MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

ENGINEERING DIVISION

DESIGN CONCEPT REPORT

83RD AVENUE

FROM

NORTHERN AVENUE TO OLIVE AVENUE

WORK ORDER #68972

PBS&J
PROJECT NUMBER 54251
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APRIL 1999

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TABLE OF CONTENTS

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LIST OF FIGURES

LIST OF TABLES

APPENDIX

1.0 GENERAL

1.1. Executive Summary

This report represents the results of analyzing the preferred/recommended low cost alternative described in the Candidate Assessment Report (CAR) dated January 20, 1997 (revised February 24, 1997) for 83rd Avenue between Northern Avenue and Olive Avenue (C97-2731-11). 83rd Avenue is a Classification 8 (Minor Arterial) roadway according to Maricopa County of Transportation (McDOT) Classification System. This section of roadway is located in Sections 34 and 35, T3N, R1E of the Gila and Salt River Base and Meridian for Maricopa County, Arizona. See Figure 1 for Vicinity Map.

A Traffic Impact Study for this section of roadway was completed in January, 1997. The traffic impact study was developed for the desired Level of Service is "C" (V/C=0.70-0.79) as required by the Maricopa County Roadway Design Manual dated November 3, 1993. The Maricopa County Roadway Design Manual also specifies that Urban Minor Arterial Roadways shall have four (4) through lanes.

83rd Avenue is a major link between the City of Peoria and the City of Glendale. Existing and proposed growth in the area has increased congestion and traffic demands on 83rd Avenue. The existing 2-lane roadway section cannot accommodate the projected traffic demands. The projected traffic is anticipated to increase congestion and concerns over safety issues. The existing pavement is in poor condition due to the lack of proper drainage structures and standing water.

The preferred/recommended roadway section from the CAR is a 5-lane modified City of Peoria modified 19.5-meter (64-foot) section which includes curb and gutter. Sidewalks are not included in this roadway section. The roadway shall have 4-meter (13-foot) lanes along the curbs, 3.7 meter (12 foot) through lanes and a 4.1-meter (14-foot) two-way left turn lane. There will be two horizontal curves required at the south end of the project to offset the centerline approximately 4.69 meters (15.39 feet) in order to avoid impacting the existing City of Peoria Pump Station located at the northwest corner of 83rd Avenue and Northern Avenue. This offset distance was developed as part of the McDOT Northern Avenue, Loop 101 to 67th Avenue (Project #68915) project which is currently under design. A drainage system will be developed to convey roadway for the 10-year and 100-year storm flows as required by the Flood Control District of Maricopa County (FCDMC) Drainage Design Manuals. The proposed drainage system will connect to drainage improvements currently under design for McDOT and for FCDMC.

The proposed costs for this project are $2,078,229 in 1998 dollars, based upon the Low Cost Alternative as described in the CAR.

1.2. Project Description

The Design Concept Report (DCR) provides McDOT information required to develop scope, budget and schedule the 83rd Avenue Improvement design and construction. This project has not been programmed in the 5-year Capital Improvement Plan (CIP).

The study is to determine the conceptual alignment and drainage requirements for the proposed modified 5-lane City of Peoria 19.5 meter (64 foot) roadway section that will replace the existing 2-lane roadway section. This study details traffic information and analysis, design criteria, drainage information, land use, right-of-way, environmental information, geotechnical and pavement design, utility information and cost estimates for this project.

1.3. Purpose

The project study team is to determine the design layout, drainage patterns and design and prepare conceptual design layout for 83rd Avenue. This is determined by coordinating with the local municipalities and utilities, residences and businesses through the public meeting processes and by coordinating with McDOT and FCDMC on proposed adjacent improvements. This study will determine proposed drainage improvements, right-of-way impacts and costs of construction and will be utilized by McDOT to determine timing and budgeting of the design and construction.

1.4. General Location

The project is a 1.6-kilometer (1-mile) segment of 83rd Avenue located in Maricopa County, Arizona. The project limits are Northern Avenue to the south and Olive Avenue to the north. There are three (3) streets that intersect 83rd Avenue from the west. The streets are Las Palmaritas Drive, Butler Drive and Alice Drive extending into Villa del Oeste and Pioneer Village 3 subdivisions located in the City of Peoria. See Figure 2 for Location Map.

1.5. Jurisdictions

83rd Avenue is located in Maricopa County and is maintained by McDOT. Northern Avenue is also currently located in Maricopa County. Olive Avenue, including the intersection of 83rd Avenue, is located in the City of Peoria along with the residential streets connecting to 83rd Avenue from the west, Las Palmaritas Drive, Butler Drive and Alice Drive.

1.6. Background

83rd Avenue is located on the section line as part of the grid system of roadways in this area. 83rd Avenue developed initially as a farm to market roadway and has evolved into a minor urban arterial roadway. As-built plans of this roadway were not available from McDOT records.

83rd Avenue's importance to the transportation system in this area is due to its use as a major link between the cities of Glendale to the east and Peoria to the north and west.

83rd Avenue, which runs parallel to the Loop 101 Freeway, is located approximately 2 kilometers (1.25 miles) east of Loop 101 Freeway. There is interchange access to Loop 101 at both Northern Ave. and Olive Ave.

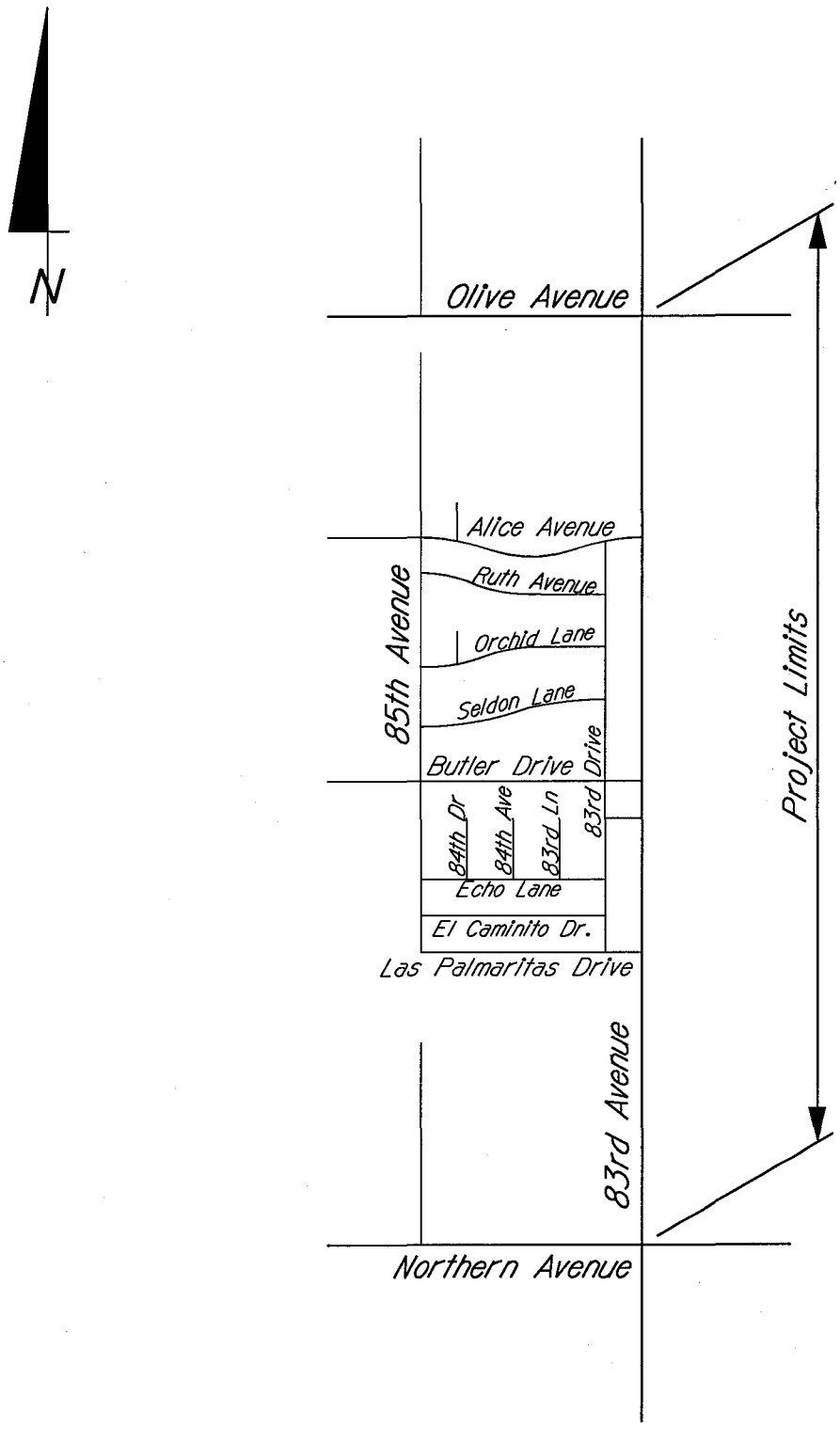
1.7. Description of Existing Pavement Roadway Features

Existing 83rd Avenue consists of a two-lane roadway with lanes of varying widths between Northern Avenue and Olive Avenue. There is existing curb and gutter on the west side from immediately south of Las Palmaritas Drive to just north of Alice Avenue. At the intersection of Olive Avenue and 83rd Avenue, there is existing curb and gutter located at the intersection radii. A segment of 1.5 meter (1.5-foot) sidewalk is located between Butler Drive and Alice Avenue adjacent to the curb and gutter. There is a driveway opening located on the west side of 83rd Avenue approximately 50-meters (165-feet) south of Butler Drive. There are approximately 18 driveways, which are generally dirt or gravel, located on the east side of 83rd Avenue and 5 driveways located on the west side south of the existing SRP irrigation drainage ditch.

Currently there are no underground drainage facilities located in the roadway. There is an existing drainage ditch located on the west side of the roadway south of Las Palmaritas Drive which collects all of the drainage on the west half of 83rd Avenue from Las Palmaritas Drive to the end of the existing curb and gutter just north of Alice Avenue.

The existing pavement is greatly deteriorated from standing water, especially on the east side of the roadway. This is due to the lack of cross-slope and the lack of any drainage outlets.

There are existing traffic signals (2-phase) located at the intersections of 83rd Avenue and Olive Avenue and 83rd Avenue and Northern Avenue. The City of Peoria maintains the traffic signal at Olive Avenue and McDOT maintains the traffic signal located at Northern Avenue.



LOCATION MAP

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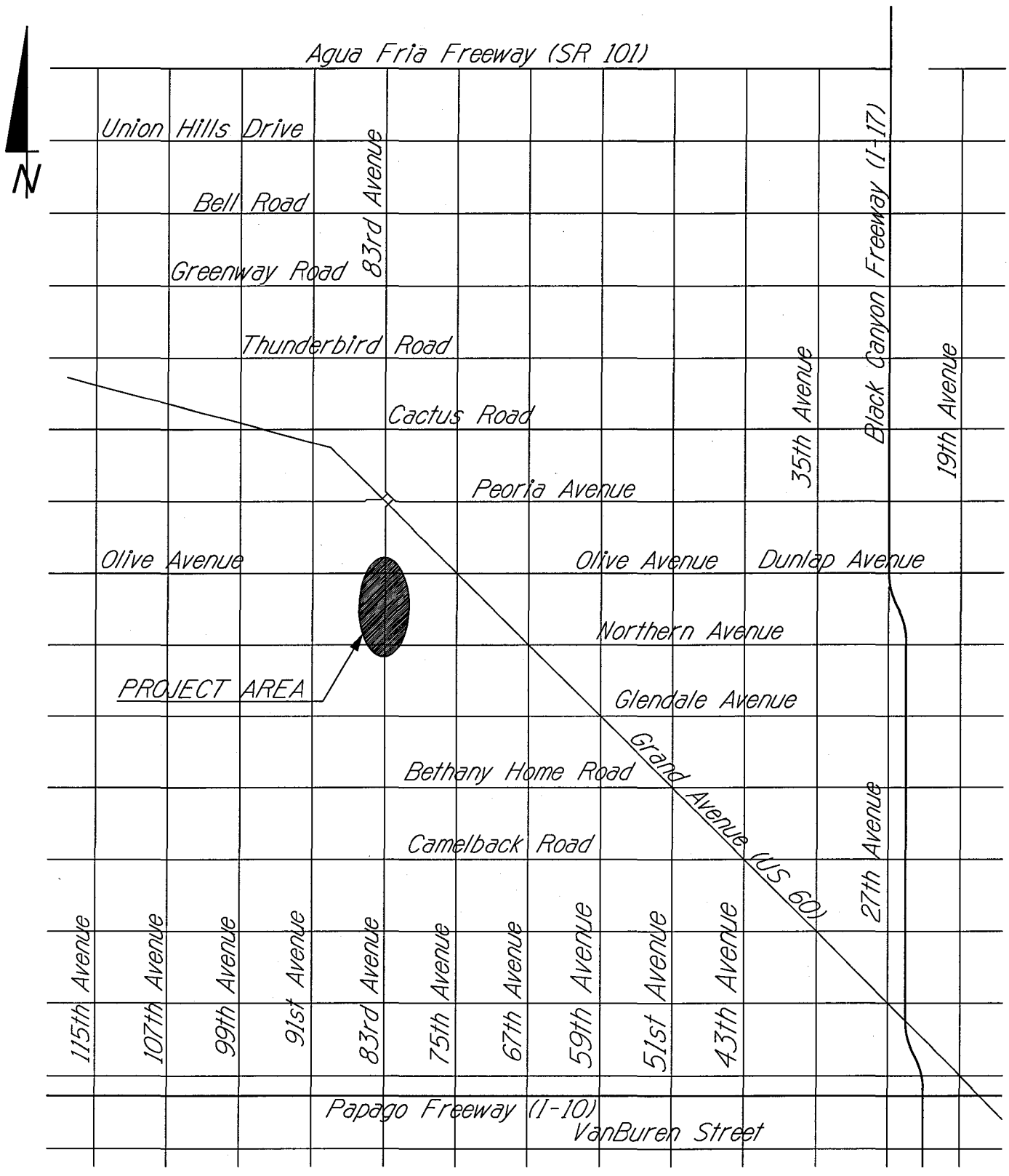
83rd Avenue
From: Northern Avenue To: Olive Avenue

Figure 1



VICINITY MAP

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83rd Avenue
From: Northern Avenue To: Olive Avenue

Figure 2

1.8. Summary of Public Process

A public meeting was held on October 19, 1998 at Alta Loma Elementary School, 9750 North 87th Avenue, Multi-purpose Room from 5 to 7 p.m. (See copy of public meeting information in Appendix E).

Walter and Betty Bartol were the only property owners along the alignment that attended the Public Meeting. They are the owners of properties APN 142-33-005B, APN 142-33-005E and APN 142-33-005E located on the west side of 83rd Avenue just north of the existing City of Peoria Pump Station. The concerns of this property owner were the loss of right-of-way and the maintenance of the existing irrigation facilities serving their property.

2.0 TRAFFIC INFORMATION AND ANALYSIS

The Traffic Impact Study prepared by HNTB Corporation is included as Appendix A in this report. The Traffic Impact Study was completed on January 20, 1997. Accident information gathered for the CAR will be included as Appendix A.

3.0 DESIGN CRITERIA

The horizontal and vertical alignments will utilize criteria based upon the 1994 Edition of A Policy on Geometric Design of Highways and Streets (AASHTO Green Book, 1994 ed.) superseded by the Maricopa County Roadway Design Manual. Table 3.0-1 lists the design criteria.

TABLE 3.0-1 – Design Criteria

NO.	DESIGN CRITERIA	VALUE	SOURCE
1.	Functional Classification	Minor Arterial (8)	McDOT Road Management System
2.	Level of Service	C – ADT/Lane =5,500	McDOT Roadway Design Manual
3.	Design Year	2020	McDOT Roadway Design Manual
4.	Design Vehicle	WB-50	Candidate Assessment Report
5.	Design Speed	90 KM/HR (55 MPH)	McDOT Roadway Design Manual, Candidate Assessment Report
6.	Maximum Superelevation	0.06 m/m	McDOT Roadway Design Manual
7.	Minimum Radii	335 m (1100 ft.), w/o superelevation= 3010 m (9875.30 ft.)	AASHTO Green Book, 1994 ed., p. 172 Table III-12
8.	Lane Widths	4.0 m (13 ft) w/ C&G, 3.7 m (12 ft) , 4.2 m (14 ft) TWLTL	Candidate Assessment Report, City of Peoria modified 5-lane section
9.	Shoulder Width	N/A	

NO.	DESIGN CRITERIA	VALUE	SOURCE
10.	Median	N/A	
11.	Roadway Cross-Slope	0.02 m/m	McDOT Roadway Design Manual
12.	Shoulder Cross-Slope	N/A	
13.	Embankment Cut/Fill Slopes	4:1	McDOT Roadway Design Manual
14.	Clear Zone	0.46 m (1.5 ft)	McDOT Roadway Design Manual
15.	Minimum Stopping Sight Distance	131.2 m (430.4 ft)	AASHTO Green Book, 1994 ed.
16.	Minimum Passing Sight Distance	605 m (2132.5 ft.)	AASHTO Green Book, 1994 ed.
17.	Sidewalks	MAG Std. Dtl. 230	McDOT Roadway Design Manual
18.	Maximum Longitudinal Grade	5%	McDOT Roadway Design Manual
19.	Minimum Longitudinal Grade	0.25%	McDOT Roadway Design Manual
20.	Minimum K-Factors for Sag and Crest Vertical Curves	Sag: 30 Crest: 43	AASHTO Green Book, 1994 ed. Stopping Sight Distance Criteria
21.	Curb and Gutter Types	MAD Std. Dtl. 220, Type "A", H=6"	McDOT Roadway Design Manual
22.	Curb Return Radii	10.67 m (35 ft.)	McDOT Roadway Design Manual
23.	Tapers	L=(0.6)WS	AASHTO Green Book, 1994 ed. MUTCD, 1988
24.	Flares	N/A	
25.	Traffic Signals	N/A	
26.	Pavement Markings	----	McDOT Pavement Marking Manual
27.	Signing Plans	----	McDOT Sign Manual
28.	Guardrails	----	McDOT Roadway Design Manual
29.	Vertical Clearance	4.4 m	AASHTO Green Book, 1994 ed.
30.	Pavement Design Life	20 years	Candidate Assessment Report
31.	Drainage Criteria		Flood Control District of Maricopa County, Drainage Design Manuals
32.	Lighting	N/A	

4.0 DRAINAGE INFORMATION

4.1. General Description

This Study will give general layout, sizing and locations of required drainage facilities in 83rd Avenue between Northern Avenue and Olive Avenue. This design will be based upon the FCDMC Drainage Design Manual.

The drainage design will include all property located within the proposed right-of-ways. It assumes the adjacent property owners will handle all drainage outside the right-of-way. According to the City of Peoria, all historical off-site drainage is passed through while the 100-year 2-hour storm is retained. This issue will need to be addressed by the City of Peoria and Maricopa County to determine limits of the drainage areas.

4.2. Existing Information

Currently, there are no underground drainage facilities located in 83rd Avenue. Along the west side of 83rd Avenue between north of Alice Drive and Las Palmaritas Drive, the drainage flows south along the curb and gutter until it reaches a scupper located at the northwest corner of Las Palmaritas Drive and 83rd Avenue. At this location, the water is piped under Las Palmaritas Drive through a 30-inch CMP to an existing drainage ditch located along the west side of 83rd Avenue. The drainage is then conveyed to the existing SRP irrigation discharge ditch. All other roadway drainage currently flows along the roadway until it reaches a low spot to drain off into the farm fields and properties located along 83rd Avenue.

FCDMC has under design a drainage basin located at the northwest intersection of Northern Avenue and the 85th Avenue alignment. This is part of the larger Northern/Orangewood Storm Drain Project which is being designed for FCDMC. This is currently under design by Wood, Patel and Assoc. A 1676 mm (66-inch) pipe is stubbed north of Las Palmeritas Drive on 83rd Avenue from the Griswold Road alignment. This pipe is to handle all drainage on 83rd Avenue north of Butler Drive. This pipe is to extend north as it is part of a larger Northern/Orangewood Drainage Project for the FCDMC.

A McDOT project on Northern Avenue between 67th Avenue and the proposed Loop includes drainage design on Northern Avenue and the south end of 83rd Avenue. A 457 mm (18-inch) storm drain stub-out located 121.67 m north of the centerline of Northern Avenue on 83rd Avenue. This pipe is to handle all of the drainage collected south of Butler Drive on 83rd Avenue. A copy of the pertinent drainage calculations for the project is included in Appendix B.

4.3. Summary of Hydraulic Results

4.3.1. Hydrology

The pavement surface runoff computations were conducted using the rational method. The procedures for this methodology are outlined in Chapter 3 of the *Drainage Design Manual for Maricopa County, Volume 1, Hydrology.* The runoff coefficient for the pavement surface is in accordance with Table 3.2 of the manual. The rainfall depth for the design storm is based upon the 10-year return period event. Rainfall depths for determination of the rainfall intensity used in the rational formula were derived from information given in Chapter 2 of the *drainage design Manual for Maricopa County Volume 1, Hydrology.*

4.3.2. Catch Basins

The catch basin locations and spacing were determined based upon criteria given in the *Drainage Design Manual for Maricopa County, Volume 2, Hydraulics.* Design criteria provided in this document state that the catch basins shall be provided so that one driving lane in each direction is provided during the 10-year return period storm. In addition, no curb overtopping shall occur. Preliminary hydraulic computations determined that the curb catch basin spacing could be as much as 400 to 500 meters for the proposed cross section and longitudinal grade given on the preliminary road plans. Requirements set forth in the *Drainage Design Manual for Maricopa County* limit the catch basin spacing to 200 meters. Therefore, the flow spread does not control the catch basin locations or spacing.

Preliminary catch basin locations were set based upon the 200-meter interval criteria. The catch basin locations were then adjusted to place them immediately upstream of the intersections with cross streets so as to prohibits or minimize the surface drainage leaving the cross section of 83rd Avenue.

The catch basin type which will be used on the 83rd Avenue project is a City of Phoenix Type M1. The wing basin lengths were set so as to limit bypass flow to no more than 10% of the 10-year return period discharge. The preliminary catch basin location and wing length which were determined based upon the criteria outlined above are given on Table 4.3.1 of this report. The Hydrologic and Hydraulic results are included in Appendix C.

TABLE 4.3-1 – Catch Basins

Station	CB Type/Length	Notes
10+122	M-1 w/ 3' Wing	Per existing Plans
10+330	M-1	200m. max interval
10+28.62	M-1 w/3' Wing	at MH in SD
10+569	M-1 w/3' Wing	at intersection
10+724	M-1 w/3' Wing	
10+840	M-1 w/6' Wing	at intersection
11+040	M-1 w/6' Wing	200m. max interval
11+230	M-1 w/6' Wing	at intersection
11+430	M-1 w/6' Wing	200 m. max interval

4.4. Culverts and Other Structures

4.5. Dip Section Designs

83rd Avenue will not include any dip sections.

4.6. Land Potentially Affected by Improvements

The drainage improvements proposed will not have any impacts to the adjacent properties.

4.7. Summary of Recommended Drainage Improvements

The proposed drainage improvements will be shown on the conceptual plans included in Appendix G.

5.0 LAND USE

5.1. Existing Land Use

Current land uses include a mixture of agricultural and low-density commercial and light industrial on the east side of 83rd Avenue. The west side of 83rd Avenue is primarily residential with some agricultural, open space and light industrial/commercial.

5.2. Existing Zoning in the Area

According to the City of Peoria Comprehensive Master Plan dated April, 1997, the west side of 83rd Avenue between Olive Avenue and Northern Avenue is zoned Low Density Residential (1.5-4.0 du/ac.). The east side of 83rd Avenue is zoned Business Park/Industrial.

5.3. Area Roadway Classifications

83rd Avenue is currently a McDOT Classification 8 (Minor Arterial) roadway as mentioned above. According to by the City of Peoria Master Plan dated April 1997, 83rd Avenue is considered a Major Arterial Roadway. The current plan is for the City of Peoria to annex this section of 83rd Avenue after the improvements are complete.

A history of the roadway improvements was obtained from McDOT Maintenance Department and is included as Table 5.3-1. The Pavement Condition Rating (PCR) is 50 which falls in the Fair category. The Sufficiency Rating is 89 and the International Roughness Index Rating (IRI) is 151. A description of these categories is included in Appendix D.

TABLE 5.3-1 – Historical Roadway Improvements

83rd Avenue:

TYPE OF IMPROVEMENT	YEAR COMPLETED
Chip Seal – Seal Coat	1991
Chip Seal – Seal Coat with Latex	1990
Chip Seal – Seal Coat with Latex	1984
Grade and Pave	1976

Northern Avenue is also considered a McDOT Classification 8 (Minor Arterial) roadway. Currently, Northern Avenue from Loop 101 to 67th Avenue is under design for roadway widening, including curb and gutter, and drainage improvements (Project Number 68915).

Olive Avenue is considered a Major Arterial by the City of Peoria Master Plan dated July 1997. The intersection of Olive Avenue and 83rd Avenue is located in the City of Peoria.

5.4. Municipal, State Transportation and Other Infrastructure Plans

Currently, Maricopa County Department of Transportation has Northern Ave from 67th Avenue to Loop 101 (Project # 68915) under design. Flood Control District of Maricopa County has Northern and Butler Storm Drains, Sub-Phase A also under design.

City of Peoria is planning to extend the City's Water system in this area. No plans are currently under design for this work.

5.5. General Plan Areas

The plans show the proposed improvements on 83rd Avenue from Northern Avenue to Olive Avenue.

