30 percent design phase.

In addition, westbound right-turn lanes would be provided at 111th and 107th avenues and an eastbound right-turn lane would be provided at 107th Avenue to help alleviate anticipated congestion at both intersections in the AM and PM peak hour in 2030 and to enhance safety (see Traffic Report). The existing lane configuration for 111th Avenue would be maintained with a southbound left-turn lane, a southbound right-turn lane, and a northbound lane. 107th Avenue would be widened to provide northbound and southbound left-turn lanes, a through lane in each direction, and a shared right-turn/through lane in each direction. The overall level of service for 111th Avenue and 107th Avenue is forecast to be F in the AM and PM peak hours in 2030.

The signalized intersections of 107th and 111th avenues would help to maintain access and circulation for the residential neighborhoods located on both sides of Northern Parkway between 112th and 103rd avenues. The installation of the continuous raised medians would present some challenges to neighborhood access and circulation. Although westbound right turns into and out of 112th, 110th, 108th, Country Meadows Townhomes, and 106th avenues would be allowed, eastbound left turns at these intersections would not be possible due to the raised median. Similarly, eastbound right-turn access would be maintained at 110th and 109th avenues, and Country Meadows Condos Unit 2; however, westbound left-turns at these locations would not be allowed. The elimination of these left-turn movements would enhance safety on the parkway. In addition, current street connections at 109th and 104th avenues (north side) would be eliminated. The elimination of the 109th Avenue intersection would be needed to provide space to relocate an EPNG facility, and elimination of 104th Avenue would be necessary due to its proximity to the 103rd Avenue GSI. The loss of these connections and left-turn movements would be mitigated by allowing U-turn movements during the dedicated left-turn phases at 107th and 111th avenues, U-turn movements at the 103rd Avenue GSI, and by adding new neighborhood connector streets as described in Section 4.9 of this report.



Features

- Left Turns & U Turns @ 111th & 107th
- Right In / Right Out Access
- No Left Turns Between Signals
- 45 MPH Speed Limit
- Northern Parkway Under 103rd Ave

Legend

- Northern Parkway
- Bridge
- Ramps/Connector Roads
- Proposed Access Roads
- Traffic Signals

FIGURE 4-4
115TH AVENUE TO 103RD AVENUE - OPTION 1

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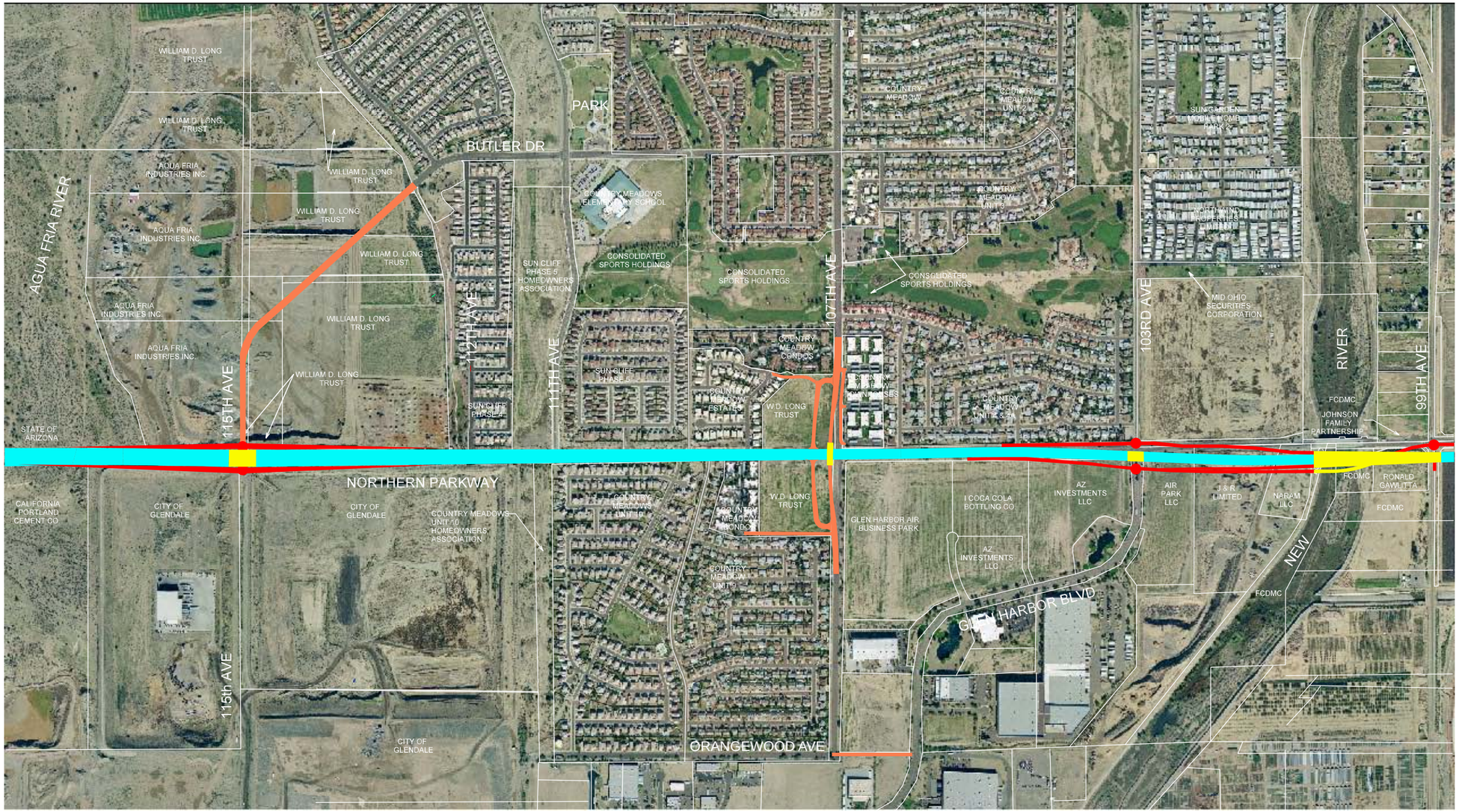
4.7.2 Option 2

Option 2 would remove the traffic signals and left turns at 111th and 107th avenues included in Option 1, add a GSI at 115th Avenue, and elevate 107th Avenue over the parkway (see Figure 4-5). The GSI at 115th Avenue and the 107th Overpass could be added to the Option 1 improvements at a later date. When they are constructed, the opening in the raised median at 111th would be removed creating a right-in/right-out condition at this intersection.

Similarly, the median opening at 107th Avenue in Option 1 would be replaced by a continuous raised median. The 107th Avenue and Northern Parkway intersection would be replaced by the elevated 107th Avenue approach roadway and bridge structure over the parkway. A single lane in each direction would be provided on the overpass structure and approaches. Retaining walls would help minimize right-of-way impacts to adjacent properties. The overpass would also provide for pedestrian movements from the southern neighborhoods to the neighborhoods, elementary school, and city park north of Northern Parkway. New "jughandle" streets located immediately west of the existing 107th Avenue could be included to provide right-in/right-out connections from Northern Parkway to 107th Avenue (see Figure 4-5). The "jughandle" streets would also provide access to undeveloped commercial land west of 107th Avenue and additional access to Country Meadows Estates and Country Meadows Condos Unit 2 (south of Northern Avenue). If the "jughandle" connections are not provided, alternative access routes to the GSI at 115th Avenue and 103rd Avenue would need to be used to get to destinations along 107th Avenue including routes through existing neighborhoods.

The 115th Avenue GSI would provide a turn-around location for traffic from the neighborhoods accessing Northern Parkway and would provide a connection to Butler Drive (see Figure 4-5). A bridge structure over Northern Parkway would be constructed to elevate 115th Avenue. The elevated intersection would be in a SPUI to facilitate U-turn movements. Ramps or connector roadways would be provided for all movements and the auxiliary lane on the parkway would be removed between the west and east ramp gores. The 115th Avenue/Butler Drive connection would traverse an area currently being mined for sand and gravel and would provide alternative access to the neighborhoods north of Northern Parkway. Substantial earthwork import may be needed to construct the road through the mined area. The other neighborhood access streets from Option 1 and as described in Section 4.9 are included in Option 2 as well except for the 111th Lane to 111th Avenue connection.



