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115th Avenue

MC 85 to McDowell Road

FINAL

Candidate Assessment Report

C97-2812-05-06

January 31, 1997

Revised: February 28, 1997

Maricopa County

Department of Transportation

Prepared By:

SVERDRUP CIVIL, INC.

for

Transportation Planning Division

Registered Professional Engineer (Civil)
CERTIFICATE NO
21705
ROGER W.
MILES
Date Signed
ARIZONA, U.S.A.

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SECTION 1.0
PREFERRED ALTERNATIVE SUMMARY

1.1 Summary

The purpose of this project is to increase the capacity of the 115th Avenue from MC 85 to McDowell Road to accommodate anticipated future traffic volumes and to improve the traffic flow to Phoenix International Raceway (PIR). A follow-up traffic study of a PIR event will be prepared and submitted to MCDOT which may affect the recommendations of this report. This 3.2 km (2-mile) project is divided into a rural section and a urban section. The rural section extends from MC 85 (Buckeye Road) to Interstate 10 (I-10) and the urban section is from I-10 to McDowell Road.

The preferred alternative is the Low Cost Alternative described in the report. The total project cost for the Full Cost Alternative is $3,395,000 as indicated in Table 10.5 located on page 46 of this report. It consists of the construction of a rural minor arterial section from MC 85 to I-10 and an urban minor arterial section from I-10 to McDowell Road. The rural section conforms to Figure 5.2 of the MCDOT Roadway Design Manual as modified in Figure 9.2 of this report. The rural section allows developers to construct curb and gutter when the property develops. The urban section will adhere to Figure 5.8 in the MCDOT manual as modified in Figure 9.2. The urban minor arterial section was selected because of its proximity to ADOT urban improvements on 115th Avenue at I-10 and due to the location of the ADOT drainage channel on the north side of I-10. It will also provide an acceptable level of service for the 2020 traffic volumes.

The preferred alternative includes improvements on Van Buren Street. These improvements consist of installation of a traffic signal and widening the roadway to a five-lane section for the length of the left turn lanes. A traffic signal will also be installed at the intersection of McDowell Road along with improvements to the south leg of the intersection.

A box culvert located north of the railroad tracks is included in the preferred Low Cost Alternative. It is designed to convey 100-year offsite flows to the west. This location was identified by the Flood Control District of Maricopa County (FCDMC) as a concentration point. An outfall channel to the Agua Fria River should be designed and installed by FCDMC in conjunction with the installation of this box culvert.

Part of this project was analyzed previously in a Candidate Assessment Report (CAR # C96-2812-06-07). This report studied 115th Avenue from I-10 to Thomas Road.

SECTION 2.0
BACKGROUND

2.1 Project Description and Location

The project under consideration for this Candidate Assessment Report is located on 115th Avenue from MC 85 (Buckeye Road) to McDowell Road. This section of 115th Avenue is located east of the Town of Avondale in the southwestern part of the Phoenix metropolitan area (see Figure 2.1). The project was requested by Tim Oliver of MCDOT's Planning Division, Systems Planning Section. His request is a result of the Southwest Valley Transportation Study prepared by BRW for MCDOT. This project is identified in the 10-year action plan as a Number 1 priority regional project. The anticipated problem stated in the project request form is future traffic congestion due to increasing traffic volumes. Widening the roadway to 5-lanes will help meet the anticipated future traffic.

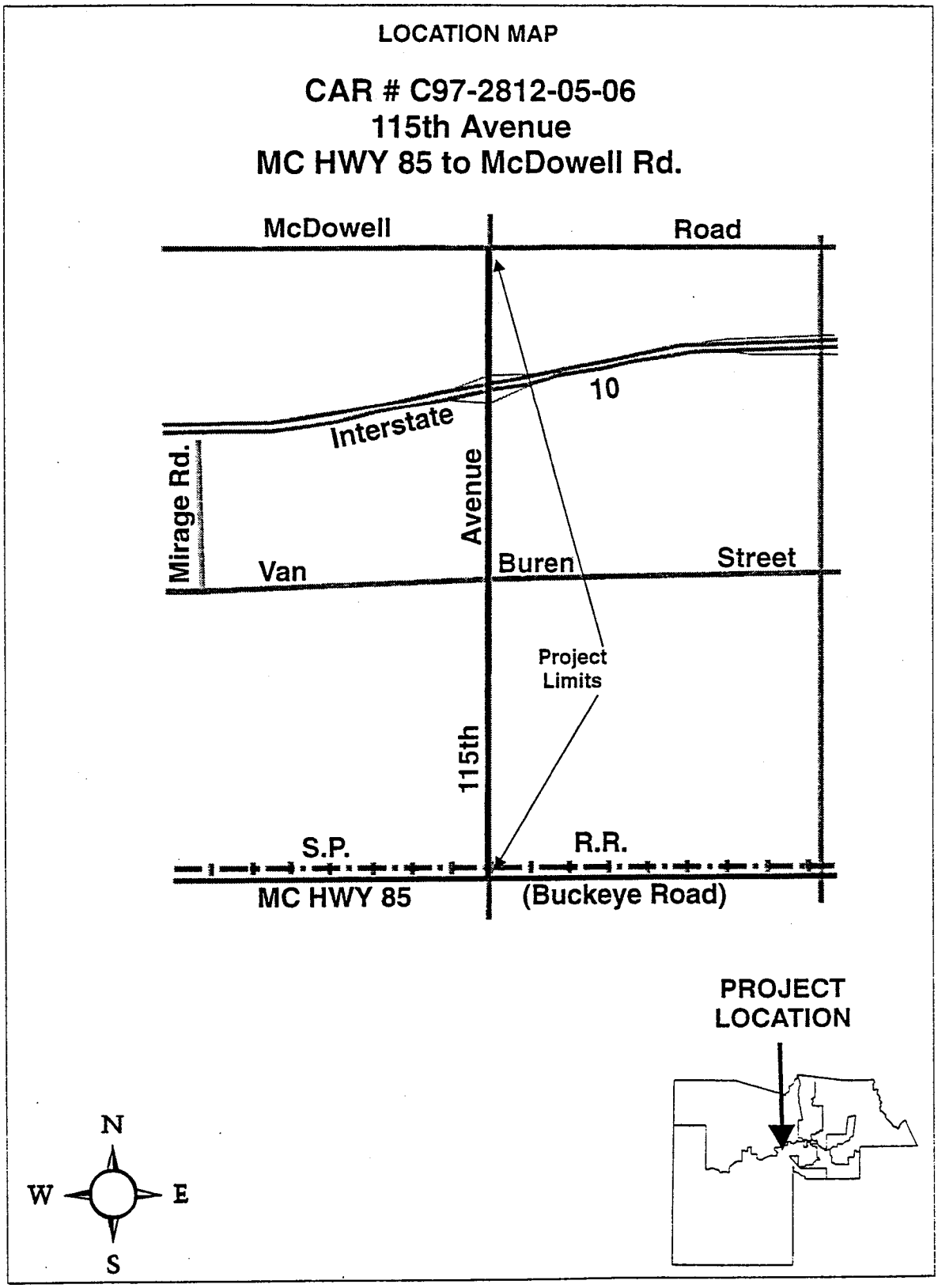
2.2 Adjacent Municipalities

The project site is nearly surrounded by area annexed by the City of Avondale (see Figure 2.2). Large sections of land northeast of the intersection of MC 85 and 115th Avenue, northwest of Van Buren Street and 115th Avenue, southeast and northeast of the intersection of McDowell Road and 115th Avenue are within the City of Avondale. These large annexed areas exclude the 115th Avenue right-of-way. Only the Van Buren Street intersection and a small portion of the right-of-way north of the Southern Pacific Railroad tracks are within the City of Avondale. Most of the land adjacent to the project is still undeveloped.

An intergovernmental agreement (IGA) with the City of Avondale should be prepared that will include a provision to allow MCDOT to acquire right-of-way within Avondale and annexation of the roadway by Avondale after the completion of the project where adjacent land has been already annexed by Avondale.

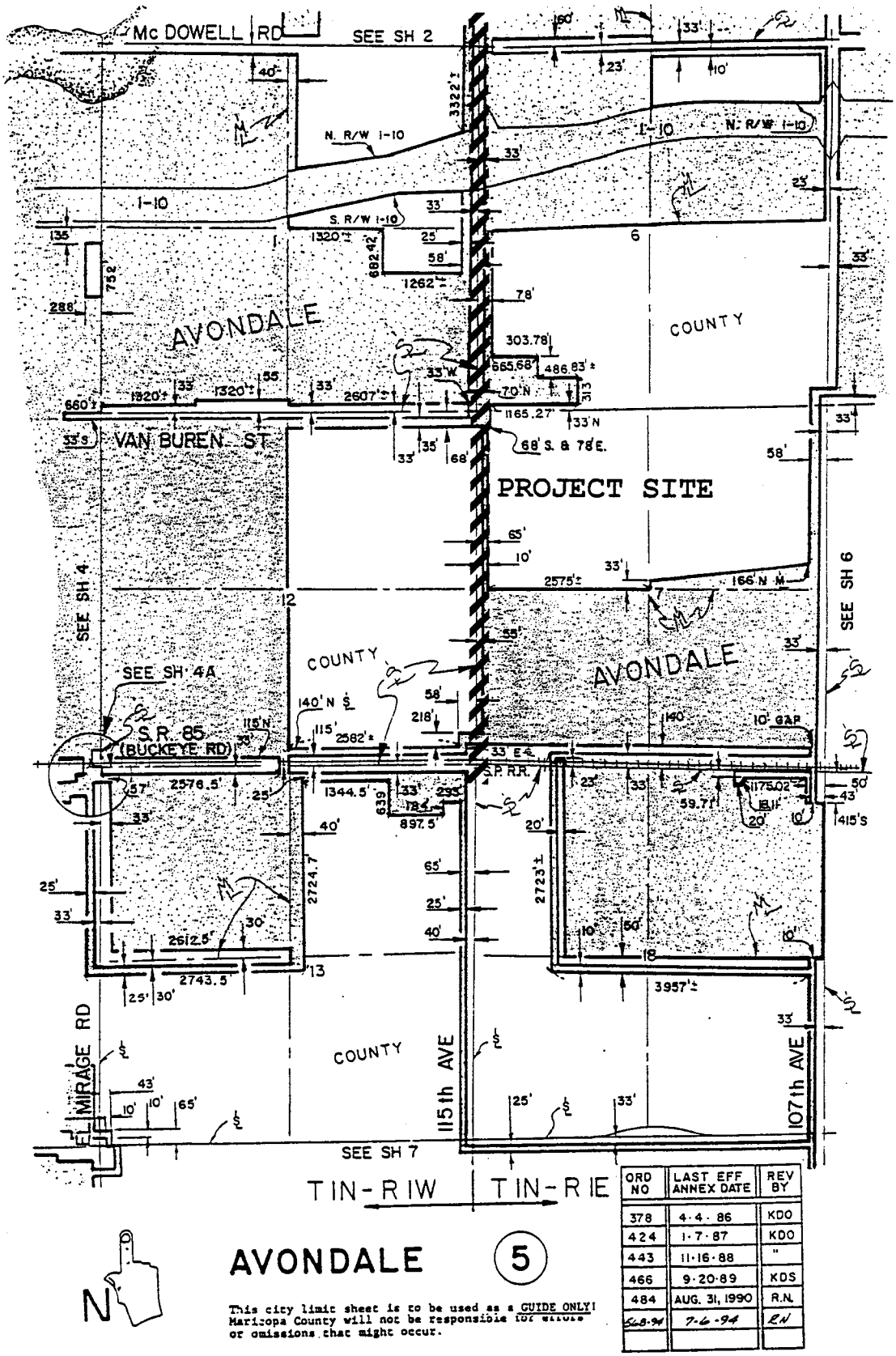
2.3 Existing Roadway Characteristics:

The existing roadway from MC 85 to I-10 was reconstructed by MCDOT in 1985 under MCDOT Work Order Number 68060. This section of MC 85 is classified as 2-lane minor collector in the Southwest Valley Transportation Study. The existing 8.6 m (28 ft) section conforms to a rural local road but the existing traffic volumes exceed MCDOTs standard for rural local roads.



See City Limits Map for detailed City Limits information.

Figure 2.1 - Location Map



ORD NO	LAST EFF ANNEX DATE	REV BY
378	4-4-86	KDO
424	1-7-87	KDO
443	11-16-88	"
466	9-20-89	KDS
484	AUG. 31, 1990	R.N.
568-94	7-6-94	RN

Figure 2.2 - Avondale City Limits Map-1

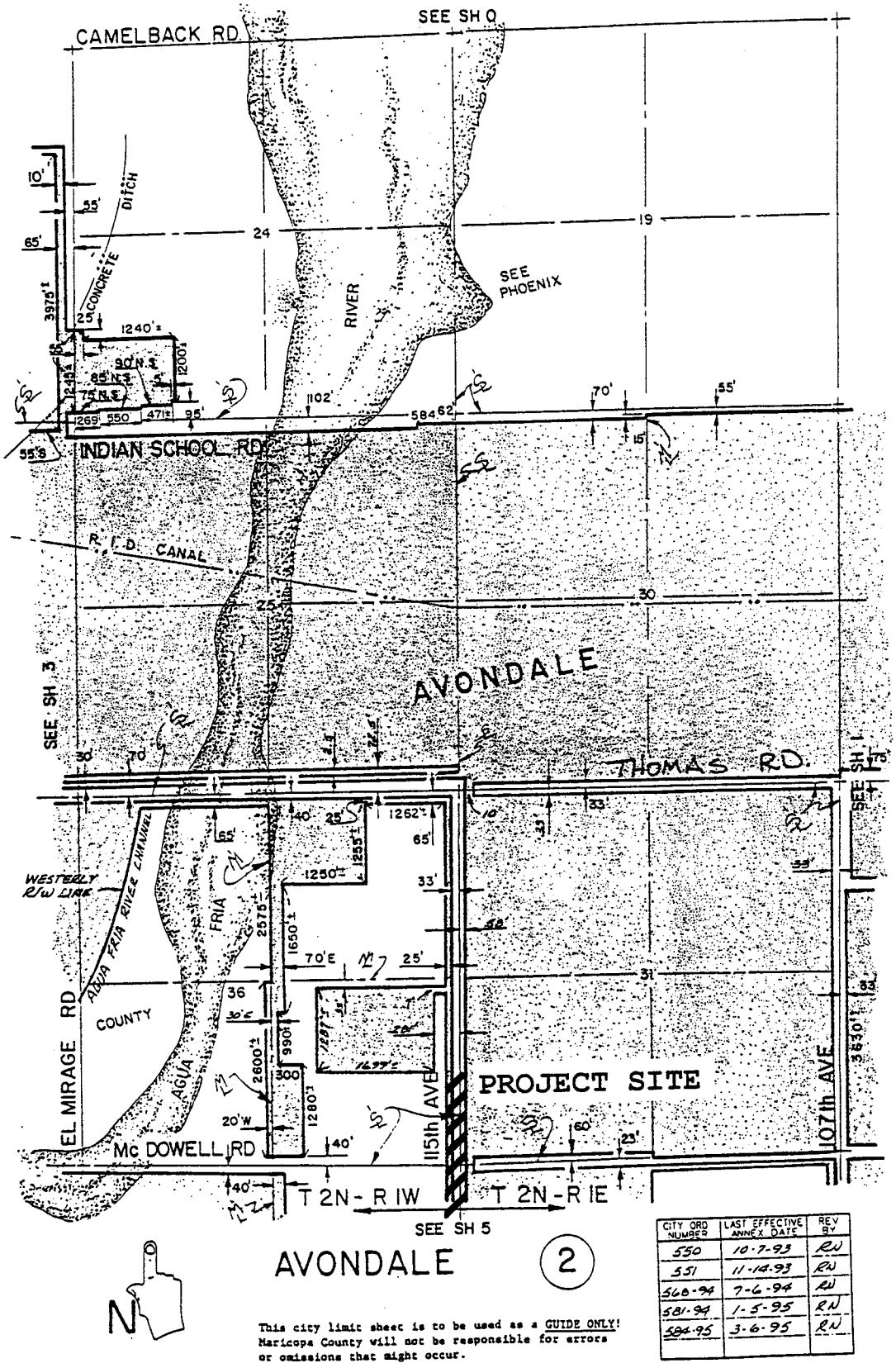


Figure 2.2 - Avondale City Limits Map-2

115th Avenue from MC 85 to I-10 consists of a 8.6 m (28-ft) roadway with two 3.6 m (12-ft) wide travel lanes and two 0.6 m (2-ft) wide paved shoulders according to MCDOT as-built drawings (W.O. No. 68060). The roadway widens to 13.4 m (44 ft) at Van Buren Street for left turn lanes. The pavement structure installed with this project consists of 65 mm (2.5 in) of asphaltic concrete over 100 mm (4 in) of aggregate base course and 150 mm (6 in) of select material.

The south end of the roadway was constructed by ADOT as part of State Route (SR) 85 improvements. These improvements were constructed in 1983 as part of ADOT Project RS-371(9)P. Improvements on 115th Avenue included in the ADOT project consist of a 20.6 m (68-ft) roadway with 4 through lanes and a left turn lane. This 20.6 m (68-ft) section extends 91 m (300 ft) north of MC 85. The pavement structure on 115th Avenue constructed with this project consists of 75 mm (3 in) of asphaltic concrete and 13 mm (½ in) of asphalt concrete friction course (ACFC).

115th Avenue widens to 24.4 m (80 ft) at the intersection of I-10 which includes 6 lanes under the I-10 bridges (4 through lanes and 2 left turn lanes) and 4 lanes and a median north and south of I-10. These improvements were constructed in 1986 as part of ADOT Project I-10-2(70). The full-width sections also include curb and gutter. There is a 3.0 m (10 ft) right turn lane on the northbound approach to the eastbound on-ramp to I-10. The pavement structure consists of 540 mm (6.5 in) of asphaltic concrete and 13 mm (½ in) of ACFC.

North of I-10, 115th Avenue consists of a 13.4 m (44 ft) section including a continuous left turn lane and two through lanes. North of McDowell Road, 115th Avenue tapers down to a 8.5 m (28-ft) roadway.

The pavement condition is very good as indicated by the average PCR value of 89 and 86 in the MCDOT Road Summary Report shown in Appendix F. The only distresses observed by MCDOT were some scattered transverse cracking, a little excess asphalt and shoving near the intersections.

115th Avenue south of MC 85 is a 4-lane roadway that continues south to Phoenix International Raceway (PIR).

