

LOOP
303

Loop 303 (Estrella)

**McDowell Road to Thomas Road
MCDOT Transportation Planning Division**

Final Draft Report



April 1999

SAIC
An Employee-Owned Company

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EXECUTIVE SUMMARY

Background

The Estrella Freeway (Loop 303) was originally proposed as an access controlled freeway. Loop 303 was envisioned with grade separations at all crossroads and interchanges, as part of a 375 kilometer (230 mile) Maricopa Association of Governments (MAG) Freeway System developed in 1985. Maricopa County voters passed a one-half cent sales tax referendum to complete the freeway system in the early 1990's. Due to lower than projected revenue, Loop 303 was dropped from the MAG Freeway Plan in 1994. The completion of Loop 303 south of Thomas Road has been delayed indefinitely by ADOT. In fact, Loop 303 reverted to the Maricopa County Department of Transportation jurisdiction in the early 1990's.

The Maricopa County Department of Transportation (MCDOT) proposes to realign and complete Loop 303 at its southern terminus. The one remaining section yet to be completed is a 2.19 km (1.4 mile) segment from Thomas Road on the north to McDowell Road on the south. This section of Loop 303 is immediately north of Interstate 10.

Principal Problem Statement

The major traffic movement within the project area is travel between I-10 and Loop 303 via Thomas Road and Cotton Lane. To accomplish this movement, vehicles must negotiate two 90 degree turns with 12.20 meter (40 foot) and 16.46 meter (54-foot) radii curves. Traveling northbound, vehicles must make a right turn from Cotton Lane to Thomas Road, followed by a left turn onto Loop 303. Southbound vehicles must make a right turn from Loop 303 onto Thomas Road followed by a left turn onto Cotton Lane. Both turns for southbound Loop 303 traffic are controlled by stop signs, while northbound vehicles are unimpeded by stop control. The majority of commercial class vehicles are unable to complete these maneuvers while staying within their own travel lane.

The purpose of the project is to complete a Design Concept Report (DCR) for an interim roadway improvement that addressed the specific problems associated with traffic operations in the corridor. The DCR will provide the MCDOT staff and the Transportation Advisory Board with the information necessary to proceed to a final design. The DCR will

also provide the information that is needed to compare the proposed roadway improvements to other transportation improvements within the county, such that the project may be programmed into the MCDOT Five-Year Capital Improvement Program.

Options Evaluated

Four options were evaluated from a candidate list of over nine options. The four options cover a wide gamut of possibilities for alleviating the traffic operations problems that were discovered in this corridor. The four options are:

- Alternative 0 is the "no-build" alternative.
- Alternative 1, the "Enhanced Maintenance" Alternate, consists of minor intersection improvements at the existing Loop 303 and Thomas Road intersection to eliminate the non-conflicting southbound stop sign and convert the intersection into a larger radius ninety degree curve.
- Alternative 2 constructs a new two-lane road from Loop 303 at Thomas Road to Cotton Lane at McDowell Road and truncates existing Cotton Lane one half mile south of Thomas Road.
- Alternative 3 is the same as Alternative 3 except that the new roadway width is four lanes.

Each option had five principal criteria that were evaluated: (1) civil design; (2) traffic; (3) drainage; (4) right-of way and (5) cost.

Summary of Recommendations

Three options, as well as a no-build option, were carried forward under this Design Concept Report. Alternate 2 – Two Lane option is recommended. This option provides for a two-lane interim roadway, one lane in each direction, with room to easily expand the cross-section to accommodate a four lane, divided roadway with an earth median. Alternate 2 is planned on a new alignment, essentially connecting Loop 303 from the north directly to Interstate 10 on the south, via the McDowell/Loop 303 traffic intersection and ultimately the Cotton Lane interchange with I-10.

Interim improvements are recommended at both the Thomas and McDowell intersections with Loop 303 to facilitate turning vehicles. Provisions should be provided for future signalization of the two mentioned intersections. Drainage will be accommodated by use of four interim retainage basins along the west and east perimeter of the new alignment.

Right-of-way impacts are minimal, especially considering the ample available right-of-way that remains from the original Loop 303 corridor concept of a full system interchange with I-10.

SUMMARY OF RECOMMENDATION TABLE:

Project Name:	Loop 303 Design Concept Report Thomas Road to McDowell Road Work Order: 68965
Location:	Maricopa County, City of Goodyear
Request by:	Maricopa County Department of Transportation
Improvement Requested:	Realign Loop 303 from Thomas to McDowell Roads; provide a two-lane interim roadway. The new alignment of the two lane roadway should occupy the southbound barrel of a future four-lane, divided roadway. This new roadway will be on a new alignment. The recommendation also provides for improved intersection traffic operations by providing dedicated turning lanes.
	Drainage improvements are recommended with construction of four retention basins and several culverts.
	The recommendations also suggest that the ultimate Loop 303 freeway right-of-way be retained for possible corridor facility expansion.
Additional Work:	The roadway prism should be slightly elevated above the existing terrain in order to facilitate superelevation. Drainage improvements would be interim, consisting of several detention basins along the perimeter of the new alignment. The retention basins could be incorporated into larger Loop 303 drainage scheme in the future. Traffic management during construction would be easily facilitated by the fact that the majority of the construction work would occur away from the current traffic areas.
PM-10 Non-Attainment Area:	Yes
Length:	2.19km (1.4 mile)
Estimated Cost:	\$1,335,000

1. INTRODUCTION

1.1 - Overview and Project Background

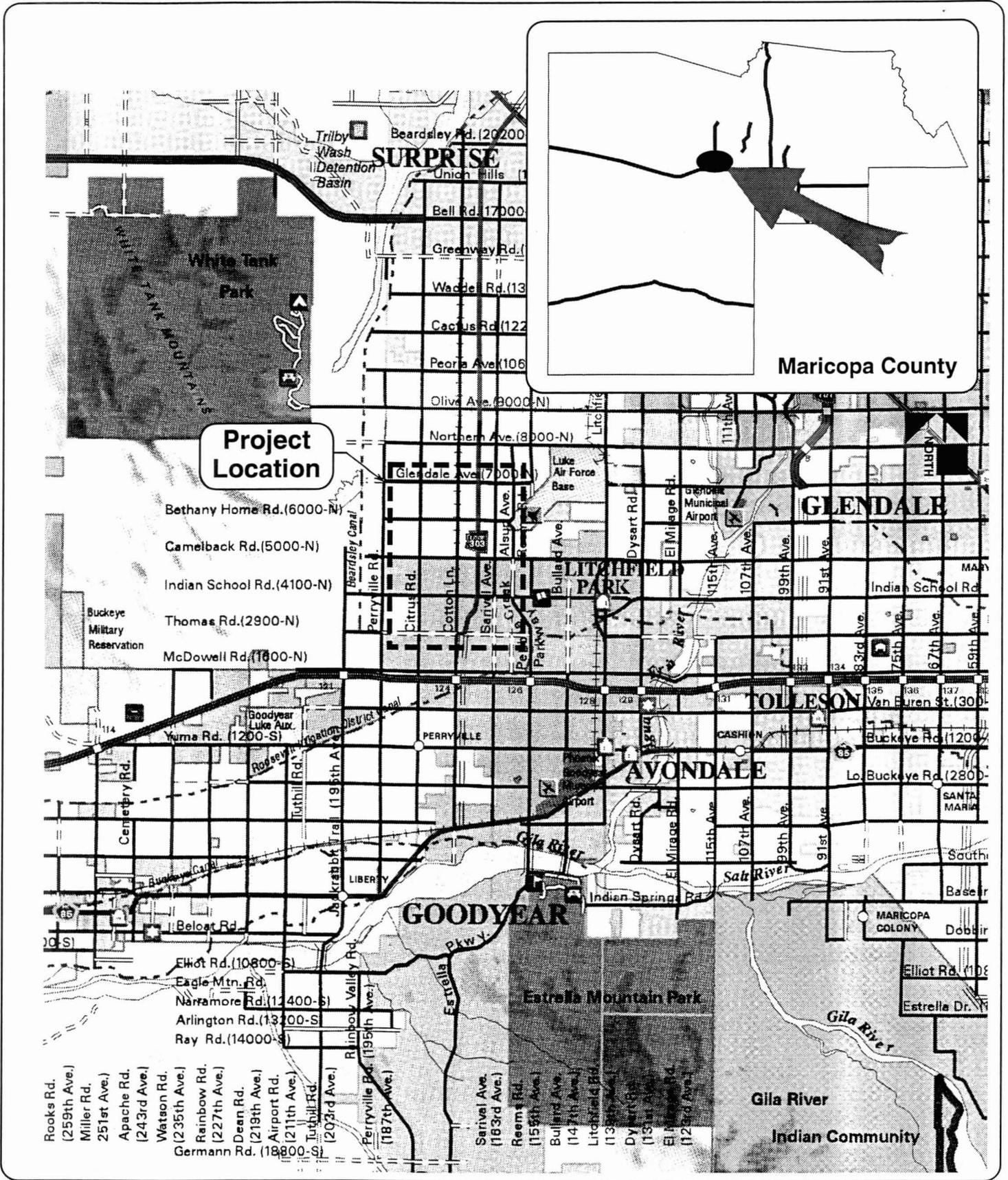
The Estrella Freeway (Loop 303) was originally proposed as an access controlled freeway, with grade separations at all crossroads and interchanges, as part of a 375 kilometer (230 mile) Maricopa Association of Governments (MAG) Freeway System developed in 1985. Maricopa County voters passed a one-half cent sales tax referendum to complete the freeway system in the early 1990's. Due to lower than projected revenue, Loop 303 was dropped from the MAG Freeway Plan in 1994. The completion of Loop 303 south of Thomas Road has been delayed indefinitely by ADOT. In fact, Loop 303 reverted to the Maricopa County Department of Transportation jurisdiction in the early 1990's.

The Maricopa County Department of Transportation (MCDOT) proposes to realign and complete Loop 303 at its southern terminus. The one remaining section yet to be completed is a 2.19 km (1.4 mile) segment from Thomas Road on the north to McDowell Road on the south. This section of Loop 303 is immediately north of Interstate 10. A project vicinity and jurisdictional map is shown in Figure 1-1.

1.2 - Purpose of Report

North of Thomas Road, Loop 303 is a two-lane access controlled facility, with intersections at least 2.19 kilometers (1.4 mile) apart. This corridor provides a western bypass of the Phoenix metropolitan area for commercial vehicles. The facility also provides a north/south connector between I-10 and US 60 for residents in western Maricopa County. Currently, Loop 303 extends from Thomas Road to US 60/93 in Sun City. Between Thomas Road and I-10, Cotton Lane provides connection between Loop 303 and I-10.

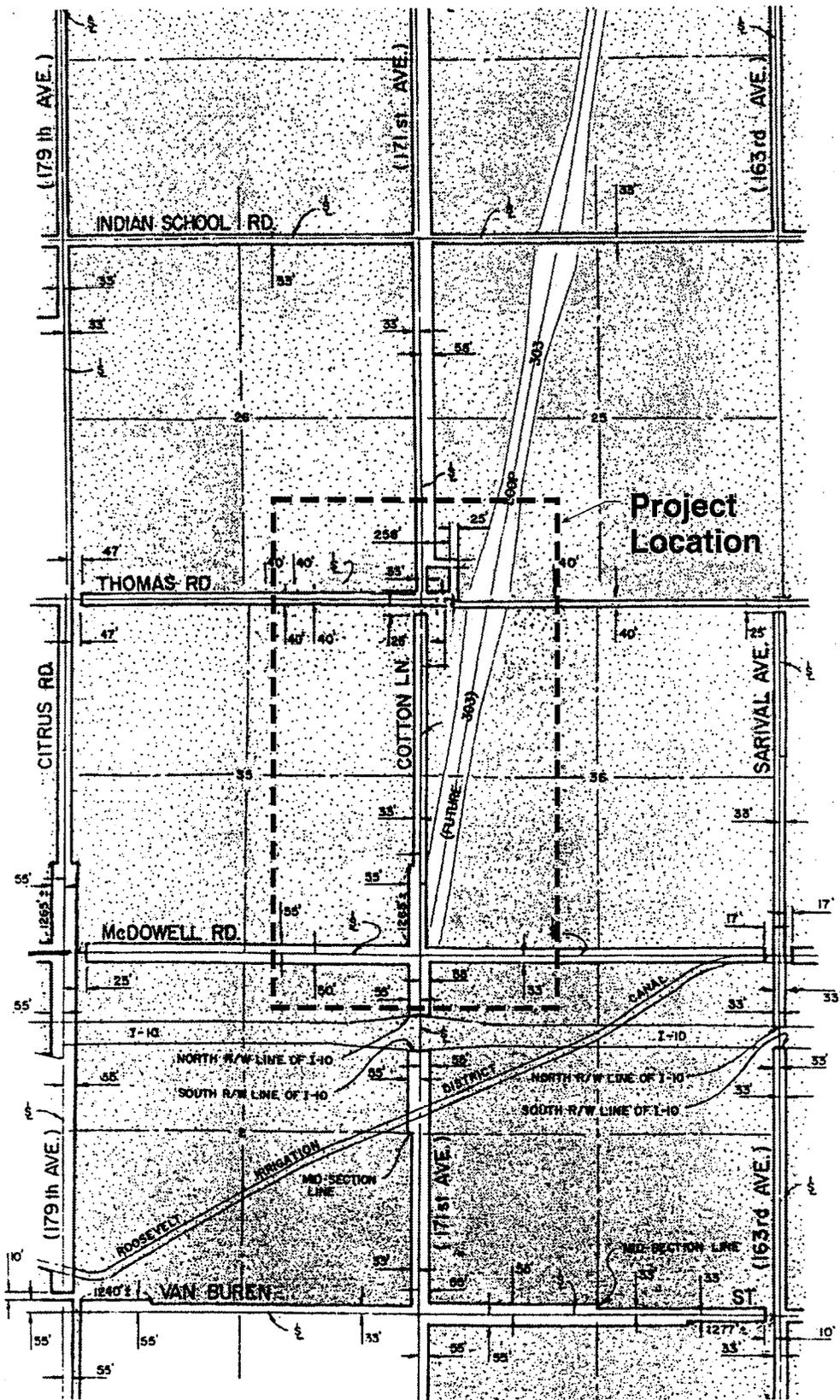
The major traffic movement within the project area is travel between I-10 and Loop 303 via Thomas Road and Cotton Lane. To accomplish this movement, vehicles must negotiate two 90-degree turns with 12.20 meter (40 foot) and 16.46 meter (54-foot) radii. Traveling northbound, vehicles must make a right turn from Cotton Lane to Thomas Road, followed by a left turn onto Loop 303. Southbound vehicles must make a right turn from Loop 303 onto Thomas Road followed by a left turn onto Cotton Lane. Both turns for



LOOP 303 **Loop 303 (Estrella)**
McDowell Road to Thomas Road
ICDOT Transportation Planning Division

Figure 1-1
 Project Location





LOOP
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Loop 303 (Estrella)
McDowell Road to Thomas Road
 MCDOT Transportation Planning Division

Figure 1-2
 Project Location



southbound Loop 303 traffic are controlled by stop signs, while northbound vehicles are unimpeded by stop control. The majority of commercial class vehicles are unable to complete these maneuvers while staying within their own travel lane.

Growth projections for the area indicate that additional traffic will be detrimental to the existing level of service. Accidents could be expected to increase due to the unusual nature of the termination of Loop 303 at Thomas Road. The intent of this project is to accommodate future traffic volumes, improve safety, and realign Loop 303. The Maricopa County Department of Transportation proposes roadway improvements for travel between I-10 and Loop 303 through the elimination of the ninety degree turn movements. The improvements would be interim improvements until a freeway could be constructed.

The specific purpose of the project is to complete a Design Concept Report (DCR) for the proposed interim roadway realignment. The DCR will provide the MCDOT staff and the Transportation Advisory Board with the information necessary to proceed to a final design. The DCR will also provide the information that is needed to compare the proposed roadway improvements to other transportation improvements within the county, such that the project may be programmed into the MCDOT Five-Year Capital Improvement Program.

Objectives for this project include:

- Identify existing conditions that would affect alternative development.
- Provide continuity from existing portion of Loop 303 to I-10.
- Provide a higher margin of safety by eliminating tight turning radii.
- Identify viable alternatives that will achieve improvements in traffic flow and enhance the roadway user's safety.

1.3 - Study Tasks

Major tasks undertaken for the interim Loop 303 facility are to:

- Identify engineering aspects of the study area, including land use patterns, existing topography, utilities and roadway operational characteristics.
- Analyze projected traffic volume data for the years 2010 and 2020.
- Determine the feasibility for storm water to convey the site.
- Evaluate the impacts to new or existing right-of-way.
- Estimate engineering and construction costs.

- Provide a recommendation for one alternative that best meets the objectives of the study.

1.4 - Location

The project site is located in the southwest Metropolitan Phoenix area (Maricopa County) within the boundaries of the City of Goodyear, Arizona. The site is approximately 32.21 km (20 miles) west of downtown Phoenix. The project site includes Cotton Lane (between McDowell Road and Thomas Road), Thomas Road (between Cotton Lane and Loop 303), and the three intersections of McDowell Road/Cotton Lane, Cotton Lane/Thomas Road, and Thomas Road/Loop 303. Figure 1-2 illustrates the project location.

1.5 - Study Background

Loop 303 is a two-lane; 7.93 meter (26-foot) wide bituminous surfaced roadway with 1.83 meter (6 foot) graded shoulders with a total cross-section of 11.59 meters (38 feet). The speed limit is posted 55 M.P.H. on Loop 303 between Thomas Road and US 60. The roadway surface is approximately one meter (three feet) above the surrounding terrain.

Loop 303 is generally access controlled, with intersections at least one mile apart. Travel on Loop 303 is mostly unimpeded with few stop-controlled locations. Roadways intersecting Loop 303 are stopped controlled. Loop 303 is stop controlled for southbound travel at Thomas Road.

Thomas Road is a 12.20 meter (40-foot) wide bituminous surfaced rural collector roadway. The posted speed limit on Thomas Road is 35 M.P.H. between Cotton Lane and Loop 303.

Cotton Lane is a 7.32 meter (24-foot) wide bituminous surfaced rural local roadway. The speed limit is posted 55 M.P.H. on Cotton Lane. Both Thomas Road and Cotton Lane were designed to ADOT standards and exceed MCDOT standards except for overall pavement width and turning radii.

The West Area Transportation Analysis prepared for MAG by Parsons Brinkerhoff Quade and Douglas, Inc. in June 1985 presented several alternatives for the Estrella Corridor. The study recommended a freeway facility from SR 85 to I-17. Based on the study's recommendation, the Loop 303 (formerly known as the Cotton Lane/Northwest Loop

Freeway) was included as part of the 1985 MAG Freeway System. Voters of Maricopa County approved financing for the implementation of the MAG Freeway System by passing a one-half cent sales tax referendum in 1985.

A Draft Reconnaissance Report dated February 1987 outlined the social, economic and environmental aspects as well as the conceptual alignments of the proposed freeway. A Draft Environmental Assessment was prepared for the Cotton Lane Section in April 1988. A location public meeting was held for the proposed facility on January 14, 1988 and the State Board of Transportation made a location selection for the facility on April 14, 1988.

The Location and Design Concept Report (DCR) prepared for ADOT by Cella Barr Associates in association with Kimley-Horn and Associates, Inc. in November 1991, discussed the engineering and technical development of the proposed Loop 303 alternatives. The report recommends an alignment for the freeway facility and includes technical reports on drainage, geotechnical conditions, utility and irrigation relocation, and noise analysis. A plan of the selected alignment was also prepared and presented in a separate report entitled Loop 303 Preliminary Location Plan and Profile.

The construction of Loop 303 as a freeway has been delayed indefinitely by ADOT, and this freeway currently is not shown in the MAG freeway plan. To address the problems associated with travel south of the interim Loop 303 terminus, MCDOT prepared a Candidate Assessment Report (CAR) in 1996 that identified limited improvements to Loop 303 and Thomas Road intersection. The CAR was updated in 1998 to take into account the availability of existing ADOT right-of-way south of Thomas Road. The right-of-way was identified and an alternative utilizing the right-of-way was developed in the updated CAR.

This study evaluates alternative alignments for the proposed improvements and provides preliminary engineering plans for the alignment chosen. With completion of the DCR and preliminary plans, the project can be included into MCDOT Capital Improvement Program programming process. Final design plans and construction can occur after the project is included into the Five-Year Capital Improvement Program. During final design, this report and the conceptual plans, will serve as the design guidelines.

Five pertinent documents were used in the preparation of this report:

Document:
• <i>MAG West Area Transportation Analysis</i> ; June, 1985
• <i>ADOT Location and Design Concept Report</i> (Estrella Freeway State Route 303L, SR 85 to I-17); November, 1991
• <i>ADOT Preliminary Location Plan and Profile</i> (Estrella Freeway State Route 303L, SR 85 to I-17); November, 1991
• <i>Candidate Assessment Report</i> (Loop 303 Interim, McDowell Road to Thomas Road); 1998 Update
• <i>Draft Reconnaissance Report</i>

2. CHARACTERISTICS OF THE CORRIDOR

Several aspects of the corridor are considered focal to the decision process, and are reported within. These aspects represent the major elements that were inventoried and researched as key elements that comprise the engineering criteria used in selecting the recommended alternative.

2.1 - Land Use

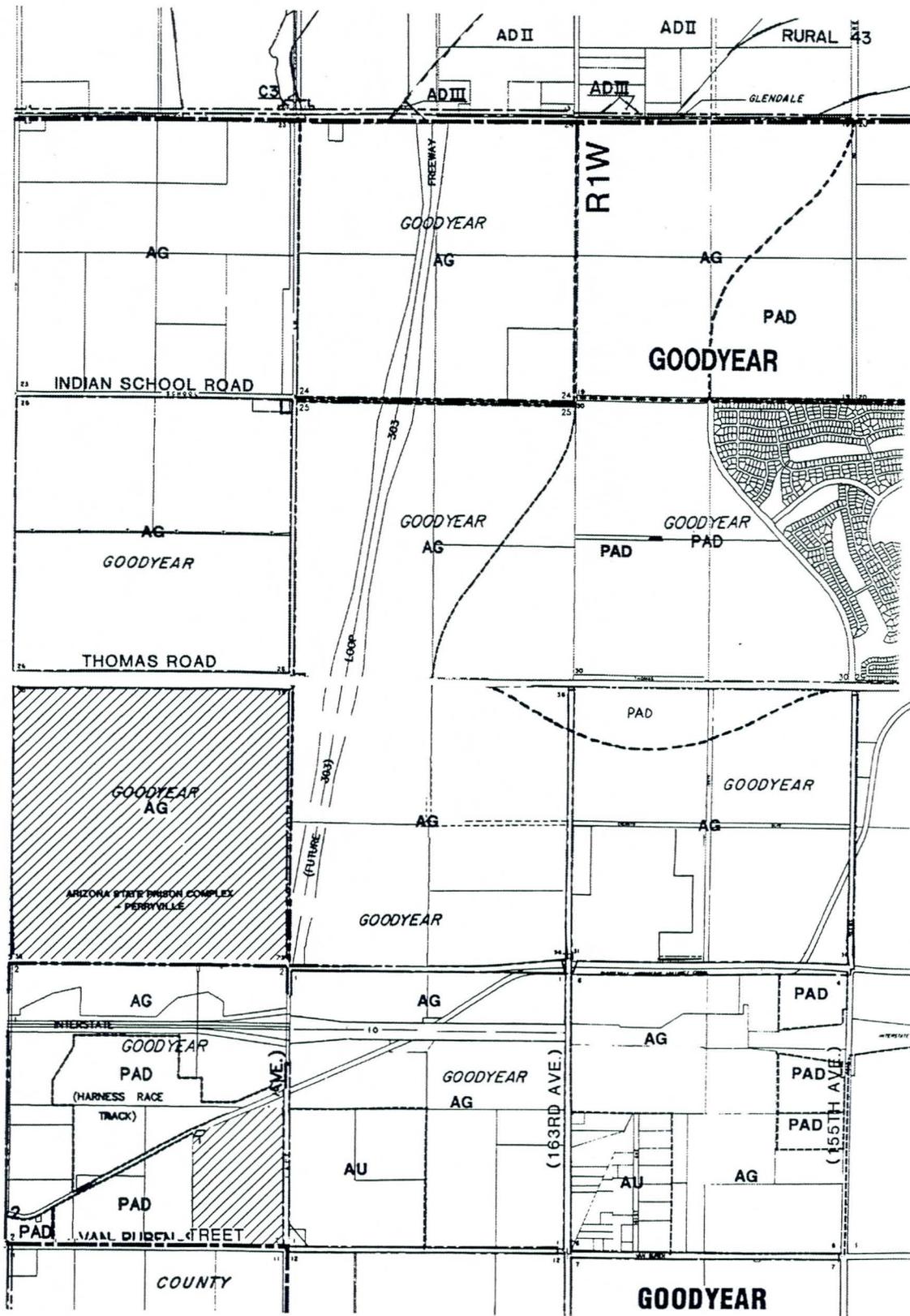
The project area is located entirely within the City of Goodyear limits. The identified land use within and around the project area is agricultural use. The land within the project area is currently being used for irrigated agricultural purposes, with the exception of the Arizona Public Service (APS) Company's Pima Substation used for electrical power distribution. This substation is located in the northeast corner of the Cotton Lane/Thomas Road intersection.

The Arizona State Prison-Perryville Unit is adjacent to the project area on the west side of Cotton Lane.

Residential growth expansion is occurring aggressively in this area immediately to the east of the study area. Two major developments (SunCor and Robson communities) are in the development stages for major new communities adjacent to the project. Figure 2-1 shows the present land use. Figure 2-2 is a graphical map from the SunCor development. Development to the immediate west of the project has been identified for industrial/commercial use. Land further to the west of Cotton Lane and in proximity to the large state prison complex is restricted in use.

2.2 - Topographic Features

The study area lies north of the Gila River. The natural terrain slopes to the southeast from the northwest. The Interstate 10 drainage system lies immediately south of McDowell Road. There is extensive agricultural land use in the area. Land development (commercial, light industrial and residential) is anticipated in the immediate vicinity of Loop 303, both on

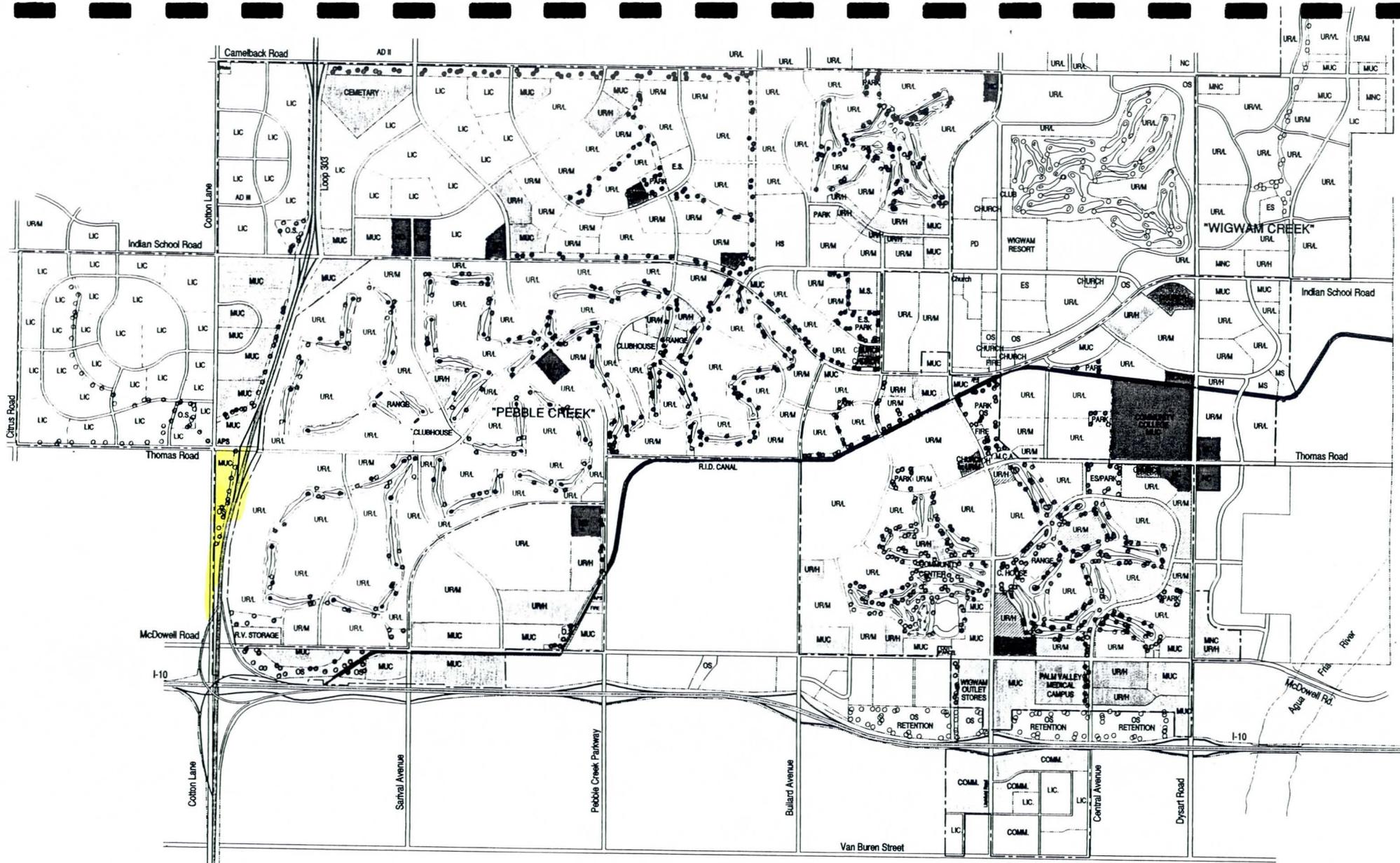


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Loop 303 (Estrella)
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Figure 2-1
Land Use





- Legend**
- URL S.F.D. RESIDENTIAL 0-4 DU/AC
 - URM MED. DENSITY RESID. 6-12 DU/AC
 - URH HIGH DENSITY RESID. 12-25 DU/AC
 - MUC COMMERCIAL
 - NC NEIGHBORHOOD RETAIL
 - MNC COMMUNITY COMMERCIAL
 - LIC LIGHT INDUSTRIAL
 - SU CEMETERY
 - MUC1 COMMUNITY COLLEGE
 - MUC2 TOWN CENTER
 - MUC3 HOSPITAL
 - GPC REGIONAL CENTER
 - OS OPEN SPACE AND SCHOOLS
 - CHURCH SITES
 - EXISTING DEVELOPED PARCELS



PALM VALLEY

Information Center Located at 2025 N. Litchfield Road, Goodyear, Az 85338 (602)935-5100

Figure 2-2

NOTE: THIS MASTER PLAN IS BASED ON THE PALM VALLEY MASTER PLAN PREPARED BY WENICH SWANACK ASSOCIATES. PEBBLE CREEK PLAN PROVIDED BY B & H ENGINEERING, INC. PREPARED: 1-22-88 REVISIONS: 2-2-88, 3-15-87, 8-21-87, 8-15-87 LVA JOB NO. 1052



LARSON, VOSS ASSOC., INC.

the east, and to some extent to the west of the project. Detailed topographic information is contained in Section 6 - Concept Plans.

2.3 - Utility Information

2.3.1 Existing Utilities

The only identified existing utilities within the project area are power and irrigation facilities. Arizona Public Service (APS) Company has a substation (Pima Substation) located on the northeast corner of the Thomas Road/Cotton Lane intersection. From the substation, overhead power lines (12 kV and 69 kV) extend to the north and the south along the east side of Cotton Lane. The lines also extend to the east along the north side of Thomas Road and cross Loop 303. Power service is provided to irrigation facilities by way of service lines and poles in the southeast corner of the Thomas Road/Cotton Lane intersection, and on the east side of Cotton Lane approximately one half mile south of Thomas Road.

Irrigation facilities within the project area are owned by SunCor Development. These facilities consist of a supply canal composed of a combination of concrete lined channel and reinforced concrete pipe (RCP). The canal runs parallel to Thomas Road approximately 45 feet south of the centerline and conveys irrigation water beneath a berm. Standpipes are located along the irrigation canal, approximately 480 feet west of Loop 303 and in the southeast corner of the Thomas Road/Cotton Lane intersection. A pump and above ground piping also are present in this corner, as well as a 20 inch concrete pipe crossing Thomas Road beneath a protective concrete slab. A standpipe and pump at the power service approximately one half mile south of Thomas Road and a standpipe on the east side of Cotton Lane approximately one-quarter mile south of Thomas Road are other irrigation facilities within the project area.

There may be additional, unidentified underground utilities in the McDowell/Cotton Lane intersection as well as closer to Interstate 10.

Since this project limits planned improvements to generally north and south of the intersection of Loop 303 and Thomas Road, as well as interim widening immediately east and west of Loop 303 at the intersection with McDowell Road, it is unlikely that major underground utility infrastructure will be affected.

Only limited engineering discussions have been held with the utility providers at this time. The persons contacted at the various utility companies are listed below:

Agency:	Contact:	Telephone No.:
Arizona Public Service	Cary Ann Bailey	(602) 371-6258
SunCor, Inc.	Tom Hill	(602) 390-2375

No reported utility facilities from Cox Cable, the City of Phoenix, El Paso Natural Gas, Salt River Project, AT&T, Santa Fe Pacific Pipeline Partners, L.P., Southwest Gas nor US West Communications have been discovered within the project limits.

2.3.2 Impacts to Utilities

Generally utility conflicts depend on the alternative selected (see Section 4 Roadway Design Alternatives). Listed below are the general utility conflicts that have been identified with several of the alternatives.

2.3.2.1 Arizona Public Service Facilities Affected

Cotton Lane – One APS 69 KV power pole would require being relocated with one of the alternatives discussed in Section 4 - Alternates Development and Analysis.

Thomas Road – None apparent.

Loop 303 – Approximately nine APS 12 KV power poles are to be relocated with several of the alternatives discussed in Section 4. The costs of these relocations are \$8,000 each (\$72,000 total). Approximately seven APS 69 KV power poles are also to be relocated with several of the alternatives. The costs of these relocations are \$15,000 each (\$105,000 total).

2.3.2. SunCor Facilities Affected

Up to three SunCor irrigation ditches will need to be relocated at an estimated cost of \$10,000.

2.3.2.3 MCDOT Facilities Affected

An existing concrete drainage facility on the south side of Thomas Road, crossing the potential Loop 303 alignment, will need to be rebuilt. These costs are shown in Section 4 – Roadway Design Alternatives.

2.4 - Right-of-Way

Loop 303 was originally envisioned as an ADOT limited access, freeway class facility. The right-of-way initially allocated for this facility was thus robust enough to facilitate a full divided freeway and system interchange with Interstate 10 in the future. This interim project, by its nature, will require considerably less right-of-way than the full freeway facility.

Existing dedicated right-of-way within the project area was determined from Maricopa County Assessors Maps and ADOT right-of-way plans. No title information has been researched.

Loop 303 currently has 109.72 meters (360 feet) of right-of-way, 54.86 meters (180 feet) on either side of the centerline, both north and south of Thomas Road. The right-of-way traverses in a southwesterly direction and intersects Cotton Lane at the McDowell intersection. The right-of-way flares out to 182.87 meters (600 feet) wide between approximately 121.91 meters (400 feet) north and 121.91 meters (400 feet) south of the Thomas Road centerline to allow for the future construction of an interchange.

A right-of-way of 33.54 m (110 feet), 16.77 m (55 feet) on either side of the proposed ultimate Loop 303 centerline exists for Thomas Road between the Loop 303 right-of-way and Cotton Lane, except for the northeast corner of the Thomas Road/Cotton Lane intersection. The easement along the 60.9 meters (200 feet) section that borders the APS Substation is only 10.06 meters (33 feet) wide from the Thomas Road centerline and follows the existing fence line.

Cotton Lane has 20.12 meters (66 feet) of right-of-way, 10.06 (33 feet) on each side of the centerline. The right-of-way flares out to 17.68 meters (58 feet) from 10.06 meters (33 feet) on the east side of the centerline north of the APS Substation and to 16.77 meters (55 feet) on the west side of the centerline (1/4-mile) north of McDowell Road.

This section of Loop 303, from Thomas to McDowell Roads, has a proposed 30.48 meters (100 feet) right of way on either side of the future four-lane roadway centerline.

It is further recommended that the existing right-of-way that is currently retained by ADOT be perpetually retained for future considerations by ADOT.

A legal description of each of the parcel is listed in the Appendix. Property owners and assessor numbers are enumerated below:

Property Owner:	Assessor Number:
SunCor, Inc. (assigned to ADOT)	Book 501; Map 1; Sheets 1 and 2 Book 502; Map 30 and 32

Maricopa County Department of Transportation staff will develop the right-of-way plans with survey control obtained from ADOT.

2.5 - Drainage Characteristics

2.5.1 Introduction

The purpose of this drainage analysis is to address and propose solutions to the hydraulic conditions along the interim Loop 303, from McDowell Road to Thomas Road. All drainage calculations and improvements are in conformance to the *Drainage Design Manual for Maricopa County, Volume 1*.

The land surrounding the project area is generally flat due to its use for agriculture purposes. However, roadside drainage facilities and mapping records indicate that there is a southeasterly slope in the terrain. Drainage within the project area is shown on the U.S.G.S. Topographic maps (Perryville Quadrangle) and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (panel 2060 of 4350). Both drawings are contained in the appendix. Additionally the White Tank/Agua Fria Area Drainage Master Study (ADMS) was consulted in the preparation of this report.

2.5.2 Hydraulic Conditions

General overland flow in the immediate vicinity of the roadway travels to the southeast. Several roadways divert the natural flow of runoff by the use of roadside ditches. These roads include Cotton Lane, Thomas Road, Virginia Street, Encanto Boulevard, Palm Street, and McDowell Road. The largest diversion of natural flow is Cotton Lane, which carries rainfall runoff along its west drainage ditch from as far north as McMicken Dam. This rainfall converges at McDowell Road and Cotton Lane, causing flooding problems on even small rainfall events.

The White Tanks/Agua Fria ADMS prepared by the WLB Group in 1994 addresses the major drainage issues in this area and proposes the use of four regional detention basins and a major flood channel to convey the 100-year event to the Gila River. The peak 100-year flow in this channel would range from 51.0 m³/sec (1,800 cfs) at Waddell Road to 110.4 m³/sec (3,900 cfs) at the Gila River Outlet.

2.5.3 Interim Drainage Concerns

The scope of this project is to address the 100-year event along the Interim Loop 303 between McDowell Road and Thomas Road. The WLB HEC1 analysis diverted runoff to the south and east at Thomas Road and Cotton Lane. The 100-year event was channeled to the south along Cotton Lane to the south side of McDowell Road. For this reason we will set our drainage boundaries as Thomas Road, Cotton Lane and the Loop 303 alignment. This section of land totals 22.5 hectares (55.8 acres) and is agricultural in use. Any drainage improvements shall incorporate the runoff from the existing and proposed roadways.

2.5.4 Existing Drainage Facilities

Drainage flows south along Loop 303 and then east along Thomas Road in roadside ditches.

Existing drainage facilities within the project area include:

- Two 610 mm (24 inch) Reinforced Concrete Pipes (RCP's) of approximately 30 meters (100 feet) in length. These drainage structures cross the Loop 303 alignment approximately 24 m (80 feet) north of Thomas Road. These structures pass drainage into a roadside ditch running southeast from Loop 303.
- A 610 mm (24 inch) corrugated steel pipe (CSP). The pipe is located underneath a berm 13.45 m (44 feet) west of the Loop 303 centerline and approximately 12 m (270 feet) north of Thomas Road, and passes drainage into a roadside ditch running east from Loop 303.
- A 460 mm (18-inch) bituminous coated CSP. The pipe is located parallel to and approximately 12 m (40 feet) south of the Thomas Road centerline. Drainage is passed into a roadside ditch running east from Loop 303.
- A 610 mm (24 inch) RCP, located parallel to and 9 m (29 feet) north of the Thomas Road centerline. Drainage is conveyed through the pipe from the roadside ditch along the east side of Cotton Lane (southerly flowing) to the roadside ditch along the north side of Thomas Road (easterly flowing). The culvert begins 21 m (70 feet) north of Thomas Road along Cotton Lane and heads south for a distance of 3 m (9 feet). The culvert then turns east at the substation

fence corner by way of two 45-degree bends and heads east to approximately 5 m (15 feet) east of the substation fence line.

As indicated on the FEMA map, this section of Loop 303 is not in a flood plain, therefore there is no anticipated significant flooding problem.

At the northwest corner of McDowell Road and Cotton Lane, an area that historically has been subject to localized water retention as been identified. An irrigation channel parallels both sides of Cotton Lane. In addition to providing irrigation tail water (excess water that exits the adjacent irrigated land), this channel also serves as a drainage system for storm runoff at various location to drain the agricultural farmlands that surround the immediate area. The Flood Control District of Maricopa County (FCDMC) is studying this immediate area and any solution is considered beyond the scope of this project.

The FCDMC representative, Mr. Amir Motamedi, was contacted regarding the drainage in the project area. He stated that no significant drainage issues exist and no flood plains will be affected.

Specific project recommendations related to drainage facilities are made in Section 5 – Selection of the Preferred Alternative. The Flood Control District anticipates a large drainage study to commence during this next year. This study will identify an outfall to the Gila River for a drainage area generally north and west of this project. This outfall will be combined with the anticipated Loop 303 drainage channels that may be required if the Loop 303 facility is expanded or elevated.

2.6 - Roadway Characteristics

The existing Loop 303 essentially terminates at the Thomas Road intersection. Loop 303 north of Thomas Road is a two lane, undivided, rural collector class facility. Earth shoulders (ungraded) are adjacent to each 3.6m (12 feet) wide striped traffic lane. The roadway prism is approximately 1m (3 feet) above the terrain, with the profile lowering beyond each cross-corridor drainage structure.

Loop 303 is generally designed for a 110km (70 MPH) design speed. The posted speed limit is 55 MPH (90 kilometers per hour).

Thomas Road and McDowell Road are arterial class facilities each with two 3.6m (12 feet) wide traffic lanes and an earth shoulder (graded) on both sides. Cotton Lane is also a

typical section line, arterial roadway with near identical cross-section elements to Thomas Road. Super-elevation is minimally provided for each roadway, with a general crown cross-section being predominate.

The Thomas Road/Loop 303, McDowell Road/Loop 303, and the Cotton Lane and Thomas Road intersections are two-way stop controlled intersections.

Loop 303, Thomas Road and Cotton Lane have geometric deficiencies that impact its ability to handle significant volumes of turning vehicles, as well as large profile vehicles. Trucks must generally track across the centerline of Thomas Road and Cotton Lane in order to negotiate the two 90 degree turns required to traverse the area. The following describes these deficiencies:

- Lack of physical separation between opposing lanes of traffic on Loop 303, Thomas Road and Cotton Lane.
- Stop controlled intersections that limit throughput and capacity.
- Dual right/left turn (90 degree) movements.
- Lack of additional traffic lanes that are needed to satisfy capacity needs.
- Inadequate recovery area width as set forth in the AASHTO guidelines.
- Lack of off-site and on-site drainage collection systems.

Loop 303 is expected to play a significant role in mobility in the near future as the existing regional and local street network uses up additional capacity.

2.7 - Current Traffic Conditions

2.7.1 Traffic Volumes

The Average Daily Traffic (ADT) volumes for the Year 2010 and Year 2020 were obtained from MAG's EMM2 model's most recent revision. These ADT's were adjusted to Design Hourly Volumes (DHV's) using a k-factor of 8 percent in the peak direction and 5.5 percent in the off-peak direction.

The existing traffic volumes were obtained from peak period turning movement and tube counts. Turning movement counts at the intersections of McDowell Road at Cotton Lane and Thomas Road at Cotton Lane from 6:30 a.m. – 8:30 a.m., 11:00 a.m. – 1:00 p.m., and 4:30 p.m. – 6:30 p.m. on a Wednesday and Thursday in October of 1998 were obtained.

Automated counting tubes were placed on Thomas Road and on Cotton Lane just south of Thomas Road for the purpose of counting 24 hour traffic volumes in October of 1998. Figure 2-3 summarizes the volume information.

2.7.2 Level of Service

An analysis of capacity and level of service at each of the two unsignalized intersections were prepared based on the most recently published procedures from the 1994 *Highway Capacity Manual (HCM)*.

Level of service (LOS) is a qualitative measure of the performance of a transportation facility. LOS ratings are based on a scale from A to F, with LOS A representing uncongested conditions, LOS E representing conditions when traffic demand is near the capacity of the facility, and LOS F representing congested conditions when traffic demand exceeds the capacity of the facility. The revised 1994 HCM procedures include a new multi-way stop intersection analysis procedure, and a new two way stop analysis procedure. Average delay per vehicle is used as a measure of effectiveness to determine level of service for unsignalized intersections. The following table summarizes the LOS criteria for unsignalized intersections. Capacity analysis calculations were prepared with the aid of the *Highway Capacity Software (HCS)* computer software application.

Level of Service:	Unsignalized Intersection Average Delay per Vehicle (seconds/veh.):
A	0 to 5.0
B	5.1 to 10.0
C	10.1 to 20.0
D	20.1 to 30.0
E	30.1 to 45.0
F	> 45.0

All intersections in the project area operate at LOS A.

2.7.3 Accident History

The County provided the accident history for the project area. The following tables contain the accident history from January 1, 1995 to June 30, 1998.