Features

- 107th Ave Over Parkway & "Jughandle" Connections
- Right In / Right Out Access
- No Left Turns
- 45 MPH Speed Limit
- Northern Parkway Under 103rd Ave

Legend

- Northern Parkway
- Bridge
- Ramps/Connector Roads
- Proposed Access Roads
- Traffic Signals

FIGURE 4-5
115TH AVENUE TO 103RD AVENUE - OPTION 2

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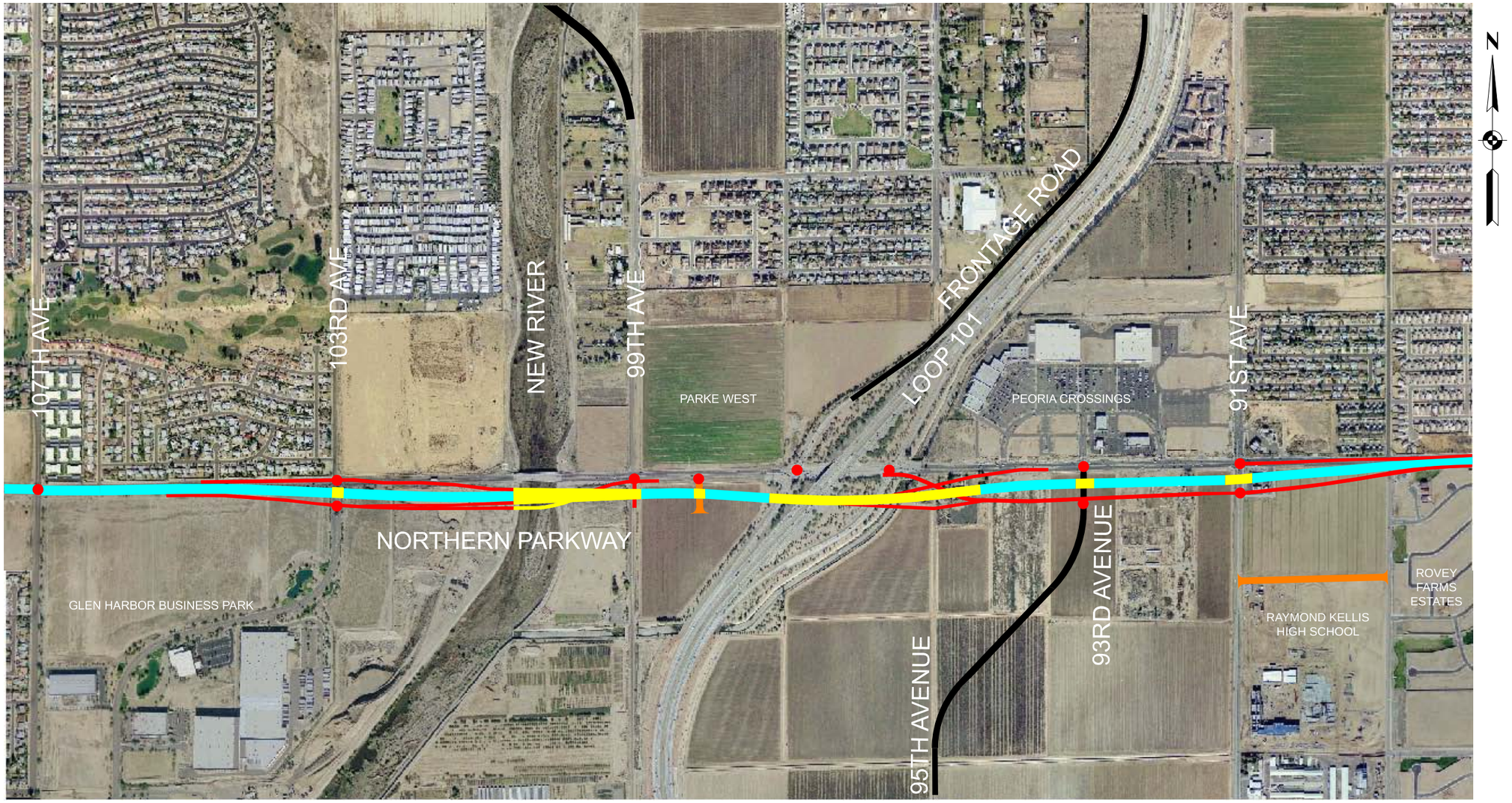
A grade-separated pedestrian crossing may need to be considered near 111th Avenue in Option 2. There would be one mile between the 107th Avenue overpass and the 115th Avenue GSI where pedestrians could cross Northern Parkway safely. The elementary school and park located near 111th Avenue and Butler Drive attract pedestrians from the neighborhoods south of Northern Parkway and they typically cross in the vicinity of 110th and 109th avenues. Although sidewalks would be provided along Northern Parkway on both sides of the street, continued at grade pedestrian crossings of the parkway present safety concerns due to the traffic volume and speeds anticipated for the parkway. Another possible location of a grade-separated pedestrian crossing is at 110th Avenue. Further analysis of pedestrian traffic should be performed during 30 percent design.

Generally, Option 2 would provide safer access and circulation for traffic from/to the adjacent neighborhoods; however, this access would be more awkward and require more out-of-direction movements compared to Option 1.

4.8 103RD AVENUE TO 91ST AVENUE OPTIONS

Eleven options were evaluated for the 103rd to 91st avenues segment of Northern Parkway as documented in the Northern Parkway Alternatives – 103rd Avenue to 91st Avenue Technical Memorandum prepared in October 2005 and contained in Appendix D of this report. Alternative 4D was the recommended alternative in the technical memorandum, and it has been refined through subsequent input from property owners and stakeholders. The alternative contained in the concept plans consists of a bypass roadway that would provide free flow through traffic, with full access control from 103rd Avenue to 91st Avenue. Traffic wanting access to Loop 101 would exit the parkway at 103rd Avenue or 91st Avenue and travel on Northern Avenue to the ramps at Loop 101. A full interchange would be included for 103rd Avenue while 91st Avenue will be a modified split-diamond configuration. The west ramps at 91st Avenue would be placed on the west side of 93rd Avenue. A GSI would be provided at 93rd Avenue/Peoria Crossings center entrance and the west ramps of 93rd Avenue would be connected to the east ramps at 91st Avenue by a one-way westbound roadway along existing Northern Avenue and a one-way eastbound roadway to be constructed on the south side of the bypass (see Figure 4-6). This option would provide good access to Peoria Crossings and to the future Glendale commerce center south of Northern Avenue. The west ramps at 93rd Avenue would be largely on bridge structure over Loop 101 and the NB Loop 101 Northern Avenue off-ramp.



Features

- Northern Parkway Separate From Northern Ave
- Access Control On Parkway (Bypass)
- Full Access To Northern Ave
- 45 MPH Speed Limit
- 91st/93rd Split Diamond TI

Legend

- Northern Parkway
- Bridge
- Ramps/Connector Roads
- Proposed Access Roads
- By Others
- Traffic Signals

FIGURE 4-6
103RD AVENUE TO 91ST AVENUE PROPOSED CONCEPT

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4.9 ALTERNATIVE ACCESS STREETS

The access control measures to be implemented for Northern Parkway may create awkward out of direction travel for access to and from several neighborhoods and employment areas. The following proposed access streets would help alleviate this situation.

4.9.1 127th Avenue/Butler Drive Extension

Access to the developing area north of Northern Parkway between Dysart Road and El Mirage Road was analyzed extensively by the partner agencies. Although one-way frontage roads on both the north and south sides of the parkway are included in this DCR, additional connections were desired to improve circulation and access to Northern Parkway. Several options were analyzed to provide better connection to both future and existing development on the north side of Northern Parkway including the new Hanson Pipe facility. The option agreed to by the Northern Parkway Management Committee consists of constructing 127th Avenue (half mile street) from the Northern Parkway westbound frontage road to Butler Drive (0.5-mile north) and extending Butler Drive from 127th Avenue to Dysart Road (see Figure 1-7). The new streets would add up to approximately one mile in length and would traverse private property.