2.4 Intersecting Roadways

There are four intersections on 115th Avenue from MC 85 to McDowell Road including McDowell Road. Van Buren Street intersects 115th Avenue near the middle of the project. It consists of a paved

2-lane road east and west of 115th Avenue. It has been widened to a 13.4 m (44 ft) wide roadway at 115th Avenue which includes a left turn lane and two through lanes. The intersection of 115th Avenue and Van Buren Street is controlled by 4-way stop signs.

Interstate 10 (I-10) crosses 115th Avenue between Van Buren Street and McDowell Road. The intersection consists of a diamond interchange. The off ramps are controlled by stop signs on the ramps.

McDowell Road intersects with 115th Avenue at the northern end of the project. McDowell Road consists of a 4-lane roadway widened at 115th Avenue to include left turn lanes. Traffic at the intersection of 115th Avenue and McDowell Road is controlled by 4-way stop signs.

SECTION 3.0
ADJACENT LAND USE

3.1 General

The project is surrounded by undeveloped portions of Avondale. Adjacent land is primarily used for irrigated farming with some exceptions for homes and businesses. The Southern Pacific Railroad tracks are about 23 m (75 ft) north of the MC 85 roadway centerline at 115th Avenue.

3.2 Large Enterprises

There are no large enterprises along 115th Avenue from MC 85 to McDowell Road. Littleton Elementary School is located south of the project site on the southwest corner of MC 85 and 115th Avenue. The most significant enterprise effecting the project site is PIR which is located 6.4 km (4 mi) south of the project site. 115th Avenue is a primary access route for PIR to and from I-10.

3.3 Zoning

Figure 3.1 shows both Maricopa County and City of Avondale existing zoning around the project site. Land west of 115th Avenue is mostly zoned Rural-43.

3.4 Land Use Plan

Figure 3.2 shows the City of Avondale Future Growth Plan. This plan shows a commercial regional node at I-10 and 115th Avenue extending north to McDowell Road. Land surrounding 115th Avenue from McDowell Road south to 800 m (½ mi) south of Van Buren Street is classified as High Intensity Development while the land north of the railroad tracks is slated as an industrial area. 115th Avenue is designated as a transportation corridor.

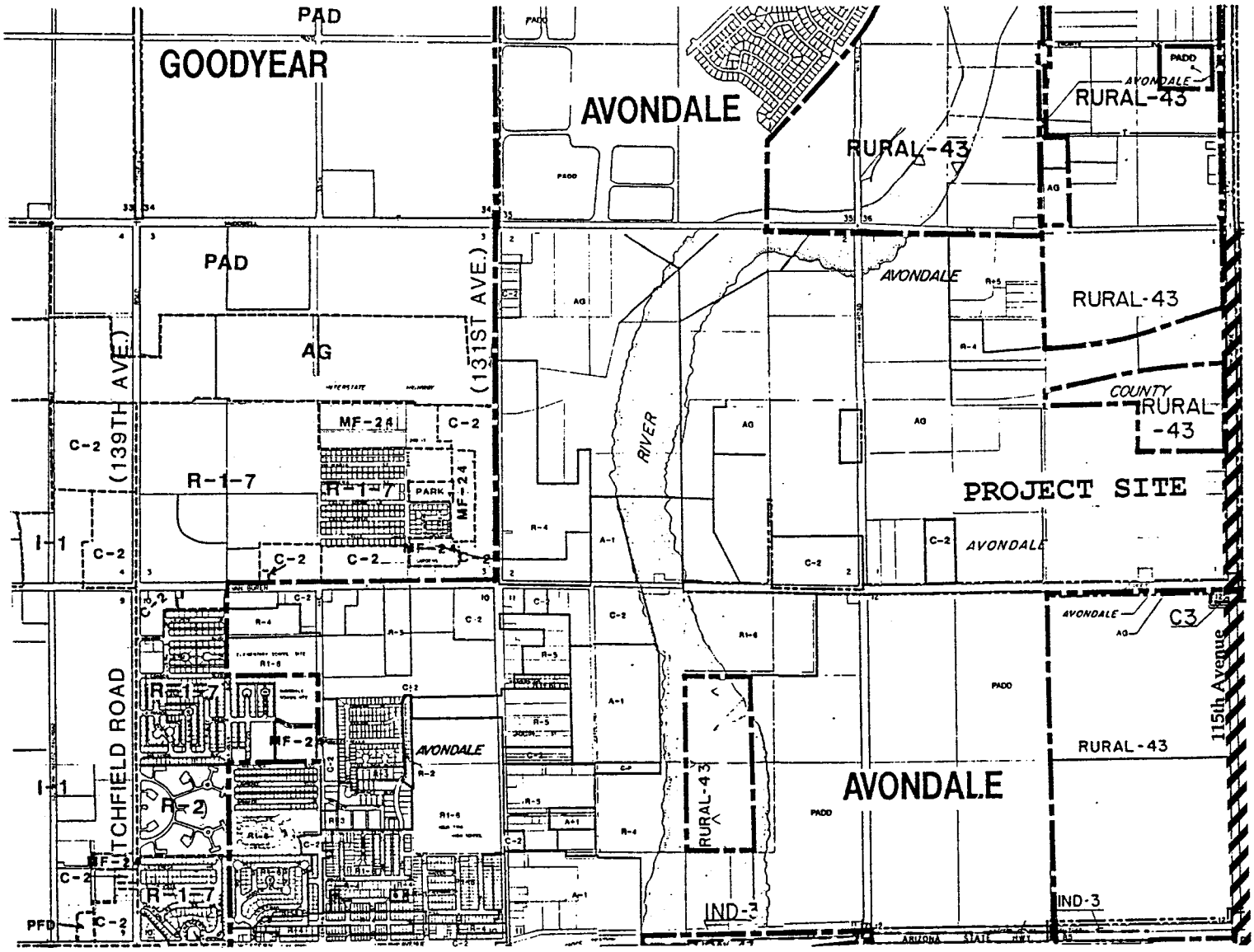


Figure 3.1 - Existing Zoning Map-1

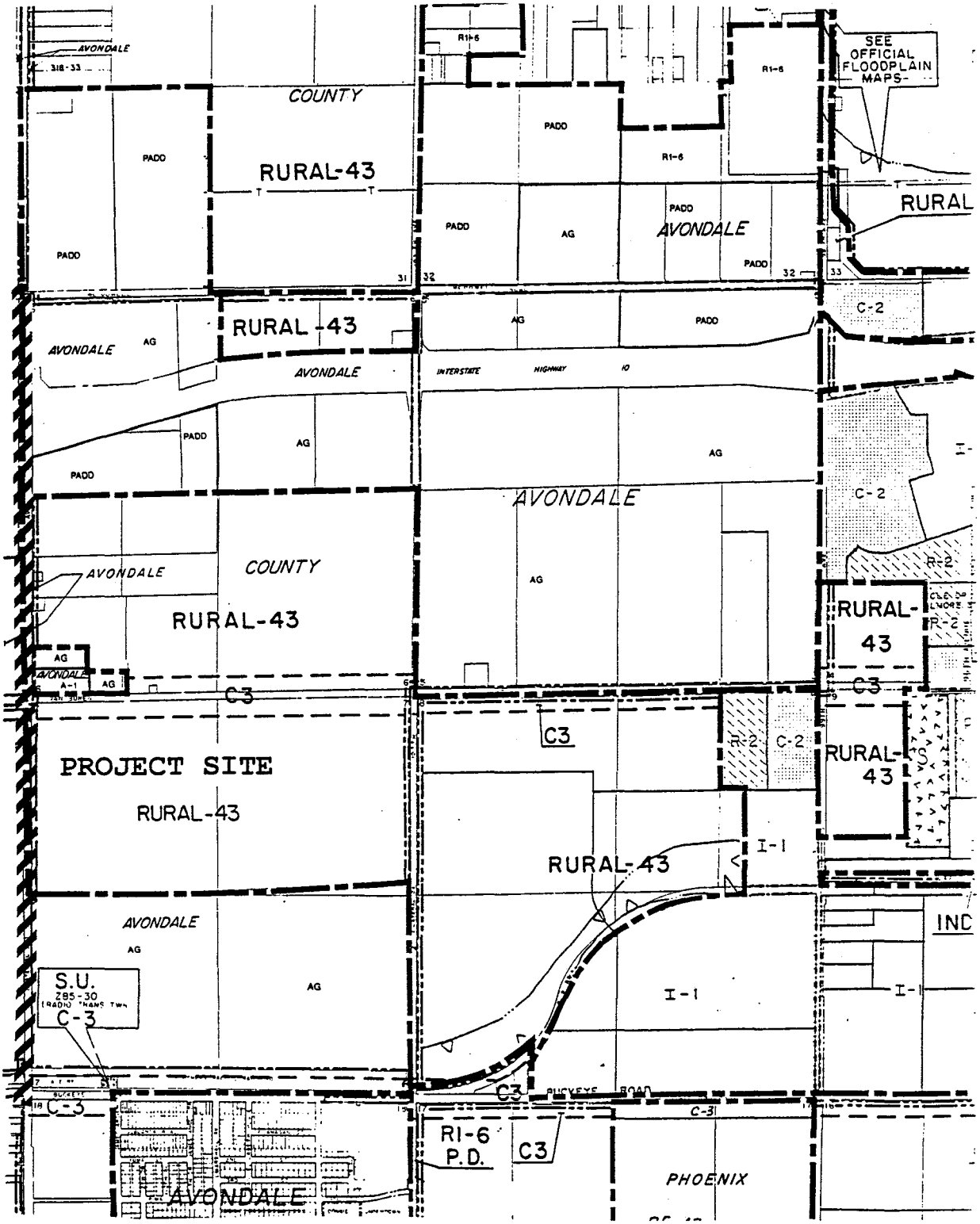


Figure 3.1 - Existing Zoning Map-2

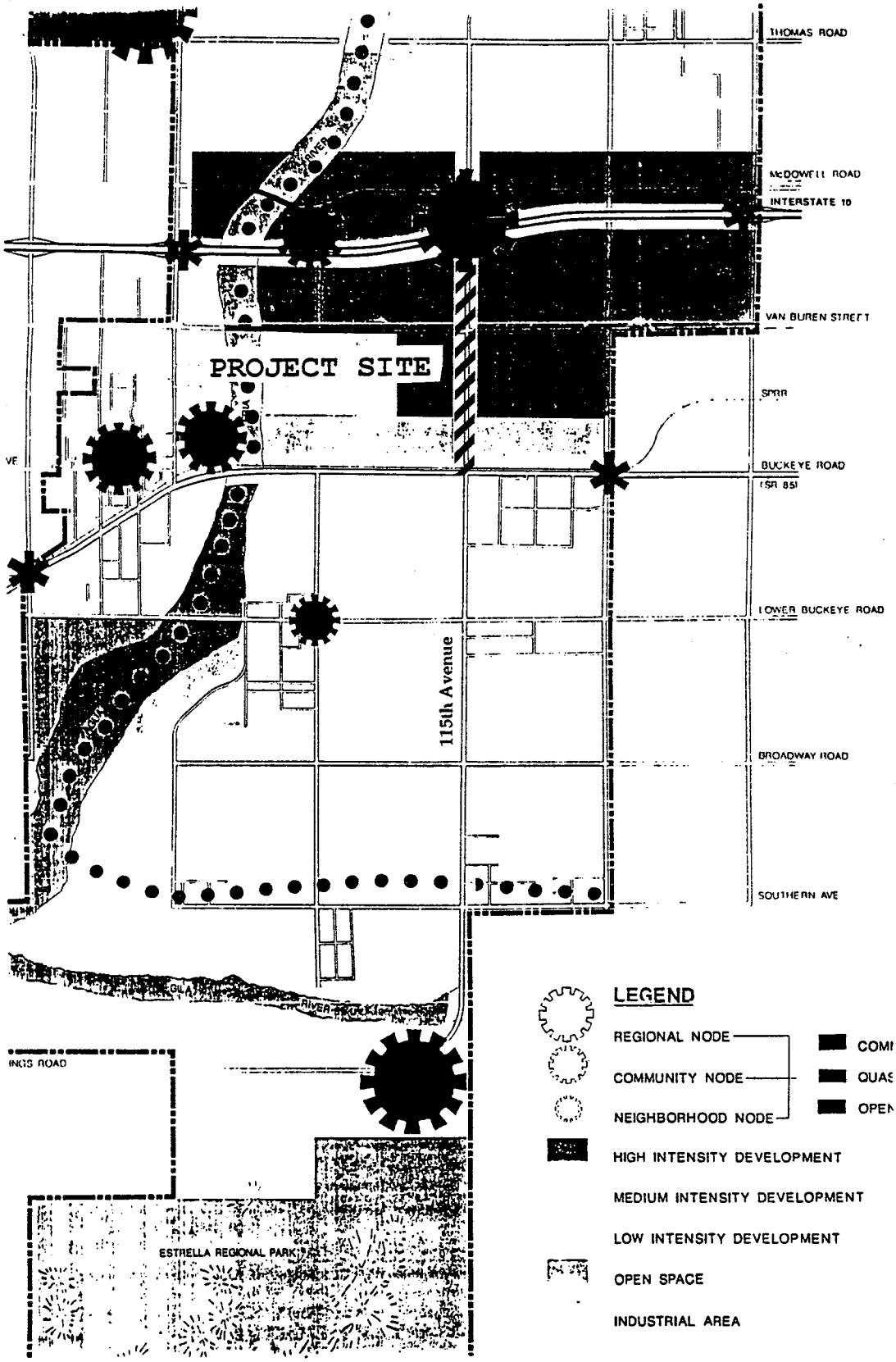


Figure 3.2 - City of Avondale Future Growth Plan

SECTION 4.0
UTILITIES

4.1 Cable TV

Cox Communications was contacted and have no facilities in the vicinity of the project according to Amy Logsdon of their Engineering Department.

4.2 Communication Utilities

MCI Telecommunications Corporation has a fiber optic cable line located in the Southern Pacific Railroad right-of-way north of MC 85. The cable line crosses 115th Avenue about 11.0 m (36 ft) north of the railroad tracks according to MCI facility maps provided by Kent Pilcher of MCI.

US West Communications has three buried telephone cables on the north side of Van Buren Street that cross 115th Avenue. The lines are located 8.1 m (26.5 ft), 9.1 m (30 ft), and 10.7 m (35 ft) north of the roadway centerline.

4.3 Power

Salt River Project (SRP) has facilities in the area of the project. There is a 12 kV overhead power line on the west side of 115th Avenue from MC 85 to Van Buren Street. The poles for this power line are located about 9.7 m (32 ft) west of the roadway centerline. About 15 poles will require relocation for both the Low Cost and Full Cost Alternatives.

4.4 Irrigation

SRP has extensive irrigation facilities along 115th Avenue (see Appendix H). According to SRP irrigation facility maps obtained from Susana Ortega of SRP and as shown on MCDOT project 68060 plans, there is a 1,067 mm (42 in) concrete pipe 11.5 m (37.75 ft) east of 115th Avenue from the railroad tracks to 142 m (468 ft) north of MC 85. This pipe connects to a 2.4 m (8 ft) wide concrete lined ditch located 14.6 m (48 ft) east of the roadway centerline from 142 m north of MC 85 to 787 m (2,582 ft) north of MC 85. At this location, the ditch shifts to an offset of 13.5 m (44.4 ft). It continues at this offset until just south of Van Buren Street. Here the ditch is connected to a 1,067 mm (42 in) concrete pipe that goes under Van Buren Street and extends north 560 m (1,837 ft). This pipe is located 11.0 m (36.25 ft) east of the roadway centerline. 560 m (1,837 ft) north of Van Buren Street the pipe size is reduced to 762 mm (30 in) which continues north to the well site located about 804 m (2,637 ft) north of Van Buren Street. This 762 mm (30 in) pipe

is located 6.5 m (21.25 ft) east of the roadway centerline.

There is another 1,067 mm (42 in) SRP concrete pipe located west of 115th Avenue. It begins at the railroad tracks and extends north 787 m (2,582 ft). This pipe is located 7.3 m (24 ft) west of the roadway centerline.

SRP has a 1,372 mm (54") concrete pipe that extends from the well site south of I-10 to McDowell Road. It is located 12.8 m to 22.86 m (42.5-75 ft) west of the roadway centerline.

There are SRP facilities on the south side of Van Buren Street as well. East of 115th Avenue there is a 1.676 m (66 in) pipe located 13.1 m (43 ft) south of the roadway centerline. West of 115th Avenue there is a 610 mm (24 in) pipe located 11.3 m (37 ft) south of the roadway centerline. There are junction boxes on the southwest, southeast, and northeast corners of the intersection of 115th Avenue and Van Buren Street.

Along McDowell Road, east of 115th Avenue there is a 914 mm (36 in) concrete pipe located 10.7 m (35 ft) south the roadway centerline. West of 115th Avenue there is a 610 mm (24 in) concrete pipe 17.1 m (56 ft) north of the McDowell Road centerline.

The Low Cost Alternative will require the relocation of about 1900 m (6234 ft) of SRP concrete lined ditch and associated facilities while the Full Cost Alternative only requires relocation of 565 m (1854 ft) of concrete lined ditch. The well site south of I-10 may require relocation but the aerial image indicates it will not. A curb section or guardrail will need to be added to the low cost alternative.

4.5 Gas Utilities

El Paso Natural Gas Company (EPNG) has a 508 mm (20 in) diameter pipeline located 3.0 m (10 ft) west of the 115th Avenue centerline from MC 85 to McDowell Road according to maps obtained from Mr. Robert Starks of El Paso Natural Gas. The Phoenix District Manager, Mr. Bill Ward, said that this 20" line is 1.5 m to 1.8 m (5 ft to 6 ft) below the pavement. This pipe location conflicts with the proposed box culvert locations. The relocation of this line will be less disruptive to EPNG during summer months because of reduced gas usage.

Southwest Gas has a 114 mm (4.5 in) gas line located about 8.8 m (29 ft) south of the Van Buren centerline that crosses 115th Avenue.

Santa Fe Pacific Pipelines has a 508 mm (20 in) pipe that crosses 115th Avenue in the railroad right-of-way north of the railroad tracks.

4.6 Municipal Utilities

There is a 406 mm (16 in) water line located 6.1 m (20 ft) east of the 115th Avenue centerline from Van Buren Street to McDowell Road. Another 406 mm (16 in) water line is located west of 115th Avenue 3.0 m (10 ft) south of the Van Buren Street centerline. It is assumed that the City of Avondale owns these water lines.