6.0 RIGHT-OF-WAY

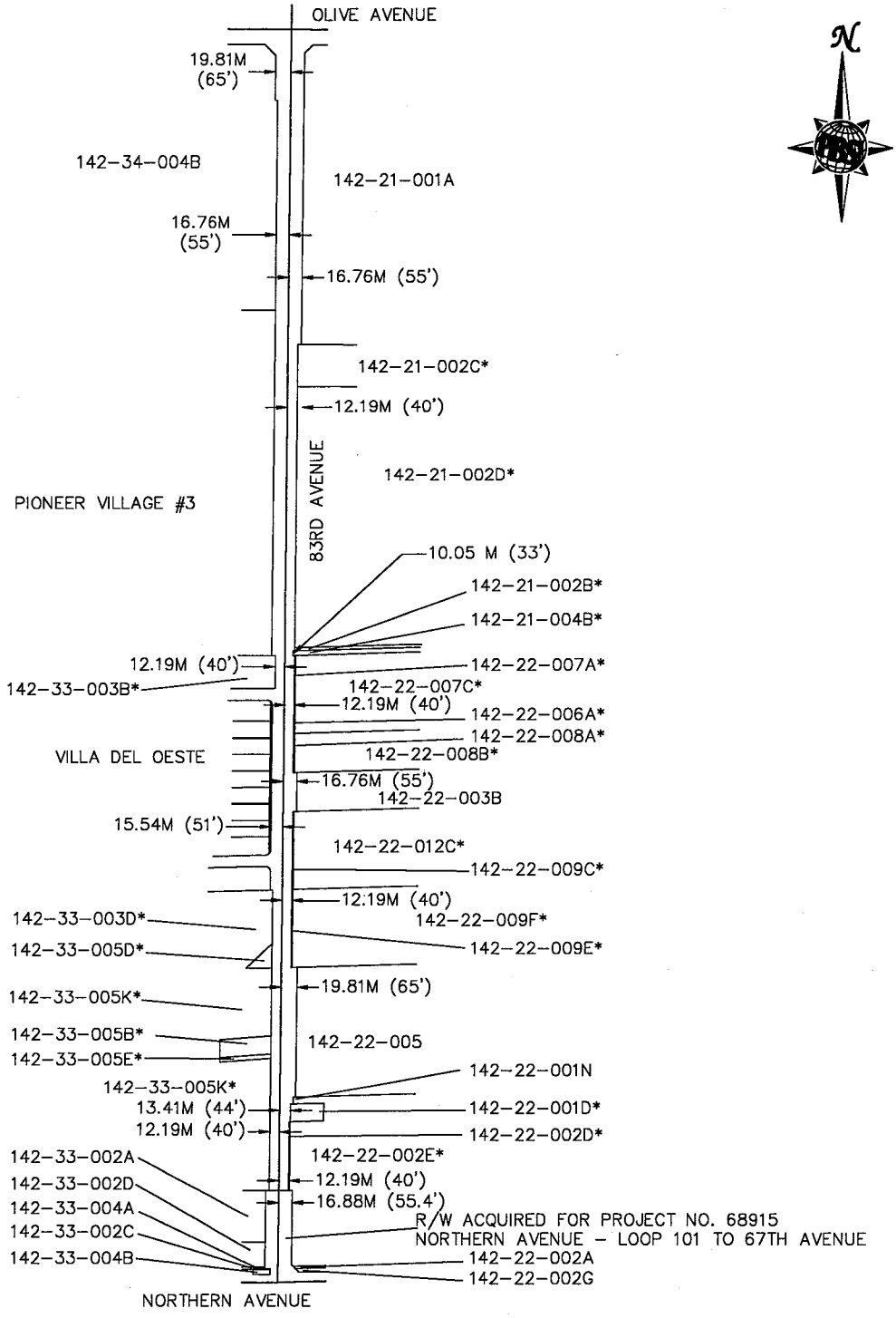
6.1. Summary of Existing Rights-of-Way

The existing roadway rights-of-way were determined by review of right-of-way information obtained from the Flood Control District of Maricopa County Right-of-Way Division. The existing right-of-ways are determined from referencing the Maricopa County Assessor Maps (Book 142, Maps 21, 22, 33, 34) and the corresponding Metroscan legal descriptions of the properties located along 83rd Avenue. Figure 3 shows the existing rights-of-way.

6.2. Summary of Proposed Rights-of-Way

The proposed right-of-way is 16.764 meters (55-feet) each side of the section line except at the south end of the project at the existing City of Peoria pump station and along the existing Villa Del Oeste subdivision, which has 15.24 meters (50 feet) of existing right-of-way. No additional right-of-way is proposed to be purchased along the Villa Del Oeste subdivision. At the pump station, there will be 16.764 meters (55-feet) east of the section line and 10.085 meters (33-feet) west of the section line. The roadway centerline is located 4.69 meters (15.39 feet) east of the section line at the City of Peoria pump station. Figure 4 shows the proposed rights-of-way for Alternative 1. The proposed right-of-way requirements are tabulated in Table 6.2-1.

FIGURE 3
EXISTING RIGHT–OF–WAY



* DENOTES EXISTING RIGHT–OF–WAY THAT REQUIRES PARTIAL OR FULL ACQUISITION

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FIGURE 4
PROPOSED RIGHT–OF–WAY

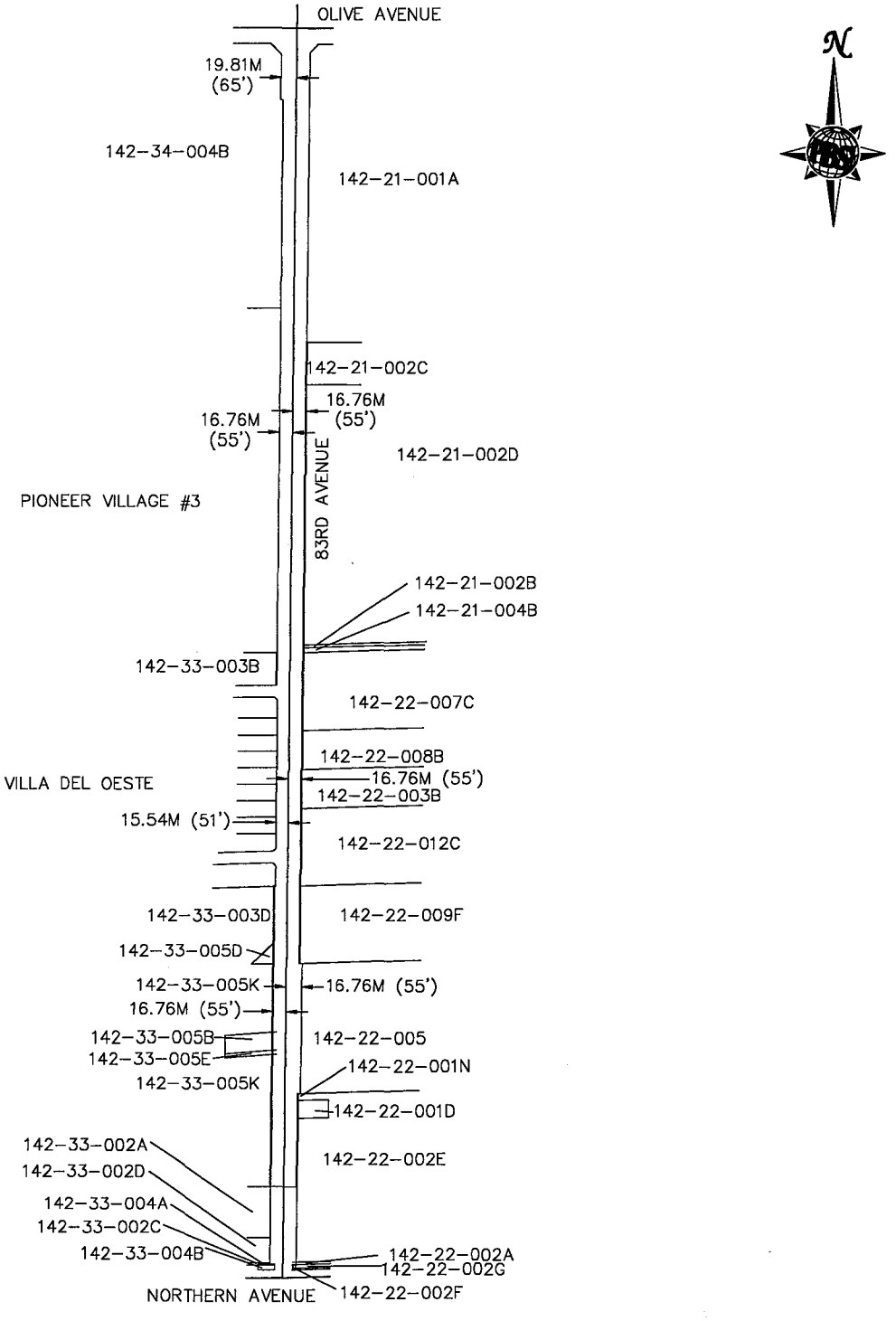

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TABLE 6.2-1 – Proposed Right-of-Way Acquisition

PARCEL #	AREA (M ^2)	AREA (FT^ 2)	*ZONING	OWNERSHIP
142-22-002D	106	1,141	BP/I	Chickasha Cotton Oil Co.
142-22-002E	297	3,197	BP/I	Larry Rovey Farms
142-22-001D	77	825	BP/I	Luis/Maria Bonilla
142-22-006A	61	660	BP/I	Caldwell C. / Rufigia M. Mothershed
142-22-007A	61	660	BP/I	Caldwell C. / Rufigia M. Mothershed
142-22-007C	337	3,630	BP/I	Caldwell C. / Rufigia M. Mothershed
142-22-008A	61	660	BP/I	James A. / Reva Shumaker
142-22-008B	169	1,815	BP/I	James A. / Reva Shumaker
142-22-009C	123	1,320	BP/I	Rovey Investments
142-22-009E	123	1,320	BP/I	SRP Powerline Easement
142-22-009F	337	3,630	BP/I	SRP Powerline Easement
142-22-012C	337	3,630	BP/I	Rovey Investments
142-21-002B	18	191	BP/I	
142-21-002C	249	2,685	BP/I	
142-21-002D	1,535	16,525	BP/I	
142-21-004B	41	440	BP/I	
142-33-003B	192	2,067	LD	Amelia Lopez
142-33-003D	326	3,508	LD	SRP Powerline Easement
142-33-005B	103	1,104	LD	Walter W. / Betty Bartol
142-33-005D	133	1,429	LD	SRP AI&PD
142-33-005E	25	271	LD	Walter W. / Betty Bartol
142-33-005K	1,166	12,548	LD	Walter W. / Betty Bartol

* Based upon the City of Peoria Comprehensive Master Plan dated April, 1997. LD-Low Density Residential, BP/I-Business Park/Industrial

The total right-of-way required is 5,877 square meters (63,196 square feet).

6.3. Rights-of-Way Cost Basis and Cost Summary

The cost basis for the right-of-way is the $86,500 per hectare set in the CAR adjusted with a 2.90% factor to obtain 1998 values.

7.0 FIELD SURVEY

7.1. Basis of Project Stationing

This project is stationed from 100+00 at the intersection of the Northern Avenue centerline and the proposed 83rd Avenue centerline. This matches the stationing of the Northern Avenue (Loop 101 to 67th Avenue) project stationing. The Northern Avenue centerline is located 4.28 meters (14 feet) north of the Northern Avenue Section and Monument Line. At Northern Avenue, the centerline of 83rd Avenue is located 4.69 meters (15.39 feet) east of the 83rd Avenue Section and Monument Line. These offsets are to avoid the existing City of Peoria pump station.

7.2. Summary of Field Survey Results

Survey cross-sections were taken approximately every 152 meters (500 feet) along the monument line of 83rd Avenue between Northern Avenue and Olive Avenue. Also, additional field survey was taken at all of the intersections, existing drainage features, driveways, surface utilities and survey control points. This information was merged with aerial topography obtained from the Flood Control District of Maricopa County Geographic Information System to determine an existing profile and digital terrain model used to determine proposed earthwork and drainage requirements.

8.0 ROADWAY DESIGN ALTERNATIVES

The following alternatives were analyzed in the CAR: Low Cost Alternative (Alternative 1) and Full Cost Alternative (Alternative 2). The "No Build" Alternative was not discussed in the CAR and will not be discussed in this DCR. An "Ultimate" Alternative was briefly discussed but was ruled out due to the high costs of relocating the City of Peoria Pump Station.

8.1. Description of Alternative 1

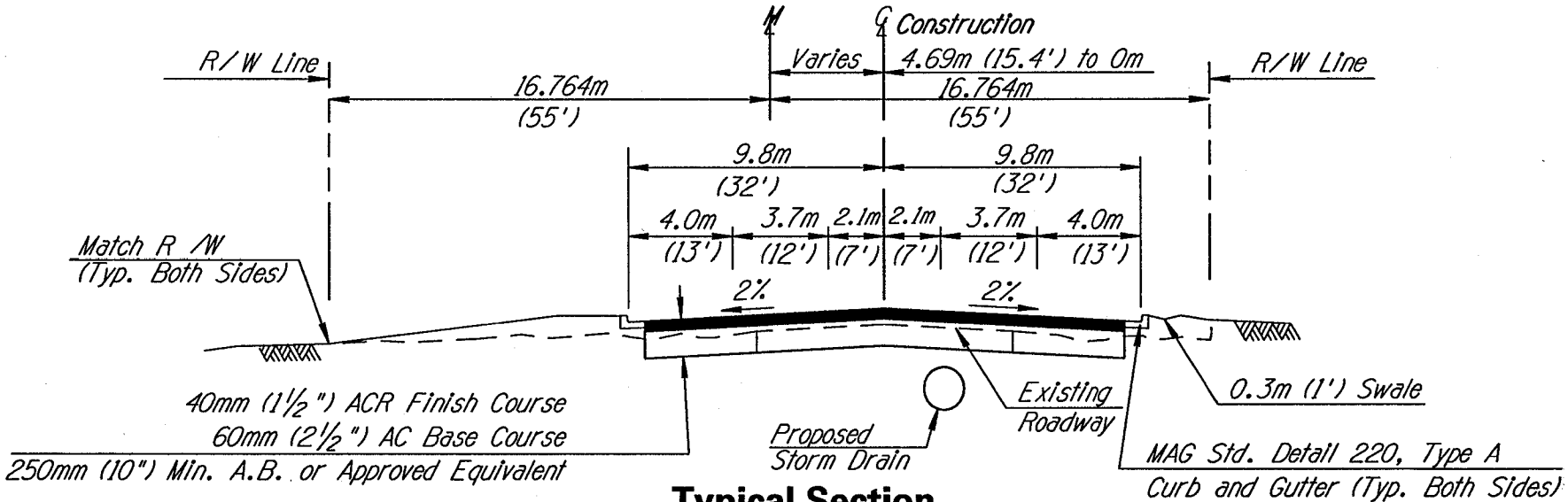
Alternative 1 is the "Low Cost Alternative" as described in the CAR. This section is the City of Peoria modified 5-lane section consisting of a 4.0 meter (13-foot) edge lane with curb and gutter both directions, a 3.7 meter (12-foot) through lane in each direction and a 4.2 meter (14-foot) two-way left turn lane which becomes a directional left turn lane at the intersections (See Figure 5 for Section). This alternative begins at the north end of the improvements on 83rd Avenue that are the result of the intersection improvements for McDOT Project 68915, Northern Avenue, Loop 101 to 67th Avenue. No sidewalk is included in the proposed design. Existing sidewalk located between Butler Drive and Alice Avenue will be maintained and sidewalk ramps and sidewalks around the curb radii will be installed at all intersections for future considerations. The existing curb and gutter located along the west side of 83rd Avenue between Las Palmaritas Drive and approximately 30 meters north of Alice Avenue. Driveways will be included for the businesses and residences located along the roadway. This alternative includes drainage inlets and pipes per requirements of the Maricopa County Drainage Design Manual that will transfer the storm water to drainage structures proposed in projects by FCDMC (Northern and Butler Storm Drains Sub-Phase A) and McDOT (Northern Avenue – Loop 101 to 67th Avenue).

8.2. Description of Alternative 2

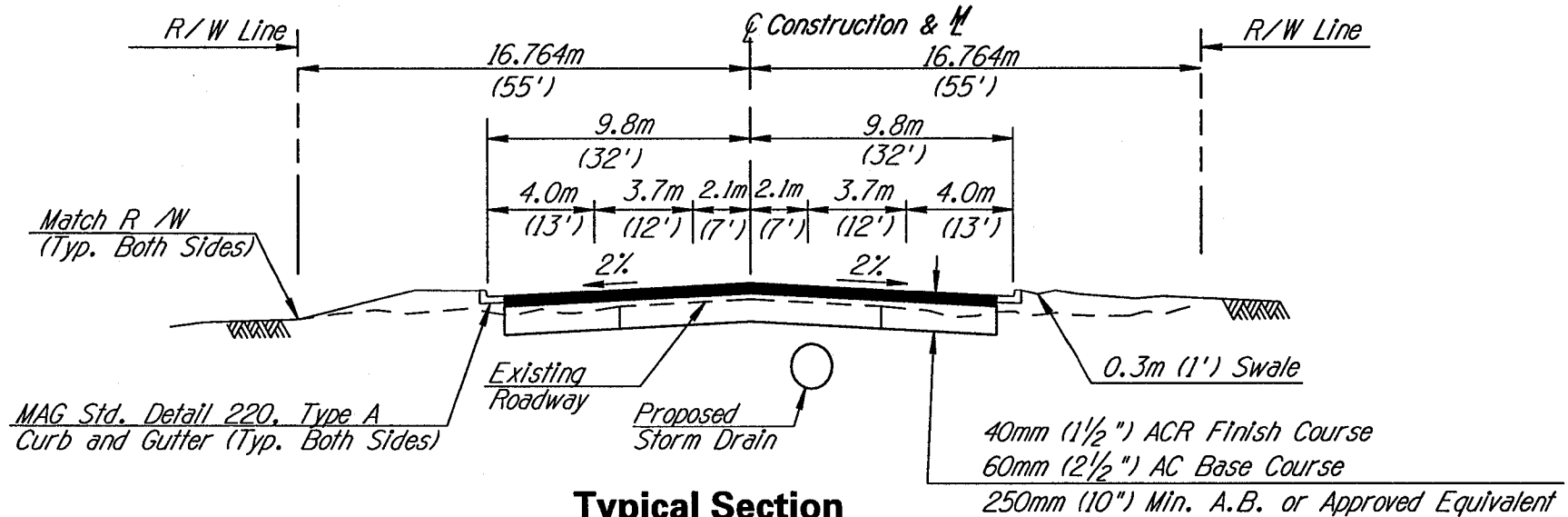
Alternative 2 is the "Full Cost" Alternative as described in CAR. This Alternative consists of the same pavement dimensions as described in Alternative 1 with 1.5 meter (5-foot) sidewalks offset from the roadway (See Figure 5 for section). This is the City of Peoria 5-lane section. Drainage requirements and design would be the same as described in Alternative 1.

8.3. No Build Alternative

A No-Build Alternative will not be discussed in this report. The CAR did not investigate this alternative.



Typical Section
Station 10+070 to 10+308



Typical Section
Station 10+308 to 10+510
Station 11+250 to 11+600

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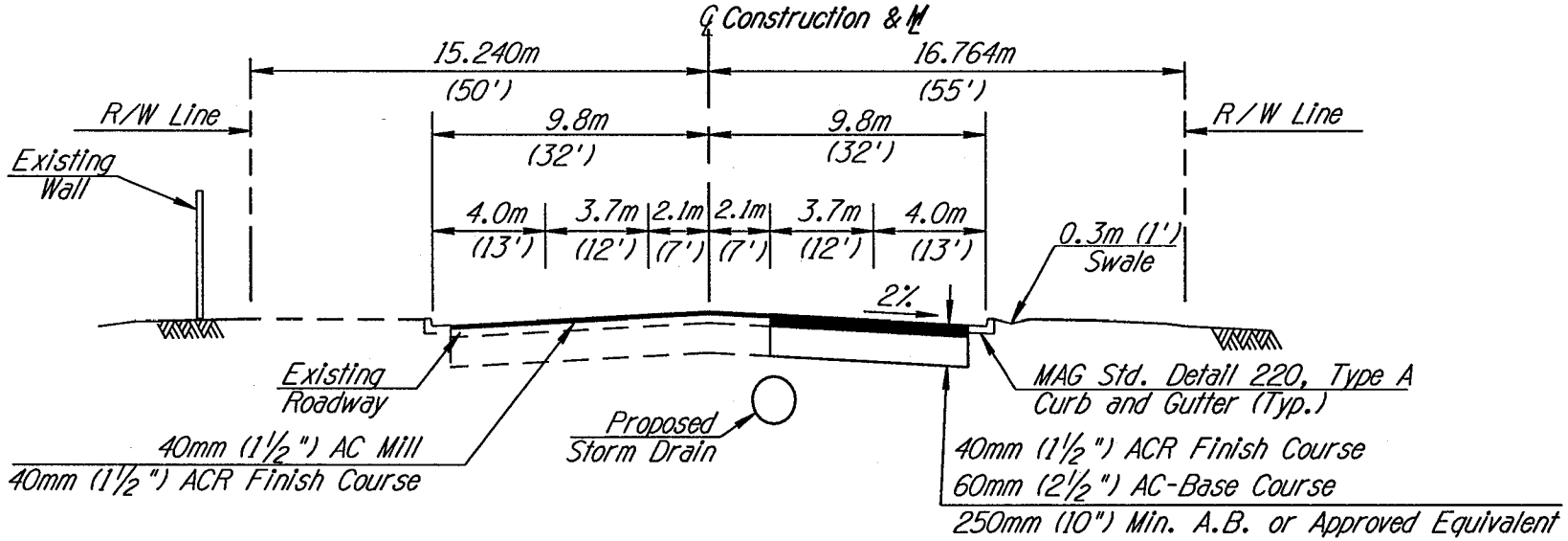
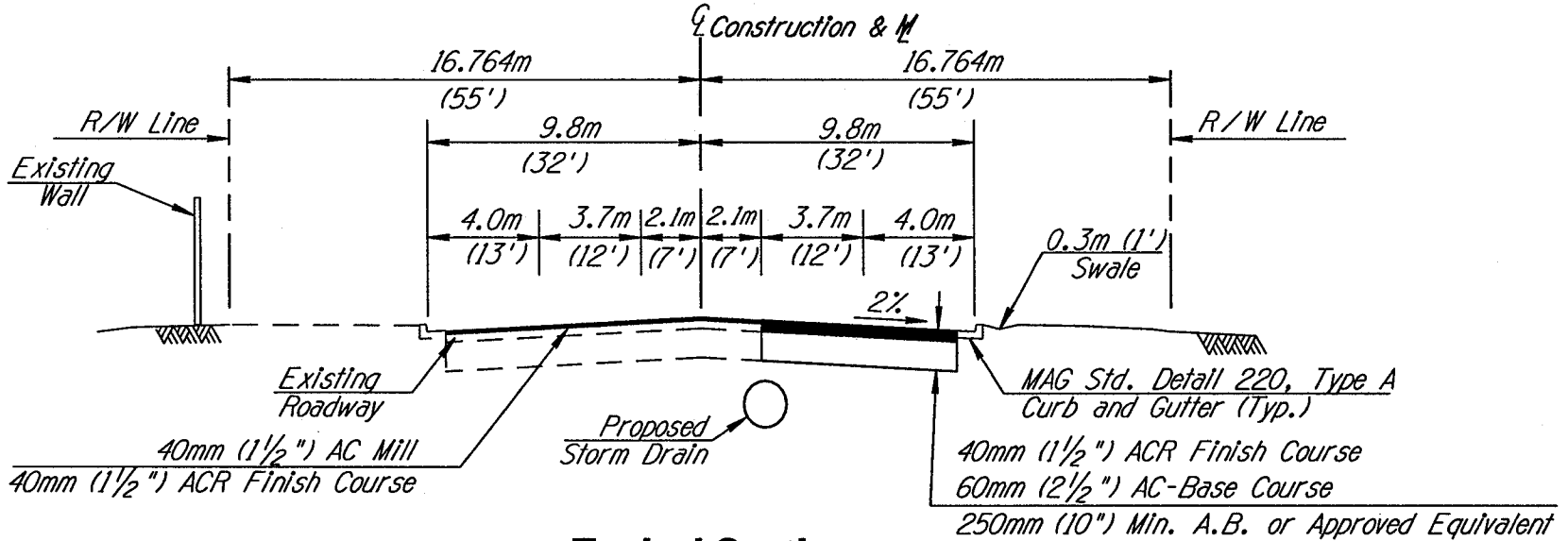
83rd Avenue
Northern Avenue To Olive Avenue

Figure 5A



Typical Section
Station 10+510 to 10+750



Typical Section
Station 10+750 to 11+250

PBS&J
Pointe Business Plaza.
7227 N. 16th St., Suite 207
Phoenix, Arizona 85020
Telephone: 602/943-1003
Fax: 602/943-1303
ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

83rd Avenue
Northern Avenue To Olive Avenue

Figure 5B

9.0 DISCUSSION AND ANALYSIS OF ALTERNATIVES

9.1. Analysis of Alternative 1

Alternative 1, the "Low Cost" Alternative will connect to the improvements proposed by McDOT approximately 70 meters north of the intersection of Northern Avenue. This will lessen the costs required to complete the construction. Also, the drainage systems proposed by McDOT and FCDMC will be extended to accommodate the required roadway catch basins and pipes. This alternative results in the lower costs of construction and the lanes required.

9.2. Analysis of Alternative 2

Alternative 2, the "Full Cost" Alternative would require a larger offset, 6.7 meters (22 feet) at the south end of the project, the intersection of Northern Avenue and 83rd Avenue, in order to accommodate the sidewalk described in the alternative description. This alternative would require reconstruction of the intersection of 83rd Avenue and Northern Avenue due to the greater offset than is designed in the Northern Avenue (Loop 101 to 67th Avenue) plans. This results in greater costs of construction and of greater costs of right-of-way required just north of Northern Avenue. For the remaining length of the project, the only difference between Alternative 1 and Alternative 2 is the addition of sidewalk. This alternative was investigated in the CAR and the findings there are carried forward to this report. For the cost estimate, the roadway quantities from the CAR were used with updated 1998 cost information provided by McDOT. The drainage costs are the same for Alternative 2 and Alternative 1. The right-of-way requirements and the utility relocation requirements were obtained from the CAR, but the cost basis obtained for the DCR and used for Alternative 1 will be used.

9.3. No-Build Alternative

The No-Build Alternative was not investigated for either the CAR or this DCR.

9.4. Comparison Matrix and Conclusions

TABLE 11.4-1 – Alternative Cost Comparison Matrix

Category	Alternative 1	Alternative 2
Construction	$1,512,848	*$1,790,018
Right-of-Way	$52,310	*$80,553
Utility Relocation	*$348,000	*$348,000
Design (12% Construction)	$181,542	$214,802
Administration (10% Construction)	$151,285	$179,002
Construction Management (15% Construction)	$226,927	$268,503
Total	**$2,472,912**	**$2,880,878**

* Based upon quantities calculated for the CAR.

The costs are based upon quantities and cost breakdowns included in Appendix F. This table includes 1998 costs only. For 5 year projected costs, see Appendix F.

9.5. Summary Recommendations

The recommendation of this DCR is to proceed with Alternative 1, the Low Cost Alternative, as recommended in the CAR.

10.0 UTILITY INFORMATION

10.1. Summary of Utility Owner Information

There are currently many different utilities located along 83rd Avenue between Northern Avenue and Olive Avenue. These utilities are owned by the City of Peoria, McDOT, SRP Power and Irrigation, Cox Communication, US West Telephone and Southwest Gas. The utilities are shown on the plans included in the Appendix.

10.2. Electric Power Facilities and Impacts

A high voltage power line (69kV) and towers are located within an 100.584 meter (330 foot) easement crossing 83rd Avenue . The location of this is shown on the plans. The tower located on the east side of the roadway will infringe upon the proposed right-of-way. An easement will need to be granted to SRP to maintain the location of the tower. A 12 kV power line is currently located on poles along the west side of 83rd Avenue. These poles will need to be relocated in order to achieve the required clear zone.

10.3. Irrigation District Facilities and Impacts

There is an 18-inch HWCP SRP irrigation waste pipe located along the east side of 83rd Avenue from south of Las Palmaritas Drive to Butler Avenue. The centerline of the pipe is 11.58 meters (38-feet) from the centerline of 83rd Avenue. This connects into a 30-inch pipe crossing 83rd Avenue to an existing waste ditch running to the southwest. The outlet of this pipe may need to be extended to the west. The existing irrigation waste pipe may need to be relocated or an easement will need to be granted to SRP.