4.9.2 115th Avenue/Butler Drive (Option 2 Only)

This street would connect the proposed 115th Avenue GSI with neighborhoods to the northeast in the Suncliff and Country Meadows neighborhoods (see Figure 4-5). This street would begin at the 115th Avenue GSI and head northward. It would then curve to the northeast and connect to existing Butler Drive. This new street would be about 0.6 mile long. The roadway would traverse private property that is being mined by sand and gravel companies. The construction of this street would require a City of Peoria General Plan Amendment.

4.9.3 Royal Palm Road – 111th Lane to 111th Avenue (Option 1 Only)

This street would provide access from Suncliff V neighborhood to 111th Avenue and the 111th Avenue traffic signal at Northern Parkway. Without this new connection, Suncliff V residents desiring to go eastbound on Northern Parkway would either have to go to Butler Drive (0.5 mile north of Northern Avenue) to access 111th Avenue or make at right turn from 112th Avenue go west 1.5 miles on Northern Parkway, make a U-turn at the El Mirage Road GSI and head east on the parkway (see Figure 4-4). The new street would align with Royal Palm Road to the west and be separated far enough north of Harmont Drive on the east side of 111th Avenue so that the new intersection of Royal Palm Road would not cause conflicts for the existing “T” intersection of 111th Avenue and Harmont Drive. The right-of-way required for the new street is owned by the

Suncliff Home Owner Association (HOA) with overlying transmission tower easements. This street extension would be approximately 0.1 mile long.

4.9.4 Royal Palm Road – 108th Drive to 107th Avenue

Extending Royal Palm Road east to 107th Avenue would provide access from the Country Meadows Estates neighborhood to 107th Avenue (see Figure 4-4 and Figure 4-5). Currently the only access to this neighborhood is from Northern Avenue. Without this new connector street, eastbound traffic from the neighborhood would have to turn right on Northern Parkway and then make a U-turn at 111th (Option 1) or 115th Avenue GSI (Option 2). The street would be located along the north side of undeveloped commercial property and require the removal of a house in the neighborhood. This street extension would be approximately 0.1 mile long.

4.9.5 Augusta Avenue – West of 107th Avenue

This street would connect 107th Avenue to the Country Meadows Condos Unit 2 subdivision located on the south side of Northern Avenue. The condos currently only have access to Northern Avenue (see Figure 4-4 and Figure 4-5). Without this new connector street, westbound traffic wanting to get to the condos would have make a U-turn at 111th Avenue (Option 1) or 115th Avenue (Option 2). The right-of-way for the street would be acquired along the south edge of vacant commercial property. Two condo units of an 8-unit building would have to be removed to make space for the new street and driveway. This street would be approximately 0.1 mile long.

4.9.6 Orangewood Avenue – 107th Avenue to Glen Harbor Boulevard

Orangewood Avenue would be extended from 107th east to Glen Harbor Boulevard (see Figure 4-4 and Figure 4-5). This street would provide access from Country Meadows neighborhoods south of Northern Avenue to the proposed 103rd Avenue GSI and provide alternative access to Glendale Avenue to the south. The new right-of-way would be acquired from private property in the Glen Harbor Business Park that is currently vacant. This extension of Orangewood would be about 0.1 mile long.

4.9.7 Hayward Avenue – 91st Avenue to 89th Avenue

This street would connect 91st Avenue to 89th Avenue and provide enhanced access for the Rovey Farm Estates neighborhood south of Northern Avenue and east of 89th Avenue (see Figure 4-6). Without this connection, westbound traffic from the neighborhood would take a right-turn at 89th Avenue head east (¾ mile) along Northern Parkway; make a U-turn at 83rd Avenue, and then head west. Right-of-way would be acquired at the south end of vacant property

just north of Raymond Kellis High School. This new street would be approximately 0.25 mile long.

4.9.8 Griswold Road – 87th Avenue to 83rd Avenue

This street would connect 87th and 83rd avenues approximately 0.25-mile north of Northern Parkway (see Figure 1-7). This 0.5-mile long street would provide enhanced access to Summersett Village neighborhood north of Northern Avenue between 89th and 87th avenues, better access for future commercial development located on the northeast corner of 87th and Northern, an alternative access route to the Omega School located on the north side of Northern Avenue east of 87th Avenue, and other undeveloped properties between 87th and 83rd avenues. The street would be located just south of the SRP transmission tower property. Right-of-way would be acquired from undeveloped private property and the backyards of two homes near the 85th Avenue alignment.

4.9.9 SRP Access – East of 75th Avenue

The SRP Agua Fria Generating Station located northeast of 75th Avenue and Northern Avenue currently has their main entrance off Northern Avenue near the 73rd Avenue alignment. The proposed new access driveway would extend east from 75th Avenue. Without this new access route, eastbound Northern traffic headed to the SRP facility would have to continue east one mile past the plant and turn around using the connector roadways at Grand Avenue, which is very awkward. The new driveway would be constructed on land owned by SRP with a temporary construction easement. This new access roadway would be about 0.2 mile long.

4.10 GRAND AVENUE/NORTHERN AVENUE INTERSECTION OPTIONS

The Northern Parkway concept from the 2003 DCR includes a “flyover” ramp from Northern Parkway west of Grand to Grand Avenue southeast of Northern Avenue. In addition, ADOT recently completed the 67th Avenue overpass project, which removed this traffic from the Northern/Grand intersection. In spite of the removal of the 67th Avenue traffic and “flyover” traffic from the intersection, the Northern Avenue and Grand Avenue intersection still is expected to be congested. An acceptable level of service would be expected if the left turns were removed from the intersection and the traffic signal became two phase. The left turns removed from the intersection would be accommodated by using the existing connector roadways installed in the 67th Avenue overpass project. An additional connector road added to the southeast quadrant of Northern and Grand avenues would be required to accommodate SEB to EB traffic (see Figure 4-7). SEB Grand Avenue traffic wanting to go east on Northern Avenue would get in the left lane northwest of Northern Avenue, go through intersection into a one-lane

roadway located between the Grand Avenue "flyover" and the northwest-bound Grand Avenue roadway, then make a left-turn onto a new roadway and then north to Northern Parkway. This left-turn movement across northwest-bound Grand Avenue traffic would be controlled by a two phase new traffic signal.

4.11 NORTHERN PARKWAY ALTERNATIVES

Four Northern Parkway alternatives have been identified for the corridor from Loop 303 to Grand Avenue (US 60). The alternatives are Alternative 1 – Northern Avenue Alignment Option 1 (with two traffic signals), Alternative 2 – Northern Avenue Alignment Option 2 (no traffic signals), Alternative 3 – Southern Alignment, and the No Build Alternative. Each of these alternatives are described in the following sections and then evaluated against the project purpose and need and implementation criteria.