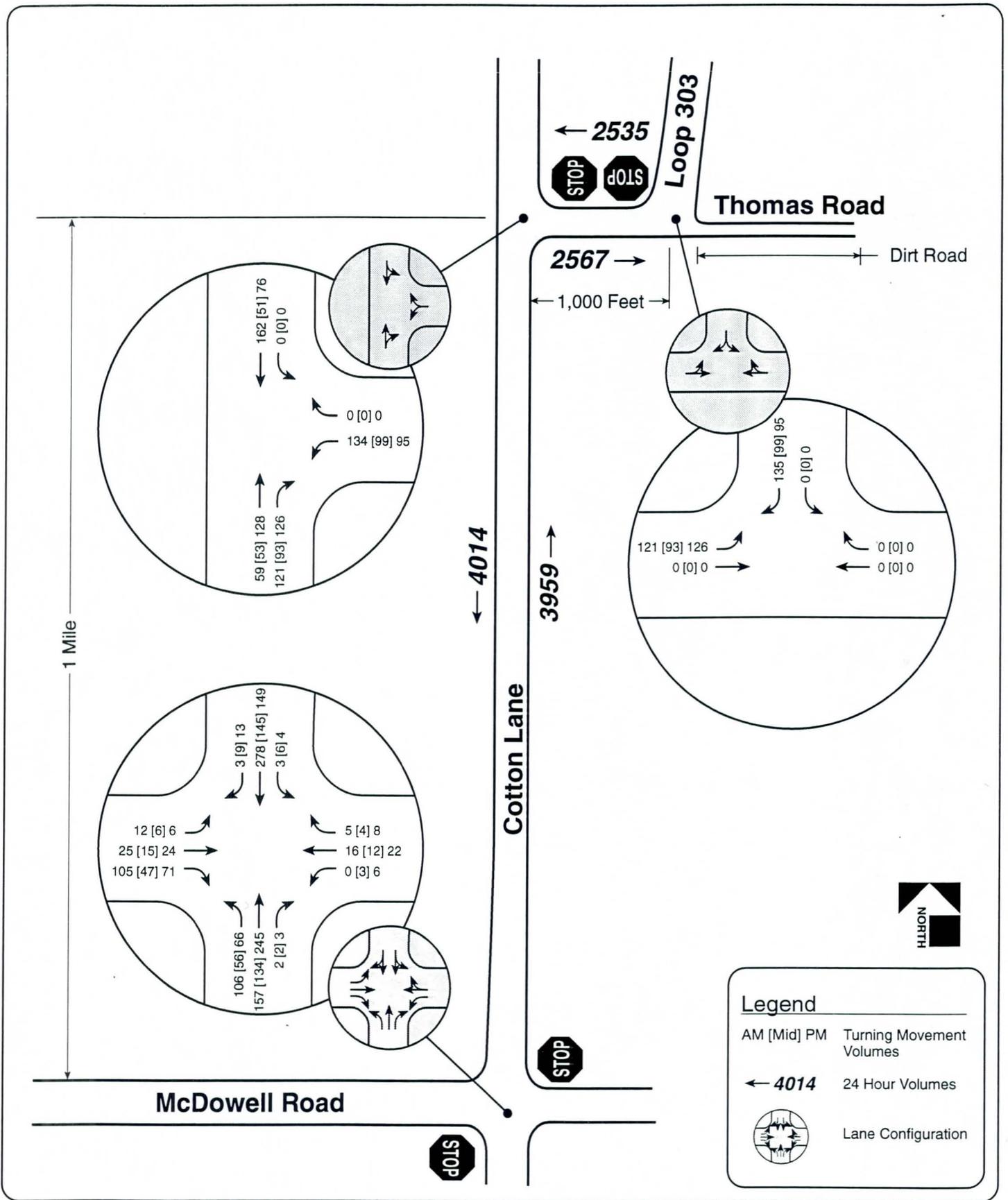


Figure 2-3
 Existing Volumes and Lane Configuration

Injury Severity Coding:	
961	No Injury
962	Injury – Unknown
962-2	Possible Injury
962-3	Non-incapacitating
962-4	Incapacitating
963	Fatal

Intersection Accidents – McDowell Road at Cotton Lane			
Type	Number	Severity	Number
Right Angle	9	961	4
Left Turning	1	962	1
Rear End	3	962-2	4
Side Swipe	1	962-3	4
Single Vehicle	0	962-4	1
Other	0	963	0
Total	14	Total	14

Intersection Accidents – Thomas Road at Cotton Lane			
Type	Number	Severity	Number
Right Angle	5	961	1
Left Turning	0	962	0
Rear End	1	962-2	2
Side Swipe	0	962-3	2
Single Vehicle	0	962-4	1
Other	0	963	0
Total	6	Total	6

Cotton Lane: McDowell Road – Thomas Road			
Type	Number	Severity	Number
Right Angle	0	961	1
Left Turning	0	962	0
Rear End	1	962-2	2
Side Swipe	0	962-3	1
Single Vehicle	3	962-4	0
Other	0	963	0
Total	4	Total	4

Single Vehicles – Ran Off Road	
Type	Number
Abutment/Barrier	0
Animal	0
Curb/Median	0
Ditch	0
Embankment	0
Fence	0
Mail Box	0
Misc.	1
Overtaken	2
Sign	0
Signal Pole	0
Tree	0
Utility Pole	0

2.7.4 Future Traffic Conditions

The Average Daily Traffic (ADT) volumes for the Year 2010 and Year 2020 were obtained from MAG's *EMM2* model's most recent revision. These ADT's were adjusted to Design Hourly Volumes (DHV's) using a k-factor of 8 percent in the peak direction and 5.5 percent in the off-peak direction, which are generally consistent with conditions in other outlying areas of the Phoenix metropolitan area.

Geotechnical Engineering

The assumed pavement section is 100 millimeters (4 inches) of asphaltic concrete on 250 millimeters (10 inches) of aggregate base, as requested by County staff.

2.8 - Environmental Overview

2.8.1 Land Use

Land surrounding the Loop 303 corridor is both publicly and privately owned. The right-of-way for the Estrella Corridor consists of many parcels of land previously donated to, or purchased by, ADOT for the Loop 303 project. The topography of the project area is level, and does not traverse any natural washes or floodplains. The 100-year floodplain elevation ranges from 1,017 feet to 1,045 feet. Drainage runs from northwest to southeast and flows overland toward the Roosevelt Irrigation District Canal. Soils range from loams to sandy loams.

2.8.2 Threatened and Endangered Species

The United States Fish and Wildlife Service (USFWS) list of threatened and endangered species for Maricopa County was reviewed for species that may potentially occur in the vicinity of the project. No critical habitat for species of concern has been delineated in the area. Habitat preferences and requirements for each species were compared with habitats present in the vicinity. No habitat for listed species was identified in the project area. No protected native plants are present in the project area, therefore none will be affected by the proposed project.

2.8.3 Water Quality

Desert washes are jurisdictional waters of the U.S., subject to Section 404 of the Clean Water Act. Section 404 regulates the placement of fill in waters of the U.S. under a permit system administered by the U.S. Army Corps of Engineers. There are no natural washes in the project vicinity; however the project crosses two irrigation canals. Because the area is zoned as AG for agricultural use, and because the land use in the vicinity is primarily agricultural, the irrigation canals are not categorized as jurisdictional waters of the U.S.

2.8.4 Floodplains

The Federal Emergency Management Agency (FEMA) has classified the project area as Zone X (FEMA Flood Insurance Rate Map, panel 2060 of 4350, Maricopa County). Zone X is characterized as: areas of 500-year flood; areas of 100-year flood with average depths of

less than one foot or with drainage areas less than one square mile; and areas protected by levees from a 100-year flood. No impacts to floodplains are anticipated to occur as a result of the proposed project.

2.8.5 Air Quality and Noise

Impacts to sensitive noise receptors were analyzed to provide input and determine potential needs for further noise studies. Future noise studies would be conducted after the 40 percent design phase is completed to fit the data into the noise model to evaluate noise mitigation measures, if necessary.

This project is located in the Phoenix Metropolitan Non-Attainment Area, meaning that air quality in the region does not meet National Ambient Air Quality Standards. The construction activities can result in some deterioration of the existing air quality on a temporary basis. Such impacts are expected to be localized and temporary. Dust generated by construction activities will be mitigated and controlled in accordance with County Air Pollution Regulations and as stipulated in the required County earthmoving permit.

2.8.6 Cultural Resources

Cultural resources surveys is scheduled to be completed for this project by the end of February 1999 and a report filed with MCDOT's Archaeology Program Manager. If unknown cultural resources are discovered during construction, work must be stopped and MCDOT's Archaeology Program Manager contacted for evaluation of the discovery.

2.9 - Field Survey and Aerial Photography

A section control survey will be required in order to develop the right-of-way plans for several of the alternatives. All monuments were field located and re-surveyed for purposes of this report. Aerial targets were then set for the subsequent aerial photographic base plans that are shown in Section 6 – Concept Design Plans Set. Additionally each alternative centerline was tied to the State Plan Coordinate System.

3. MAJOR DESIGN FEATURES

3.1 - Design Features

3.1.1 Alternatives Overview

Design features related to the various alternatives are described in this section. Analysis and development of the alternatives is detailed in Section 4 - Roadway Design Alternatives. Alternatives were identified based on the needs of MCDOT to correct geometric deficiencies in the Loop 303 segment studied in this report. The four alternatives ultimately considered within are briefly summarized as no build, minor intersection improvement, new two-lane roadway, and new four-lane roadway. The identified alternatives are generally described below:

- Alternative 0 is the “no-build” alternative.
- Alternative 1 is the "Enhanced Maintenance" alternative. This alternative consists of minor intersection improvements at the existing Loop 303 and Thomas Road intersection to eliminate the non-conflicting southbound stop sign and convert the intersection into a larger radius ninety degree curve.
- Alternative 2 constructs a new two-lane road from Loop 303 at Thomas Road to Cotton Lane at McDowell Road. This alternative truncates existing Cotton Lane one half mile south of Thomas Road.
- Alternative 3 is the same as Alternative 2 except that the new roadway width is four lanes.

3.1.2 Engineering Aspects

The following table summarizes the engineering criteria adopted for the various mainline roadway alternatives (Alternatives 1, 2 and 3). With one exception all three alternatives have no major impact on the existing crossroads at McDowell Road and Thomas Road. The exception is the widening of Thomas Road to MCDOT Minor Rural Collector typical section for an eastbound left turn lane. The following paragraphs explain some of these criteria in more detail.

Major Design Features (Mainline)			
Criteria:	Alt 1 Curve Correction¹	Alt. 2 Two Lane Interim	Alt. 3 Four Lane Ultimate
Standard Typical Section (Functional Classification)	MCDOT Rural Collector	MCDOT Rural Collector (see Sheet 7 of 8)*	Modified ² MCDOT Rural Principal Arterial (see Sheet 8 of 8)
Design Year	2020	2020	2020
Design Vehicle	WB-15	WB-15	WB-15
Design Speed	110 kph (70mph)	110 kph (70mph)	110 kph (70mph)
Pavement Section ³	100mm (4") AC on 150mm (6") AB	100mm (4") AC on 250mm (10") AB	100mm (4") AC on 250mm (10") AB
Number of Lanes ⁴	2	2	4
Roadway Width	L303: 8.5 m (28') Thomas: 12.2 m (40')	10.2 m (34')	2 x 10.2 m (34') + 8.4 m (28') median = 24.6 m (96')
Shoulder Width	0.6 m (2')	1.52 m (5')	2.44 m (8') outside shoulder
Intersection Geometrics	22.9 m Radius ⁵ (75'), uncurbed	15.2 m Radius (50'), uncurbed	15.2 m Radius (50'), uncurbed
Drainage	None	10 year (Roadway) 100 year (Retention)	10 year (Roadway) 100 year (Retention)
Right of Way	None	60.96 m (200') ⁶	60.96 m (200') ⁷
Superelevation	0.05 max.	0.05 max.	0.037 max.
Clear Zone Width	10.5 m (34)	10.5 m (34')	10.5 m (34')
Stopping Sight Distance	246.4m (808')	246.4m (808')	246.4m (808')
Curb and Gutter Types	None	None	None
Access Control ⁸	Full	Full	Full
Unpaved Shoulder Slope	2%, 0.05 when superelevated	2%, 0.05 when superelevated	2%, 0.05 when superelevated
Lane Drop Taper Rate	None	70:1	70:1
Lane Realign Taper Rate	None	35:1	35:1
Left Turn Lane Geom.	None	Case D-3 ⁹	Case D-3 ¹⁰

*Note: Plans sheets shown in Section 6 - Concept Plans.

¹ See Alternative 2 "Enhanced Maintenance Alternative" from 1998 Update Candidate Assessment Report for details.

² Shoulder increased from 1.5m (5') to 2.5m (8'), median increased from 2.1m (7') to 4.2m (14'), in accordance with Figure 17 "Expressway Typical Sections" from the 1998 Update Candidate Assessment Report.

³ See Section 2.8

⁴ Alternatives 2 & 3 also add northbound and southbound left turn lanes to the McDowell Road intersection, increasing the existing 4-lane section to 5 lanes

⁵ Radius applies to Loop 303 / Thomas Road intersection only, as described in Alternative 2 of 1998 Update Candidate Assessment Report.

⁶ Right of way width in accordance with Figure 17 "Expressway Typical Sections" from the 1998 Update Candidate Assessment Report.

⁷ *ibid.*

⁸ Full access control, supercedes MCDOT functional classification.

⁹ See AASHTO A Policy on Geometric Design of Highways and Streets, 1994, Fig. IX-72, pg. 784.

¹⁰ *ibid.*

3.1.2.1 Loop 303 Typical Sections

Alternative 1 consists of limited roadway work. The existing Loop 303 and Thomas Road typical sections are preserved except for widening of the roadways at the intersection to change the radius from 16.5 meters (54') to 23.0 meters (75').

The Alternatives 2 and 3 typical sections are shown on sheets 7 (Alt. 3) and 8 (Alt. 2) in Section 6 – Concept Plans.

Loop 303

Sta. 10+000.000 to Sta 10+384.241. The alignment follows the existing four-lane Cotton Lane.

Alternatives 2 and 3 add northbound and southbound left turn lanes to the McDowell Road intersection. The existing pavement is to be sawcut and widened on both sides of the road to provide the additional width. The existing pavement is to be chip-sealed unless an overlay is recommended by MCDOT upon pavement testing. The typical section is a MCDOT Rural Minor Arterial Road¹¹

Sta. 10+384.241 to Sta. 11+026.339. The alignment curves northeasterly away from Cotton Lane.

The Alternative 2 roadway narrows from four to two lanes, completing the northbound 70:1 tapered transition at Sta. 10+585.646. The roadway north of this point is a MCDOT Rural Collector Road¹² typical section, with minor variations to the slope and width of the unpaved shoulders. The two lane roadway is designed on an alignment and typical section consistent with the future southbound roadway of the Alternative 3 four-lane roadway.

The Alternative 3 four lane roadway transitions from the MCDOT Rural Minor Arterial Road to a modified MCDOT Principal Arterial Road¹³, with an 8.4 meter (28') unpaved median.

Sta. 11+026.339 to Thomas Road. The alignment is tangent, then reverses the previous curvature northerly to a tangent connection to the existing Loop 303 roadway at Thomas Road.

Alternative 2 continues as a MCDOT Rural Minor Collector Road and as the southbound half of Alternative 3, which continues as a modified MCDOT Principal Arterial Road.

¹¹ MCDOT Roadway Design Manual, Fig. 5.2, pg. 5-7.

¹² MCDOT Roadway Design Manual, Fig. 5.3, pg. 5-8.

¹³ MCDOT Roadway Design Manual, Fig. 5.1, pg. 5-6.

Thomas Road Intersection

Alternative 2 provides a northbound left turn lane to Thomas Road. The existing southbound pavement north of the intersection is widened to realign the through traffic around the northbound left turn lane.

Again, the Alternative 2 roadway becomes the southbound half of the Alternative 3 four lane divided facility, with north and southbound left turn lanes. The southbound widened roadway at Thomas Road may be reused as a right turn auxiliary lane. The four lane improvements presumably connect to similar improvements that would be constructed concurrently north of Thomas Road. Therefore, a transition from four to two lanes was not studied in this report.

3.1.2.2 Design Year

The design year is 2020.

3.1.2.3 Design Vehicle

The design vehicle to be used is WB-15.

3.1.2.4 Design Speed

The design speed anticipated for Loop 303 on this project is 110 kph (70 mph). This design speed preserves the ADOT established design speed found on segments of Loop 303 to the north.

3.1.2.5 Pavement Section

The pavement section will be provided by MCDOT. The assumed pavement section for the extension of Loop 303 was 100 mm (4") AC and 250 mm (10") AB.

3.1.2.6 Number of Lanes

Alternative 1 maintains two traffic lanes. Alternative 2 provides two new through lanes. Alternatives 2 and 3 widen the existing four lane portion of Cotton Lane at McDowell Road to provide new northbound and southbound left turn lanes, as well as intersection improvements at Thomas Road. Alternative 3 provides four new through lanes.

3.1.2.7 Roadway Width

Alternative 1 preserves the existing widths of Loop 303, 8.5m (28') and Thomas Road, 12.2m (40').

The mainline roadway width of Alternative 2 in the Cotton Lane four lane portion varies from 18.6 m (62') to 22.8 m (74') wide at the left turn lanes. The two lane portion of Alternative 2 is 10.2m (34') wide, with two 3.6m (12') lanes and two 1.5m (5') shoulders.

Alternative 3 is identical to Alternative 2 in the Cotton Lane four lane portion. The remainder of Alternative 3 consists of twin 10.2m (34') wide roadways, separated by a median of 8.4m (28'). Each roadway consists of a 4.2m (14') left lane, 3.6m (12') right lane, and 2.4m (8') right shoulder. Note that the southbound roadway matches the Alternative 2 two-way roadway width.

3.1.2.8 Shoulder Width

Alternative 2 has 1.52 m (5') shoulders and Alternative 3 has a 2.44 m (8') outside shoulder.

3.1.2.9 Intersection Geometrics

The layout and geometry is based on tracking the WB-15 design vehicle to maneuver within its own lane. Return radii are to be 15.2m (50'). Straight approaches of at least 100m (330') are required between intersections and horizontal curves per MCDOT policy.¹⁴ Sight triangle clearance and stopping sight distance at intersections will be in accordance with AASHTO policy. Left turn bay tapers are to be 44.7 m (146.7') in length (see Table 3.1).

3.1.2.10 Right of Way Requirements

The new alignment of Alternatives 2 and 3 is designed to occupy a right of way width of 60.96 m (200')¹⁵.

3.1.2.11 Superelevation

The two reverse curves of Alternatives 2 and 3 will require a superelevation rate of .037. The Alternative 2 transitional northbound alignment into the two-lane portion and southbound barrel of the future four lane facility will require a superelevation rate of .05.

3.1.2.12 Access Control

Access is limited to 1.6 km (1 mile) intervals.

¹⁴ See *MCDOT Roadway Design Manual*, page 6-3.

¹⁵ Right of way width in accordance with Figure 17 "Expressway Typical Sections" from the 1998 *Update Candidate Assessment*.

3.1.2.13 Unpaved Shoulder Slopes

Two percent 0.05 when superelevated.

3.1.2.14 Clear Zone Widths

According to the *AASHTO Roadside Design Guide*, minimum clear zone widths for roadways with an ADT exceeding 6,000 vpd where fill slopes are less than 1:6 is 9.0m (30') to 10.5m (34'). The favorable terrain and flat slopes suggest that the 10.5m clear zone is appropriate for this facility.

3.1.2.15 Stopping Sight Distance

The stopping sight distance requirement for Loop 303 is 246.4 meters (808 feet).

3.1.2.16 Tapers

Lane drop tapers are to be 70:1 in accordance with MCDOT policy¹⁶. The taper rate for realignment of through traffic lanes to accommodate changes in typical section is half of the lane drop taper rate, thus 35:1, in accordance with AASHTO policy¹⁷.

3.1.2.17 Profile

The roadway prism will be constructed on fill above the nearly flat agricultural terrain. A profile grade line of 1m (3.22') above the existing grade was used to estimate the earthwork quantities for this report. This concept matches the profile of the existing Loop 303 roadway to the north. The profile of the existing Loop 303 varies from as low as 0.2m (0.66') to 1.0m (3.22') above existing ground. The high points in the profile occur at frequent drainage crossings allowing the sheet flow drainage pattern of the area to pass under the road without overly concentrating the downstream drainage. The actual roadway design may reduce the need for some embankment earthwork by lowering the profile for segments where no drainage crossings are needed.

3.1.3 Left Turn Lane Geometry

A 35:1 taper to provide a 48.8 m (160'), 3.6 m (12') lane.

3.1.4 Drainage

¹⁶ See *MCDOT Roadway Design Manual*, page 5-49.

(See Section 2.5 – Drainage Characteristics; as well as discussion in Section 4 - Roadway Design Alternate for each respective alternative evaluated in depth).

3.1.5 Right-of-Way

A large portion of new right-of-way needed for Alternatives 2 and 3 is located within the ADOT right-of-way reserved for the Estrella Highway (see Section 4 - Alternatives Development and Analysis for background). The total additional right of way required is approximately 7.9 hectares (19.5 acres), of which 6.2 hectares (15.4 acres) is within the ADOT reservation, and two parcels, one 0.8 hectares (1.9 acres), and the other 0.9 hectares (2.2 acres) that are adjacent to the ADOT reservation.

3.1.6 Utilities

(See Section 2.3 – Utility Information)

3.2 - Design Exceptions

The table below summarizes the compliance with the 12 FHWA critical design elements.

Compliance with FHWA 12 Critical Design Elements	
Critical Elements¹⁸	Status
Design Speed	Compliant
Lane Width	Compliant
Shoulder Width	Compliant
Horizontal Alignment	Compliant
Vertical Alignment	Compliant
Grades	Compliant
Stopping-Sight Distance	Compliant
Cross Slopes	Compliant
Superelevation	Compliant
Structural Capacity	Not Applicable
Vertical Clearance	Not Applicable
Bridge Width	Not Applicable

¹⁷ See AASHTO A Policy on Geometric Design of Highways and Streets, 1994, page 235.

¹⁸ See AASHTO A Policy on Geometric Design of Highways and Streets, 1994. Rural Arterials: pp. 484-490,499-500. Rural Collectors: pp. 461-468.

4. ROADWAY DESIGN ALTERNATIVES

4.1 - Alternative Considerations and Selection

With the criteria established in Section 3 - Major Features, the alternative selection process was initiated:

All alternatives except the no-build alternative are two lane roadways extending Loop 303 from its current terminus at Thomas Road to a new connection at Cotton Lane at a point north of McDowell Road.

4.1.1 Description of Alternate 0 -- No-Build Alternative

The No-Build Alternative involves making no improvements within the project area.

4.1.2 Description of Alternative 1 – Enhanced Maintenance Improvements

Alternative 1 is a low cost improvement that consists of minor traffic modifications and limited roadway work (radius increase for turns).

4.1.3 Description of Alternative 2 – Interim Two Lane on New Alignment

Alternative 2 is an enhanced version of the preferred alternative from the 1998 update of the CAR prepared by the County. The plans for this alternative are in Section 6 - Concept Plans. This alternate is to construct a two lane, undivided roadway on a new alignment. The new alignment would depart the Thomas/Loop 303 intersection and traverse to the southwest, aligning with the existing Cotton Lane/McDowell intersection. The new roadway would occupy the western half of a future four lane, divided, at grade facility (i.e., the future southbound roadway of a divided roadway facility).

4.1.4 Description of Alternative 3 – Interim Four Lane on New Alignment

This alternate would construct a four lane facility immediately, with an earth median separating the two roadways. The alignment would also start at the Thomas/Loop 303 intersection and traverse southwest to the Cotton Lane/McDowell intersection at grade.

4.1.5 Additional Alternatives Considered

Five broader alternatives were identified early on in the concept development process.

Alternative A: Build the interim alignment on a significant offset to allow for the future four lane and six lane grade separated roadway to be built without relocation of traffic during construction. This alternative would initially place the interim alignment further to the west, resulting in rather horizontal severe curves, not unlike those that may be seen at similar interim detours.

Alternative B: Build an interim alignment "shoe-fly" around the envisioned Thomas Road grade separation site to allow the future traffic interchange to be built without relocation of traffic. This would require reconstructing a portion of existing Loop 303 and the intersection with Thomas Road.

Alternative C: Build the interim alignment such that it allows room for construction of half of the future mainline elevated section of the freeway. This would also entail severe horizontal curves, but to a lesser extent than Alternative A.

Alternative D: Build Cotton Lane so it curves into Loop 303 about a half mile south of Thomas Road. This is the alternative from the 1998 CAR update. It would provide a half-mile access point to Loop 303 for traffic from the northwest.

Alternative E: Build the interim Loop 303 to the west of the ultimate Loop 303 centerline to facilitate the installation of the directional ramps to and from I-10 without relocation of traffic.

Input from the County suggested that these alternatives not be evaluated further.

4.2 - Detailed Analysis of Impacts of Alternatives

Several alternatives were identified in Section 4.1. The three alternatives that are carried forward are explored in more detail within. The alternatives were developed within the context of the previous planning documents for the corridor, including:

- *MAG West Area Transportation Analysis*; June, 1985
- *ADOT Location and Design Concept Report* (Estrella Freeway State Route 303L, SR 85 to I-17); November, 1991
- *ADOT Preliminary Location Plan and Profile* (Estrella Freeway State Route 303L, SR 85 to I-17); November, 1991
- *Candidate Assessment Report* (Loop 303 Interim, McDowell Road to Thomas Road); 1998 Update

The ultimate facility recommended for the corridor in 1985 is a six-lane freeway to include a system interchange with Interstate 10 and a diamond interchange at Thomas Road. Right-of-way for the ultimate freeway footprint was reserved based on the 1991 planning documents. An interim two-lane Loop 303 facility was constructed north of Thomas Road. The existing two-lane Loop 303 corridor is constructed on an "interim centerline" within the ultimate ADOT right of way. The ultimate freeway, when built, would replace this roadway entirely.

The abrupt southerly end to this roadway (at Thomas Road) forces north-south traffic to traverse through two awkward right angle intersections. The 1998 update to the *1996 Candidate Assessment Report* noted that available ADOT right-of-way south of Thomas Road could be used for an improved alignment with large radii curves to connect Loop 303 to Cotton Lane at McDowell Road. The *CAR Update* also noted that increased traffic volumes indicated the need for a four-lane facility in the year 2004 and beyond.

With no plans to build the ultimate freeway in the near future, all alternatives in this report are considered to be interim, and would be totally replaced by the ultimate freeway.

4.2.1 Alternative 0 – No Build Alternative

4.2.1.1 Alternative 0 (No Build) Analysis - Civil

The No-Build Alternative would make no improvements within the project area. Existing roadway geometry and traffic control would remain. There is no construction cost associated with this alternative. The *1998 CAR Update* eliminated this alternative as insufficient to meet project requirements.

4.2.1.2 Alternative 0 (No Build) Analysis - Traffic

See combined discussion under Section 4.2.2.2 – Alternate No. 1.

4.2.1.3 Alternative 0 (No Build) Analysis - Drainage

No drainage impact due to improvements is anticipated with this alternative. Existing storm water management issues remain.

4.2.1.4 Alternative 0 (No Build) Analysis – Right-of-Way

No additional right-of-way is anticipated with this alternate.

4.2.1.5 Alternative 0 (No Build) -- Itemized Cost Estimates

No additional costs are anticipated with this alternate.

4.2.2 Alternative No. 1 – Enhanced Maintenance Improvements

4.2.2.1 Alternative No. 1 Analysis - Civil

The “Enhanced Maintenance Alternative” is identical to Alternative 2 in the *1998 CAR Update*, described as follows:

"This alternative consists of minor traffic control modifications and limited roadway work. Remove the stop control for southbound Loop 303 at Thomas Road and provide improved turning geometry at the northwest corner by modifying the current radius of 54 feet out to 75 feet. This will allow commercial vehicles to navigate the turn in their own lane and to continue around the corner without coming to a complete stop where there is no conflicting movement.

Construction of this alternative will require extension of the two existing 24 inch RCP's beneath Loop 303, regrading of the roadside ditches in the northwest quadrant and placement of new pavement and base material. The recommended pavement section is 6 inches of asphaltic concrete pavement over 4 inches of aggregate base course to match the Loop 303 pavement section constructed by ADOT. Maintenance of traffic should be limited to shoulder closures.

No irrigation facilities are impacted by this alternative, however, it may be necessary to relocate a power pole carrying 12kv and 69kv lines. No additional right of way is needed as the improvements are fully within ADOT's existing right-of-way."

The *1998 Car Update* also rejected this alternative as insufficient to meet project requirements.

4.2.2.2 Alternative No. 1 Analysis - Traffic

The traffic operational analysis was performed using the methodologies contained in the Highway Capacity Manual (HCM), Special Report 209, compiled by the Transportation Research Board and using the Highway Capacity Software (HCS). The Average Daily

Traffic Volumes (ADT's) were obtained from MAG and adjusted as described in Section 2.7.4. The existing controls, two-way-stop-controlled, were assumed unless Level of Service (LOS) E or F was found, then a traffic signal was evaluated.

Both Alternative No. 0 (No Build) and Alternative No. 1 are assumed to operate the same, presuming the radius improvement has nominal impact on the LOS. The Design Hourly Volumes (DHV's) for the new Loop 303 were reassigned to Cotton Lane and Thomas Road for these two alternatives. The traffic was reassigned assuming an unconstrained network, i.e. poor intersection operation has no impact on the traffic volumes.

4.2.2.1 Year 2010

Figure 4-1 summarizes the ADT's, DHV's, intersection operation and geometry for the Year 2010 for the No – Build Alternative and Alternative 1. The following table contains the Year 2010 intersection level of service.

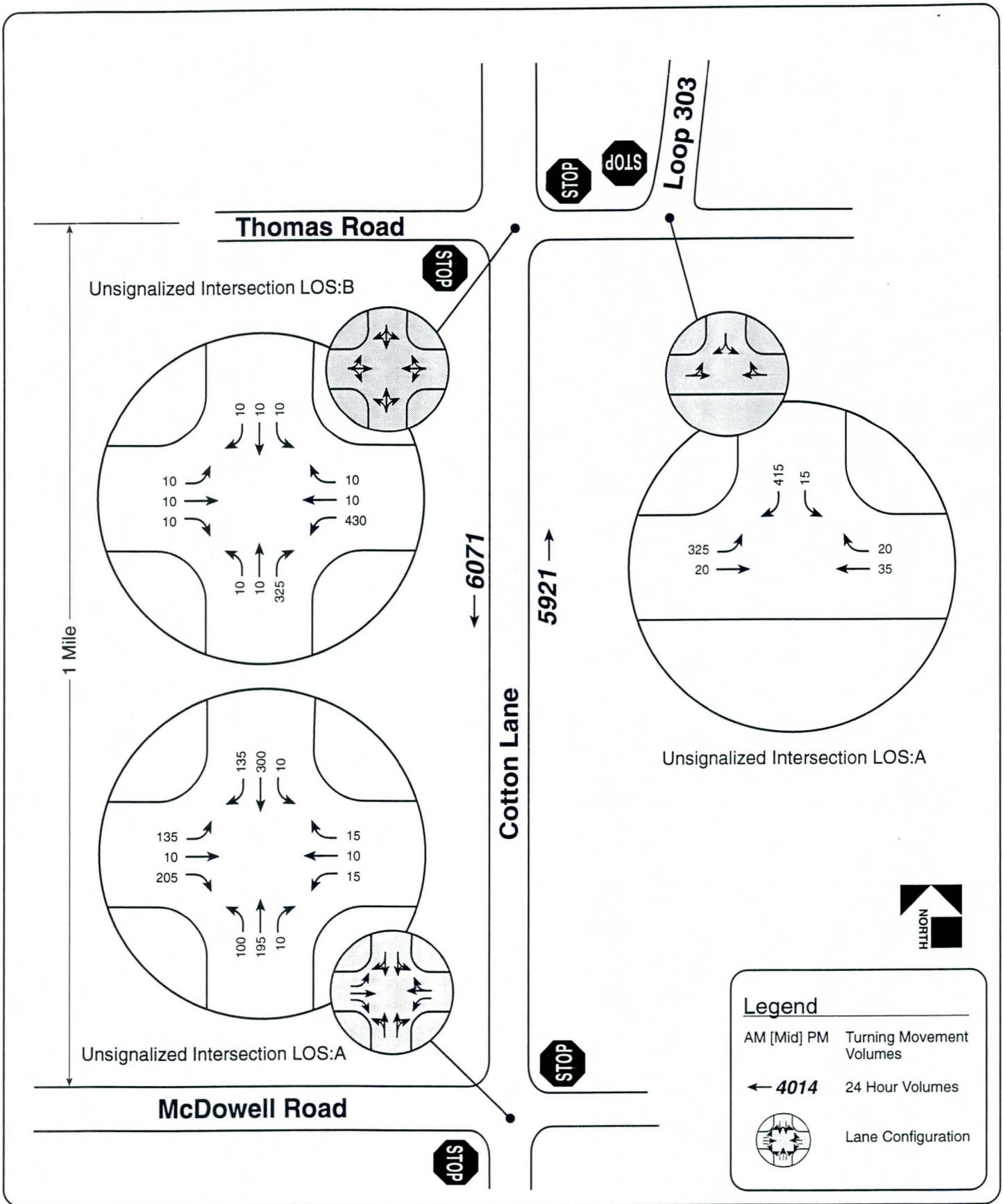
Intersection Level of Service No –Build Alternative and Alternative 1 Year 2010			
Intersection	Control	Intersection LOS	Delay (sec/veh)
Loop 303 @ Thomas Road	Stop	A	3.8
Cotton Lane @ Thomas Road	Stop	B	9.7
Cotton Lane @ McDowell Road	Stop	A	4.9

Loop 303 at Thomas Road

This intersection was found to operate at LOS A with the existing lane configuration and the southbound approach for Loop 303 stop controlled. All movements operate at LOS B or better.

Thomas Road at Cotton Lane

This intersection was found to operate at LOS A with the existing lane configuration and control. The westbound approach operates at LOS C, with all other approaches operating at LOS A.



Legend

AM [Mid] PM	Turning Movement Volumes
← 4014	24 Hour Volumes
	Lane Configuration

Figure 4-1
 Alternative 1 - Upgrade Existing Curves
 2010 Volumes and Lane Configuration



Loop 303 at McDowell Road

This intersection was found to operate at LOS A with the existing lane configuration and control. The eastbound lefts operate at LOS D, the eastbound through movement and westbound lefts operate at LOS C, and the westbound through-right movement operates at LOS B. All other movements operate at LOS A.

4.2.2.2.2 Year 2010

The Year 2020 ADT is more than double the Year 2010 ADT. Figure 4-2 depicts the ADT's, DHV's, intersection operation and geometry. The following table contains the Year 2020 intersection level of service.

Intersection Level of Service No -Build Alternative and Alternative 1 Year 2020			
Intersection	Control	Intersection LOS	Delay (sec/veh)
Loop 303 @ Thomas Road	Stop	F	84.5
	Signal	F	*
Cotton Lane @ Thomas Road	Stop	F	*
	Signal	F	*
Cotton Lane @ McDowell Road	Stop	F	626
	Signal	F	*

* Too high to be calculated.

Loop 303 at Thomas Road

The Year 2020 DHV's exceed the capacity of both a traffic signal and a stop controlled intersection, especially the southbound approach of Loop 303, which operates at LOS F.

Thomas Road at Cotton Lane

This intersection also operates at LOS F for both a traffic signal and a stop controlled intersection, primarily due to the high left turn volume which is mainly composed of traffic from Loop 303.

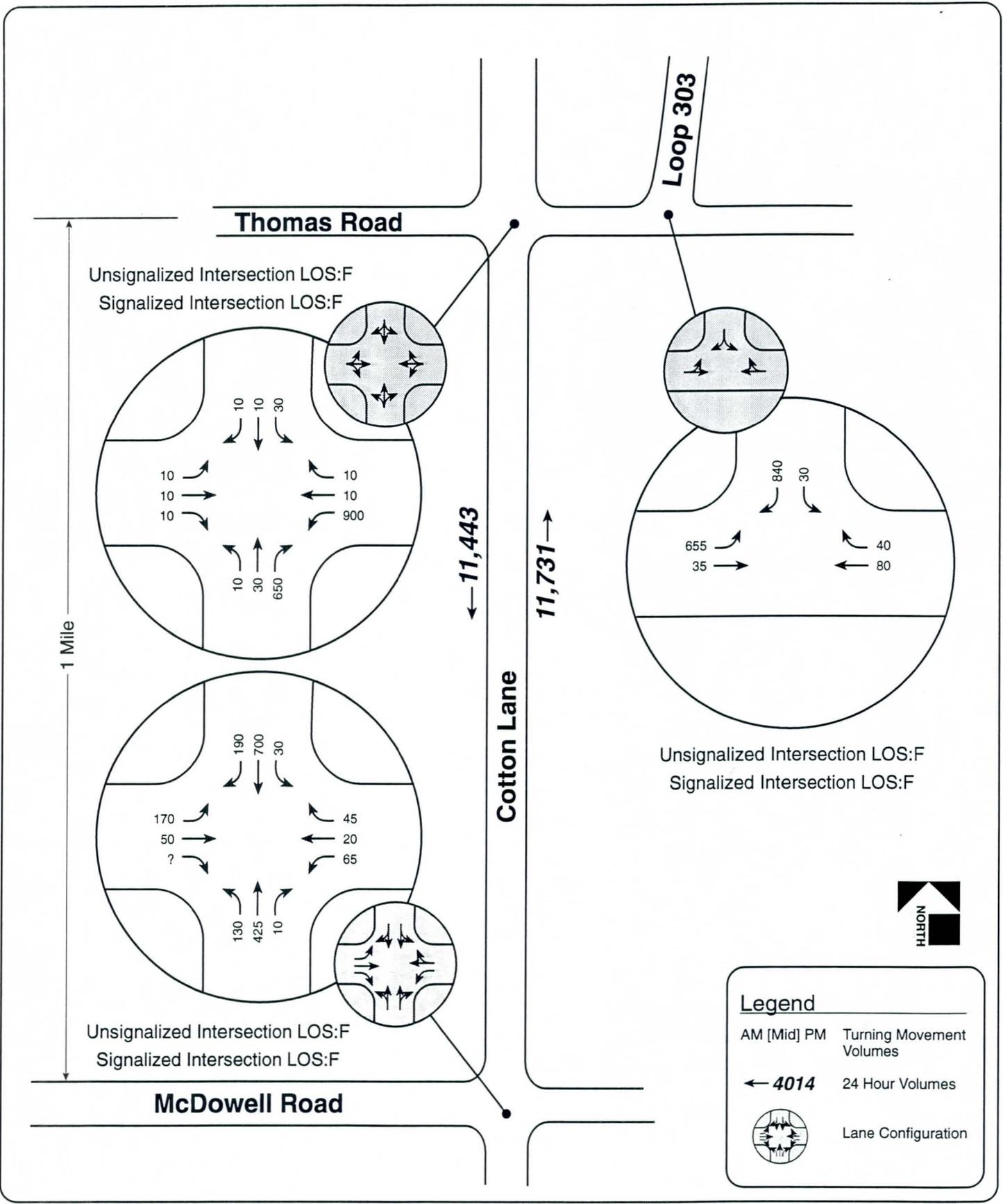


Figure 4-2
Alternative 1 - Upgrade Existing Curves
2020 Volumes and Lane Configuration

Loop 303 at McDowell Road

This intersection also operates at LOS F regardless of the type of control.

4.2.2.3 Alternative No. 1 Analysis – Drainage

None.

4.2.2.4 Alternative No. 1 Analysis – Right-of-Way

Alternative 1 does not require additional right-of-way.

4.2.2.5 Alternative No. 1 Itemized Cost Estimates

The itemized costs for Alternative 1 are \$13,500. A detailed cost summary is shown in Section 7 - Documentation.

4.2.3 Alternative No. 2 – Two Lane Interim Roadway on New Alignment

4.2.3.1 Alternative No. 2 Analysis - Civil

Alternative 2, shown in Section 6 - Concept Plans; Sheets 1-3 would construct a two lane road connecting the Thomas Road/Loop 303 intersection with the Cotton Lane/McDowell Road intersection along an expressway alignment within right-of-way sufficient to provide an ultimate 6-lane facility. The roadway would be positioned in the westerly half of the right-of-way to eventually serve as the southbound roadway of the ultimate facility. This alternative is similar to the “Full Cost Alternative” described as a “two lane major rural collector interim road” in the *1998 CAR Update*. The construction would include the following features:

- Cotton Lane would be widened from near Interstate 10 to the point north of McDowell Road where Loop 303 leaves the existing Cotton Lane alignment. The widening of four lanes to five would provide north and southbound left turn lanes to McDowell Road. The widening would be achieved by resurfacing the existing roadway, sawcutting the edge, and adding pavement to the outside of the existing pavement.
- The roadway north of McDowell Road would narrow to two lanes on a transition alignment that would preserve the new roadway as the ultimate southbound roadway for a four lane facility, i.e., northbound traffic would be shifted westerly to the future southbound fast lane. The new roadway would follow reversing 1.127 degree (radius = 1,550 m; 5085.55 ft) curves separated by sufficient tangent distance for superelevation runoffs. The radius of the two curves is slightly

smaller than the 1 degree curves proposed in the CAR Update. However, the 110 kph (70 mph) design speed is preserved using 3.7 percent superelevation. The tighter radius was necessary for the alignment to be compatible with the future parallel roadway to the east. A short portion of the future northbound barrel could be constructed as part of the four to two lane transition so that the need for traffic control during the future four-lane construction could be reduced.

- The new roadway would connect to the existing Loop 303 roadway at Thomas Road. A northbound left turn lane would be provided in the new roadway. The existing roadway north of Thomas Road would be widened along the west side to realign southbound traffic to match the new southbound lane south of Thomas Road, which is offset due to the northbound turn lane. The future southbound left turn lane for the four lane facility is optional widening construction along the east side of the existing roadway.
- Existing Cotton Lane would be obliterated between the new point of curvature and the approximate half way point between McDowell Road and Thomas Road.
- McDowell Road and Thomas Road would require minor changes to striping and traffic control devices.
- Any drainage excavation material would be incorporated into the roadway prism.

4.2.3.2 Alternative No. 2 Analysis – Traffic

This alternative continues a two lane Loop 303 south 1.6 kilometers (1 mile) to McDowell Road, eliminating the two stop controlled, right angle turns which caused unacceptable intersection operation in the Year 2020 in the No – Build Alternative and Alternative 1. Figure 4-2 summarizes the geometric, operational, and volume information.

4.2.3.2.1 Year 2010

Figure 4-3 summarizes the ADT's, DHV's, lane configurations, and level of service for the Year 2010 for Alternative 2. The following table contains the Year 2010 intersection level of service.

Intersection Level of Service Alternative 2 Year 2010			
Intersection	Control	Intersection LOS	Delay (sec/veh)
Loop 303 @ Thomas Road	Stop	A	1.2
Cotton Lane @ Thomas Road	Stop	A	<1
Cotton Lane @ McDowell Road	Stop	A	4.8

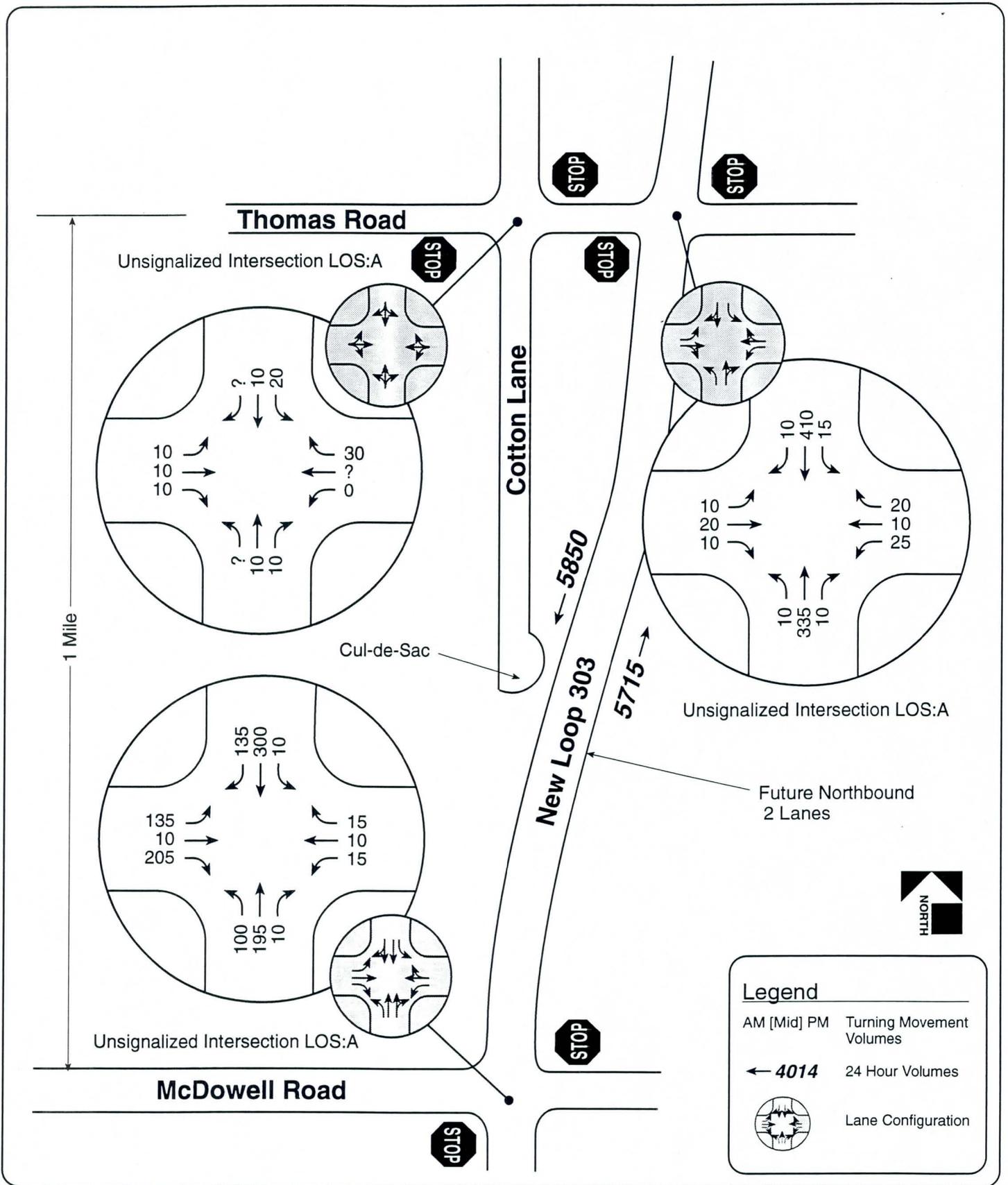


Figure 4-3

Alternative 2
2010 Volumes and Lane Configuration

Loop 303 at Thomas Road

This intersection operates at LOS A with Thomas Road stop controlled. The left turns from Loop operate at LOS A and the westbound and eastbound (stop controlled) approaches operate at LOS C.