SECTION 5.0
TRAFFIC DATA AND ANALYSIS

5.1 Traffic Analysis Report

A traffic analysis report was prepared for 115th Avenue from MC 85 to McDowell Road in conjunction with this candidate assessment report (CAR). A follow up report that will analyze PIR traffic flow on 115th Avenue from MC 85 to McDowell Road after a major event, is due to begin soon.

The CAR traffic study evaluated existing roadway geometry using existing traffic volumes within the project limits including intersections and roadway segments. The intersections of the I-10 off-ramps were not included in the study since these are operated by ADOT. Turning movement counts were performed manually on Tuesday December 3, 1996 at MC 85, Van Buren Street, and McDowell Road. In addition, 24-hour traffic count and classification count data were collected on 115th Avenue by machine counters on December 3rd. These 24 hour counts were taken just north and south of I-10. Traffic volumes on all other sections of 115th Avenue and intersecting roadways were obtained from MCDOT. The result of the study showed that all intersections operate at a level of service of B or better under existing volumes and existing geometry. All roadway segments operate at level of service C or better.

The traffic study also evaluated the existing roadway geometry using 2005 projected traffic volumes from the Southwest Valley Regional Transportation Study. The result of this analysis showed that the existing intersections of Van Buren Street and McDowell Road will fail under the 2005 traffic volumes. If a traffic signal is installed at these intersections, the intersections improve to a level of service B. By interpolating the traffic volumes, a signal is needed in the year 2000. The roadway sections operate at a level of service C south of I-10 and level of service D north of I-10 for 2005 projected traffic volumes and existing geometry.

The design year of 2020 was also analyzed in the traffic analysis report. The 2020 project traffic volumes were obtained from MAG. The result of this analysis showed that all the existing intersections failed under 2020 traffic volumes. With traffic signals added to Van Buren Street and McDowell Road, 5-lane roadway improvements completed, and auxiliary lanes added where appropriate, the intersections of MC 85 and McDowell Road operate at a level of service D and Van Buren operates at a level of service of B. The recommended auxiliary lanes for the intersection of MC 85 and 115th Avenue are NB, SB, WB exclusive right-turn lanes; and NB, SB, EB, and WB dual left-

turn lanes. No auxiliary lanes are needed for Van Buren Street. McDowell Road intersection analysis indicates that NB and WB exclusive right-turn lanes; EB dual right-turn lanes; and NB and EB dual left-turn lanes are need for the 2020 traffic volumes. The existing roadway section under 2020 projected traffic volumes has a level of service of F from I-10 to McDowell Road, level of service E from Van Buren Street to I-10, and level of service D from MC 85 to Van Buren Street. With the proposed 5-lane section, the level of service improves to A and B.

SECTION 6.0
DRAINAGE

6.1 Existing Conditions

The general slope of the terrain through the project area is from the northeast to the southwest at about a 0.33%. The land use of the area is predominantly agricultural. Approximately ¼ mile south of McDowell Road, Interstate 10 (I-10) is elevated as it crosses over 115th Avenue. Just north of I-10 is a drainage intercept channel that conveys runoff from north of I-10 west to the Agua Fria River. South of I-10 the runoff is controlled by agricultural fields, roadside ditches, and irrigation channels. The Southern Pacific Railroad (SPRR) has an elevated track that crosses 115th Avenue just north of Buckeye Road (MC 85). The railroad embankment intercepts the runoff and directs the flow in a westerly direction to the Agua Fria River, which is located approximately 1 ½ miles west of 115th Avenue.

There are two existing dip sections on 115th Avenue within the project limits. The first dip crossing location is approximately 300 m (1,000 ft) north of Van Buren Street. The crossing is shallow with one area inlet located on each side of the roadway to intercept roadside flows. The flows are then discharged into a nearby irrigation pipe for other uses. Storm runoff also crosses 115th Avenue just north of the SPRR. Water ponds on the west side of the roadway at this location.

6.2 Flood Control District of Maricopa County Report

Dibble and Associates completed the Floodplain Delineation of the Tolleson Area, Hydrology Report for the Flood Control District of Maricopa County (FCDMC) in October, 1996. This report includes this roadway project site (see Figure 6.1). The report identifies two concentration point that discharge runoff across 115th Avenue. These locations are north of the railroad tracks and north Van Buren Street. The flows cross from east to west. The reported 100 year runoff rate for 115th Avenue north of Van Buren Street is 11.1 m^3/sec. (392 cfs). The reported runoff rate for 115th Avenue north of the SPRR is 26.8 m^3/sec. (946 cfs).

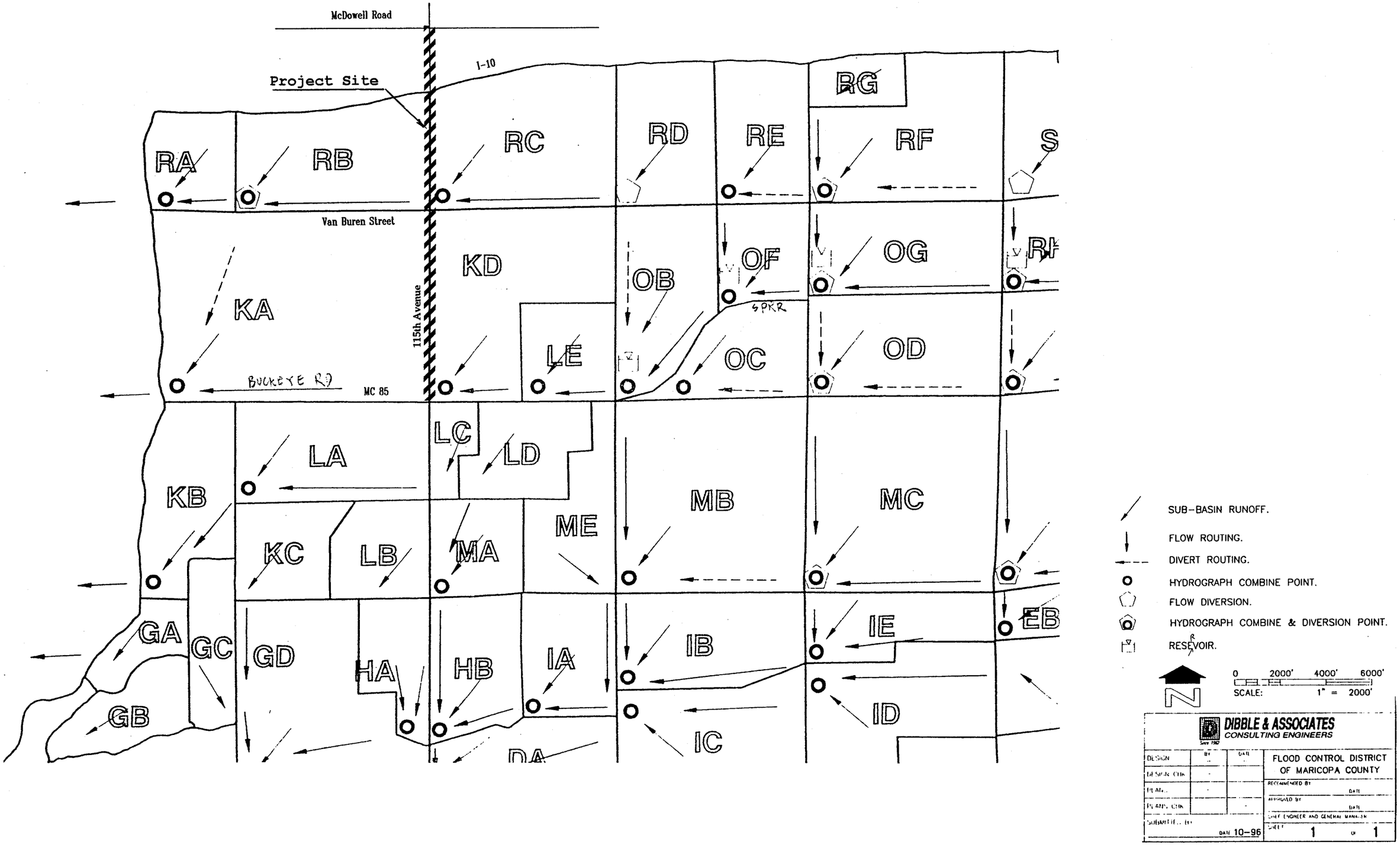


Figure 6.1
Watershed Delineation Map

6.3 Drainage Analysis

The hydrologic HEC-1 computer model developed for the Floodplain Delineation of the Tolleson Area, Hydrology Report was used to obtain flow estimates for other design year events. The precipitation values used in the computer model were adjusted to obtain flow values for the desired design event (i.e. Q10, Q25, and Q50). The results have been shown on the Alternative Concept Plans located in Appendix A and B.

Drainage facilities for the Low Cost Alternative will contain runoff from the roadway R/W using retention basins. Because there are no drainage outfall channels to the Agua Fria River, the retention basins have been sized to contain the 25 year storm volumes. The allowable time to drain these retention basins is 36 hours. Dry wells located in each retention basin will ensure that this standard is met. The retention basins were sized assuming a basin depth of 1.2 m (4 ft). To be conservative and because of the lack of accuracy of the input data available, the runoff coefficient was assumed to be 1.00 (see drainage calculations in Appendix E). The proposed locations of the retention basins have been shown on the Concept Plans in Appendix A. Roadway storm runoff will be directed to special shoulder ditches. Flow in the shoulder ditch will flow to shoulder grate inlets and piped into the retention basins. A berm will surround the basins to prevent offsite drainage from entering the retention basins.

The Low Cost Alternative will include a storm drain system for the roadway north of I-10. This storm drainage system will outfall into the ADOT channel north of I-10. The system was designed for a 10-year storm with an assumed slope of 0.10%. It will include 450 m (1,476 ft) of 610 mm (24 in) RGRCP trunk line, and 90 m (295 ft) of 460 mm (18 in) RGRCP laterals for 8 catch basins spaced 122 m (400 ft) along the new curbs.

The existing dip crossings were analyzed based on the 100-year storm event (see calculations Appendix E). The maximum allowable depth of flow across a roadway per MCDOT standards is 152 mm (6 in). The maximum is exceeded at the dip crossing north of the railroad tracks in every storm event analyzed. The crossing north of Van Buren Street only exceeds the standard in the 50-year and 100-year storm events. The depth and width of flow at the crossing north of Van Buren Street are shown in the Alternative Concept Plan in Appendix A. A box culvert was designed for the crossing north of the railroad tracks and is included in both the Low Cost Alternative and the Full Cost Alternative.

Drainage facilities for the Full Cost Alternative will use box culverts for both cross drainage locations. The box culverts were sized using the 100-year runoff volumes. The box culverts will not be effective unless considerable flood control improvements are down stream of the box culvert locations under 115th Avenue. North of the railroad, a concrete lined channel set

at a slope of 0.20%, 1.5 m (5.0 ft) deep, sideslopes of 1:1, with a bottom width of 6.1 m (20 ft) would provide the capacity to convey the 100-year flow to the Agua Fria River (see calculations in Appendix E). North of Van Buren Street, a concrete lined channel set at a slope of 0.20%, 1.5 m (5.0 ft) deep, sideslopes of 1:1, with a bottom width of 2.4 m (8 ft) would also provide adequate capacity to convey the 100-year flow to the Agua Fria River. Concrete lined drop inlets located upstream of each box culvert would temporarily intercept the offsite flows until future upstream developments can provide expanded collection facilities.

The Full Cost Alternative will contain the drainage runoff from the roadway by using catch basins and storm drain collection systems to collect and convey runoff to the box culverts or ADOT drainage channel for discharge. The storm drainage system was designed using a 10-year storm. Runoff volumes were determined using the Rational method (see calculations in Appendix E). The resultant drainage system from MC 85 to I-10 includes 1,090 m (3,576 ft) 610 mm (24 in) RGRCP, 1,090 m (3,576 ft) 760 mm (30 in) RGRCP, and 750 mm (2,460 ft) 910 mm (36 in) RGRCP trunk line; 520 m (1,706 ft) 460 mm (18 in) RGRCP laterals for 46 catch basins spaced 122 m (400 ft); and 23 manholes. This drainage system will outfall to the proposed box culverts north of MC 85 and north of Van Buren Street. The box culvert locations have been shown on the Concept Plans in Appendix A & B. The Full Cost Alternative also includes the drainage system north of I-10 as described in the Low Cost Alternative.

6.4 Joint Project Recommendation

For this project, depending on which alternative is selected either one or two outfall channels are recommended to convey 100 year storm flows to the Agua Fria River. For the Low Cost Alternative, one outfall channel from a box culvert under 115th Avenue north of the railroad is needed. For the Full Cost Alternative, two outfall channels are recommended to convey flows from the box culverts under 115th Avenue. Both outfall channels would be approximately 1½ miles long from 115th Avenue to the Agua Fria River. These channels follow existing flow lines as shown in the FCDMC model in the Tolleson Floodplain Delineation Study. The first channel would be located along the north side of Van Buren Street. The second channel would be located along the north side of the Southern Pacific Railroad. At the present time, agricultural concerns, the railroad and urbanization downstream of the roadway drainage crossings have obliterated the historical flow path of the storm flows to the Agua Fria River. Before significant future development occurs in this area, it would be advantageous to plan for and construct these outfall channels to the Agua Fria River. The planning, design, and funding of these channels is beyond the scope of this project or MCDOT. It is recommended that FCDMC and the City of Avondale be approached to plan, design, and funding of the needed offsite drainage improvements including the proposed outfall channels for this area near 115th Avenue.

SECTION 7.0
RIGHT-OF-WAY

7.1 Existing Conditions

The right-of-way widths along 115th Avenue vary a lot. From MC 85 to 91 m (300 ft) north, there is 15.240 m (50 ft) of right-of-way west of the centerline and 13.716 m (45 ft) east of the centerline (see right-of-way strip map in Appendix C). There is 16.764 m (55 ft) of right-of-way east of the centerline from 91 m (300 ft) north of MC 85 to Van Buren Street. West of the centerline from 91 m (300 ft) north to 152 m (500 ft) south of Van Buren Street, the right-of-way half-width is 10.058 m (33 ft). There is 12.192 m (40 ft) of right-of-way west of the 115th Avenue centerline from 152 m (500 ft) south of Van Buren Street to 780 m (2,559 ft) north of Van Buren Street. On the east side of 115th Avenue from Van Buren Street to 560 m north of Van Buren Street, there is 13.716 m (45 ft) of right-of-way east of the roadway centerline. From 506 m north of Van Buren Street to 813 m (2,667 ft) north of Van Buren Street the right-of -way width east of the centerline is 12.192 m (40 ft). There is 16.764 m (55 ft) of right-of-way east and west of the roadway centerline from south of I-10 to 150 m south of McDowell Road. From 150 m south of McDowell Road to the northern project limits, there is 10.058 m (33 ft) right-of-way west of the roadway centerline and 13.716 m (45 ft) east of the centerline.

The existing right-of-way half-width on Van Buren Street is 12.192 m (40 ft) (see Appendix C) except for east of 115th Avenue south of the section line. There is 16.764 m (55 ft) of right-of-way east of 115th Avenue south of the Van Buren Street centerline.

7.2 Property Owners

The affected properties and owners are listed in Appendix C. Properties shown on the strip map are based on the assessor's maps obtained from MCDOT. Several of the parcels shown on the assessor's map are listed as canceled in the County Assessors Office Ownership list. Property lines northwest of the intersection of Van Buren Street and 115th Avenue were not available from the assessors map and were determined from the legal descriptions in the ownership list. Property data for the area southwest of 115th Avenue and McDowell Road is incomplete due to lack of information. Further detailed research is required.

Most of the Right-of-way takes from the east side of 115th Avenue from Van Buren Street to McDowell involve only long narrow parcels parallel to the roadway.

7.3 Low Cost Alternative Right-of-Way Requirements

The required right-of-way for the Low Cost Alternative are shown in the typical sections in Figure 9.2. The rural section is to be used from MC 85 to I-10. The standard right-of-way width for a rural minor arterial road is a minimum of 33.528 m (110 ft.). To provide the required clear distance for a rural road with a design speed of 100 kmph (65 mph), 39.624 m (130 ft) of right-of-way will be obtained.

The low cost urban section will be applied from I-10 to McDowell Road. The standard right-of-way width for a urban minor arterial is 33.528 (110 ft).

16.764 m (55 ft) of right-of-way will be obtained along Van Buren Street for the widened section and tapers. Only 15.24 m (50 ft) of right-of-way on the south side of the road, west of the intersection will be acquired due to existing buildings.

7.4 Full Cost Alternative Right-of-Way Requirements

The Full Cost Alternative section is a urban minor arterial (see Figure 9.3). The required right-of-way for this section is also 33.528 m (110 ft). Additional right-of-way for the future auxiliary lanes will be acquired near the intersections of 115th Avenue and MC 85 and McDowell Road and 115th Avenue (see Appendix C). A right-of-way half-width of 18.288 m (60 ft) is recommended for the dual left-turn lane conditions, 19.812 m (65 ft) for the right-turn lane, 21.336 m (70 ft) for a combination dual left and right-turn lane situation, and 25.908 m (85 ft) for a combination dual left and dual right.

SECTION 8.0
ENVIRONMENTAL CONSIDERATIONS

8.1 MCDOT Report

The Environmental Planning Section of the MCDOT Planning Division has prepared an environmental overview for this project. The overview is located in Appendix G.

8.2 Other Concerns

No obvious environmental concerns were noticed at the project site.

SECTION 9.0
DESIGN CRITERIA AND ALTERNATIVES

9.1 No-Build Alternative

The No- Build alternative consists of applying a chip seal to the existing pavement and striping. The chipseal application will begin north of the railroad tracks and end on the south leg of the intersection of McDowell Road and 115th Avenue. The existing ADOT pavement near I-10 will not receive the chipseal application since ADOT maintains this portion of 115th Avenue.

9.2 Minimum Build Alternative

The Draft Traffic Analysis Report recommended providing a three lane facility from MC 85 to I-10 as a cost effective interim improvement to accommodate PIR event day traffic. The center continuous left turn lane can be a reversible lane. This will allow 2 lanes of traffic northbound or southbound along 115th Avenue from PIR to I-10 during a PIR event. The widening will be achieved by constructing additional pavement on the east side of the existing road (see Figure 9.1). The east side of the road was selected because of existing right-of-way constraints on the west side and for constructability. The resultant roadway section will provide a section that complies with MCDOT standard rural local road typical section (MCDOT Roadway Design Manual Figure 5.4). The entire roadway will then be chip sealed to provide a sealed pavement surface and for striping. A traffic signal will be placed at Van Buren Street intersection since it is anticipated that it will meet warrants in the year 2000 according to the traffic analysis report.