4.11.1 Alternative 1 – Northern Avenue Alignment Option 1 (with two traffic signals)

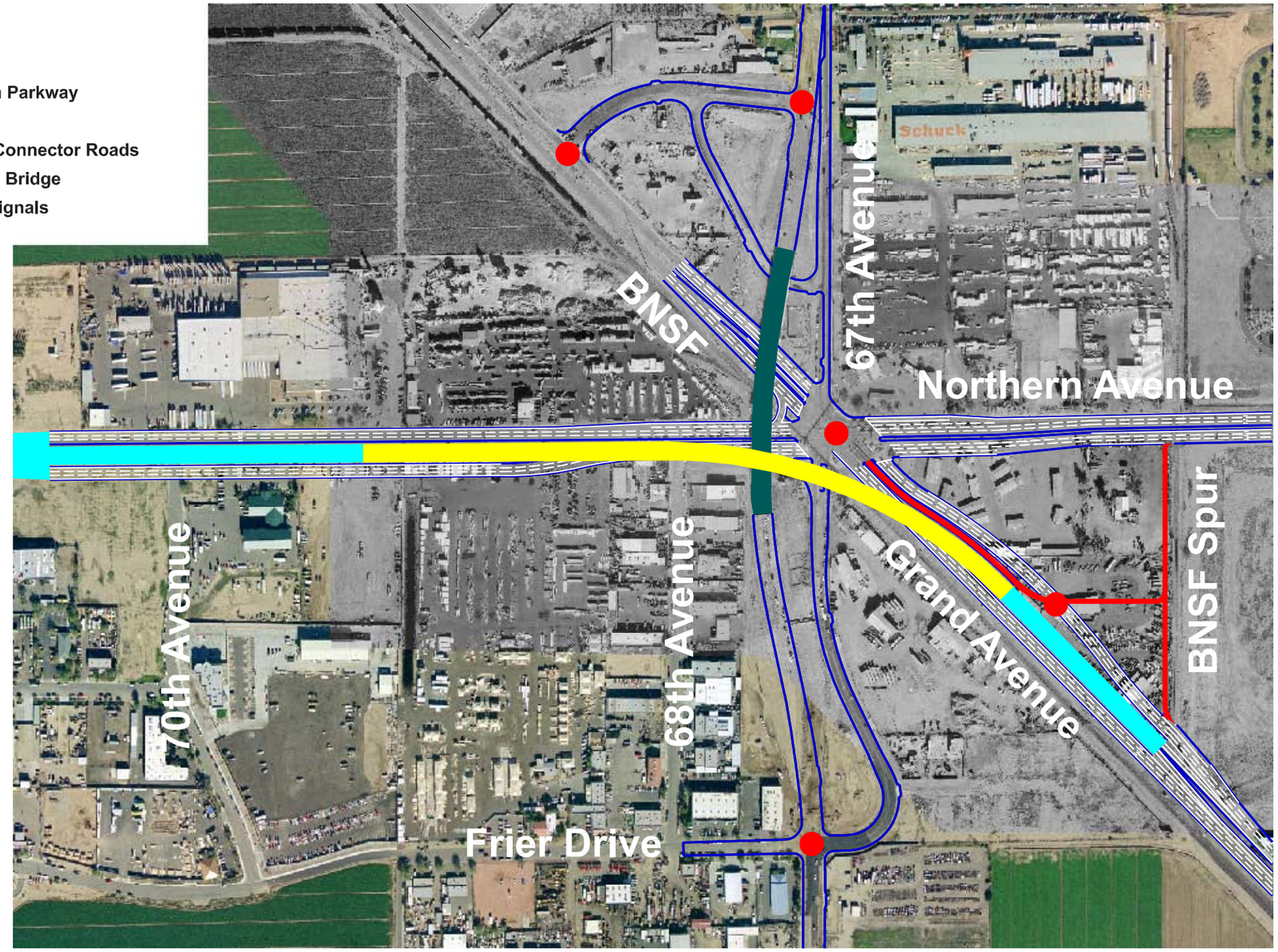
Northern Parkway would begin at Loop 303. A fully directional "T" interchange has been proposed for Northern Parkway at Loop 303. The interchange is expected to be a part of the Loop 303 project and built by ADOT so its design and costs are not included in this study. The interchange is located at the mid point between Northern and Olive avenues at the Butler mid-section location.

Alternative 1 would begin at the existing Sarival Avenue and continue eastward along the Butler alignment to Litchfield Road. It would then swing south to the Northern Avenue alignment at Dysart Road and continue along this alignment to US 60 (Grand Avenue). Grade Separation Intersections (GSI) would be provided at Sarival Avenue, Reems Road, Litchfield Road, Dysart Road, El Mirage Road, 103rd Avenue, 93rd Avenue, 91st Avenue, 83rd Avenue, and 75th Avenue. The parkway would provide three through lanes in each direction plus an auxiliary lane between GSIs. The parkway would be fully access controlled from Loop 303 to 115th Avenue. Full shoulders would be provided along with a concrete median barrier. A drainage channel would be constructed along the north side of the parkway from Sarival to Dysart Road to intercept overland flows and discharge them into various outfalls. Some of these facilities would be jointly funded by the FCDMC.

Special design features would be incorporated into the Litchfield Road GSI. Litchfield Road would be constructed below ground so that the height of the bridge structure for the parkway over Litchfield Road would be lower than other GSI structures for the parkway.

Legend

- Northern Parkway
- Bridge
- Ramps/Connector Roads
- 67th Ave Bridge
- Traffic Signals



N

Features

- No Left Turns From Northern & Grand
- Right In / Right Out Access
- 45 MPH Speed Limit

FIGURE 4-7
GRAND AVENUE - PROPOSED CONCEPT

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Frontage Roads are planned between Dysart Road and El Mirage Road to accommodate expected truck traffic from the developing industrial uses.

A major new bridge is planned at the Agua Fria River at the existing dip crossing area. A master plan for channelizing the river has been prepared by FCDMC, and its implementation is dependent upon participation by landowners and by the sand and gravel extraction operations in the general flood plain area. Timing for the bridge construction is planned to coincide with the river channelization.

Traffic signals at 111th and 107th avenues would be provided to facilitate neighborhood access. The signals would have left-turn phases for Northern Parkway traffic. No left turns would be permitted anywhere other than at these two signals. Neighborhood connector streets as described in Section 4.9 would be constructed to aid restoration of access to all the neighborhoods. Curbs, gutters, sidewalks, street lighting, and landscaping would be provided from 112th Avenue east to Grand Avenue.

Between 103rd and 91st avenues, a unique configuration was developed that includes maintaining a portion of Northern Avenue to provide access to properties and to Loop 101. Northern Avenue would be improved to provide three lanes in each direction plus turning lanes. A separate fully access controlled bypass would be provided for the parkway that would be aligned to the south of Northern Avenue. The bypass would be elevated over 99th Avenue, Loop 101, 93rd Avenue, and 91st Avenue and depressed under 103rd Avenue. It would have three lanes in each direction.

The Northern Avenue interchange at Loop 101 would need to be widened and modified to accommodate future traffic volumes but would function similarly as today. The widened roadway would include three through lanes and dual left-turn lanes in each direction.

At US 60 (Grand Avenue) a direct flyover ramp is planned to connect the west leg (Northern Parkway) to the southeast leg of Grand Avenue. The flyover would provide a free flow connection between the Northern Parkway and Grand Avenue southeast of the parkway. The flyover would consist of one lane in each direction and would be in the median of the parkway and of Grand Avenue. Improvements to the intersection of Grand Avenue and Myrtle Avenue near downtown Glendale would be needed to accommodate the increased traffic on Grand expected from Northern Parkway.

Northern Avenue would continue eastward from the beginning of the Grand Avenue flyover (71st Avenue) to connect with Grand Avenue at the signalized intersection as it does today. Northern Avenue would be widened to three lanes in each direction divided by the flyover, and would be widened at the intersection of Grand to provide four through lanes in each direction

and a westbound right-turn lane. All left turns at this intersection would be prohibited at the intersection but accommodated by the existing or planned connector streets.

Northern Parkway is planned as a major traffic thoroughfare so that bicycles and local bus service are discouraged along this roadway. Parallel routes are available.

4.11.2 Alternative 2 – Northern Avenue Alignment Option 2 (no traffic signals)

Alternative 2 is the same as Alternative 1 west of the Agua Fria River bridge and east of 103rd Avenue. Between the Agua Fria River Bridge and 103rd Avenue, Option 1 would be modified to include a GSI at 115th Avenue and a grade separation at 107th Avenue and the elimination of traffic signals at 107th and 111th avenues as described in Section 4.7.2 of this report.