Thomas Road at Cotton Lane

All the movements operate at LOS A.

Loop 303 at McDowell Road

This intersection operates at LOS A with McDowell Road stop controlled. However, the eastbound left turn operates at LOS D, the eastbound through and the westbound left operate at LOS C, and the westbound through-right turn lane operates at LOS B.

Roadway Operation

The two lane interim roadway was calculated to operate at LOS C with the design hourly volumes. It should be noted that the update to the CAR stated that a four lane, divided roadway would be necessary in 2004. Traffic volumes should be evaluated as they approach the threshold level in order to determine when the facility should be upgraded to a four lane, divided roadway.

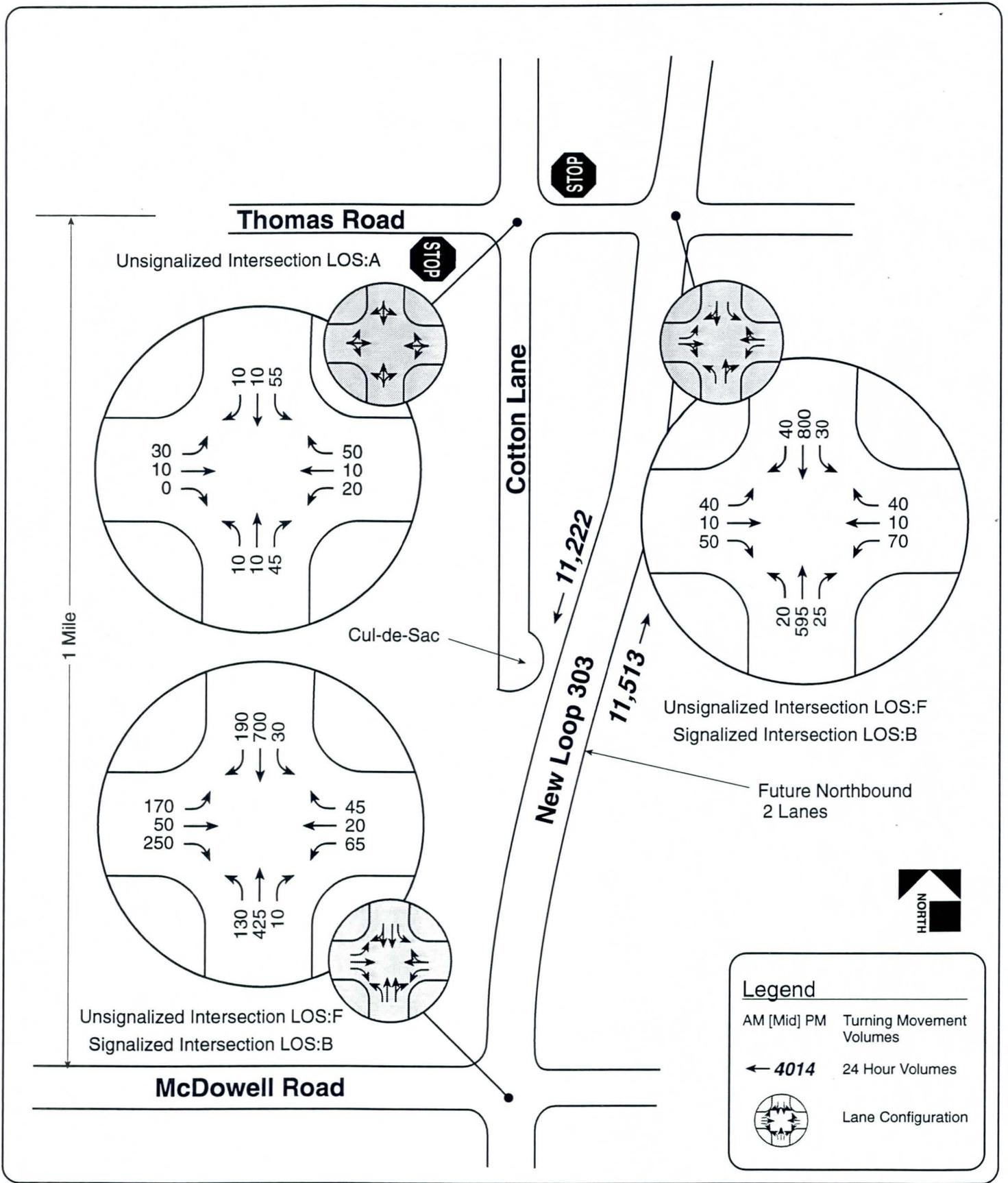
4.2.3.2.2 Year 2020

Figure 4-4 summarizes the ADT's, DHV's, lane configurations, and level of service for the Year 2020 for Alternative 2.

Intersection Level of Service Alternative 2 Year 2020			
Intersection	Control	Intersection LOS	Delay (sec/veh)
Loop 303 @ Thomas Road	Stop	B	15**
	Signal	B	9.8
Cotton Lane @ Thomas Road	Stop	A	<1
Cotton Lane @ McDowell Road	Stop	F	519.6
	Signal	B	13.9

* Too high to calculate

** The Thomas Road left turns operate at LOS F.



LOOP
303

Loop 303 (Estrella)
McDowell Road to Thomas Road
 MCDOT Transportation Planning Division

Figure 4-4
Alternative 2
2020 Volumes and Lane Configuration



Loop 303 at Thomas Road

This intersection operates at LOS B, however both the left turns from Thomas Road operate at LOS F with two way stop control. Therefore, a traffic signal was analyzed. The left turns operate acceptable with a traffic signal, and the intersection was found to operate at LOS B.

Thomas Road at Cotton Lane

This intersection operates at LOS A.

Loop 303 at McDowell Road

The westbound and eastbound (stop controlled) approaches operate at LOS F. The installation of a traffic signal improves the traffic operation to LOS B.

Roadway Operation

Loop 303 will operate at LOS E as a two lane undivided road with the 2020 projected volumes.

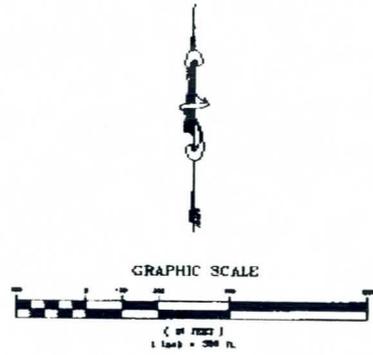
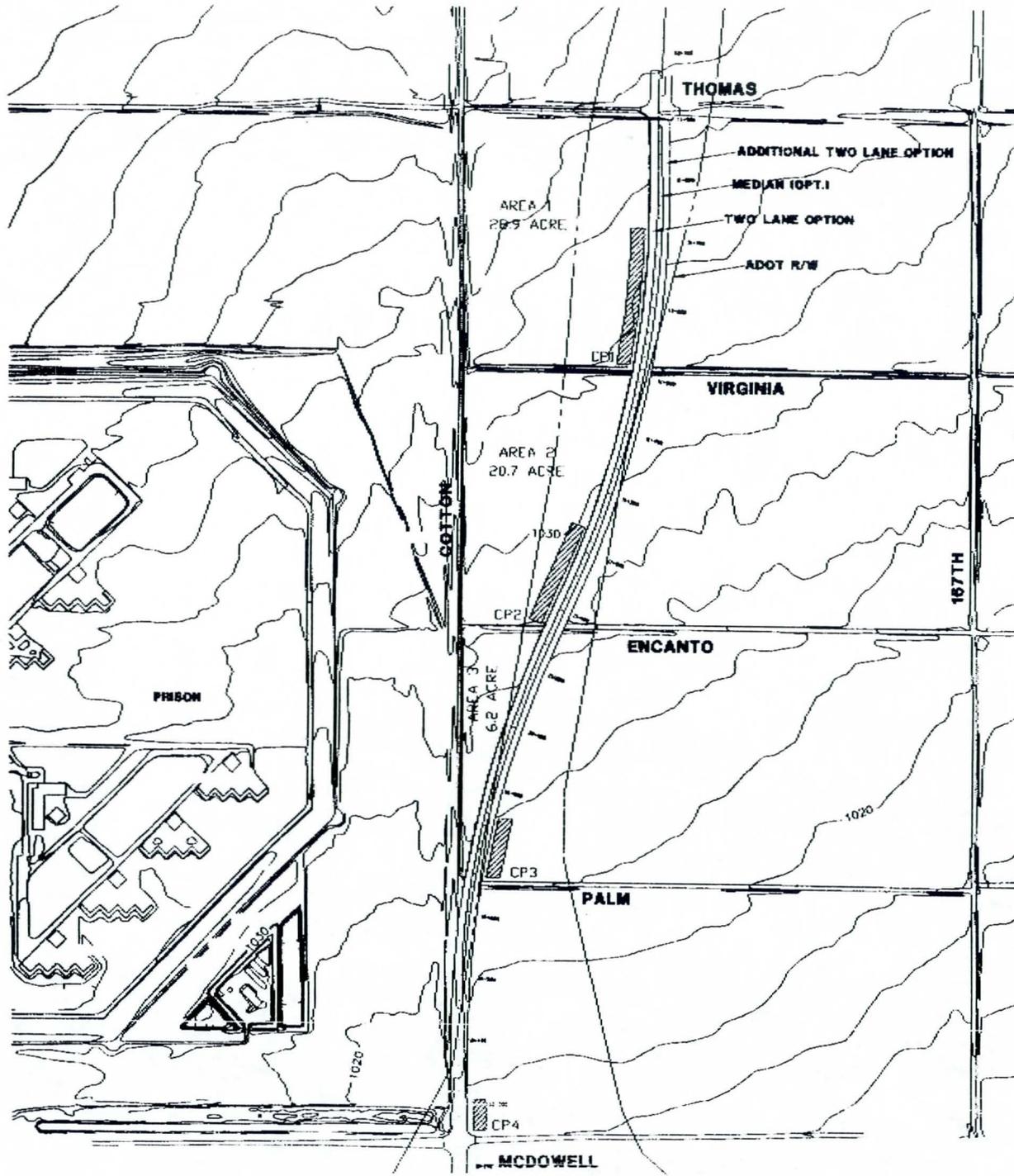
4.2.3.3 Alternative No. 2 Analysis – Drainage

Several options are available for the interim drainage solutions for Alternatives 2 and 3:

Option No. 1:

The drainage basin will be divided into four separate areas as depicted in Figure 4-5. Each sub-area shall be equipped with a retention basin large enough to hold the appropriate 100-year event. Retention basins were sized assuming a 30.5 m (100 ft) drainage easement along the Loop 303 alignment. Top widths of the basins were assumed to be 21.3 m (70 ft) to allow for separation from the roadway and possible maintenance roads. The design basins utilized 1:6 side slopes and were no deeper than 1 m (3 ft). The lengths of these basins are as follows:

Drainage Area Number	Retention Basin -- Length: 21.3 m (70') – top wide Side Slopes: 1:6 side slopes
1 (north end)	213 m (700')
2 (mid-point)	167 m (550')
3 (south end)	94 m (310')
4 (McDowell intersection)	48 m (160')



TITLE DRAINAGE CONCEPT EXHIBIT A PROJECT DESCRIPTION LOOP 303 MCDOWELL RD. TO THOMAS RD.	DRAWN BY: [] DATE: 4/78
	DESIGNED BY: [] DATE: 4/78
	CHECKED BY: [] DATE: 4/78
	PROJECT NO.: [] SCALE: []
PROJECT: [] DRAWN: [] DATE: []	PROJECT NO.: [] SCALE: [] DATE: []

PROJ. CT. ENGINEERING CONSULTANTS, LTD.
 7220 SMOKE RANCH ROAD, SUITE 4
 LAS VEGAS, NV 89126 PHONE (702) 360-1044

Median drainage will be required between Sta. 10+384 and 11+900 (Thomas Road) once the additional lanes are added. Median drainage should be routed to the east side of the roadway and allowed to flow to existing roadside ditches.

Detention basins 1 and 2 will be provided with high water bleed off pipes under the elevated roadway. These culverts will serve the purpose of protecting the roadway from flooding if the respective basins become full.

Drainage runoff from areas 3 and 4 are designed to collect runoff along the west side of the roadway section by cut ditch and divert this flow to the south. Flows will then be captured by catch basins and diverted under the roadway to their respective detention basins. If additional right-of-way is acquired, these basins may be placed on the west side of the roadway alignment. Special attention will be required at McDowell Road to avoid mixing the runoff flows down Cotton Lane and the existing tail water ditches.

Option No. 2:

The previously mentioned areas 1, 2 and 3 will be combined and collected in one large retention basin located in the south portion of area 3. Area 3 does not fall into the current ADOT right-of-way and would need to be purchased. The combined runoff would total 7,400 m³ (6 acre-ft). A 1 m (3 ft) retention basin would therefore need to be approximately 0.8 ha (2 acres) in size.

Drainage area 4 would remain the same as Option 1, collecting runoff along the west cut ditch and constructing a culvert under the roadway to retention basin 4.

Option No. 3:

Provide multiple inlet structures and culverts across the roadway to divert the flow to the east side of Loop 303. These culverts would need to be minimal in height due to the fact that the interim roadway is only minimally elevated. Collection ditches would need to be added to the typical roadway profile on both sides of the roadway.

Proposed Solution

Our recommendation is to provide four separate retention basins as depicted in Option 1. These basins would be accompanied by median drainage to the east and high water relief pipes for drainage areas 1 and 2. Runoff from drainage areas 3 and 4 should be diverted under the roadway with the use of catch basins and culverts. The retention basins may then be placed within the existing ADOT right-of-way. If additional right-of-way is acquired, these basins may be placed on the west side of the roadway alignment.

4.2.3.4 Alternative No. 2 Analysis – Right-of-Way

Alternative 2 requires approximately an additional 1.67 HA (4.1 acres) of right-of-way for the planned four-lane road.

4.2.3.5 Alternative No. 2 Itemized Cost Estimate

The itemized costs for Alternative 2 are \$2.2 million. A detailed cost summary is shown in Section 7 - Documentation.

4.2.4 Alternative No. 3 – Four Lane Interim Roadway on New Alignment

As noted in Section 4.2.1, this alternative provides four divided traffic lanes between Thomas and McDowell Roads. The only intersection geometric change from Alternative 2 was assumed to be two through lanes in each direction on Loop 303 at Thomas Road.

4.2.4.1 Alternative No. 3 Analysis - Civil

Alternative 3, shown in Section 6 - Concept Plans; Sheets 4-6 of the plans at the back of this report, would construct a four-lane facility. The southbound roadway of Alternative 3 follows the same alignment as the two-lane roadway from Alternative 2. The northbound roadway would be built parallel to the southbound roadway, eliminating the need for the four to two lane transition required in Alternative 2. The construction would include the following features:

- The intersection of Loop 303 (Cotton Lane) and McDowell Road would remain as constructed in Alternative 2.
- The northbound roadway would be constructed parallel and east of the two-lane roadway described in Alternative 2. The 8.4m (28') median would match the "4 Lane Roadway" typical section described on Figure 17 of the *1998 CAR Update*, and be compatible with the "6 Lane Roadway" typical section also described in the *Update*. The southerly curve would be used to narrow the median, which would uniformly transition to the 4.2m (14') wide southbound left turn lane for the intersection with McDowell Road.
- The intersection of Loop 303 and Thomas Road would be improved to provide north and southbound left turn lanes within the available median width.

4.2.4.2 Alternative No. 3 Analysis - Traffic

The design traffic volumes were assumed to be the same as Alternative 2.

4.2.4.2.1 Year 2010

Figure 4-6 summarizes the ADT's, DHV's, lane configurations, and level of service for the Year 2010 for Alternative 3.

Intersection Level of Service Alternative 3 Year 2010			
Intersection	Control	Intersection LOS	Delay (sec/veh)
Loop 303 @ Thomas Road	Stop	A	1.2
Cotton Lane @ Thomas Road	Stop	A	<1
Cotton Lane @ McDowell Road	Stop	A	4.8

Loop 303 at Thomas Road

This intersection operates at LOS A with Thomas Road stop controlled. The left turns from Loop 303 operate at LOS A and the westbound and eastbound (stop controlled) approaches operate at LOS C.

Thomas Road at Cotton Lane

This intersection has the same DHV's and geometry in Alternatives 2 and 3, and thus the same operation. All the movements operate at LOS A.

Loop 303 at McDowell Road

This intersection has the same DHV's, geometry and operation in both Alternatives 2 and 3. This intersection operates at LOS A with McDowell Road stop controlled. However, the eastbound left turn operates at LOS D, the eastbound through and the westbound left operate at LOS C, and the westbound through-right turn lane operates at LOS B.

Roadway operation

Loop 303 operates at level of service of A as a four lane divided facility with the 2010 projected traffic volumes.

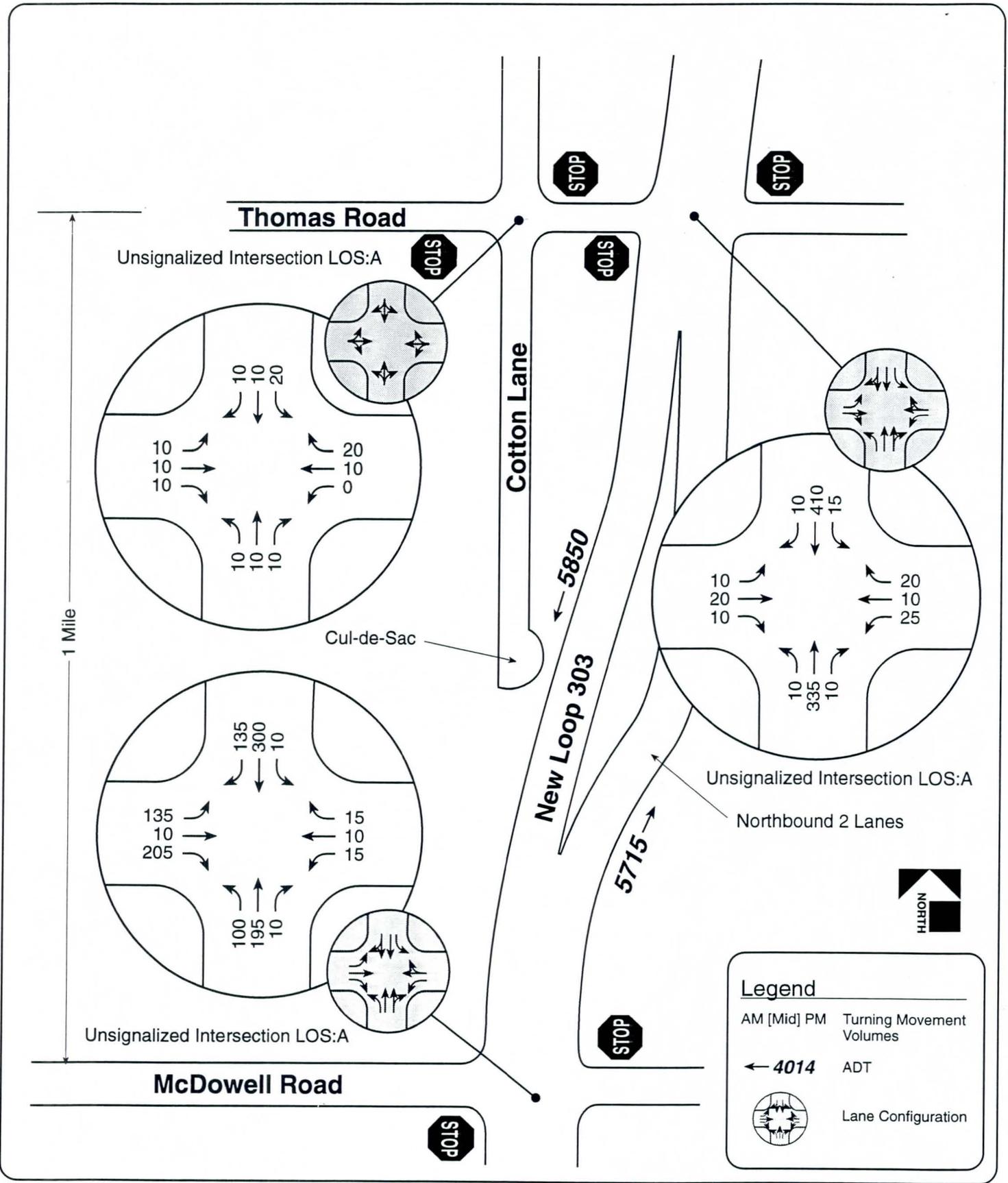


Figure 4-6

Alternative 3
2010 Volumes and Lane Configuration

4.2.4.2.2 Year 2020

Figure 4-7 summarizes the ADT's, DHV's, lane configurations, and level of service for the Year 2010 for Alternative 3

Intersection Level of Service Alternative 3 Year 2020			
Intersection	Control	Intersection LOS	Delay (sec/veh)
Loop 303 @ Thomas Road	Stop	C **	23.8
	Signal	B	5.7
Cotton Lane @ Thomas Road	Stop	A	<1
Cotton Lane @ McDowell Road	Stop	F	*
	Signal	B	13.9

* Too high to calculate

** The eastbound and westbound lefts operate at LOS F

Loop 303 at Thomas Road

As an unsignalized intersection operates at LOS C, however the stop controlled Thomas Road left turns operate at LOS F. The signalized intersection operation improves to LOS B with all movements operating at an acceptable level.

Thomas Road at Cotton Lane

This intersection has the same DHV's and geometry in Alternatives 2 and 3, and thus the same operation.

Loop 303 at McDowell Road

This intersection also has the same DHV's, geometry and operation in both Alternatives 2 and 3. The westbound and eastbound (stop controlled) approaches operate at LOS F. The installation of a traffic signal improves the traffic operation to LOS B

Roadway Operation

Loop 303 operates at level of service of A as a four lane divided facility with the 2020 projected traffic volumes. The four lane alternative should be constructed once traffic volumes warrant such action.

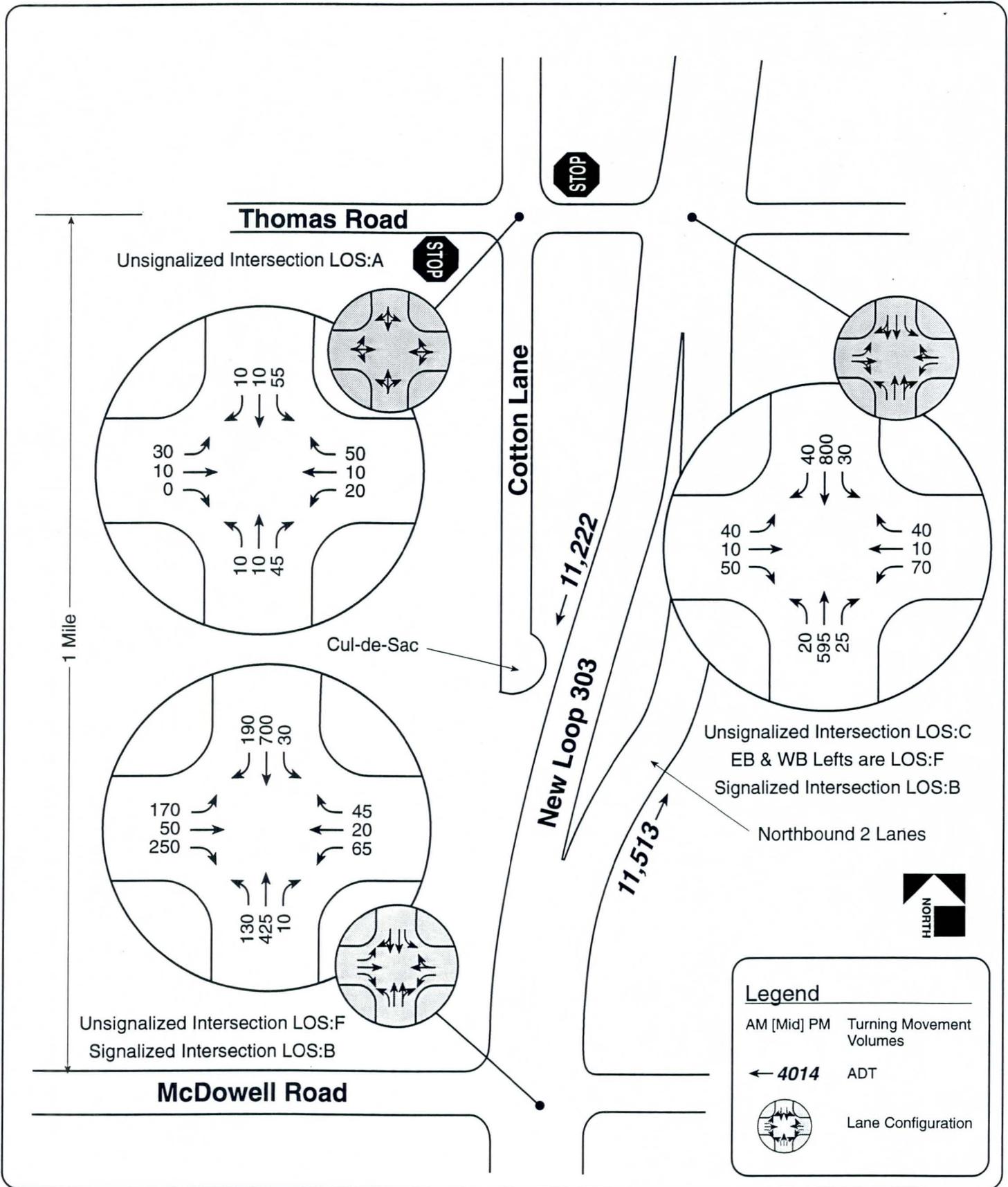


Figure 4-7

Alternative 3
2020 Volumes and Lane Configuration

4.2.4.3 Alternative No. 3 Analysis – Drainage

Provide multiple inlet structures and culverts across the roadway to divert the flow to the east side of Loop 303. These culverts would need to be minimal in height due to the fact that the interim roadway is only minimally elevated. Collection ditches would need to be added to the typical roadway profile on both sides of the roadway.

4.2.4.4 Alternative No. 3 Analysis – Right-of-Way

Alternate 3 required the same additional right-of-way as that required for Alternate 2.

4.2.4.5 Alternative No. 3 Itemized Cost Estimate

The itemized costs for Alternative 3 are \$3.4 million. A detailed cost summary is shown in Section 7 - Documentation.

4.3 - Results of Public Meeting

Since public input in the development and subsequent evaluation of alternatives was deemed very important, a final public meeting process was implemented. A public involvement process was designed to disseminate information to the public on project activities and solicit information from the public on issues and concerns relating to the project. A public meeting was held on December 14, 1998 at Western Sky Middle School in Goodyear. The conceptual design and supporting data was presented at the meeting. The meeting was advertised in the *Arizona Republic* the first week of December. *The West Valley View* published the press release. Meeting announcements were also mailed to key stakeholders.

An attempt to include participants that fall under Title VI was also made as groups associated with low income and minority populations were informed and invited to the public meeting. A copy of the *Loop 303 Public Involvement Plan, the Official Summary of the Public Meeting, and Sign-In Sheet* received from the public are included in Section 7 - Documentation.

Generally the public meeting was moderately well attended. Representatives from the City of Goodyear, the Arizona Department of Corrections, SunCor and several private

citizens attended. The comments received orally indicated that those that were in attendance favored the realignment of Loop 303 through the study area.

Comments ranged to include the following:

- Truck access onto Loop 303 was mentioned as being slightly more difficult with the ever increasing traffic.
- Negotiating two stops and two ninety degree turns for Loop 303 motorists is considered hazardous.
- Drainage in the northwest quadrant of McDowell and Loop 303 was a historical problem.
- Loop 303 should be extended south of Interstate 10.
- Signalized intersections seem warranted.

4.4 - Evaluation of Alternatives

4.4.1 Overview

4.4.1.1 Adjacent Properties

The existing land use is currently agricultural. Alternatives No. 0 and No. 1 would have no impact on the existing land use. Alternative No. 2 and No. 3 would require shifting agricultural activities and relocating irrigation ditches bisected by the new roadway(s).

The Palm Valley master plan for development of the area indicates that the land use will become "Commercial" to the west and "low density residential" to the east of Loop 303 in the future. The ultimate freeway alignment is shown in the master plan. The interim alignments of Alternates No. 2 and No. 3, which fall mostly within the ultimate freeway right-of-way, should minimize the impact on future development.

4.4.1.2 Adjacent Roadway Traffic

Alternatives No. 0 and No. 1 would not correct the growing deterioration in roadway and intersection level of service. Congestion and delay is expected to grow to unacceptable levels under both alternatives.

Alternative No. 2 would improve traffic conditions in the short term. Alternative No. 3 would improve traffic conditions in the longer term. Since Alternative No. 2 is the first stage of Alternative No. 3, there is no disadvantage to constructing Alternative No. 2 first and building Alternative No. 3 when conditions warrant. If traffic volumes build to unacceptable

level for Alternative No. 3 before the ultimate freeway becomes viable, an additional lane in each direction could be added to the four-lane Alternative No. 3 within the same right-of-way.

Prior to the Design Year (2020) two new traffic signals will be required.

4.4.1.3 Utilities

There are approximately 13 utility poles that will need to be relocated at an estimated cost of \$184,000 to \$192,000. Up to three irrigation ditches will need to be relocated at an estimated cost of \$10,000.

4.4.1.4 Environmental

No environmental concerns are apparent with any of the alternatives. Normal environmental construction measures will have to be observed.

Rationale

The Alternatives Evaluation Matrix is shown on the next table.

Alternatives No. 0 and No. 1 may be rejected for failing to deliver favorable results in the categories of safety, traffic operations, public/landowner preference, corridor consistency, and flexibility for the future.

Alternative No. 2 is preferable to Alternative No. 3 based on lower cost and maximum flexibility. Since Alternative No. 2 represents the first phase of Alternative No. 3, the additional capacity of Alternative No. 3 is not precluded by the selection of Alternative No. 2. It is unnecessary to commit funding to Alternative No. 3 at this stage, when it could easily be built later with minimal additional impact and traffic control required.

Alternatives Evaluation Matrix				
Category	Alt 0 No build	Alt 1 Curve Correction	Alt. 2 Two Lane Interim	Alt. 3 Four Lane Ultimate
1. Cost	None	Minimal	Moderate	High
2. Safety	Does Not Meet Standards and Driver Expectations	Slight Improvement, Does Not Meet Standards and Driver Expectations	Meets Standards and Driver Expectations	Exceeds Standards and Provides Higher Level of Safety
3. Traffic Operations, Roadways	Unacceptable	Unacceptable	Acceptable for near term	Acceptable beyond design year (2020).
4. Traffic Operations, Intersections	Unacceptable	Unacceptable	Acceptable for near term	Acceptable beyond design year (2020).
5. Public/Landowner Preference	Not Preferred	Not Preferred	Preferred	Preferred
6. Drainage Impacts	None	Minimal	Very Low	Low
7. Right of Way	None	None	2 Small Parcels + Available ADOT ROW*	2 Small Parcels + Available ADOT ROW*
8. Loop 303 Corridor Consistency	Not Consistent	Slight Improvement, Not Consistent	Consistent with 2-lanes to North	Consistent with 4-lanes to South
9. Flexibility for Future	Flexibility Lost if ADOT ROW Not Used and Relinquished	Flexibility Lost if ADOT ROW Not Used and Relinquished	Expandable to Six Lanes, Reserves ROW for Ultimate Freeway	Expandable to Six Lanes, Reserves ROW for Ultimate Freeway

* SunCor Development (Mr. Tom Hill) has confirmed that all right-of-way required would be reallocated for Loop 303 expansion

5. SELECTION OF THE PREFERRED ALTERNATE

5.1 - Preferred Alternative

The preferred alternative is Alternative No. 2. The concept plans for this alternative are shown in Section 6 - Concept Plans; Sheets 1-3 and 8. The plan is based on constructing the two-lane portion such that a future parallel roadway can be built to provide four lanes in the future.

5.2 - Design Criteria

The design criteria are identical to those described for Alternative No. 2 in Section 3 - Major Features and shown on page 3-2 (Major Design Features - Mainline).

5.3 - Description of the Preferred Alternative

Alternative No. 2 is described in detail in Section 4.1.4. The typical sections described in Section 3.1.2 for all alternatives are summarized in this section for the preferred alternative only.

5.3.1 Horizontal Alignment

Sta. 10+000.000 to Sta 10+384.241. The alignment follows the existing four-lane Cotton Lane. This alternative adds northbound and southbound left turn lanes to the McDowell Road intersection. The existing pavement is to be sawcut and widened on both sides of the road to provide the additional width. The existing pavement is to be chip-sealed unless an overlay is recommended by MCDOT upon pavement testing. The typical section is a MCDOT Rural Minor Arterial Road¹.

Sta. 10+384.241 to Sta. 10+585.646. The alignment curves northeasterly away from Cotton Lane. The roadway narrows from four to two lanes, completing the northbound 70:1 tapered transition at Sta. 10+585.646.

Sta. 10+585.646 to Thomas Road. The previous curve continues northeasterly to a short section of tangent needed for superelevation runoff. The alignment reverses the previous curvature northerly to a tangent connection to the existing Loop 303 roadway at Thomas Road.

¹ MCDOT Roadway Design Manual, Fig. 5.2, pg. 5-7.

The roadway in this segment is a MCDOT Rural Collector Road² typical section, with minor variations to the slope and width of the unpaved shoulders. The two lane roadway is designed on an alignment and typical section consistent with the future southbound roadway of the Alternative 3 four-lane roadway.

Thomas Road Intersection

Alternative No. 2 provides northbound and future southbound left turn lanes to Thomas Road. The existing southbound pavement north of the intersection is widened to realign the through traffic around the northbound left turn lane and provide this future southbound turning lane when warranted.

5.3.2 Drainage

Drainage facilities are discussed in Section 4.2.3.3.

5.3.3 Utilities

Generally, utility relocations will be required as mentioned in Section 4.2.3.

5.3.4 Other Features

The recommended alternative will also show a cul-de-sac for Cotton Lane, approximately 800m (½ mile) south of the intersection with Thomas Road. Further, No. 7 pull boxes with crossing conduits will be provided in all four quadrants of the two intersections, this to facilitate the installation of a future traffic signal at each intersection. A short segment of the future northbound roadway will be completed just north of the McDowell Road intersection in order to facilitate the addition of a second, parallel roadway. This feature will allow minimal disruption to traffic when the second roadway is built.

5.4 - Traffic Management of Preferred Alternative

Traffic management for construction of the Alternate No. 2 should be relatively straight forward. The widening of the four lane portion of Cotton Lane may require lane closures. Brief shutdowns for chip sealing or pavement overlay, as well as re-striping operations may be handled with standard traffic control methods. The construction along the new alignment will not require traffic management during construction except for warning signs at points of construction ingress/egress to existing roadways. Most of the new Loop

² MCDOT Roadway Design Manual, Fig. 5.3, pg. 5-8.

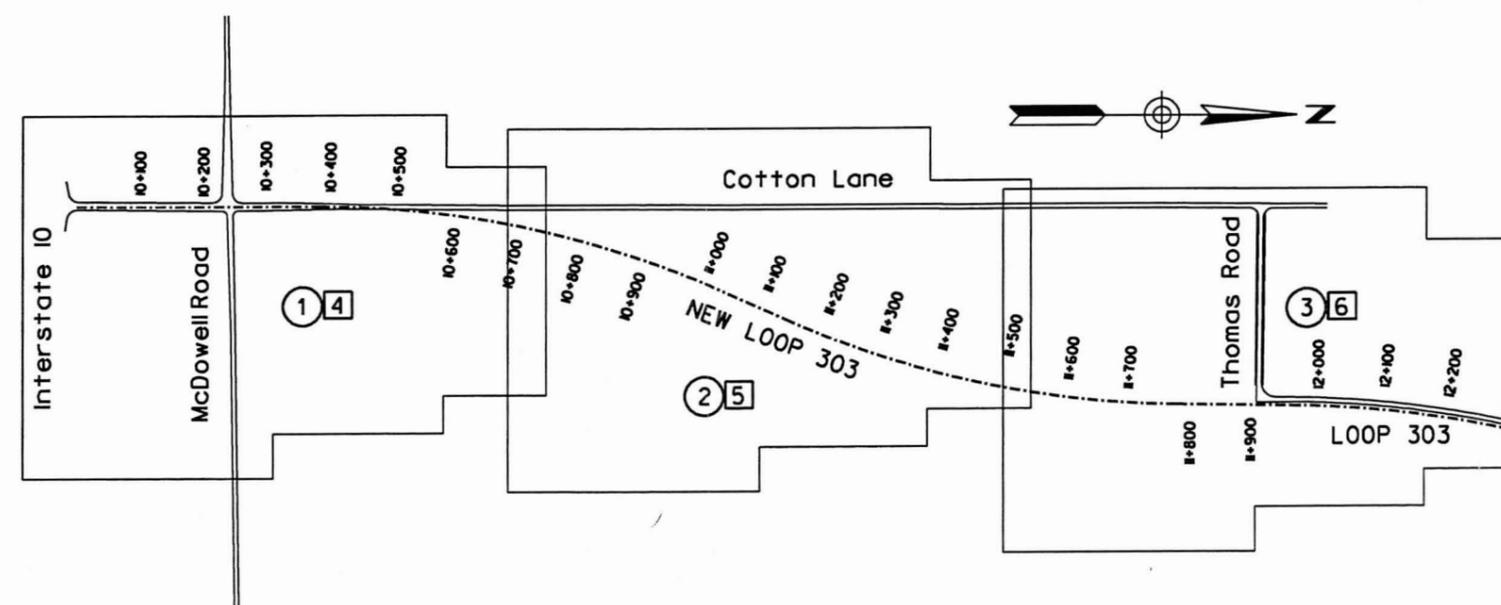
303 roadway can be constructed with no impact to traffic on existing Loop 303. The Loop 303 intersections with Thomas Road and McDowell Road will require lane closures in order to facilitate turn-bay construction. The tie-in of Loop 303 to Cotton Lane will require the closure of Cotton Lane, with traffic detoured to Citrus Road and Pebble Creek Parkway via Indian School Road for southbound 303 traffic and via McDowell Road for northbound traffic.

6. CONCEPT PLANS

LOOP 303 DESIGN CONCEPT REPORT PLANS & TYPICAL SECTIONS

INDEX

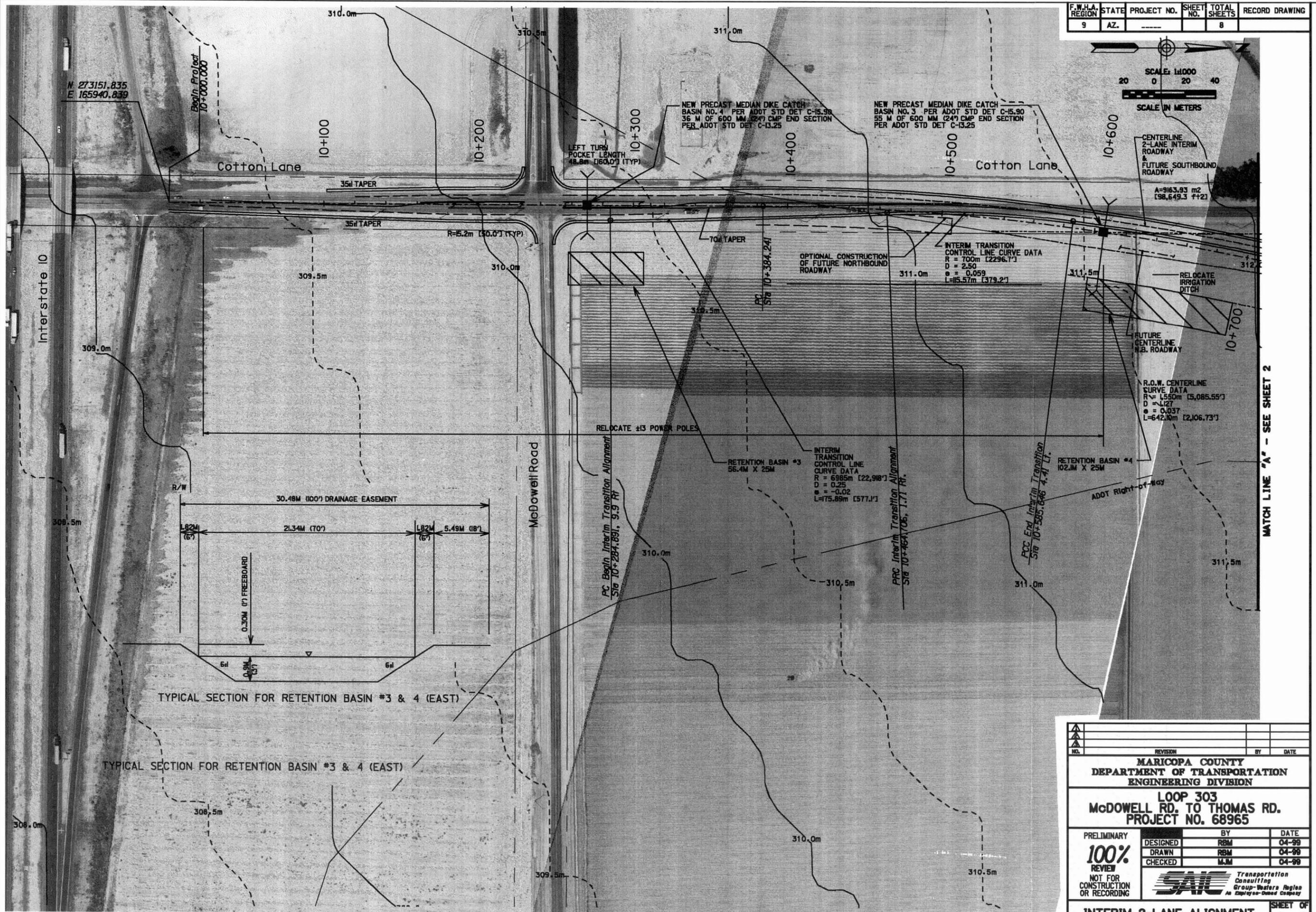
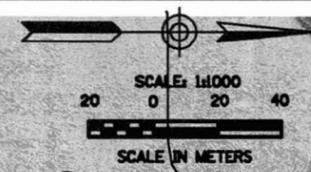
SHEET NO.	DESCRIPTION
① · ② · ③	- ALTERNATE 2: INTERIM 2-LANE ALIGNMENT
④ · ⑤ · ⑥	- ALTERNATE 3: ULTIMATE 4-LANE ALIGNMENT
7, 8	- TYPICAL SECTIONS



KEY MAP
NO SCALE

NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
LOOP 303 McDOWELL RD. TO THOMAS RD. PROJECT NO. 68965			
PRELIMINARY	DESIGNED	BY	DATE
100% REVIEW	DRAWN	RBM	04-99
	CHECKED	MJM	04-99
NOT FOR CONSTRUCTION OR RECORDING			SAE Transportation Consulting Group-Western Region An Employee-Owned Company
TITLE SHEET / KEY MAP			SHEET OF 0 8

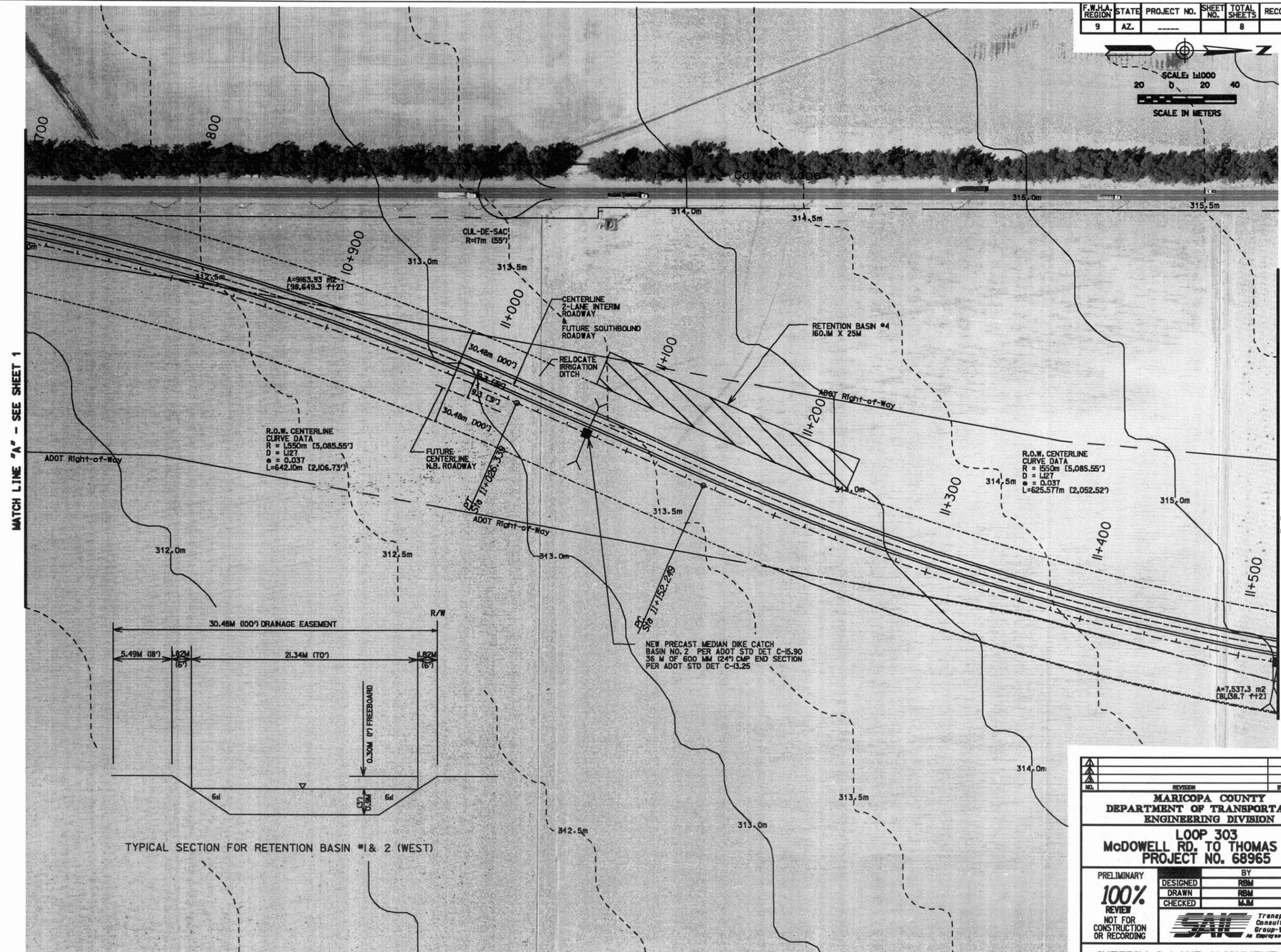
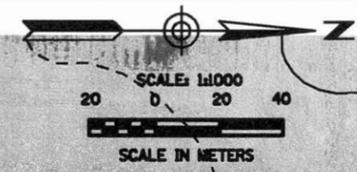
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9	AZ.		8	8	