10.4. Private Irrigation Facilities and Impacts

There are no records of any private irrigation facilities located along the roadway.

10.5. Municipal and Other Local Utility Impacts

There are existing waterlines and sanitary sewer lines belonging to the City of Peoria located in 83rd Avenue. Manhole and water valve adjustments will be required, but no relocations.

10.6. Other Utility Impacts

These are no other utilities which will have any impacts to the roadway except for valve and manhole adjustments.

10.7. Utilities That May Have Prior Rights

SRP may have prior rights for their irrigation facilities located along 83rd Avenue.

10.8. Basis of Project Utility Relocation Cost Estimates

The cost estimate is based upon the need to relocate 10 utility poles to obtain the required clear zone.

11.0 COST ESTIMATES

11.1. Preliminary Construction Cost

The preliminary construction costs in 1998 dollars are $1,745,308.

11.2. Summary Project Cost

For a complete cost breakdown for this project, see Appendix F.

11.3. Partnering Opportunities

Per the CAR, there is a possibility that the City of Peoria will enter into an Intergovernmental Agency Agreement (IGA) with Maricopa County for the construction of 83rd Avenue. The City would then assess development fees to developers along 83rd Avenue. The City also has plans to annex this section of 83rd Avenue upon completion of the improvements.

11.4. Construction Costs in Other Jurisdictions

There are no construction costs located in other jurisdictions.

12.0 REFERENCES

McDOT C97-2731-11, "Final Candidate Assessment Report – 83rd Avenue – Northern Avenue to Olive Avenue," HNTB Corporation, February 1997.

FCDMC WP#94153.02, "Design Report for Northern and Butler Storm Drains, Northern/Orangewood – Phase II," Wood, Patel & Associates, February 1998.

FCDMC, "Glendale-Peoria Area Drainage Master Plan," Camp Dresser & McKee, Inc., May 1987.

McDOT Project Number 68915, "Northern Avenue – Loop 101 to 67th Avenue – 70% Preliminary Design," Stanley Consultants, Inc., July 1998.

13.0 APPENDIX MATERIALS

Appendix A – Traffic Impact Study by HNTB dated January 20, 1997

Appendix B – Drainage Information for Projects proposed by McDOT and FCDMC

Appendix C – Summary of Hydrologic and Hydraulic Results

Appendix D - McDOT Pavement Rating Descriptions

Appendix E – Public Process Information

Appendix F – Cost Estimates

Appendix G – Project Conceptual Plans

Appendix H – Environmental Information (to be supplied by McDOT)

Appendix I – Geotechnical Engineering & Pavement Design (to be supplied by McDOT)

Appendix J – Photographs

MCDOT TRANSPORTATION PLANNING DIVISION

C97-2731-11

83rd AVENUE - NORTHERN AVENUE TO OLIVE AVENUE

FINAL
TRAFFIC IMPACT STUDY

Prepared by:

HNTB Corporation
Two Renaissance Square
40 North Central, Suite 300
Phoenix, Arizona 85004
(602) 528-4300

January 20, 1997

I. INTRODUCTION AND SUMMARY

Purpose and Study Objectives

This Traffic Impact Study has been conducted to assess the existing and projected traffic conditions on 83rd Avenue between Northern Avenue and Olive Avenue in the vicinity of the Cities of Glendale and Peoria. The study is to be included in a Candidate Assessment Report (CAR) on 83rd Avenue for the Maricopa County Department of Transportation (MCDOT). Exhibit 1 shows the location and surrounding street network of the study area.

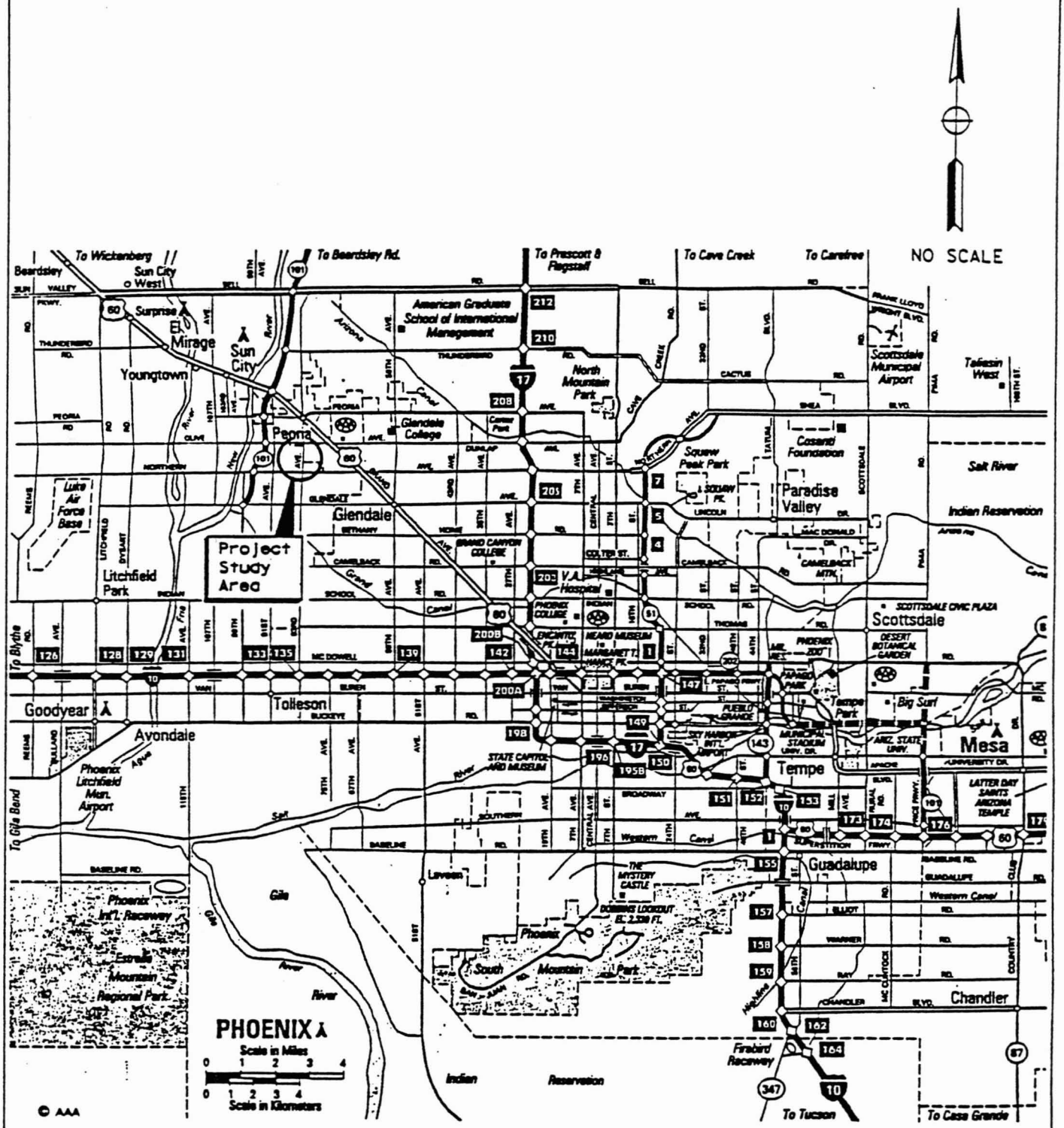
This study evaluates both the existing and future traffic volumes utilizing both the current and proposed street geometry. The study documents the potential traffic impacts that may occur in the year 2020 as compared to existing conditions. Each intersection was evaluated using existing geometry for both the existing and projected year 2020 traffic volumes. This approach allows a determination to be made as to whether the current geometry is adequate to accommodate projected future 2020 volumes. The intersections were evaluated using the proposed geometry and document the expected improvements in traffic flow in the year 2020.

Executive Summary

83rd Avenue is a north-south arterial that traverses Cities of Glendale and Peoria. It is approximately thirteen miles in length and extends from Buckeye Road to the south to Bell Road to the north. Currently, the study segment of 83rd Avenue is carrying approximately 17,500 vehicles per day.

Site Location and Study Area - The study area is historically agricultural in use, but it is being developed into suburban uses including residential and business developments. The segment of 83rd Avenue under consideration, approximately 1.6 km (1 mile) in length, is bounded by Northern Avenue to the south and Olive Avenue to the north. It is currently a two lane arterial and is classified as a Urban Minor Arterial Street (a four lane street) by the City of Peoria Master Plan. This segment of 83rd Avenue falls within both the City of Peoria and the Maricopa County. The intersection of 83rd Avenue and Northern Avenue falls within the County, while the intersection of 83rd Avenue and Olive Avenue is within the City of Peoria. Exhibit 2 shows the proposed study segment and intersections.

The MCDOT has identified safety and congestion issues within this segment of 83rd Avenue. It was observed by County staff and recorded in a Capital Improvement Project Request Form dated August 27, 1996 that demand is exceeding existing capacity. Also, current pavement conditions are "in poor condition and will require extensive maintenance costs to restore road to status." A copy of this Capital Improvement Project Request Form is provided in Appendix C. The project under consideration is to improve 83rd Avenue to four lanes (two in each direction). This study will focus on this segment of 83rd Avenue as well as determining the lane assignments at the two intersections for projected future traffic.



SOURCE: AUTOMOBILE CLUB OF SOUTHERN CALIFORNIA

EXHIBIT 1

REGIONAL VICINITY
83rd AVENUE
NORTHERN AVENUE TO OLIVE AVENUE

HNTB

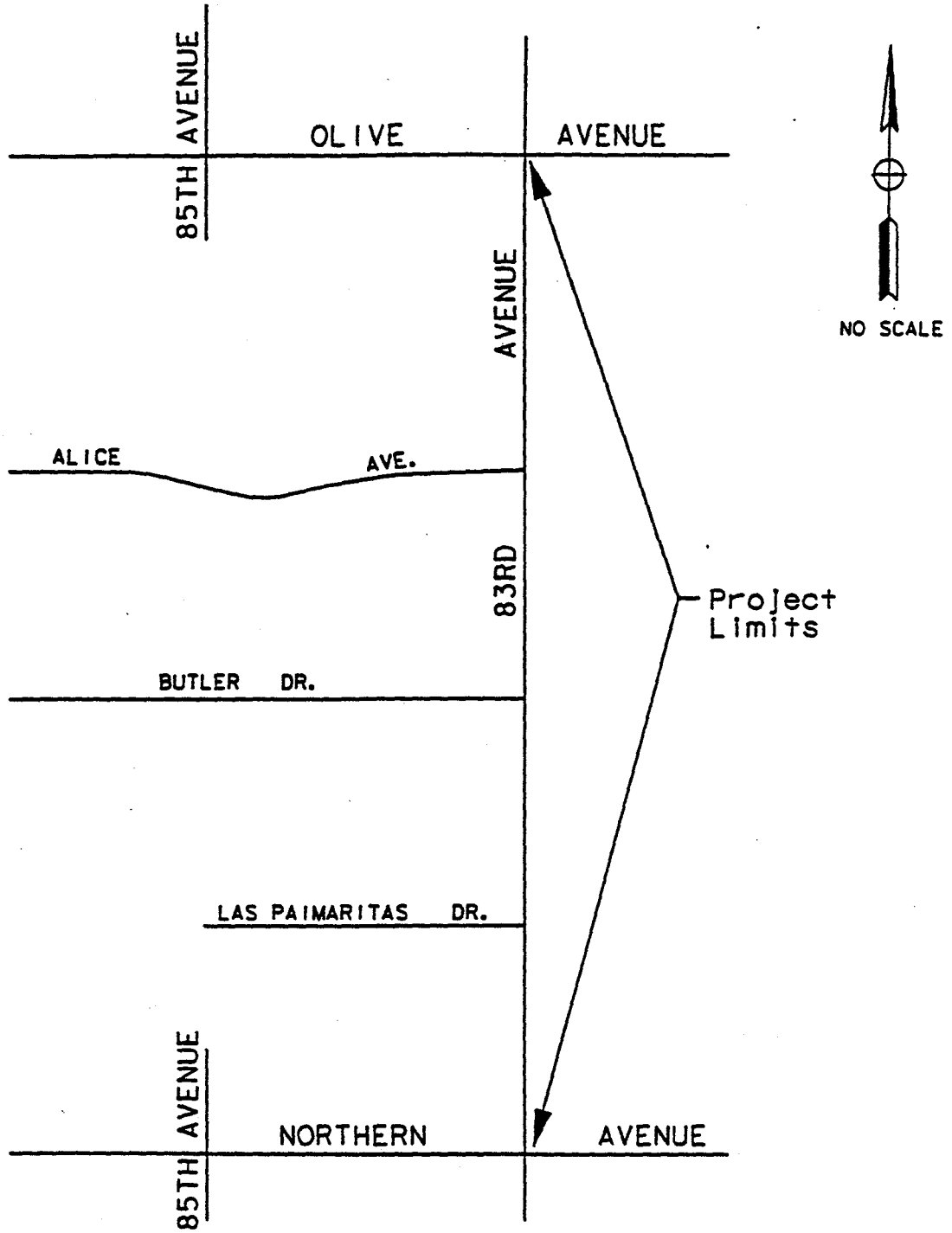


EXHIBIT 2

SITE PLAN
83RD AVENUE
NORTHERN AVENUE TO OLIVE AVENUE

HNTB

2. EXISTING CONDITIONS

Existing Conditions

83rd Avenue - The segment of 83rd Avenue under study is essentially unimproved paved roadway, 7.9 meter (26 foot) wide within a minimum 24.6 meters (80 feet) right-of-way. A majority of the 26 foot width exists in the vicinity of both intersections. Some sections of roadway are comprised of full width improvements on the west half along the residential development up to 10.4 meters (34 feet) pavement width from the centerline. Currently there are two lanes (one in each direction) with a painted median. The posted speed limit on the study segment of 83rd Avenue is 60 km/h (40 mph).

83rd Avenue and Northern Avenue - This intersection is a four leg signalized intersection. It is within Maricopa County jurisdiction and the signal operation is currently fully actuated with a 2-phase, 60 second cycle per MCDOT staff. This intersection is maintained and operated by Maricopa County. The existing geometry for each approach of this intersection is comprised of one exclusive left and one though/right option lane. Each approach provides a pedestrian crosswalk.

The posted speed limit on Northern Avenue is 80 km/h (50 mph). The posted speed limits on 83rd Avenue are 60 km/h (40 mph) north of this intersection and 70 km/h (45 mph) south of this intersection.

83rd Avenue at Olive Avenue - This intersection is a four leg signalized intersection. It is within the City of Peoria jurisdiction. The signal phasing is currently a 2-phase operation. This traffic signal is currently maintained and operated by the City of Peoria. The existing geometry for each approach is comprised of one exclusive left, one through and one through/right option lane. This intersection does not provide pedestrian crosswalks.

The posted speed limit on Olive Avenue is 70 km/h (45 mph). The posted speed limits on 83rd Avenue are 60 km/h (35 mph) north of this intersection and 60 km/h (40 mph) south of this intersection.

III. TRAFFIC VOLUMES

Existing Traffic

Both existing (1996) and future (2020) Average Daily Traffic (ADT) volumes were provided by the MCDOT. Exhibit 3 is provided to show both the 1996 and projected 2020 ADT's. Turning movement traffic counts were conducted at the two intersections in November of 1996 for both the morning and evening peak periods. Exhibit 4 shows existing AM and PM peak hour turning movements at the two study intersections. Detailed AM and PM peak hour counts taken at the two intersections are provided in Appendix A.

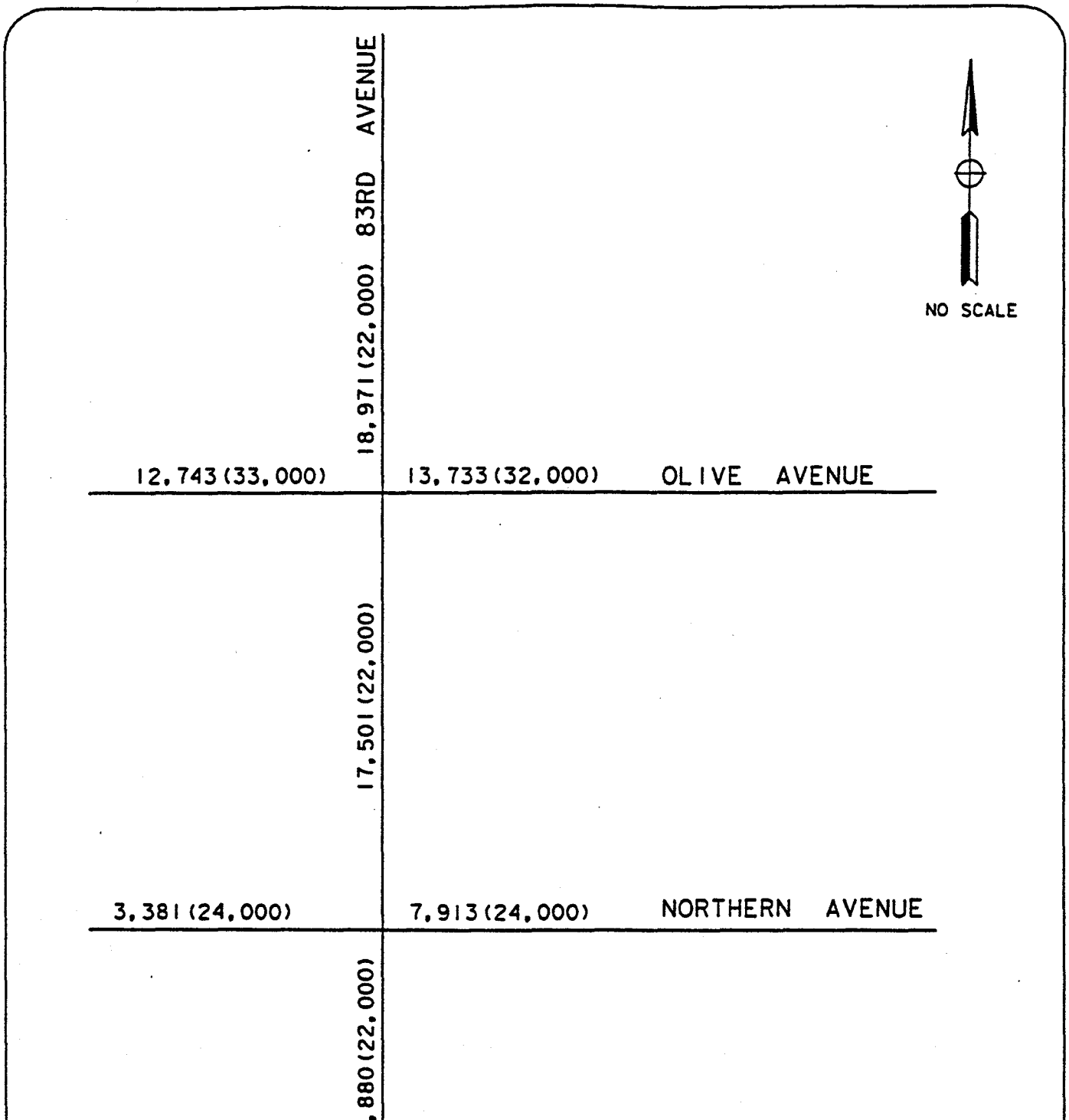


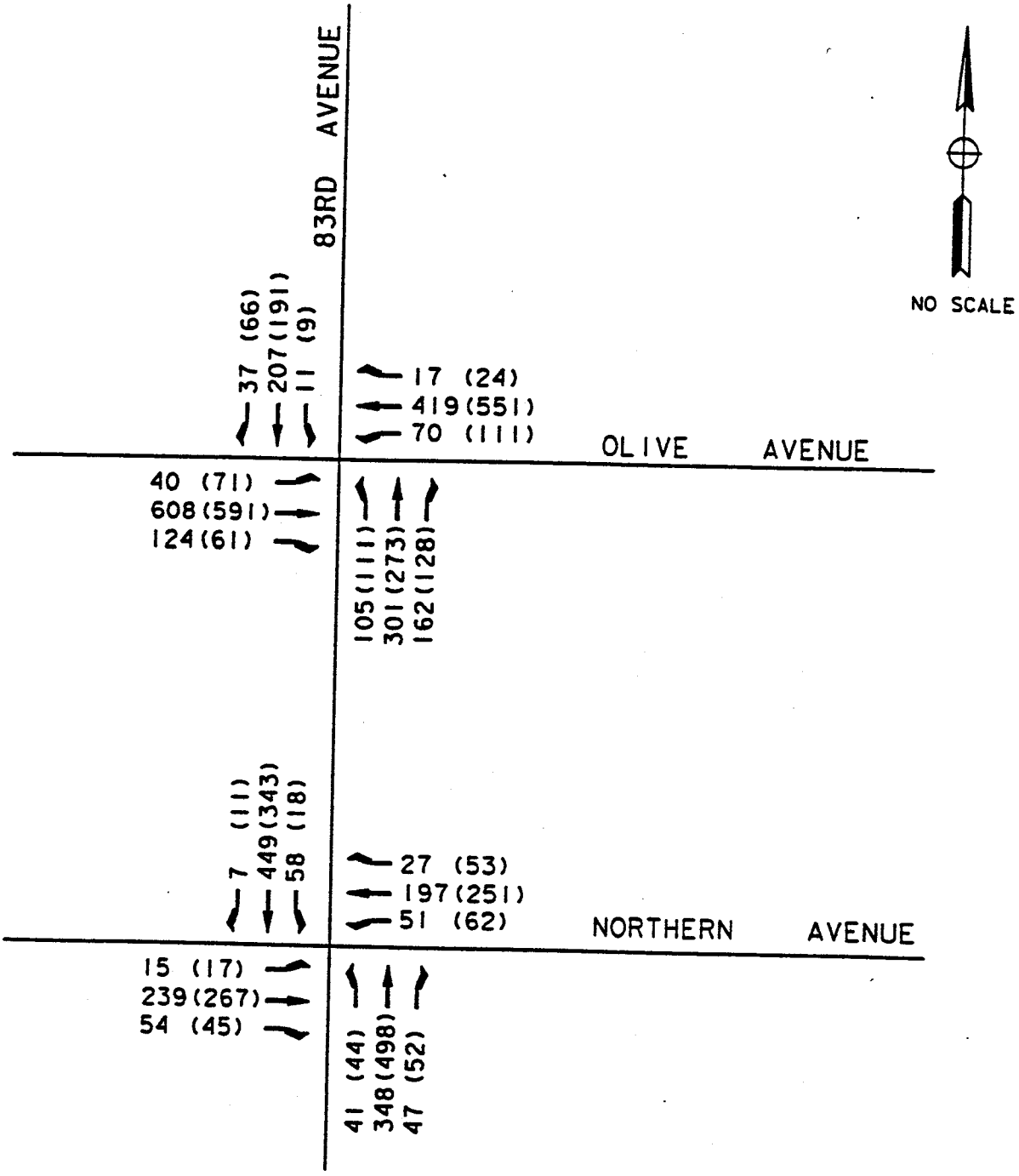
EXHIBIT 3

LEGEND

1996 (2020) ADT

AVERAGE DAILY TRAFFIC
83RD AVENUE
NORTHERN AVENUE TO OLIVE AVENUE

HNTB



LEGEND

AM (PM) PEAK HOUR VOLUME

EXHIBIT 4

EXISTING PEAK HOUR TURNING MOVEMENTS 83RD AVENUE NORTHERN AVENUE TO OLIVE AVENUE

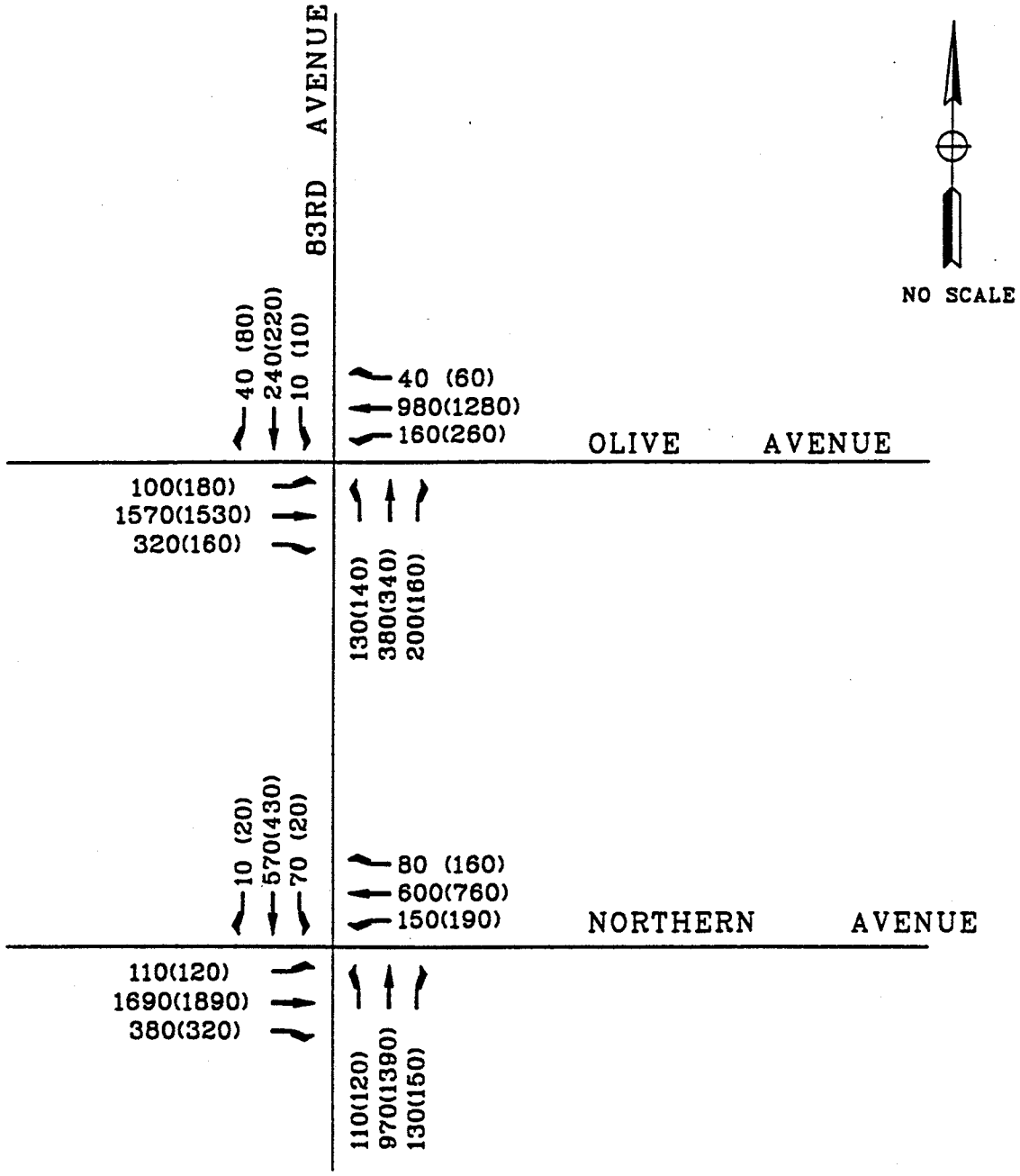
HNTB

Future Traffic

Future peak hour traffic volumes for the year 2020 were calculated by utilizing the current peak hour count volumes, current ADT volumes and projected 2020 ADT volumes. By comparing the existing ADT volumes to the existing peak hour volumes at each approach, a percentage for peak hour approach volumes was determined. These percentages were then applied to the 2020 ADT volumes for each approach and the peak hour approach volumes for the year 2020 were determined. The results of this process is shown in Exhibit 5, the projected 2020 peak hour turning movement counts.