4.11.3 Alternative 3 – Southern Alignment

The Alternative 3 would be the same as Alternative 1 west of Dysart Road and east of 91st Avenue. East of Dysart Road, the Northern Parkway alignment would curve south and cross Glendale Avenue west of El Mirage Road (see Figure 3-2 or concept plans in Volume II of the DCR). The parkway would continue eastward south of and parallel to Glendale Avenue to Glen Harbor Boulevard. East of Glen Harbor Boulevard, the alignment would curve north and cross Loop 101 midway between Glendale Avenue and Northern Avenue. East of Loop 101, the parkway would curve north and match into the Alternative 1 bypass alignment west of 91st Avenue.

Alternative 3 would include GSI at Dysart Road, El Mirage Road, Glen Harbor Boulevard and 91st Avenue. In addition, grade separations would be provided at EB Northern Avenue (east of Dysart Road), WB Glendale Avenue (west of El Mirage Road), 115th Avenue/Glendale Landfill entrance, WB Glendale Avenue (east of Glen Harbor Blvd.), Loop 101, a future street east of Loop 101, 95th Avenue, and EB Northern Avenue (west of 91st Avenue). Northern Parkway would be elevated over intersecting streets except Glen Harbor Boulevard where the parkway would be depressed to accommodate the Glendale Airport runway operation. The Southern Alignment would include three lanes in each direction plus an auxiliary lane between GSI and full width paved shoulders. Alternative 3 would be access controlled from Loop 303 to 91st Avenue. One-way frontage roads would be provided from El Mirage Road to Glen Harbor Boulevard. The WB frontage road would replace the existing Glendale Avenue roadway.

New bridges would be included over the Dysart Drain, Agua Fria River (main line and EB frontage road), and New River.

A fully directional system interchange with Loop 101 would be provided as part of the Southern Alignment alternative. The parkway ramps to Loop 101 would be braided with existing ramps at Glendale and Northern avenues. Additional lanes for the parkway ramps and tapers would require widening the Glendale and Northern Avenue bridges, reconstruction of the Glendale Avenue SPUI, and paving work south to Bethany Home Road and north to Olive Avenue.

4.11.4 No Build Alternative

The No Build Alternative would consist of Northern Avenue as it currently exists with no improvements. Northern Avenue is a rural roadway with one lane in each direction from Loop 303 to 112th Avenue and a five-lane street with two lanes in each direction and a two-way left turn lane from 112th Avenue to Grand Avenue. Northern Avenue would connect to the improved Loop 303 freeway with a full diamond interchange. Intersecting arterials and parallel arterials in the area are assumed to be improved in accordance with the MAG 2030 model and local agency future plans.

4.11.5 Purpose and Need Evaluation

The four alternatives described in the previous sections were each evaluated against the project purpose and need criteria discussed in Section 1.3 of this report. A summary of this evaluation is contained in Table 4-1.

Table 4-1
Comparison of Alternatives
Purpose and Need Evaluation

Project Purpose and Need Criteria	Alternative 1 Northern Avenue Alignment Option 1 (with two traffic Signals)	Alternative 2 Northern Avenue Alignment Option 2 (no traffic signals)	Alternative 3 Southern Alignment	No Build Alternative
1. Serve Population Growth (high capacity route serving developing areas)	• High capacity route links western growth area and Loop 101 commercial area **Fair**	• Higher capacity route links western growth area and Loop 101 commercial area **Good**	• Highest capacity route links western growth area and Loop 101 commercial area and potential growth area south of Glendale Avenue **Best**	• No additional capacity is added to accommodate growth **Poor**
2. Improve Travel Time (from Loop 303 to US 60/Myrtle Avenue Intersection)	• Provides direct travel path • Good Speeds, but signals reduce average speeds (Average Speed = 32.6 mph) • Travel Time = 24.2 minutes **Good**	• Provides direct travel path • No signals and considerable access control increase speed (Average Speed = 39.1 mph) • Travel Time = 20.2 minutes **Best**	• Out of direction travel offsets improved travel times • No signals and considerable access control increase speed (Average Speed = 41.9 mph) • Travel Time = 20.5 minutes **Good**	• Provides direct travel path • Poor Speeds, No access control and numerous signals reduce average speeds (Average Speed = 19.3 mph) • Travel Time = 41.6 minutes **Poor**
3. Provide Regional Connectivity (connect to freeway and to state highway system)	• Provides regionally designated route • Regional connection to Loop 303 • Enhanced connection to Loop 101 • Enhanced connection to US 60 (Grand Avenue) **Good**	• Provides regionally designated route • Regional connection to Loop 303 • Enhanced connection to Loop 101 • Enhanced connection to US 60 (Grand Avenue) **Good**	• Provides regionally designated route • Regional connection to Loop 303 • Regional connection to Loop 101 • Enhanced connection to US 60 (Grand Avenue) **Best**	• No regional route provided • No enhanced connections provided **Poor**
4. Improve Regional Facility Spacing	• Provides new regional corridor at desired spacing **Good**	• Provides new regional corridor at desired spacing **Good**	• Provides new regional corridor at desired spacing **Good**	• Does not provide new regional corridor **Poor**
5. Provide New Agua Fria River Crossing (enhance all-weather travel)	• Provides new bridge crossing **Best**	• Provides new bridge crossing **Best**	• Does not provide new crossing location **Fair**	• Maintains at-grade crossing **Poor**

Project Purpose and Need Criteria	Alternative 1 Northern Avenue Alignment Option 1 (with two traffic Signals)	Alternative 2 Northern Avenue Alignment Option 2 (no traffic signals)	Alternative 3 Southern Alignment	No Build Alternative
6. Enhance East/West Traffic Flow (A higher capacity route is needed to supplement the limited East/West network)	• Doubles capacity of route over arterial street conditions • Connects western Maricopa County to El Mirage, Peoria, Glendale, Luke AFB, including future industrial areas, commercial/stadium area, and central Phoenix	• Triples capacity of route over arterial street conditions • Connects western Maricopa County to El Mirage, Peoria, Glendale, Luke AFB, including future industrial areas, commercial/stadium area, and central Phoenix	• 3.5 times capacity of route over arterial street conditions • Connects western Maricopa County to El Mirage, Peoria, Glendale, Luke AFB, including future industrial areas, commercial/stadium area, and central Phoenix	• No increase in capacity • No high-capacity linkage of activity centers
	Fair	**Good**	**Best**	**Poor**
7. Implement Regional and Local Plans	• Most consistent with adopted transportation plans and ballot measures	• Generally consistent with adopted transportation plans, but level of access control and elimination of signals not anticipated in these plans	• Not consistent with corridor or concept shown on ballot measures • Use of Glendale Avenue segment not consistent with plans for a transit corridor on this alignment	• Would not implement adopted plans
	Best	**Good**	**Fair**	**Poor**
8. Improve Accident Rates (provide design features that reduce potential for accidents)	• Reduction in signals and full-to-partial access control improves safety over arterial street conditions • Remaining 2 signals on an otherwise high-speed roadway could present safety concerns	• No signals and full-to-partial access control greatly improve safety over arterial street conditions	• No signals and more complete access control greatly improves safety over other alternatives	• Little access control and numerous traffic signals result in high crash rates on arterials
	Good	**Best**	**Best**	**Poor**

4.11.6 Other Evaluation Factors

In addition to the purpose and need factors, other factors were used to evaluate the four alternatives. These other factors relate to how the alternative will accommodate future traffic demands, constructability, access impacts to adjacent neighborhoods and businesses, and cost of the alternative. The factors used are described in the following paragraphs of the report and a summary of the evaluation is contained in Table 4-2.

LOS

The average level of service (LOS) for each alternative is the first evaluation factor in Table 4-2. Each alternative achieves at least an acceptable LOS of C or D in AM and PM peak hours with 2030 traffic volumes with a few exceptions. The signalized intersections of 107th and 111th avenues in Option 1 would have LOS F during the peak hours, which is not an acceptable LOS for design of new roadways. The higher volumes attracted to the parkway in Option 2 and the Southern Alignment Alternative would cause the LOS to slip to E during peak hours between Dysart and Loop 101. The No Build Alternative would carry considerably less traffic volumes than the build alternatives and the LOS would drop to E and F east of 91st Avenue.