MATCH LINE "A" - SEE SHEET 2

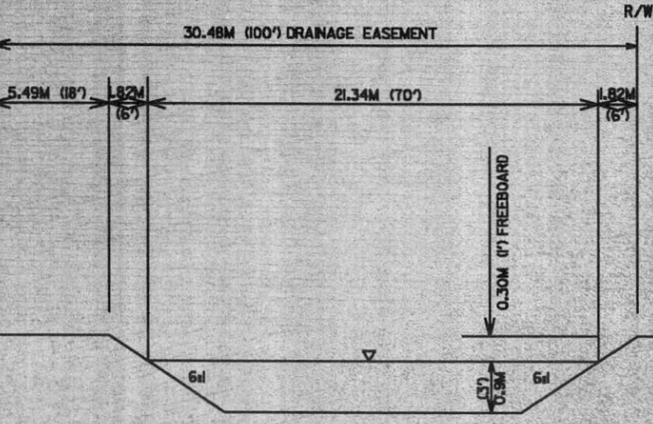
NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
LOOP 303 McDOWELL RD. TO THOMAS RD. PROJECT NO. 68965			
PRELIMINARY	DESIGNED	BY	DATE
100% REVIEW NOT FOR CONSTRUCTION OR RECORDING	DRAWN	RBM	04-99
	CHECKED	RBM	04-99
		MJM	04-99
		Transportation Consulting Group - Western Region An Employee-Owned Company	
INTERIM 2-LANE ALIGNMENT			SHEET OF 1 8

F.W.H.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.			8	



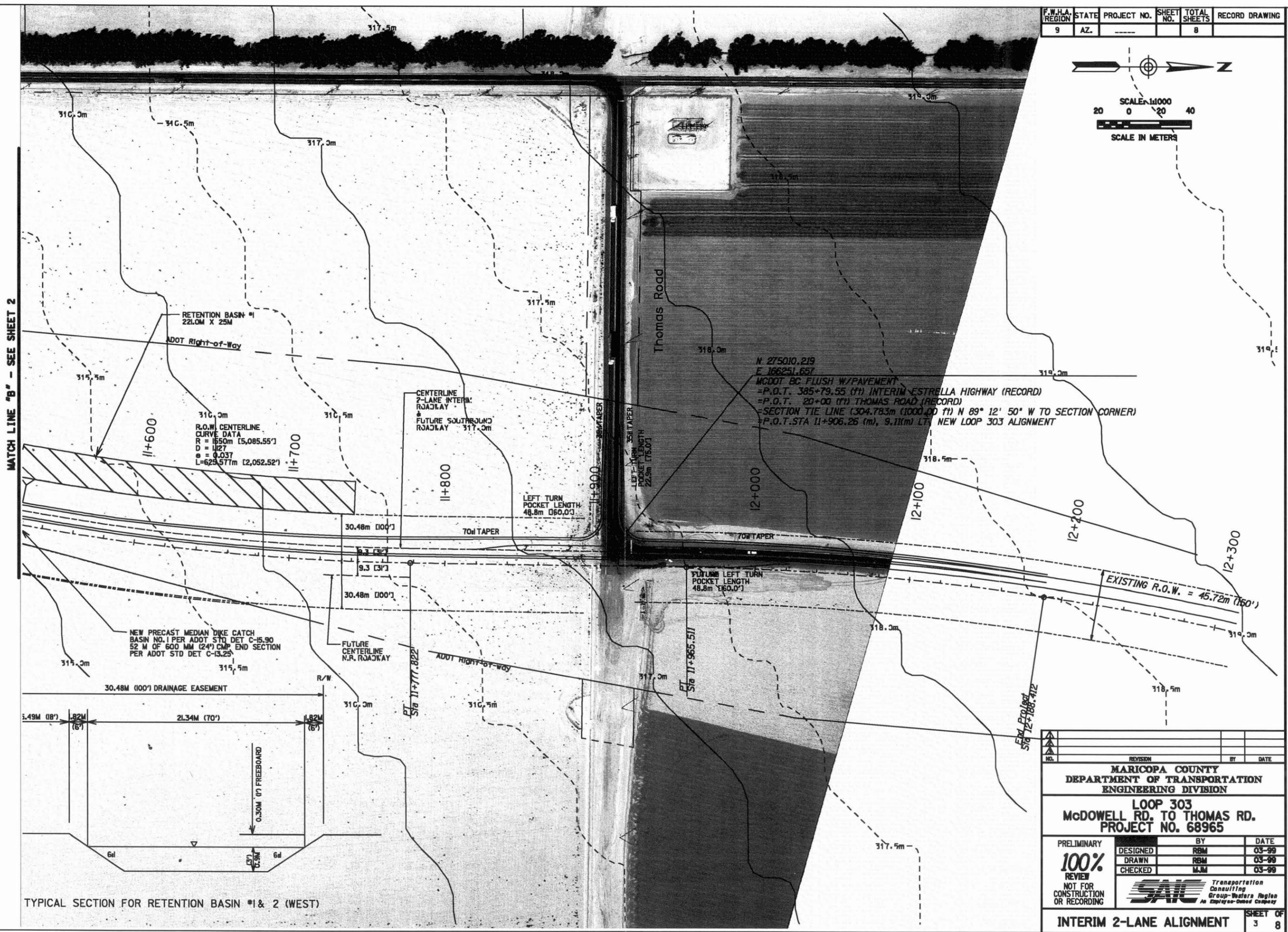
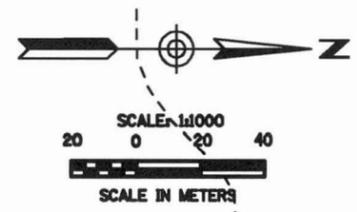
MATCH LINE "A" - SEE SHEET 1

MATCH LINE "B" - SEE SHEET 3



TYPICAL SECTION FOR RETENTION BASIN #1 & 2 (WEST)

NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
LOOP 303 MCDOWELL RD. TO THOMAS RD. PROJECT NO. 68965			
PRELIMINARY	DESIGNED	BY	DATE
100% REVIEW NOT FOR CONSTRUCTION OR RECORDING	DRAWN	RBM	04-99
	CHECKED	RBM	04-99
		MJM	04-99
			SHEET OF 2 8
INTERIM 2-LANE ALIGNMENT			



MATCH LINE "B" - SEE SHEET 2

RETENTION BASIN #1
22.0M X 25M

R.O.W. CENTERLINE
CURVE DATA
R = 1650m (5,085.55')
D = 112.7
e = 0.037
L = 629.577m (2,062.52')

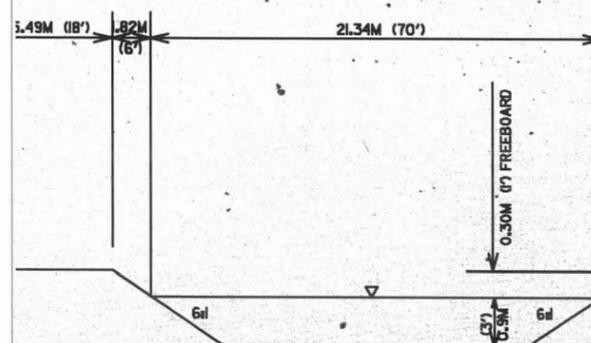
CENTERLINE
2-LANE INTERIM
ROADWAY
&
FUTURE SOUTHBOUND
ROADWAY 317.0m

LEFT TURN
POCKET LENGTH
48.8m (160.0')

N 275010.219
E 166251.657
MCDOT BC FLUSH W/PAVEMENT
-P.O.T. 385+79.55 (PI) INTERIM ESTRELLA HIGHWAY (RECORD)
-P.O.T. 20+00 (PI) THOMAS ROAD (RECORD)
-SECTION TIE LINE (304.783m (1000.00 ft) N 89° 12' 50" W TO SECTION CORNER)
-P.O.T. STA 11+906.26 (m), 9.11(m) LT, NEW LOOP 303 ALIGNMENT

NEW PRECAST MEDIAN DIKE CATCH
BASIN NO. 1 PER ADOT STD DET C-15.90
52 M OF 600 MM (24") CMP END SECTION
PER ADOT STD DET C-13.25

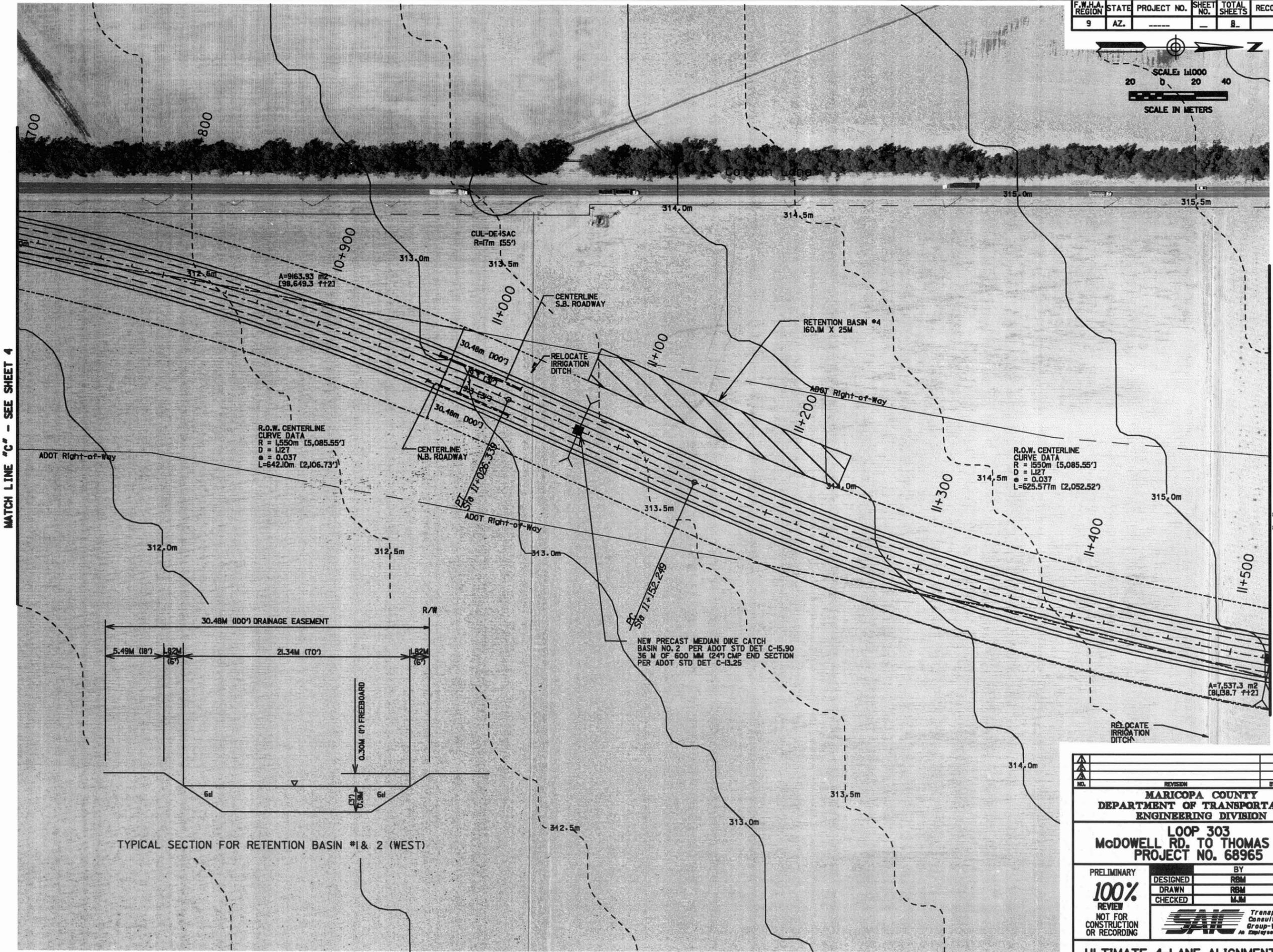
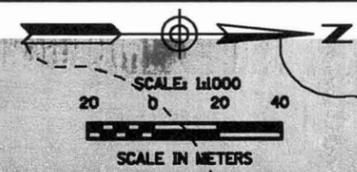
30.48M (100') DRAINAGE EASEMENT



TYPICAL SECTION FOR RETENTION BASIN #1 & 2 (WEST)

NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
LOOP 303 McDOWELL RD. TO THOMAS RD. PROJECT NO. 68965			
PRELIMINARY	DESIGNED	BY	DATE
100% REVIEW NOT FOR CONSTRUCTION OR RECORDING	DRAWN	RBM	03-99
	CHECKED	RBM	03-99
		MJM	03-99
			SHEET OF 3 8

F.W.H.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.			8	



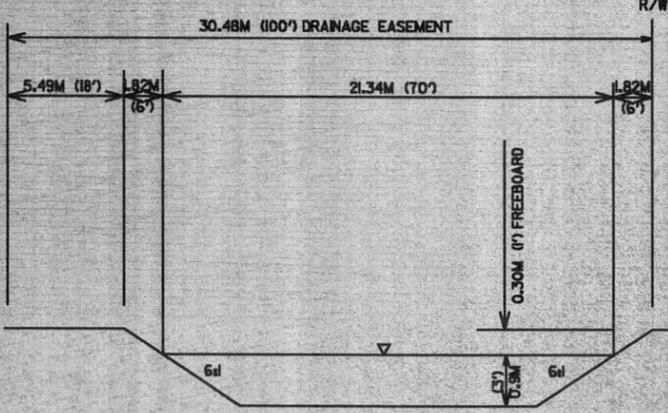
MATCH LINE "C" - SEE SHEET 4

MATCH LINE "D" - SEE SHEET 6

R.O.W. CENTERLINE CURVE DATA
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 D = 1127
 e = 0.037
 L = 642.10m [2,106.73']

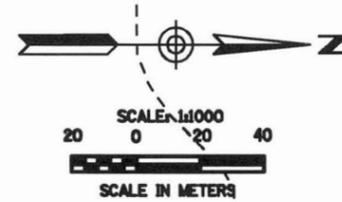
R.O.W. CENTERLINE CURVE DATA
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 D = 1127
 e = 0.037
 L = 625.577m [2,052.52']

NEW PRECAST MEDIAN DIKE CATCH BASIN NO. 2 PER ADOT STD DET C-15.90
 36 M OF 600 MM (24") CMP END SECTION PER ADOT STD DET C-13.25

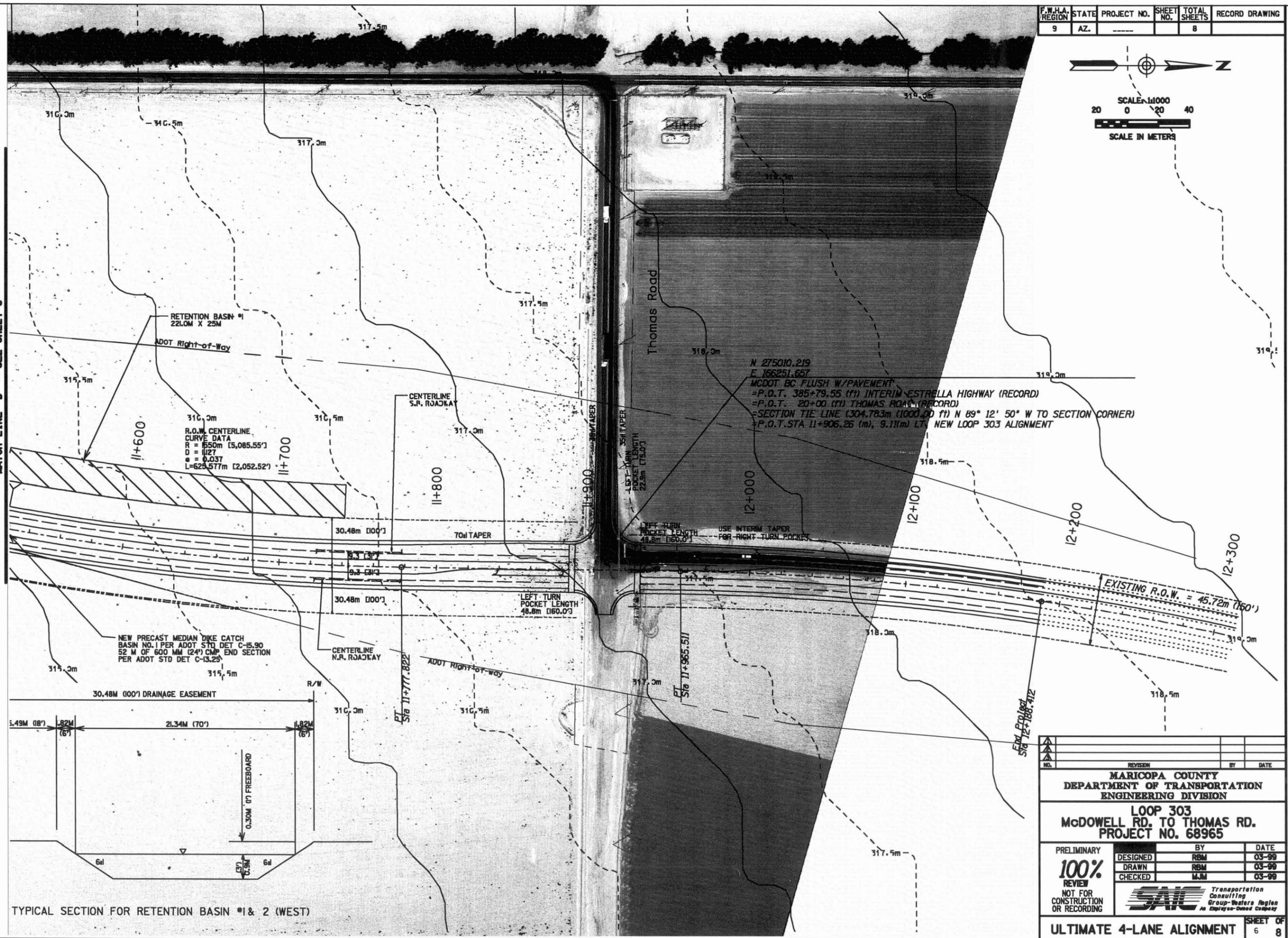


TYPICAL SECTION FOR RETENTION BASIN #1 & 2 (WEST)

NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
LOOP 303 MCDOWELL RD. TO THOMAS RD. PROJECT NO. 68965			
PRELIMINARY	DESIGNED	BY	DATE
100% REVIEW NOT FOR CONSTRUCTION OR RECORDING	DRAWN	RBM	04-99
	CHECKED	RBM	04-99
		MJM	04-99
		Transportation Consulting Group-Waters Region <small>An Employee-Owned Company</small>	
ULTIMATE 4-LANE ALIGNMENT			SHEET OF 5 8



MATCH LINE "D" - SEE SHEET 5

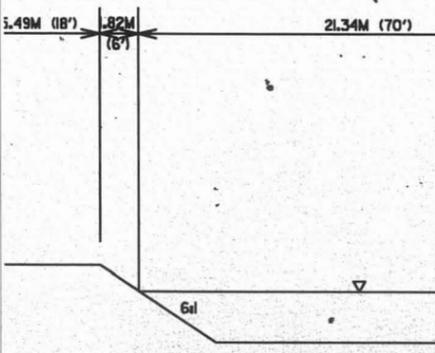


N 275010.219
 E 166251.657
 MCDOT BC FLUSH W/PAVEMENT
 -P.O.T. 385+79.55 (11) INTERIM ESTRELLA HIGHWAY (RECORD)
 -P.O.T. 20+00 (11) THOMAS ROAD (RECORD)
 -SECTION TIE LINE (304.763m (1000.00 ft)) N 89° 12' 50" W TO SECTION CORNER)
 -P.O.T. STA 11+906.26 (m), 9.11(m) LT, NEW LOOP 303 ALIGNMENT

R.O.W. CENTERLINE
 CURVE DATA
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 e = 0.037
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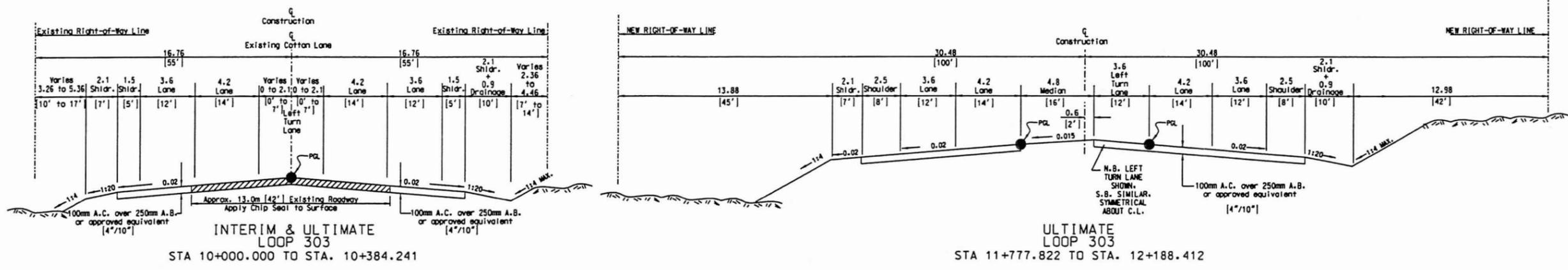
NEW PRECAST MEDIAN DIKE CATCH
 BASIN NO. 1 PER ADOT STD DET C-15.90
 52 M OF 600 MM (24") CMP END SECTION
 PER ADOT STD DET C-13.25

30.48M (100') DRAINAGE EASEMENT

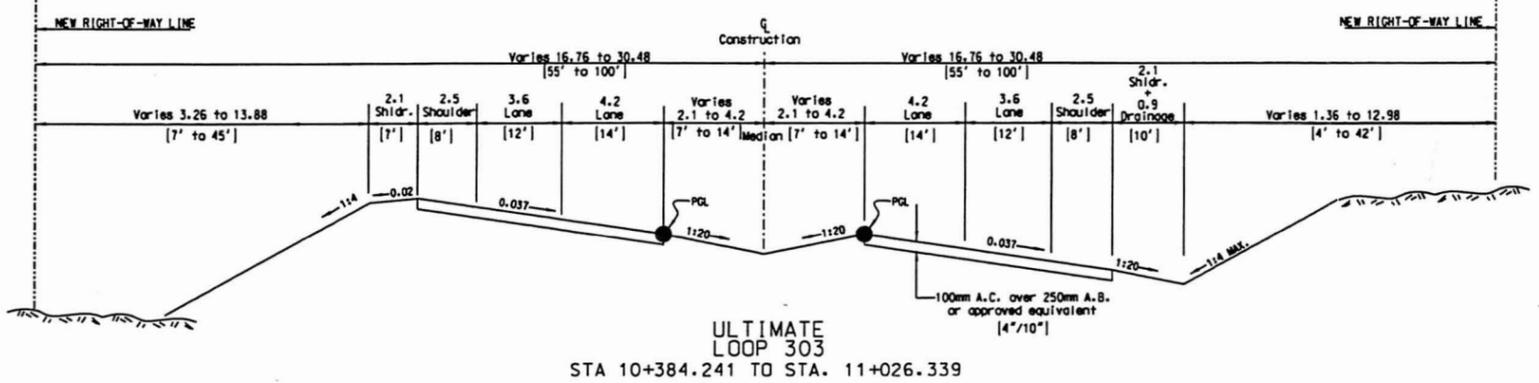


TYPICAL SECTION FOR RETENTION BASIN #1 & 2 (WEST)

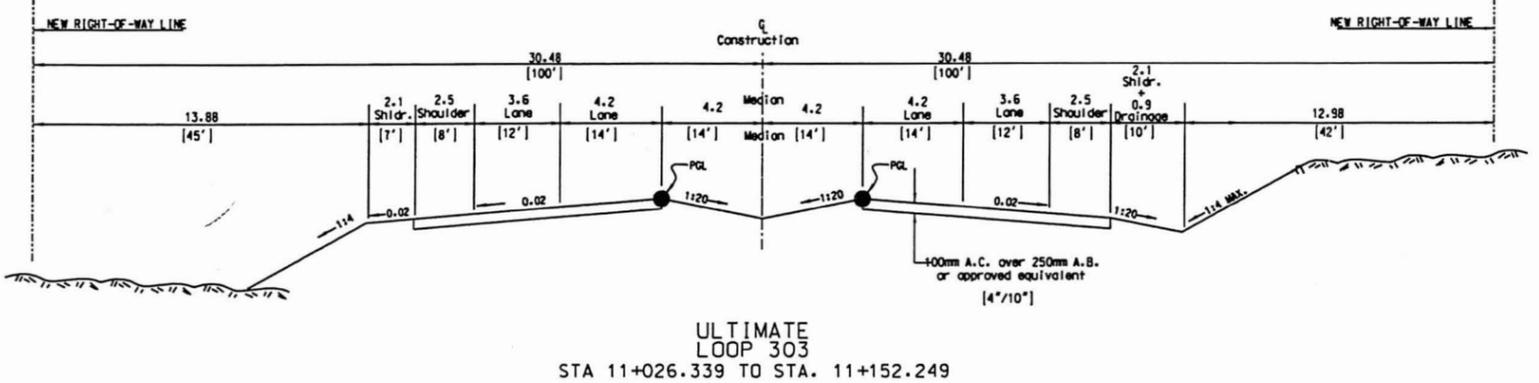
NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
LOOP 303 McDOWELL RD. TO THOMAS RD. PROJECT NO. 68965			
PRELIMINARY	DESIGNED	BY	DATE
100% REVIEW NOT FOR CONSTRUCTION OR RECORDING	DRAWN	RBM	03-99
	CHECKED	MJM	03-99
ULTIMATE 4-LANE ALIGNMENT			SHEET OF 6 8



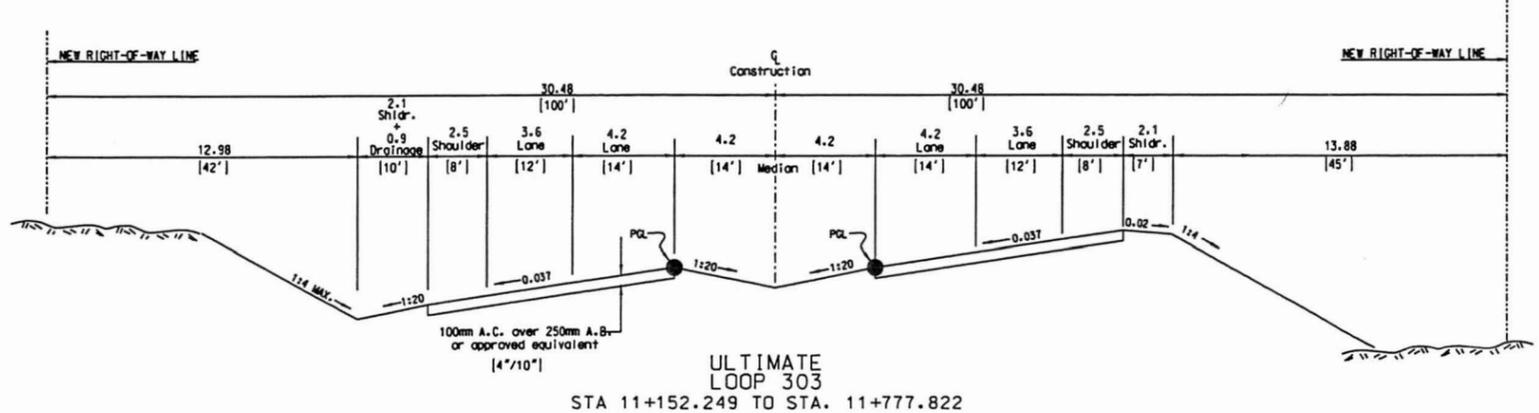
ULTIMATE LOOP 303
 STA 11+777.822 TO STA. 12+188.412



ULTIMATE LOOP 303
 STA 10+384.241 TO STA. 11+026.339



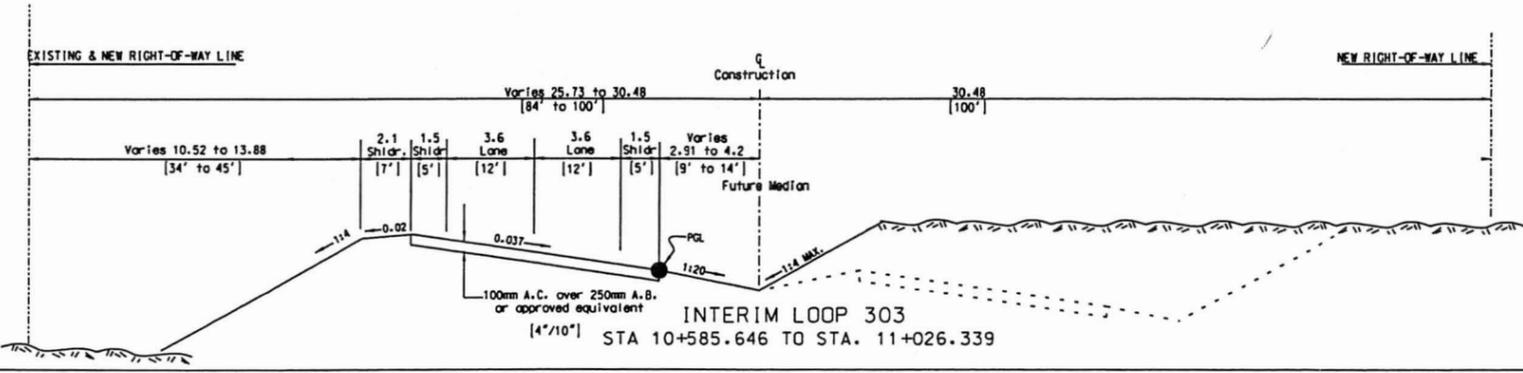
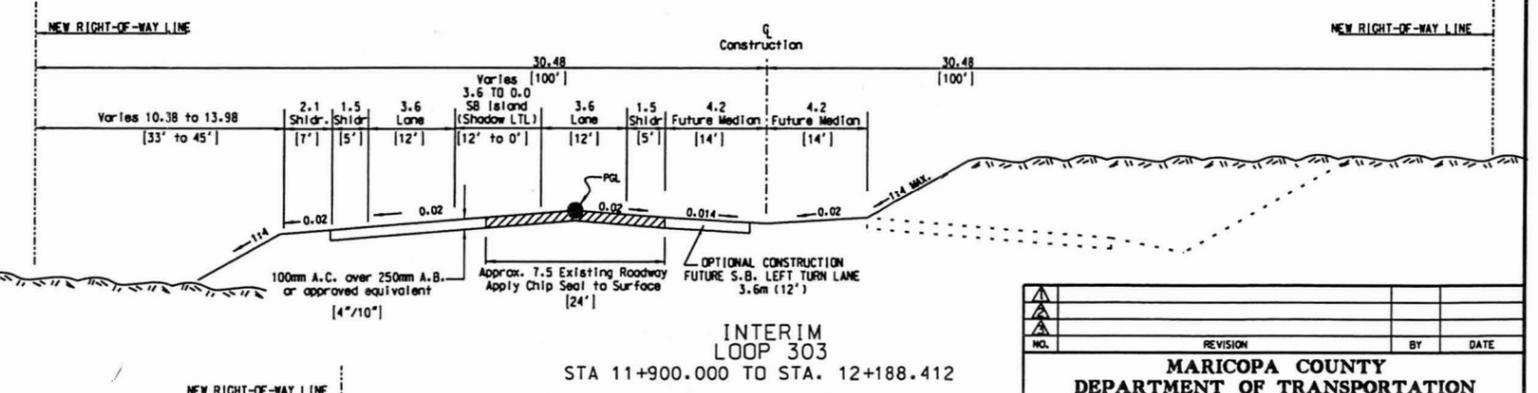
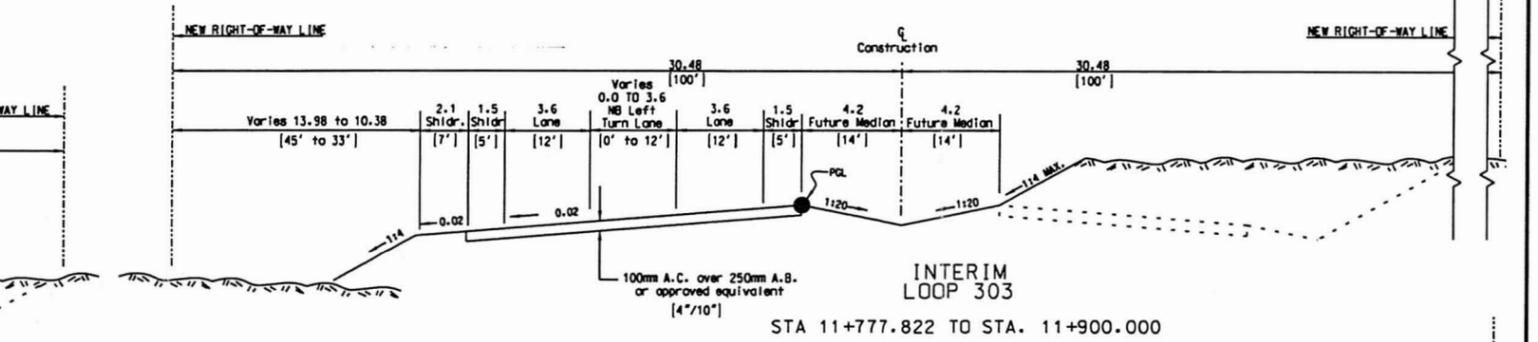
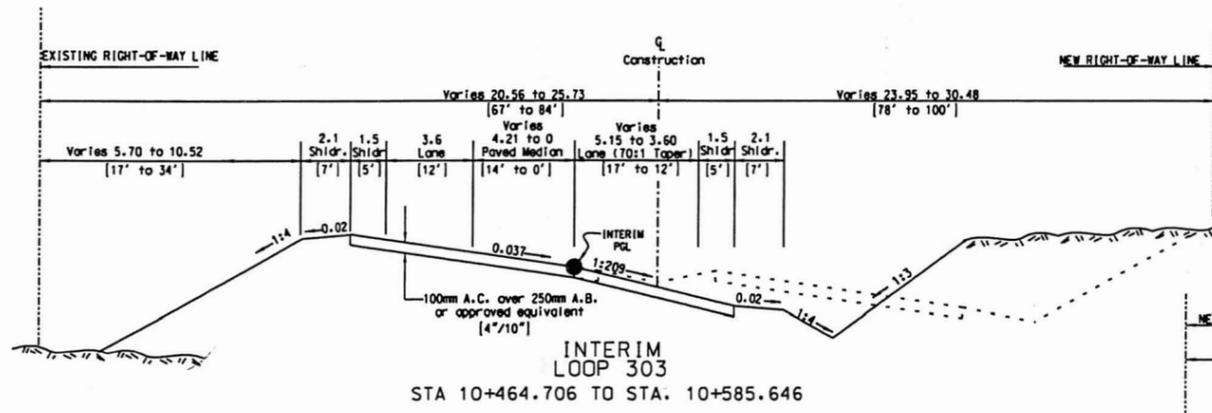
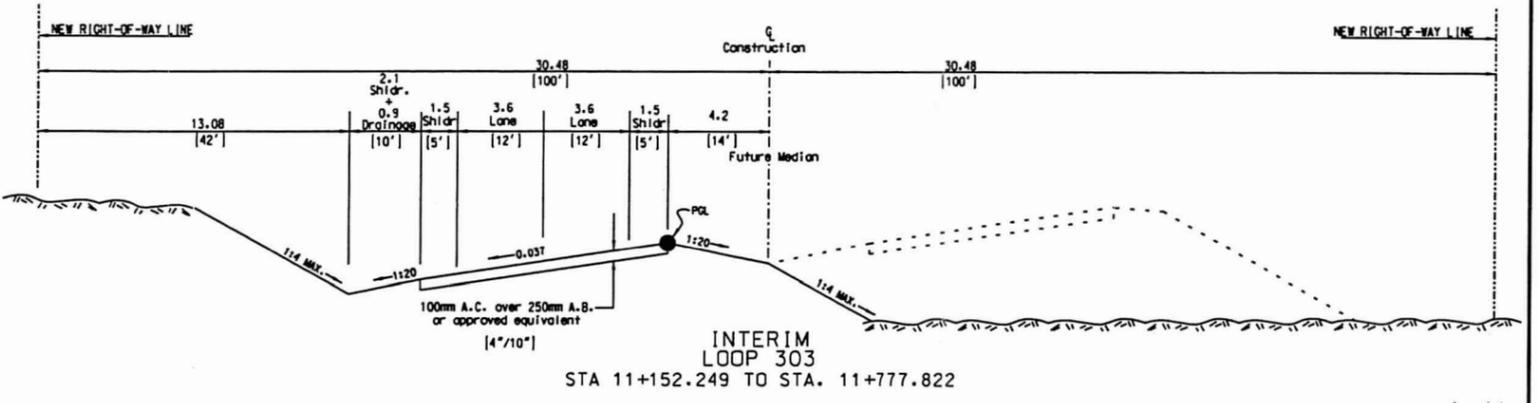
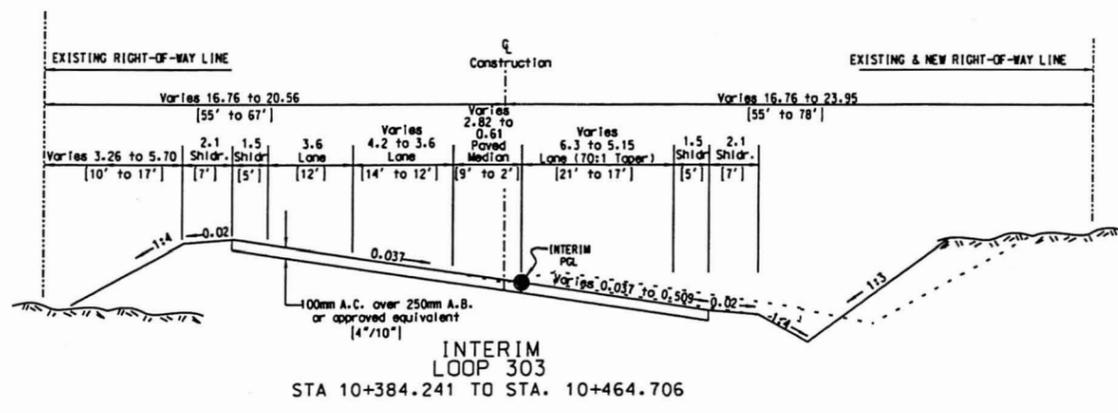
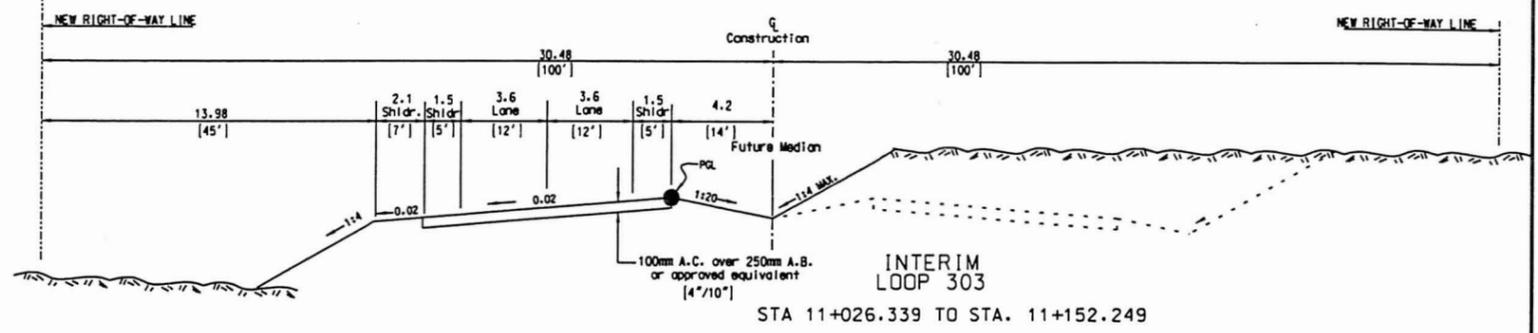
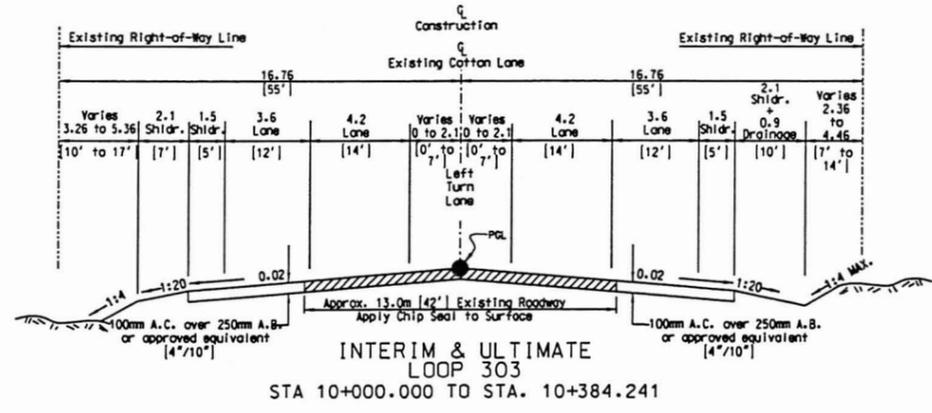
ULTIMATE LOOP 303
 STA 11+026.339 TO STA. 11+152.249



ULTIMATE LOOP 303
 STA 11+152.249 TO STA. 11+777.822

NOTE: ALL DIMENSION IN METERS unless otherwise noted.

NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
LOOP 303 MCDOWELL RD. TO THOMAS RD. PROJECT NO. 68965			
PRELIMINARY	DESIGNED	BY	DATE
100% REVIEW		RBM	04-99
	DRAWN	RBM	04-99
	CHECKED	MJM	04-99
NOT FOR CONSTRUCTION OR RECORDING		 SAIC Transportation Consulting Group-Western Region An Employee-Owned Company	
ULTIMATE 4-LANE ALIGNMENT			SHEET OF 7 8



NOTE: ALL DIMENSION IN METERS unless otherwise noted.

NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
LOOP 303 MCDOWELL RD. TO THOMAS RD. PROJECT NO. 68965			
PRELIMINARY	DESIGNED	BY	DATE
100% REVIEW	DRAWN	RBM	04-99
NOT FOR CONSTRUCTION OR RECORDING	CHECKED	MJM	04-99
 SAIC Transportation Consulting Group-Western Region An Employee-Owned Company		SHEET OF 8 / 8	
INTERIM 2-LANE ALIGNMENT			

7. DOCUMENTATION

7.1 - Summary of Public Meeting



PUBLIC INVOLVEMENT PLAN

DESIGN CONCEPT REPORT
(DCR)
AND DESIGN PHASE

LOOP 303
MCDOWELL ROAD TO THOMAS ROAD
WO# 68965
DISTRICT 4

PREPARED OCTOBER 1998

THE RIGHT ROAD, THE RIGHT TIME, THE RIGHT COST...

*The purpose of this document is to serve as a guideline only. Project components,
dates / schedules and participants may change.*

Loop 303

(From McDowell Road to Thomas Road)
W.O. #68965

Project Manager – Ray Smith @ 506-2901
District 4

DESCRIPTION: This two-lane major rural collector road will solve a majority of the existing geometric problems associated with the existing road. In the concept developed, Cotton Lane would not connect directly to the Loop 303 improvement, but will end in a cul-de-sac.

LENGTH: 1 mile

ESTIMATED CONSTRUCTION DATE: This project will have to be scored and admitted into the Capital Improvement Program before a construction date can be estimated.

RIGHT-OF-WAY: Right-of-way may be required

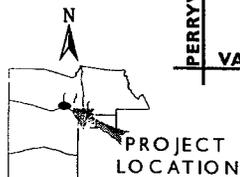
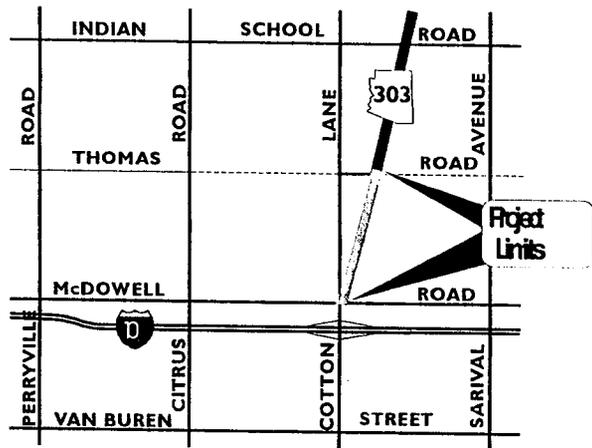
IGA PARTNERING: Partners will be sought.