Next, the current total peak hour volumes for each approach were compared against each turning movement for that respective approach. This yielded a percentage of vehicles turning a giving direction per the approach peak hour volumes. These percentages were applied to the 2020 peak hour approach volumes and the 2020 peak hour turning movement volumes were determined. These calculations are included in Appendix B for each movement of the northbound approach during the pm peak hour.

Utilizing the current peak hour count volumes, current ADT volumes and projected 2020 ADT volumes a yearly growth percentage was determined following the same procedures discussed above and dividing the calculated data by 24 years. This allows further analysis to be performed to supplement the final conclusions.



LEGEND

AM (PM) PEAK HOUR VOLUME

EXHIBIT 5

NOTE: PROJECTED VOLUMES HAVE BEEN ROUNDED TO THE NEAREST 10

PROJECTED 2020 PEAK HOUR TURNING MOVEMENTS 83RD AVENUE NORTHERN AVENUE TO OLIVE AVENUE

HNTB

p:\irvw00\projects\EXHIBITS.dgn

IV. TRAFFIC ANALYSIS

The traffic analysis was performed in accordance with the Maricopa County Department of Transportation staff and Maricopa County Traffic Impact Procedures dated February, 1994. According to the County Procedures, when urban roadways have signal controlled intersections at or less than a mile apart, the capacity of the roadway is dominated by the intersections and roadway LOS calculations are not required. Due to the fact that the distance between Northern Avenue and Olive Avenue is approximately one mile, a volume/capacity analysis was not conducted on this specific segment of 83rd Avenue. HNTB evaluated the two intersections mentioned earlier for potential AM and PM peak hour traffic impacts in the vicinity of the project.

The traffic analysis was prepared based on a study horizon year of 2020 as directed by County staff. It was also decided that a detailed related project analysis and implementing an ambient growth factor were not necessary due to the fact that the 2020 Average Daily Traffic volumes provided by the County (MAG 2020 Assignment) were modeled by taking these variables into account.

The relative impact of added traffic volumes for the AM and PM peak hours for the year 2020 has been evaluated based on the analysis performed on the two intersections . Volume/Capacity analysis at the two intersections was conducted using the methods described in the Highway Capacity Manual for signalized intersections per the County's procedures. The result is expressed in terms of level of service (LOS), which is a qualitative concept used to describe the quality of traffic flow. LOS vary from A to F, LOS A relating to "free-flow" and LOS F to "jammed' conditions. Table 1 describes the various levels of service.

TABLE 1

INTERSECTION LEVEL OF SERVICE INTERPRETATION

Level of Service	Description	Volume to Capacity Ratio
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	≤ 0.59
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	0.60-0.69
C	Good operation. Occasionally drivers may have to wait more than 60 seconds, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	0.70-0.79
D	Fair operation. Cars are sometimes required to wait more than 60 seconds during short peaks. There are no long-standing traffic queues. This level is typically associated with design practice for peak periods.	0.80-0.89
E	Poor Operation. Some long-standing vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes.	0.90-0.99
F	Forced flow. Represents jammed conditions. Backups form locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	≥ 1.00

Source: Highway Capacity Manual, Special Report 209, Transportation Research Board, Washington , D. C., 1985 and Interim Materials on Highway Capacity, NCHRP Circular 212, 1982.

Table 3

Intersection Level of Service

2020 Traffic Conditions
Existing Roadway Geometry

Intersection	AM PEAK HOUR		PM PEAK HOUR	
	LOS	V/C	LOS	V/C
83rd Avenue & Northern Avenue	F	*	F	*
83rd Avenue & Olive Avenue	F	*	F	*

MITIGATION

To provide an acceptable LOS at the intersection of 83rd Avenue and Northern Avenue it is proposed to incorporate two exclusive left turn lanes, three through lanes and an exclusive right turn lane on the eastbound approach. On the westbound approach it proposed to incorporate two exclusive left turn lanes, two through lanes and one through/right lane. On the northbound approach it is proposed to incorporate two exclusive left turn lanes, three through lanes and an exclusive right turn lane. On the southbound approach it is proposed to incorporate one exclusive left turn lane, one through lanes and one through/right option lane.

To provide an acceptable LOS at the intersection of 83rd Avenue and Olive Avenue it is proposed to incorporate two exclusive left turn lanes, two through lanes and one through/right option lane for both the eastbound and westbound approaches. On the northbound approach it is proposed to incorporate two exclusive left turn lanes, and one exclusive right turn lane. On the southbound approach it is proposed to incorporate one exclusive left turn lane and two through lanes.

A LOS analysis was performed for the two study intersections using the projected 2020 volumes with the above mentioned mitigation improvements to the intersections. Table 4 summarizes the volume-capacity analysis (ICU) results for the study intersections. This reveals that by incorporating the proposed improvements, the intersections will operate at a LOS D. This translates to an acceptable LOS at each intersection in the year 2020.

Table 4

Intersection Level of Service

2020 Traffic Conditions
Proposed Roadway Geometry

Intersection	AM PEAK HOUR		PM PEAK HOUR	
	LOS	V/C	LOS	V/C
83rd Avenue & Northern Avenue	D	.669	D	.726
83rd Avenue & Olive Avenue	D	.682	D	.847

As part of the proposed improvements a queuing analysis was conducted per the County guidelines. To be conservative, the peak hour that had the greater volume of vehicles turning for each movement was used. Appendix D provides these calculations. The length of each turn pocket is shown in Appendix D for each turning movement.

V. CONCLUSIONS

In the Maricopa County Department Transportation Roadway Design Manual, Section 2.3 *Traffic Impact Studies,* it allows for LOS C for a design objective at intersections. It states that no intersection through lane movement shall fall below LOS D, and no intersection turning movement shall fall below LOS E. Per these guidelines, the results of this study indicate that for the year 2020 a LOS F or worse can be expected with the current geometry.

Based on these findings, the mitigation improvements are required in order to achieve an acceptable LOS for the study intersections. It was also determined through analyses that by the year 2001, the existing intersection geometry will no longer support an acceptable LOS. By calculating a percentage increase of traffic per year (calculating the percentage increase between the year 1996 ADT and the 2020 ADT and dividing that by 24 years to get a yearly increase), it was determined that the two study intersections will encounter a LOS E or worse in the year 2001.

In addition to the mitigation improvements discussed, signal system and timing refinements will also be required to accommodate the future traffic volumes. As discussed, the proposed mitigation measures will provide the motorists with intersections that will operate at acceptable levels of service.

MCDOT TRANSPORTATION PLANNING DIVISION

83rd AVENUE - NORTHERN AVENUE TO OLIVE AVENUE

TRAFFIC IMPACT STUDY

APPENDIX A

SUSAN MEDLAND

Two Vehicle Analysis with Right on Red

Date: 12/05/1996

[redacted]ation: OLIVE AVE. & 83RD AVE.
[redacted]es : 83RD AVE.=N/S
[redacted]y ID: 647A
[redacted]rator: TRA
[redacted]ther : CLEAR

Starts : 12/04/96 at 07:00:00
Ends : 12/04/96 at 09:00:00
Interval : 15 min Intervals: 8
S/N : 0 Type: C,Tr,Ped-rt/red
Correction: 1.00

[redacted]g[redacted]s		From North				From South				From East				From West				Interval
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12/04/1996																		
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	Truck	0	0	0	0	0	1	4	1	0	0	11	2	0	0	4	0	23
		0			0				0				0				0	0
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	Truck	0	0	1	0	0	1	2	3	0	1	4	3	0	0	6	1	22
		0			0				0				0				0	0
Hour	Auto	0	10	204	37	0	102	291	157	0	66	383	12	0	40	587	122	2011 <
	Truck	0	1	3	0	0	3	10	5	0	4	36	5	0	0	21	2	90
		0			0				0				0				0	0
	All	0	11	207	37	0	105	301	162	0	70	419	17	0	40	608	124	2101
	%	0.0	0.5	9.9	1.8	0.0	5.0	14.3	7.7	0.0	3.3	19.9	0.8	0.0	1.9	28.9	5.9	100.0%
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	All	0	20	95	33	0	51	128	90	0	43	348	16	0	28	447	53	1352
	%	0.0	1.5	7.0	2.4	0.0	3.8	9.5	6.7	0.0	3.2	25.7	1.2	0.0	2.1	33.1	3.9	100.0%