Traffic Signals

Traffic signals on high volume arterials generally restrict traffic capacity, cause delay, and increase traffic accidents. The fewer traffic signals, the better the alternative was rated.

Access Control

Streets and driveways that intersect an arterial street generally cause an increase in traffic accidents and reduce the traffic flow on the arterial street. Each alternative was evaluated on the length of the parkway with full access control.

Alignment Length

The length of each alignment alternative was compared between Sarival and Grand avenues. The Southern Alignment was determined to be the worst since it is approximately 0.9 miles longer than Option 1 or 2 resulting in out-of-direction travel.

Table 4-2
Comparison of Alternatives
Other Factors

Other Factors	Alternative 1 Northern Avenue Alignment Option 1 (with two traffic Signals)	Alternative 2 Northern Avenue Alignment Option 2 (no traffic signals)	Alternative 3 Southern Alignment	No Build Alternative
1. LOS (2030 average and at critical locations)	• LOS C /D • LOS F at intersections of 111th and 107th avenues on Northern Parkway • LOS E/F at Grand and Myrtle intersection	• LOS C/D • LOS E between Dysart and 91st Avenue • LOS F at Grand and Myrtle intersection	• LOS C/D • LOS E at Litchfield Overpass • LOS E between Dysart and Loop 101 • LOS F at Grand and Myrtle intersection	• LOS C/D • LOS E/F at Litchfield Road, 99th Avenue, and east of 91st Avenue
	Fair	**Fair**	**Fair**	**Poor**
2. Traffic Signals (Number of expected signals in 2030)	• 2	• 0	• 0	• 24
	Good	**Best**	**Best**	**Poor**
3. Access Control (length of fully access controlled roadway)	• 8.8 miles	• 9.3 miles	• 11.0 miles	• 0
	Good	**Good**	**Best**	**Poor**
4. Alignment Length (miles)	• 12.4	• 12.4	• 13.3	• 12.2
	Good	**Good**	**Fair**	**Good**
5. Construction Phasing (flexibility in phasing)	• Phasing – Sarival to Dysart, Bypass from 103rd to 91st Avenue • Remaining portions of Northern Parkway can be divided into small segments for construction	• Phasing – Sarival to Dysart, Bypass from 103rd to 91st Avenue • Remaining portions of Northern Parkway can be divided into small segments for construction	• Phasing – Sarival to Dysart • Portion from Dysart to 91st Avenue requires larger segments for construction • Remaining portion of Northern Parkway can be divided into small segments for construction	• N/A
	Good	**Good**	**Fair**	**-**

Other Factors	Alternative 1 Northern Avenue Alignment Option 1 (with two traffic Signals)	Alternative 2 Northern Avenue Alignment Option 2 (no traffic signals)	Alternative 3 Southern Alignment	No Build Alternative
6. Maintenance of Traffic During Construction (New alignment construction allows minimum traffic control and disruption to existing traffic)	• Sarival to Agua Fria – 5.6 mi • Bypass – 103rd to 91st avenues – 1.5 mi	• Sarival to Agua Fria – 5.6 mi • Bypass – 103rd to 91st avenues – 1.5 mi	• Sarvial to 91st avenues – 10.0 mi	• N/A
	Good	**Good**	**Best**	**-**
7. Utility Impacts (major utility impacts)	• Relocate 5 water wells • Relocate Sewer lift station • Relocate EPNG "piglauncher" • Major pipeline relocations at 103rd, 91st, 83rd, 75th, and Grand Avenue "flyover"	• Relocate 5 water wells • Relocate Sewer lift station • Relocate EPNG "piglauncher" • Major pipeline relocations at 107th, 103rd, 91st, 83rd, 75th, and Grand Avenue "flyover"	• Relocate groundwater recharge facility • Major pipeline relocations at 91st, 83rd, 75th, and Grand Avenue "flyover"	• none
	Fair	**Fair**	**Good**	**Best**
8. Local Access and Neighborhood Circulation	• Left turns and U-turns at signalized intersections of 111th and 107th avenues provides good access • Other left turns and U-turns restricted to GSI	• Right-in/right-out only at 111th and 107th avenues. Left turns and U-turns restricted to GSI including 115th and 103rd avenues • "Jughandle" connector streets at 107th Avenue	• Access and circulation in Country Meadows area unaffected • Left turns and U-turns restricted to GSI	• Local access not impacted
	Good	**Fair**	**Good**	**Best**
9. Right-of-Way Impacts (area in acres, number of parcels, homes removed, businesses removed)	• 305 acres • 224 "partial take" parcels • 26 "total take" parcels • relocate 28 houses • relocate 9 businesses	• 313 acres • 230 "partial take" parcels • 26 "total take" parcels • relocate 28 houses • relocate 9 businesses	• 426 acres • 229 "partial take" parcels • 18 "total take" parcels • relocate 22 houses • relocate 10 businesses	•
	Fair	**Fair**	**Poor**	**Best**

Other Factors	Alternative 1 Northern Avenue Alignment Option 1 (with two traffic Signals)	Alternative 2 Northern Avenue Alignment Option 2 (no traffic signals)	Alternative 3 Southern Alignment	No Build Alternative
10. Preserve and Serve Large Developable Parcels for Economic Development (Diagonal alignment across undeveloped parcels eliminates large areas from potential development)	• Diagonal alignment between Litchfield and Dysart roads **Good**	• Diagonal alignment between Litchfield and Dysart roads **Good**	• Diagonal alignment between Litchfield and Dysart roads • Diagonal alignment between Dysart and El Mirage roads • Diagonal alignment between Glen Harbor Boulevard and 91st Avenue. **Poor**	• No realignment of Northern Avenue, so large parcels remain **Best**
11. Enhance Flood Protection in the West Valley	• Provides additional flood protection to downstream properties consistent with regional flood control plan **Good**	• Provides additional flood protection to downstream properties consistent with regional flood control plan **Good**	• Provides additional flood protection to downstream properties consistent with regional flood control plan **Good**	• No additional flood protection to downstream properties **Fair**
12. Project Cost	• $640.9 million **Good**	• $681.4 million **Fair**	• $790.0 million **Poor**	• **Best**

Construction Phasing

Northern Parkway is planned to be constructed in phases due to funding limitations, constructability issues, and maintaining connectivity. The ability to divide the alternative into smaller segments for construction is deemed beneficial for the project implementation. Restrictions to construction in smaller sections occur between Sarival and Dysart roads since this segment is on a new alignment. Construction of this segment is best served if at least the interim concept is constructed at one time which is common in all three build alternatives include. Alternatives 1 and 2 include the bypass segment from 103rd Avenue to 91st Avenue which must be completed to provide connections to the parkway. The Southern Alignment can be constructed in 1-mile segments; however, through traffic along the Northern Avenue corridor from Loop 101 to Grand Avenue would not be serviced well until the entire segment from Dysart Road to 91st Avenue is completed.

Maintenance of Traffic During Construction

Construction of the parkway on portions of the alignment separated from traffic greatly simplifies the construction process and may result in cost savings. Construction on the Butler alignment from Sarival Avenue to Dysart Road could be accomplished without interfering with traffic except at cross streets. Construction of the parkway south of the existing Northern Avenue from Dysart Road to the Agua Fria River (Alternatives 1 and 2) would also provide separation from traffic during construction. Alternatives 1 and 2 also include 1.5 miles of bypass construction from 103rd to 91st Avenues. The Southern Alignment Alternative also would allow construction separated from traffic Dysart Road to 91st Avenue.

Utility Impacts

Alternatives 1 and 2 would encounter major utility conflicts east of 112th Avenue through developed areas including an El Paso Natural Gas pipe monitoring facility (pig launcher) at 109th Avenue and a sewer lift station near 112th Avenue. The grade separated intersections of 103rd, 91st, 83rd, 75th and Grand avenues would be the most disruptive to utility facilities. The Southern Alignment Alternative would avoid the lift station and EPNG facility but would impact a groundwater recharge facility.