DETOUR (ROAD CLOSURES): Detours are expected.

KEY ISSUES: Serious drainage problems will be encountered with the improvement of this road.

NOTE: This DCR project was approved by the Transportation Advisory Board to design. It has not yet been approved by the Board of Supervisors to be added to the Capital Improvement Program.

LOOP 303
McDowell Road to Thomas Road
WO# 68965



	Estimated Cost:\$
Design:	100,000
Right-of-Way:	
Utility Relocation	20,000
Construction:	575,000
TOTAL:	695,000

Introduction

Citizens and businesses need and deserve open, ongoing communication and input for public projects that affect their homes, livelihood and community. Public information management is vitally important to Maricopa County Department of Transportation (MCDOT). Public information planning and the well-organized execution of this Public Involvement Plan ensures two-way dialogue between affected individuals, businesses and MCDOT, as well as coordination with affected local, state, and federal agencies and jurisdictions.

Overview and Identification of Key Elements

Project Scope: This Loop 303 Design Concept Report (DCR) project will eliminate a roadway with two ninety-degree turns and provide a smooth transition with the use of reverse curves. The right-of-way for this roadway has been acquired by Arizona Department of Transportation (ADOT) and transferred to Maricopa County Department of Transportation (MCDOT). The relocation of the roadway will present some unique drainage problems that will need to be engineered.

Participants: MCDOT Project Manager: Ray Smith

Engineering Consultant for MCDOT: Science Applications International Corporation (SAIC)

MCDOT Public Events Coordinator: Roberta Crowe

Public Information Consultant for MCDOT:
Arizona Construction Services (ACS)

Proposed Public Meeting Schedule:

First Public Meeting <i>(Project Scoping)</i>	November 18, 1998
▪ <i>Rehearsal</i>	November 4, 1998
Second Public Meeting <i>(Preliminary Design)</i>	(Date)

Third Public Meeting (Date)
(Post 40-percent Design)

Fourth Public Meeting (Date)
(Pre-Construction Public Meeting)

**Special Project
Issues:**

- Cotton Lane closure south of Thomas Road and traffic will use the new roadway
- Coordination of drainage issues with the Flood Control District of Maricopa County (FCDMC).

Stakeholders

(Identification of Agencies and Concerned Public):

Note: The engineering consultant for MCDOT should coordinate with the MCDOT project manager in identifying federal, state and local agencies that may have an interest in the project. The Public Events Coordinator shall contact the respective Maricopa County Board of Supervisors member(s), Transportation Advisory Board member(s) and local Council member(s) who have jurisdiction where the project is located.

The public information consultant for MCDOT must compile a database of key Stakeholders defined in the Design Concept Report (DCR), including government agencies, public interest groups, residents, business owners and homeowner associations that should receive public meeting invitations, newsletters and other appropriate project information correspondence.

Stakeholders on this project shall include but not be limited to the following:

- Maricopa County Department of Transportation (MCDOT)
- Flood Control District Maricopa County (FCDMC)
- Maricopa County Sheriffs Office
- Town of Goodyear
- SunCorp
- ~~Local residents and~~ farmers

- District 4 Maricopa County Board of Supervisor and Transportation Advisory Board member

Public Notification

MCDOT Public Events Coordinator shall notify all interested parties regarding public information meetings at least two weeks prior to the meeting. The MCDOT Public Events Coordinator shall notify the public of upcoming meetings and solicit public input through the undertaking of several activities. Paid advertising, news releases, direct mailings and notification signs posted throughout the area may be used during the project development to notify those citizens affected by the project.

Advertising

Advertising may be placed with the following local publications:

- *West Valley View*
- *Arizona Republic*

Public Meetings

Public Participation Meeting Goals:

- ... to encourage active public participation in MCDOT project development
- ...to provide opportunity for open dialogue with concerned and/or affected parties (stakeholders)
- ... to identify and integrate into project stakeholder-defined measures that add value
- ... to identify or remove design features or components that stakeholders feel shall have negative effect or impact on the community
- ... to initiate and promote good will among stakeholders and MCDOT

Note: Alternative format materials, sign language interpreter, and infra-red listening devices are available upon 72 hours advance notice through Maricopa County Department of Transportation, Community Relations Division. To the extent possible, additional reasonable accommodations will be made available within the time frame of the request.

DCR Phase

Public Meeting Components

Meeting 1- Public Scoping. Gather and compile stakeholder-identified problems, issues or opportunities for possible incorporation into project design. This meeting should take place early in the design schedule.

Meeting 2- Preliminary and Alternative Design. This meeting shall take place after proposed roadway alignments have been determined or alternative Project Design Concept(s) are developed. This meeting shall also provide MCDOT a system for feedback on potentially significant issues between MCDOT and other partners.

Meeting 3- Public Final. Conduct at 40 percent design level. Preliminary design presented along with existing site conditions, proposed roadway alignment, width, grade and profile, along with proposed schedule for bid advertisement and construction information. Graphic renderings, identification of new and existing right-of-way and handouts shall also be made available.

Note: Projects will be evaluated on a case by case basis to determine if Meeting 2 is necessary. In some instances, the alternatives are very limited; therefore, Meeting 2 may be deleted.

Note: Meeting 4 is detailed in the Construction Phase section of this plan.

Follow Up

Communication is important to the successful implementation of any public involvement effort. During the design process, the MCDOT Project Manager through telephone conversations or one-on-one meetings shall maintain ongoing communication with stakeholders.

In addition, the Project Manager and Public Events Coordinator should develop a follow-up communication plan in post-meeting sessions. Information shall be disseminated as events warrant or as needed to address specific public concerns and issues.

Summary of Responsibilities DCR and Design Phase

MCDOT Project Manager shall

- Coordinate with the Engineering Consultant for MCDOT to identify key partners and government agencies
- Initiate a Public Meeting Request to the MCDOT Public Events Coordinator no later than six weeks prior to meeting date
- Coordinate with Engineering Consultant for MCDOT to determine necessary information to provide at public meetings
- Attend public meeting and respond to questions and requests for additional information
- Meet with Public Events Coordinator to develop follow-up communication plan in post-meeting sessions.

Engineering Consultant for MCDOT shall

- Provide names and mailing addresses for key government agencies or stakeholders involved in the project
- Provide aerial photograph of the project area ~~and a minimum of 100 project fact sheets or handouts outlining project design, purpose and scope~~
- Provide mounted presentation graphics of the proposed improvements showing alignments, typical sections, drainage features and right-of-way
(For 0-50 expected attendance a two-station minimum is suggested. For 51-100 expected attendance a three-station minimum is suggested. For greater than 100 expected attendance a four-stations minimum is suggested.)
- Attend public meeting and respond to questions and requests for additional information

MCDOT Public Events Coordinator shall

- Arrange meeting with Project Manager to initiate Public Involvement Plan
- Coordinate public meeting activities with the Public Information Consultant for MCDOT
- Arrange meeting location, execute facility rental agreements/arrangements and provide insurance certificate as required
- Write and oversee print production of meeting notices and coordinate distribution with Public Information Consultant for MCDOT if needed
- Provide sign-in sheets, badges, easels, audio/visual equipment, trail signs and comment cards
- Attend public meeting

- Prepare "morning after" report following each public meeting
- Meet with Project Manager to develop follow-up communication plan in post-meeting sessions

Public Information Consultant for MCDOT shall

- Assist MCDOT staff as required
- Develop database of property owners and business owners/managers affected by project construction
- Disseminate meeting notices
- Provide staff assistance at public meetings
- Analyze comment cards and prepare summary report

Communications Coordinator for MCDOT shall

- Coordinate activities for public meeting with Public Events Coordinator
- Write and disseminate press releases as needed
- Review newsletter and special notices prepared by MCDOT Public Events Coordinator and Public Information Consultant for MCDOT
- Contract for paid advertisement as required
- Write and disseminate press kits or releases as needed
- Notify MCDOT staff of public meetings

Construction Phase

Introduction

Citizens and businesses need and deserve open, ongoing communication and input for public projects that affect their homes, livelihood and community. Public information management is vitally important to Maricopa County Department of Transportation (MCDOT). Public information planning and well-organized execution of this Public Involvement Plan ensures two-way dialogue between affected individuals, businesses and MCDOT, as well as coordination with affected local, state, federal agencies and jurisdictions.

The purpose of this plan is to provide an overview of the key elements and recommendations that are important to the successful public information management during the construction of this project.

Overview and Identification of Key Elements

- Project Scope:** (Define)
- Participants:** MCDOT Project Manager (Name)
Operations Division Construction Manager (Name)

Contractor (Name)
Construction Management Consultant (Name)

MCDOT Public Events Coordinator (Name)

MCDOT Communications Coordinator (Name)

Public Information Consultant (Name)
(Specify whether Contractor or MCDOT provided)
- Proposed Public Meeting Schedule:** Meeting 4
(*Pre-Construction Public Meeting*) (Date)

Special Project

Issues: (Cite)

Stakeholders:

- (Names)
-
-
-

Pre-Construction

The Public Information Consultant shall meet with the MCDOT Public Events Coordinator to define the geographic area affected by the construction and disseminate an informational meeting notice to the affected area.

Pre-Construction Public Notice

This notice shall contain but not be limited to the following components:

- Name of Contractor and Contractor representatives
- 24-hour construction telephone number
- Brief project description
- Name of MCDOT Project Manager/Engineer
- Proposed construction schedule including work hours
- Traffic restrictions
- Time and place for pre-construction meeting

Pre-Construction Public Meeting

Prior to the Pre-Construction Public Meeting, the Public Information Consultant shall conduct one-on-one meetings with the affected business owners or managers, schools, emergency services (police/fire/ambulance). Informational signs with the hotline number should be posted in and around the project area (see attached detail).

The purpose of the *Pre-Construction Public Meeting* is to inform interested stakeholders about the proposed project and discuss how the communication process shall work throughout project construction.

The Public Information Consultant shall:

- Provide a local site for the meeting that is easy to access and can accommodate the anticipated crowd
- Develop displays, easy to understand graphics and handouts

- Adhere to the agenda and explain to the participants how the meeting shall run.
- Develop a specific agenda that can include the following:
 1. Introduction of project team
 2. History of the public participation effort to date
 3. Construction scope
 4. Public information program
 5. Questions and answers session
 6. Closing

Note: An "open house" meeting format may also be used.

During Construction

24-hour Construction Hotline

The Public Information Consultant shall provide a 24-hour Construction Hotline to answer calls from interested citizens. Answering services shall not be used during work hours. Incoming calls shall be logged and a copy of the log(s) shall be furnished to the MCDOT Project Manager weekly or upon request.

Construction Hotline logs shall contain the following information:

- Date and time of call
- Name, address and phone number of caller
- Question(s) or complaint(s)
- Response(s) and action(s) taken

One-on-one Communications with Affected Businesses

The Public Information Consultant shall make job site visits for MCDOT on a regular basis and also conduct one-on-one consultations with local business-owners or managers, schools, and emergency services (police/fire/ambulance) on a regular basis to discuss construction activities that directly affect their respective property or business.

Construction Newsletter

A biweekly or monthly newsletter shall be published for MCDOT and disseminated to the affected area by the Public Information Consultant. The newsletter shall contain as applicable:

- progress schedule
- 24-hour Construction Hotline information
- traffic restrictions or closures
- construction activity update

A draft of the newsletter shall be submitted to the MCDOT Project Manager, MCDOT Public Events Coordinator and MCDOT Communications Coordinator for approval.

Progress Meetings

Progress meetings may be held as needed with those citizens affected by the project. In the event a progress meeting is scheduled, representatives of MCDOT and the construction company shall be in attendance.

Advance Public Notification of Closures Utility Shutdowns

If required, advance notification of road closures, utility line shutdowns or access restriction shall be distributed to affected businesses and residents. Emergency services (police and fire) shall receive advance notification via telephone. The Contractor should give MCDOT Project Manager 72 hours notice prior to the planned restriction, closure or shutdown.

Prior to Construction/Project Completion

Public Evaluation Cards

Approximately 30 to 45 days prior to project completion, evaluation forms with return postage shall be prepared by the Public Information Consultant and distributed with the regular project newsletter to a sample of the public affected by the project. The questionnaire may contain the following:

- Did you receive a newsletter every two weeks/month?
- Was the newsletter information easy to understand?
- Did you call the 24-hour hotline?
- Were we responsive? If no, please tell us why.
- Comments or suggestions.

Upon receipt of the respondents' evaluation, the Public Information Consultant shall review the feedback and submit a final report to MCDOT Project Manager and MCDOT Public Events Coordinator.

Summary of Responsibilities

Construction Phase

MCDOT Construction Manager shall

- Notify Communications Coordinator of all emergency or planned restrictions, closures or shutdowns
- Define limits of affected area
- Approve newsletter, special notices and press release drafts
- Attend public meeting and progress meetings as required

Contractor for MCDOT shall

- Provide schedules and other information for public meeting and newsletters
- Provide phone numbers to MCDOT Project Manager for after-hours emergencies
- Attend public meeting and progress meetings as required
- Notify MCDOT Project Manager and Public Information Consultant with 72 hours notice prior to the planned restrictions, closures or shutdowns
- Provide Public Information Consultant who shall perform functions and services as detailed in this Public Involvement Plan if included as part of Contractor bid specifications

MCDOT Public Events Coordinator shall

- Review newsletter, special notice and press release drafts
- Oversee Public Information Consultant activities
- Notify appropriate TAB/BOS members of public meeting activities

Public Information Consultant shall

- Execute facility rental agreements and provide insurance certificate as required
- Arrange meeting location, print and disseminate meeting notices and/or press releases
- Provide sign-in sheets, easels, presentation graphics, public meeting agenda and conduct public meeting
- Attend public meetings and progress meetings as required
- Provide information signs on the job site
- Provide and staff 24-hour construction hotline
- Provide one-on-one consultations with business or property owners as required
- Write, edit, illustrate, set-up and disseminate project newsletters
- Print and disseminate evaluation/comment cards and prepare final report
- Provide advance public notification of closures, utility shutdowns, or other restrictions, including all emergency public services (fire/ambulance/police)

Communications Coordinator for MCDOT shall

- Write and disseminate press releases as needed
- Arrange for paid advertisement as required
- Review newsletter, special notice and press release drafts
- Disseminate press kits or releases as needed

Loop 303

(From McDowell Road to Thomas Road)

W.O. #68965

Project Manager – Ray Smith @ 506-2901

District 4

DESCRIPTION: This project would extend Loop 303 south from its current terminis at Thomas Road to McDowell Road at Cotton Lane. The improvement would eliminate the two 90 degree turns currently required to access or exit Loop 303. Cotton Lane south of Thomas Road would be reconfigured.

LENGTH: 1 mile

ESTIMATED CONSTRUCTION DATE: This project is a candidate for the MCDOT Capital Improvement Program. No construction date has been set.

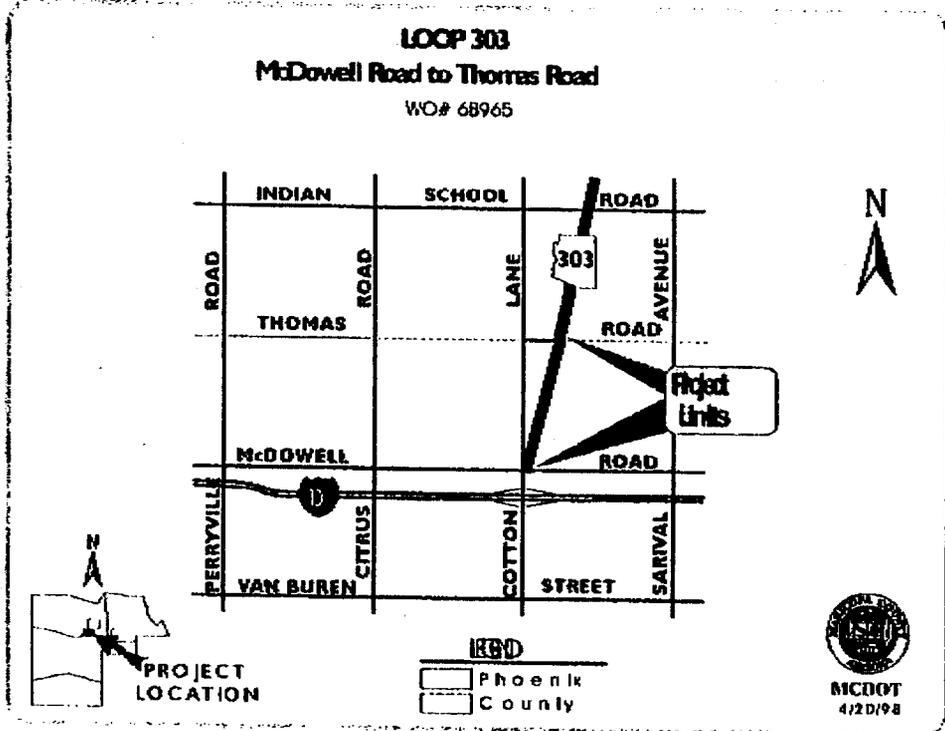
RIGHT-OF-WAY: The county will work with ADOT to acquire or transfer the existing right-of-way obtained by ADOT.

IGA PARTNERING: Partners including the City of Goodyear and adjacent land owners will be sought.

KEY ISSUES:

- Handling offsite drainage
- Disposition of Cotton Lane
- Consistency with future development

NOTE: This DCR project was approved by the Transportation Advisory Board to design. It has not yet been approved by the Board of Supervisors to be added to the Capital Improvement Program.



	Estimated Cost:\$
Design:	100,000
Right-of-Way:	
Utility Relocation	20,000
Construction:	575,000
TOTAL:	695,000

KLP:12/10/98

Loop 303



Your Comments Are Needed Regarding The Extension Of Loop 303

The Maricopa County Department of Transportation (MCDOT) will host an open house public meeting regarding potential improvements to Loop 303 from McDowell Road to Thomas Road.

MCDOT is gathering information from area residents regarding needs and concerns to construct a one-mile section that would extend Loop 303 from Thomas Road southwest to McDowell Road to connect with Cotton Lane Road at I-10.

The project is in the early scoping stage of a design concept report and is under consideration as a future capital improvement project.

The open house public meeting is:

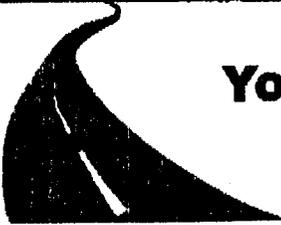
Monday, December 14, 1998 — 6:00 p.m. to 8:00 p.m.
Western Sky Middle School Cafeteria

The school is on Indian School Road 1/4 mile west of Litchfield Road.

For more information, contact Sami Ayoub, project manager, at 506-4662 or write to Ayoub at MCDOT, 2901 West Durango Street, Phoenix, AZ, 85009, or e-mail at samayoub@mail.maricopa.gov.

Reasonable accommodations may be made available with a minimum 72-hour notice for people with disabilities. Please call Roberta Crowe at (602) 506-8003 for more information.





We Need Your Comments To Extend Loop 303

The Maricopa County Department of Transportation (MCDOT) will host an open house public meeting regarding potential improvements to Loop 303 from McDowell Road to Thomas Road. MCDOT is gathering information from area residents regarding needs and concerns to construct a one-mile section that would extend Loop 303 from Thomas Road southwest to McDowell Road to connect with Cotton Lane Road at I-10. The project is in the early scoping stage of a design concept report and is under consideration as a future capital improvement project.

Monday, December 14, 1998 — 6:00 p.m. to 8:00 p.m.
Western Sky Middle School Cafeteria

The school is on Indian School Road 1/4 mile west of Litchfield Road.

For more information, contact Sami Ayoub, project manager, at (602) 506-4662 or write to Ayoub at MCDOT, 2901 West Durango Street, Phoenix, AZ, 85009, or e-mail at samayoub@mail.maricopa.gov.

Reasonable accommodations may be made available for people with disabilities with a minimum 72-hour notice. Please call Roberta Crowe at (602) 506-8003 for more information.



DISPLAY AS

AZ-REPUBLIC
Zone 5

12/5/98

7.2 - Design Team Meetings

PROJECT TITLE: Loop 303
MEETING DATE: 10/22/98
LOCATION: McDowell Road to Thomas Road Deck
SUBJECT: Kick-off Meeting

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
Y	RS	Ray Smith	McDOT
Y	PP	Paul Porell	SAIC
Y	MM	Mike Marum	SAIC
Y	DC	David Chambers	SAIC

ITEM	DESCRIPTION	STATUS	STARTED	DUE	BALL IN COURT
01-001	SAIC currently is in the data collection phase of the project, having obtained 24 hour volume counts, peak period turning movement counts, right-of-way information, and existing geometry. SAIC asked for adjustment factors to convert the 24 hour volume counts to Average Daily Traffic (ADT) volumes. Also requested from McDOT were the 2010 and 2020 ADT's and 3 years of traffic volume and accident information, as required by the scope of services. Mr. Smith recommended that we call Mr. Bruce Ward of McDOT Traffic Engineering to get this information. David Chambers called Mr. Ward on 10/29 and left a message	New	10/22		Bruce Ward
01-002	Mr. Porell gave a summary of the surveying progress to date. Project Engineering Consultants (PEC), SAIC's survey sub-consultant, has located all project area monuments and provided aerial targets for Kenny Aerial Survey. We have obtained the digital aerial photography. Mr. Porell mentioned that we were having some trouble with the digital computer file because of its size. We will probably have to ask Kenny to clip some of the file. Mr. Porell also asked if we should take into account the ultimate roadway detention basins. Mr. Smith says he will check with the flood control district.	New	10/22		Ray Smith
01-003	Mr. Marum asked if we should investigate the future right-of-way needs as part of the DCR, to avoid having to obtain right-of-way in the future. Mr. Smith approved of this idea. We also decided that the interim roadway is to be considered throw away and not try to follow the ultimate roadway alignment, allowing an optimal two lane roadway alignment.	New	10/22		SAIC
01-004	SAIC will use the Highway Capacity software (HCS) in its operational analyses. We will evaluate traffic signal requirements at Thomas and McDowell Roads. Possible interconnection of traffic signals will be considered in the DCR.	New	10/22		SAIC
01-005	Mr. Porell asked about the pavement section for the design. Mr. Smith said to use 4" of asphaltic concrete on 10" of aggregate base.	New	10/22		SAIC

PROJECT TITLE: Loop 303

MEETING DATE: 11/5/98

LOCATION: McDowell Road to Thomas Road

SUBJECT: Field Kick-off Meeting

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
Y	RS	Ray Smith	McDOT
N	PP	Paul Porell	SAIC
N	MM	Mike Marum	SAIC
Y	DC	David Chambers	SAIC

ITEM	DESCRIPTION	STATUS	STARTED	DUE	BALL IN COURT
01-001	SAIC currently is in the data collection phase of the project, having obtained 24 hour volume counts, peak period turning movement counts, right-of-way information, and existing geometry. SAIC asked for adjustment factors to convert the 24 hour volume counts to Average Daily Traffic (ADT) volumes. Also requested from McDOT were the 2010 and 2020 ADT's and 3 years of traffic volume and accident information, as required by the scope of services. Mr. Smith recommended that we call Mr. Bruce Ward of McDOT Traffic Engineering to get this information. David Chambers called Mr. Ward on 10/29 and left a message	Old	10/22		Bruce Ward
01-002	Mr. Porell gave a summary of the surveying progress to date. Project Engineering Consultants (PEC), SAIC's survey sub-consultant, has located all project area monuments and provided aerial targets for Kenny Aerial Survey. We have obtained the digital aerial photography. Mr. Porell mentioned that we were having some trouble with the digital computer file because of its size. We will probably have to ask Kenny to clip some of the file. Mr. Porell also asked if we should take into account the ultimate roadway detention basins. Mr. Smith says he will check with the flood control district.	Old	10/22		Ray Smith
01-003	Mr. Marum asked if we should investigate the future right-of-way needs as part of the DCR, to avoid having to obtain right-of-way in the future. Mr. Smith approved of this idea. We also decided that the interim roadway is to be considered throw away and not try to follow the ultimate roadway alignment, allowing an optimal two lane roadway alignment.	Old	10/22		SAIC
01-004	SAIC will use the Highway Capacity software (HCS) in its operational analyses. We will evaluate traffic signal requirements at Thomas and McDowell Roads. Possible interconnection of traffic signals will be considered in the DCR.	Old	10/22		SAIC
01-005	Mr. Porell asked about the pavement section for the design. Mr. Smith said to use 4" of asphaltic concrete on 10" of aggregate base.	Old	10/22		SAIC

PROJECT TITLE: Loop 303

MEETING DATE: 11/24/98

LOCATION: McDowell Road to Thomas Road

SUBJECT: Meeting Number 3

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
Y	RS	Ray Smith	McDOT
Y	SA	Sami Ayoub – New Project Manager	McDOT
N	PP	Paul Porell	SAIC
Y	MM	Mike Marum	SAIC
Y	DC	David Chambers	SAIC

ITEM	DESCRIPTION	STATUS	STARTED	DUE	BALL IN COURT
01-001	SAIC currently is in the data collection phase of the project, having obtained 24 hour volume counts, peak period turning movement counts, right-of-way information, and existing geometry. SAIC asked for adjustment factors to convert the 24 hour volume counts to Average Daily Traffic (ADT) volumes. Also requested from McDOT were the 2010 and 2020 ADT's and 3 years of traffic volume and accident information, as required by the scope of services. Mr. Smith recommended that we call Mr. Bruce Ward of McDOT Traffic Engineering to get this information. David Chambers called Mr. Ward on 10/29 and left a message	Old	10/22		Bruce Ward
01-002	Mr. Porell gave a summary of the surveying progress to date. Project Engineering Consultants (PEC), SAIC's survey sub-consultant, has located all project area monuments and provided aerial targets for Kenny Aerial Survey. We have obtained the digital aerial photography. Mr. Porell mentioned that we were having some trouble with the digital computer file because of its size. We will probably have to ask Kenny to clip some of the file. Mr. Porell also asked if we should take into account the ultimate roadway detention basins. Mr. Smith says he will check with the flood control district.	Old	10/22		Ray Smith
01-003	Mr. Marum asked if we should investigate the future right-of-way needs as part of the DCR, to avoid having to obtain right-of-way in the future. Mr. Smith approved of this idea. We also decided that the interim roadway is to be considered throw away and not necessarily try to follow the ultimate roadway alignment, allowing an optimal two lane roadway alignment.	Old	10/22		SAIC
01-006	Additional items to be provided by McDOT include: <ul style="list-style-type: none"> • McDOT right-of-way standards. • McDOT roadway CAD standards. • McDOT right-of-way delineation preparation manual. 	Old	10/22		Ray Smith

- Example CAD drawings.
- Site map on disk.
- Right-of-way costs.
- Construction cost estimate spread sheet.
- Sample DCR on diskette.

02-004	The alternative that considers the future parallel roadway will be Alternative 1. Alternative 2 will be decided upon with the input of McDOT. The 360 foot ultimate right of way for a freeway will be obtained, a 70 mph design speed and a 28 foot median will be used.	Old	11/5		
02-005	Exclusive left turn lanes will be provided at all intersections and two through lanes north and southbound will be provided at the intersection of McDowell. Storage lengths will be 160 feet.	Old	11/5		
02-006	A cul de sac on Cotton Lane will be built about a 1/2 mile south of Thomas.	Old	11/5		
02-007	Irrigation and power poles will have to be relocated and McDOT will check on prior rights.	Old	11/5		Sami Ayoub
03-001	A list of 5 alternatives will be faxed to Sami by 12/2.	New	11/24	12/2	SAIC
03-002	Ray will check on the 28 foot median width on the other 4 lane projects.	New	11/24		Ray Smith
03-003	The next team meeting is scheduled for 12/10 at 9:00 am.	New			

Prepared by: SAIC

Signed: _____

Dated: 11/30/98

Five Alternatives for Loop 303

- Option 1: Build interim alignment on off-set to allow for both new roadways to be built without relocation of traffic.
- Option 2: Build interim alignment "shoe-fly" around Thomas Grade Separation site.
- Option 3: Build interim alignment such that it allows room for construction of the future ½ of the mainline, elevated section of the freeway (maybe already being considered).
- Option 4: Build Cotton Lane sweep into Thomas Road TI (Future) such that Thomas turns into Cotton Lane to the north.
- Option 5: Build interim Loop 303 to the west to facilitate the installation of the directional ramps to and from I-10 without relocation of traffic.

Meetings 4 through 8:

- Meetings No. 4, 5 and 8 were administrative in nature and recorded minutes were not kept.
- Meeting No. 6 was the public meeting held on December 14, 1998 (see also Section 7 - Documentation)
- Meeting No. 7 was the presentation of the Draft Design Concept Report on December 23, 1998.

PROJECT TITLE: Loop 303

MEETING DATE: 2/25/99

LOCATION: McDowell Road to Thomas Road Deck

SUBJECT: Kick-off Meeting

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
Y	RS	Ray Smith	MCDOT
Y	S	Sami Ayoub	MCDOT
Y		Amir Matamedi	MC FLOOD CONTROL DISTRICT
Y		Bing Zhao	MC FLOOD CONTROL DISTRICT
Y	LM	Larry Maldonado	PEC, Inc.
Y	DC	David Chambers	SAIC
Y	MM	Mike Marum	SAIC

ITEM	DESCRIPTION	STATUS	STARTED	DUE	BALL IN COURT
09-001	<p>This meeting represents the ninth meeting between the Agency and the Design Team. A draft final Design Concept Report (DCR) was issued on December 18, 1998 that constituted the submittal of the one remaining open task for the project. Subsequent conversations with the Project Manager (Sami Ayoub) suggested that several elements of the DCR were incomplete or needed additional detail. These areas included the following: Traffic Background – data was subsequently provided by the MCDOT staff. The data was not made available prior to January, 1999 to the Design Team</p> <p>Drainage Study – data presented was minimal within the report based upon an understanding that this project was not intending to secure a permanent solution to the drainage issues that exist. Rather this project was first thought to scope only the two lane, interim roadway option. Thus small cross-drainage pipes were tabulated in the Draft Report. Upon subsequent conversation with the Project Manager it was determined that several additional elements of the drainage solution needed to be scoped. These additional elements were the reason for this meeting and are discussed below.</p> <p>Alternate Roadway Prisms – the Project Manager suggested the DCR also contain a discussion of at least one new alternate, a four lane interim roadway. This alternate was listed in the options considered in the Draft DCR, but was not elaborated upon. A discussion of this alternate proceeded (see below).</p>	New	0225	N/A	N/A
9-002	<p>The drainage concept shown within the DCR suggests that the interim two lane roadway would be sufficiently protected with interim cross-drainage pipes. This concept was consistent with our understanding of the drainage design that was provided for the Loop 303 alignment to the north of this project.</p>	New	2/25	3/19	DLC/LM

Upon further discussion with the Project Manager, it was determined that the DCR should address the need for "On-site" retention of potential floodwaters that were approaching the roadway from the north and west.

Specifically two elements are proposed to be added to the DCR discussion under the Drainage section. First, a broad discussion of the larger drainage problems in the area is to now be addressed within the DCR. During the Public Open House held on November 1998 several property owners presented evidence of significant drainage problems in the NW quadrant of the McDowell/Cotton Lane intersection. This drainage problem was described as severe during times of the year, to a point that the County was prepared to issue a "citation" to the upstream property owner for not managing the flood waters that were entering the County roadway system. This statement was unfounded and could not be substantiated by Mr. Amir Motamedi.

The second discussion that will be added to the DCR centers on the need to retain stormwater in an upstream detention/channel. This detention/channel is proposed to be immediately upstream (west) of the two lane interim roadway (or on both sides of the roadway). The detention/channel will also provide capacity for the new four-lane interim roadway alternative. The channel geometry, side slope conditions and possible outfall will be discussed.

The issue of a permanent outfall was discussed. The county is beginning advance engineering for a future outfall channel to the Gila River. This south flowing outfall will be of considerable size and will cross SR-85, U.P. Railroad, Interstate 10 and eventually handle the proposed drainage channel along the west boundary of Loop 303.

Mr. Maldonado was to consult with the Design Team in obtaining background information as to alignment, profile and roadway prism considerations included in the Draft DCR. He was also to consult with the County Flood Control staff for background on the two problems stated above.

9-003

Mr. Marum described the nature of the alignment options that have been discussed within the Draft DCR to date. Specifically he focused on the first option, which is to construct a two lane, future southbound barrel of a four lane divided facility. The option to this preferred alignment was to perform several interim improvements to the existing facility, including significant improvement in the corner radius improvements at the Thomas intersection (2).

New 2/25 3/12 MJM

Due to the fact that the ultimate freeway class roadway will be elevated throughout the alignment from Interstate 10 to Thomas, the Draft DCR did not suggest that any of the interim two-lane roadway would be salvageable for use in the future. Additionally, it has been understood that the vertical alignment is different. A demonstration of a possible profile will be developed and presented during a meeting with the County Project Manager on March 10, 1999.

Subsequently, it was determined that an interim, parallel four-lane roadway would be developed and detailed for the final DCR. The ultimate profile for the elevated roadway will also be detailed in the Final DCR.

Prepared by: SAIC

Signed: RA J. MARUM

PROJECT TITLE: Loop 303

MEETING DATE: 2/25/99

LOCATION: McDowell Road to Thomas Road Deck

SUBJECT: Kick-off Meeting

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
Y	RS	Ray Smith	MCDOT
Y	S	Sami Ayoub	MCDOT
Y		Amir Matamedi	MC FLOOD CONTROL DISTRICT
Y		Bing Zhao	MC FLOOD CONTROL DISTRICT
Y	LM	Larry Maldonado	PEC, Inc.
Y	DC	David Chambers	SAIC
Y	MM	Mike Marum	SAIC

ITEM	DESCRIPTION	STATUS	STARTED	DUE	BALL IN COURT
10-001	<p>This meeting represents the ninth meeting between the Agency and the Design Team. A draft final Design Concept Report (DCR) was issued on December 18, 1998 that constituted the submittal of the one remaining open task for the project. Subsequent conversations with the Project Manager (Sami Ayoub) suggested that several elements of the DCR were incomplete or needed additional detail. These areas included the following: Traffic Background – data was subsequently provided by the MCDOT staff. The data was not made available prior to January, 1999 to the Design Team</p> <p>Drainage Study – data presented was minimal within the report based upon an understanding that this project was not intending to secure a permanent solution to the drainage issues that exist. Rather this project was first thought to scope only the two lane, interim roadway option. Thus small cross-drainage pipes were tabulated in the Draft Report. Upon subsequent conversation with the Project Manager it was determined that several additional elements of the drainage solution needed to be scoped. These additional elements were the reason for this meeting and are discussed below.</p> <p>Alternate Roadway Prisms – the Project Manager suggested the DCR also contain a discussion of at least one new alternate, a four lane interim roadway. This alternate was listed in the options considered in the Draft DCR, but was not elaborated upon. A discussion of this alternate proceeded (see below).</p>	New	0225	N/A	N/A
10-002	<p>The drainage concept shown within the DCR suggests that the interim two lane roadway would be sufficiently protected with interim cross-drainage pipes. This concept was consistent with our understanding of the drainage design that was provided for the Loop 303 alignment to the north of this project.</p>	New	2/25	3/19	DLC/LM

Upon further discussion with the Project Manager, it was determined that the DCR should address the need for "On-site" retention of potential floodwaters that were approaching the roadway from the north and west.

Specifically two elements are proposed to be added to the DCR discussion under the Drainage section. First, a broad discussion of the larger drainage problems in the area is to now be addressed within the DCR. During the Public Open House held on November 1998 several property owners presented evidence of significant drainage problems in the NW quadrant of the McDowell/Cotton Lane intersection. This drainage problem was described as severe during times of the year, to a point that the County was prepared to issue a "citation" to the upstream property owner for not managing the flood waters that were entering the County roadway system. This statement was unfounded and could not be substantiated by Mr. Amir Motamedi.

The second discussion that will be added to the DCR centers on the need to retain stormwater in an upstream detention/channel. This detention/channel is proposed to be immediately upstream (west) of the two lane interim roadway (or on both sides of the roadway). The detention/channel will also provide capacity for the new four-lane interim roadway alternative. The channel geometry, side slope conditions and possible outfall will be discussed.

The issue of a permanent outfall was discussed. The county is beginning advance engineering for a future outfall channel to the Gila River. This south flowing outfall will be of considerable size and will cross SR-85, U.P. Railroad, Interstate 10 and eventually handle the proposed drainage channel along the west boundary of Loop 303.

Mr. Maldonado was to consult with the Design Team in obtaining background information as to alignment, profile and roadway prism considerations included in the Draft DCR. He was also to consult with the County Flood Control staff for background on the two problems stated above.

10-003

Mr. Marum described the nature of the alignment options that have been discussed within the Draft DCR to date. Specifically he focused on the first option, which is to construct a two lane, future southbound barrel of a four lane divided facility. The option to this preferred alignment was to perform several interim improvements to the existing facility, including significant improvement in the corner radius improvements at the Thomas intersection (2).

New 2/25 3/12 MJM

Due to the fact that the ultimate freeway class roadway will be elevated throughout the alignment from Interstate 10 to Thomas, the Draft DCR did not suggest that any of the interim two-lane roadway would be salvageable for use in the future. Additionally, it has been understood that the vertical alignment is different. A demonstration of a possible profile will be developed and presented during a meeting with the County Project Manager on March 10, 1999.

Subsequently, it was determined that an interim, parallel four-lane roadway would be developed and detailed for the final DCR. The ultimate profile for the elevated roadway will also be detailed in the Final DCR.

Prepared by: SAIC

Signed: W. J. Anderson 3/9/99

PROJECT TITLE: Loop 303

MEETING DATE: March 18, 1999

LOCATION: McDowell Road to Thomas Road Deck

SUBJECT: Kick-off Meeting

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
	AM	Amir Motamedi	MC Flood Control District
	ZB	Zhao Bing	MC Flood Control District
	RS	Ray Smith	MC Dept of Transportation
Y	SA	Sami Ayoub	MC Dept of Transportation
Y	MM	Mike Marum	SAIC
Y	DC	David Chambers	SAIC
	LM	Larry Maldonado	PEC, Inc.
	RM	Ron Mikalson	TransCore/ SAIC
Y	TH	Tom Hill	SunCor

ITEM	DESCRIPTION	STATUS	STARTED	DUE	BALL IN COURT
11-001	Briefing on proposed improvements for Loop101 from Thomas to McDowell by Mr. Ayoub. Mr. Marum detailed the work planned, including the three options. Mr. Hill was interested in our contacting the Robson Development Company for any potential right of way impacts. Our two lane interim option did not impact known right of way, but the four lane option did require additional right of way. Mr. Ayoub is to provide direction on whether SAIC is to initiate this contact.	New	3/18		Sami Ayoub
11-002	Overview of three alternatives being brought forward under DCR by Mr. Marum: Interim 2 Lane on new alignment, Interim Turning Improvements on existing alignment and Interim 4 Lane on new alignment. Each option was shown in color, and the color roll plot was retained by Mr. Hill. Generally he agreed with the assessment of the designers alignment choices. He is interested in the four lane option being exercised in the near term, but understands the initial option of two lanes is the present course of action.	New	3/18		SAIC

11-003	<p>Summary of Drainage Considerations by Mr. Maldonado. Mr. Maldonado was not able to attend due to a conflicting presentation. Mr. Marum and Chambers summarized the latest thinking in this regard. Specifically the water shed for: (1) on site and (2) within the area bounded by Thomas, McDowell, Cotton Lane and the new Loop 303 alignment were being assessed. The interim scheme is to store this storm event in a linear detention channel upstream of the Loop 303 alignment. A refined design assessment is underway.</p> <p>No specific details or plans are underway to assess the larger drainage problems. It is our understanding that the County is planning a large stormwater channel from the project site south to the Gila River within the next five years.</p> <p>Mr. Hill was keenly interested in a solution for the storm water mitigation. He is aware of the limited scope of this project. He was made aware that additional right of way may or may not be needed for the new stormwater detention system under consideration. A final decision on the need for this additional right of way will be made in early April.</p>	New	3/18		SAIC
11-004	<p>Time Line for completion of Design Concept Report by Mr. Marum. A proposed time line is shown as follows: Drainage Report received from PEC – April 5th Mapping Updated – April 5th New CAD Design with drainage – April 9th Team Meeting – April 14th Wednesday Draft Final DCR with all graphics –</p>	New	3/18		SAIC/MCDOT



	April 20 th Final DCR – April 30 th				
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11-005 Intergovernmental Agreement – Mr. Ayoub. It was agreed that Mr. Ayoub would begin the process of securing this agreement.

New 3/18 Mr. Ayoub

Prepared by: SAIC
3/28/99

PROJECT TITLE: Loop 303

MEETING DATE: March 25, 1999

LOCATION: McDowell Road to Thomas Road Deck

SUBJECT: SunCor Debriefing

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
	AM	Amir Motamedi	MC Flood Control District
	ZB	Zhao Bing	MC Flood Control District
	RS	Ray Smith	MC Dept of Transportation
	SA	Sami Ayoub	MC Dept of Transportation
	MM	Mike Marum	SAIC
	DC	David Chambers	SAIC
	LM	Larry Maldonado	PEC, Inc.
	RM	Ron Mikalson	TransCore/ SAIC

ITEM	DESCRIPTION
12-001	Overview of Meeting with SunCor on March 19th
12-002	Drainage Update – work by Matt Schultz of PEC
12-003	Overview of three alternatives being brought forward under DCR with latest graphics (11 x 17 and color roll plot): Interim 2 Lane on new alignment, Interim Turning Improvements on existing alignment and Interim 4 Lane on new alignment
12-004	Traffic Evaluation – summary table for intersection Level of Service operations
12-005	Time Line for completion of Design Concept Report by Mr. Marum: Drainage Report received from PEC – April 5 th Mapping Updated – April 5 th New CAD Design with drainage – April 9 th Team Meeting – April 14 th Wednesday Draft Final DCR with all graphics – April 20 th Final DCR – April 30 th
12-006	Evaluation Matrix look
12-007	Questions / Comments

Prepared by: SAIC

Signed: _____

7.3 - Title VI and Environmental Justice Considerations

Title VI of the Civil Rights Act of 1964 and the Federal Highway Administration Notice of September 2, 1992 (N 4720.6) and other related statutes assure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination on the basis of race, color, national origin, age, sex, or disability. Executive Order 12898 on Environmental Justice directs that programs, policies, and activities not have a disproportionately high and adverse human health and environmental effect on minority and low-income populations. Alternative transportation improvements should not adversely impact such groups disproportionately. Moreover, an array of alternatives should be developed which provide transportation service to all groups.

The MCDOT requires that all projects and studies produced by Maricopa County ensure nondiscrimination in all their programs and activities whether those programs and activities are federally funded or not. To prevent discrimination, efforts must be taken that address but not be limited to a program's impacts, access, benefits, participation, treatment, services, contracting opportunities, training opportunities, investigations of complaints, allocations of funds, prioritization of projects and the functions of right-of-way, research, planning and design.

This project falls under MCDOT requirements and every effort was made to determine the impacts to Title VI populations and to receive their input into the project. Demographic data from the 1990 Census was used to screen the populations of the project area to identify minority and low income populations

Information on socioeconomic and population demographics for the project area were obtained from the MAG Transportation Management Systems Report – FY 1997 Update and U.S. Census Bureau data. The influence area for the project area is defined as a four mile square area bordered by McDowell Road to the south, Indian School to the north, and one mile on either side of Loop 303. Although, characteristics for a broader area that is served by Loop 303 are also discussed. Maps from the MAG Transportation Management Systems Report – FY 1997 Update summarizing the data is included in the appendix.

Minorities make up approximately 24 percent of the resident population of Maricopa County. Hispanic persons account for the majority of minority populations with 16 percent

of the total resident population. Other major categories of minorities include African American, American Indian, and Asian/ Pacific Islander populations. The majority of the square mile sections in southwest Maricopa County have populations that are 11 to 25 percent Hispanic and 5 to 12 percent other minorities. Only the square mile section west of Loop 303 and north of Thomas Road has a Hispanic population of 11 to 25 percent of the total resident population, the other three sections have less than 11 percent. Less than five percent of the resident population is non-Hispanic minority for all four square miles within the project influence area.

Elderly persons are generally well distributed throughout Maricopa County. However, the percentage of persons over 60 is less than 11 percent for most of southwestern Maricopa County and the project influence area. There are also a below average number of females within the southwestern Maricopa County and project influence area. Slightly over 50 percent of the population in Maricopa County are female while all sections of the project area influence area show less than 50 percent of the total population being female and three out of the four sections showing less than 45 percent. The percentage of persons with disabilities is also low within southwestern Maricopa County and the project influence area with less than three percent of the population reported as having disabilities.

The federal poverty level in 1996 for a family of four is \$15,600 annual income. Approximately 13.5 percent of the families in Maricopa County fall below the federal poverty level. The majority of the square mile sections within southwest Maricopa County shows that less than 0.8 families per acre are under the federal poverty level. Less than 0.2 families per acre are shown for the project influence area.