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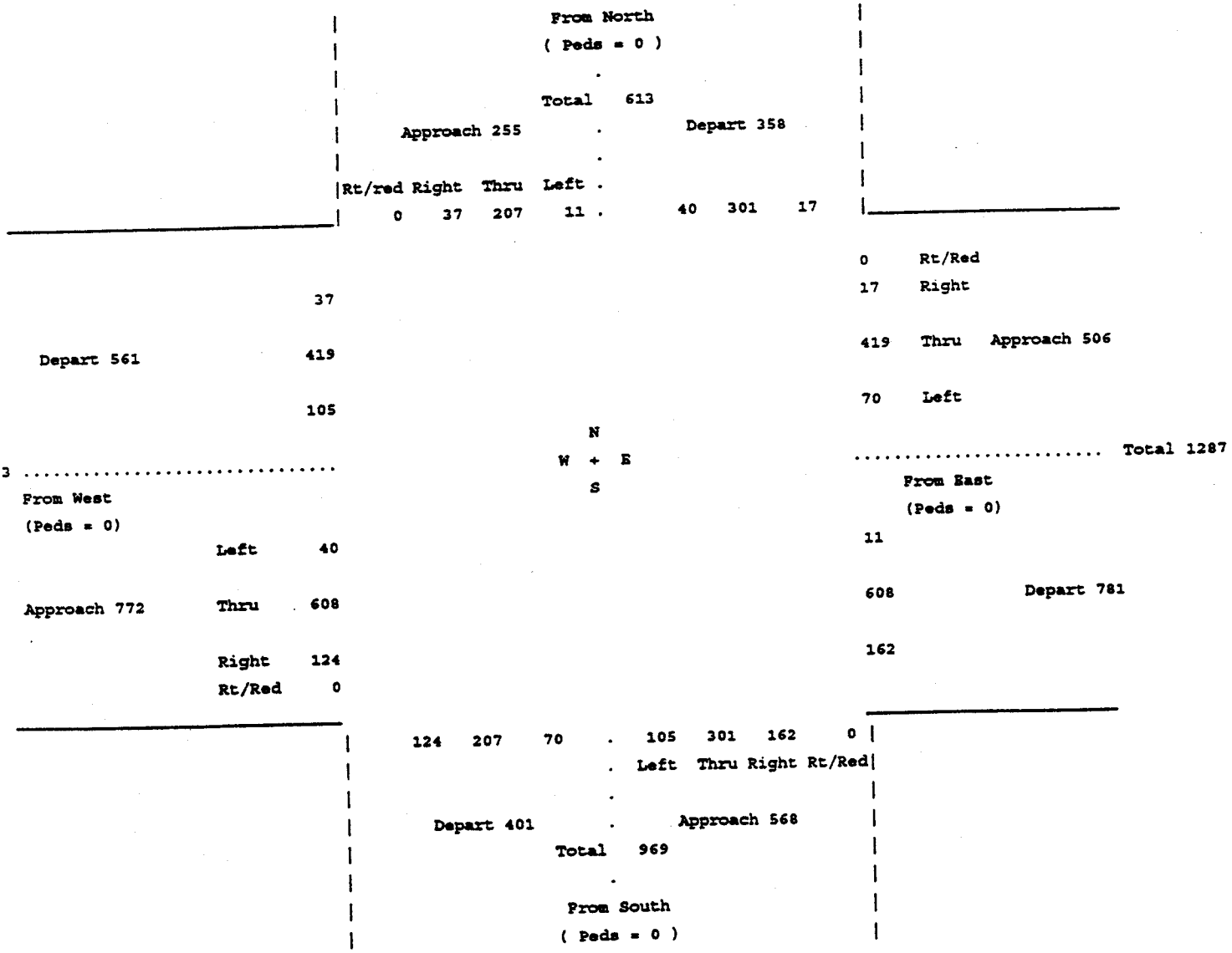
dy ID: 647A                    Interval :  15 min  Intervals: 8
rator: TRA                     S/N : 0          Type: C,Tr,Ped-rt/red
ther : CLEAR                   Correction: 1.00
**********************************************************************
```

TOTAL INTERSECTION PEAK HOUR ANALYSIS

al Intersection Peak is: Wed Dec 04 07:00:00 1996

	VOLUME						Peak	PERCENTS				
ECTION	Peds	Rt/Red	Left	Thru	Right	Total	Factor	Rt/Red	Left	Thru	Right	Total
North	0	0	11	207	37	255	0.80	0.0%	4.3%	81.2%	14.5%	100.0%
South	0	0	105	301	162	568	0.61	0.0%	18.5%	53.0%	28.5%	100.0%
East	0	0	70	419	17	506	0.95	0.0%	13.8%	82.8%	3.4%	100.0%
West	0	0	40	608	124	772	0.98	0.0%	5.2%	78.8%	16.1%	100.0%
s	0	0	226	1535	340	2101	0.85	0.0%	10.8%	73.1%	16.2%	100.0%



Two Vehicle Analysis with Right on Red

****

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es : 83RD AVE.=N/S
dy ID: 647P
rator: TRA
ther : CLEAR

Starts : 12/04/96 at 16:00:00
Ends : 12/04/96 at 18:00:00
Interval : 15 min Intervals: 8
S/N : 0 Type: C,Tr,Ped-rt/red
Correction: 1.00

****

		From North				From South				From East				From West				Interval
ins		0	Left	Thru	Right	0	Left	Thru	Right	0	Left	Thru	Right	0	Left	Thru	Right	Total
12/04/1996																		
5:00	Auto	0	4	30	15	0	18	70	28	0	14	114	6	0	20	150	17	486 <
	Truck	0	0	1	1	0	1	4	4	0	0	4	0	0	0	11	1	27
		0			0				0				0				0	0
6:15	Auto	0	4	36	10	0	20	63	26	0	22	124	3	0	11	111	9	439 <
	Truck	0	1	5	0	0	1	2	2	0	0	2	0	0	0	7	2	22
		0			0				0				0				0	0
30	Auto	0	3	37	14	0	27	66	23	0	43	105	7	0	23	150	14	512 <
	Truck	0	1	2	0	0	0	2	1	0	1	4	0	0	1	6	0	18
		0			0				0				0				0	0
45	Auto	0	2	46	16	0	16	69	22	0	29	132	7	0	11	144	16	510 <
	Truck	0	1	0	1	0	0	0	2	0	0	1	2	0	0	2	1	10
		0			0				0				0				0	0
Hour	Auto	0	13	149	55	0	81	268	99	0	108	475	23	0	65	555	56	1947 <
	Truck	0	3	8	2	0	2	8	9	0	1	11	2	0	1	26	4	77
		0			0				0				0				0	0
	All	0	16	157	57	0	83	276	108	0	109	486	25	0	66	581	60	2024
	%	0.0	0.8	7.8	2.8	0.0	4.1	13.6	5.3	0.0	5.4	24.0	1.2	0.0	3.3	28.7	3.0	100.0%
00	Auto	0	1	51	24	0	23	64	38	0	23	120	4	0	16	127	14	505 <
	Truck	0	0	2	1	0	3	2	0	0	0	1	0	0	0	5	0	14
		0			0				0				0				0	0
15	Auto	0	2	43	11	0	32	69	38	0	23	148	2	0	21	157	16	562 <
	Truck	0	0	0	0	0	1	0	0	0	1	1	0	0	1	6	0	10
		0			0				0				0				0	0
30	Auto	0	3	49	12	0	35	69	28	0	35	148	9	0	22	147	14	571 <
	Truck	0	0	0	1	0	1	0	0	0	0	0	0	0	0	3	0	5
		0			0				0				0				0	0
45	Auto	0	2	54	20	0	30	55	14	0	26	107	1	0	19	149	12	489 <
	Truck	0	0	1	0	0	0	0	1	0	0	0	1	0	0	3	0	6
		0			0				0				0				0	0
Hour	Auto	0	8	197	67	0	120	257	118	0	107	523	16	0	78	580	56	2127 <
	Truck	0	0	3	2	0	5	2	1	0	1	2	1	0	1	17	0	35
		0			0				0				0				0	0
	All	0	8	200	69	0	125	259	119	0	108	525	17	0	79	597	56	2162
	%	0.0	0.4	9.3	3.2	0.0	5.8	12.0	5.5	0.0	5.0	24.3	0.8	0.0	3.7	27.6	2.6	100.0%

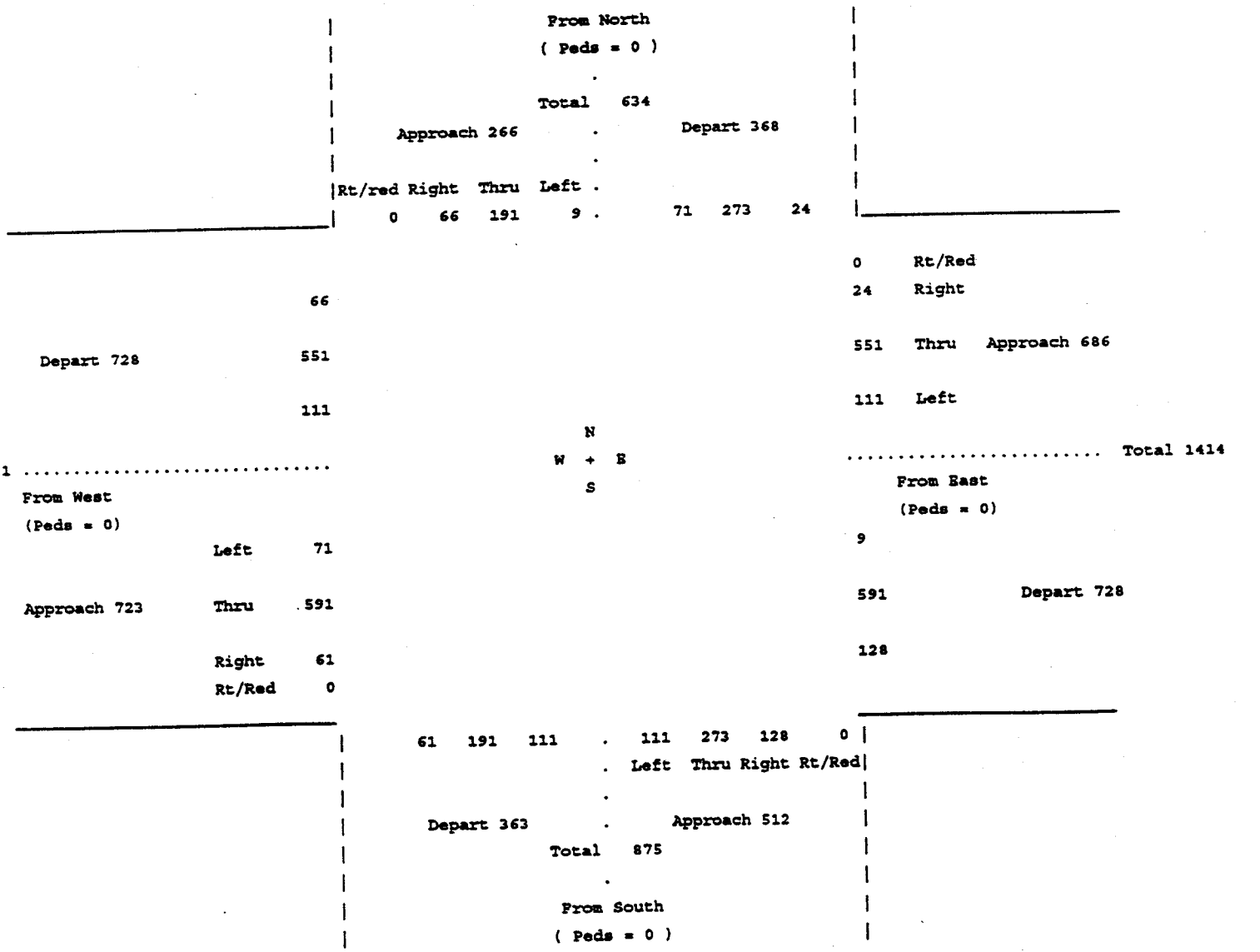
ation: OLIVE AVE. & 83RD AVE.
es : 83RD AVE.=N/S
dy ID: 647P
rator: TRA
ther : CLEAR

Starts : 12/04/96 at 16:00:00
Ends : 12/04/96 at 18:00:00
Interval : 15 min Intervals: 8
S/N : 0 Type: C,Tr,Ped-rt/red
Correction: 1.00

TOTAL INTERSECTION PEAK HOUR ANALYSIS

l Intersection Peak is: Wed Dec 04 16:45:00 1996

	VOLUME						Peak	PERCENTS				
CTION	Peds	Rt/Red	Left	Thru	Right	Total	Factor	Rt/Red	Left	Thru	Right	Total
North	0	0	9	191	66	266	0.84	0.0%	3.4%	71.8%	24.8%	100.0%
South	0	0	111	273	128	512	0.91	0.0%	21.7%	53.3%	25.0%	100.0%
East	0	0	111	551	24	686	0.89	0.0%	16.2%	80.3%	3.5%	100.0%
West	0	0	71	591	61	723	0.90	0.0%	9.8%	81.7%	8.4%	100.0%
	0	0	302	1606	279	2187	0.95	0.0%	13.8%	73.4%	12.8%	100.0%



Two Vehicle Analysis with Right On Red

[redacted]tion: NORTHERN & 83RD AVE.
[redacted]ts : 83RD AVE.=N/S
[redacted]y ID: 648A
[redacted]ator: TRA
[redacted]ther : CLEAR

Starts : 12/04/96 at 07:00:00
Ends : 12/04/96 at 09:00:00
Interval : 15 min Intervals: 8
S/N : 0 Type: C,Tr,Ped-rt/red
Correction: 1.00

[redacted]		From North				From South				From East				From West				Interval
		0	Left	Thru	Right	0	Left	Thru	Right	0	Left	Thru	Right	0	Left	Thru	Right	Total
[redacted]s																		
[redacted]04/1996																		
[redacted]00	Auto	0	15	115	1	0	9	72	9	0	13	36	7	0	6	59	8	350
	Truck	0	0	1	0	0	0	5	0	0	0	2	1	0	0	4	0	13
		0			0				0				0				0	0
[redacted]15	Auto	0	14	110	1	0	10	79	11	0	14	49	8	0	1	37	15	349
	Truck	0	2	4	0	0	2	4	1	0	0	6	0	0	0	3	0	22
		0			0				0				0				0	0
[redacted]:30	Auto	0	12	118	2	0	10	80	13	0	9	42	4	0	3	66	17	376
	Truck	0	1	1	0	0	2	3	1	0	0	4	0	0	2	3	0	17
		0			0				0				0				0	0
[redacted]:45	Auto	0	14	98	3	0	5	101	11	0	14	54	7	0	1	63	13	384
	Truck	0	0	2	0	0	3	4	1	0	1	4	0	0	2	4	1	22
		0			0				0				0				0	0
[redacted]our	Auto	0	55	441	7	0	34	332	44	0	50	181	26	0	11	225	53	1459
	Truck	0	3	8	0	0	7	16	3	0	1	16	1	0	4	14	1	74
		0			0				0				0				0	0
	All	0	58	449	7	0	41	348	47	0	51	197	27	0	15	239	54	1533
	%	0.0	3.8	29.3	0.5	0.0	2.7	22.7	3.1	0.0	3.3	12.9	1.8	0.0	1.0	15.6	3.5	100.0%
[redacted]																		
[redacted]8:00	Auto	0	11	73	0	0	3	65	12	0	9	49	0	0	4	44	6	276
	Truck	0	0	6	0	0	3	5	0	0	0	3	1	0	2	5	2	27
		0			0				0				0				0	0
[redacted]8:15	Auto	0	8	51	3	0	10	54	14	0	8	40	13	0	3	45	6	255
	Truck	0	1	1	0	0	3	4	0	0	1	5	0	0	1	5	0	21
		0			0				0				0				0	0
[redacted]:30	Auto	0	10	41	2	0	5	57	11	0	10	25	6	0	2	37	1	207
	Truck	0	0	5	1	0	2	1	0	0	0	4	0	0	2	5	2	22
		0			0				0				0				0	0
[redacted]:45	Auto	0	8	37	1	0	3	56	10	0	2	18	7	0	3	34	3	182
	Truck	0	0	0	0	0	1	3	1	0	0	4	0	0	0	2	0	11
		0			0				0				0				0	0
[redacted]dour	Auto	0	37	202	6	0	21	232	47	0	29	132	26	0	12	160	16	920
	Truck	0	1	12	1	0	9	13	1	0	1	16	1	0	5	17	4	81
		0			0				0				0				0	0
	All	0	38	214	7	0	30	245	48	0	30	148	27	0	17	177	20	1001
	%	0.0	3.8	21.4	0.7	0.0	3.0	24.5	4.8	0.0	3.0	14.8	2.7	0.0	1.7	17.7	2.0	100.0%

Two Vehicle Analysis

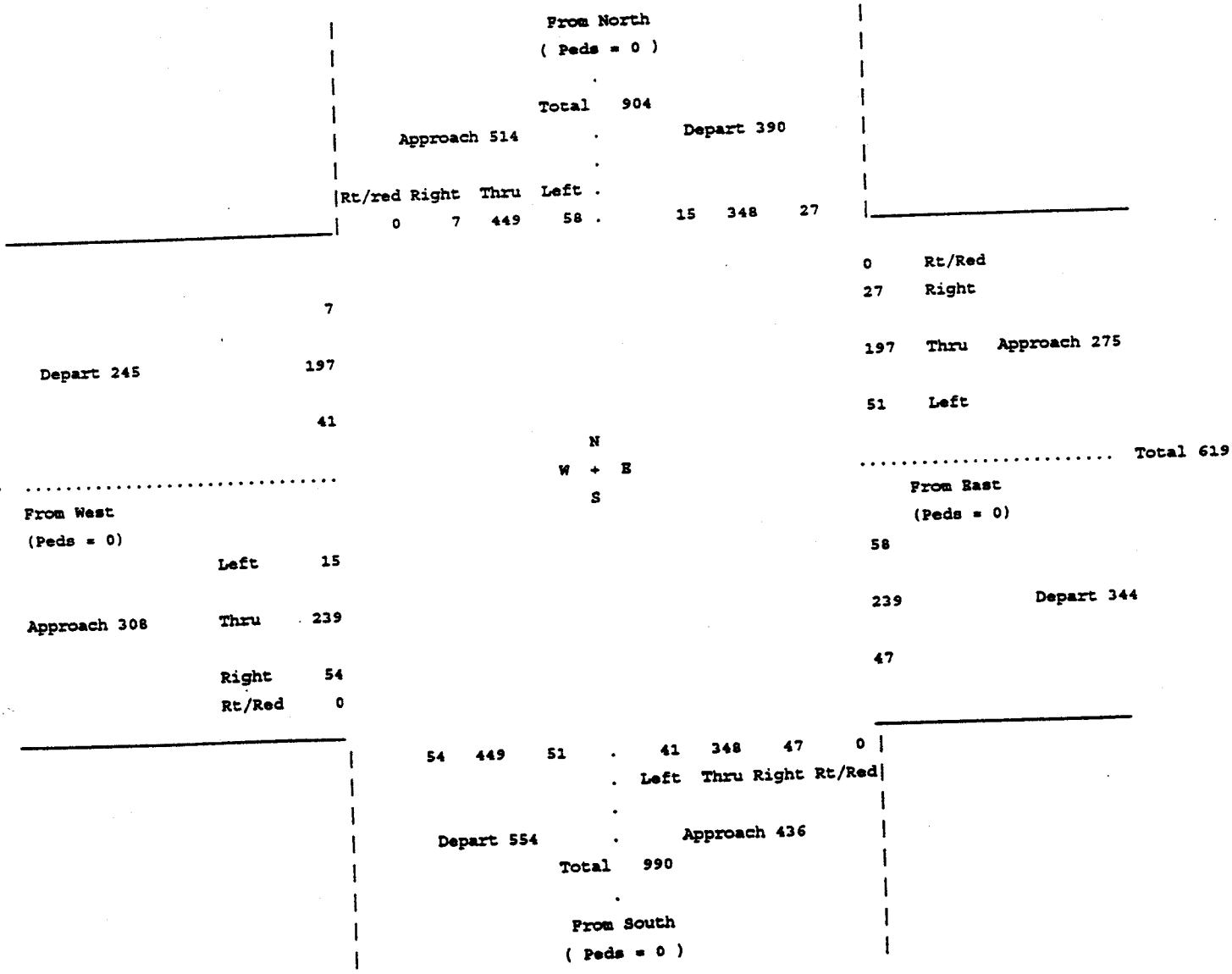
tion: NORTHERN & 83RD AVE.
es : 83RD AVE.=N/S
y ID: 648A
ator: TRA
her : CLEAR

Starts : 12/04/96 at 07:00:00
Ends : 12/04/96 at 09:00:00
Interval : 15 min Intervals: 8
S/N : 0 Type: C,Tr,Ped-rt/red
Correction: 1.00

TOTAL INTERSECTION PEAK HOUR ANALYSIS

tal Intersection Peak is: Wed Dec 04 07:00:00 1996

	VOLUME						PERCENTS				
TION	Peds	Rt/Red	Left	Thru	Right	Total	Peak Factor	Rt/Red	Left	Thru	Right	Total
North	0	0	58	449	7	514	0.96	0.0%	11.3%	87.4%	1.4%	100.0%
South	0	0	41	348	47	436	0.87	0.0%	9.4%	79.8%	10.8%	100.0%
East	0	0	51	197	27	275	0.86	0.0%	18.5%	71.6%	9.8%	100.0%
West	0	0	15	239	54	308	0.85	0.0%	4.9%	77.6%	17.5%	100.0%
ls	0	0	165	1233	135	1533	0.94	0.0%	10.8%	80.4%	8.8%	100.0%



SUSAN MEDLAND

Two Vehicle Analysis with Right on Red

Date: 12/05/1996

****

Location: NORTHERN & 83RD AVE.
Streets : 83RD AVE.=N/S
City ID: 648P
Operator: TRA
Weather : CLEAR

Starts : 12/04/96 at 16:00:00
Ends : 12/04/96 at 18:00:00
Interval : 15 min Intervals: 8
S/N : 0 Type: C,Tr,Ped-rt/red
Correction: 1.00

****

Time		From North				From South				From East				From West				Interval Total
		0	Left	Thru	Right	0	Left	Thru	Right	0	Left	Thru	Right	0	Left	Thru	Right	
12/04/1996																		
16:00	Auto	0	7	66	6	0	8	131	16	0	12	64	12	0	7	76	13	418
	Truck	0	2	0	0	0	0	9	0	0	1	3	1	0	3	0	0	19
		0			0				0				0				0	0
16:15	Auto	0	15	56	3	0	10	113	18	0	22	62	10	0	3	60	5	377
	Truck	0	2	3	0	0	1	3	0	0	0	4	0	0	0	9	0	22
		0			0				0				0				0	0
16:30	Auto	0	3	87	4	0	9	104	9	0	17	69	12	0	7	65	12	398
	Truck	0	0	4	0	0	0	4	0	0	0	0	0	0	0	3	0	11
		0			0				0				0				0	0
16:45	Auto	0	7	77	5	0	9	99	13	0	17	61	15	0	4	67	10	384
	Truck	0	0	3	0	0	0	1	0	0	1	2	0	0	0	0	1	8
		0			0				0				0				0	0
Hour	Auto	0	32	286	18	0	36	447	56	0	68	256	49	0	21	268	40	1577
	Truck	0	4	10	0	0	1	17	0	0	2	9	1	0	3	12	1	60
		0			0				0				0				0	0
	All	0	36	296	18	0	37	464	56	0	70	265	50	0	24	280	41	1637
	%	0.0	2.2	18.1	1.1	0.0	2.3	28.3	3.4	0.0	4.3	16.2	3.1	0.0	1.5	17.1	2.5	100.0%
17:00	Auto	0	4	82	0	0	9	140	13	0	10	58	10	0	4	61	11	402
	Truck	0	0	3	0	0	0	3	0	0	0	1	0	0	0	2	2	11
		0			0				0				0				0	0
17:15	Auto	0	4	85	2	0	16	145	17	0	17	59	16	0	2	67	8	438
	Truck	0	0	2	0	0	1	2	0	0	0	1	0	0	0	2	1	9
		0			0				0				0				0	0
17:30	Auto	0	3	97	4	0	10	126	21	0	14	53	15	0	3	45	8	399
	Truck	0	0	2	0	0	0	2	0	0	0	0	0	0	0	1	1	6
		0			0				0				0				0	0
17:45	Auto	0	4	75	3	0	9	106	11	0	12	48	7	0	0	34	11	320
	Truck	0	0	0	0	0	0	4	1	0	0	1	0	0	0	4	0	10
		0			0				0				0				0	0
Hour	Auto	0	15	339	9	0	44	517	62	0	53	218	48	0	9	207	38	1559
	Truck	0	0	7	0	0	1	11	1	0	0	3	0	0	0	9	4	36
		0			0				0				0				0	0
	All	0	15	346	9	0	45	528	63	0	53	221	48	0	9	216	42	1595
	%	0.0	0.9	21.7	0.6	0.0	2.8	33.1	3.9	0.0	3.3	13.9	3.0	0.0	0.6	13.5	2.6	100.0%

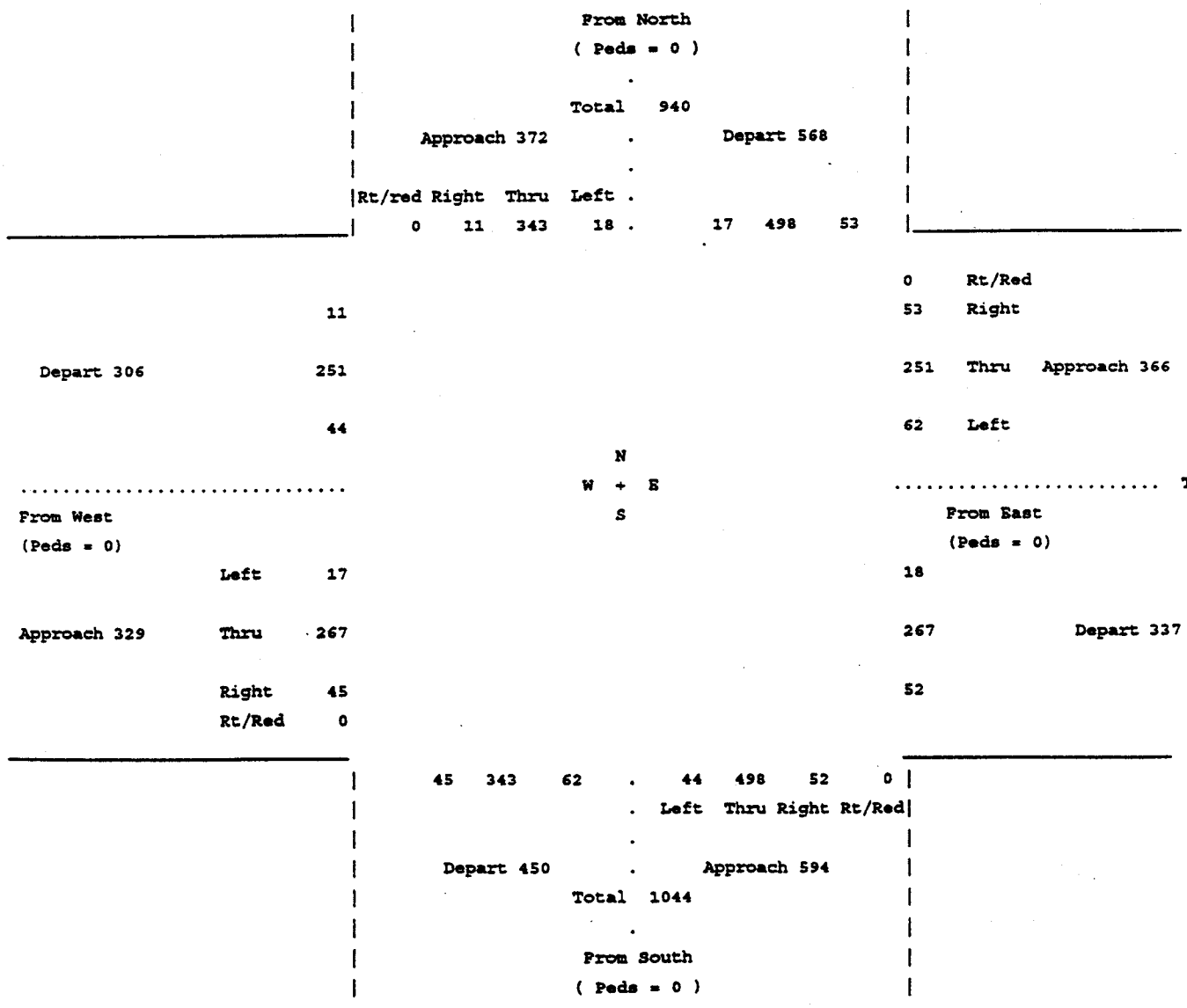
tion: NORTHERN & 83RD AVE.
es : 83RD AVE.=N/S
y ID: 648P
ator: TRA
ther : CLEAR

Starts : 12/04/96 at 16:00:00
Ends : 12/04/96 at 18:00:00
Interval : 15 min Intervals: 8
S/N : 0 Type: C,Tr,Ped-rt/red
Correction: 1.00

TOTAL INTERSECTION PEAK HOUR ANALYSIS

tal Intersection Peak is: Wed Dec 04 16:30:00 1996

	VOLUME						PERCENTS					
TION	Peds	Rt/Red	Left	Thru	Right	Total	Peak Factor	Rt/Red	Left	Thru	Right	Total
North	0	0	18	343	11	372	0.95	0.0%	4.8%	92.2%	3.0%	100.0%
South	0	0	44	498	52	594	0.82	0.0%	7.4%	83.8%	8.8%	100.0%
East	0	0	62	251	53	366	0.93	0.0%	16.9%	68.6%	14.5%	100.0%
West	0	0	17	267	45	329	0.95	0.0%	5.2%	81.2%	13.7%	100.0%
ls	0	0	141	1359	161	1661	0.93	0.0%	8.5%	81.8%	9.7%	100.0%



MCDOT TRANSPORTATION PLANNING DIVISION

83rd AVENUE - NORTHERN AVENUE TO OLIVE AVENUE

TRAFFIC IMPACT STUDY

APPENDIX B

Projected 2020 peak hour turning movement calculations

83rd Avenue ADT
1996 17,500 vehicles
2020 22,000 vehicles

Intersection of 83rd Avenue and Olive Avenue 1996 northbound PM peak hour approach volumes

	Vehicles	% of Approach
Left	111	21.7
Through	273	53.3
Right	128	25
Total approach volume	512	

512 Peak Hour Volume => 2.93%
17,500 1996 ADT

Peak hour volume is 2.93% of ADT

2.93% * 2020 ADT yields 2020 peak hour approach volume

2.93% * 22,000 = 644.6 vehicles

2020 estimated PM peak hour turning movement volumes

	% of total approach		Approach volume		
Left	21.7	*	644.6	=	139.8
Through	53.3	*	644.6	=	343.6
Right	25	*	644.6	=	161.2

These numbers have been rounded to the nearest 10 in the LOS calculations because they are projected volumes and not meant to be exact.

MCDOT TRANSPORTATION PLANNING DIVISION

83rd AVENUE - NORTHERN AVENUE TO OLIVE AVENUE

TRAFFIC IMPACT STUDY

APPENDIX C

icopa County Department Of Transportation
sportation Planning Division
01 W. Durango Street, Phoenix, AZ 85009-6295
one: 602-506-8600 FAX: 602-506-4882

AUG 27 1996

apital Improvement Project Request Form

lease type or print legibly on this form. If we are unable to read the form it will be returned for verification

e & Agency RICK Boeger; MCDOT - ops - RM's Date 8-27-96

ress

y State Zip

e Fax

506-4509

idate Project (Road Name) 83rd AVE

oject Location With Beginning And End Points: NORTHERN AVE to OLIVE AVE.

se describe the problem by checking the boxes that apply:

☐ Safety ☐ Aesthetic ☐ Drainage ☐ Dust ☒ Traffic Congestion

Other:

hat is the cause of the problem?

TRAFFIC HAS EXCEEDED the design Capacity for the 2 LANE Roadway. Plus the pavement IS CURRENTLY IN POOR Condition & will Require extensive maintenance (costs) to Restore Road to status.

doc

you have a recommendation? If yes, please detail:
Yes, Reconstruct Roadway from 2 lane to 4 lane

s this project proposed/included in a municipal CIP? ☐ Yes ☐ No ☐ Not Sure

there any potential partners, intergovernmental agreements, or commitments by others to help fund or construc
project? Please list the potential partners.

ase use the area below for a sketch, map, and / or comments to further clarify the candidate project.

(Please indicate roadway names, if possible)

N

Maricopa County Department of Transportation
Road Management System
Road Summary Report

11/6/96
10:46 A

Count: 1

ROAD: 83rd Ave

FROM: Northern Ave

TO: Olive Ave

Maintenance District:	MAINTENANCE DISTRICT 4	Jurisdiction:	
HPMS Classification:	SECTIONLINE	Supervisorial District:	
Subdivision/Unit:			

Miles: 1.00 # of Lanes: 2 Road Width: 34.00 Curb Gutter: No

LEFT SHOULDER

Type: LEFT SHOULDER WIDTH
Width: 0

MEDIAN

Type:
Width:

RIGHT SHOULDER

Type: RIGHT SHOULDER WIDTH
Width: 0

TRAFFIC

ADT:	757		
ADT Date:	06/02/1995		
Peak Daily Traffic:		Hour:	12:00 AM
% Trucks:			
DeTrucks Date:			
Projected ADT:			
Projected Date:			

SURFACE

Type:	ASPHALTIC CONCRETE		
Thickness:	3.00	inches	
Date Placed:	06/03/1976		
Base Type:	DECOMPOSED GRANITE		
Base Thickness:	8.00	inches	
Last Work Date:	10/15/1991		
Type of Work:	CHIP SEAL		

PCR

73 Type: Field Date: 06/24/1996
Rated By: Shewak, Stephen G

IRI

151.00 Date: 09/11/1996
IRI
Rated By: Shewak, Stephen G

SUFFICIENCY

89 Date: 01/01/1994
Rated By: Shewak, Stephen G

CAR# C97-2731-11

Maricopa County Department of Transportation
Road Management System
Road Summary Report

11/6/96
10:46 A

Count: 1

AD: 83rd Ave

FROM: Northern Ave

TO: Olive Ave

DETAIL

	Deduct Value	Extent	Severity	Rating
Cracks	0	NONE	NONE	0
Asphalt	0	NONE	NONE	0
ocue Cracks	7	Three or more < 50 sf	Width > 1/8"	6
udinal Cracks	8	Wheel path single	Width > 3/8"	5
ching	1	Number < 5 repairs	Quality of repair good	1
ng	0	NONE	NONE	0
ting	0	NONE	NONE	0
ing/Pushing/Corr.	5	Between intersections onl	Ride Discomfort Mild	2
erse Cracks	6	Spacing > 50 feet	Width > 3/8"	4

FICIENCY DETAIL