No new right-of-way or utility relocation is anticipated for this interim alternative.

9.3 Low Cost Alternative

The Low Cost Alternative consists of building a rural minor arterial roadway in accordance with Figure 5.2 in the MCDOT Roadway Design Manual and as modified in Figure 9.2 of this report. The rural section will be constructed from MC 85 to I-10 due to the undeveloped nature of the adjacent property. A 50 mm (2 in) overlay over the entire width of the roadway will provide the MCDOT standard pavement thickness and provide a good sealed pavement surface. The major design features are listed in Table 9.1 below.

TABLE 9.1 - Major Design Features
Low Cost Alternative (Rural)

Standard Typical Section	**Rural Minor Arterial (Fig. 5.2)**
Project Design Year	**2020**
Design Vehicle	**WB-15 (WB-50)**
Design Speed	**100 kmph (65 mph)**
Pavement Design Life	**20 years**
Number of Lanes	**5**
Roadway Width	**21.6 m (72 feet)**
Intersection Geometrics	**Curb return radius is 13.7 m (45 ft.)**
Standard Right-of-Way Width	**19.812 m (65 feet)**
Clear Zone Width	**9.1 m (30 feet)**

From I-10 to McDowell Road the roadway section will conform to the Urban Minor Arterial section as shown in Figure 5.8 of the MCDOT Roadway Design Manual. The urban section was selected for several reasons. The location of the ADOT drainage channel north of I-10 provides an outfall opportunity for an underground storm drain system. The curb and gutter section will allow 33.528 m (110 ft) of right-of-way instead of 39.624 m (130 ft) required in the rural section. The existing ADOT curb and gutter on 115th Avenue is another reason for the proposed urban section. The ADOT curb and gutter ends 363.5 m (1193 ft) south of McDowell Road. The relatively short distance between I-10 and McDowell Road suggest a single section be implemented through this section of 115th Avenue. The major design features are listed in Table 9.2 below.

TABLE 9.2 - Major Design Features
Low Cost Alternative (Urban)

Standard Typical Section	**Urban Minor Arterial (Fig. 5.8)**
Project Design Year	**2020**
Design Vehicle	**WB-15 (WB-50)**
Design Speed	**90 km/h (55 mph)**
Pavement Design Life	**20 years**
Number of Lanes	**5**
Roadway Width	**20.6 m (68 feet)**
Intersection Geometrics	**Curb return radius is 10.7 m (35 ft.)**
Standard Right-of-Way Width	**16.764 m (55 feet) half-width**

The Low Cost Alternative also includes improvements to Van Buren Street. The intersection will be signalized and curb and gutter placed at the four intersection radii. The curb and gutter will be placed at the ultimate urban minor arterial section locations. Van Buren Street will be widened to a half-width of 10.3 m (34 ft) with no curb and gutter. The widened section will extend east and west of 115th Avenue to the beginning of the left-turn lane. The MCDOT standard left-turn lane length is 19 m (160 ft). The pavement will then be tapered or flared at a rate of 15:1 on the approaches to the intersections and 65:1 on the departures from the intersection. The outside lanes will act as a right-turn lane on the approach and a merge lane on the departure.

The intersection of McDowell Road and 115th Avenue will also have a traffic signal installed in the Low Cost Alternative. The curb and gutter on the south approach to this intersection will include the radii on the southeast and southwest corners. No improvements north of McDowell Road will be included in this alternative. The northbound outside lane will become a exclusive right-turn lane at the intersection.

A box culvert north of the railroad tracks will be included in the Low Cost Alternative. This box will not be constructed without the offsite flood control facilities being built.

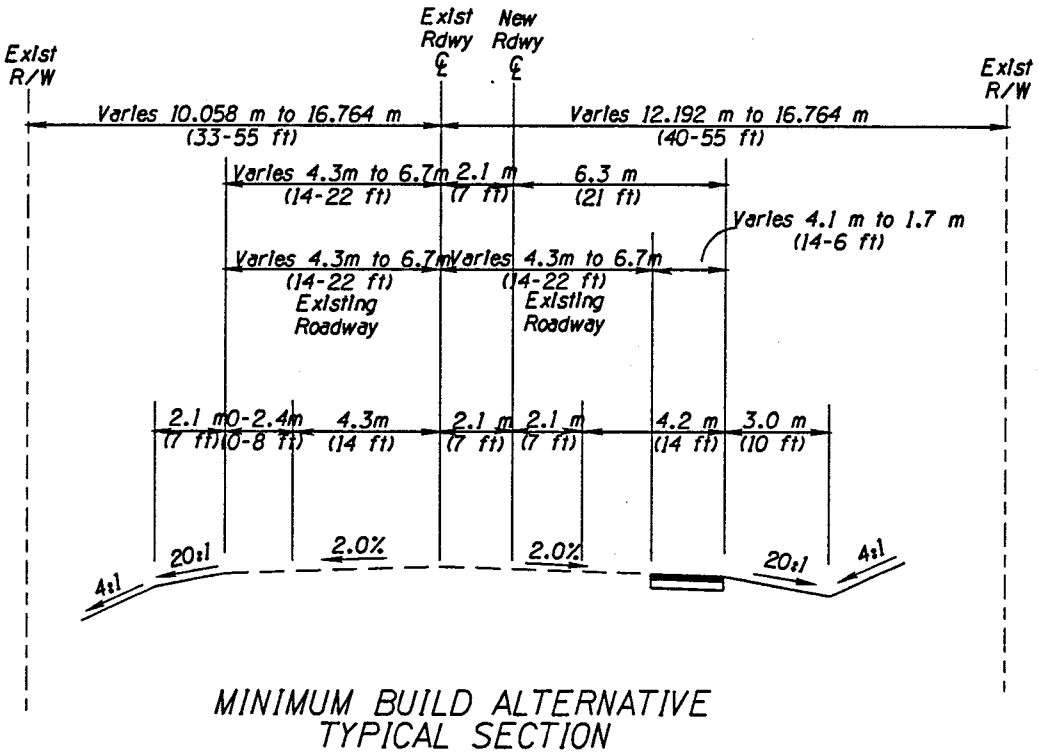
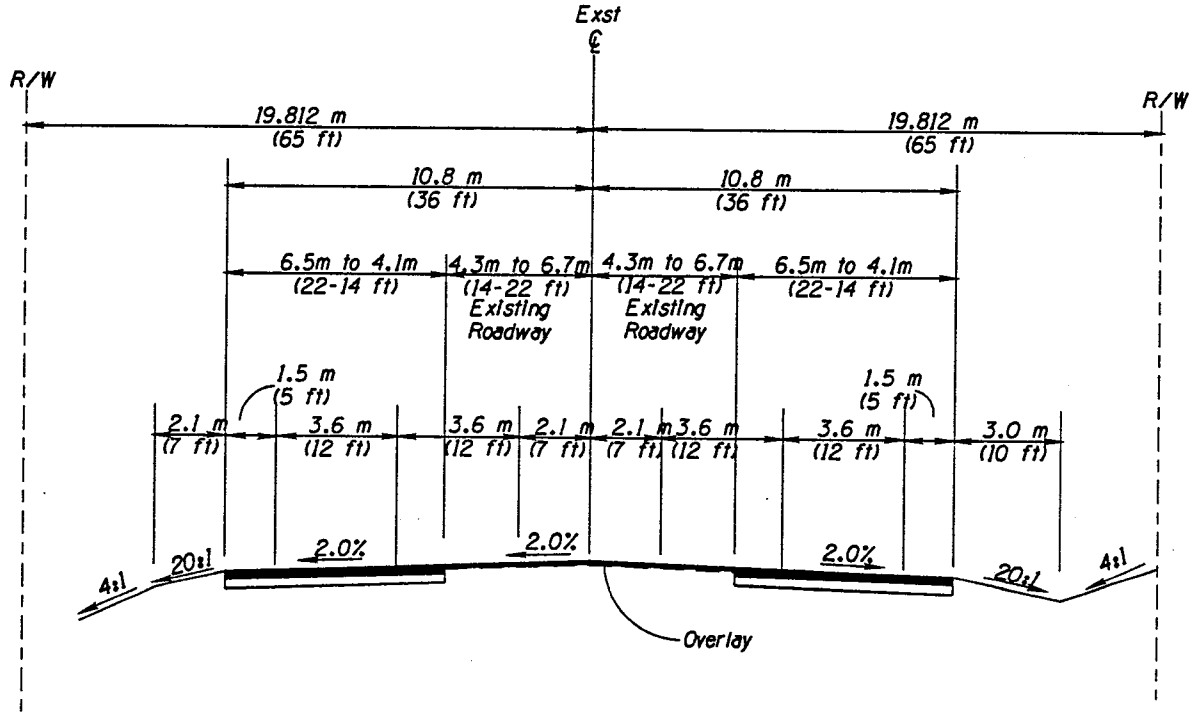
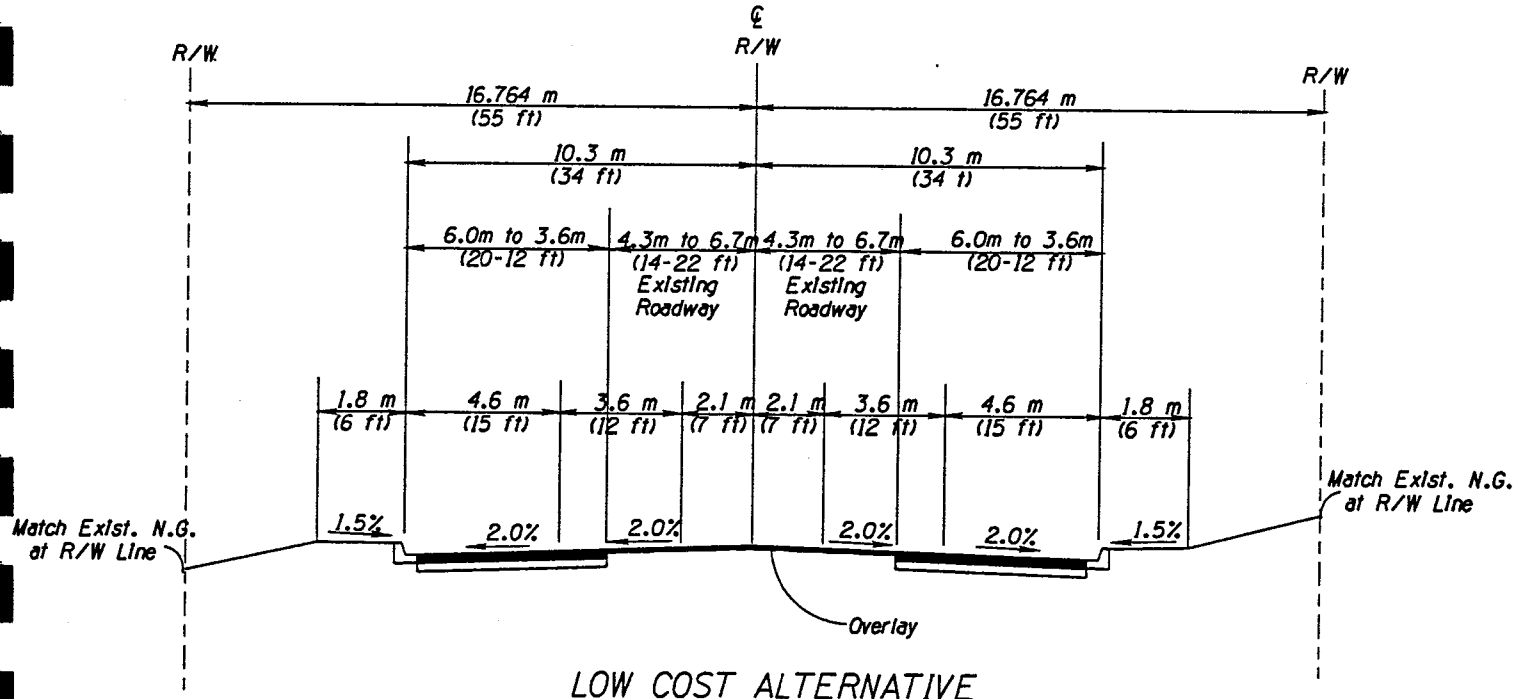


Figure 9.1 - Minimum Build Alternative Typical Section



LOW COST ALTERNATIVE
TYPICAL RURAL SECTION



LOW COST ALTERNATIVE
TYPICAL URBAN SECTION

Figure 9.2 - Low Cost Alternative Typical Sections

9.4 Full Cost Alternative

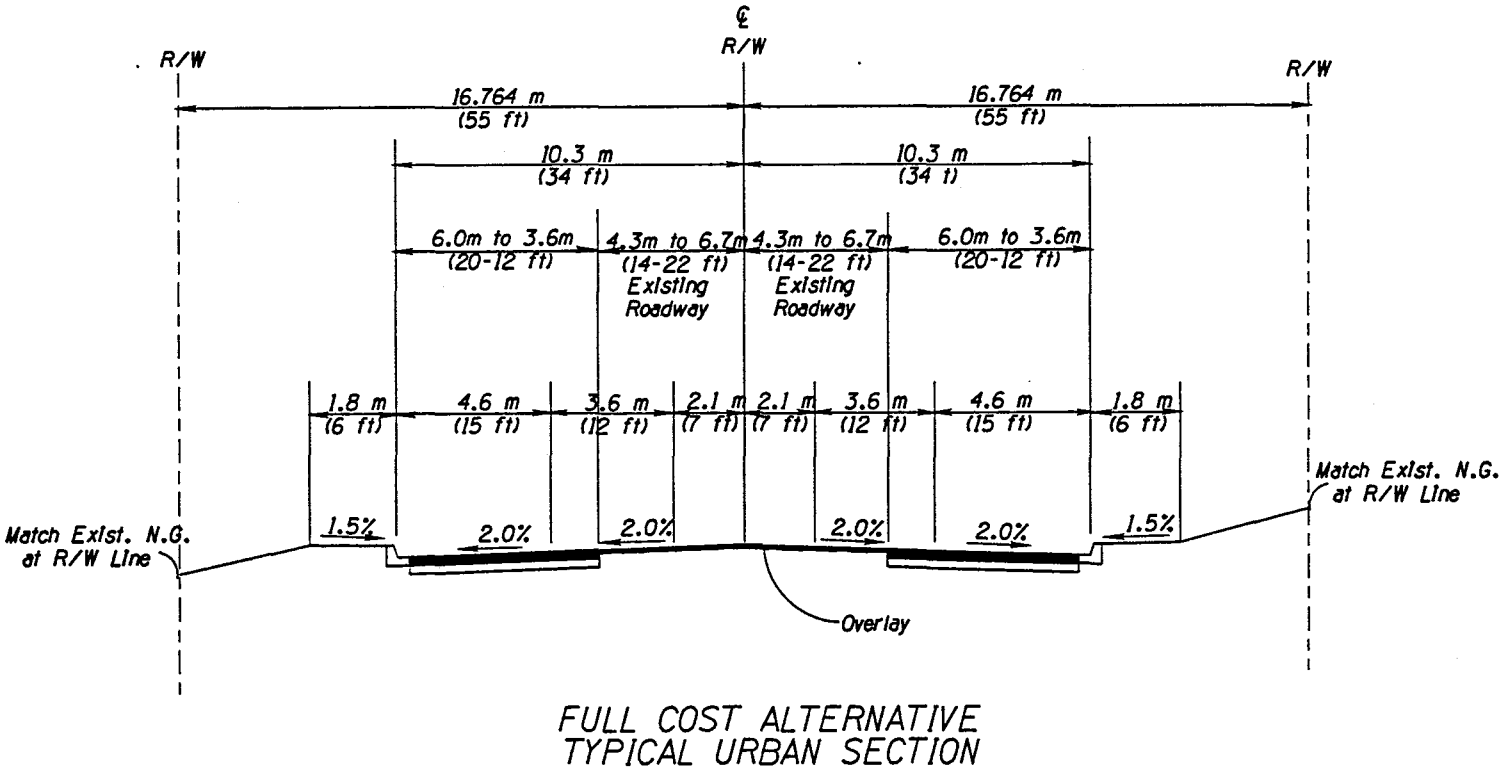
The full cost section consists of constructing an urban minor arterial in accordance with Figure 5.8 of the MCDOT Roadway Design Manual and as modified in Figure 9.3 contained in this report. The major design features are listed in Table 9.3 below.

TABLE 9.3 - Major Design Features
Full Cost Alternative (Urban)

Standard Typical Section	**Urban Minor Arterial (Fig. 5.8)**
Project Design Year	**2020**
Design Vehicle	**WB-15 (WB-50)**
Design Speed	**90 kmph (55 mph)**
Pavement Design Life	**20 years**
Number of Lanes	**5**
Roadway Width	**20.6 m (68 feet)**
Intersection Geometrics	**Curb return radius is 10.7 m (35 ft.)**
Standard Right-of-Way Width	**16.764 m (55 ft) half-width**

The Full Cost Alternative includes the same intersection work at Van Buren Street and McDowell Road as the Low Cost Alternative. The northeast and northwest curb returns at the intersection of McDowell Road as well as taper section on 115th Avenue north of McDowell Road are added to the Full Cost Alternative. It also includes improvements to the railroad crossing north of MC 85.

The Full Cost Alternative includes a box culvert north of Van Buren as well as the box culvert north of the railroad tracks. A storm drain system is also included for the section from MC 85 to I-10 that depends on the box culvert construction and operation.



FULL COST ALTERNATIVE
TYPICAL URBAN SECTION

Figure 9.3 - Full Cost Alternative Typical Section

9.5 Evaluation of Alternatives

The No-Build Alternative maintains the existing roadway geometry and does not provide for future traffic volumes, improvement to the PIR traffic or any drainage improvements. The intersections will fail without improvements in 2005 with projected volumes.

The Minimum Build Alternative provides a good interim facility that provide adequate traffic capacities through 2005. The continuous left-turn lane will provide a reversible lane that can be used for PIR events that will greatly improve event traffic. The improvements in this alternative will not provide adequate level of service in 2020 with projected volumes. This alternative does not improve the substandard drainage condition or obtain any new right-of-way now when its least expensive. Design exceptions will be required for the right-of-way, drainage, and clear zone standards. These exceptions are acceptable due the interim nature of this alternative. Developers can make ultimate improvements as the area develops.

The Low Cost Alternative provides a good solution until development occurs. It will fit in better with the current agricultural rural landscape of the corridor. When development does occur, the developers can place the curb and gutter and Street intersections where desired without having to remove existing curb and gutter. The Low Cost Alternative provides an adequate level of service through the year 2020. It provides more right-of-way than may be necessary for the ultimate curb and gutter section. The drainage standards will not be met at the dip crossing north of Van Buren during the 50 and 100-year storm events. A design exception for drainage will be required. This is acceptable provided the FCDMC makes the necessary offsite drainage improvements north of the railroad. It will require relocations of 1,500 m (6,234 ft) of concrete lined irrigation ditches and associated head walls and junction boxes.