7.4 Traffic Analysis

Center For Microcomputers In Transportation
 University of Florida
 512 Weil Hall
 Gainesville, FL 32611-2083
 Ph: (904) 392-0378

Streets: (N-S) Loop 303 (E-W) McDowell Road
 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information.....Exist.
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 2	< 0	0	> 2	< 0	1	1	1	1	1	< 0
Stop/Yield	N			N								
Volumes	106	157	3	3	278	3	6	25	105	1	16	5
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade	0			0			0			0		
MC's (%)	0			0								
SU/RV's (%)	0			0								
CV's (%)	10			10								
PCE's	1.10			1.10			1.10 1.10 1.10			1.10 1.10 1.10		

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	88	156
Potential Capacity: (pcph)	1250	1154
Movement Capacity: (pcph)	1250	1154
Prob. of Queue-Free State:	0.99	0.89
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	177	312
Potential Capacity: (pcph)	1377	1166
Movement Capacity: (pcph)	1377	1166
Prob. of Queue-Free State:	1.00	0.89
TH Saturation Flow Rate: (pcphpl)	3400	3400
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	1.00	0.88
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph)	608	608
Potential Capacity: (pcph)	481	481
Capacity Adjustment Factor due to Impeding Movements	0.88	0.88
Movement Capacity: (pcph)	423	423
Prob. of Queue-Free State:	0.95	0.93
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	620	615
Potential Capacity: (pcph)	425	428
Major LT, Minor TH Impedance Factor:	0.82	0.84
Adjusted Impedance Factor:	0.86	0.88
Capacity Adjustment Factor due to Impeding Movements	0.76	0.87
Movement Capacity: (pcph)	324	373

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	8	373		9.9	0.0	B	
EB T	31	423		9.2	0.1	B	4.8
EB R	129	1154		3.5	0.4	A	
WB L	1	324		11.1	0.0	C	
WB T	20	423 >					7.6
WB R	7	1250 >	511	7.4	0.0	B	
NB L	130	1166		3.5	0.4	A	1.4
SB L	3	1377		2.6	0.0	A	0.0

Intersection Delay = 1.7 sec/veh

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Streets: (N-S) Loop 303 (E-W) Thomas Road
 Major Street Direction.... EW
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information.....Exist.
 Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	0	0	1	< 0	0	0	0	0	> 0	< 0
Stop/Yield			N			N						
Volumes	121	0			0	0				0		135
PHF	.95	.9			.9	.9				.9		.9
Grade		0			0						0	
MC's (%)	0									0		0
SU/RV's (%)	0									0		0
CV's (%)	10									10		10
PCE's	1.10									1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		0
Potential Capacity: (pcph)		1385
Movement Capacity: (pcph)		1385
Prob. of Queue-Free State:		0.88
Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		0
Potential Capacity: (pcph)		1714
Movement Capacity: (pcph)		1714
Prob. of Queue-Free State:		0.92
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.92
Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		127
Potential Capacity: (pcph)		894
Major LT, Minor TH Impedance Factor:		0.92
Adjusted Impedance Factor:		0.92
Capacity Adjustment Factor due to Impeding Movements		0.92
Movement Capacity: (pcph)		821

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB L	0	821	>				
SB R	165	1385	>	3.0	0.4	A	3.0
EB L	140	1714		2.3	0.2	A	2.3

Intersection Delay = 2.6 sec/veh

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 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information.....2010 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	10	250	10	10	410	15	10	10	10	25	10	20
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street		
	WB	EB
Conflicting Flows: (vph)	284	464
Potential Capacity: (pcph)	994	806
Movement Capacity: (pcph)	994	806
Prob. of Queue-Free State:	0.98	0.99
Step 2: LT from Major Street		
	SB	NB
Conflicting Flows: (vph)	289	473
Potential Capacity: (pcph)	1248	1020
Movement Capacity: (pcph)	1248	1020
Prob. of Queue-Free State:	0.99	0.99
Step 3: TH from Minor Street		
	WB	EB
Conflicting Flows: (vph)	778	776
Potential Capacity: (pcph)	426	427
Capacity Adjustment Factor due to Impeding Movements	0.98	0.98
Movement Capacity: (pcph)	417	418
Prob. of Queue-Free State:	0.97	0.97
Step 4: LT from Minor Street		
	WB	EB
Conflicting Flows: (vph)	781	786
Potential Capacity: (pcph)	374	371
Major LT, Minor TH		
Impedance Factor:	0.95	0.95
Adjusted Impedance Factor:	0.96	0.96
Capacity Adjustment Factor due to Impeding Movements	0.95	0.94
Movement Capacity: (pcph)	355	348

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	12	348 >					
EB T	12	418 >	461	8.5	0.2	B	8.5
EB R	12	806 >					
WB L	31	355 >					
WB T	12	417 >	478	8.8	0.5	B	8.8
WB R	24	994 >					
NB L	12	1020		3.6	0.0	A	0.1
SB L	12	1248		2.9	0.0	A	0.1

Intersection Delay = 1.0 sec/veh

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Streets: (N-S) Loop 303 (E-W) McDowell Road
 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information.....Alt. 2, 2020 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	1	1	1	< 0
Stop/Yield	N			N								
Volumes	130	425	10	30	700	190	170	50	250	65	20	45
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade	0			0			0			0		
MC's (%)	0			0			0			0		
SU/RV's (%)	0			0			0			0		
CV's (%)	10			10			10			10		
PCE's	1.10			1.10			1.10			1.10		

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

* The calculated value was greater than 999.9.

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Streets: (N-S) Loop 303 (E-W) Thomas Road
 Major Street Direction.... EW
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information.....Exist. Geometry 2010 Peak Hour
 Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	0	0	1	< 0	0	0	0	0	> 0	< 0
Stop/Yield			N			N						
Volumes	635	35			80	40				30		840
PHF	.9	.9			.9	.9				.9		.9
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10									1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

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 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information.....2010 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	1	1	1	< 0
Stop/Yield			N			N						
Volumes	100	110	10	10	300	135	135	10	205	15	10	15
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

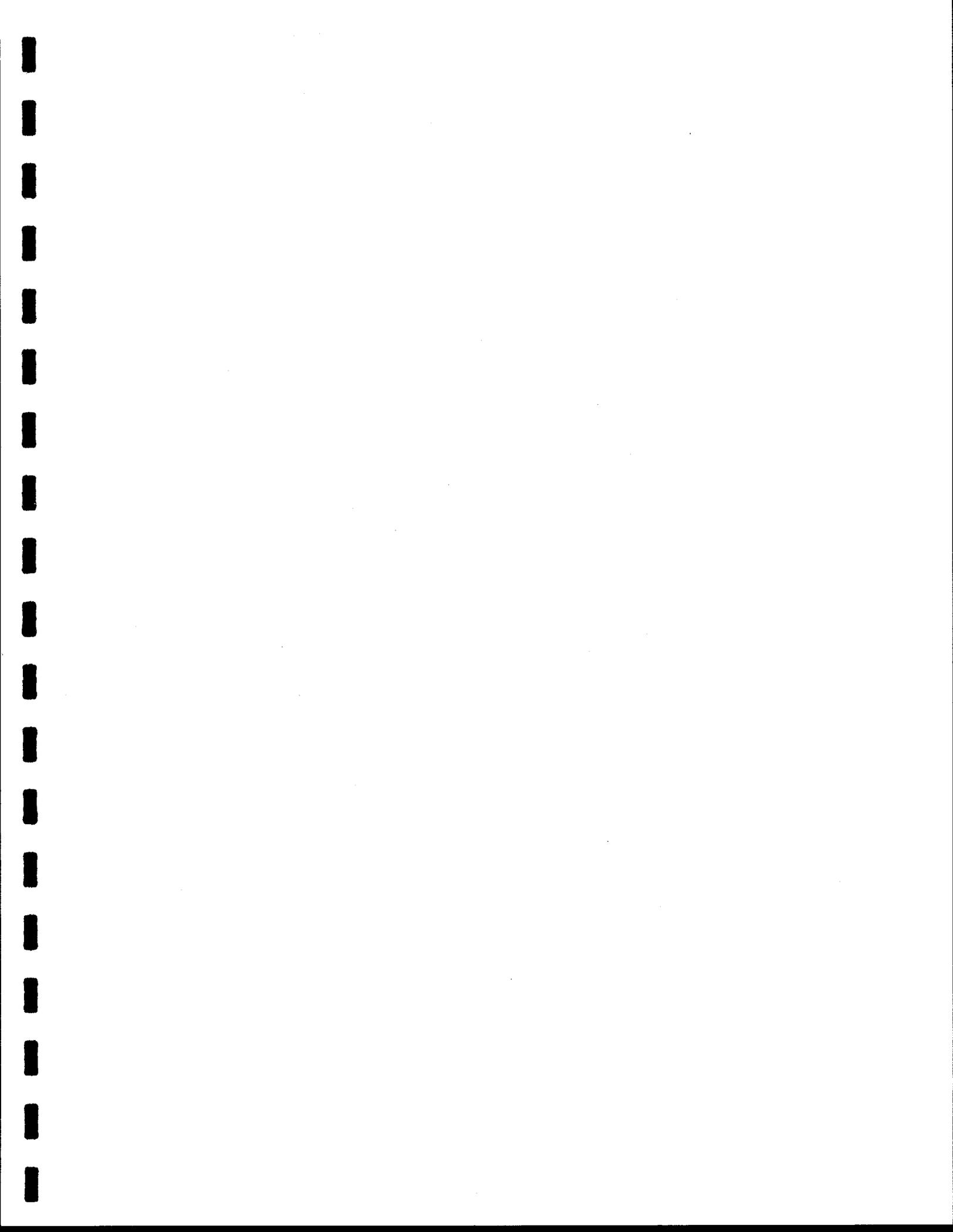
Worksheet for TWSC Intersection

Step 1: RT from Minor Street		
	WB	EB
Conflicting Flows: (vph)	66	242
Potential Capacity: (pcph)	1282	1044
Movement Capacity: (pcph)	1282	1044
Prob. of Queue-Free State:	0.99	0.76
Step 2: LT from Major Street		
	SB	NB
Conflicting Flows: (vph)	133	483
Potential Capacity: (pcph)	1454	944
Movement Capacity: (pcph)	1454	944
Prob. of Queue-Free State:	0.99	0.87
Step 3: TH from Minor Street		
	WB	EB
Conflicting Flows: (vph)	732	663
Potential Capacity: (pcph)	407	447
Capacity Adjustment Factor due to Impeding Movements	0.86	0.86
Movement Capacity: (pcph)	351	386
Prob. of Queue-Free State:	0.97	0.97
Step 4: LT from Minor Street		
	WB	EB
Conflicting Flows: (vph)	588	658
Potential Capacity: (pcph)	446	402
Major LT, Minor TH Impedance Factor:	0.84	0.83
Adjusted Impedance Factor:	0.87	0.87
Capacity Adjustment Factor due to Impeding Movements	0.66	0.86
Movement Capacity: (pcph)	296	346

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	165	346		19.8	2.9	C	
EB T	12	386		9.6	0.0	B	10.6
EB R	251	1044		4.5	1.1	A	
WB L	19	296		13.0	0.1	C	
WB T	12	351					8.6
WB R	19	1282	633	6.0	0.0	B	
NB L	122	944		4.4	0.5	A	2.0
SB L	12	1454		2.5	0.0	A	0.1

Intersection Delay = 4.3 sec/veh



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Streets: (N-S) Cotton Lane (E-W) Thomas Road
 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/25/99
 Other Information.....Exist. Geometry 2010 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield	N			N								
Volumes	10	10	325	10	10	10	10	10	10	430	10	10
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade	0			0			0			0		
MC's (%)	0			0			0			0		
SU/RV's (%)	0			0			0			0		
CV's (%)	10			10			10			10		
PCE's	1.10			1.10			1.10			1.10		

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	192	16
Potential Capacity: (pcph)	1107	1359
Movement Capacity: (pcph)	1107	1359
Prob. of Queue-Free State:	0.99	0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	372	22
Potential Capacity: (pcph)	1140	1673
Movement Capacity: (pcph)	1140	1673
Prob. of Queue-Free State:	0.99	0.99
TH Saturation Flow Rate: (pcphpl)	1700	1700
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	0.99	0.99
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph)	236	410
Potential Capacity: (pcph)	820	665
Capacity Adjustment Factor due to Impeding Movements	0.98	0.98
Movement Capacity: (pcph)	804	652
Prob. of Queue-Free State:	0.99	0.98
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	241	241
Potential Capacity: (pcph)	768	768
Major LT, Minor TH Impedance Factor:	0.96	0.97
Adjusted Impedance Factor:	0.97	0.97
Capacity Adjustment Factor due to Impeding Movements	0.96	0.96
Movement Capacity: (pcph)	739	740

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	12	740 >					
EB T	12	652 >	829	4.5	0.0	A	4.5
EB R	12	1359 >					
WB L	526	739 >					
WB T	12	804 >	746	18.0	8.0	C	18.0
WB R	12	1107 >					
NB L	12	1673		2.2	0.0	A	0.1
SB L	12	1140		3.2	0.0	A	1.1

Intersection Delay = 9.7 sec/veh

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 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/25/99
 Other Information.....Exist. Geometry 2020 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield	N			N								
Volumes	10	30	650	30	10	10	10	10	20	900	10	10
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade	0			0			0			0		
MC's (%)	0			0			0			0		
SU/RV's (%)	0			0			0			0		
CV's (%)	10			10			10			10		
PCE's	1.10			1.10			1.10			1.10		

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	394	16
Potential Capacity: (pcph)	874	1359
Movement Capacity: (pcph)	874	1359
Prob. of Queue-Free State:	0.99	0.98
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	755	22
Potential Capacity: (pcph)	749	1673
Movement Capacity: (pcph)	749	1673
Prob. of Queue-Free State:	0.95	0.99
TH Saturation Flow Rate: (pcphpl)	1700	1700
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	0.95	0.99
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph)	460	816
Potential Capacity: (pcph)	626	407
Capacity Adjustment Factor due to Impeding Movements	0.94	0.94
Movement Capacity: (pcph)	588	382
Prob. of Queue-Free State:	0.98	0.97
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	471	466
Potential Capacity: (pcph)	565	569
Major LT, Minor TH Impedance Factor:	0.91	0.92
Adjusted Impedance Factor:	0.93	0.94
Capacity Adjustment Factor due to Impeding Movements	0.91	0.93
Movement Capacity: (pcph)	517	527

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 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information..... Alt. 2, 2020 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes	20	595	25	30	800	40	40	10	50	70	10	40
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade		0			0			0			0	
MC's (%)	0			0			0	0	0	0	0	0
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	10			10			10	10	10	10	10	10
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB

Conflicting Flows: (vph)	675	911
Potential Capacity: (pcph)	630	478
Movement Capacity: (pcph)	630	478
Prob. of Queue-Free State:	0.92	0.87

Step 2: LT from Major Street	SB	NB

Conflicting Flows: (vph)	689	933
Potential Capacity: (pcph)	805	616
Movement Capacity: (pcph)	805	616
Prob. of Queue-Free State:	0.96	0.96

Step 3: TH from Minor Street	WB	EB

Conflicting Flows: (vph)	1663	1655
Potential Capacity: (pcph)	146	148
Capacity Adjustment Factor due to Impeding Movements	0.92	0.92
Movement Capacity: (pcph)	134	136
Prob. of Queue-Free State:	0.91	0.91

Step 4: LT from Minor Street	WB	EB

Conflicting Flows: (vph)	1674	1668
Potential Capacity: (pcph)	114	115
Major LT, Minor TH Impedance Factor:	0.84	0.84
Adjusted Impedance Factor:	0.87	0.87
Capacity Adjustment Factor due to Impeding Movements	0.76	0.81
Movement Capacity: (pcph)	87	93

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	48	93		78.2	2.8	F	
EB T	12	136	>				39.4
EB R	62	478	> 340	13.5	0.9	C	
WB L	86	87		302.6	9.9	F	
WB T	12	134	>				181.5
WB R	48	630	> 362	11.9	0.6	C	
NB L	24	616		6.1	0.0	B	0.2
SB L	36	805		4.7	0.0	A	0.2

Intersection Delay = 15.0 sec/veh

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB

Conflicting Flows: (vph)		50
Potential Capacity: (pcph)		1306
Movement Capacity: (pcph)		1306
Prob. of Queue-Free State:		0.61

Step 2: LT from Major Street	WB	EB

Conflicting Flows: (vph)		61
Potential Capacity: (pcph)		1603
Movement Capacity: (pcph)		1603
Prob. of Queue-Free State:		0.77
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.76

Step 4: LT from Minor Street	NB	SB

Conflicting Flows: (vph)		414
Potential Capacity: (pcph)		610
Major LT, Minor TH		
Impedance Factor:		0.76
Adjusted Impedance Factor:		0.76
Capacity Adjustment Factor due to Impeding Movements		0.76
Movement Capacity: (pcph)		465

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB L	19	465 >					
SB R	507	1306 >	1226	5.1	2.5	B	5.1
EB L	376	1603		2.9	1.1	A	2.8

Intersection Delay = 3.8 sec/veh

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Streets: (N-S) Loop 303 (E-W) McDowell Road
 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information..... Existing geometry, 2010 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 2	< 0	0	> 2	< 0	1	1	1	1	1	< 0
Stop/Yield	N			N								
Volumes	100	195	10	10	300	135	135	10	205	15	10	15
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade	0			0			0			0		
MC's (%)	0			0			0	0	0	0	0	0
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	10			10			10	10	10	10	10	10
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB

Conflicting Flows: (vph)	114	242
Potential Capacity: (pcph)	1212	1044
Movement Capacity: (pcph)	1212	1044
Prob. of Queue-Free State:	0.98	0.76

Step 2: LT from Major Street	SB	NB

Conflicting Flows: (vph)	228	483
Potential Capacity: (pcph)	1293	944
Movement Capacity: (pcph)	1293	944
Prob. of Queue-Free State:	0.99	0.87
TH Saturation Flow Rate: (pcphpl)	3400	3400
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	0.99	0.86

Step 3: TH from Minor Street	WB	EB

Conflicting Flows: (vph)	828	758
Potential Capacity: (pcph)	358	393
Capacity Adjustment Factor due to Impeding Movements	0.85	0.85
Movement Capacity: (pcph)	305	335
Prob. of Queue-Free State:	0.96	0.96

Step 4: LT from Minor Street	WB	EB

Conflicting Flows: (vph)	683	752
Potential Capacity: (pcph)	387	350
Major LT, Minor TH Impedance Factor:	0.82	0.82
Adjusted Impedance Factor:	0.86	0.86
Capacity Adjustment Factor due to Impeding Movements	0.65	0.85
Movement Capacity: (pcph)	253	296

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	165	296		27.2	3.7	D	
EB T	12	335		11.1	0.0	C	13.5
EB R	251	1044		4.5	1.1	A	
WB L	19	253		15.4	0.2	C	
WB T	12	305 >					10.0
WB R	19	1212 >	563	6.8	0.0	B	
NB L	122	944		4.4	0.5	A	1.4
SB L	12	1293		2.8	0.0	A	0.1

Intersection Delay = 4.9 sec/veh

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 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information..... Existing geometry, 2020 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 2	< 0	0	> 2	< 0	1	1	1	1	1	< 0
Stop/Yield			N			N						
Volumes	130	425	10	30	700	190	170	50	250	65	20	45
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade		0			0			0			0	
MC's (%)	0			0			0	0	0	0	0	0
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	10			10			10	10	10	10	10	10
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB

Conflicting Flows: (vph)	242	494
Potential Capacity: (pcph)	1044	778
Movement Capacity: (pcph)	1044	778
Prob. of Queue-Free State:	0.95	0.61

Step 2: LT from Major Street	SB	NB

Conflicting Flows: (vph)	483	989
Potential Capacity: (pcph)	944	505
Movement Capacity: (pcph)	944	505
Prob. of Queue-Free State:	0.96	0.69
TH Saturation Flow Rate: (pcphpl)	3400	3400
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	0.94	0.63

Step 3: TH from Minor Street	WB	EB

Conflicting Flows: (vph)	1644	1544
Potential Capacity: (pcph)	119	136
Capacity Adjustment Factor due to Impeding Movements	0.60	0.60
Movement Capacity: (pcph)	71	81
Prob. of Queue-Free State:	0.66	0.23

Step 4: LT from Minor Street	WB	EB

Conflicting Flows: (vph)	1461	1543
Potential Capacity: (pcph)	123	109
Major LT, Minor TH Impedance Factor:	0.14	0.39
Adjusted Impedance Factor:	0.27	0.52
Capacity Adjustment Factor due to Impeding Movements	0.16	0.49
Movement Capacity: (pcph)	20	53

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	208	53		*	78.5	F	
EB T	62	81		158.6	5.5	F	*
EB R	306	778		7.6	2.2	B	
WB L	79	20		*	30.4	F	
WB T	24	71 >					*
WB R	55	1044 >	202	29.2	2.0	D	
NB L	158	505		10.4	1.5	C	2.4
SB L	36	944		4.0	0.0	A	0.1

Intersection Delay = 626.7 sec/veh

* The calculated value was greater than 999.9.

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Streets: (N-S) Loop 303 (E-W) Thomas Road
 Major Street Direction.... EW
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information..... Exist. Geometry 2020 Peak Hour
 Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	0	0	1	< 0	0	0	0	0	> 0	< 0
Stop/Yield			N			N						
Volumes	655	35			80	40				30		840
PHF	.95	.9			.9	.9				.9		.9
Grade		0			0						0	
MC's (%)	0									0		0
SU/RV's (%)	0									0		0
CV's (%)	10									10		10
PCE's	1.10									1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB

Conflicting Flows: (vph)		111
Potential Capacity: (pcph)		1216
Movement Capacity: (pcph)		1216
Prob. of Queue-Free State:		0.16

Step 2: LT from Major Street	WB	EB

Conflicting Flows: (vph)		133
Potential Capacity: (pcph)		1482
Movement Capacity: (pcph)		1482
Prob. of Queue-Free State:		0.49
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.48

Step 4: LT from Minor Street	NB	SB

Conflicting Flows: (vph)		839
Potential Capacity: (pcph)		346
Major LT, Minor TH Impedance Factor:		0.48
Adjusted Impedance Factor:		0.48
Capacity Adjustment Factor due to Impeding Movements		0.48
Movement Capacity: (pcph)		165

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB L	36	165 >	1000	159.4	56.4	F	159.4
SB R	1026	1216 >					
EB L	758	1482		5.0	3.4	A	4.7

Intersection Delay = 84.5 sec/veh

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Streets: (N-S) Loop 303 (E-W) Thomas Road
 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information..... Alt. 2, 2010 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	10	335	10	10	410	15	10	20	10	25	10	20
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB

Conflicting Flows: (vph)	378	464
Potential Capacity: (pcph)	891	806
Movement Capacity: (pcph)	891	806
Prob. of Queue-Free State:	0.97	0.99

Step 2: LT from Major Street	SB	NB

Conflicting Flows: (vph)	383	473
Potential Capacity: (pcph)	1126	1020
Movement Capacity: (pcph)	1126	1020
Prob. of Queue-Free State:	0.99	0.99

Step 3: TH from Minor Street	WB	EB

Conflicting Flows: (vph)	872	870
Potential Capacity: (pcph)	380	381
Capacity Adjustment Factor due to Impeding Movements	0.98	0.98
Movement Capacity: (pcph)	372	373
Prob. of Queue-Free State:	0.97	0.94

Step 4: LT from Minor Street	WB	EB

Conflicting Flows: (vph)	880	880
Potential Capacity: (pcph)	328	328
Major LT, Minor TH Impedance Factor:	0.91	0.95
Adjusted Impedance Factor:	0.93	0.96
Capacity Adjustment Factor due to Impeding Movements	0.92	0.93
Movement Capacity: (pcph)	302	306

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	12	306	>				
EB T	24	373	> 405	10.1	0.4	C	10.1
EB R	12	806	>				
WB L	31	302	>				
WB T	12	372	> 414	10.4	0.6	C	10.4
WB R	24	891	>				
NB L	12	1020		3.6	0.0	A	0.1
SB L	12	1126		3.2	0.0	A	0.1

Intersection Delay = 1.2 sec/veh

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Streets: (N-S) Loop 303 (E-W) McDowell Road
 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information.....2010 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	1	1	1	< 0
Stop/Yield			N			N						
Volumes	100	195	10	10	300	135	135	10	205	15	10	15
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB

Conflicting Flows: (vph)	114	242
Potential Capacity: (pcph)	1212	1044
Movement Capacity: (pcph)	1212	1044
Prob. of Queue-Free State:	0.98	0.76

Step 2: LT from Major Street	SB	NB

Conflicting Flows: (vph)	228	483
Potential Capacity: (pcph)	1293	944
Movement Capacity: (pcph)	1293	944
Prob. of Queue-Free State:	0.99	0.87

Step 3: TH from Minor Street	WB	EB

Conflicting Flows: (vph)	828	758
Potential Capacity: (pcph)	358	393
Capacity Adjustment Factor due to Impeding Movements	0.86	0.86
Movement Capacity: (pcph)	309	339
Prob. of Queue-Free State:	0.96	0.96

Step 4: LT from Minor Street	WB	EB

Conflicting Flows: (vph)	683	752
Potential Capacity: (pcph)	387	350
Major LT, Minor TH Impedance Factor:	0.83	0.83
Adjusted Impedance Factor:	0.87	0.87
Capacity Adjustment Factor due to Impeding Movements	0.66	0.86
Movement Capacity: (pcph)	256	299

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	165	299		26.6	3.7	D	
EB T	12	339		11.0	0.0	C	13.2
EB R	251	1044		4.5	1.1	A	
WB L	19	256		15.2	0.1	C	
WB T	12	309	>				9.9
WB R	19	1212	> 569	6.7	0.0	B	
NB L	122	944		4.4	0.5	A	1.4
SB L	12	1293		2.8	0.0	A	0.1

Intersection Delay = 4.8 sec/veh

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Streets: (N-S) Loop 303 (E-W) Thomas Road
 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information..... Alt. 3, 2010 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes	10	335	10	10	410	15	10	20	10	25	10	20
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB

Conflicting Flows: (vph)	192	236
Potential Capacity: (pcph)	1107	1051
Movement Capacity: (pcph)	1107	1051
Prob. of Queue-Free State:	0.98	0.99

Step 2: LT from Major Street	SB	NB

Conflicting Flows: (vph)	383	473
Potential Capacity: (pcph)	1068	955
Movement Capacity: (pcph)	1068	955
Prob. of Queue-Free State:	0.99	0.99

Step 3: TH from Minor Street	WB	EB

Conflicting Flows: (vph)	872	870
Potential Capacity: (pcph)	337	338
Capacity Adjustment Factor due to Impeding Movements	0.98	0.98
Movement Capacity: (pcph)	329	330
Prob. of Queue-Free State:	0.96	0.93

Step 4: LT from Minor Street	WB	EB

Conflicting Flows: (vph)	866	863
Potential Capacity: (pcph)	296	297
Major LT, Minor TH Impedance Factor:	0.91	0.94
Adjusted Impedance Factor:	0.93	0.95
Capacity Adjustment Factor due to Impeding Movements	0.92	0.93
Movement Capacity: (pcph)	271	277

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	12	277		13.6	0.0	C	
EB T	24	330	>				10.3
EB R	12	1051	> 428	9.2	0.2	B	
WB L	31	271		15.0	0.4	C	
WB T	12	329	>				10.2
WB R	24	1107	> 619	6.2	0.1	B	
NB L	12	955		3.8	0.0	A	0.1
SB L	12	1068		3.4	0.0	A	0.1

Intersection Delay = 1.2 sec/veh

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Streets: (N-S) Loop 303 (E-W) Thomas Road
 Major Street Direction.... NS
 Length of Time Analyzed... 60 (min)
 Analyst..... DLC
 Date of Analysis..... 3/24/99
 Other Information.....Alt. 3, 2020 Peak Hour
 Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes	20	595	25	30	800	40	40	10	50	70	10	40
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Grade		0			0			0			0	
MC's (%)	0			0			0	0	0	0	0	0
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	10			10			10	10	10	10	10	10
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB

Conflicting Flows: (vph)	344	466
Potential Capacity: (pcph)	927	804
Movement Capacity: (pcph)	927	804
Prob. of Queue-Free State:	0.95	0.92

Step 2: LT from Major Street	SB	NB

Conflicting Flows: (vph)	689	933
Potential Capacity: (pcph)	731	541
Movement Capacity: (pcph)	731	541
Prob. of Queue-Free State:	0.95	0.96

Step 3: TH from Minor Street	WB	EB

Conflicting Flows: (vph)	1663	1655
Potential Capacity: (pcph)	116	117
Capacity Adjustment Factor due to Impeding Movements	0.91	0.91
Movement Capacity: (pcph)	105	106
Prob. of Queue-Free State:	0.89	0.89

Step 4: LT from Minor Street	WB	EB

Conflicting Flows: (vph)	1624	1632
Potential Capacity: (pcph)	97	96
Major LT, Minor TH Impedance Factor:	0.81	0.80
Adjusted Impedance Factor:	0.85	0.85
Capacity Adjustment Factor due to Impeding Movements	0.78	0.81
Movement Capacity: (pcph)	76	77

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	48	77		116.9	3.7	F	
EB T	12	106	>				53.6
EB R	62	804	> 389	11.4	0.8	C	
WB L	86	76		498.2	12.5	F	
WB T	12	105	>				295.6
WB R	48	927	> 361	12.0	0.6	C	
NB L	24	541		7.0	0.0	B	0.2
SB L	36	731		5.2	0.0	B	0.2

Intersection Delay = 23.8 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 04-14-1999
 Center For Microcomputers In Transportation

Streets: (E-W) Thomas Road (N-S) Cotton Lane
 Analyst: DLC File Name: 20NOCOTT.HC9
 Area Type: Other 3-25-99 PM PEAK
 Comment: Existing geometry, 2020 peak hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0
Volumes	10	10	10	900	10	10	10	30	650	30	10	10
Lane W (ft)	12.0			12.0			12.0			12.0		
RTOR Vols	0			0			0			0		
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
WB Left	*				SB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
NB Right					EB Right			
SB Right					WB Right			
Green	50.0A				Green 20.0A			
Yellow/AR	6.0				Yellow/AR 6.0			
Cycle Length:	82 secs Phase combination order: #1 #5							

Intersection Performance Summary

Lane	Group:	Adj Sat		v/c	g/C	Delay	LOS	Approach:	
		Cap	Flow	Ratio	Ratio			Delay	LOS
EB	LTR	637	986	0.052	0.646	3.4	A	3.4	A
WB	LTR	834	1291	1.225	0.646	*	*	*	*
NB	LTR	374	1332	2.050	0.280	*	*	*	*
SB	LTR	183	654	0.300	0.280	15.3	C	15.3	C

Intersection Delay = * (sec/veh) Intersection LOS = *
 (g/C)*(V/c) is greater than one. Calculation of D1 is infeasible.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 04-14-1999
 Center For Microcomputers In Transportation

Streets: (E-W) McDowell Road (N-S) Cotton Lane
 Analyst: DLC File Name: NOMCDW20.HC9
 Area Type: Other 3-25-99 PM PEAK
 Comment: Existing geometry, 2020 Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	1	1	1	< 0	0	> 2	< 0	0	> 2	< 0
Volumes	170	50	250	65	20	45	130	425	10	30	700	190
Lane W (ft)	12.0	12.0	12.0	12.0	12.0			12.0			12.0	
RTOR Vols			30			0			0			10
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
WB Left	*				SB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
NB Right					EB Right			
SB Right					WB Right			
Green	20.0A				Green	50.0A		
Yellow/AR	6.0				Yellow/AR	6.0		
Cycle Length:	82 secs	Phase combination order: #1 #5						

Intersection Performance Summary

	Lane Group:	Mvmts	Adj Sat	v/c	g/C	Delay	LOS	Approach:	
								Cap	Flow
EB	L	377	1345	0.501	0.280	16.9	C	17.2	C
	T	484	1727	0.116	0.280	14.2	B		
	R	412	1468	0.595	0.280	18.1	C		
WB	L	393	1402	0.183	0.280	14.5	B	14.4	B
	TR	434	1547	0.166	0.280	14.4	B		
NB	DfL	123	191	1.166	0.646	*	*	*	*
	TR	1112	1721	0.434	0.646	4.8	A		
SB	LTR	1883	2914	0.564	0.646	5.5	B	5.5	B

Intersection Delay = * (sec/veh) Intersection LOS = *
 (g/C)*(V/c) is greater than one. Calculation of D1 is infeasible.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 04-14-1999
 Center For Microcomputers In Transportation

Streets: (E-W) Thomas Road (N-S) Loop 303
 Analyst: DLC File Name: NOTHOM10.HC9
 Area Type: Other 3-25-99 PM PEAK
 Comment: Existing geometry - 2020 Peak Period

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	0	0	1	< 0	0	0	0	0	> 0	< 0
Volumes	635	35			80	40				30		840
Lane W (ft)		12.0			12.0						12.0	
RTOR Vols			0			0						300
Lost Time	3.00	3.00			3.00	3.00				3.00		3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left			
Thru	*				Thru			
Right					Right			
Peds					Peds			
WB Left					SB Left	*		
Thru		*			Thru			
Right		*			Right	*		
Peds		*			Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		55.0A			Green	40.0A		
Yellow/AR		6.0			Yellow/AR	6.0		
Cycle Length: 107 secs Phase combination order: #1 #5								

Intersection Performance Summary

Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:		
							Mvmts	Cap	Flow
EB	LT	538	992	1.385	0.542	*	*	*	*
WB	TR	801	1477	0.166	0.542	8.0	B	8.0	B
SB	LR	534	1330	1.184	0.402	*	*	*	*

Intersection Delay = * (sec/veh) Intersection LOS = *
 (g/C)*(V/c) is greater than one. Calculation of D1 is infeasible.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 04-14-1999
 Center For Microcomputers In Transportation

Streets: (E-W) Thomas Road (N-S) Loop 303
 Analyst: DLC File Name: NOTHOM20.HC9
 Area Type: Other 3-25-99 PM PEAK
 Comment: Existing geometry - 2010 Peak Period

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	0	0	1	< 0	0	0	0	0	> 0	< 0
Volumes	325	20			35	20				15		415
Lane W (ft)		12.0			12.0						12.0	
RTOR Vols			0			0						0
Lost Time	3.00	3.00			3.00	3.00				3.00		3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*							
Thru	*							
Right								
Peds								
WB Left								
Thru	*							
Right	*							
Peds	*							
NB Right								
SB Right								
Green	55.0A				50.0A			
Yellow/AR	6.0				6.0			
Cycle Length: 117 secs Phase combination order: #1 #5								

Intersection Performance Summary

Lane	Group:	Mvmts	Cap	Adj Sat	v/c	g/C	Delay	LOS	Approach:	
				Flow	Ratio	Ratio			Delay	LOS
EB	LT	637	1285	0.601	0.496	14.8	B	14.8	B	
WB	TR	729	1470	0.084	0.496	10.0	B	10.0	B	
SB	LR	601	1327	0.795	0.453	22.8	C	22.8	C	
Intersection Delay = 18.6 sec/veh Intersection LOS = C										
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.694										

Streets: (E-W) McDowell Road (N-S) Loop 303
 Analyst: DLC File Name: MCDW2020.HC9
 Area Type: Other 3-25-99 AM PEAK
 Comment: Alt. 2, 2020 Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	1	1	1	< 0	1	2	< 0	1	2	< 0
Volumes	170	50	250	65	20	45	130	425	10	30	700	190
Lane W (ft)	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
WB Left	*				SB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
NB Right					EB Right			
SB Right					WB Right			
Green	20.0A				Green	50.0A		
Yellow/AR	6.0				Yellow/AR	6.0		
Cycle Length: 82 secs Phase combination order: #1 #5								

Intersection Performance Summary

Lane	Group:	Mvmts	Adj Sat	v/c	g/C	Delay	LOS	Approach:	
								Cap	Flow
EB	L	377	1345	0.501	0.280	16.9	C	18.2	C
	T	484	1727	0.116	0.280	14.2	B		
	R	412	1468	0.675	0.280	19.9	C		
WB	L	393	1402	0.183	0.280	14.5	B	14.4	B
	TR	434	1547	0.166	0.280	14.4	B		
NB	L	133	206	1.082	0.646	100.7	F	25.3	D
	TR	2225	3443	0.228	0.646	3.9	A		
SB	L	419	649	0.079	0.646	3.5	A	4.9	A
	TR	2161	3344	0.480	0.646	4.9	A		

Intersection Delay = 13.9 sec/veh Intersection LOS = B
 Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.959

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 04-14-1999
 Center For Microcomputers In Transportation

Streets: (E-W) Thomas Road (N-S) Loop 303
 Analyst: DLC File Name: THOM2020.HC9
 Area Type: Other 3-25-99 AM PEAK
 Comment: Alt. 2, 2020 Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	1	< 0	1	1	< 0
Volumes	40	10	50	70	10	40	20	595	25	30	800	40
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
WB Left	*				SB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
NB Right					EB Right			
SB Right					WB Right			
Green	20.0A				Green	50.0A		
Yellow/AR	6.0				Yellow/AR	6.0		
Cycle Length: 82 secs Phase combination order: #1 #5								

Intersection Performance Summary

Lane	Group:	Mvmts	Adj Sat	v/c	g/C	Delay	LOS	Approach:	
								Cap	Flow
EB	L	394	1406	0.112	0.280	14.2	B	14.3	B
	TR	424	1511	0.158	0.280	14.4	B		
WB	L	382	1362	0.204	0.280	14.6	B	14.4	B
	TR	426	1520	0.129	0.280	14.2	B		
NB	L	88	130	0.250	0.646	4.3	A	6.2	B
	TR	1110	1717	0.621	0.646	6.3	B		
SB	L	111	171	0.299	0.646	4.6	A	11.3	B
	TR	1108	1715	0.842	0.646	11.5	B		
Intersection Delay = 9.8 sec/veh Intersection LOS = B									
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.649									

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4f 04-14-1999
 Center For Microcomputers In Transportation

Streets: (E-W) Thomas Road (N-S) Loop 303
 Analyst: DLC File Name: 203THOM.HC9
 Area Type: Other 3-25-99 AM PEAK
 Comment: Alt. 3, 2020 Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	2	< 0	1	2	< 0
Volumes	40	10	50	70	10	40	20	595	25	30	800	40
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
WB Left	*				SB Left	*		
Thru	*				Thru	*		
Right	*				Right	*		
Peds	*				Peds	*		
NB Right					EB Right			
SB Right					WB Right			
Green	20.0A				Green	50.0A		
Yellow/AR	6.0				Yellow/AR	6.0		
Cycle Length:	82 secs Phase combination order: #1 #5							

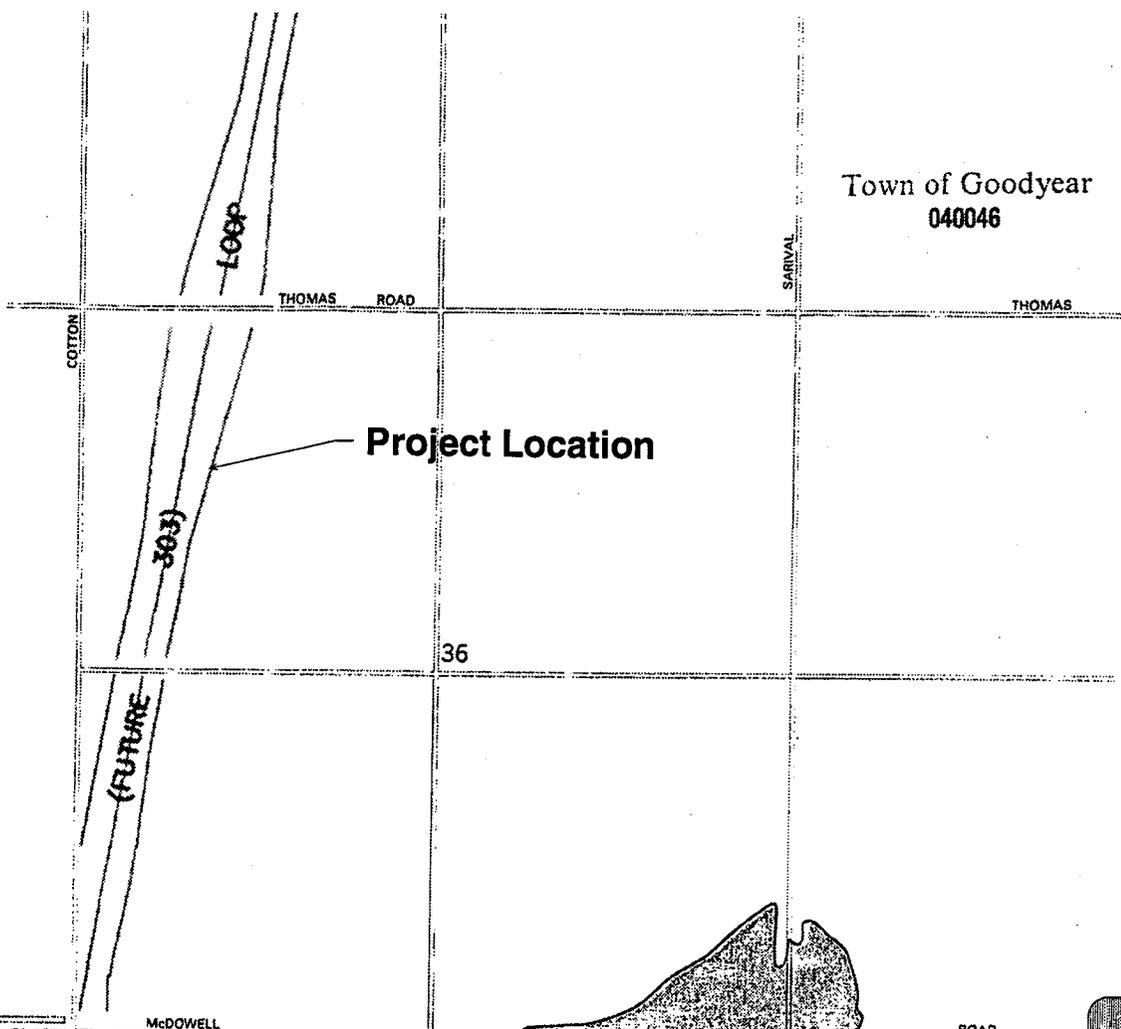
Intersection Performance Summary

	Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:		
								Mvmts	Cap	Flow
EB	L		394	1406	0.112	0.280	14.2	B	14.3	B
	TR		424	1511	0.158	0.280	14.4	B		
WB	L		382	1362	0.204	0.280	14.6	B	14.4	B
	TR		426	1520	0.129	0.280	14.2	B		
NB	L		159	246	0.138	0.646	3.7	A	4.2	A
	TR		2219	3433	0.326	0.646	4.2	A		
SB	L		282	436	0.117	0.646	3.6	A	4.7	A
	TR		2217	3430	0.442	0.646	4.7	A		

Intersection Delay = 5.7 sec/veh Intersection LOS = B
 Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.370

7.5 FEMA and USGS Topo Maps

Town of Goodyear
040046



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY,
ARIZONA AND
INCORPORATED AREAS

PANEL 2060 OF 4530

COUNTY	NUMBER	PANEL	SUFFIX
GOODYEAR TOWN OF	040046	2060	E
LYONSVILLE TOWN OF	040128	2060	E
WILLOW CREEK TOWN OF	040130	2060	E

MAP NUMBER
04013C2060 E

MAP REVISED:
SEPTEMBER 30, 1995



Federal Emergency Management Agency

Federal Emergency Management Agency
(FEMA)
Flood Plain Map

LOOP
303

Loop 303 (Estrella)
McDowell Road to Thomas Road
MCDOT Transportation Planning Division

SAIC
An Employee-Owned Company

7.6 Drainage Calculations

VOLUME CALCULATIONS

Offsite Areas $V = C(P/12)A$ Eq. 3.4

Where $V =$ Volume (acre-feet)
 $C =$ Runoff Coefficient Table 3.2
 $P =$ Rainfall Depth (inches) Figure 3.2
 $A =$ Drainage Area (acres)

$C \Rightarrow$ 100 year - Agricultural = 0.25
 $P \Rightarrow$ 100 year, 2 hour Storm = (1.5 in/hr)(2hr) = 3 in.