	Deduct Value	Extent	Severity	Rating
neck	0	None	Low	0
inage	3	Moderate	High	3
ntal Sight	0	Good	Low	0
	0	Lane width = 14 ft	None	0
lder	1	Left & Right Shoulder Wid	< or = 10 ft	1
al Sight	0	Good	Low	0

MCDOT TRANSPORTATION PLANNING DIVISION

83rd AVENUE - NORTHERN AVENUE TO OLIVE AVENUE

TRAFFIC IMPACT STUDY

APPENDIX D

Eastbound right turn lane:
Vehicles/cycle= 2 x (320)/[(1/140)(3600)]=24.9
Storage length= 24.9 x 25 feet = 622 feet
Use 620 foot lane

Assuming 15 percent of the vehicles turn right on red 320-48=272
Vehicles/cycle= 2 x (272)/[(1/140)(3600)]=21.15
Storage length= 21.2 x 25 feet = 528 feet
Use 530 foot lane

Another option could be a shared through right lane in addition to the right turn only lane

Eastbound left turn lanes
Vehicles/cycle = 2x(120)/[(1/140)(3600)]=9.3
Storage length = 9.3 x 25 = 233 feet
233/2 lanes = 116 feet/lane
Use (2) 120 foot lanes

Westbound left turn lanes
Vehicles/cycle = 2x(190)/[(1/140)(3600)]=14.7
Storage length = 14.7 x 25 = 369 feet
369/2 lanes = 184 feet/lane
Use (2) 190 foot lanes

APPENDIX B

DRAINAGE INFORMATION – FOR PROJECTS PROPOSED BY MCDOT AND FCDMC

The Flood Control District
of
Maricopa County, Arizona

GLENDALE-PEORIA AREA DRAINAGE MASTER PLAN

by

CAMP DRESSER & McKEE INC.

and

James M. Montgomery, Consulting Engineers, Inc.

MAY 1987

STUDY AREAS

For the purposes of developing the Glendale-Peoria ADMP facilities, the study area was divided into a number of subareas as shown in Figure 1. These subareas and the procedure used for developing the drainage facilities for each area are described below.

South Glendale

This area consists of the area in Glendale generally between Camelback Road and Northern Avenue. The drainage facilities selected for this area in the "Glendale Stormwater Management Plan" could not be improved by combining with a drainage facility in Peoria. Therefore, the facilities previously selected have been included in the Glendale-Peoria ADMP without change.

South Peoria/Glendale

This area consists of the portion of Glendale south of the ACDC that is not included in the South Glendale area, and the portion of Peoria east of New River and Skunk Creek. Because of the natural drainage pattern from east to west in this area, it appeared that combining the Glendale facilities in this area with Peoria facilities would be advantageous. Therefore, facilities in this area were determined by choosing the best set of combined facilities. The process for this selection is described in more detail in this section.

North Glendale

This area consists of the portion of Glendale that is north of the ACDC. Facilities for this area were included from the "Glendale Stormwater Management Plan" without change.

North Peoria

This area consists of the area of Peoria that is north of Skunk Creek or west of New River and north of Sun City. Facilities for this area were included from the "City of Peoria Master Plan of Storm Drainage" without change.

South Peoria West of New River

This area consists of the area of Peoria that is west of New River and south of Sun City. Facilities for this area were included from the "City of Peoria Master Plan of Storm Drainage" without change.

Sun City

This area consists of the entire area of Sun City which is an unincorporated planned development. Sun City is already almost completely developed, and has an existing self-contained storm drainage system which does not affect any other subareas. There is no detailed information about the design capacity of the drainage system; however, the system has been handling the drainage flows within the area. Therefore, no improvements are recommended for this area, and the existing facilities are included in this plan for information purposes.

ALTERNATIVE PLANS FOR THE SOUTH PEORIA/GLENDALE COMBINED SYSTEM

Four major alternative drainage plans were developed for ADMP facilities in the South Peoria/Glendale area that would collect water from both cities and convey it to New River. These alternatives are described as follows:

Alternative 1

This alternative is shown in Figure 3 and consists of drains (trunk mains) along Cactus Road and Olive Avenue that would carry flow from Glendale west through Peoria. In addition, a drain along Northern Avenue in Peoria would carry flows to Orangewood Avenue in Glendale, where it would join other flows from the Glendale area.

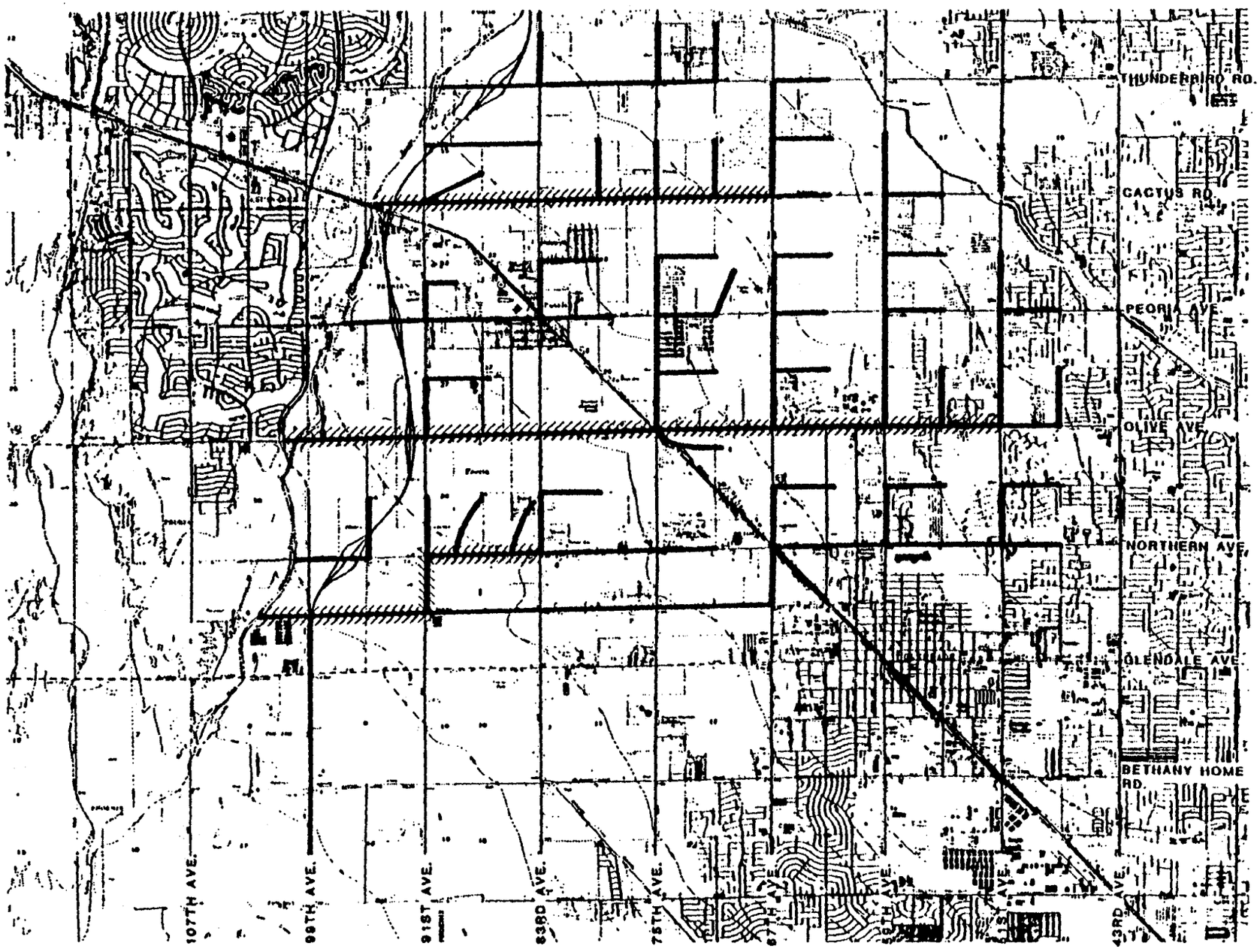


FIGURE 3

ALTERNATIVE 1

Alternative 2

This alternative is shown in Figure 4 and consists of a drain flowing west along Cactus Road, and another drain flowing west along Peoria Avenue, south along 75th Avenue, and then west along Orangewood Avenue.

Alternative 3

This alternative is shown in Figure 5 and consists of a drain flowing west along Cactus Road, and another drain flowing west along Mt. View Road, south on 75th Avenue, and then west along Butler Drive.

Alternative 4

This alternative is shown in Figure 6 and consists of a drain flowing west along Cactus Road, and a drain flowing west along Northern Avenue, south on 67th Avenue, and west along Orangewood Avenue. Another drain flowing west on Olive Avenue and south on 83rd Avenue would join the Orangewood Avenue trunk.

The locations of the drains in these alternatives were chosen based on a general evaluation of conditions in the area and discussions with Peoria and Glendale staffs.

The following factors were felt to be important in developing the alternatives and in their subsequent evaluation:

In the northern part of the Glendale-Peoria area, a drain along Cactus Road was felt to be the best alignment. An alignment one-half mile north of Cactus Road would be a problem because the street has not yet been constructed. An alignment farther north along Thunderbird Road would drain such a small area that it would be impractical as an ADMP facility. An alignment farther south than Cactus Road would interfere with existing improvements in Central Peoria.

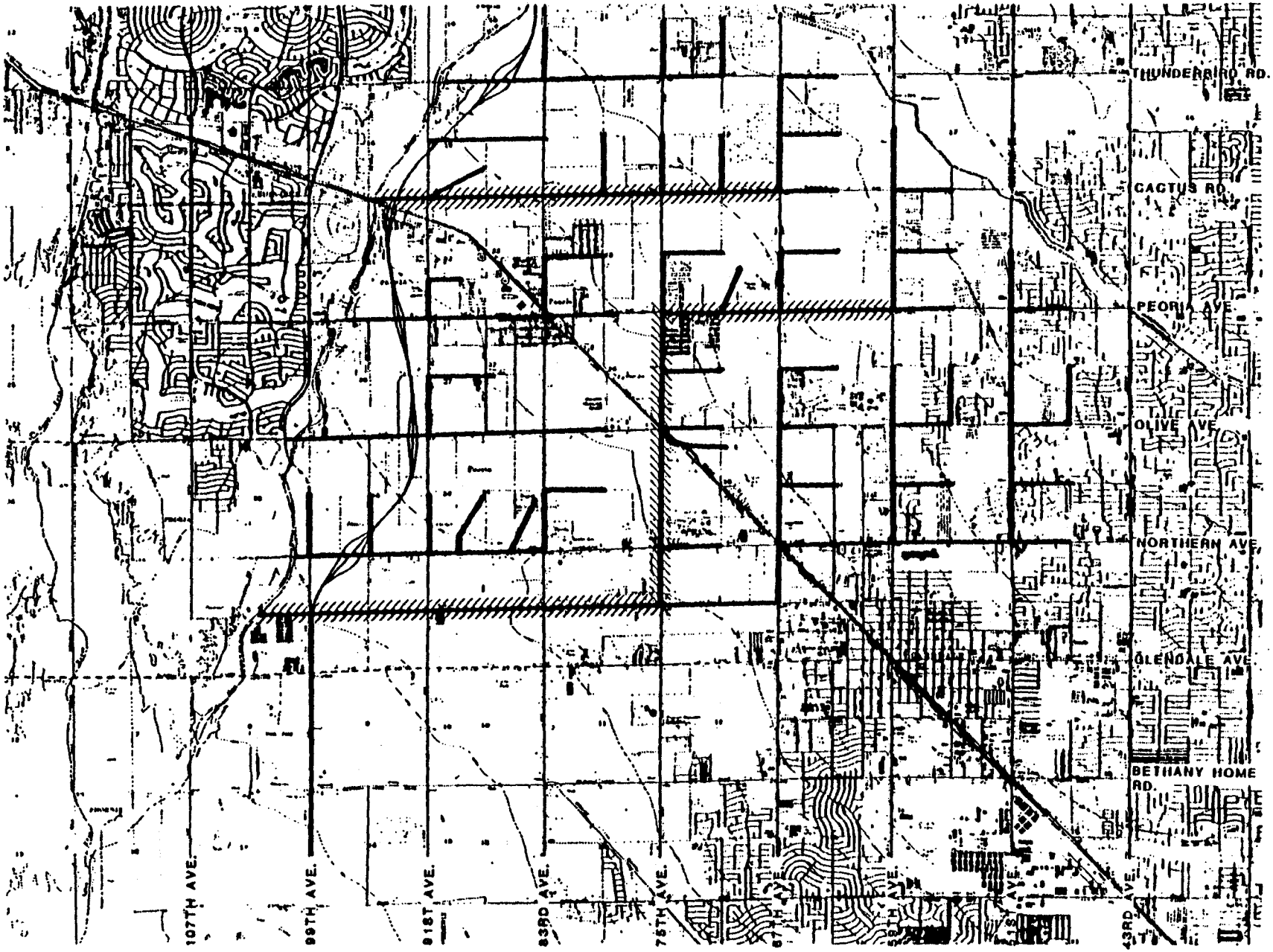


FIGURE 4

ALTERNATIVE 2

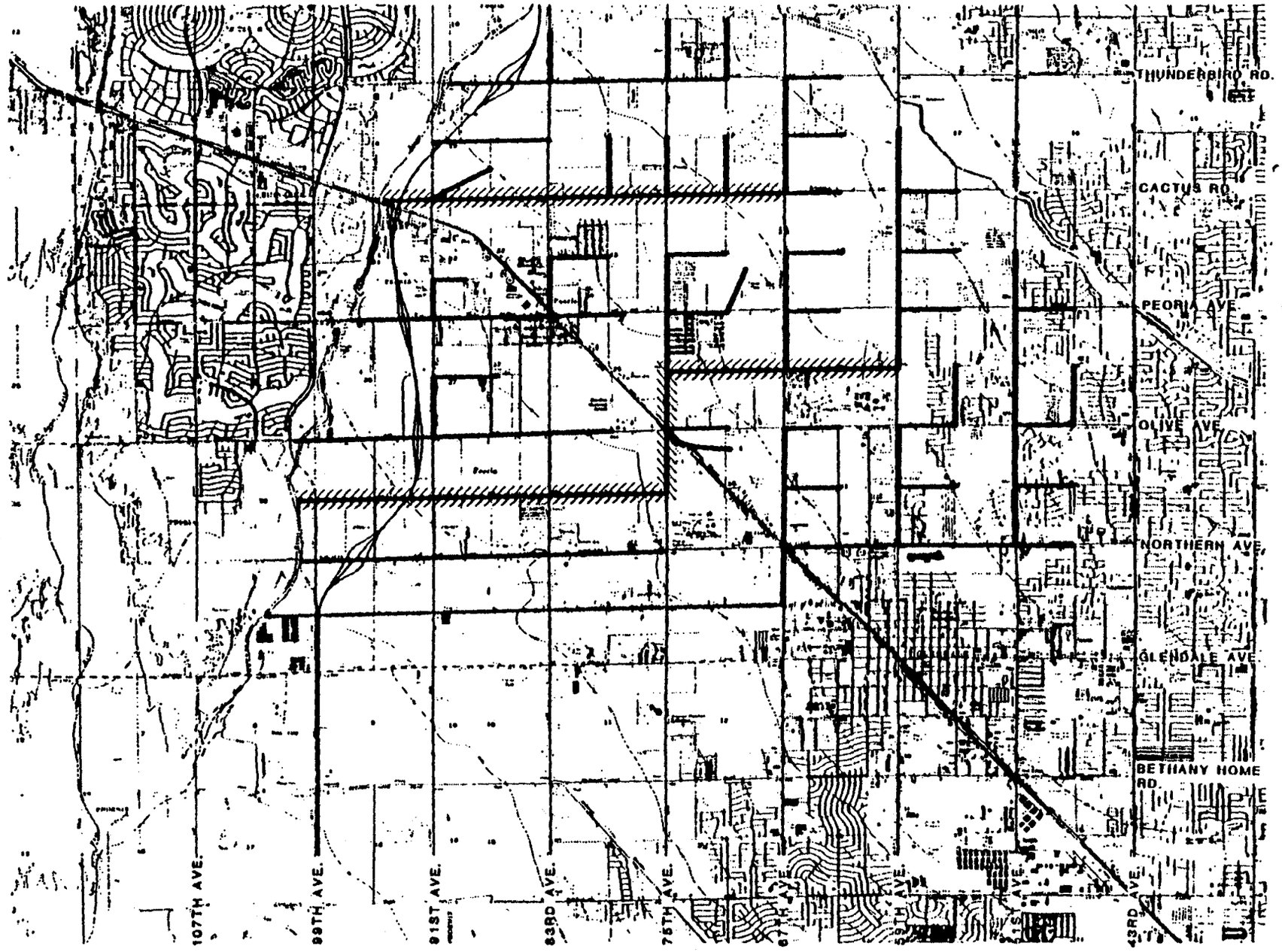


FIGURE 6

ALTERNATIVE 3

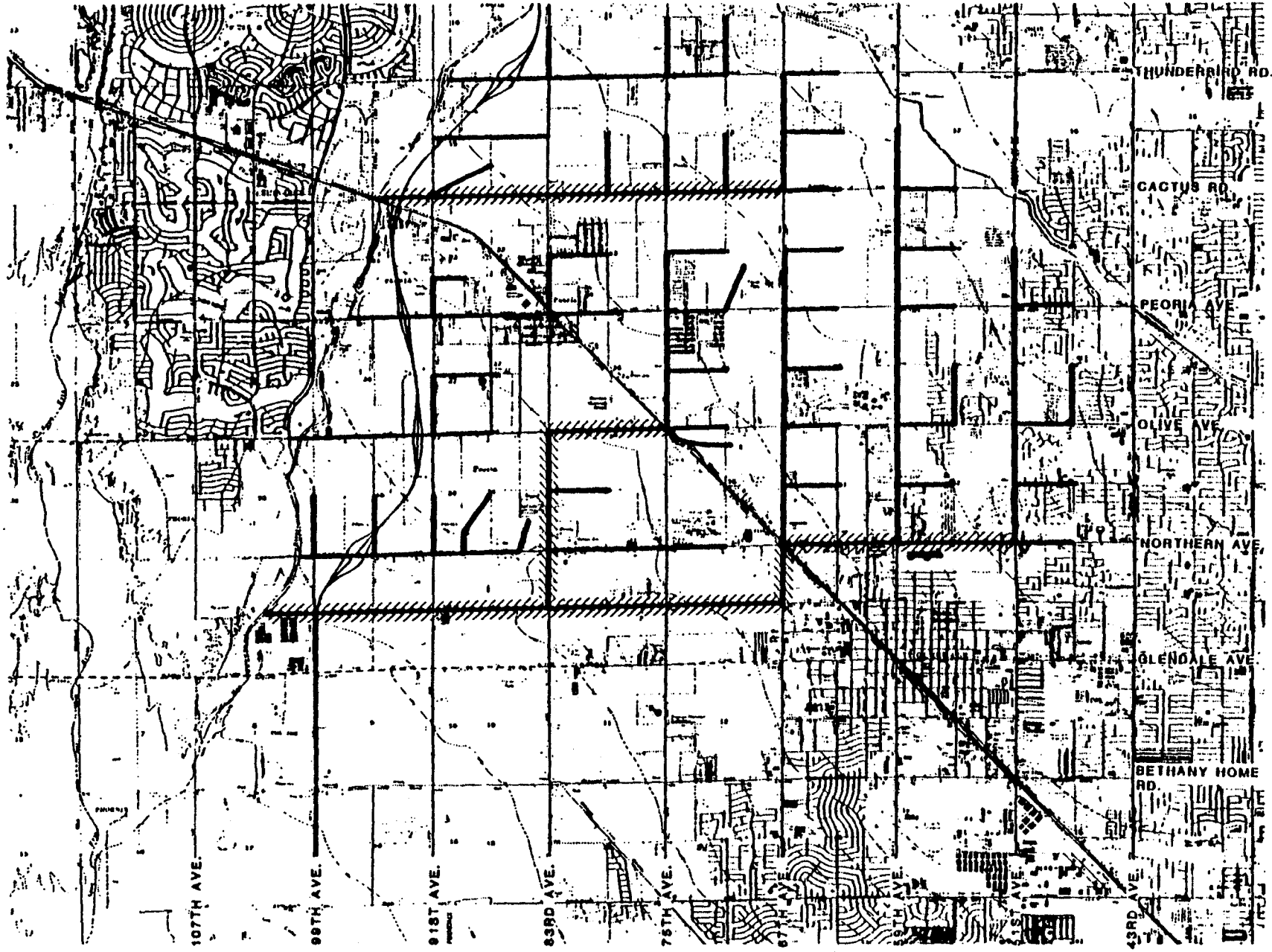


FIGURE 6

ALTERNATIVE 4

In the central part of the Glendale-Peoria area, it was recommended that the alignment avoid drains which would pass through the central Peoria area, because of the resulting congestion and interference problems with utilities in this area. The use of Olive Avenue was felt to be a desirable alignment because both Peoria and Glendale are planning to make major improvements to this street in the near future, and this would tie in well with the installation of a storm drain system.

In the southern part of the Glendale-Peoria area, an alignment for a drain along Northern Avenue was considered but was felt to present a number of construction difficulties due to the number of utilities located in this street. Therefore, an alignment one-half mile south along Orangewood Avenue was chosen in this area.

The advantages and disadvantages of the alternatives that were considered are as follows:

Alternative 1

This alternative is well balanced in terms of avoiding the major problem areas and providing a logical path for flows. It has three outlets to New River and would allow construction to proceed more rapidly.

Alternative 2

This alternative avoids the major problem areas but combines most of the flow from Glendale and some of the flow from Peoria into one drain along 75th Avenue then along Orangewood Avenue that would have to be very large. This would cause extra construction difficulties, and could require a large initial expenditure for the first phase of the plan.

Alternative 3

This alternative has the disadvantage of having all of the ADMP drains located in Peoria. In addition, the drain along Butler Drive is located too far north to effectively carry runoff from Glendale.

Alternative 4

This alternative combines most of the flow from Glendale and Peoria into a single drain that would have to be very large. This could have the same disadvantages as Alternative 2 of construction difficulties and large required initial expenditures.

Because of the disadvantages of Alternative 3, and because it did not seem to provide any distinct advantage over the other alternatives, it was dropped from further consideration.

(INVERTED
STREET SECTION)

THUNDERBIRD RD.

CACTUS RD.

PEORIA AVE.

OLIVE AVE.

NORTHERN AVE.

GLENDALE AVE.

BETHANY HOME RD.

CAMELBACK RD.

EXISTING

PEORIA

PHOENIX

north

0 2000 4000 6000

feet

LEGEND

- PIPE
- 704 PIPE NUMBER
- FLOW DIRECTION
- B DETENTION BASIN
- ADMP FACILITY

FIGURE 7
PREFERRED ALTERNATIVE

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

GLENDALE-PEORIA AREA
DRAINAGE MASTER STUDY

CDM

APPENDIX C

SUMMARY OF HYDROLOGIC AND HYDRAULIC RESULTS

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME- _____
LOCATION - 10+840
VER 2.23 May 1992

TRACS NO.- _____
DESIGNER - _____
CHECKER - _____

01-18-1999

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.467
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	1.860
SPREAD-Ft.--T	=	9.920
Average Velocity-V-fps	=	1.916
FLOW in Gutter-CFS--Q	=	0.721
% Flow in Gutter-CFS--Eo	=	38.783
Velocity of Flow in Gutter-fps	=	2.434
Depth at Curb Line-Inches--d	=	3.036

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	1.860
Gutter Velocity at INLET-fps	=	2.697
GUTTER FLOW at INLET-CFS--Q	=	0.912
Depth at INLET Curb Line-Inches--d	=	3.036
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	9.703
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.410	0.763	1.097
6.583	0.756	1.405	0.455
9.583	0.940	1.748	0.112
13.583	1.000	1.860	0.000
20.583	1.000	1.860	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 11+090
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

01-18-1999

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.467
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	1.750
SPREAD-Ft.--T	=	9.681
Average Velocity-V-fps	=	1.895
FLOW in Gutter-CFS--Q	=	0.695
% Flow in Gutter-CFS--Eo	=	39.693
Velocity of Flow in Gutter-fps	=	2.398
Depth at Curb Line-Inches--d	=	2.979

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	1.750
Gutter Velocity at INLET-fps	=	2.661
GUTTER FLOW at INLET-CFS--Q	=	0.881
Depth at INLET Curb Line-Inches--d	=	2.979
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	9.352
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.424	0.741	1.009
6.583	0.775	1.356	0.394
9.583	0.954	1.670	0.080
13.583	1.000	1.750	0.000
20.583	1.000	1.750	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 11+230
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

01-18-1999

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.404
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	1.860
SPREAD-Ft.--T	=	10.212
Average Velocity-V-fps	=	1.807
FLOW in Gutter-CFS--Q	=	0.702
% Flow in Gutter-CFS--Eo	=	37.732
Velocity of Flow in Gutter-fps	=	2.304
Depth at Curb Line-Inches--d	=	3.106

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	1.860
Gutter Velocity at INLET-fps	=	2.548
GUTTER FLOW at INLET-CFS--Q	=	0.884
Depth at INLET Curb Line-Inches--d	=	3.106
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	9.414
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.421	0.783	1.077
6.583	0.771	1.435	0.425
9.583	0.952	1.770	0.090
13.583	1.000	1.860	0.000
20.583	1.000	1.860	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

01-18-1999

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 117+30
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.467
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	1.490
SPREAD-Ft.--T	=	9.074
Average Velocity-V-fps	=	1.841
FLOW in Gutter-CFS--Q	=	0.629
% Flow in Gutter-CFS--Eo	=	42.189
Velocity of Flow in Gutter-fps	=	2.305
Depth at Curb Line-Inches--d	=	2.833

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	1.490
Gutter Velocity at INLET-fps	=	2.569
GUTTER FLOW at INLET-CFS--Q	=	0.804
Depth at INLET Curb Line-Inches--d	=	2.833
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	8.485
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.461	0.687	0.803
6.583	0.825	1.230	0.260
9.583	0.985	1.468	0.022
13.583	1.000	1.490	0.000
20.583	1.000	1.490	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 10+122
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

01-18-1999

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.510
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	1.864

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

01-18-1999

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 10+322
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.240
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	0.87

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

01-18-1999

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 10+419
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.380
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	1.38

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

01-18-1999

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 10 & 59
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.390
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	1.425

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 10+72 ℄
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

01-18-1999