The Full Cost Alternative will seem out of place until the area develops. It has significant drainage improvements that depend on the new box culverts and outfall channels which are not in this project. Only 33.528 m (110 ft) of right-of-way is required for this alternative but building the curb and gutter at this time may not be expedient. Additional right-of-way for future auxiliary lanes at MC 85 and McDowell Road is included in the Full Cost Alternative. Only 565 m (1,854 ft) of concrete lined irrigation ditch needs to be relocated for this alternative.

SECTION 10.0
ESTIMATED PROJECT COSTS

10.1 Construction Costs

The construction costs for the No-Build, Minimum Build, Low Cost, and Full Cost Alternatives are listed in Tables 10.1, 10.2, 10.3, and 10.4, respectively. The quantity calculations are contained in Appendix E of this report. Most of the unit costs used were provided by MCDOT (i.e. see Appendix E for pavement unit cost derivation). A unit cost of $300 per square meter of box culvert surface area was provided by MCDOT personnel for use in this report. This unit cost was applied to the individual box culverts to determine the per each cost for the box culverts. For items where MCDOT standard unit costs were not available, previous MCDOT and other agency experience was relied on to determine appropriate unit costs.

The No-build Alternative includes a cost for striping 4 lanes although a 3-lane section will be actually striped.

The Low Cost Alternative assumes a pavement structure in the widened areas of 100 mm (4 in.) of asphaltic concrete over 250 mm (10 in.) of aggregate base course. The unit price includes prime coat, tack coat, fog coat, and subgrade preparation. A 50 mm (2 in.) overlay over the existing pavement is also included.

The Full Cost Alternative assumes the same pavement structure as the Low Cost Alternative for 115th Avenue. The improvements also include relocating existing railroad crossing gates, flashers, and constructing a new rubber surface railroad crossing.

10.2 Utility Costs

There are significant SRP irrigation facilities within the project site that need to be relocated. See Table 10.5 for an itemized listing of the facilities to be relocated for the Low Cost and Full Cost Alternatives.

The construction of the proposed box culverts will require the relocation of the 20 in. diameter El Paso Natural Gas line at two locations. El Paso will perform this work and back-charge the County. A summary of the anticipated costs are in Appendix E. The unit cost was obtained from Bill Ward of El Paso Natural Gas Company.

Fifteen 12 KV power poles owned by SRP will require relocation. It is assumed that these poles do not have prior rights and that the cost of relocating these poles will be the responsibility of SRP.

Table 10.1
Preliminary Construction Cost Estimate, No Build Alternative

Alternative: No Build					
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
107.09200	Community Relations	Allowance	1	$5,000.00	$5,000
110.01000	Mobilization @ 5%	L.S.	1	$2,623.00	$2,623
	Chip Seal Surface on Pavement	SQ M	32,500	$1.15	$37,375
401.00000	Traffic Control @ 3.5%	L.S.	1	$1,836.00	$1,836
402.00000	Traffic Signing & Striping - 2 lanes	M	3,150	$3.20	$10,080
			Subtotal Construction		$56,914
			Contingency	20%	$11,383
			Total		**$68,297**
			Subtotal less percentages		$52,455

Table 10.2

Preliminary Construction Cost Estimate, Minimum Build Alternative

Alternative: Minimum Build					
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
107.09200	Community Relations	Allowance	1	$5,000.00	$5,000
110.01000	Mobilization @ 5%	L.S.	1	$10,347.00	$10,347
107.09200	New Asphalt Pavement (75 mm AC / 150 mm ABC)	SQ M	8,000	$11.25	$90,000
	Chip Seal Surface on Pavement	SQ M	26,000	$1.15	$29,900
401.00000	Traffic Control @ 3.5%	L.S.	1	$7,243.00	$7,243
402.00000	Traffic Signing & Striping - 2 lanes	M	2,200	$3.20	$7,040
402.00000	Traffic Signal, Full Intersection	L.S.	1	$75,000.00	$75,000
		Subtotal Construction			$224,530
		Contingency		20%	$44,906
		Total			**$269,436**
		Subtotal less percentages			$206,940

Table 10.3
Preliminary Construction Cost Estimate, Low Cost Alternative

Alternative: Low Cost					
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	$10,000.00	$10,000
110.01000	Mobilization @ 5%	L.S.	1	$58,953.50	$58,954
215.00000	Channel & Retention Basin Excavation	CM	6,600	$4.00	$26,400
	New Asphalt Pavement (100 mm AC / 250 mm ABC)	SQ M	31,400	$15.25	$478,850
	Asphalt Concrete 50 mm Overlay	SQ M	36,000	$3.60	$129,600
340.01120	Conc. C & G	M	950	$26.00	$24,700
350.01110	Removal of Existing Improvements	L.S.	1	$30,000.00	$30,000
401.00000	Traffic Control @ 3.5%	L.S.	1	$41,267.45	$41,267
402.00000	Traffic Signing & Striping - 5 lanes	M	3,900	$5.80	$22,620
402.00000	Traffic Signal, Full Intersection	EA	2	$75,000.00	$150,000
505.06125	Catch Basin	EA	22	$2,200.00	$48,400
	Manhole	EA	4	$2,500.00	$10,000
618.02324	610 mm (24") & Smaller RGRCP, Class III	M	940	$125.00	$117,500
	Box Culvert	EA	1	$85,000.00	$85,000
	Dry Wells	EA	7	$6,000.00	$42,000

Subtotal Construction		$1,279,291
Contingency	20%	$255,858
Total		**$1,535,149**
Subtotal less percentages =		$1,179,070

Table 10.4
Preliminary Construction Cost Estimate, Full Cost Alternative

Alternative: Full Cost					
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	$12,000.00	$12,000
110.01000	Mobilization @ 5%	L.S.	1	$100,123.50	$100,124
	New Asphalt Pavement (Arterial Section)	SQ M	29,600	$15.25	$451,400
	Asphalt Concrete 50 mm Overlay	SQ M	40,500	$3.60	$145,800
340.01120	Conc. C & G	M	5,750	$20.00	$115,000
350.01110	Removal of Existing Improvements	L.S.	1	$50,000.00	$50,000
401.00000	Traffic Control @ 3.5%	L.S.	1	$70,086.45	$70,086
402.00000	Traffic Signing & Striping - 5 lanes	M	4,400	$5.80	$25,520
	Traffic Signal, Full Intersection	EA	2	$75,000.00	$150,000
505.06125	Catch Basin	EA	46	$2,200.00	$101,200
	Manhole	EA	23	$2,500.00	$57,500
618.02324	610 mm (24") & Smaller RGRCP, Class III	M	1,610	$125.00	$201,250
618.02336	760 mm & 910 mm (30" & 36") RGRCP, Class III	EA	1,840	$195.00	$358,800
	Box Culverts	EA	2	$65,000.00	$130,000
	Railroad Crossing	EA	1	$200,000.00	$200,000

Subtotal Construction		$2,172,680
Contingency	20%	$434,536
Total		$2,607,216
Subtotal less percentages =		$2,002,470

Table 10.5
Preliminary Utility Construction Cost Estimate
Low and Full Cost Alternatives

Alternative: Low Cost					
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
1	Mobilization	LS	1	$2,500.00	$2,500
2	610 mm (24") & smaller RGRCP, Class III	M	290	$215.00	$62,350
3	760 mm (30") RGRCP	M	336	$280.00	$94,080
4	1065 mm (42") RGRCP	M	1,325	$345.00	$457,125
5	Headwall, 460 mm to 910 mm Pipe (MAG Details)	EA	9	$2,400.00	$21,600
6	Junction Box	EA	2	$2,500.00	$5,000
	SRP Subtotal				**$637,655**
1	El Paso Gas Relocation (20" Pipe)	M	25	$1,280.00	$32,000
	Subtotal Construction				**$669,655**
	Contingency			10%	$66,966
	Total				**$736,621**
Alternative: Full Cost					
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
1	Mobilization	LS	1	$2,500.00	$2,500
2	610 mm (24") & Smaller RGRCP, Class III	M	240	$215.00	$51,600
3	760 mm (30") RGRCP	M	336	$280.00	$94,080
4	Headwall, 460 mm to 910 mm Pipe (MAG Details)	EA	3	$2,400.00	$7,200
5	Earth Irrigation Ditch	M	286	$25.00	$7,150
	SRP Subtotal				**$162,530**
1	El Paso Gas Relocation (20" Pipe)	M	45	$1,280.00	$57,600
	Subtotal Construction				**$220,130**
	Contingency			10%	$22,013
	Total				**$242,143**

10.3 Right-of-Way Costs

The Low Cost Alternative will require an additional 45,398 square meters (11.22 acres) of right-of-way involving 30 parcels (see Appendix C). The Full Cost Alternative will require 26,556 square meters (6.56 acres) of right-of-way in 28 parcels. For estimating purposes, a unit price of $40,000 per acre was provided by MCDOT for use in this report.

10.4 Design Costs

TABLE 10.6

Estimate of Design Labor Hours and Direct Costs

	Low Cost		Full Cost	
Item	Hrs	Direct Cost	Hrs	Direct Cost
DCR	325	$19,500	325	$19,500
Fld. Mon. Survey		$7,000		$7,000
Misc., repro., travel etc.		$4,000		$4,000
Total DCR	325	$30,500	325	$30,500
Plans	2,300	$138,000	3,300	$198,000
Survey		$25,000		$25,000
Geotech & Pvmt Dsgn		$7,000		$7,000
Misc., repro., travel etc.		$15,000		$15,000
Total Plans	2,300	$185,000	3,300	$245,000
Specs & Estimate	140	$8,400	140	$8,400
R/W Package	600	$36,000	720	$43,200
Grand Totals	3,565	$259,900	4,485	$327,100

10.5 Summary of Estimated Costs

TABLE 10.7
Preliminary Summary Cost Estimates

COST CATAGORIES	Factors	No Build Alternative	Minimum Build Alternative	Low Cost Alternative	Full Cost Alternative
Construction		$68,297	$269,436	$1,535,149	$2,607,216
Design		$6,830	$26,944	$259,900	$327,100
Construction Management	15%	$10,240	$40,420	$230,270	$391,080
Right-of-Way		$0	$0	$448,800	$262,400
Utility Relocation		$0	$0	$736,621	$242,143
Administration	12%	$8,200	$32,330	$184,220	$312,870
Total		$94,000	$369,000	$3,395,000	$4,143,000

10.6 Summary of Time of Design

TABLE 10.8 - DESIGN TIME

Alternative	Design Time (months)
No Build	2
Low Cost	10
Full Cost	12

APPENDIX A

LOW COST ALTERNATIVE CONCEPT PLANS

APPENDIX B

FULL COST ALTERNATIVE CONCEPT PLANS

APPENDIX C

RIGHT-OF-WAY STRIP MAPS AND PARCEL INFORMATION

115th Avenue, McDowell Rd to MC 85, Avondale, AZ
Maricopa County Department of Transportation
Candidate Assessment Reports

1/30/97

Right-of-Way Quantity Estimate

Parcel Tax Code No.	Township/ Range/ Section	Approx. Parcel Size (Sq. Meters)	Approx. Parcel Size (Acres)	Owner's Name	Estimated Land Take		Comments
					Low Cost Alternative (Sq. Meters)	Full Cost Alternative (Sq. Meters)	
101-01-001A	1N / 1E / 07	520,980	128.737	Tait, Roy & Marie	2,120	0	Field Crops
101-01-001B	1N / 1E / 07	5,722	1.414	Phoenix Southwest Assoc.	23	0	Field Crops
101-01-004F	1N / 1E / 07	591,610	146.190	Hurley, Emory Thomas etal.	0	0	Field Crops
101-01-004G	1N / 1E / 07	2,388	0.590	Hurley, Emory Thomas etal.	2,306	0	Field Crops
101-01-008	1N / 1E / 07	49,740	12.291	Englund, Chester	434	325	Warehouses
101-01-971B	1N / 1E / 07	94,021	23.233	Southern Pacific Trans. Co.	0	70	Railroad
101-01-972D	1N / 1E / 07	66,081	16.329	Southern Pacific Trans. Co.	32	24	Railroad
102-30-004E	2N / 1E / 31	331,875	82.008	Maricopa County	0	1,438	County Ownership
102-56-004G	1N / 1E / 6	172,841	42.710	TR West Ltd Partnership	0	54	Field Crops
102-56-004K	1N / 1E / 6	1,793	0.443	WP Ritter Ltd Part & T. Tait	526	879	Field Crops
102-56-004F	1N / 1E / 6	688	0.170	Tierra Business Park	793	0	Field Crops
102-57-004C	1N / 1E / 6	2,023	0.500	Leverton Investments Ltd Part	1,793	1,092	Field Crops
102-57-005C	1N / 1E / 6	0	0.000	Cancelled 10/29/80 (Note 1)	307	162	See Note 1
102-57-005J	1N / 1E / 6	1,093	0.270	Heather, Loren	958	445	Field Crops
102-57-005L	1N / 1E / 6	15,904	3.930	Allison, Forrest & Gloria	453	243	Field Crops
102-57-005M	1N / 1E / 6	23,346	5.769	Val-Mar Investments	1,619	1,254	Warehouses
102-57-007H	1N / 1E / 6	0	0.000	Cancelled 7/28/93 (Note 1)	298	147	See Note 1
102-57-007J	1N / 1E / 6	0	0.000	Cancelled 7/28/93 (Note 1)	297	150	See Note 1
102-57-007L	1N / 1E / 6	0	0.000	Cancelled 10/31/80 (Note 1)	372	182	See Note 1

115th Avenue, McDowell Rd to MC 85, Avondale, AZ
Maricopa County Department of Transportation
Candidate Assessment Reports

1/30/97

Right-of-Way Quantity Estimate

Parcel Tax Code No.	Township/ Range/ Section	Approx. Parcel Size (Sq. Meters)	Approx. Parcel Size (Acres)	Owner's Name	Estimated Land Take		Comments
					Low Cost Alternative (Sq. Meters)	Full Cost Alternative (Sq. Meters)	
500-29-005G	1N / 1W / 12	1,509	0.373	Weiler, Carl & Patricia	184	184	Field Crops
500-29-005H	1N / 1W / 12	37,077	9.162	Weiler, Carl & Patricia	3,339	1,076	Field Crops
500-29-005J	1N / 1W / 12	643,418	158.992	115th Ave / Van Buren Street	6,861	3,720	Field Crops
500-29-005K	1N / 1W / 12	549,806	135.860	Weiler, Carl & Patricia	9,439	6,112	Field Crops
500-29-006B	1N / 1W / 12	6,151	1.520	Weiler, Carl & Patricia	181	190	Field Crops
500-29-971	1N / 1W / 12	N/A	N/A	AERR Co. / Operative	0	152	Railroad
500-01-007B	1N / 1W / 1	73,167	18.080	West - 40 Ltd Partnership	3,236	2,711	Field Crop
500-01-007H	1N / 1W / 1	77,538	19.160	West - 40 Ltd Partnership	2,665	935	Field Crop
500-01-007K	1N / 1W / 1	40,469	10.000	Ten West A Ltd Partnership	2,023	486	Field Crop
500-01-007M	1N / 1W / 1	1,987	0.491	Heitzmann Family Partnershp	15	0	Field Crop
500-01-007R	1N / 1W / 1	77,335	19.110	Heitzmann Family Partnershp	1,345	0	Field Crop
500-01-007S	1N / 1W / 1	1,012	0.250	Heitzmann Family Partnershp	1,303	850	Field Crop
500-01-007T	1N / 1W / 1	3,942	0.974	Devera, Peter / Remedios	381	230	Residence
500-01-007U	1N / 1W / 1	35,309	8.725	Summers, John & Thelma	373	215	Citrus Crop Trees
500-01-007W	1N / 1W / 1	57,587	14.230	Heitzmann Family Partnershp	549	0	Field Crops
500-01-XXXX	1N / 1W / 1	N/A	N/A	N/A	1,173	2,178	Unknown
501-74-018F/L	2N / 1W / 36	898	0.222	Hammond Family Partnership	0	1,052	Field Crops
				Total Area	45,398	26,556	
				Total Area (Acres)	11.22	6.56	

Note 1: Parcel shows up on Assessor's Map however, property listing shows that the parcel split was cancelled.