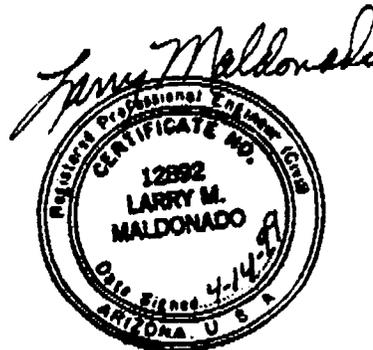
Area 1: Concentration Point @ 11 + 500 - CP1
 $V = (0.25)(3/12)(28.9) = \underline{181 \text{ acre-feet}}$
Area 2: Concentration Point @ 11+085 - CP2
 $V = (0.25)(3/12)(20.7) = \underline{1.29 \text{ acre-feet}}$
Area 3: Concentration Point @ 10+625 - CP3
 $V = (0.25)(3/12)(6.2) = \underline{0.39 \text{ acre-feet}}$

Roadways

$C \Rightarrow$ 100 year, Paved = 0.95
 $C \Rightarrow$ 100 year, Shoulder = 0.80 (Median)

Station 10 + 220 - 10 + 625:

Concentration Point @ 10 + 220 - McDowell - CP4
2 Lane: $V = (0.95)(0.25)(1.65) = 0.39 \text{ acre-feet}$
Median: $V = (0.80)(0.25)(0.17) = 0.03 \text{ acre-feet}$
+ 2 Lanes: $V = (0.95)(0.25)(0.57) = 0.14 \text{ acre-feet}$



Station 10 + 625 - 11 + 085:

Concentration Point @ 10 + 625 - Palm - CP3

2 Lane: $V = (0.95)(0.25)(1.18) = 0.28$ acre-feet

Median: $V = (0.80)(0.25)(0.77) = 0.15$ acre-feet

+ 2 Lanes: $V = (0.95)(0.25)(1.18) = 0.28$ acre-feet

Station 11 + 085 - 11 + 500:

Concentration Point @ 11 + 085 - Encanto - CP2

2 Lane: $V = (0.95)(0.25)(1.06) = 0.25$ acre-feet

Median: $V = (0.80)(0.25)(0.84) = 0.17$ acre-feet

+ 2 Lanes: $V = (0.95)(0.25)(1.06) = 0.25$ acre-feet

Station 11 + 500 - 11 + 900:

Concentration Point @ 11 + 500 - Virginia - CP1

2 Lane: $V = (0.95)(0.25)(1.21) = 0.29$ acre-feet

Median: $V = (0.80)(0.25)(0.54) = 0.11$ acre-feet

+ 2 Lanes: $V = (0.95)(0.25)(1.21) = 0.29$ acre-feet

Volume Summary

CP1: Offsite = 1.81 acre-feet
 2 Lanes = 0.29 acre-feet
 + 2 Lanes/Median = 0.40 acre-feet

 Total = 2.50 acre-feet

CP2: Offsite = 1.29 acre-feet
 2 Lanes = 0.25 acre-feet
 + 2 Lanes/Median = 0.42 acre-feet

 Total = 1.96 acre-feet

CP3: Offsite = 0.39 acre-feet
 2 Lanes = 0.28 acre-feet
 + 2 Lanes/Median = 0.43 acre-feet

 Total = 1.10 acre-feet

CP4: 2 Lanes = 0.39 acre-feet
 + 2 Lanes/Median = 0.17 acre-feet

 Total = 0.56 acre-feet

Retention Basin Area Calculations – Option 1

- ◆ Option 1 is retention of offsite and roadway
- Assume 70' Top Width W/ 6:1 Side Slopes

CP1: Storage = 2.50 acre-feet = 108,900 ft² – feet
@ 2 feet: L = 108,900 ft² – feet / 116 ft² = 938 feet
@ 3 feet: L = 108,900 ft² – feet / 156 ft² = 698 feet
@ 4 feet: L = 108,900 ft² – feet / 184 ft² = 592 feet

CP2: Storage = 1.96 acre-feet = 85,377 ft² – feet
@ 2 feet: L = 85377 / 116 = 736 feet
@ 3 feet: L = 85377 / 156 = 547 feet
@ 4 feet: L = 85377 / 184 = 464 feet

CP3: Storage = 1.10 acre-feet = 47,916 ft² – feet
@ 2 feet: L = 47916 / 116 = 413 feet
@ 3 feet: L = 47916 / 156 = 307 feet
@ 4 feet: L = 47916 / 184 = 260 feet

CP4: Storage = 0.56 acre-feet = 24,394 ft² – feet
@ 2 feet: L = 24394 / 116 = 210 feet
@ 3 feet: L = 24394 / 156 = 156 feet
@ 4 feet: L = 24394 / 184 = 132 feet

7.7 Candidate Assessment Report and Update

CANDIDATE ASSESSMENT REPORT

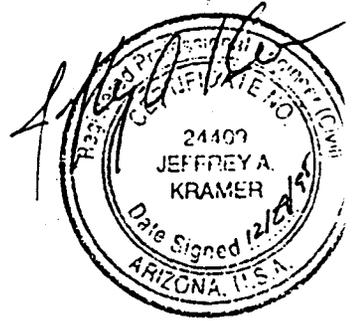
C96-LOOP 303

LOOP 303 (ESTRELLA)

SEC. 36, T. 2N., R. 2W., G&SRB&M

MCDOT TRANSPORTATION PLANNING DIVISION

DECEMBER 29, 1995



Project Name: Loop 303 (Estrella)

Project Termini: Thomas Road to Encanto Boulevard

Requested by: MCDOT

Improvement Requested: Improve Loop 303 Access From Cotton Lane & Thomas Road

PM₁₀ Area? Yes

Length: 0.5 miles (approximate)

Estimated Construction Cost: \$ 621,721

Problem Identification:

Completion of the Loop 303 freeway south of Thomas Road has been delayed by ADOT indefinitely. The major movement is reportedly between Loop 303, Thomas Road and South Cotton Lane, requiring two right angle turns which commercial vehicles cannot navigate in their own lane. North of Thomas Road the heaviest traffic volumes are on Loop 303, with only local or nearby destination traffic using Cotton Lane north of Thomas Road. Stop conditions are imposed upon the major movement while the minor movements to north Cotton Lane are unimpeded.

Summary Recommendation:

Construct an extension of Loop 303 southwesterly from its present terminus at existing Thomas Road to Cotton Lane approximately 0.5 miles to the south (approximately on the Encanto Boulevard alignment). Revise the connection to north Cotton Lane to a stop controlled right angle intersection with the new Loop 303, providing a left-turn lane for northbound Cotton Lane at the new intersection. Close the existing Thomas Road and Cotton Lane segments between the new connections as access to private facilities allows. Provide new drainage culverts, acquire right-of-way and relocate utilities as required by the final design.

Candidate Assessment Report Number C96-LOOP 303

Right of Way:

The existing right-of-way was determined from Maricopa County Assessors Maps (Book 501, Map 1, Sheets 1 & 2, and Book 502, Maps 30 & 32) and ADOT records. Cotton Lane right-of-way is 33 feet each side of centerline, extending out to 58 feet on the east side north of the APS Substation and 55 feet on the west side one quarter mile north of McDowell Road. Thomas Road has a permanent easement 55 feet wide on each side of centerline from the Loop 303 right-of-way to Cotton Lane, except for the approximately 200 foot long segment bordering the APS Substation in the northeast quadrant of the Thomas Road/Cotton Lane intersection, which is only 33 feet wide and follows the existing fence line. The existing right-of-way for Loop 303 north and south of Thomas Road is 150 feet each side of centerline, however, it flares out to 550 feet wide from approximately 55 feet north and 150 feet south of the Thomas Road centerline to allow for a future interchange. The Loop 303 right-of-way is oriented southwesterly, and intersects Cotton Lane at the McDowell Road intersection.

Drainage:

The existing drainage within the project area is shown on the Perryville Quadrangle of the U.S.G.S. Topographic maps as well as by FEMA Flood Insurance Rate Map panel 2060 of 4350. Due to its agricultural use the surrounding land is very flat, however available records indicate a southeasterly slope. This is consistent with the roadside drainage which flows south along Loop 303 and east along Thomas Road in roadside ditches. Drainage facilities in place include the following:

1. A 24 inch CSP beneath a berm 44 feet west of the Loop 303 centerline and approximately 270 feet north of Thomas Road passes drainage in a roadside ditch.
2. Two 24 inch RCP's approximately 100 feet long cross Loop 303 approximately 80 feet north of Thomas Road to pass drainage in a roadside ditch.
3. An 18 inch bituminous coated CSP placed parallel to and approximately 40 feet south of the Thomas Road centerline passes drainage in a roadside ditch beneath a berm directly opposite from Loop 303.
4. A 24 inch RCP placed parallel to and 29 feet north of the Thomas Road centerline conveys drainage from the southerly flowing roadside ditch along the east side of Cotton Lane to the easterly flowing roadside ditch along the north side of Thomas Road. The culvert begins approximately 70 feet north of Thomas along Cotton Lane, heading south 9 feet west of the substation fence line, turning east at the substation fence corner via two 45 degree bends, and heading east to approximately 15 feet east of the substation fence line.

Candidate Assessment Report Number C96-LOOP 303

Average Daily Traffic (ADT) & Accidents:

Average Daily Traffic

1993 ADT	2015 MAG Forecast ADT
2000	14,700

Accidents

1992	1993	1994
1	1	1

One additional accident occurred in the first eight months of 1995. The four accidents show no pattern or consistency other than an element of driver error. As a result, the proposed improvements are not likely to affect the accident rate.

Utilities:

Existing utilities in the project area include power and irrigation facilities. Arizona Public Service (APS) Company's Pima Substation is located in the northeast quadrant of the Cotton Lane / Thomas Road intersection. From this location overhead power lines (12 kv and 69 kv) extend to the north and south along the east side of Cotton Lane, and to the east along the north side of Thomas Road where they cross Loop 303. Power service is supplied to irrigation facilities via service lines and poles in the southeast quadrant of the Cotton Lane / Thomas Road intersection, and on the east side of Cotton Lane approximately one half mile south of Thomas Road (near the Encanto Boulevard alignment).

Irrigation facilities, owned by SunCor Development, consist of a supply canal parallel to and approximately 45 feet south of the Thomas Road centerline. This canal is a combination of concrete lined channel and RCP, with one RCP placed to convey irrigation water beneath a berm directly opposite from Loop 303. Standpipes are located along the irrigation canal approximately 480 feet west of Loop 303 and just behind the curb in the southeast quadrant of the Cotton Lane / Thomas Road intersection. Other facilities in this same quadrant include a pump and above ground piping as well as below ground facilities including a 20 inch concrete pipe crossing Thomas Road beneath a protective concrete slab. Other irrigation facilities include a standpipe on the east side of Cotton Lane approximately one quarter mile south of Thomas Road and a standpipe and pump at the power service approximately one half mile south of Thomas Road.

Candidate Assessment Report Number C96-LOOP 303

Environmental:

No environmental issues were evident on this project during the field review. MCDOT will prepare a separate environmental review report to fully address this issue.

Land Use:

Current land uses in the area are agricultural in nature. The surrounding land is zoned AG for agricultural use. The Arizona State Prison - Perryville is adjacent to the project on the west side of Cotton Lane. Residential growth is expanding toward the project area from the east.

Potential Intergovernmental and Private Development Partners:

An intergovernmental agreement with ADOT may be possible since the project will provide direct access and improvement to an ADOT facility (Loop 303). The project also lies entirely within the limits of the Town of Goodyear, therefore it may be possible to receive participation from them as well.

ALTERNATIVE SOLUTIONS AND EVALUATION

Alternative 1: Do nothing. This alternative will not provide the desired improvement of access to Loop 303 and does not satisfy the project's objective. There is no construction cost associated with this alternative.

Alternative 2: Enhanced Maintenance Alternative. This alternative consists of minor traffic control modifications and limited roadway work. Remove the stop control for southbound Loop 303 at Thomas Road and provide improved turning geometry at the northwest corner by modifying the current radius of 54 feet out to 75 feet. This will allow commercial vehicles to navigate the turn in their own lane and to continue around the corner without coming to a complete stop where there is no conflicting movement.

Construction of this alternative will require extension of the two existing 24 inch RCP's beneath Loop 303, regrading of the roadside ditches in the northwest quadrant and placement of new pavement and base material. The recommended pavement section is 6 inches of asphaltic concrete pavement over 4 inches of aggregate base course to match the Loop 303 pavement section constructed by ADOT. Maintenance of traffic should be limited to shoulder closures.

No irrigation facilities are impacted by this alternative, however, it may be necessary to relocate a power pole carrying 12 kv and 69 kv lines. No additional right-of-way is needed as the improvements are fully within ADOT's existing right-of-way.

Candidate Assessment Report Number C96-LOOP 303

Alternative 3: Low Cost Improvement Alternative. This alternative consists of minor traffic control modifications and moderate paving, drainage and utility work.

At the intersection of Loop 303 and Thomas Road, remove the stop control for southbound traffic and provide improved turning geometry at the northwest corner by modifying the current radius of 54 feet out to 75 feet. At the intersection of Thomas Road and Cotton Lane provide improved operations by adding northbound right-turn and westbound left-turn lanes, providing a 75 foot radius at the southeast corner, and modify the stop control to affect the traffic to and from the north leg of Cotton Lane only. This will allow commercial vehicles to navigate the turns in their own lane and to continue around the corners without coming to a complete stop.

Construction of this alternative will require extension of the two existing 24 inch RCP's beneath Loop 303, regrading of the roadside ditches in the northwest quadrant and placement of new pavement and base material. It may be necessary to relocate a power pole carrying 12 kv and 69 kv lines that is located in this quadrant. The recommended pavement section for all new pavement is 6 inches of asphaltic concrete pavement over 4 inches of aggregate base course to match the Loop 303 pavement section constructed by ADOT. Maintenance of traffic should be limited to shoulder closures and minor lane shifts, with possible short term full closures for restriping.

The turn lane additions and larger turning radius in the southeast quadrant of Thomas Road and Cotton Lane will require extensive relocation of utilities. Irrigation impacts include two standpipes, a pump and piping above ground and RCP located below ground. Power impacts include one or more poles carrying 12 kv and 69 kv lines along Cotton Lane and service to the irrigation facilities. (All improvements must be kept in this quadrant to avoid impacting the APS substation.) The irrigation company is expected to have prior rights, resulting in the County funding all relocation efforts. No additional right-of-way is needed for this alternative as the improvements are fully within ADOT's existing right-of-way.

Alternative 4: Full Improvement Alternative. This alternative consists of the addition of a new extension of Loop 303 south of Thomas Road and reconstruction of the Loop 303/Thomas Road/Cotton Lane connection. The design speed for Loop 303 is 65 mph, and for the Cotton Lane connector is 50 mph. All designs are for possible ice conditions (0.08 foot per foot maximum superelevation).

From the existing southern terminus of Loop 303, construct a southerly extension of the roadway with MCDOT standard typical (34 feet with a 12 foot lane, five foot paved shoulder and seven foot graded shoulder in each direction) and pavement structural sections (six inches of asphaltic concrete pavement over four inches of aggregate base course). The extension roadway will begin a 3° 30' curve to the west immediately south of existing Thomas Road. This curve will be between 900 and 1200 feet long,

Candidate Assessment Report Number C96-LOOP 303

transitioning into a tangent that must exceed 444 feet long. Another 3° 30' long curve back to the east (between 900 and 1200 feet long) will connect the transition into Cotton Lane approximately one half mile south of existing Thomas Road.

The new connector for the northern leg of Cotton Lane will intersect the new Loop 303 at the midpoint of the tangent to provide the greatest horizontal sight distance possible in both directions (> 1000 feet). This connector will match the proposed Loop 303 typical and pavement structural sections and will be stop controlled at Loop 303. From its perpendicular intersection with Loop 303, the connector proceeds northwesterly approximately 200 feet on a tangent, transitioning into a 7° curve to the north (between 700 and 800 feet long) which intersects the existing Cotton Lane approximately 500 feet south of existing Thomas Road. In order to provide adequate protection for northbound Cotton Lane traffic, a left-turn lane will be provided on Loop 303 at the new Cotton Lane connector.

Once construction of the new roadways is complete, the existing Thomas Road and the segment of existing Cotton Lane between the new Loop 303 and new Cotton Lane connector can be closed to through traffic. Access to these roadways cannot be fully eliminated, as entrance to the APS substation and access to irrigation facilities must be maintained. When Thomas Road is developed to this area in the future, it's intersection with Loop 303 should be designed to accommodate through traffic on Loop 303 with stop conditions on Thomas Road.

New culverts will be requires to pass drainage beneath the Cotton Lane connector and the old Cotton Lane alignment just north of the new Loop 303 / Cotton Lane transition point. Final design of the project will determine if the overhead power line or irrigation standpipe on the east side of Cotton Lane in the transition area will be impacted, however ample opportunity exists in the design process to avoid these facilities. The existing CSP and irrigation RCP on the Loop 303 alignment immediately south of existing Thomas Road may need to be extended based on the final design.

New right-of-way will be needed for approximately 80% of the Loop 303 extension and for all of the Cotton Lane connector. This amounts to approximately nine acres of new right-of-way. The location of the new roadway alignments creates an approximately 4.5 acre island west of the new roadways, and bisects an existing agricultural operation. As a result damages may be due to the property owners.

RECOMMENDED ALTERNATIVE AND DESIGN SPECIFICATIONS

Selected Alternative:

The selected alternative for this project is the full improvement alternative shown above as alternative number 4. This alternative satisfies the need to upgrade Loop 303 access

Candidate Assessment Report Number C96-LOOP 303

in light of ADOT's decision to indefinitely delay the completion of Loop 303. It also revises the access to favor the major traffic movements rather than the minor ones, and provides the maximum level of safety for commercial vehicle traffic by eliminating the right angle turns within the major movements.

MAJOR DESIGN FEATURES

Standard Typical Section:	Rural Minor Collector Road
Design Year:	2015
Design Vehicle:	WB-60
Design Speed:	65 MPH on Loop 303 50 MPH on Cotton Lane
Pavement Design Life:	20 Years
Number of Lanes:	2 (Plus left-turn on NB Loop 303)
Roadway Width:	34 Feet
Intersection Geometrics:	Per MCDOT Roadway Design Manual
Drainage Structures:	Corrugated Steel or Reinforced Concrete Pipes
Standard Right-of-way Requirements:	70 Feet Each Side of Centerline on Loop 303 55 Feet Each Side of Centerline on Cotton Lane
Other:	

Design Exceptions:

None

Survey:

This project will require survey.

Design:

This project will require design.

Construction Cost Estimate:

Cost estimates for the alternatives are attached.

Candidate Assessment Report Number C96-LOOP 303

Design Concept Report (DCR):

A DCR is recommended to determine specific turning lane requirements and the optimal alignment for the extension.

Attachments:

Cost Estimates

Typical Section Sketches

City Limits Map

1" = 200' Bluelines of the Alternatives

Loop 303 (Estrella)
 C96-LOOP 303
 Alternative 2 Cost Estimate

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
107.01100	N.P.D.E.S.	L.S.	1	\$1,500.00	\$1,500.00
110.01000	Mobilization @ 5%	L.S.	1	\$350.00	\$350.00
211.xxxxx	Roadway Embankment	C.Y.	45	\$9.00	\$405.00
301.01000	Subgrade Preparation	S.Y.	65	\$3.00	\$195.00
310.07100	Aggregate Base Course (4")	TON	15	\$15.00	\$225.00
321.02100	A.C. Pavement C-3/4 (6")	TON	25	\$45.00	\$1,125.00
329.07000	Bituminous Tack Coat	TON	1	\$400.00	\$400.00
401.00000	Traffic Control @ 3.5%	L.S.	1	\$250.00	\$250.00
622.00024	24" RCP Pipe Culvert	L.F.	40	\$50.00	\$2,000.00
xxx.xxxxx	Relocate Electric Facilities	L.S.	1	\$1,000.00	\$1,000.00
			Subtotal		\$7,450.00
			Contingency	10%	\$745.00
			Total		\$8,195.00

Loop 303 (Estrella)
 C96-LOOP 303
 Alternative 3 Cost Estimate

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
107.01100	N.P.D.E.S.	L.S.	1	\$2,500.00	\$2,500.00
110.01000	Mobilization @ 5%	L.S.	1	\$5,000.00	\$5,000.00
211.xxxxx	Roadway Embankment	C.Y.	50	\$9.00	\$450.00
301.01000	Subgrade Preparation	S.Y.	1100	\$2.00	\$2,200.00
310.07100	Aggregate Base Course (4")	TON	200	\$12.00	\$2,400.00
321.02100	A.C. Pavement C-3/4 (6")	TON	400	\$40.00	\$16,000.00
329.07000	Bituminous Tack Coat	TON	1	\$400.00	\$400.00
401.00000	Traffic Control @ 3.5%	L.S.	1	\$3,500.00	\$3,500.00
450.01304	4" White Thermoplastic Traffic Stripe	L.F.	1800	\$0.50	\$900.00
450.01404	4" Yellow Thermoplastic Traffic Stripe	L.F.	1000	\$0.50	\$500.00
622.00024	24" RCP Pipe Culvert	L.F.	40	\$50.00	\$2,000.00
xxx.xxxxx	Relocate Irrigation Facilities	L.S.	1	\$70,000.00	\$70,000.00
xxx.xxxxx	Relocate Electric Facilities	L.S.	1	\$1,000.00	\$1,000.00
			Subtotal		\$106,850.00
			Contingency	10%	\$10,685.00
			Total		\$117,535.00

Loop 303 (Estrella)
 C96-LOOP 303
 Alternative 4 Cost Estimate

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
107.01100	N.P.D.E.S.	L.S.	1	\$5,000.00	\$5,000.00
110.01000	Mobilization @ 5%	L.S.	1	\$17,500.00	\$17,500.00
211.xxxxx	Roadway Embankment	C.Y.	16,500	\$7.00	\$115,500.00
301.01000	Subgrade Preparation	S.Y.	15,400	\$1.00	\$15,400.00
310.07100	Aggregate Base Course (4")	TON	2,700	\$10.00	\$27,000.00
321.02100	A.C. Pavement C-3/4 (6")	TON	5,200	\$30.00	\$156,000.00
329.07000	Bituminous Tack Coat	TON	5	\$350.00	\$1,750.00
336.08100	Pavement Sawcut	L.F.	50	\$2.00	\$100.00
401.00000	Traffic Control @ 3.5%	L.S.	1	\$12,000.00	\$12,000.00
450.01304	4" White Thermoplastic Traffic Stripe	L.F.	8,200	\$0.30	\$2,460.00
450.01404	4" Yellow Thermoplastic Traffic Stripe	L.F.	8,000	\$0.30	\$2,400.00
622.00024	24" RCP Pipe Culvert	L.F.	200	\$50.00	\$10,000.00
xxx.xxxxx	Relocate Irrigation Facilities	L.S.	1	\$15,000.00	\$15,000.00
xxx.xxxxx	Relocate Electric Facilities	L.S.	1	\$1,000.00	\$1,000.00
			Subtotal		\$381,110.00
			Contingency	10%	\$38,111.00
	Right-of-Way	Acre	13.5	\$15,000.00	\$202,500.00
			Total		\$621,721.00

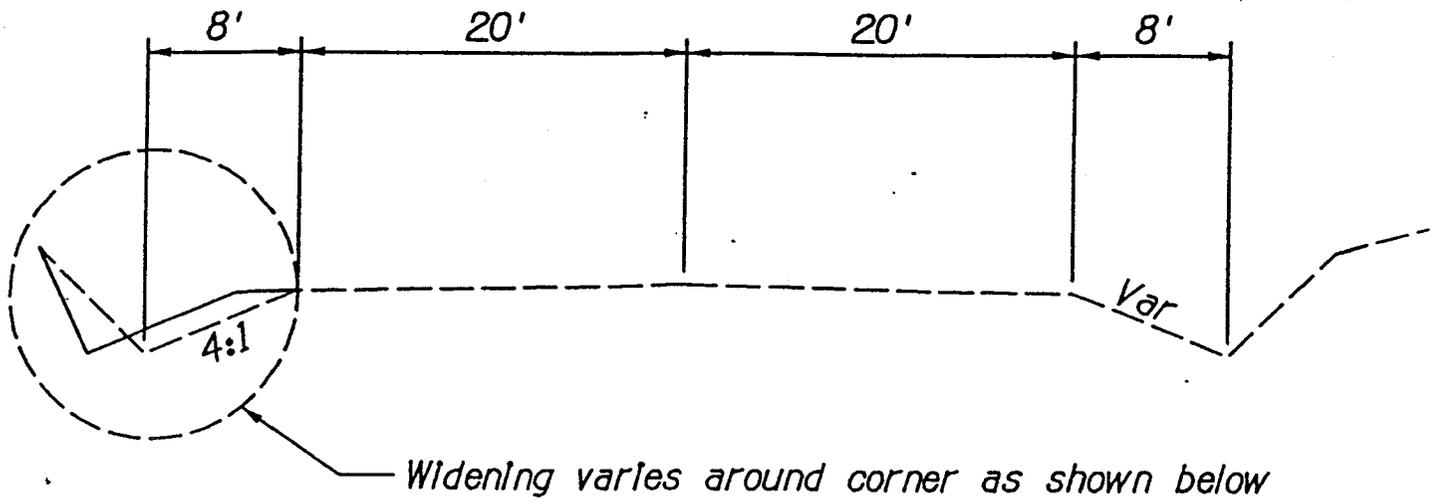
Loop 303 (Estrella)
C96-LOOP 303
Alternative 2 Full Cost Estimate

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
107.01100	N.P.D.E.S.	L.S.	1	\$1,500.00	\$1,500.00
110.01000	Mobilization @ 5%	L.S.	1	\$350.00	\$350.00
211.xxxxx	Roadway Embankment	C.Y.	45	\$9.00	\$405.00
301.01000	Subgrade Preparation	S.Y.	65	\$3.00	\$195.00
310.07100	Aggregate Base Course (4")	TON	15	\$15.00	\$225.00
321.02100	A.C. Pavement C-3/4 (6")	TON	25	\$45.00	\$1,125.00
329.07000	Bituminous Tack Coat	TON	1	\$400.00	\$400.00
401.00000	Traffic Control @ 3.5%	L.S.	1	\$250.00	\$250.00
622.00024	24" RCP Pipe Culvert	L.F.	40	\$50.00	\$2,000.00
xxx.xxxxx	Relocate Electric Facilities	L.S.	1	\$1,000.00	\$1,000.00
				Subtotal	\$7,450.00
				Contingency	10% \$745.00
				Construction Total	\$8,195.00
				Design	10% \$819.50
				Construction Management	13% \$1,065.35
				Administration	12% \$983.40
				Total	\$11,063.25

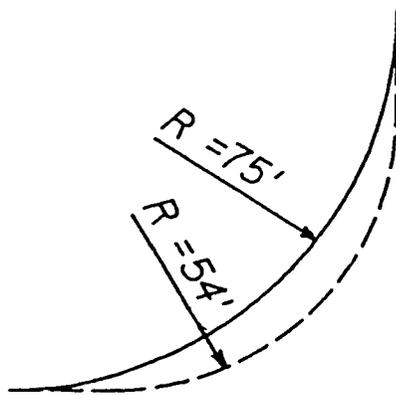
Loop 303 (Estrella)
 C96-LOOP 303
 Alternative 3 Full Cost Estimate

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
107.01100	N.P.D.E.S.	L.S.	1	\$2,500.00	\$2,500.00
110.01000	Mobilization @ 5%	L.S.	1	\$5,000.00	\$5,000.00
211.xxxxx	Roadway Embankment	C.Y.	45	\$9.00	\$405.00
301.01000	Subgrade Preparation	S.Y.	1100	\$2.00	\$2,200.00
310.07100	Aggregate Base Course (4")	TON	200	\$12.00	\$2,400.00
321.02100	A.C. Pavement C-3/4 (6")	TON	400	\$40.00	\$16,000.00
329.07000	Bituminous Tack Coat	TON	1	\$400.00	\$400.00
401.00000	Traffic Control @ 3.5%	L.S.	1	\$3,500.00	\$3,500.00
450.01304	4" White Thermoplastic Traffic Stripe	L.F.	1800	\$0.50	\$900.00
450.01404	4" Yellow Thermoplastic Traffic Stripe	L.F.	1000	\$0.50	\$500.00
622.00024	24" RCP Pipe Culvert	L.F.	40	\$50.00	\$2,000.00
xxx.xxxxx	Relocate Irrigation Facilities	L.S.	1	\$70,000.00	\$70,000.00
xxx.xxxxx	Relocate Electric Facilities	L.S.	1	\$1,000.00	\$1,000.00
				Subtotal	\$106,805.00
				Contingency	10% \$10,680.50
				Construction Total	\$117,485.50
				Design	10% \$11,748.55
				Construction Management	13% \$15,273.12
				Administration	12% \$14,098.26
				Total	\$158,605.43

LOOP 303 (ESTRELLA FREEWAY)
ALTERNATIVE NO. 2
TYPICAL SECTION

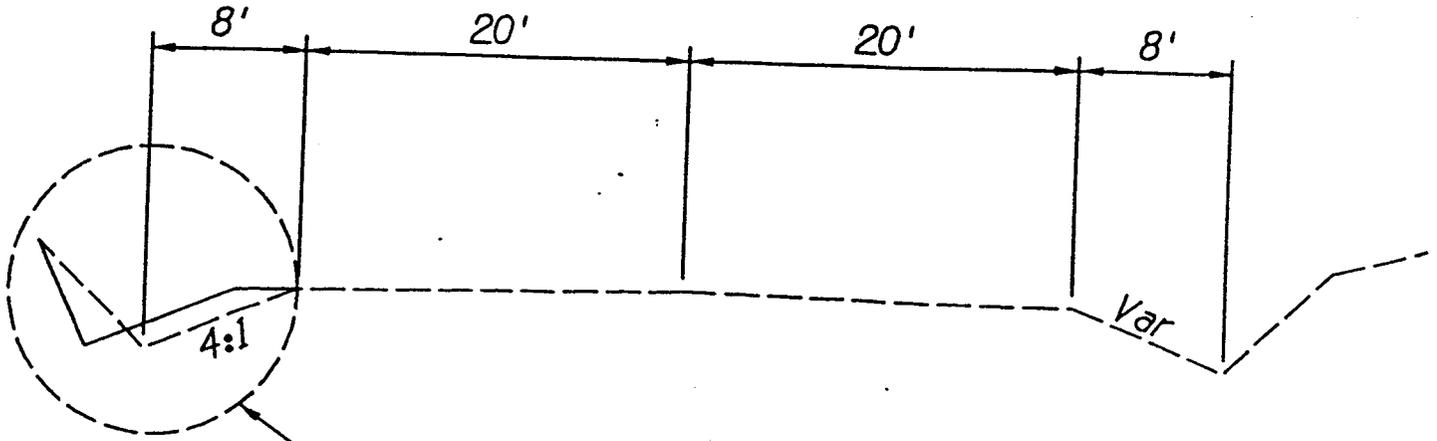


THOMAS ROAD at LOOP 303
(Looking Eastbound)



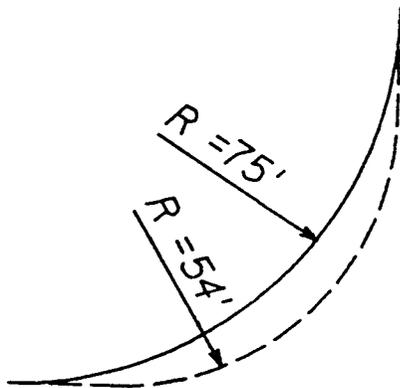
PLAN AT WIDENING

LOOP 303 (ESTRELLA FREEWAY)
ALTERNATIVE NO. 3
TYPICAL SECTION



Widening varies around corner as shown below

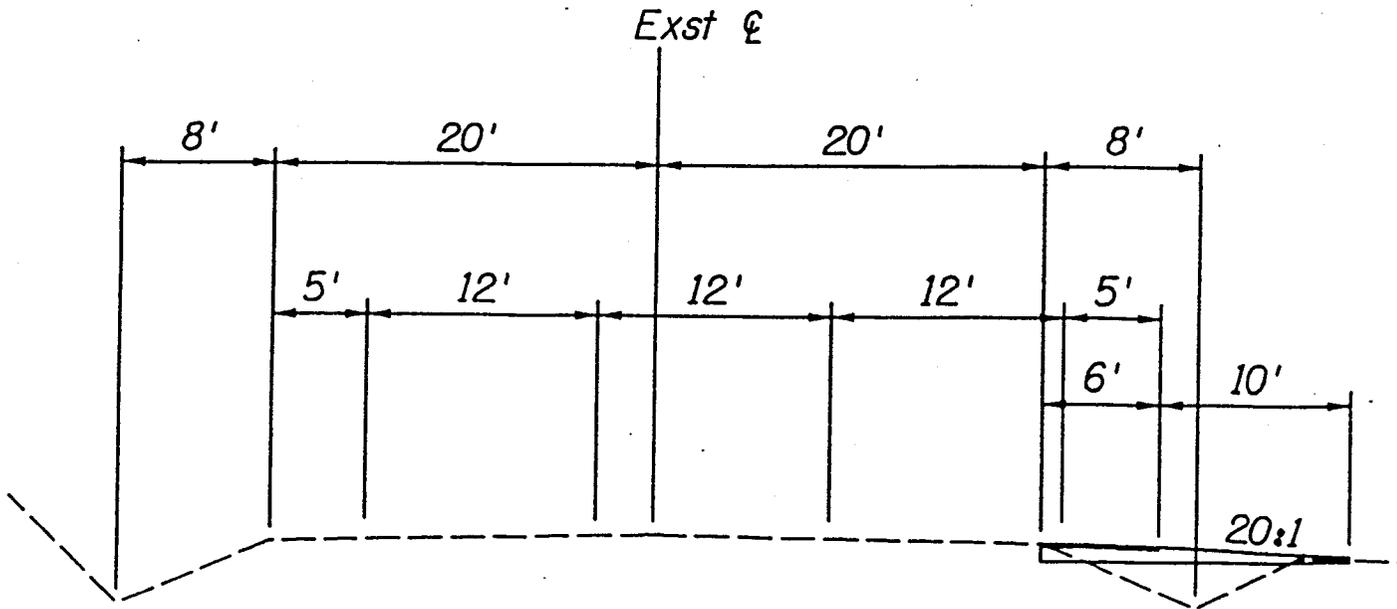
THOMAS ROAD
(Looking Eastbound)



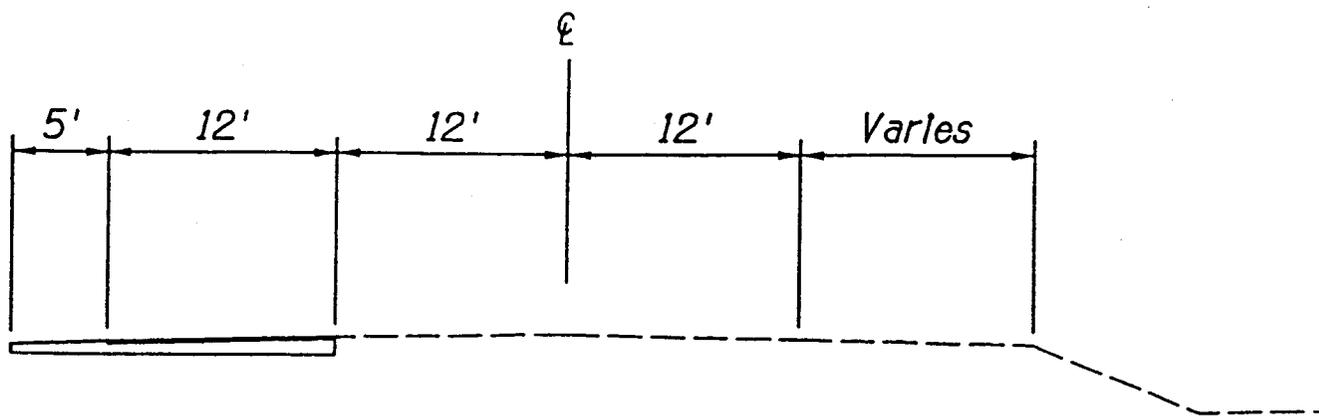
PLAN AT WIDENING



LOOP 303 (ESTRELLA FREEWAY)
 ALTERNATIVE NO. 3
 TYPICAL SECTIONS

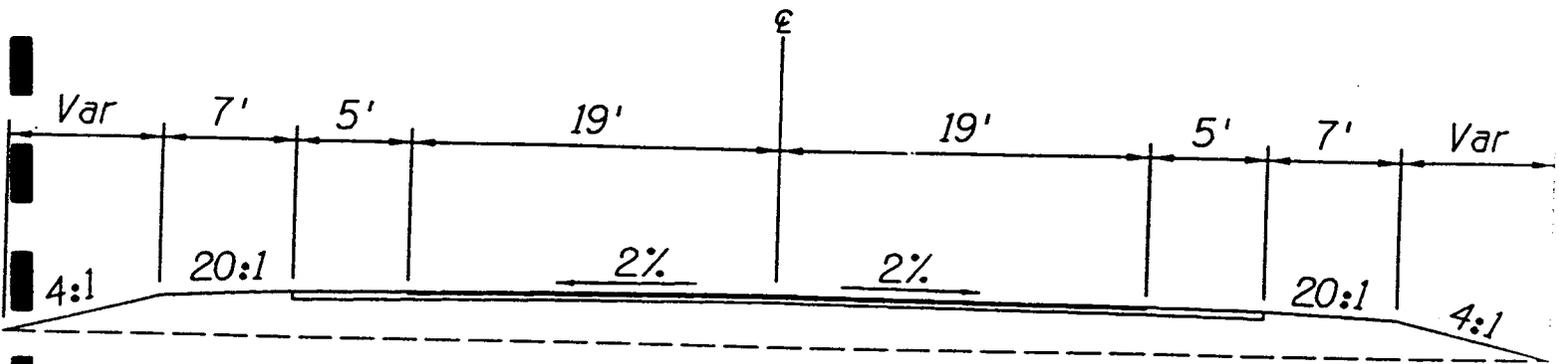
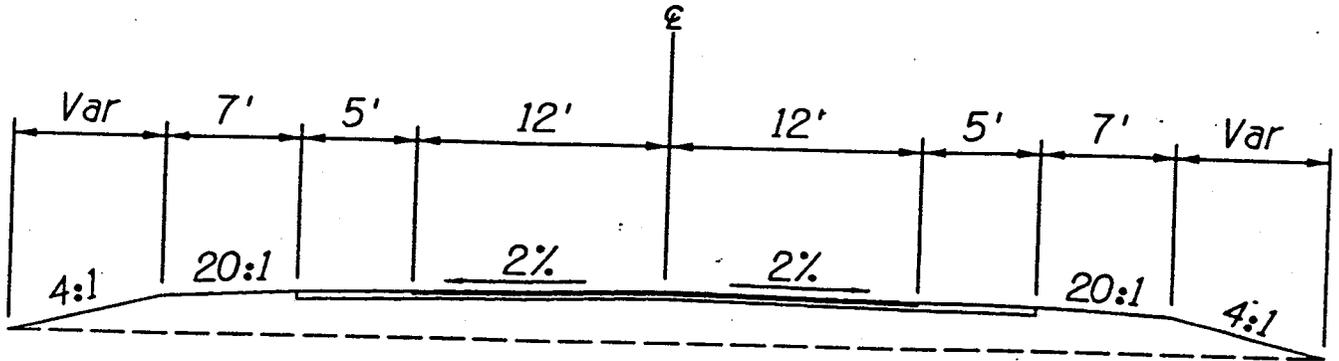


THOMAS ROAD at COTTON LANE
 (Looking Eastbound)

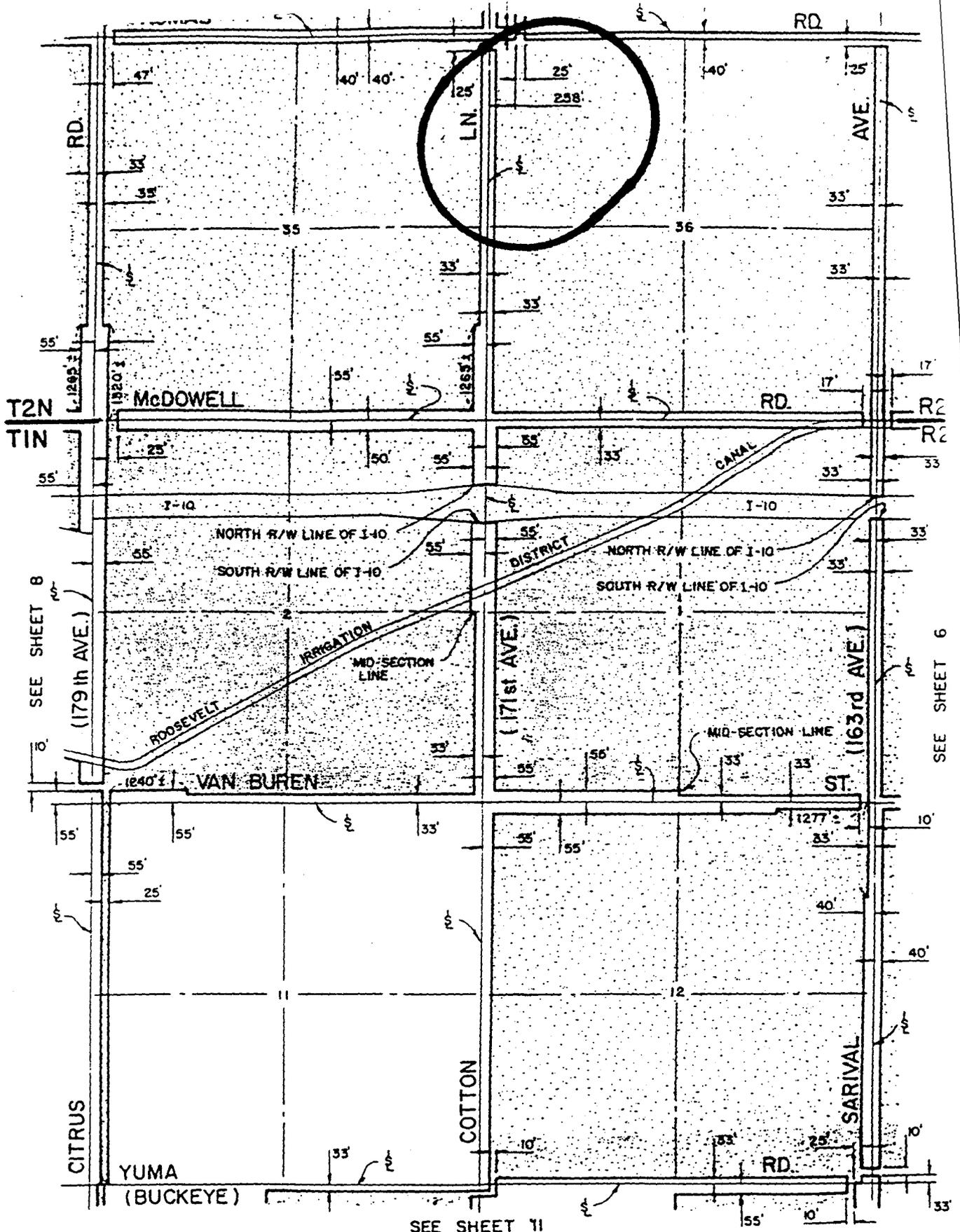


COTTON LANE
 (Looking Northbound)

LOOP 303 (ESTRELLA FREEWAY)
ALTERNATIVE NO. 4
TYPICAL SECTIONS



WIDENED FOR LEFT TURN LANE



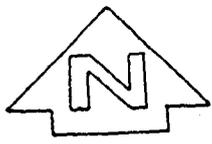
SEE SHEET 8
(179th AVE.)

SEE SHEET 6

SEE SHEET 11

GOODYEAR
TIN & T2N-R2W

7



This city limit sheet is to be used as a GUIDE ONLY!
Maricopa County will not be responsible for errors
or omissions that might occur.

ORD NO	LAST EFF ANNEX DATE	REV BY
89-284	SEPT. 7, 1989	R.N.
92-469	OCT. 22, 1992	R.N.

LOOP 303 (ESTRELLA FWY)
ALTERNATIVE #3



LOOP 303

APS SUBSTATION

24" CSP

2-24" RCP's

18" CSP

24" CSP

NOTE: RELOCATE IRRIGATION FACILITIES

SCALE: 1" = 200'

SHOFTON LANE

1998 UPDATE
CANDIDATE ASSESSMENT REPORT
LOOP 303 INTERIM
McDOWELL ROAD TO THOMAS ROAD
LOCATION & COST REVISIONS

Thomas J. Phelan III
THOMAS J. PHELAN, III
2/12/98
ALABAMA, U.S.A.

1998 UPDATE

CANDIDATE ASSESSMENT REPORT

LOOP 303 INTERIM

McDOWELL ROAD TO THOMAS ROAD

LOCATION AND COST REVISIONS

BACKGROUND

The original Candidate Assessment Report prepared in 1996 identified a limited improvement alternative which primarily addressed problems associated with the Interim Loop 303 and Thomas Road intersection. During a review of this CAR in 1997 it was observed that the Consultant did not take into account the availability of existing ADOT Loop 303 right-of-way south of Thomas Road. The right-of-way was identified and an improvement utilizing the right-of-way was developed.

Also in 1997 an Estrella (Loop 303) Corridor Study was undertaken by MCDOT. This study is nearing completion. The title page, traffic volumes and proposed interim and final cross sections from the December 1997 Draft Study are included herein.

New traffic counts were taken in 1998 and an accident rate computed based on data obtained from ADOT databases.

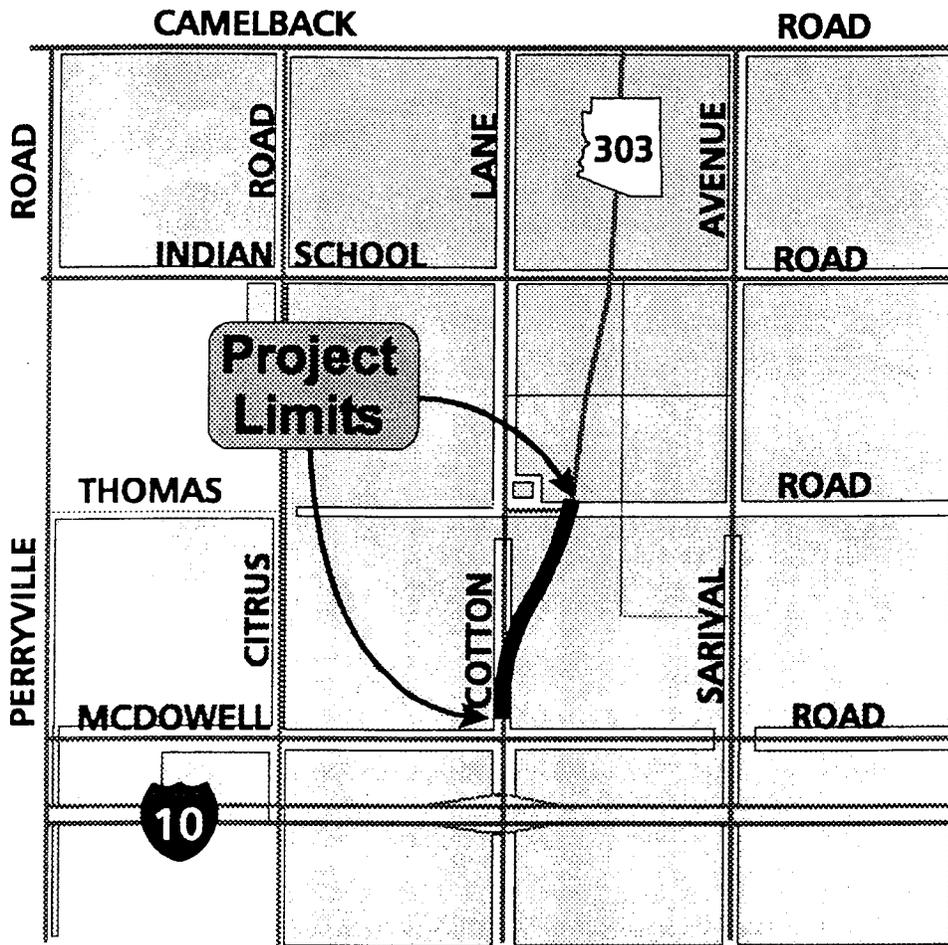
COST AND LOCATION REVISIONS

The revised location provides for a direct connection between the Cotton Lane and McDowell Road intersection and the existing 303 alignment north of Thomas Road.. The curves have been made with larger radii and the majority of the alignment has been placed within the ADOT right-of-way.