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.300
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	1.097

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 10+840
VER 2.23 May 1992

01-18-1999

TRACS NO.-
DESIGNER -
CHECKER -

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.510
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	1.864

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 11+090
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

01-18-1999

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.480
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	1.754

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

01-18-1999

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 114+30
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.510
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	1.864

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

01-18-1999

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 117+30
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

*** RATIONAL EQN: Q=CIA ***

DRAINAGE AREA--ACRES--A	=	0.410
Runoff Coefficient---C	=	0.850
RAINFALL INTENSITY--Inches/Hour--I	=	4.300
Discharge-CFS--Q	=	1.499

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 10+122
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

01-18-1999

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.309
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	1.860
SPREAD-Ft.--T	=	10.770
Average Velocity-V-fps	=	1.622
FLOW in Gutter-CFS--Q	=	0.667
% Flow in Gutter-CFS--Eo	=	35.846
Velocity of Flow in Gutter-fps	=	2.082
Depth at Curb Line-Inches--d	=	3.240

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	1.860
Gutter Velocity at INLET-fps	=	2.294
GUTTER FLOW at INLET-CFS--Q	=	0.834
Depth at INLET Curb Line-Inches--d	=	3.240
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	8.900
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.442	0.823	1.037
6.583	0.801	1.489	0.371
9.583	0.971	1.807	0.053
13.583	1.000	1.860	0.000
20.583	1.000	1.860	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 107322
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

01-18-1999

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.309
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	0.870
SPREAD-Ft.--T	=	7.923
Average Velocity-V-fps	=	1.420
FLOW in Gutter-CFS--Q	=	0.416
% Flow in Gutter-CFS--Eo	=	47.778
Velocity of Flow in Gutter-fps	=	1.729
Depth at Curb Line-Inches--d	=	2.557

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	0.870
Gutter Velocity at INLET-fps	=	1.943
GUTTER FLOW at INLET-CFS--Q	=	0.539
Depth at INLET Curb Line-Inches--d	=	2.557
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	5.622
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.646	0.562	0.308
6.583	0.993	0.864	0.006
9.583	1.000	0.870	0.000
13.583	1.000	0.870	0.000
20.583	1.000	0.870	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME- _____
LOCATION - 10TH/11TH
VER 2.23 May 1992

TRACS NO.- _____
DESIGNER - _____
CHECKER - _____

01-18-1999

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.467
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	1.380
SPREAD-Ft.--T	=	8.796
Average Velocity-V-fps	=	1.817
FLOW in Gutter-CFS--Q	=	0.599
% Flow in Gutter-CFS--Eo	=	43.428
Velocity of Flow in Gutter-fps	=	2.262
Depth at Curb Line-Inches--d	=	2.766

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	1.380
Gutter Velocity at INLET-fps	=	2.526
GUTTER FLOW at INLET-CFS--Q	=	0.769
Depth at INLET Curb Line-Inches--d	=	2.766
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	8.100
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.480	0.662	0.718
6.583	0.849	1.172	0.208
9.583	0.995	1.373	0.007
13.583	1.000	1.380	0.000
20.583	1.000	1.380	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME- _____
LOCATION - 10 F 569
VER 2.23 May 1992

TRACS NO.- _____
DESIGNER - _____
CHECKER - _____

01-18-1999

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.467
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	1.430
SPREAD-Ft.--T	=	8.924
Average Velocity-V-fps	=	1.828
FLOW in Gutter-CFS--Q	=	0.613
% Flow in Gutter-CFS--Eo	=	42.849
Velocity of Flow in Gutter-fps	=	2.282
Depth at Curb Line-Inches--d	=	2.797

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	1.430
Gutter Velocity at INLET-fps	=	2.546
GUTTER FLOW at INLET-CFS--Q	=	0.785
Depth at INLET Curb Line-Inches--d	=	2.797
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	8.277
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.471	0.674	0.756
6.583	0.838	1.198	0.232
9.583	0.991	1.417	0.013
13.583	1.000	1.430	0.000
20.583	1.000	1.430	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP
BRIDGE DRAINAGE SERVICES

PROJECT NAME- 83RD AVE
HIGHWAY NAME-
LOCATION - 10+724
VER 2.23 May 1992

TRACS NO.-
DESIGNER -
CHECKER -

01-18-1999

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.467
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	3.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.400
Gutter Slope-Ft./Ft.--Sw	=	0.059
Gutter Depression-Inches--	=	1.981
Manning's 'N	=	0.015
Flow-CFS--Q	=	1.100
SPREAD-Ft.--T	=	8.016
Average Velocity-V-fps	=	1.753
FLOW in Gutter-CFS--Q	=	0.520
% Flow in Gutter-CFS--Eo	=	47.281
Velocity of Flow in Gutter-fps	=	2.140
Depth at Curb Line-Inches--d	=	2.579

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	1.100
Gutter Velocity at INLET-fps	=	2.403
GUTTER FLOW at INLET-CFS--Q	=	0.674
Depth at INLET Curb Line-Inches--d	=	2.579
Local Gutter Depression-Inches	=	0.990
Length of opening: TOTAL Intercept--Ft.	=	7.059
CLOGGING FACTOR--CURB OPEN.	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.539	0.593	0.507
6.583	0.915	1.007	0.093
9.583	1.000	1.100	0.000
13.583	1.000	1.100	0.000
20.583	1.000	1.100	0.000

APPENDIX D

ROADWAY CLASSIFICATIONS

MCDOT CLASSIFICATION:

01 - Rural Local
02 - Rural Collector
03 - Rural Minor Arterial
04 - Rural Principal Arterial
05 - Urban Local
06 - Urban Minor Collector
07 - Urban Major Collector
08 - Urban Minor Arterial
09 - Urban Principal Arterial

SUFFICIENCY RATING:

(0 - 100) rating scale with 100 being the best. We inventory six types of geometric distress; Lane width, Shoulder width, Bottlenecks, Drainage, Horizontal and Vertical sight distance. Roads with rating less than 35 are generated on to a reconstruct list.

PAVEMENT CONDITION RATING (PCR):

(0 - 100) rating scale with 100 being the best. We evaluate nine surface distress categories for extent and severity; Transverse, Longitudinal, Fatigue and Block cracking, Rutting, Raveling, Corrugation, Patching and Excess Asphalt.

	Rating	Quality
PCR	- 100-85	Excellent
	- 84-71	Very Good
	- 70-55	Good
	- 54-40	Fair
	- < 40	Poor

INTERNATIONAL ROUGHNESS INDEX RATINGS (IRI)

(0-1000) rating scale with 0 being the best and 1000 a theoretical worst.

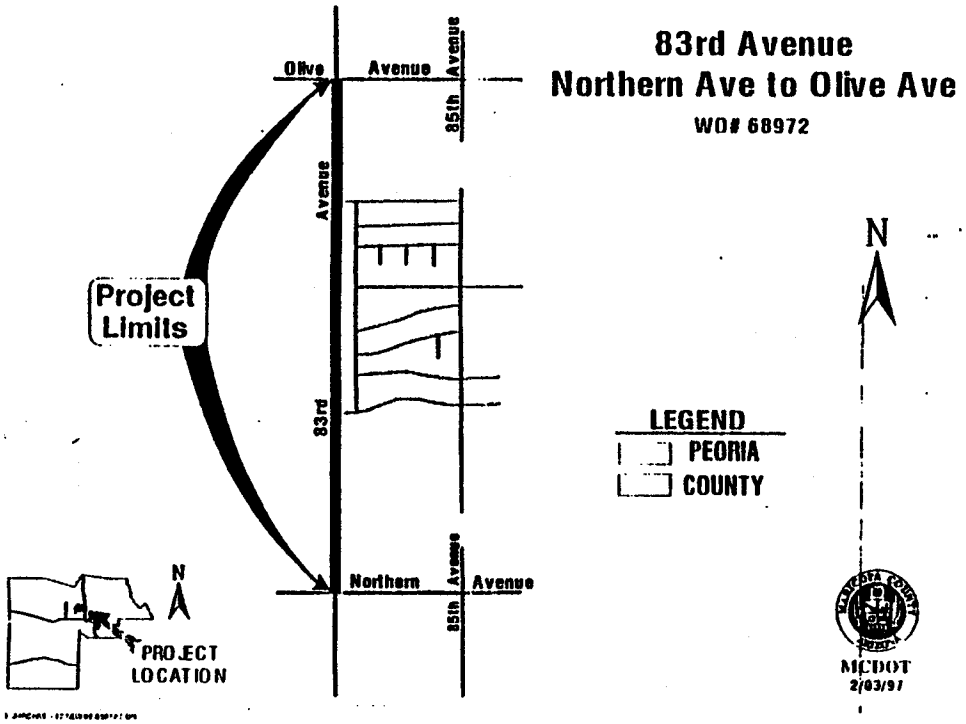
	Rating	Quality
IRI	- 0-59	Excellent
	- 60-94	Very Good
	- 95-170	Good
	- 171-220	Fair
	- >221	Poor

APPENDIX E

PUBLIC PROCESS INFORMATION

83rd Avenue

(From Northern to Olive)
W.O. #68972



LENGTH: 1 mile

	Estimated Cost:$
Design:	151,000
Right-of-Way:	78,000
Utility Relocation	48,000
Construction:	2,300,000
TOTAL:	**2,577,000**

KLP:10/15/08

Project Manager – Mike Marietti @ 506-4171
District 4

DESCRIPTION: This is a paving, drainage, and intersection improvement project in the development stage. A Design Concept Report (DCR) is being prepared to evaluate project need, alternatives and cost. The new roadway will have 5 lanes with a center continuous left-turn lane.

ESTIMATED CONSTRUCTION DATE: This project will be ranked and compete with other C.I.P. candidate projects before a construction date can be estimated.

RIGHT-OF-WAY: The roadway classification calls for 55' each side of centerline

IGA PARTNERING: Seeking IGA with the City of Peoria.

DETOUR (ROAD CLOSURES): No closures are anticipated.

KEY ISSUES:

- Acquisition of right-of-way to accommodate proposed improvements.
- Drainage from off-site sources

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

Public Involvement Process
83rd Avenue
Northern to Olive

9/28/98
1:00 p.m.
Pima Conference Room
MCDOT

Type of meeting: Rehearsal
for October 19, 1998 Public Meeting

Attendees:	Name	Agency	Phone

Agenda

Introductions

Discussion of Tasks (Preparation and execution of graphics, displays, informational literature)

Assignation/delegation of Tasks

Equipment Required

Discussi9on of issues or scenarios that may arise during public meeting and how to address them.

Arrange scheduling of participants, discuss arrival times, set-up time, etc.

Additional Information

October 19, 1998

Citizen Comments

Maricopa County Department of Transportation

83rd Avenue from Northern Avenue to Olive Road

roject number: 68972 Project Manager: Amir Masowdi, 506-4688

ase complete and submit this card to a staff member before leaving or mail to **Maricopa County Department of ansportation, Attn: Amir Masowdi, 2901 W. Durango St., Phoenix, AZ 85009.** Include your name and mailing address we can respond to your questions. **Please Print.**

me: _____ **Phone number:** _____

dress: _____

_____

eeting Survey

w would you rate the knowledge and helpfulness of staff members who assisted you?

☐ Very knowledgeable ☐ Very helpful

☐ Somewhat knowledgeable ☐ Somewhat helpful

☐ Not very knowledgeable ☐ Not very helpful

s all the project information presented in an understandable manner? Yes _____ No _____

staff answer your questions? Yes _____ No _____. If not, what didn't they answer?

_____

_____

you want more information about MCDOT projects? Yes _____ No _____. If yes, please make sure your name and ress are filled in so we can add you to our mailing list.

v did you hear about the meeting?

Newspaper _____ Radio _____ Flyers _____ Trail Signs _____

Friends/Neighbors _____ Other (please comment) _____

ditional Comments or Questions: _____

_____

_____

_____

_____

_____

APPENDIX F

COST ESTIMATES

Project Name & Termini: **83rd Avenue from Northern Avenue to Olive Avenue**
Report or Work Order No.: **68972**

1998 DCR PRELIMINARY SUMMARY COST ESTIMATES (Current Dollars)

COST CATAGORIES	*Factors*	*No Build*	*Alternative 1*	*Alternative 2*
Construction		$0	$1,512,848	$1,790,018
Design (10% TO 15%)	12%	$0	$181,542	$214,802
Construction Management	15%	$0	$226,927	$268,503
Right-of-Way ($86,500x1.029)/HA		$0	$52,310	$80,553
Utility Relocation		$0	$348,000	$348,000
Administration (8% TO 13%)	10%	$0	$151,285	$179,002
Total		**$0**	**$2,472,912**	**$2,880,878**

PRELIMINARY SUMMARY COST ESTIMATES (Adjusted for Inflation)

Assumed Annual Inflation Rate = 2.90%
Assumed Number of Years = 5

Adjusted Construction Cost		$0	$1,745,308	$2,065,068
Design		$0	$209,437	$247,808
Construction Management	15%	$0	$261,796	$309,760
Right-of-Way		$0	$60,348	$92,930
Utility Relocation		$0	$401,473	$401,473
Administration	10%	$0	$174,531	$206,507
Adjusted Total		$0	$2,852,893	$3,323,546

	PROJECT: 83rd Avenue - Alternative 1				
	1998 CONSTRUCTION COST WORK SHEET				
Alternative: ___ Grade, Drain & Pave (or Penetrate & Chip)					
Item #	***Description***	***Unit***	***Quantity***	***Unit Cost***	***Total***
107.01100	N.P.D.E.S.	L.S.	1	$4,000.00	$4,000
107.09200	Community Relations	Allowance	1	$20,000.00	$20,000
205.03000	Roadway Excavation	CM	6,555	$4.50	$29,498
210.03000	Borrow Excavation (If anticipated)	CM	0	$9.00	$0
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	23,339	$3.05	$71,184
	New Asphalt Pavement (See Pavement Sheet)	SQ M	21,346	$17.90	$382,102
	Asphalt Pavement For Temporary Diversions & Detours	SQ M	0	$7.00	$0
	Double Penetration and Chip Seal on Base Material	SQ M	0		$0
	Asphalt Concrete .40 mm Overlay (See Pavement Sht)	SQ M	8,606	$4.15	$35,715
	Chip Seal Surface on Pavement (See Pavement Sht)	SQ M	0		$0
	Mill Asphalt Concrete (40 mm)	SQ M	8,806	$2.00	$17,612
336.08100	Pavement Sawcut	M	804	$6.50	$5,224
340.01020	Single Curb	M	0	$36.00	$0
340.01120	Conc. C & G	M	2,289	$34.50	$78,966
340.00000	Conc S/W Ramp Std Det 231 Type "A"	EA	3	$700.00	$2,100
340.06950	Concrete Sidewalk Std Det 230	SQ M	64	$32.00	$2,048
340.09750	Concrete Driveway w/5' Wings, Std. Det. 250	SQ M	640	$40.00	$25,600
350.01110	Removal of Existing Improvements	L.S.	1	$50,000.00	$50,000
402.00000	Traffic Signing & Striping - 2 lanes	M		$3.60	$0
402.00000	Traffic Signing & Striping - 5 lanes	M	1,600	$6.40	$10,240
402.00000	Traffic Signing & Striping - 6 lanes	M		$9.00	$0
402.00000	Traffic Signal, Full Intersection	EA	0	$110,000.00	$0
402.00000	Interconnect/Traffic Signals	M	0	$27.00	$0
402.00000	Traffic Signal, Future "Box-in"	EA	0	$4,800.00	$0
505.30000	Catch Basin - Rural location	EA	0	$1,600.00	$0
505.06125	Catch Basin - Curb Inlet	EA	16	$3,600.00	$57,600
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	144	$138.00	$19,872
618.02324	610 mm (24") RGRCP, Class III	M	206	$160.00	$32,960
618.02336	760 mm & 910 mm (30" & 36") RGRCP, Class III	M		$215.00	$0
618.02348	1060 mm & 1220 mm (42" & 48") RGRCP, Class III	M		$255.00	$0
618.02348	1676 mm (66") RGRCP, Class III	M	1,022.0	$300.00	$306,600
625.00000	1370 mm & 1520 mm Storm Drain/Irrigation Manhole	EA	5	$3,200.00	$16,000
	Headwall, 460 mm to 910 mm Pipe (MAG Details)	EA		$1,800.00	$0
	Headwall, 1060 mm to 1520 mm Pipe (MAG Details)	EA		$4,100.00	$0
	Irrigation Headwall w/ Trashrack (Inlet-MAG Details)	EA		$2,100.00	$0