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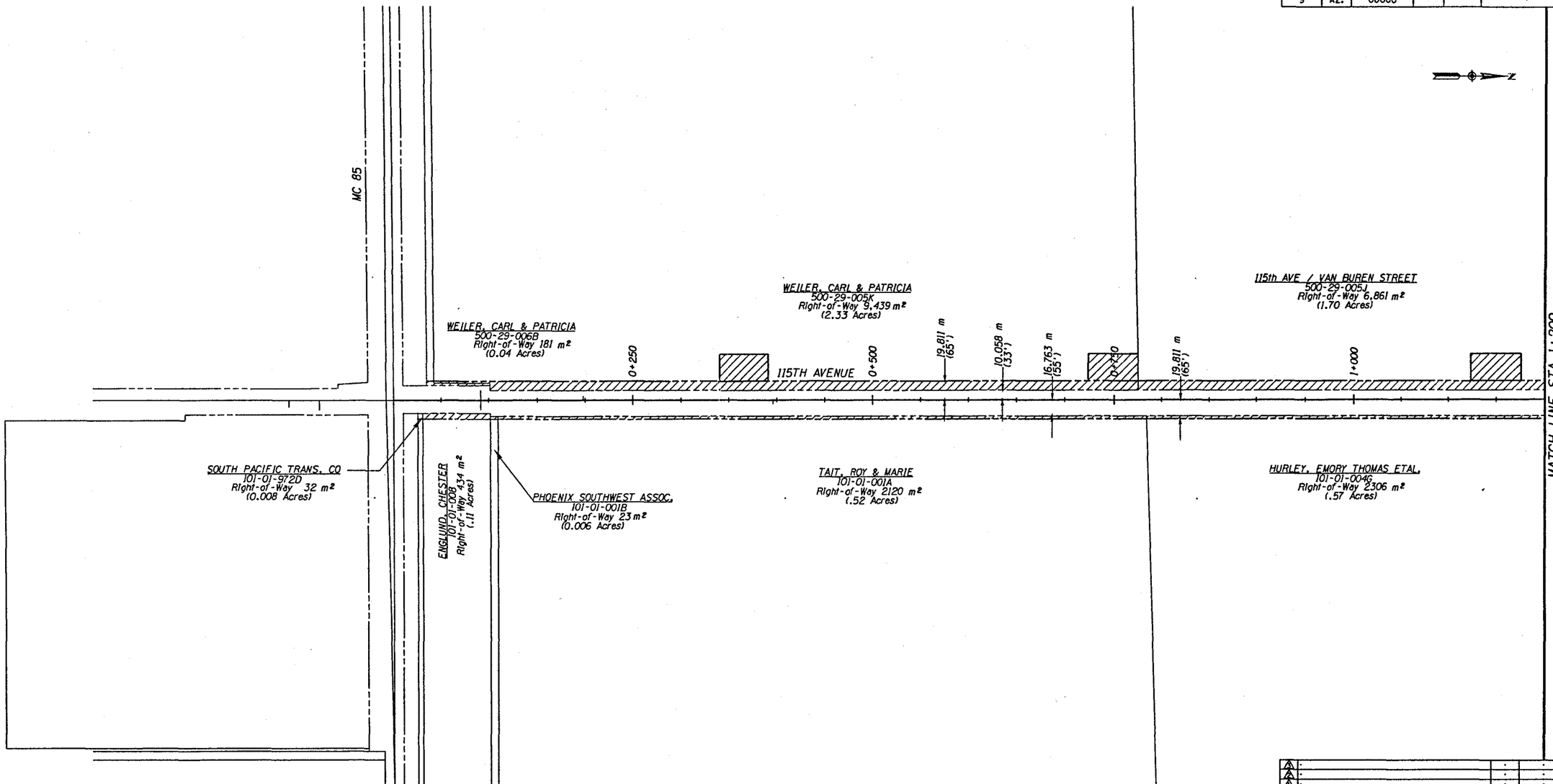

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

115TH AVENUE
MC 85 TO McDOWELL ROAD
C97-2812-05-06

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	R. MILES	1/31/97
DRAWN	R. MILES	1/31/97
CHECKED	B. OLBERT	1/31/97

Sverdrup CORPORATION

RIGHT-OF-WAY STRIP MAP
LOW COST ALTERNATIVE

SHEET 1 OF 3

TRACS NO.

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Plotted By: milesrw Date: 31-JAN-1997 11:24

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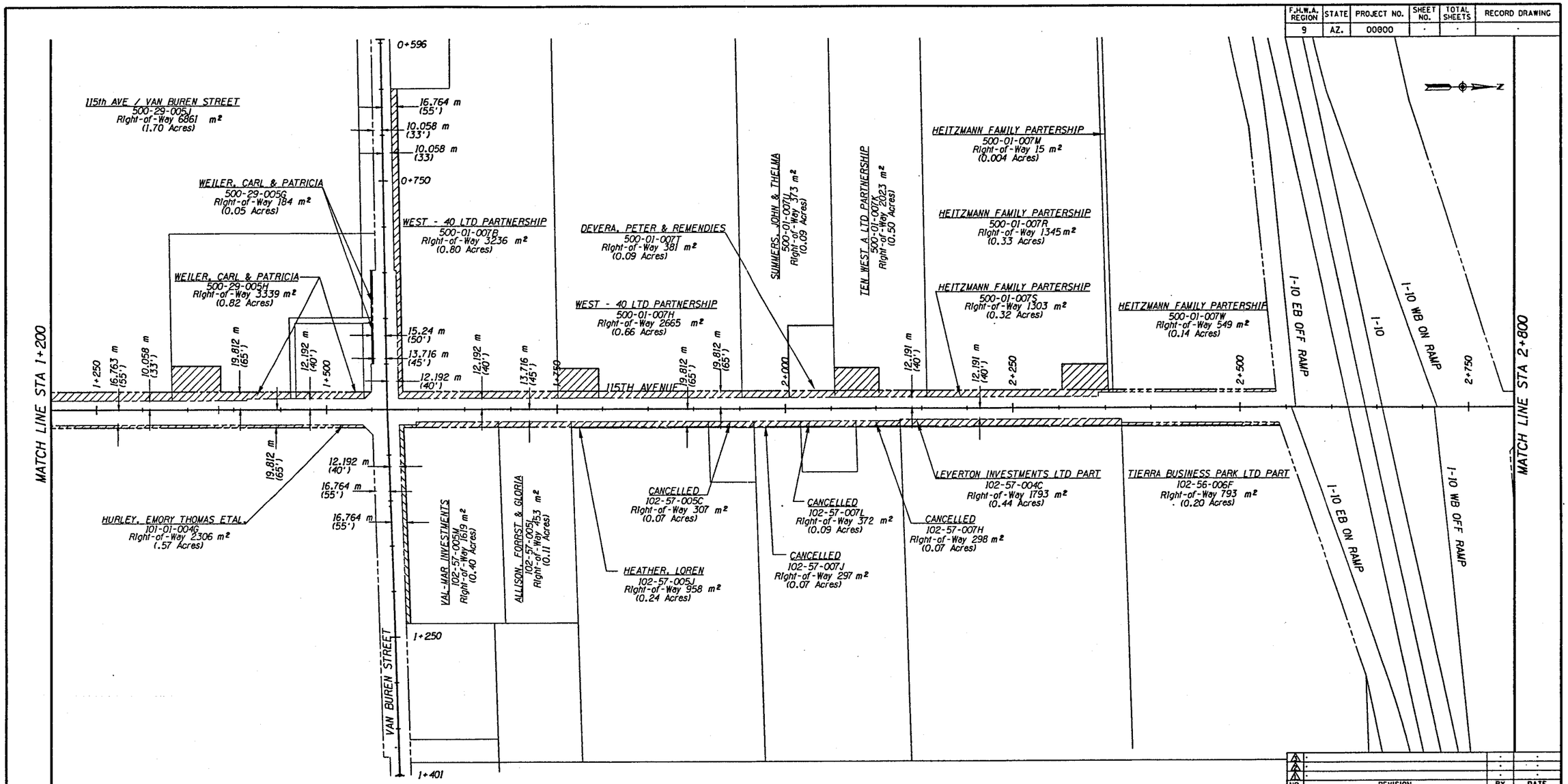

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

115TH AVENUE
MC 85 TO McDOWELL ROAD
C97-2812-05-06

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Sverdrup CORPORATION

RIGHT-OF-WAY STRIP MAP
LOW COST ALTERNATIVE

SHEET 2 OF 3

TRACS NO.

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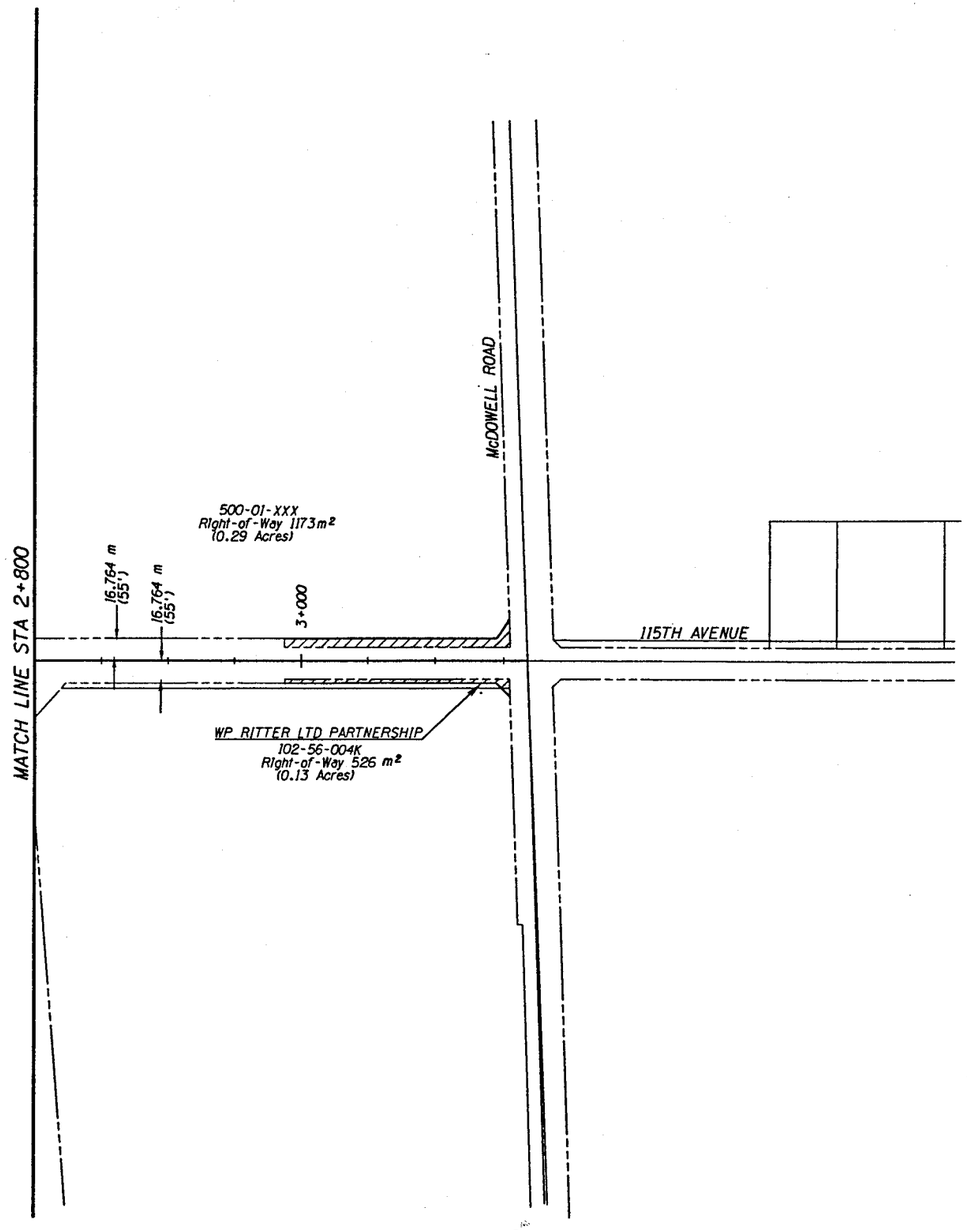

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

115TH AVENUE
MC 85 TO McDOWELL ROAD
C97-2812-05-06

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Sverdrup CORPORATION

RIGHT-OF-WAY STRIP MAP
LOW COST ALTERNATIVE

SHEET 3 OF 3

TRACS NO.

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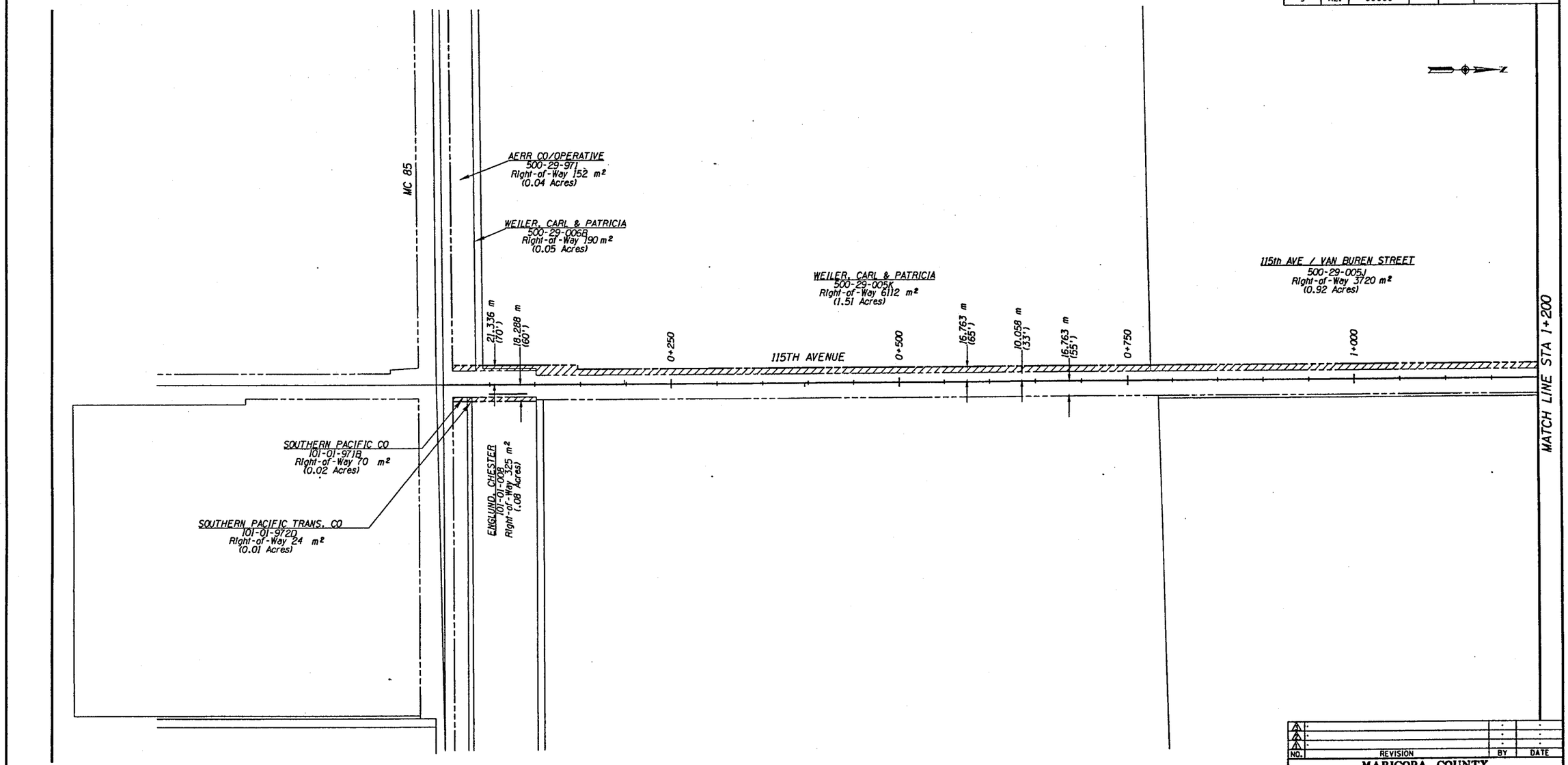

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

115TH AVENUE
MC 85 TO McDOWELL ROAD
C97-2812-05-06

PRELIMINARY
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Sverdrup
CORPORATION

RIGHT-OF-WAY STRIP MAP
FULL COST ALTERNATIVE

SHEET 1 OF 3

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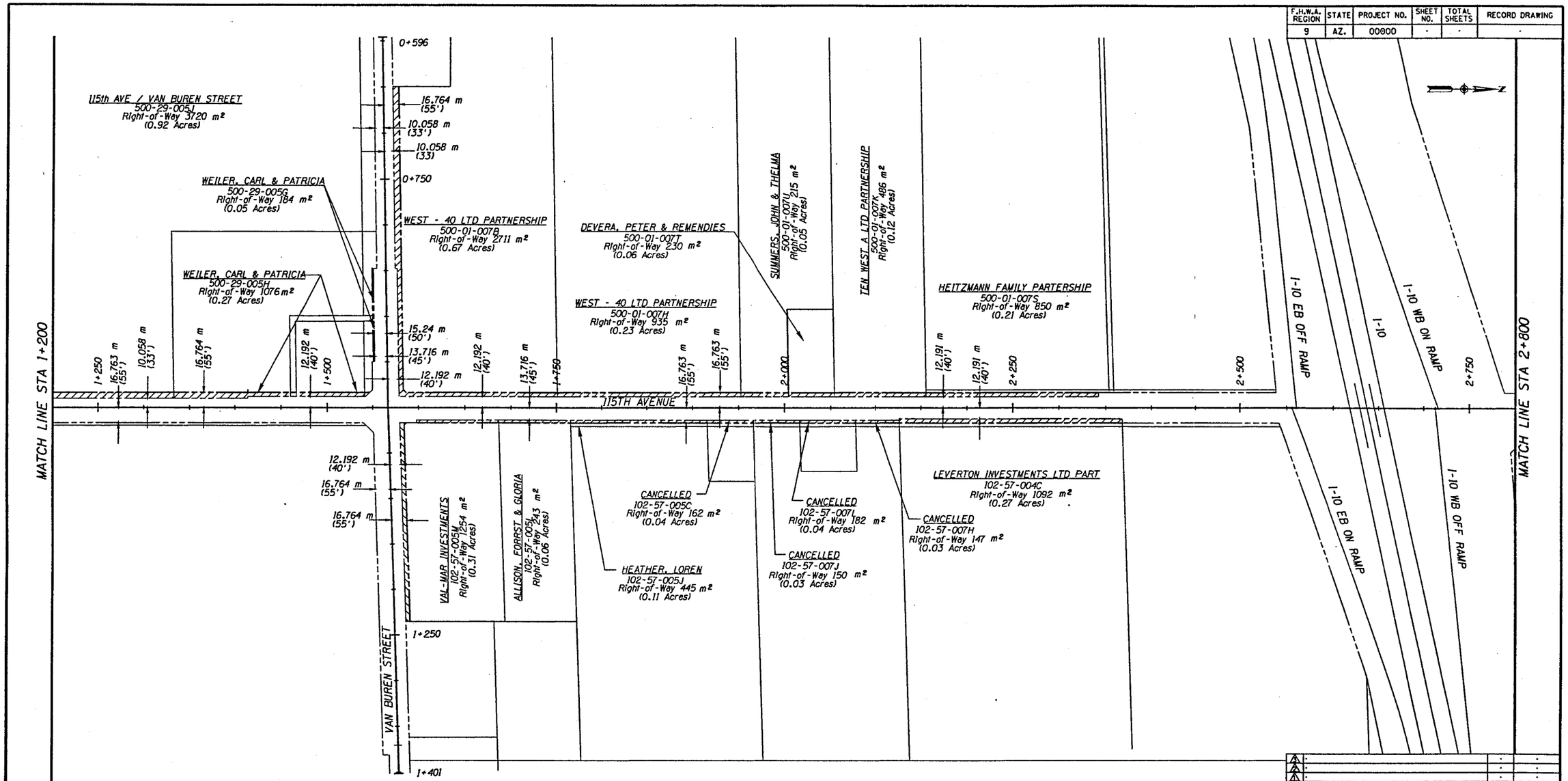

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

115TH AVENUE
MC 85 TO McDOWELL ROAD
C97-2812-05-06

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Sverdrup CORPORATION

RIGHT-OF-WAY STRIP MAP
FULL COST ALTERNATIVE

SHEET 2 OF 3

TRACS NO.