Local Access and Neighborhood Circulation

Local access and circulation would be most affected by construction of the parkway in the residential neighborhoods between 112th and 103rd avenues. Alternative 1 would provide good access and circulation at the signalized intersections of 111th and 107th avenues. The installation of the continuous raised median would necessitate U-turn movements at the traffic signals.

Alternative 2 would make access to these neighborhoods more awkward by removing the traffic signals. U-turns would be restricted to GSI at 115th and 103rd Avenues which would require out-of-direction travel. The "jughandle" connector streets at 107th Avenue would also necessitate out-of-direction travel. The Southern Alignment alternative would avoid these neighborhood access and circulation issues.

Right-of-Way Impacts

Minimizing the amount of right-of-way required for Northern Parkway was a major factor in the design and evaluation of the Northern Parkway alternatives. Retaining walls at the grade separation structure approaches help reduce the amount of right-of-way required. The total new right-of-way required for Northern Parkway Alternative 1 is 305 acres. This quantity does not include property that may be acquired outside the new right-of-way line that may be required when entire parcels need to be purchased. Also, considerable effort was made in the design to avoid the necessity of acquiring homes and businesses. In spite of these efforts, it is anticipated that 28 houses and 9 businesses will require relocation in Alternatives 1 and 2 as shown in Table 4-3. Where the impact to individual parcels was considered to be too severe, the entire parcel would be acquired. Table 4-4 lists the 26 parcels currently identified as entire "takes." Alternative 2 is similar to Alternative 1 but requires about 8 more acres of right-of-way.

Table 4-3 Alternative 1 and 2 Anticipated House and Business Relocations

Location	Parcel #	Owner	Property Address	House	Business	Plan Sht
W of Dysart	501-47-001D	B&H General		2		P39
W of Dysart	501-52-002B	B&H General		2		P41
E of El Mirage	501-54-008Z	Dakota Fabricating	12111 W. Northern Ave		1	P57
E of El Mirage	501-54-008D	Sheri Mizrachi	12000 W. Northern Ave		1	P57
NE Corner of 108th	142-73-341	L. J. Coughran	8015 N. 108th Drive	1		P75
108th and Royal Palm	142-73-331	Michelle Monaco	8095 N. 108th Drive	1		P155
CM Condos Unit 2	142-75-310	Delano Jantzen	8081 N. 108th Lane	1		P154
CM Condos Unit 2	142-75-311	Marc Evans	10815 W. Northern Ave	1		P154
E of Loop 101	142-56-001D	Manual Silva	9433 W. Northern Ave	1		P91
E of Loop 101	142-56-001G	Mathew Sparrow	9431 W. Northern Ave	1		P93
SE Corner of 91st	142-30-002H	Banana Wind LLC			1	P97
E of 83rd Avenue	142-22-002S	Ermland LLLP		1		P109
E of 83rd Avenue	142-25-007P	Peter Schubert	8231 W. Northern Ave	1		P109
E of 83rd Avenue	142-25-013	Stanley Novak	7945 W. Northern Ave	1		P111
E of 83rd Avenue	142-22-002S	Ermland LLLP		1		P109
W of 75th Avenue	142-24-011F	Rovey Investments		1		P115
W of 75th Avenue	142-23-007P	Ermland LLLP		4		P115
W of 75th Dr	142-23-008B	Sharp Family Tr	7534 W. Northern Ave	1		P117
W of 75th Dr	142-23-011B	Thompson Family	7530 W. Northern Ave	1		P117
W of 75th Dr	142-23-002D	Thompson Family	7520 W. Northern Ave	1		P117
SW Corner of 75th	142-24-021B	Ermland LLLP		3		P119
NW Corner of 75th	142-23-013V	Daryl Strickler	7502 W. Northern Ave	1		P119
SW Corner of 68th	143-24-036	William Lautour	7926 N. 68th Ave		1	P127

Location	Parcel #	Owner	Property Address	House	Business	Plan Sht
SE Corner of Grand	143-32-002B	Palm Harbor Homes	6646 W Grand Ave		1	P129
Grand	143-32-001A	David Davies	6548 W Grand Ave		1	P129
Grand	143-32-003A	Joey Loyd	6516 W Grand Ave		1	P131
Grand	143-34-009A	Pet Care Veterinary	6440 W Grand Ave		1	P149
Grand	143-34-001A	Terrones Family	6364 W Grand Ave		1	P149
Grand	143-34-005A	Sunset Trailer Park	6338 W Grand Ave	2		P148
Totals				**28**	**9**	

Table 4-4 Alternative 1 and 2 List of Entire Parcels Required for Right-of-Way

Location	Parcel #	Owner	Parcel Area (sf)
W of Litchfield	501-42-025M	Nasir Nekho	307,087
W of Dysart, North Side of Northern	501-47-001B	G & H General Partnership	66,716
SE Corner of El Mirage and Northern	501-54-008U	Gerald Mason	73,600
E of El Mirage, South Side of Northern	501-54-008Y	Carl Vasey	79,500
E of El Mirage, South Side of Northern	501-54-008T	Gerald Mason	32,300
E of El Mirage, South Side of Northern	501-54-008Z	Dakota Fabricating, Inc.	143,000
E of El Mirage, South Side of Northern	501-54-008J	Charles Rush	74,600
E of El Mirage, South Side of Northern	501-54-008G	Alice Hullien	16,600
E of El Mirage, South Side of Northern	501-54-008F, 501-54-008D	Sheri Mizrachi	74,600
E of El Mirage, South Side of Northern	501-54-008P	Atlas Construction	79,200
NE Corner of 112th and Northern	142-71-495	Suncliff III & IV HOA	3,800
Between 110th and 109th, North Side of Northern	142-74-181	Suncliff V HOA	26,000
Between 109th and 108th, North Side of Northern	142-73-342	City of Peoria	28,700
NE Corner of 108th and Northern	142-73-341	Lonnie Coughran	7,300
SW Corner of 99th and Northern	142-60-005L	City of Glendale	178,900
E of Loop 101, South side of Northern	142-56-001D	Manuel Silva	154,500
E of Loop 101, South side of Northern	142-56-001G	Matthew Sparrow	20,300
SE Corner of 91st and Northern	142-30-002H, 142-30-002J	Banana Wind, LLC	56,500
NW Corner of 83rd and Northern	142-33-002C, 142-33-002D	G&B Smith Properties	27,000
W of 75th, North Side of Northern	142-23-002D, 142-23-002E	Thompson Family	8,400
W of 75th, North Side of Northern	142-23-013X, 142-23-013Y	Sharp Family	6,800
W of 75th, North Side of Northern	142-23-025, 142-23-026	Maricopa County	7,450
SW Corner of 68th and Northern	143-24-036	William Lautour	19,400
SE Corner of 68th and Northern	143-24-011	Northern Acquisition Mgmt	18,500
S of Northern, E of Grand	143-32-004A	David and Barbara Davies	23,000
S of Northern, E of Grand	143-32-003A	Joey Loyd	54,600

Alternative 3 requires about 121 more acres of right-of-way than Alternative 1. The list of home and business relocations and total take parcels for Alternative 3 are listed in Table 4-5 and Table 4-6, respectively.