	Irrigation Junction Box (MAG Details)	EA		$2,500.00	$0
	Concrete Slip Form Irrigation Ditch	M		$65.00	$0
	Earth Irrigation Ditch/Special Drainage Ditch, 6' Top	M		$33.00	$0
	Irrigation Structure w/ Gates	EA		$7,500.00	$0
	Box Culvert (See Structure Sheet)	EA		$0.00	$0
	Bridge < 100' (See Structure Sheet)	EA		$0.00	$0
	Bridge > 100' (See Structure Sheet)	EA		$0.00	$0
415.00000	Guardrail without approach end section	M		$78.00	$0
	Guardrail Approach End Section - New ADOT Type	EA		$2,000.00	$0
	Median Fine Grading, Pre-emergent, & D.G.	SM		$22.00	$0
		Subtotal			$1,167,321
110.01000	Mobilization @ 5%	L.S.	1	$58,366.00	$58,366
401.00000	Traffic Control @ 3%	L.S.	1	$35,020.00	$35,020
	Subtotal Construction				$1,260,707
	Contingency			20%	$252,141
	Total				**$1,512,848**

APPROXIMATE UNIT COSTS FOR PAVEMENT AND OVERLAY SECTIONS

Unit Cost Derivation for Arterial Section Shown:		Metric	Actual	Used	See
1	Aggregate Base Thickness 250 mm	250 mm	9.843"	10"	Computations
	Asphalt Concrete Thickness 100 mm	100 mm	3.937"	4"	Below
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
310.07100	Aggregate Base (10")	Ton	0.5250	$11.80	$6.20
315.07000	Bituminous Prime Coat (0.4 gal per SY)	Ton	0.0016	$310.00	$0.50
	Tack Coat	SY	1	$0.18	$0.18
321.03100	Asphalt Concrete, C 3/4 (4")	Ton	0.2189	$36.50	$7.99
333.07100	Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$310.00	$0.12
	Pavement Cost Per SY				$14.98
	Pavement Cost Per SQ M				$17.92
Rounded	**Unit Cost Per SQ M for 100 mm over 250 mm**			**Total**	**$17.90**

Unit Cost Derivation for 40 mm A C Overlay:		Metric	Actual	Used	See
2	Asphalt Concrete Thickness 40 mm	40 mm	1.574	1-1/2"	Computations
					Below
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
	Tack Coat	SY	1	$0.18	$0.18
321.03100	Asphalt Concrete, C 3/4 (1-1/2")	Ton	0.0821	$38.50	$3.16
333.07100	Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$310.00	$0.12
	1-1/2" Asphalt Overlay Per SY				$3.46
	40 mm Asphalt Overlay Per SQ M				$4.14
Rounded	**Cost Per SQ M for 40 mm Overlay**			**Total**	**$4.15**

Utility Relocation-Alternative 1

Alternative: 1					
Item #	***Description***	***Unit***	***Quantity***	***Unit Cost***	***Total***
1	Relocate 69 kv Power Pole	EA		$10,500.00	
2	Other Poles associated w/ 69kv Power Line	EA	10	$4,000.00	$40,000.00
3	SRP Water Facilities	LS	1	$250,000.00	$250,000.00
4	Railroad Crossing	EA		$350,000.00	
	Subtotal Construction				$290,000.00
	Contingency			20%	$58,000.00
		Total			$348,000.00

3/26/99

PROJECT: 83rd Avenue - Alternative 2

1998 CONSTRUCTION COST WORK SHEET

Alternative: __ Grade, Drain & Pave (or Penetrate & Chip)					
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
107.01100	N.P.D.E.S.	L.S.	1	$4,000.00	$4,000
107.09200	Community Relations	Allowance	1	$20,000.00	$20,000
205.03000	Roadway Excavation	CM	2,898	$4.50	$13,041
210.03000	Borrow Excavation (If anticipated)	CM	0	$9.00	$0
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	29,663	$3.05	$90,472
	New Asphalt Pavement (See Pavement Sheet)	SQ M	23,667	$17.90	$423,639
	Asphalt Pavement For Temporary Diversions & Detours	SQ M	0	$7.00	$0
	Double Penetration and Chip Seal on Base Material	SQ M	0		
	Asphalt Concrete 40 mm Overlay (See Pavement Sht)	SQ M	8,806	$4.15	$36,545
	Chip Seal Surface on Pavement (See Pavement Sht)	SQ M	0		
	Mill Asphalt Concrete (40 mm)	SQ M	8,806	$2.00	$17,612
336.08100	Pavement Sawcut	M	864	$6.50	$5,616
340.01020	Single Curb	M	0	$36.00	$0
340.01120	Conc. C & G	M	2,415	$34.50	$83,318
340.00000	Conc S/W Ramp Std Det 231 Type "A"	EA	5	$700.00	$3,500
340.06950	Concrete Sidewalk Std Det 230	SQ M	4,892	$32.00	$156,544
340.09750	Concrete Driveway w/5' Wings, Std. Det. 250	SQ M	640	$40.00	$25,600
350.01110	Removal of Existing Improvements	L.S.	1	$50,000.00	$50,000
402.00000	Traffic Signing & Striping - 2 lanes	M		$3.60	$0
402.00000	Traffic Signing & Striping - 5 lanes	M	1,600	$6.40	$10,240
402.00000	Traffic Signing & Striping - 6 lanes	M		$9.00	$0
402.00000	Traffic Signal, Full Intersection	EA	0	$110,000.00	$0
402.00000	Interconnect/Traffic Signals	M	0	$27.00	$0
402.00000	Traffic Signal, Future "Box-in"	EA	0	$4,800.00	$0
505.30000	Catch Basin - Rural location	EA	0	$1,600.00	$0
505.06125	Catch Basin - Curb Inlet	EA	18	$3,600.00	$64,800
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	150	$138.00	$20,700
618.02324	610 mm (24") RGRCP, Class III	M	206	$160.00	$32,960
618.02336	760 mm & 910 mm (30" & 36") RGRCP, Class III	M		$215.00	$0
618.02348	1060 mm & 1220 mm (42" & 48") RGRCP, Class III	M		$255.00	$0
618.02348	1576 mm (66") RGRCP, Class III	M	1,022	$300.00	$306,600
625.00000	1370 mm & 1520 mm Storm Drain/Irrigation Manhole	EA	5	$3,200.00	$16,000
	Headwall, 460 mm to 910 mm Pipe (MAG Details)	EA		$1,800.00	$0
	Headwall, 1060 mm to 1520 mm Pipe (MAG Details)	EA		$4,100.00	$0
	Irrigation Headwall w/ Trashrack (Inlet-MAG Details)	EA		$2,100.00	$0
	Irrigation Junction Box (MAG Details)	EA		$2,500.00	$0
	Concrete Slip Form Irrigation Ditch	M		$65.00	$0
	Earth Irrigation Ditch/Special Drainage Ditch, 6' Top	M		$33.00	$0
	Irrigation Structure w/ Gates	EA		$7,500.00	$0
	Box Culvert (See Structure Sheet)	EA		$0.00	$0
	Bridge < 100' (See Structure Sheet)	EA		$0.00	$0
	Bridge > 100' (See Structure Sheet)	EA		$0.00	$0
415.00000	Guardrail without approach end section	M		$78.00	$0
	Guardrail Approach End Section - New ADOT Type	EA		$2,000.00	$0
	Median Fine Grading, Pre-emergent, & D.G.	SM		$22.00	$0
		Subtotal			$1,381,187
110.01000	Mobilization @ 5%	L.S.	1	$69,059.00	$69,059
401.00000	Traffic Control @ 3%	L.S.	1	$41,436.00	$41,436

Subtotal Construction		$1,491,682
Contingency	20%	$298,336
Total		**$1,790,018**

APPROXIMATE UNIT COSTS FOR PAVEMENT AND OVERLAY SECTIONS

Unit Cost Derivation for Arterial Section Shown:		Metric	Actual	Used	See
1	Aggregate Base Thickness 250 mm	250 mm	9.843"	10"	Computations
	Asphalt Concrete Thickness 100 mm	100 mm	3.937"	4"	Below
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
310.07100	Aggregate Base (10")	Ton	0.5250	$11.80	$6.20
315.07000	Bituminous Prime Coat (0.4 gal per SY)	Ton	0.0016	$310.00	$0.50
	Tack Coat	SY	1	$0.18	$0.18
321.03100	Asphalt Concrete, C 3/4 (4")	Ton	0.2189	$36.50	$7.99
333.07100	Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$310.00	$0.12
	Pavement Cost Per SY				$14.98
	Pavement Cost Per SQ M				$17.92
Rounded	**Unit Cost Per SQ M for 100 mm over 250 mm**			**Total**	**$17.90**

Unit Cost Derivation for 40 mm A C Overlay:		Metric	Actual	Used	See
	Asphalt Concrete Thickness 40 mm	40 mm	1.574	1-1/2"	Computations
					Below
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
	Tack Coat	SY	1	$0.18	$0.18
321.03100	Asphalt Concrete, C 3/4 (1-1/2")	Ton	0.0821	$38.50	$3.16
333.07100	Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$310.00	$0.12
	1-1/2" Asphalt Overlay Per SY				$3.46
	40 mm Asphalt Overlay Per SQ M				$4.14
Rounded	**Cost Per SQ M for 40 mm Overlay**			**Total**	**$4.15**

Alternative: 2					
Item #	***Description***	***Unit***	***Quantity***	***Unit Cost***	***Total***
1	Relocate 69 kv Power Pole	EA		$10,500.00	
2	Other Poles associated w/ 69kv Power Line	EA	10	$4,000.00	$40,000.00
3	SRP Water Facilities	LS	1	$250,000.00	$250,000.00
4	Railroad Crossing	EA		$350,000.00	

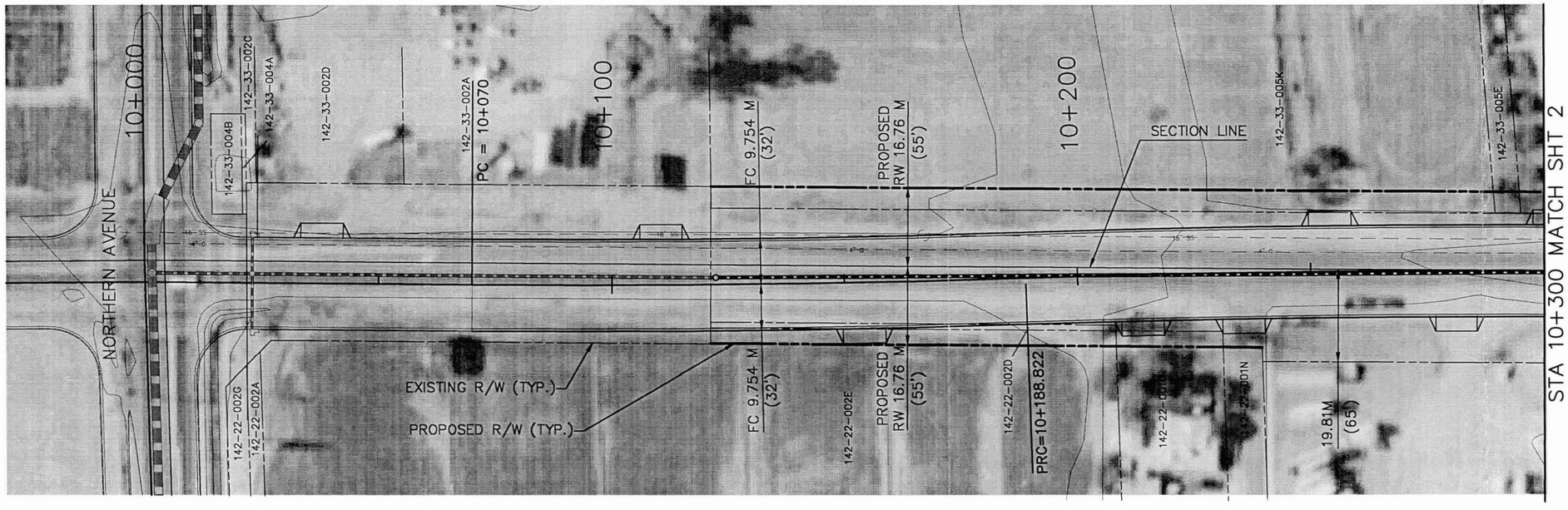
Subtotal Construction		$290,000.00
Contingency	20%	$58,000.00
Total		$348,000.00

APPENDIX G

CONCEPTUAL PLAN AND PROFILE SHEETS

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	68972		XX	

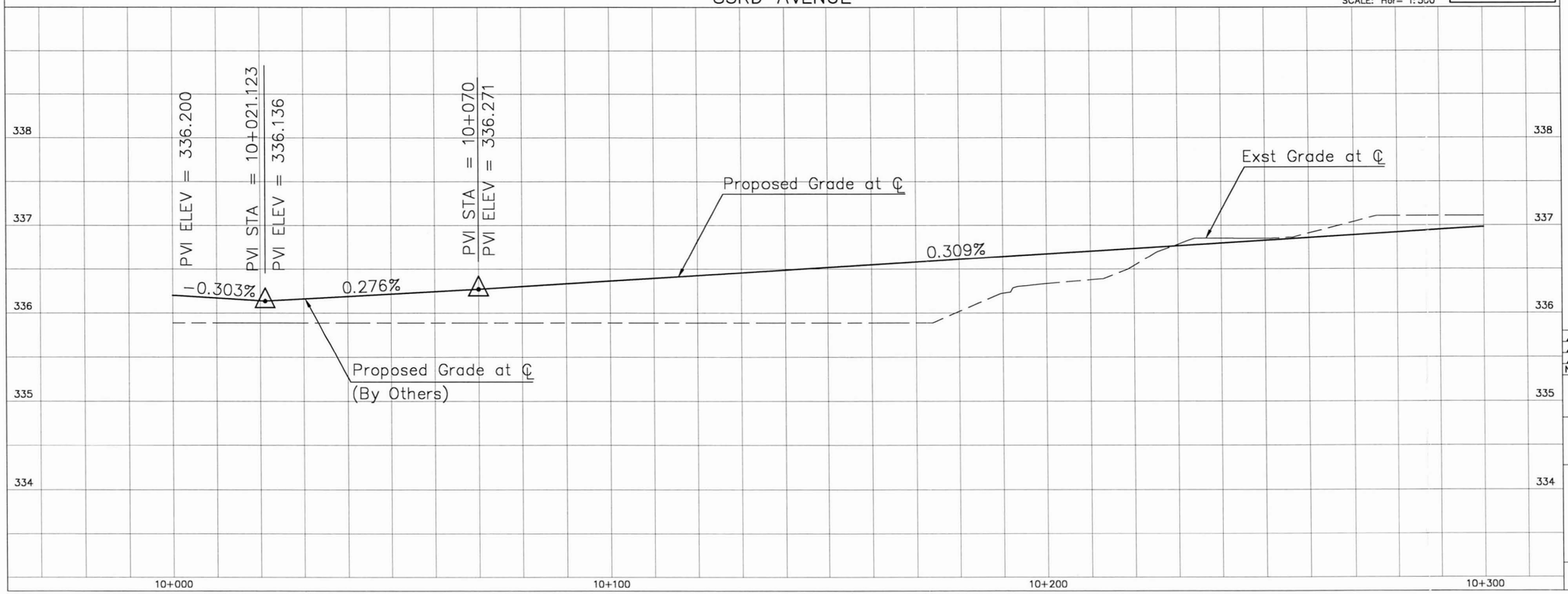
REMOVALS



5 0 5 10
Scale in Meters
SCALE: Hor= 1:500

TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE

83RD AVENUE



NO.	REVISION	BY	DATE
3			
2			
1			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

83rd AVENUE
NORTHERN AVENUE TO OLIVE AVENUE
PROJECT NO. 68972

	BY	DATE
DESIGNED		
DRAWN		
CHECKED		

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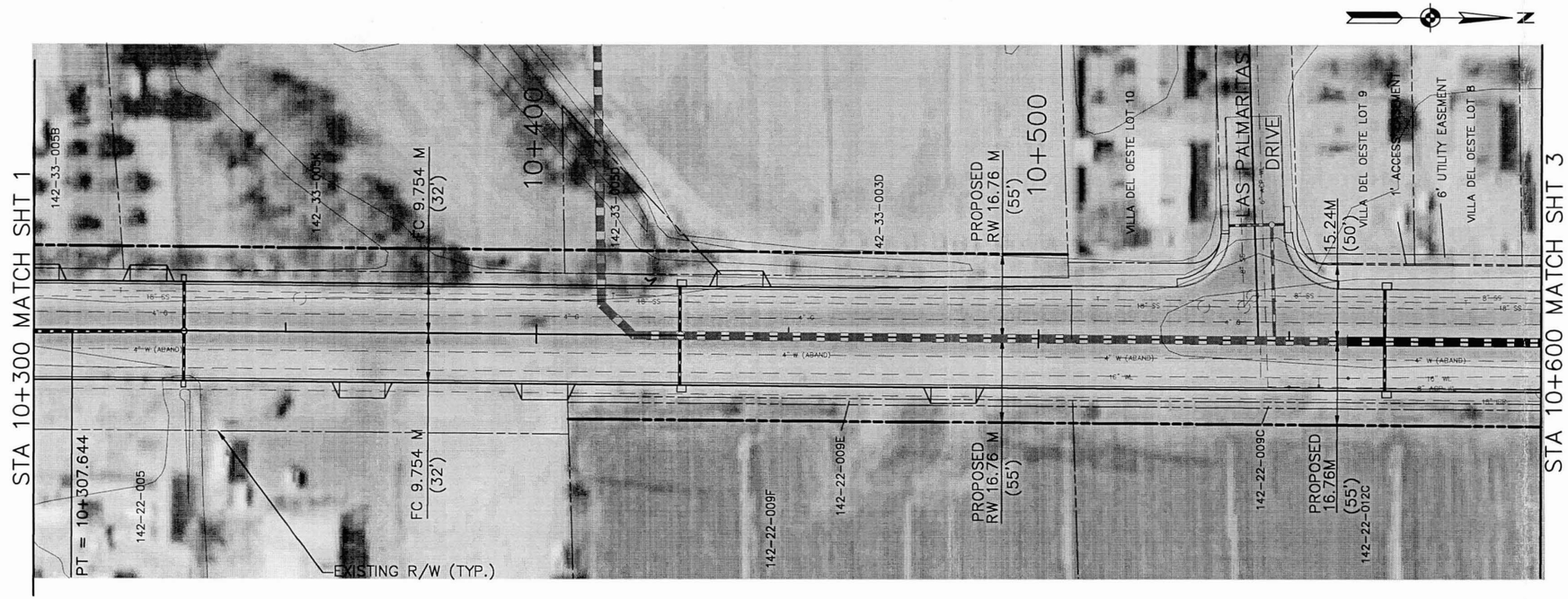

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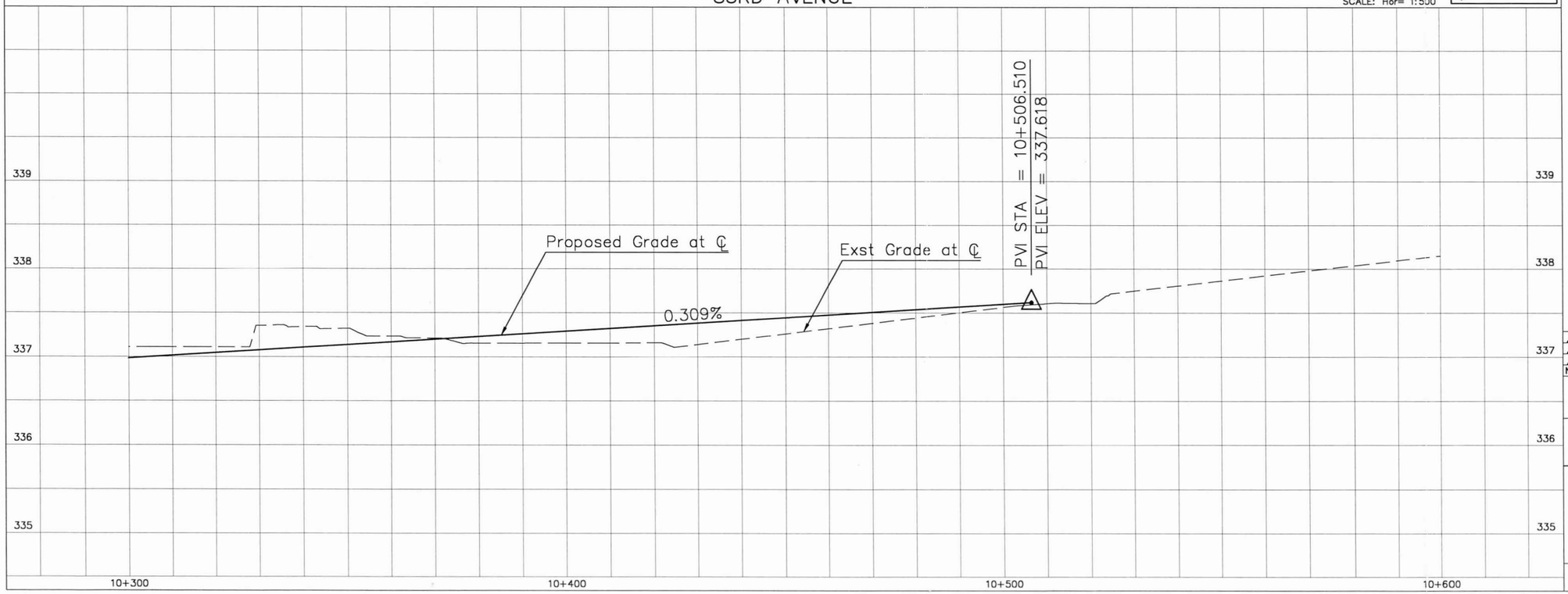

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

83rd AVENUE
NORTHERN AVENUE TO OLIVE AVENUE
PROJECT NO. 68972

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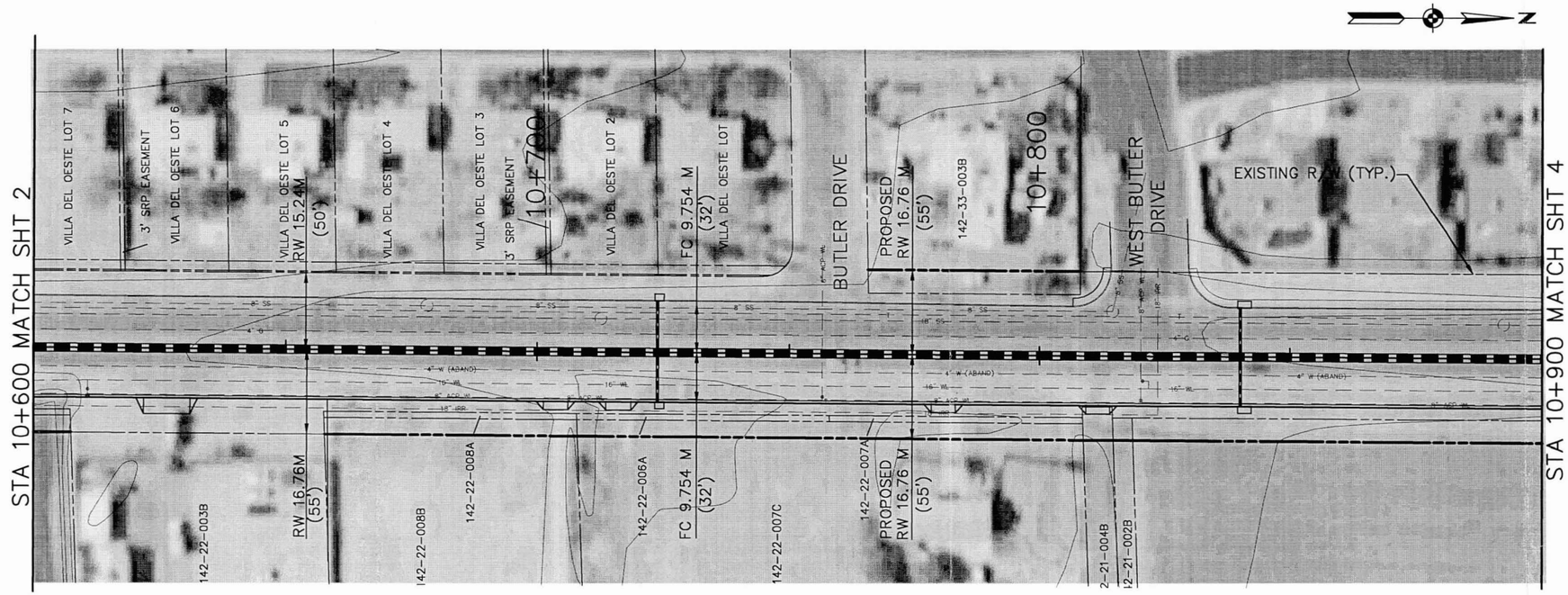

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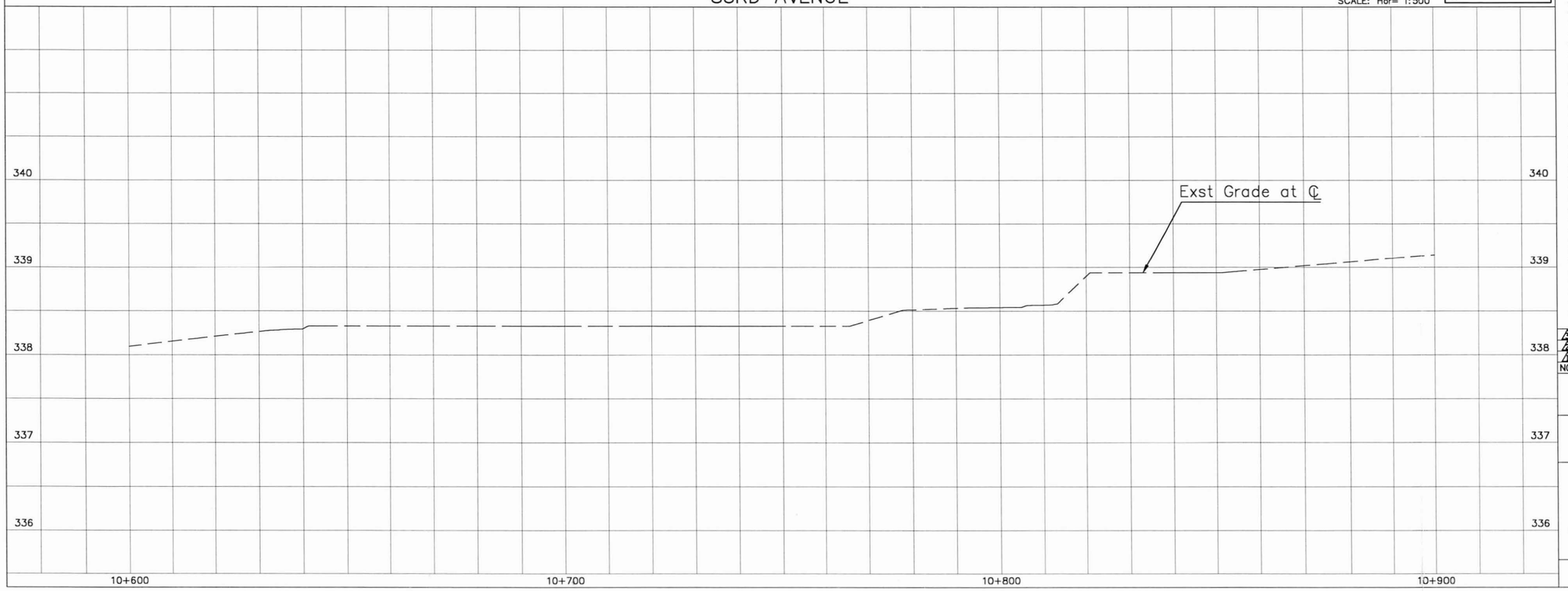

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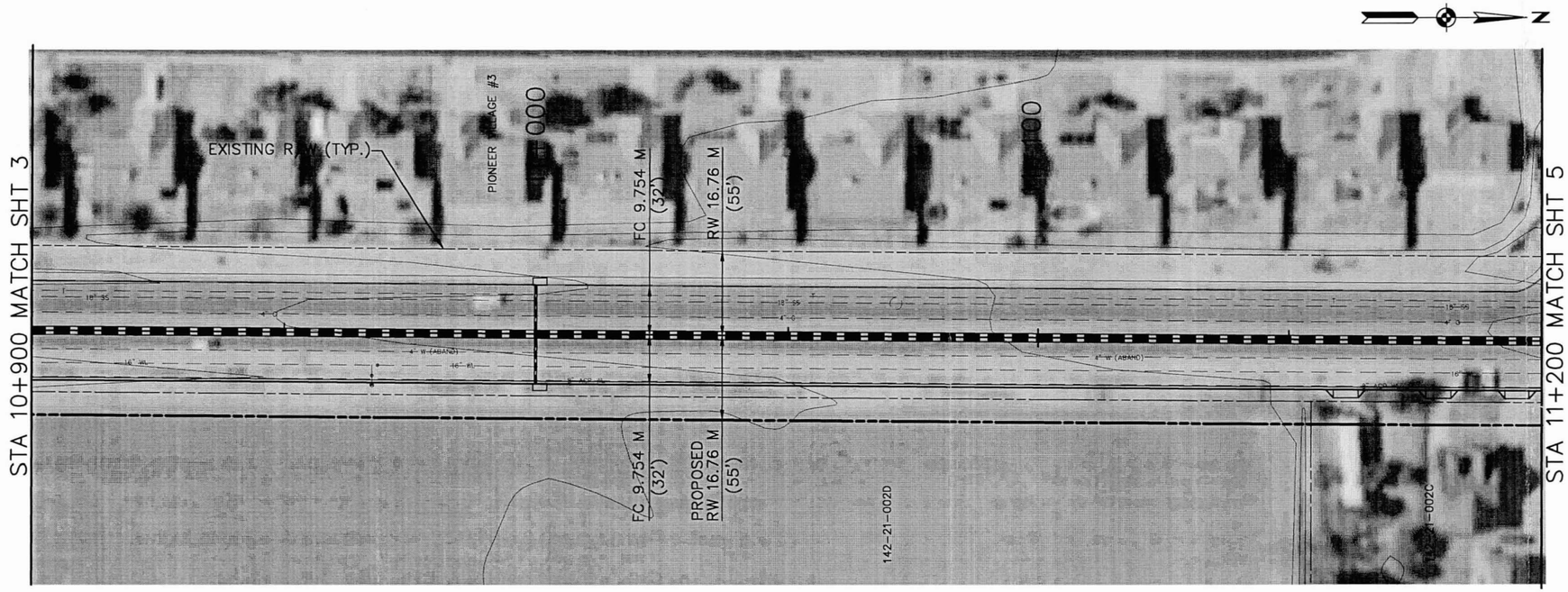

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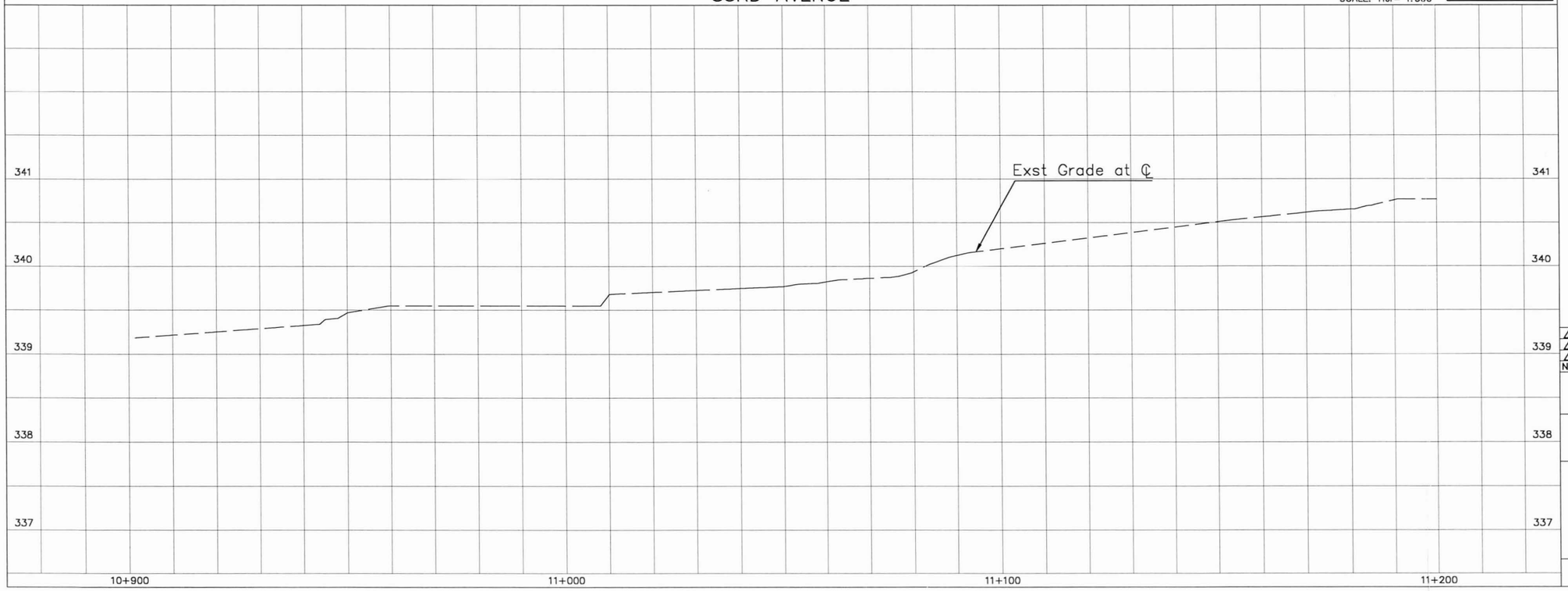

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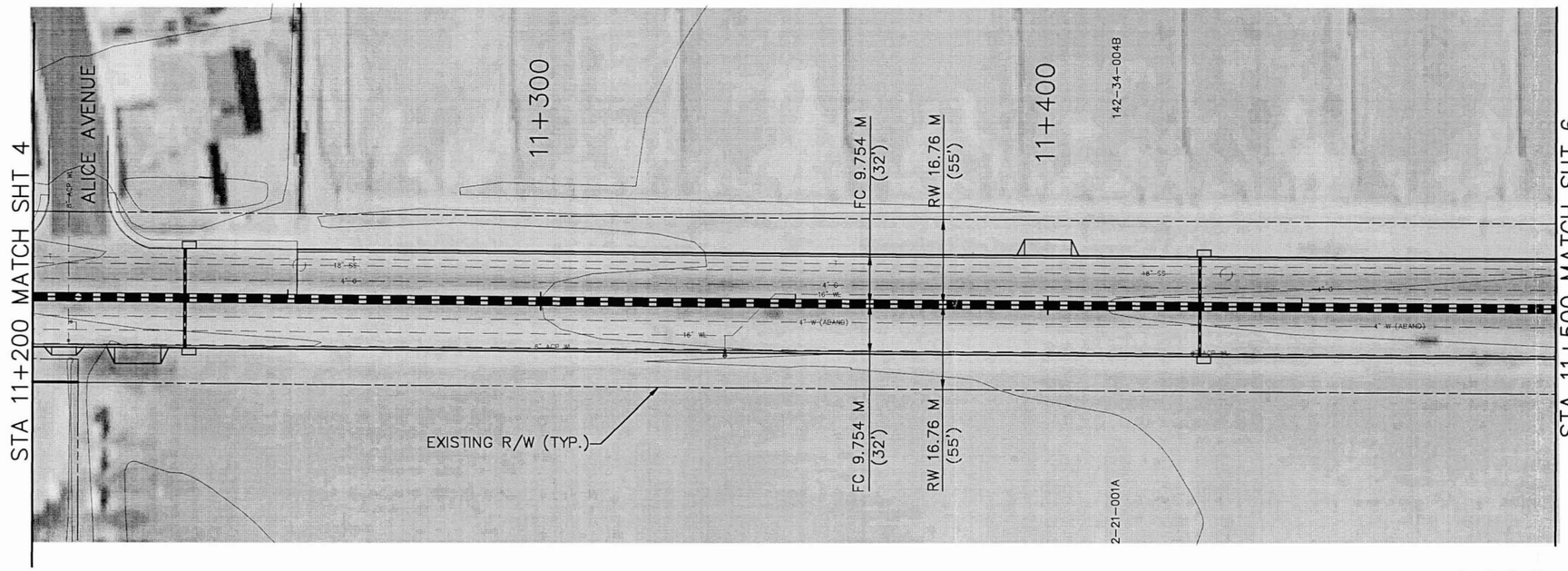

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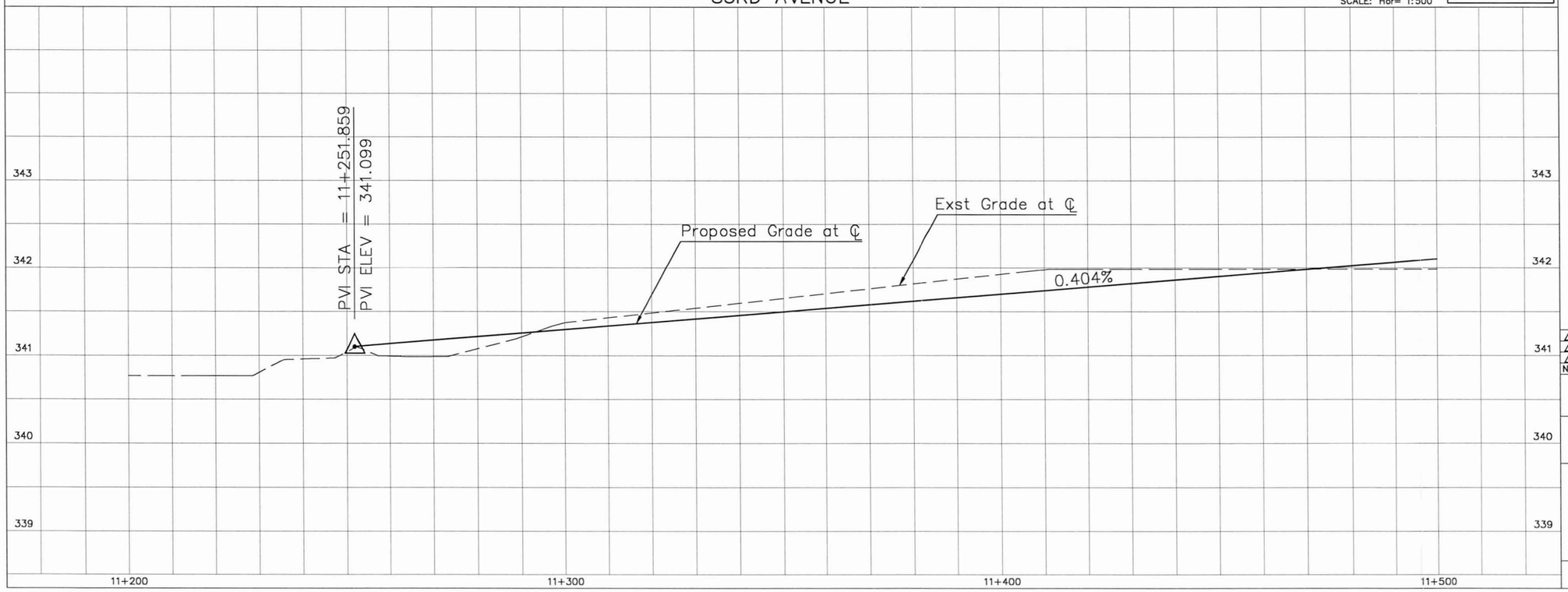

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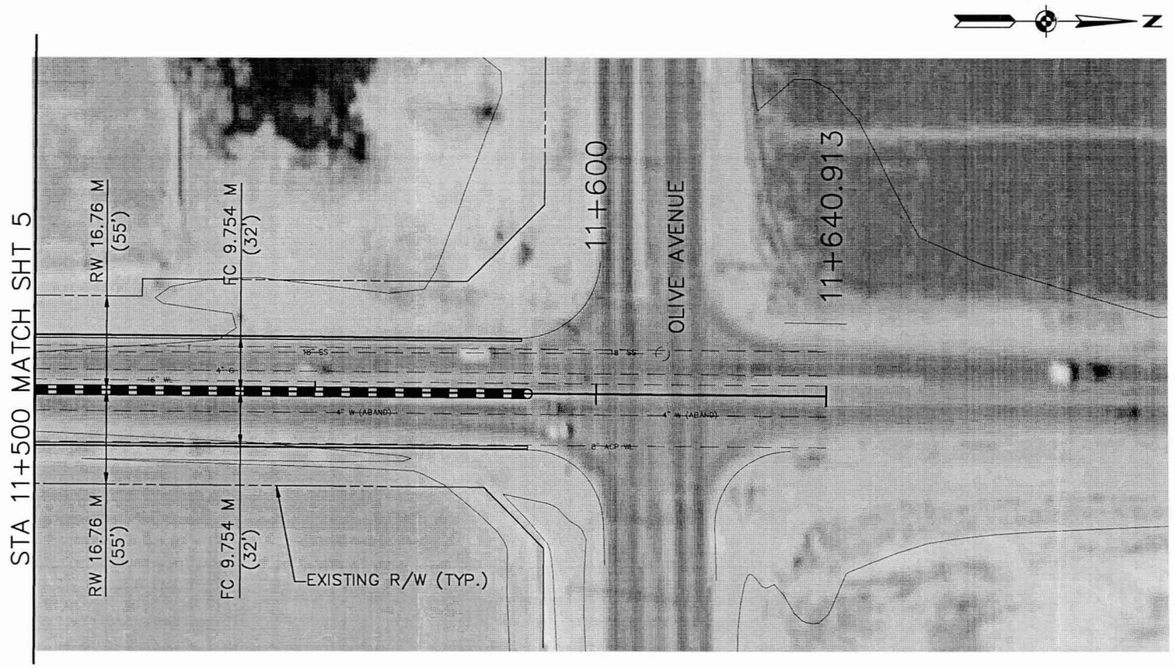

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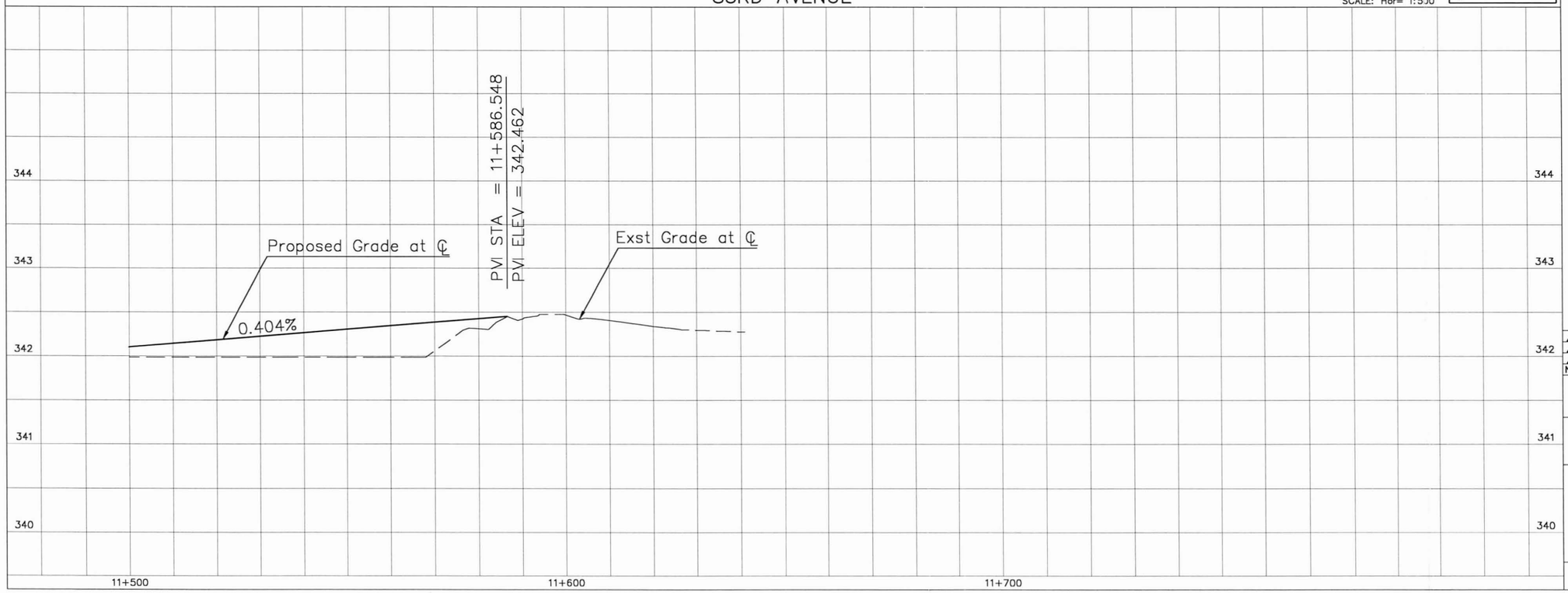

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APPENDIX H

ENVIRONMENTAL INFORMATION

ENVIRONMENTAL OVERVIEW
83rd Avenue (Northern Avenue – Olive Avenue)

This area is historically agricultural in use but is being developed into suburban uses similar to neighboring sections of Glendale and Peoria. Current land uses on the east side of the roadway are primarily agricultural with scattered residences and businesses. On the west side of the roadway, land use is predominately residential with fewer agricultural and commercial properties.

The U. S. Fish and Wildlife Service (USFWS) list of endangered threatened, proposed, and candidate species for Maricopa County was reviewed and no threatened, endangered, or special-status species were identified as potentially occurring in the vicinity of the project area. No critical habitats for the species listed were identified in the project area. There is no riparian habitat along 83rd Avenue between Northern Avenue and Olive Avenue.

Activities such as stockpiling excavated material, grading roads, and grading to remove vegetation or to level land, that may result in a discharge of dredged or fill material into waters of the United States require a Section 404 permit from the United States Army Corps of Engineers (USACE). Natural drainage flows from the northeast to the southwest with no major or minor drainage crossings of 83rd Avenue. Review of United States Geological Survey maps, as well as site inspections, indicate that there are no waters of the United States that may be affected by project activities, therefore, no Section 404 permit is required. Based upon the Flood Insurance Rate Map Panel 1630, dated December 1993, and Panel 1640, dated April 1988, the project does not lie within a Federal Emergency Management Agency (FEMA) 100-year floodplain. A National Pollutant Discharge Elimination System (NPDES) stormwater permit is required for construction sites where five or more acres will be graded or disturbed. This project will require construction activities on an area greater than five acres; therefore, a NPDES permit is required for the project.

Several potential noise receptors were noted along the east side of the project, however most appeared to be commercial businesses, with their only access from 83rd Avenue. Residential subdivisions on the west side of the project will require further analysis to determine if there are noise impacts, and if so, what mitigation should be considered. These subdivisions have existing neighborhood walls, but they may not be adequate to mitigate the roadway noise. Noise analysis, anticipated at the 40% plan stage, will be performed in accordance with the MCDOT noise abatement policy once the final alignments and elevations are determined.

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 controlled in accordance with County air pollution regulations and as stipulated in the required County earthmoving permit.

Because all new right-of-way will be acquired from undeveloped land, there will be minimal impact to residential property owners. No significant impact to existing vegetation is expected; however, compliance with the Arizona Native Plant Law will ensure that any protected shrubs or trees that would be impacted by construction activities are salvaged or relocated prior to construction.

APPENDIX I

GEOTECHNICAL ENGINEERING & PAVEMENT DESIGN

APPENDIX J

PHOTOGRAPHS

Looking NE from SW corner Olive Avenue & 83rd Avenue

Looking SE from southeast corner of 83rd Avenue & Olive Avenue

Looking south along the west side 83rd Avenue 33 m+ north of Alice Avenue

Looking south from the west side of 83rd Avenue & Butler Avenue intersection

Looking north from NW corner of Las Palmaritas Drive & 83rd Avenue intersection

Looking south from SW corner of Las Palmaritas Drive & 83rd Avenue intersection

Looking north toward Las Palmaritas Drive from irrigation ditch outlet along drainage ditch located on west side of 83rd Avenue

Looking east at outlet of irrigation drain pipe from west of 83rd Avenue

Looking south along west side 83rd Avenue approximately 300' north of Northern Avenue toward City of Peoria Pump Station

Looking SW at City of Peoria Pump Station from west side 83rd Avenue just north of Northern Avenue

Looking SE toward intersection of 83rd Avenue & Northern from the west side of 83rd Avenue just north of Northern Avenue.