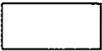
On the enclosed drawings a 110 foot interim right-of-way is shown. No regional drainage solutions are proposed and heavy surface flooding may pass over the proposed road in some locations.

LOOP 303

McDowell Rd to Thomas Rd



LEGEND

-  Goodyear
-  County
-  ADOT Right-of-Way 90% Acquired



R.W.
2/15/97

A two lane, major rural collector interim road is shown which will solve a majority of the geometric problems associated with the existing road. In the concept developed Cotton Lane would not connect directly to the Loop 303 improvement. Access to Cotton Lane would be at Thomas Road.

Considering the current growth rate of truck and other vehicle traffic the interim section may be adequate until approximately 2003. It appears that a four lane improvement will be necessary for 2004 and beyond. With the construction of the four lane arterial the overall drainage concept should be finalized for the area.

The summary cost sheets, conceptual two lane road plan, supplementary traffic and DCR information are included in this update.

SUMMARY COST

Project Name & Termini: Loop 303 - McDowell Road to Thomas Road
 CAR No. or Work Order No. C96-LOOP303

1997 CAR PRELIMINARY SUMMARY COST ESTIMATES (Current Dollars)

<i>COST CATAGORIES</i>	<i>Factors</i>	<i>No Build</i>	<i>Low Cost Alternative</i>	<i>Full Cost Alternative</i>
<i>Construction</i>		\$0	\$0	\$623,489
<i>Design (10% TO 15%)</i>	10%	\$0	\$0	\$62,349
<i>Construction Management</i>	13%	\$0	\$0	\$81,054
<i>Right-of-Way</i>		\$0	\$0	\$6,500
<i>Utility Relocation</i>		\$0	\$0	\$35,000
<i>Administration (8% TO 13%)</i>	8%	\$0	\$0	\$49,879
Total		\$0	\$0	\$858,271

1997 CAR ROAD CONSTRUCTION COST WORK SHEET						
Loop 303 - McGrawell Road to Thomas Road						
Alternative: <u>Grade, Drain & Pave (or Penetrate & Chip)</u>						
Item #	Description	Unit	Quantity	Unit Cost	Total	
107.01100	NPDES	L.S.	1	\$1,500.00	\$1,500.00	
107.09200	Community Relations	Allowance	1	\$5,000.00	\$5,000.00	
205.03000	Roadway Excavation	CM	900	\$4.00	\$3,600.00	
210.04200	Borrow Excavation (If anticipated)	CM	7,300	\$7.25	\$52,925.00	
215.00000	Channel & Retention Basin Excavation	CM	0	\$6.00	\$0.00	
	New Asphalt Pavement (See Pavement Sheet)	SQ M	19,900	\$19.65	\$391,035.00	
	Asphalt Concrete 50 mm Overlay (See Pavement Sht)	SQ M		\$4.75	\$0.00	
	Penetration and Chip Seal on Base Material (See Pav)	SQ M		\$8.40	\$0.00	
	Chip Seal Surface on Pavement (See Pavement Sht)	SQ M	2,000	\$1.15	\$2,300.00	
336.08100	Pavement Sawcut	M	60	\$4.50	\$270.00	
340.01020	Single Curb	M		\$32.00	\$0.00	
340.01120	Conc C & G.	M		\$30.00	\$0.00	
	Conc S/W Ramp Std Det 231 Type "A"	EA		\$700.00	\$0.00	
340.06950	Concrete Sidewalk Std Det 230	SQ M		\$22.00	\$0.00	
340.09750	Concrete Driveway w/5' Wings, Std, Det. 250	SQ M		\$40.00	\$0.00	
350.01110	Removal of Existing Improvements	L.S.	1	\$15,000.00	\$15,000.00	
402.00000	Traffic Signing & Striping - 2 lanes	M	1,800	\$3.20	\$5,760.00	
402.00000	Traffic Signing & Striping - 5 lanes	M		\$5.80	\$0.00	
402.00000	Traffic Signing & Striping - 7 lanes	M		\$8.20	\$0.00	
402.00000	Traffic Signal, Full Intersection	EA		\$90,000.00	\$0.00	
402.00000	Interconnect/Traffic Signals	M		\$25.00	\$0.00	
402.00000	Traffic Signal, Future "Box-in"	EA	1	\$4,900.00	\$4,900.00	
	Curb Opening to Side Median (1 M Length)	EA		\$30.00	\$0.00	
505.06125	Catch Basin	EA		\$2,300.00	\$0.00	
510.03010	Scupper with 1 M to 2 M down drain	EA		\$1,500.00	\$0.00	
	Drywell	EA		\$7,000.00	\$0.00	
618.02318	460 mm (18") CMP	M		\$80.00	\$0.00	
618.02318	460 mm (18") RGRCP, Class III	M		\$120.00	\$0.00	
618.02324	610 mm (24") RGRCP, Class III	M	120	\$145.00	\$17,400.00	
618.02336	760 mm & 910 mm (30" & 36") RGRCP, Class III	M		\$195.00	\$0.00	
618.02348	1060 mm & 1220 mm (42" & 48") RGRCP, Class III	M		\$250.00	\$0.00	
618.02348	1370 mm & 1520 mm (54" & 60") RGRCP, Class III	M		\$300.00	\$0.00	
625.00000	1370 mm & 1520 mm Storm Drain/Irrigation Manhole	EA		\$3,200.00	\$0.00	
	Headwall, 460 mm to 910 mm Pipe (MAG Details)	EA		\$1,650.00	\$0.00	
	Headwall, 1060 mm to 1520 mm Pipe (MAG Details)	EA		\$3,200.00	\$0.00	
	Irrigation Headwall w/ Trashrack (Inlet)	EA		\$2,800.00	\$0.00	
	Irrigation Junction Box (MAG Details)	EA		\$2,500.00	\$0.00	
	Concrete Slip Form Irrigation Ditch	M		\$75.00	\$0.00	
	Earth Irrigation Ditch/Special Drainage Ditch, 6' Top	M		\$30.00	\$0.00	
	Irrigation Structure w/ Gates	EA		\$7,500.00	\$0.00	
	Box Culvert (See Structure Sheet)	EA		\$0.00	\$0.00	
	Bridge < 100' (See Structure Sheet)	EA		\$0.00	\$0.00	
	Bridge > 100' (See Structure Sheet)	EA		\$0.00	\$0.00	
220.01400	Plain Riprap	CM		\$50.00	\$0.00	
415.00000	Guardrail without approach end section	M		\$75.00	\$0.00	
	Guardrail Approach End Section	EA		\$3,500.00	\$0.00	
	Median Fine Grading, Pre-emergent Treatment & D.G.	SM		\$22.00	\$0.00	
Subtotal					\$499,690	
110.01000	Mobilization @ 5%	L.S.	1	\$24,985.00	\$24,985.00	
401.00000	Traffic Control @ 3.5%	L.S.	1	\$17,489.00	\$17,489.00	
Subtotal Construction					\$542,164	
				Contingency	15%	\$81,325
Total					\$623,489	

Pavement

Unit Cost Derivation for Arterial Section Shown:		Metric	Actual	Used	See
7	Aggregate Base Thickness 100 mm	100mm	3.937"	4"	Computations Below
	Asphalt Concrete Thickness 150 mm	150 mm	5.906"	6"	
Item	Description	Unit	Quantity	Unit Cost	Total
310.07100	Aggregate Base (4")	Ton	0.2100	\$10.00	\$2.10
315.07000	Bituminous Prime Coat (0.4 gal per SY)	Ton	0.0016	\$300.00	\$0.48
	Tack Coat	SY	1	\$0.16	\$0.16
321.03100	Asphalt Concrete, C 3/4 (6")	Ton	0.3290	\$33.70	\$11.09
333.07100	Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	\$285.00	\$0.11
301.02000	Subgrade Preparation (Under new pavement only)	SY	1	\$2.50	\$2.50
	Pavement and Subgrade Preparation Cost Per SY				\$16.44
	Pavement and Subgrade Preparation Cost Per SQ M				\$19.66
Rounded	Unit Cost Per SQ M for 150 mm over 100 mm			Total	\$19.65

Calculated at 1.89 tons per CY for 1 SY of 4" AB (.0210 tons/SY)
 Calculated at 8.0 lbs per gal for 1 SY of Prime (0.0016 Tons/SY)
 Calculated at 1.97 Tons per CY for 1 SY of 6" AC (0.329 Tons/ SY)
 Calculated at 8.3 lbs per gal for 1 SY of Fog (0.0004 Tons/SY)
 Variable; this work includes constructing fill sections and misc grading.

Sounded by: SCOTT & DAVID
 Board # :
 Other :

MARICOPA COUNTY
 DEPARTMENT OF TRANSPORTATION
 2901 W DURANGO ST
 PHOENIX AZ 85009

Site Code : 0000000000
 Start Date: 02/09/98
 File I.D. : P6888433

Street name : COTTON LANE Cross street: S/O THOMAS RD Direction 1 Page : 1

Time	Mon. 02/09	Tues. 02/10	Wed. 02/11	Thur. 02/12	Fri. 02/13	Weekday Avg.	Sat. 02/14	Sun. 02/15	Week Avg. Each * Equals 25 Vehicles
12:00 am	*	*	*	*	129	129	*	*	129 *****
1:00	*	*	*	*	88	88	*	*	88 *****
2:00	*	*	*	*	55	55	*	*	55 **
3:00	*	*	*	*	59	59	*	*	59 **
4:00	*	*	*	*	92	92	*	*	92 *****
5:00	*	*	*	*	189	189	*	*	189 *****
6:00	*	*	*	*	345	345	*	*	345 *****
7:00	*	*	*	*	566	566	*	*	566 *****
8:00	*	*	*	*	434	434	*	*	434 *****
9:00	*	*	*	373	*	373	*	*	373 *****
10:00	*	*	*	452	*	452	*	*	452 *****
11:00	*	*	*	402	*	402	*	*	402 *****
12:00 pm	*	*	*	420	*	420	*	*	420 *****
1:00	*	*	*	396	*	396	*	*	396 *****
2:00	*	*	*	479	*	479	*	*	479 *****
3:00	*	*	*	460	*	460	*	*	460 *****
4:00	*	*	*	584	*	584	*	*	584 *****
5:00	*	*	*	528	*	528	*	*	528 *****
6:00	*	*	*	518	*	518	*	*	518 *****
7:00	*	*	*	344	*	344	*	*	344 *****
8:00	*	*	*	278	*	278	*	*	278 *****
9:00	*	*	*	191	*	191	*	*	191 *****
10:00	*	*	*	193	*	193	*	*	193 *****
11:00	*	*	*	159	*	159	*	*	159 *****
Totals	0	0	0	5777	1957	7734	0	0	7734

Avg. WkDa .0% .0% .0% 74.7% 25.3%
 Avg. Day .0% .0% .0% 74.7% 25.3%

Peak Volume 10:00 07:00 07:00
 452 566 566

Peak Volume 04:00 04:00 04:00
 584 584 584

OTs

MARICOPA COUNTY
 DEPARTMENT OF TRANSPORTATION
 2901 W DURANGO ST
 PHOENIX AZ 85009

Site Code : 0000000000
 Start Date: 02/09/98
 File I.D. : P6888422

Contract # :
 Contracted by: SCOTT & DAVID
 Board # :
 Other :

Street name THOMAS RD Cross street: E/O COTTON LANE Direction 1 Page : 1

Time	Mon. 02/09	Tues. 02/10	Wed. 02/11	Thur. 02/12	Fri. 02/13	Weekday Avg.	Sat. 02/14	Sun. 02/15	Week Avg. Each * Equals 25 Vehicles
01:00 am	*	*	*	*	110	110	*	*	110 ****
02:00	*	*	*	*	72	72	*	*	72 ***
03:00	*	*	*	*	32	32	*	*	32 *
04:00	*	*	*	*	55	55	*	*	55 **
05:00	*	*	*	*	70	70	*	*	70 ***
06:00	*	*	*	*	144	144	*	*	144 *****
07:00	*	*	*	*	217	217	*	*	217 *****
08:00	*	*	*	*	375	375	*	*	375 *****
09:00	*	*	*	*	299	299	*	*	299 *****
10:00	*	*	*	266	*	266	*	*	266 *****
11:00	*	*	*	320	*	320	*	*	320 *****
12:00	*	*	*	265	*	265	*	*	265 *****
01:00 pm	*	*	*	299	*	299	*	*	299 *****
02:00	*	*	*	282	*	282	*	*	282 *****
03:00	*	*	*	340	*	340	*	*	340 *****
04:00	*	*	*	332	*	332	*	*	332 *****
05:00	*	*	*	370	*	370	*	*	370 *****
06:00	*	*	*	314	*	314	*	*	314 *****
07:00	*	*	*	315	*	315	*	*	315 *****
08:00	*	*	*	207	*	207	*	*	207 *****
09:00	*	*	*	182	*	182	*	*	182 *****
10:00	*	*	*	145	*	145	*	*	145 *****
11:00	*	*	*	145	*	145	*	*	145 *****
12:00	*	*	*	108	*	108	*	*	108 ****
Totals	0	0	0	3890	1374	5264	0	0	5264

Avg. WkDa .0% .0% .0% 73.9% 26.1%
 Avg. Day .0% .0% .0% 73.9% 26.1%

Peak 10:00 07:00 07:00 07:00
 Volume 320 375 375 375
 Peak 04:00 04:00 04:00 04:00
 Volume 370 370 370 370

Is

MARICOPA COUNTY
 DEPARTMENT OF TRANSPORTATION
 2901 W DURANGO ST
 PHOENIX AZ 85009

Site Code : 0000000000

Start Date: 02/09/98

File I.D. : P688844

Page : 1

Printer :
 Printed by: SCOTT & DAVID
 Board # :
 Other :

Street name: COTTON LANE Cross street: N/O THOMAS RD Direction 1

	Mon.	Tues.	Wed.	Thur.	Fri.	Weekday	Sat.	Sun.	Week
	02/09	02/10	02/11	02/12	02/13	Avg.	02/14	02/15	Avg. Each * Equals 25 Vehicles
00:00 am	*	*	*	*	27	27	*	*	27 *
01:00	*	*	*	*	16	16	*	*	16 *
02:00	*	*	*	*	18	18	*	*	18 *
03:00	*	*	*	*	9	9	*	*	9
04:00	*	*	*	*	26	26	*	*	26 *
05:00	*	*	*	*	73	73	*	*	73 ***
06:00	*	*	*	*	152	152	*	*	152 *****
07:00	*	*	*	*	220	220	*	*	220 *****
08:00	*	*	*	*	135	135	*	*	135 *****
09:00	*	*	*	133	*	133	*	*	133 *****
10:00	*	*	*	150	*	150	*	*	150 *****
11:00	*	*	*	150	*	150	*	*	150 *****
12:00 pm	*	*	*	123	*	123	*	*	123 *****
01:00	*	*	*	134	*	134	*	*	134 *****
02:00	*	*	*	160	*	160	*	*	160 *****
03:00	*	*	*	155	*	155	*	*	155 *****
04:00	*	*	*	214	*	214	*	*	214 *****
05:00	*	*	*	208	*	208	*	*	208 *****
06:00	*	*	*	202	*	202	*	*	202 *****
07:00	*	*	*	136	*	136	*	*	136 *****
08:00	*	*	*	83	*	83	*	*	83 ***
09:00	*	*	*	59	*	59	*	*	59 **
10:00	*	*	*	51	*	51	*	*	51 **
11:00	*	*	*	45	*	45	*	*	45 **
Totals	0	0	0	2003	676	2679	0	0	2679

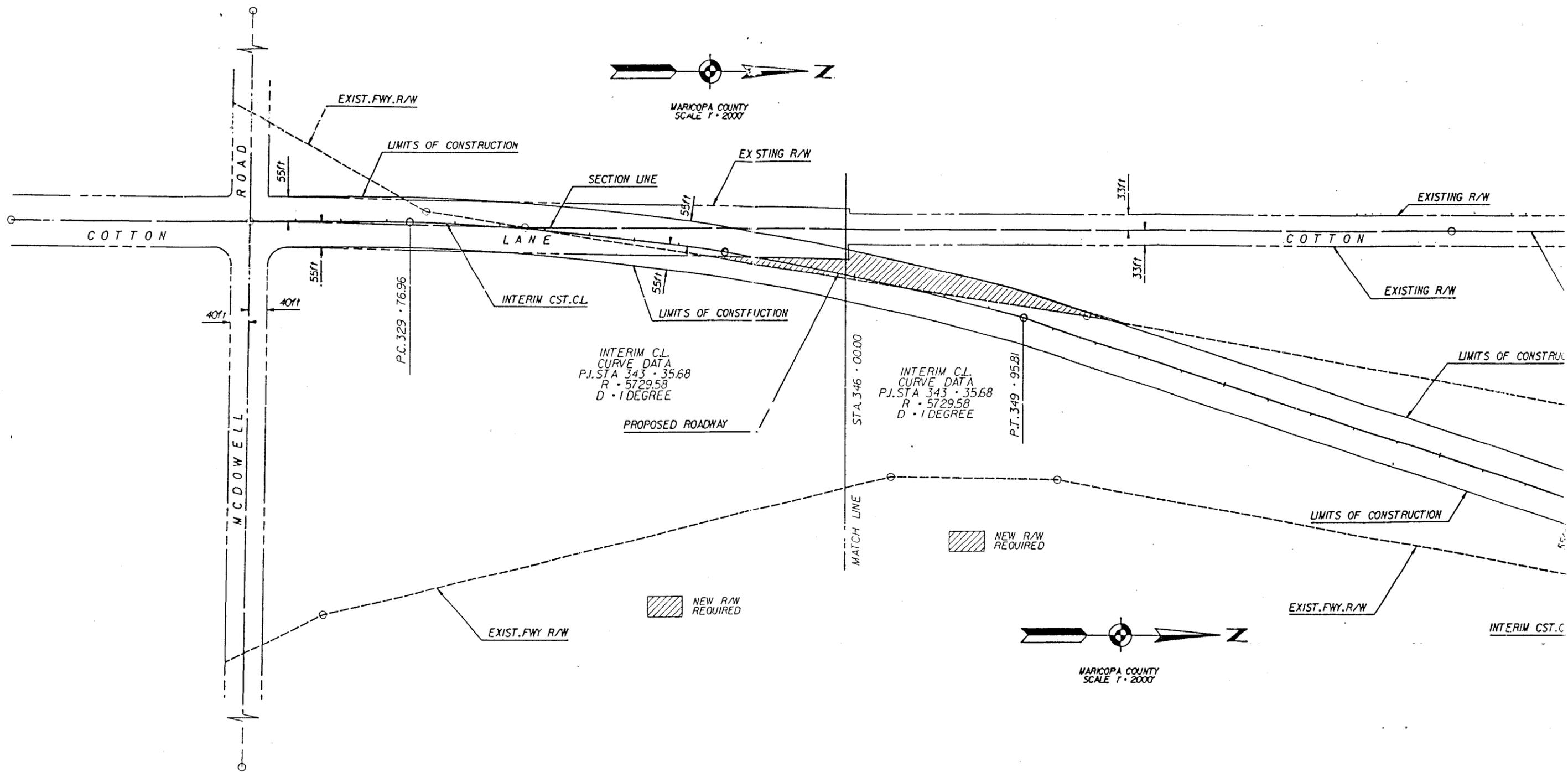
Avg. WkDa	.0%	.0%	.0%	74.7%	25.2%		.0%	.0%	
Avg. Day	.0%	.0%	.0%	74.7%	25.2%		.0%	.0%	

Peak				10:00	07:00	07:00			07:00
Volume				150	220	220			220
Peak				04:00		04:00			04:00
Volume				214		214			214

OTs



MARKOPA COUNTY
SCALE 1" = 2000'



INTERIM C.L.
CURVE DATA
P.I. STA 343 + 35.68
R = 5729.58
D = 1 DEGREE

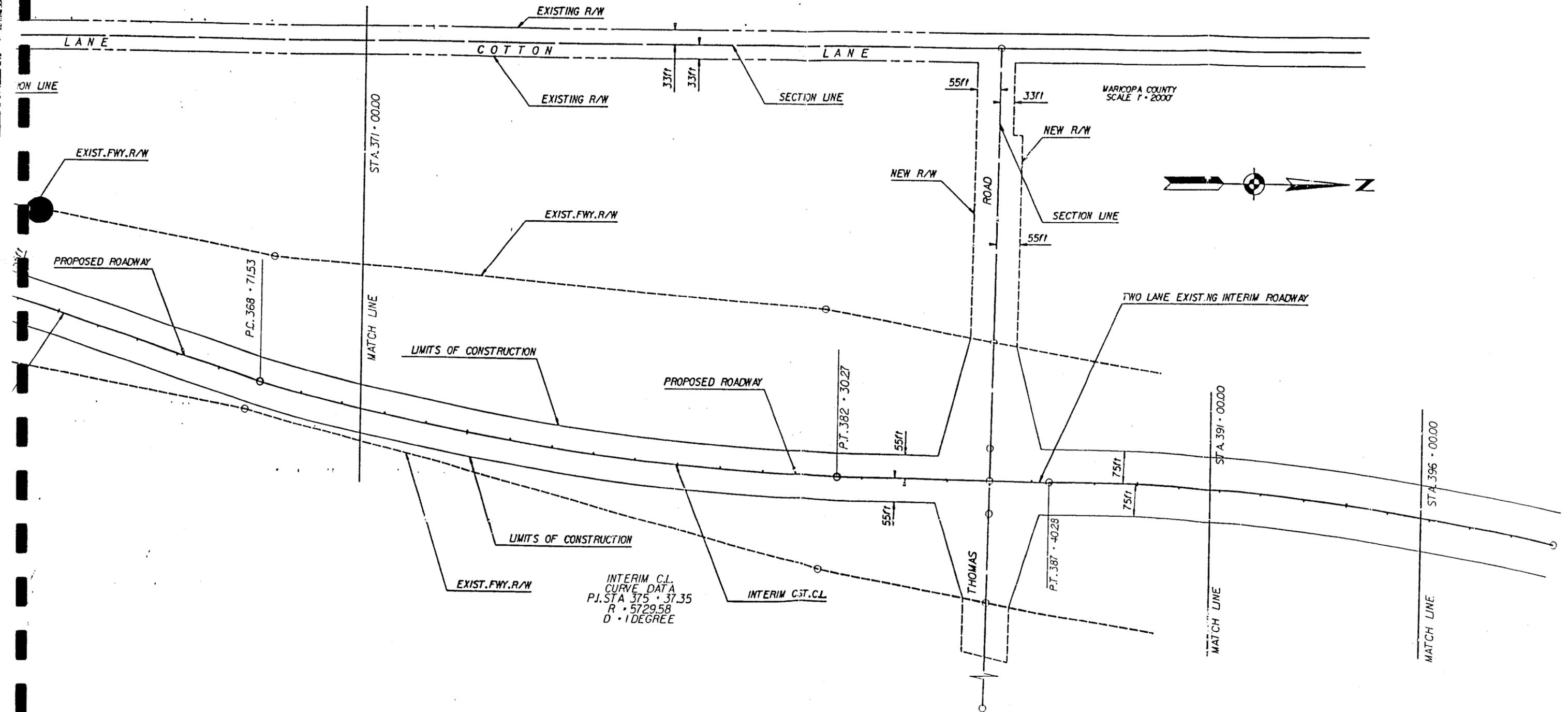
INTERIM C.L.
CURVE DATA
P.I. STA 343 + 35.68
R = 5729.58
D = 1 DEGREE

 NEW R/W
REQUIRED

 NEW R/W
REQUIRED



MARKOPA COUNTY
SCALE 1" = 2000'



MARKOPA COUNTY
SCALE 1" = 2000'



ESTRELLA CORRIDOR STUDY

MC 85 to Interstate 17

DRAFT REPORT

December 1997



**Maricopa County
Department of Transportation**

CONTRACT NO. CY 1997-14
WORK ORDER NO. 80505

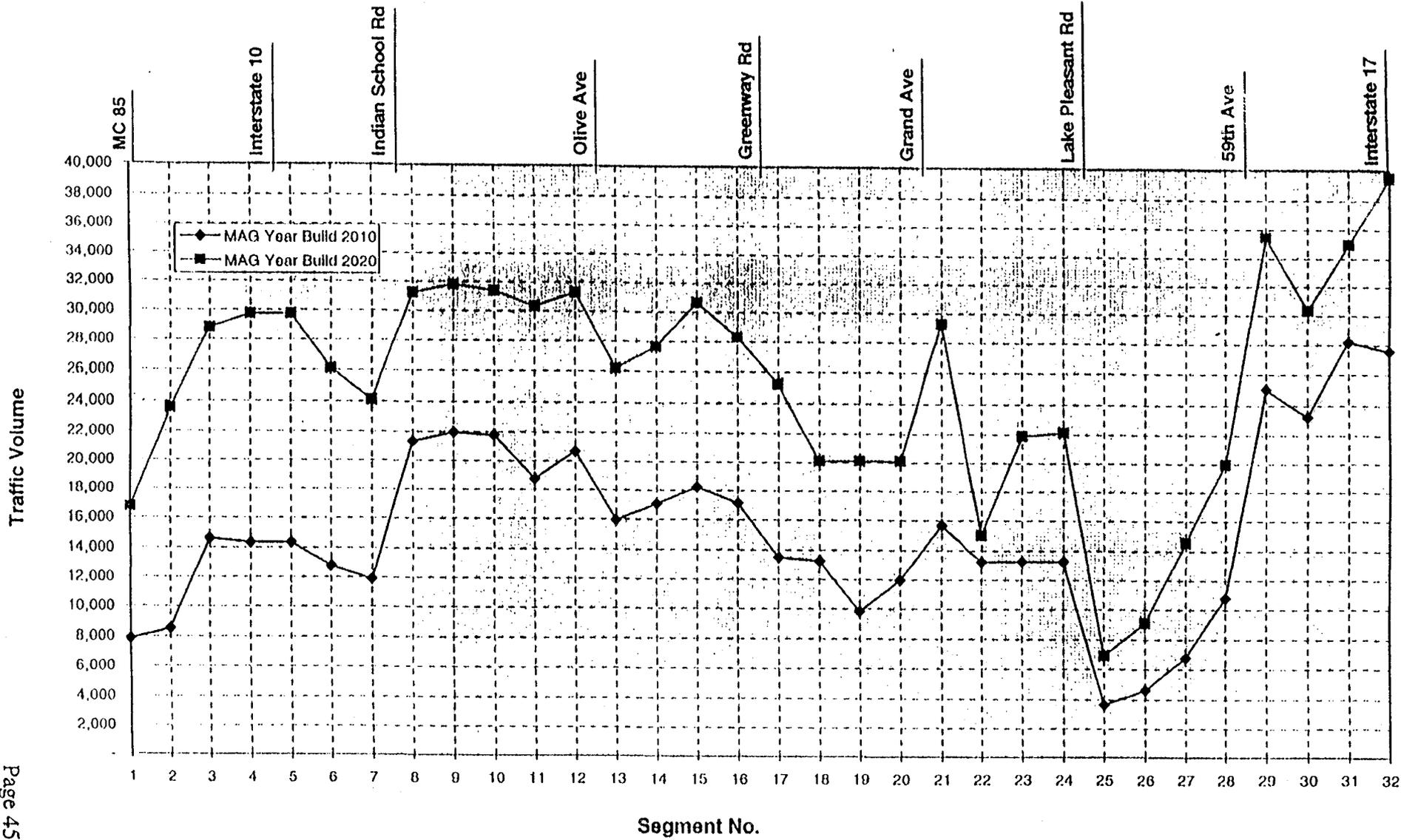
Prepared by:

DeLeuw Cather & Company
3875 N. 44th Street * Suite 250 * Phoenix, Arizona 85018

The 2010 and 2020 volumes are shown for each segment of the corridor in Table 10 along with the year that each segment is projected to warrant upgrading to four and ultimately six lanes. These dates have been derived using a straight line extrapolation of the 2010 and 2020 volumes. Graphically this same information has been shown in Figures 15 and 16.

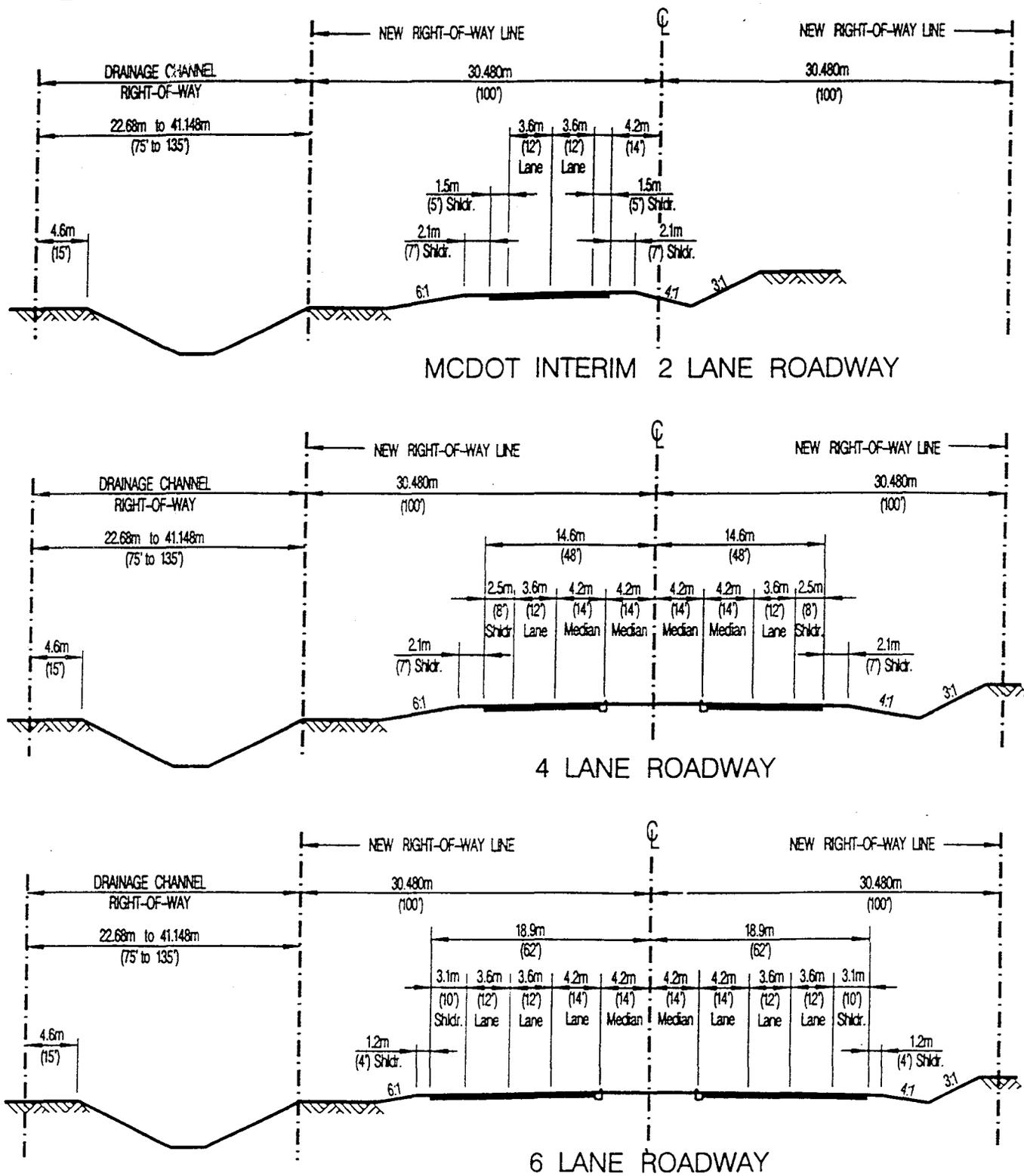
Table 10 2010 and 2020 ADT

Seg. No.	Segment Description	2010 ADT	2020 ADT	Upgrade to 4 Lanes	Upgrade to 6 Lanes
1	MC 85 to Lower Buckeye Rd	7,834	16,722	2018	2035
2	Lower Buckeye Rd to Yuma Rd	8,489	23,536	2014	2024
3	Yuma Rd to Van Buren St	14,625	28,820	2010	2021
4	Van Buren St to I-10	14,343	29,734	2010	2020
5	I-10 to McDowell Rd	14,343	29,734	2010	2020
6	McDowell Rd to Thomas Rd	12,783	26,084	2012	2023
7	Thomas Rd to Indian School Rd	11,896	24,092	2013	2025
8	Indian School Rd to Camelback Rd	21,319	31,249	2004	2019
9	Camelback Rd to Bethany Home Rd	21,968	31,807	2003	2018
10	Bethany Home Rd to Glendale Ave	21,762	31,409	2003	2019
11	Glendale Ave to Northern Ave	18,767	30,346	2007	2020
12	Northern Ave to Olive Ave	20,655	31,317	2005	2019
13	Olive Ave to Peoria Ave	15,933	26,181	2009	2024
14	Peoria Ave to Cactus Rd	17,086	27,653	2008	2022
15	Cactus Rd to Waddell Rd	18,226	30,650	2007	2019
16	Waddell Rd to Greenway Rd	17,129	28,316	2008	2022
17	Greenway Rd to Bell Rd	13,499	25,217	2011	2024
18	Bell Rd to Clearview Blvd	13,265	20,080	2013	2035
19	Clearview Blvd to Mountain View Blvd	9,809	20,080	2015	2030
20	Mountain View Blvd to Grand Ave	11,949	20,080	2014	2032
21	Grand Ave to Deer Valley Rd	15,675	29,311	2010	2021
22	Deer Valley Rd to El Mirage Rd	13,224	15,038	2020	2102
23	El Mirage to 107 h Ave	13,267	21,854	2012	2029
24	107th Ave to Lake Pleasant Rd	13,267	22,125	2012	2029
25	Lake Pleasant Rd to 91st Ave	3,639	6,907	2045	2091
26	91st Ave to 83rd Ave	4,628	9,075	2033	2067
27	83rd Ave to 67th Ave	6,785	14,549	2021	2040
28	67th Ave to 59th Ave	10,758	19,962	2015	2031
29	59th Ave to 51st Ave	25,018	35,453	2000	2015
30	51st Ave to 43rd Ave	23,255	30,367	1998	2019
31	43rd Ave to 35th Ave	28,202	34,970	1990	2013
32	35th Ave to I-17	27,560	39,476	1999	2012



Average Daily Traffic Volumes

Figure 15



DE LEUW,
CATHER

EXPRESSWAY TYPICAL SECTIONS

Figure 17

7.8 Cost of Each Option

Project Termini

Interim

PROJECT: Loop 303 McDowell Road to Thomas Road					
1998 CONSTRUCTION COST WORK SHEET					
Alternative 2: MCDOT Rural Principal Arterial Road, 4-lane @ McDowell, Interim 2-Lane @ Thomas, configured for future 4-lane					
Item #	Description	Unit	Quantity	Unit Cost	Total
07.01100	N.P.D.E.S.	L.S.	1	\$1,500.00	\$1,500
107.09200	Community Relations	Allowance	1	\$5,000.00	\$5,000
	Drainage Excavation	CM	10.911	\$7.00	\$76.377
210.03000	Borrow Excavation	CM	15.285	\$9.00	\$137.565
215.00000	Channel & Retention Basin Excavation	CM	0	\$7.00	\$0
220.01400	Plain Riprap	CM	0	\$45.00	\$0
301.00000	Subgrade Preparation	SQ M	0	\$3.00	\$0
	New Asphalt Pavement (See Pavement Sheet) Incl. Sub. Prep.	SQ M	21.787	\$20.90	\$455.338
	Asphalt Pavement For Temporary Diversions & Detours	SQ M	0	\$7.00	\$0
	Double Penetration and Chip Seal on Base Material	SQ M	0	\$6.95	\$0
	Asphalt Concrete .50 mm Overlay (See Pavement Sht)	SQ M	0	\$5.40	\$0
	Chip Seal Surface on Pavement (See Pavement Sht)	SQ M	8.472	\$1.30	\$11.014
336.08100	Pavement Sawcut	M	1.760	\$6.50	\$11.440
340.01020	Single Curb	M	0	\$36.00	\$0
340.01120	Conc. C & G	M	0	\$34.50	\$0
340.00000	Conc SAV Ramp Std Det 231 Type "A"	EA	0	\$700.00	\$0
340.06950	Concrete Sidewalk Std Det 230	SQ M	0	\$32.00	\$0
340.09750	Concrete Driveway w/5' Wings. Std. Det. 250	SQ M	0	\$40.00	\$0
350.01110	Removal of Existing Improvements	L.S.	1	\$15,000.00	\$15,000
402.00000	Traffic Signing & Striping - 2 lanes	M	1.778	\$3.60	\$6.401
402.00000	Traffic Signing & Striping - 4 lanes	M	586	\$6.40	\$3,750
402.00000	Traffic Signing & Striping - 6 lanes	M	0	\$9.00	\$0
402.00000	Traffic Signal. Full Intersection	EA	0	\$110,000.00	\$0
402.00000	Interconnect/Traffic Signals	M	1,660	\$27.00	\$44,820
	Lighting Conduit and Junction Boxes	M	1,660	\$6.00	\$9,960
	Type 3 Object Marker @ 60m o.c.	EA	0	\$90.00	\$0
402.00000	Traffic Signal. Future "Box-in"	EA	2	\$4,800.00	\$9,600
505.30000	Catch Basin - Rural location	EA	4	\$3,000.00	\$12,000
505.06125	Catch Basin - Curb Inlet	EA	0	\$3,600.00	\$0
505.06200	Scupper	EA	0	\$600.00	\$0
505.06300	Concrete Spillway with Outlet	M	0	\$108.00	\$0
	Drywell	EA	0	\$4,700.00	\$0
621.00000	460 mm (18") CMP	M	0	\$112.00	\$0
618.02318	460 mm (18") RGRCP. Class III	M	0	\$138.00	\$0
618.02324	610 mm (24") RGRCP. Class III	M	220	\$250.00	\$55,000
618.02336	760 mm & 910 mm (30" & 36") RGRCP. Class III	M	0	\$215.00	\$0
618.02348	1060 mm & 1220 mm (42" & 48") RGRCP. Class III	M	0	\$255.00	\$0
618.02348	1370 mm & 1520 mm (54" & 60") RGRCP. Class III	M	0	\$300.00	\$0
625.00000	1370 mm & 1520 mm Storm Drain/Irrigation Manhole	EA	0	\$3,200.00	\$0
	Headwall. 460 mm to 910 mm Pipe (MAG Details)	EA	0	\$1,800.00	\$0
	Headwall. 1060 mm to 1520 mm Pipe (MAG Details)	EA	0	\$4,100.00	\$0
	Flared End Sections	EA	8	\$350.00	\$2,800
	Irrigation Headwall w/ Trashrack (Inlet-MAG Details)	EA	0	\$2,100.00	\$0
	Irrigation Junction Box (MAG Details)	EA	0	\$2,500.00	\$0
	Concrete Slip Form Irrigation Ditch	M	0	\$65.00	\$0
	Earth Irrigation Ditch/Special Drainage Ditch 6' Top	M	0	\$33.00	\$0
	Irrigation Structure w/ Gates	EA	0	\$7,500.00	\$0
	Box Culvert (See Structure Sheet)	EA	0	\$0.00	\$0
	Relocate Irrigation	LS	1	\$10,000.00	\$10,000
	Relocate Power Poles	LS	1	\$192,000.00	\$192,000
415.00000	Guardrail without approach end section	M	0	\$78.00	\$0
	Guardrail Approach End Section - New ADOT Type	EA	0	\$2,000.00	\$0
	Median Fine Grading. Pre-emergent. & D G	SM	0	\$22.00	\$0
		Subtotal			\$1,059,564
110.01000	Mobilization @ 5%	L.S.	1	\$52,978.00	\$52,978
401.00000	Traffic Control @ 3%	L.S.	1	\$31,787.00	\$31,787
	Subtotal Construction				\$1,144,329
	Contingency			20%	\$228,866
	Total				\$1,373,195

Project Termini

Ultimate

PROJECT: Loop 303 McDowell Road to Thomas Road						
1998 CONSTRUCTION COST WORK SHEET						
Alternative 3: MCDOT Rural Principal Arterial Road, 4-lane						
Item #	Description	Unit	Quantity	Unit Cost	Total	
107.01100	N.P.D.E.S.	L.S.	1	\$1,500.00	\$1,500	
107.09200	Community Relations	Allowance	1	\$5,000.00	\$5,000	
	Drainage Excavation	CM	10,911	\$7.00	\$76,377	
210.03000	Borrow Excavation (If anticipated)	CM	38,675	\$9.00	\$348,078	
215.00000	Channel & Retention Basin Excavation	CM	0	\$7.00	\$0	
220.01400	Plain Riprap	CM	0	\$45.00	\$0	
301.00000	Subgrade Preparation	SQ M	0	\$3.00	\$0	
	New Asphalt Pavement (See Pavement Sheet) Incl. Sub. Prep.	SQ M	39,495	\$20.90	\$825,448	
	Asphalt Pavement For Temporary Diversions & Detours	SQ M	0	\$7.00	\$0	
	Double Penetration and Chip Seal on Base Material	SQ M	0	\$6.95	\$0	
	Asphalt Concrete .50 mm Overlay (See Pavement Sht)	SQ M	0	\$5.40	\$0	
	Chip Seal Surface on Pavement (See Pavement Sht)	SQ M	8,472	\$1.30	\$11,014	
336.08100	Pavement Sawcut	M	1,760	\$6.50	\$11,440	
340.01020	Single Curb	M	0	\$36.00	\$0	
340.01120	Conc. C & G	M	0	\$34.50	\$0	
340.00000	Conc S/W Ramp Std Det 231 Type "A"	EA	0	\$700.00	\$0	
340.06950	Concrete Sidewalk Std Det 230	SQ M	0	\$32.00	\$0	
340.09750	Concrete Driveway w/5' Wings, Std. Det. 250	SQ M	0	\$40.00	\$0	
350.01110	Removal of Existing Improvements	L.S.	1	\$15,000.00	\$15,000	
402.00000	Traffic Signing & Striping - 2 lanes	M	1,778	\$3.60	\$6,401	
402.00000	Traffic Signing & Striping - 4 lanes	M	586	\$6.40	\$3,750	
402.00000	Traffic Signing & Striping - 6 lanes	M	0	\$9.00	\$0	
402.00000	Traffic Signal, Full Intersection	EA	0	\$110,000.00	\$0	
402.00000	Interconnect/Traffic Signals	M	1,660	\$27.00	\$44,820	
	Lighting Conduit and Junction Boxes	M	1,660	\$6.00	\$9,960	
	Type 3 Object Marker @ 60m o.c.	EA	0	\$90.00	\$0	
402.00000	Traffic Signal, Future "Box-in"	EA	2	\$4,800.00	\$9,600	
505.30000	Catch Basin - Rural location	EA	4	\$3,000.00	\$12,000	
505.06125	Catch Basin - Curb Inlet	EA	0	\$3,600.00	\$0	
505.06200	Scupper	EA	0	\$600.00	\$0	
505.06300	Concrete Spillway with Outlet	M	0	\$108.00	\$0	
	Drywell	EA	0	\$4,700.00	\$0	
621.00000	460 mm (18") CMP	M	0	\$112.00	\$0	
618.02318	460 mm (18") RGRCP, Class III	M	0	\$138.00	\$0	
618.02324	610 mm (24") RGRCP, Class III	M	220	\$250.00	\$55,000	
618.02336	760 mm & 910 mm (30" & 36") RGRCP, Class III	M	0	\$215.00	\$0	
618.02348	1060 mm & 1220 mm (42" & 48") RGRCP, Class III	M	0	\$255.00	\$0	
618.02348	1370 mm & 1520 mm (54" & 60") RGRCP, Class III	M	0	\$300.00	\$0	
625.00000	1370 mm & 1520 mm Storm Drain/Irrigation Manhole	EA	0	\$3,200.00	\$0	
	Headwall, 460 mm to 910 mm Pipe (MAG Details)	EA	0	\$1,800.00	\$0	
	Headwall, 1060 mm to 1520 mm Pipe (MAG Details)	EA	0	\$4,100.00	\$0	
	Flared End Sections	EA	8	\$350.00	\$2,800	
	Irrigation Headwall w/ Trashrack (Inlet-MAG Details)	EA	0	\$2,100.00	\$0	
	Irrigation Junction Box (MAG Details)	EA	0	\$2,500.00	\$0	
	Concrete Slip Form Irrigation Ditch	M	0	\$65.00	\$0	
	Earth Irrigation Ditch/Special Drainage Ditch, 6' Top	M	0	\$33.00	\$0	
	Irrigation Structure w/ Gates	EA	0	\$7,500.00	\$0	
	Box Culvert (See Structure Sheet)	EA	0	\$0.00	\$0	
	Relocate Irrigation	LS	1	\$10,000.00	\$10,000	
	Relocate Power Poles	LS	1	\$192,000.00	\$192,000	
415.00000	Guardrail without approach end section	M	0	\$78.00	\$0	
	Guardrail Approach End Section - New ADOT Type	EA	0	\$2,000.00	\$0	
	Median Fine Grading, Pre-emergent, & D.G.	SM	0	\$22.00	\$0	
Subtotal					\$1,640,188	
110.01000	Mobilization @ 5%	L.S.	1	\$82,009.00	\$82,009	
401.00000	Traffic Control @ 3%	L.S.	1	\$49,206.00	\$49,206	
Subtotal Construction					\$1,771,403	
				Contingency	20%	\$354,281
Total					\$2,125,683	