Table 4-5 Alternative 3 Anticipated House and Business Relocations

Location	Parcel #	Owner	Property Address	House	Business	Plan Sht
W of Dysart	501-47-001D	Dysart & Northern LLC		2		P39
W of Dysart	501-52-002B	Dysart & Northern LLC		2		P41
W of El Mirage	501-56-015S	Advantage Storage LLC	12405 W. Glendale Ave		1	P183-4
W of El Mirage	501-56-001B	Western Hills Baptist Ch	12301 W. Glendale Ave		1	P184
W of 115th Avenue	501-55-002A	City of Glendale	11719 W. Glendale Ave		1	P188
SE Corner of 91st	142-30-002H	Banana Wind LLC			1	P97
E of 83rd Avenue	142-22-002S	Ermland LLLP		1		P109
E of 83rd Avenue	142-25-007P	Peter Schubert	8231 W. Northern Ave	1		P109
E of 83rd Avenue	142-25-013	Stanley Novak	7945 W. Northern Ave	1		P111
E of 83rd Avenue	142-22-002S	Ermland LLLP		1		P109
W of 75th Avenue	142-24-011F	Rovey Investments		1		P115
W of 75th Avenue	142-23-007P	Ermland LLLP		4		P115
W of 75th Dr	142-23-008B	Sharp Family Tr	7534 W. Northern Ave	1		P117
W of 75th Dr	142-23-011B	Thompson Family	7530 W. Northern Ave	1		P117
W of 75th Dr	142-23-002D	Thompson Family	7520 W. Northern Ave	1		P117
SW Corner of 75th	142-24-021B	Ermland LLLP		3		P119
NW Corner of 75th	142-23-013V	Daryl Strickler	7502 W. Northern Ave	1		P119
SW Corner of 68th	143-24-036	William Lautour	7926 N. 68th Ave		1	P127
SE Corner of Grand	143-32-002B	Palm Harbor Homes	6646 W Grand Ave		1	P129
Grand	143-32-001A	David Davies	6548 W Grand Ave		1	P129
Grand	143-32-003A	Joey Loyd	6516 W Grand Ave		1	P131
Grand	143-34-009A	Pet Care Veterinary	6440 W Grand Ave		1	P149
Grand	143-34-001A	Terrones Family	6364 W Grand Ave		1	P149
Grand	143-34-005A	Sunset Trailer Park	6338 W Grand Ave	2		P148
Totals				**22**	**10**	

Table 4-6 Alternative 3 List of Entire Parcels Required for Right-of-Way

Location	Parcel #	Owner	Parcel Area (sf)
W of Litchfield	501-42-025M	Nasir Nekho	307,087
W of Dysart, North Side of Northern	501-47-001B	Dysart and Northern LLC	66,716
W of El Mirage, S of Glendale	501-56-015K	Rick Robarge	14,193
SW Corner of El Mirage and Glendale	501-56-001B	Western Hills Baptist Church	83,435
W of 115th, S of Glendale	501-55-001A	Advantage Fund LLC	77,263
E of 107th, N of Glendale	142-58-004D	Glendale Airport Partners	10,895
W of 99th Avenue	142-57-004A	Stein Family LTD	162,767
W of 99th Avenue	142-60-008B	Stein Family LTD	92,457
E of 99th Avenue	142-56-017	Roosevelt Irrigation District	2,501
SE Corner of 91st and Northern	142-30-002H, 142-30-002J	Banana Wind, LLC	56,500
NW Corner of 83rd and Northern	142-33-002C, 142-33-002D	G&B Smith Properties	27,000

Location	Parcel #	Owner	Parcel Area (sf)
W of 75th, North Side of Northern	142-23-002D, 142-23-002E	Thompson Family	8,400
W of 75th, North Side of Northern	142-23-013X, 142-23-013Y	Sharp Family	6,800
W of 75th, North Side of Northern	142-23-025, 142-23-026	Maricopa County	7,450
SW Corner of 68th and Northern	143-24-036	William Lautour	19,400
SE Corner of 68th and Northern	143-24-011	Northern Acquisition Mgmt	18,500
S of Northern, E of Grand	143-32-004A	David and Barbara Davies	23,000
S of Northern, E of Grand	143-32-003A	Joey Loyd	54,600

Preserve and Serve Large Developable Parcels for Economic Development

A good transportation system is important to create economic vitality for local, regional, state, and national economies. The Northern Parkway corridor passes through and is adjacent to large undeveloped parcels and farmland that will be converted to urban uses based on comprehensive and general plans from Maricopa County, City of Glendale, City of Peoria, and El Mirage. It is important that the large developable parcels are not divided up into small, awkward-shaped parcels that are sometimes the result of diagonal alignments. Designation of the Northern Parkway corridor would aid the cities and county in planning urban development that is compatible with the parkway and that would use the added capacity and mobility provided by the parkway. The Parkway would help attract quality development that would support the local, regional, state and national tax base used to provide public services.

Enhance Flood Protection in the West Valley

The West Valley has few flood control structures; therefore, large areas of land are subject to flooding during major storms. FCDMC has developed an Area Drainage Master Plan of channels and basins to control flooding in the project area. The Northern Parkway project provides opportunities to work with the FCDMC to implement elements of the master plan along the corridor by combining the flood protection for the roadway with the flood protection of downstream properties, and expediting implementation through joint funding.

Project Cost

One of the most significant factors is the estimated project cost of each alternative. Alternative 1 would be the least expensive of the build alternatives while the Southern Alignment alternative would be significantly more expensive due to the system interchange at Loop 101.

4.11.7 Proposed Action

Development of the Northern Parkway Design Concept Report and the Northern Parkway Environmental Assessment have considered many options and four alternatives as described in the previous sections. Based on the evaluation of the purpose and need (Table 4-1), the evaluation of other factors listed in Table 4-2, and input from agency partners, stakeholders, and the public, the Northern Parkway Management Committee has selected Alternative 1 – Northern Avenue Alignment Option 1 (two traffic signals) as described in Sections 4 and 5 of the DCR and as shown in the concept plans contained in Volume 2 of this report. Alternative 1 is the Proposed Action and some important features are summarized below:

Alignment

The preferred alignment is along Northern Avenue from Grand Avenue to Dysart Road. Between Dysart Road and Litchfield Road the alignment transitions northward to the Butler Drive alignment. From Litchfield Road to Loop 303 the parkway would follow the Butler alignment.

Design Concept

A wide variety of design concepts have been investigated. Major issues evaluated include the level of access control and the number of signals.

This alternative includes only two traffic signals—one at 111th and one at 107th— and these intersections would provide the only two median breaks. Intersections of major arterials and the Northern Parkway would be grade separated. Committed levels of access control are as follows:

- Full access control between Sarival and 115th Avenue
- Partial access control between 115th and 103rd avenues as well as between 91st Avenue and Grand Avenue
- Between 103rd and 91st Avenue, the parkway would be located on a fully access-controlled bypass

Several alternative access roads would be provided to minimize impacts of access control. The ADOT/MCDOT Design Concept Report for Loop 303 defines the design concept for the connection between Loop 303 and the Northern Parkway.

After Alternative 1 is completed, studies will be undertaken to address any additional improvements that may be needed to meet the needs of neighborhoods and the motoring public.

Phasing

The Northern Parkway Corridor is located in a rapidly developing area. It is recognized that under current funding commitments completion of Alternative 1 is more that 20 years off and beyond the current MAG RTP and funding program. In order to ensure effective use of limited resources it is important that the parkway be constructed in meaningful contiguous segments and that right of way be protected to ensure completion of the ultimate facility.

The recommended phasing is Option 2A – West to East Not Accelerated alternative described in Appendix C of this report. This alternative includes acceleration of the local match funding from the City of Glendale and MCDOT. Elements of this phasing concept from early to final construction include:

- Interim parkway construction from Sarival to Dysart (four lanes) – at-grade signalized intersections for intersecting arterials (future locations of GSI)
- Interim throwaway widening from Dysart to 112th Avenue (four lanes) – minimal access control
- Ultimate GSI construction at Sarival, Reems, Litchfield – full access control
- Interim parkway and ultimate GSI construction from Dysart Road to the Agua Fria River including GSI at Dysart and El Mirage Road and the interim half Agua Fria River Bridge (four lanes) – full access control
- Interim parkway from the Agua Fria River to 111th Avenue (four lanes plus auxiliary lanes) – partial access control
- Ultimate parkway from 111th Avenue to 103rd Avenue (six lanes plus auxiliary lanes) – partial access control
- Ultimate Northern Avenue street improvements from 103rd Avenue to Loop 101 (six lanes)
- Interim throwaway widening from Loop 101 to 91st Avenue (six lanes)
- Interim throwaway intersection improvements at 91st, 83rd, 75th, and Grand avenues
- Other funding sources need to be identified to complete the parkway concept

Based on current projected funding, the above listed improvements can be completed within the 20 year funding program.