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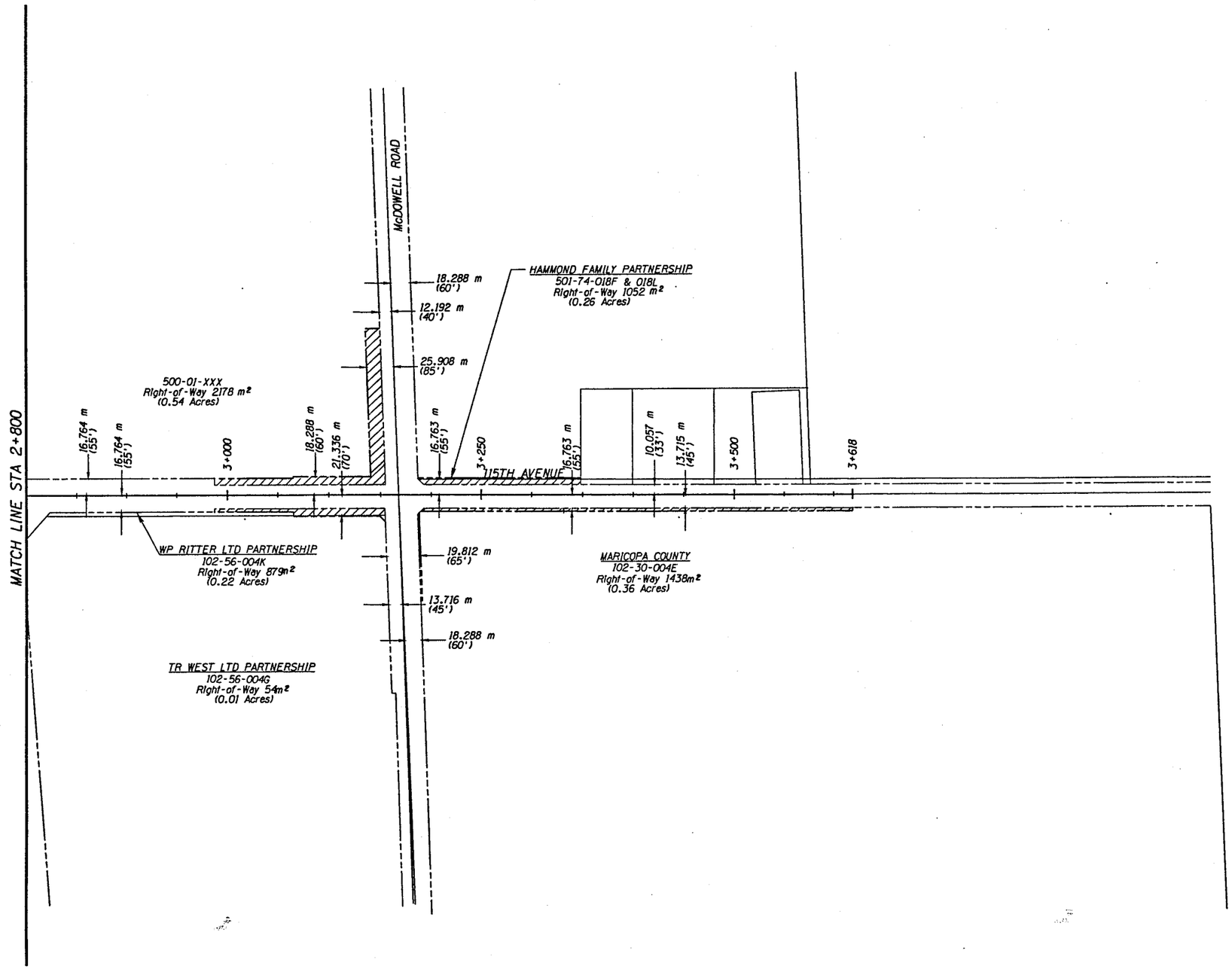

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

115TH AVENUE
MC 85 TO McDOWELL ROAD
C97-2812-05-06

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Sverdrup CORPORATION

RIGHT-OF-WAY STRIP MAP
FULL COST ALTERNATIVE

SHEET 3 OF 3

TRACS NO.

Filename: pw\00135415\12000\dgn\c545w37.dgn
Plotted By: milesrw Date: 31-JAN-1997 11:23

APPENDIX D

SUMMARY OF FIELD MEETING, CRITERIA MEETING, AND PROJECT REVIEW MEETING

MINUTES OF MEETING

Sverdrup Civil, Inc.

Date: November 27, 1996

LOCATION AND DATE: 115th Avenue between MC 85 and McDowell in Avondale, AZ
November 27, 1996

PARTICIPANTS: Thomas J. Phelan III, MCDOT Planning Division
Kelly McMullen, MCDOT Planning Division
Kent McLain, MCDOT Engineering
Sam Hatab, MCDOT Engineering
Susan Biegel, Traffic Engineering Services
Roger Miles, Sverdrup Civil, Inc.
Brad Olbert, Sverdrup Civil, Inc.

PROJECT: **Contract No. CY 1995-50**
Work Assignment C
115th Avenue, MC 85 to McDowell Road
Capital Improvements Program

SUBJECT: **Field Review Meeting**

SUMMARY:

The above attendees met at the project site to review the existing site conditions, conceptualize the alternatives to be developed, and identify the limits of the alternatives for the Candidate Assessment Report (CAR). The items discussed are presented below.

This improvement was recommended as a part of the Phoenix International Raceway Traffic Study prepared by BRW for MCDOT in 1989. The recommendation was to widen 115th Avenue to 4-lanes from MC 85 north to I-10. The City of Avondale requested the improvements be extended north of I-10 to McDowell Road.

A new development (Garden Lakes by UDC Homes) was noted approximately ½ mile to the north of McDowell Road. Tom Phelan requested that Sverdrup call Carlin Holley (City Planner) with Avondale to check if additional developments are planned for the area.

Tom Phelan requested that Sverdrup add a second bi-directional counter to the traffic study to be located between McDowell Road and I-10. Susan Biegel, with Traffic Engineering Services, said that Traffic Research & Analysis will take the traffic counts next Tuesday (12/3/96).

Between McDowell Road and I-10 provide a 5-lane urban section with curb and gutter and storm drain system for both the low-cost and high-cost alternatives. The storm drain will discharge into the ADOT concrete lined channel located just north of I-10. Size the drainage system for pavement

drainage only. Any additional increase in pipe size will be paid for by the local jurisdiction. Terminate the low cost alternative at the south curb return. For the high cost alternative provide a 5-lane section with storage and proper tapers lengths for all legs of the McDowell intersection.

Between I-10 and Van Buren provide a 5-lane urban section with curb and gutter and storm drain system for the high-cost alternative and a 5-lane rural section for the low cost alternative. Provide a minimum 5-lane section with proper storage and tapers lengths for all legs of the Van Buren intersection. Traffic study to recommend any additional lanes (double left turn lanes or auxiliary right lanes).

Between Van Buren and MC-85 the land use on both sides of the roadway is primarily agricultural. Check cost of providing a 5-lane rural section with 130' R/W against a 5-lane urban section with 110' of R/W. A 5-lane section will be used for both the low and high cost alternatives. End the low cost alternative just north of the railroad tracks which are located immediately north of the intersection with MC-85. For the high cost alternative, end at the north curb return on the south side of the railroad tracks and provide rubber surface treatment for railroad crossing.

The traffic study will recommend future lane configurations at the intersection of MC-85 and 115th Avenue, with proper storage and taper lengths.

115th Avenue appeared to be located on the monument line. Try to keep the roadway centered on the monument line.

Signed: Brad Olbert
Brad Olbert, PE

Distribution: AMB/013545-2A
RWM

MINUTES OF MEETING

Sverdrup Civil, Inc.

Date: December 12, 1996

LOCATION AND DATE: MCDOT
December 6, 1996

PARTICIPANTS: Thomas J. Phelan III, MCDOT Planning Division
Chris Plumb, MCDOT Planning Division
Roger Miles, Sverdrup Civil, Inc.
Brad Olbert, Sverdrup Civil, Inc.

PROJECT: **Contract No. CY 1995-50**
Work Assignment C
115th Avenue, McDowell Road to MC 85
Capital Improvements Program

SUBJECT: **Criteria Meeting for Candidate Assessment Report (CAR)**

SUMMARY:

The above attendees met to review the above project.

For the low and high cost alternatives utilize the typical sections described earlier in the field review meeting minutes.

For cross drainage improvements, Sverdrup has obtained the FCDMC HEC-1 files from the Floodplain Delineation Study of the Tolleson Area. These will be utilized to determine the Q100, Q50, Q25, and Q10 storm flows for the cross drainage. No outfall channel exists to convey the major storm flows to the Agua Fria River. Based upon the above drainage study, there should be an out fall channel along Van Buren Street and just north of the railroad tracks near MC 85. Placing cross drainage structures under 115th Avenue is desirable, however, there presently is no way to adequately drain the structures. Mr. Phelan said to allow the major storm events to cross over 115th Avenue for the low cost alternative and size a structure to convey the cross drainage under 115th Avenue for the high cost alternative. Mention the need for downstream conveyance capacity to the Agua Fria River.

Signed: Brad Olbert
Brad Olbert, PE

Distribution: AMB/013545-2A
RWM

432 North 44th Street, Suite 250 Phoenix, Arizona 85008 Tel. (602) 231-8999
Fax. (602) 220-9199

MINUTES OF MEETING

Sverdrup Civil, Inc.

Date: January 28, 1997

LOCATION AND DATE: MCDOT
January 16, 1997

PARTICIPANTS: Thomas J. Phelan III, MCDOT Planning Division
Robert Herz, MCDOT Planning Division
Ed Mihiloff, MCDOT Planning Division
Tony Chavez, MCDOT Right-of-Way Division
Roger Miles, Sverdrup Civil, Inc.
Brad Olbert, Sverdrup Civil, Inc.
Susan Biegel, Traffic Engineering Services

PROJECT: **Contract No. CY 1995-50**
Work Assignment C
115th Avenue, McDowell Road to MC 85
Capital Improvements Program

SUBJECT: **Project Review meeting for Candidate Assessment Report (CAR)**

SUMMARY:

The above attendees met to review the draft CAR and traffic analysis report for the above project. The results of this meeting are as follows.

The 115th Avenue Traffic Analysis Report is a separate report, not an appendix to the CAR. The traffic analysis report will be summarized in the CAR.

Ed Mihiloff requested that Sverdrup provide additional 24-hr. traffic volume information at the I-10 ramps for the next traffic study on 115th Avenue (PIR racing event scheduled 2/1/97). No analysis is necessary, just provide the traffic data in the report. Also, provide a 24-hr. Bi-directional classifier of traffic between I-10 and McDowell Road.

The No-Build Alternative will be modified to delete the additional pavement to add a third lane to the roadway. Adding the third lane will be called the Interim Alternative and will be summarized in the report along with a no-build alternative, Low Cost Alternative, and the Full Cost Alternative.

All rural sections shall have a right-of-way width of 130 feet.

Sverdrup Civil, Inc.

The auxiliary lanes recommended in the traffic analysis report will not be included in any of the alternatives. However, include the additional right-of-way needed at the intersections to allow future construction of these lanes as development occurs or when warranted.

The Full Cost Alternative shall not included bike lanes since the roadway is not designated a bike route. The roadway section will conform to Figure 5.8 in the MCDOT Roadway Design Manual instead of Figure 5.7.

Modify the CAR to add verbiage justifying the urban section north of I-10 in the Low Cost Alternative.

The design vehicle shall be WB-15 (WB-50).

The recommended alternative shall be the Low Cost Alternative described in the report plus the addition of the box culvert, located north of the railroad tracks, as described in the Full Cost Alternative. Do not include the cost of associated channel work.

Review comment sheets for Robert Herz, Ed Mihiloff, Gary Scott, Sam Hatab, and Maximo De Vera were given to Sverdrup for their use. Comments from Ed and Bob were discussed in this meeting.

The final report will be due on Friday, January 31st.

Signed: Brad Olbert
Brad Olbert, PE

Distribution: AMB/013545-2A
RWM

APPENDIX E

CALCULATIONS

SVERDRUP

JOB 013545 - CAR, 115th Ave MC85 to McDowell SHEET NO. 1 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage BY BDO CHKD RWM

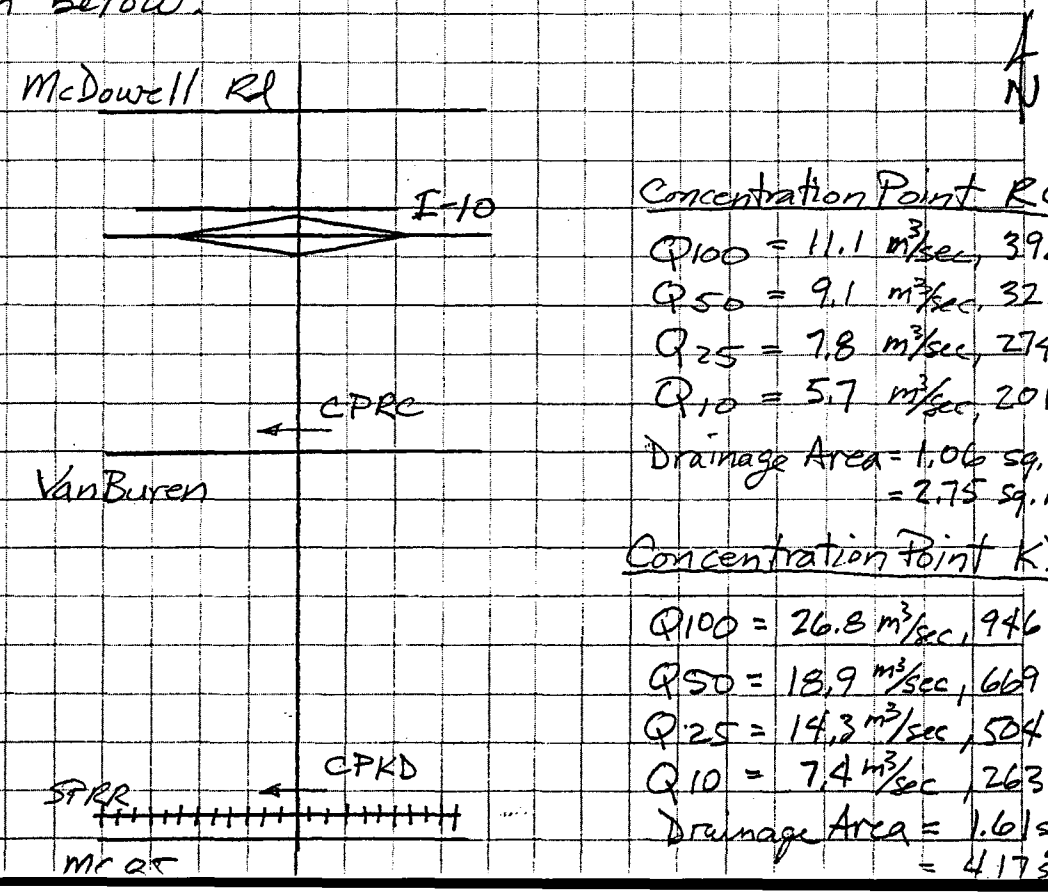
Hydrology

The following hydrology study was examined to determine the cross drainage flows for this project.

Floodplain Delineation of the Tolleson Area, Hydrology Report, FCD 95-26.
Prepared by: Dibble and Associates, Consulting Engrs.
Dated: October 1996

The HEC-1 model for the above report was modified for this study to determine the Q50, Q25 and Q10 flows at concentration points along the study route (115th Ave). Modifications included adjusting the precipitation values for the above mentioned design storms.

The concentration points, their locations and design flows are shown below.



Concentration Point RC

Q_{100} = 11.1 m^3/sec, 392 cfs
Q_{50} = 9.1 m^3/sec, 321 cfs
Q_{25} = 7.8 m^3/sec, 274 cfs
Q_{10} = 5.7 m^3/sec, 201 cfs
Drainage Area = 1.06 sq. miles
= 2.75 sq. km

Concentration Point KD

Q_{100} = 26.8 m^3/sec, 946 cfs
Q_{50} = 18.9 m^3/sec, 669 cfs
Q_{25} = 14.3 m^3/sec, 504 cfs
Q_{10} = 7.4 m^3/sec, 263 cfs
Drainage Area = 1.61 sq miles
= 4.17 sq km

SVERDRUP

JOB 013545 - 115th Ave, MC85 to McDowell SHEET NO. 2 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage BY BDO CHKD RWM

Size Cross Culverts @ Concentration Points CPRC + CPKD

@ CPRC Q100 = 392 cfs, Crossing located 300m (1000') north of Van Buren Street

From HEC No. 5 Assuming Inlet Control and a conservative HW/D of 1.0

for D = 4' then Q/B = 25 cfs/ft

392 cfs / 25 cfs/ft = 15.7 ft ∴ Use (2) 8' x 4'
(2) 2.44m x 1.22m

@ CPKD Q100 = 946 cfs

From HEC No. 5 Assuming Inlet Control and HW/D of 1.0

for D = 5' the Q/B = 32 cfs/ft

946 cfs / 32 cfs/ft = 29.6 ft ∴ Use (3) 10' x 5'
(3) 3.05m x 1.52m

Crossing is located 120m (400') north of MC 85

SVERDRUP

JOB 013545 - CAR 115th Ave, MC85 to McDowell SHEET NO. 3 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage BY BDO CHKD RWM

From McDowell Rd to I-10 per MCDOT request the following requirements will be followed:

- Section will be 5-lane urban w/ curb and gutter.
- Convey 10yr storm flow to ADOT Channel located north of I-10.
- Convey only runoff generated by 115th Ave R/W

Distance from McDowell to I-10 Offramp - 455 m (1,490 ft)

Roadway width 20.6m (68'), R/W width 33.5 m (110')

Check Q10 flow from R/W and Size Storm Drain

Area 110' x 1490' = 163,900 SF ÷ 43560 = 3.76 Acres

		C	
% Roadway = 68/110 = 0.62 x 100 = 62%	x	0.85	= 0.527
% Shoulder = 42/110 = 0.38 x 100 = 38%	x	0.70	= 0.266
		C_w =	0.793

Rainfall Intensity (Assume 10 minutes)

For 10 yr Storm i = 4.5 in/hr. (Figure 3.2, FCDMC Hydrology Man.

Q = CIA = 0.793 (4.5) 3.76 = 13.4 cfs = 0.37 m³/sec

Grade to the south is approx. 0.10%

Select 24" RCP - (610 mm) RCP @ 0.35% slope to convey storm flows to ADOT channel.

Set 4 sets of 2 catch basins on 400' (122 m) intervals with the first CB's set at the south curb returns on McDowell

Quantities needed: 450 m 610 mm RCP, 8 Catch Basins
90 m 460 mm RCP, 4 Manholes

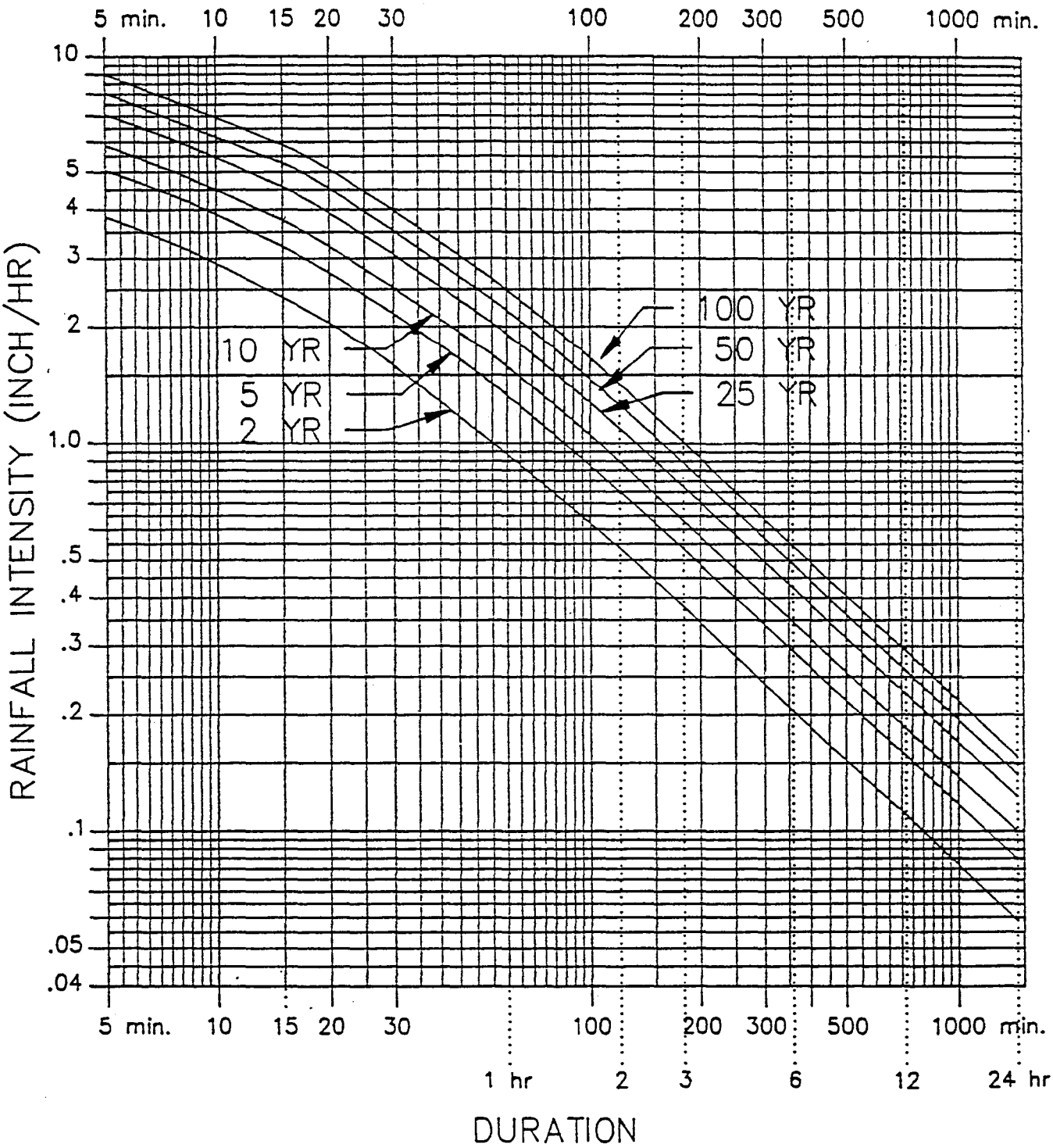


Figure 3.2
Rainfall Intensity-Duration-Frequency Relation
(Phoenix Metro Area)

SVERDRUP

JOB 013545 - CAR 115th Ave, McDowell to McDowell

SHEET NO. 4 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage

BY BDO CHKD RWM

From I-10 to Van Buren — Full Cost per MCDOT requirements

Assume the following:

- Section will be 5 lane urban w/ curb and gutter.
- Convey 10 yr storm flows (MCDOT R/W) to cross culvert near Van Buren & 5th
- Convey 100 yr storm flow under 115th Ave near Van Buren & 5th in box culvert. Assume downstream channel to be designed by joint development w/ FCD to Agua Fria River. channel not part of roadway cost.

Distance from I-10 off ramp to 1000' north of Van Buren Street (Low Point) 685 m (2,250 ft)

Rdwy width 20.6m (68'), R/W width 33.5m (110')

Check Q10 flow from R/W and size storm drain line.

Area = 110' x 2,250' = 247,500 SF ÷ 43560 = 5.7 acres

Runoff Coefficient Use - 0.80

Time of Concentration 2,250'/4 fps = 562 sec = 9.4 min (travel time)
Overland flow 10 min + 9.4 = 19.4 min, Use 20 min

Intensity @ 20 min Use 3.2 "/hr (Figure 3-2, FCDMC Hydro Manual)

Q = CIA = 0.80 (3.2) 5.7 = 14.6 cfs = 0.4 m³/sec

Slope to the south is approximately 0.10%

Use 0.15% on pipe Select 30" RCP (760mm) for half of length and 24" RCP (610 mm) other half

Set 2 catch basins @ 400' (122m) intervals on each side of rdwy.

Use 75' of 18" RCP at CBs

Quantities needed 340 m 30" RCP (760mm), 340 m 24" RCP (610mm)
10 Catch basins, 5 manholes
110 m 18" RCP (460mm) laterals

SVERDRUP

JOB 013545 - 115th Ave, MC85 to McDowell SHEET NO. 5 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage BY BDO CHKD DWM

Distance from Van Buren north to low point is 300m (1000').

Check Q10 flow from R/W

Area = 110' x 1,000' = 110,000 SF ÷ 43,560 = 2.5 Acres

Runoff Coefficient Use 0.80

Time of Concentration 1,500'/4 fps = 250 sec = 4 min

Overland flow 10 min + 4.0 min = 14.0 min

Intensity at 14 min = 3.9 in/hr (Figure 3-2, FCDMC Hydrology Manual)

Q = CIA = 0.80 (3.9) 2.5 = 7.8 cfs = 0.22 m³/sec

Slope to the north is 0.20%

Use 24 in RCP (610 mm)

Quantities needed

300 m 24" RCP (610 mm)
45 m 18" RCP (460 mm) laterals
4 catch basins
2 manholes

SVERDRUP

JOB 013545 - 115th Ave, MC85 to McDowell SHEET NO. 6 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage BY BDO CHKD RWM

From Van Buren to SPRR tracks - Full Cost per MCDOT
Assume the following:

- Section will be 5 lane Urban Section w/ Bike lanes an C&G
- Convey 10yr storm flows from MCDOT R/W to cross culvert located north of SPRR.
- Convey 100 year storm flow under 115th Avenue near SPRR tracks in box culvert. Assume downstream channel will be design and built in joint project w/ FCDMC to Agua Fria River. Channel not part of roadway costs.

Distance from Van Buren to MC 85 - 1,566 m (5,140')

Rdwy width 22.6 m (74'), R/W width 33.5 m (110')

Check Q10 flow from R/W and size stormdrain.

Area = 110' x 5140' = 565,400 SF ÷ 43560 = 13.0 Acres

Runoff Coefficient Use 0.80

Time of Concentration Overland Flow T_c = 10 min (min)
Pipe flow = 4,900/4 min = 1,225 sec = 20 min
Time of Concentration 30 min.

Intensity at 30 min Use 2.5 in/hr. (Figure 3-2, FCDMC Hydrology Manual)

Q = CIA = 0.80 (2.5) 13.0 = 26 cfs = 0.74 m³/sec

Slope to the south is approximately 0.10%
Use 0.15% on pipe ∴ Select 36" RCP (910 mm) for half of length and 30" RCP (760 mm) for other half. Set two catchbasin at 400' intervals and Use 75' of 18" laterals @ CB's
Quantities needed 750 m 36" RCP (910 mm), 24 Catch basins
750 m 30" RCP (760 mm), 12 Manholes
[illegible]

SVERDRUP

JOB 013545 - 115th Ave, MC85 to McDowell SHEET NO. 7 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage BY BDO CHKD RWM

Summary for Full Cost Alternative

Pipe

36" RCP (910mm) - 750 m = 750 m
30" RCP (760mm) - 340 m + 750 m = 1,090 m
24" RCP (610mm) - 450 m + 340 m + 300 m = 1,090 m
18" RCP (460mm) - 90 m + 110 m + 45 m + 275 m = 520 m

Catch Basins

24 + 10 + 8 + 4 = 46 Catch Basins

Manholes

12 + 5 + 4 + 2 = 23 Manholes

Culverts

(2) 2.44 m x 1.22 m x 27.0 m
(3) 3.05 m x 1.52 m x 27.0 m

SVERDRUP

JOB 013545-CAR 115th Ave, MC85 to McDowell

COMPUTATIONS FOR Drainage

SHEET NO. 8 OF

DATE 12/28/96

BY BDO CHKD RWM

Low Cost Alternative

Assumes the following for handling drainage

- 115th Ave McDowell to I-10 similar to full cost alternative
- cross drainage between I-10 and MC85 will flow across 115th in current locations (north of SPRR and Van Buren
- roadside retention needed to dispose of additional roadside flows and volumes.

Retention Volume between I-10 and low point 1000' north of Van Buren. Assume 2 retention basins. Split required retention volume between basins.

R/W Area = 247,500 SF (see sht 4)
10 yr 24hr depth = 2.41"

Volume = 247,500 SF x 2.41 in x $\frac{1 \text{ ft}}{12 \text{ in}}$ = 49,606 CF

= 1,837 Cu yd or 1,405 m^3

∴ Make two basins w/ approx. 700 m^3 storage.

25 yr 24hr depth = 3.02"

Volume = 247,500 SF x 3.02" x $\frac{1'}{12"}$ = 62,288 CF

= 2,307 Cu yds or 1,764 m^3

∴ Make two basins w/ approx. 900 m^3 storage

Note: Use 24" RCP (610mm) to convey runoff to basin under 115th Ave w/ area inlets located in roadside ditches

Assume 30m of 24" pipe w/ 2 area inlets per basin

SVERDRUP

JOB 013545 - 115th Ave, MC85 to McDowell SHEET NO. 9 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage BY BDO CHKD RWM

Retention Volume between Low Point north of Van Buren and Van Buren Street

R/W Area = 110,000 SF (See sheet 5)

10 yr 24hr depth = 2.41"

$Volume_{10}$ = 110,000 SF x 2.41" x 1'/12" = 22,092 Cu Ft

= 818 Cu Yds or 626 m^3

25 yr depth = 3.02"

$Volume_{25}$ = 110,000 SF x 3.02" x 1'/12" = 27,693 Cu Ft

= 1,025 Cu Yds or 784 m^3

Use 800 m^3

Retention Volume between Van Buren Street and SPRR tracks

R/W Area = 565,400 SF (See Sht 6)

10yr 24hr depth = 2.41"

$Volume_{10}$ = 565,400 SF x 2.41" x 1'/12" = 113,551 Cu Ft

= 4,206 Cu Yds or 3,215 m^3

25yr 24hr depth = 3.02"

$Volume_{25}$ = 565,400 SF x 3.02" x 1'/12" = 142,292 CFT

= 5,270 Cu Yds or 4,029 m^3

Divide into 4 Basins w/ approx. 800 m^3 size for 10 yr event or 1,000 m^3 for 25 yr event.

SVERDRUP

JOB 013545 - 115th Ave, MC85 to McDowell (CAK) SHEET NO. 10 OF

DATE 12/28/96

COMPUTATIONS FOR Drainage BY BDO CHKD RWM

Summary for Low Cost Alternative

For 25 yr storm capacity for retention basin sizing

2 Basins @ 900 m^3
5 Basins @ 800 m^3

7 x 30 m = 210 m of 24" RCP (610mm)
14 Area Inlets

between McDowell and I-10

450 m 24" RCP (610 mm)
90 m 18" RCP (460 mm)
8 CBs and 4 manholes

Totals

660 m 24" RCP (610 mm)
90 m 18" RCP (460 mm)
8 Catch Basins
4 Manholes
14 Area Inlets

2 Basins @ 900 m^3 capacity
1 Basin @ 800 m^3 capacity
4 Basins @ 1,000 m^3 capacity

SVERDRUP

JOB 013545-115th Ave, MC85 to McDowell

SHEET NO. 11 OF

DATE 12/30/96

COMPUTATIONS FOR Drainage

BY BDO CHKD RWM

Dip Crossing Depths @ CPKD (north of SPRR)

	Depth		Estimated Width
Q100	987.24		
	986.00		610' = 185 m
	1.24'	= 0.38 m	
Q50	987.10		560' = 170 m
	986.00		
	1.10'	= 0.34 m	
Q25	986.95		490' = 150 m
	986.00		
	0.95'	= 0.29 m	
Q10	986.75		400' = 122 m
	986.00		
	0.75'	= 0.23 m	

Culvert Designer/Analyzer Report
CPKD 100

Component:Weir

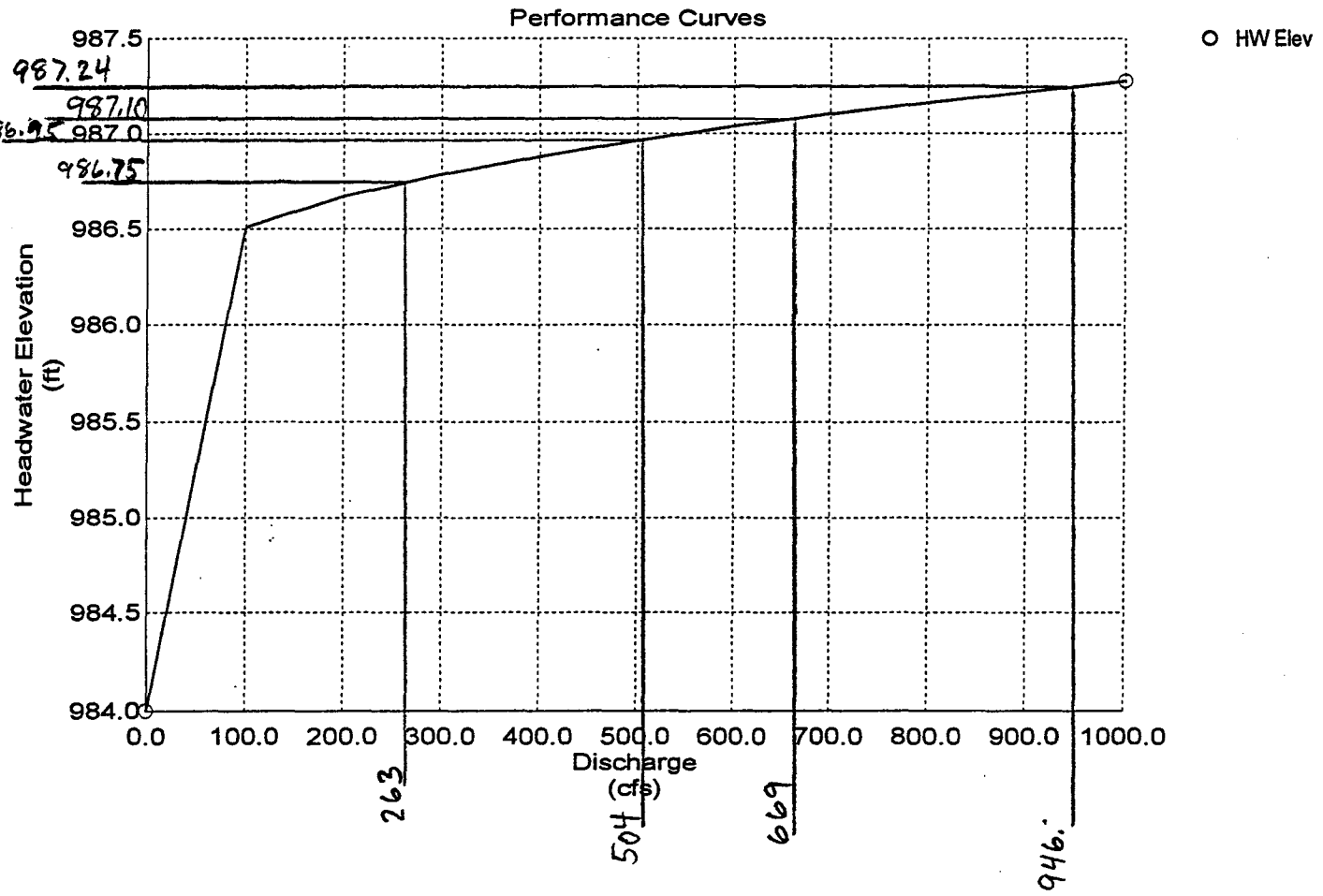
Hydraulic Component(s): Roadway			
Discharge	946.34 cfs	Allowable HW Elevation	987.2 ft
Roadway Width	60.0 ft	Overtopping Coefficient	3.03 US
Low Point	986.0 ft	Headwater Elevation	987.2 ft
Discharge Coefficient (Cr)	3.03	Submergence Factor (Kt)	1.00
Tailwater Elevation	985.9 ft		

987,24

Sta (ft)	Elev (ft)
240.0	987.2
310.0	986.6
380.0	986.2
400.0	986.0
1,400.0	988.9

Performance Curves Report
CPKD 100

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	1,000.00	100.00 cfs



SVERDRUP

JOB 013545 - 115th Ave, MC85 to McDowell SHEET NO. 12 OF

DATE 12/30/96

COMPUTATIONS FOR Drainage BY BDO CHKD RWM

Dip Crossing @ CPRC (1000' north of Van Buren)

	Depth	Estimated Width
Q100	994.10 993.50 0.60' = 0.18 m	900' = 274 m
Q50	994.01 993.50 0.51' = 0.16 m	765' = 233 m
Q25	993.98 993.50 0.48' = 0.15 m	720' = 220 m
Q10	993.95 993.50 0.45' = 0.14 m	675' = 206 m

Culvert Designer/Analyzer Report
CPRC 100

Component:Weir

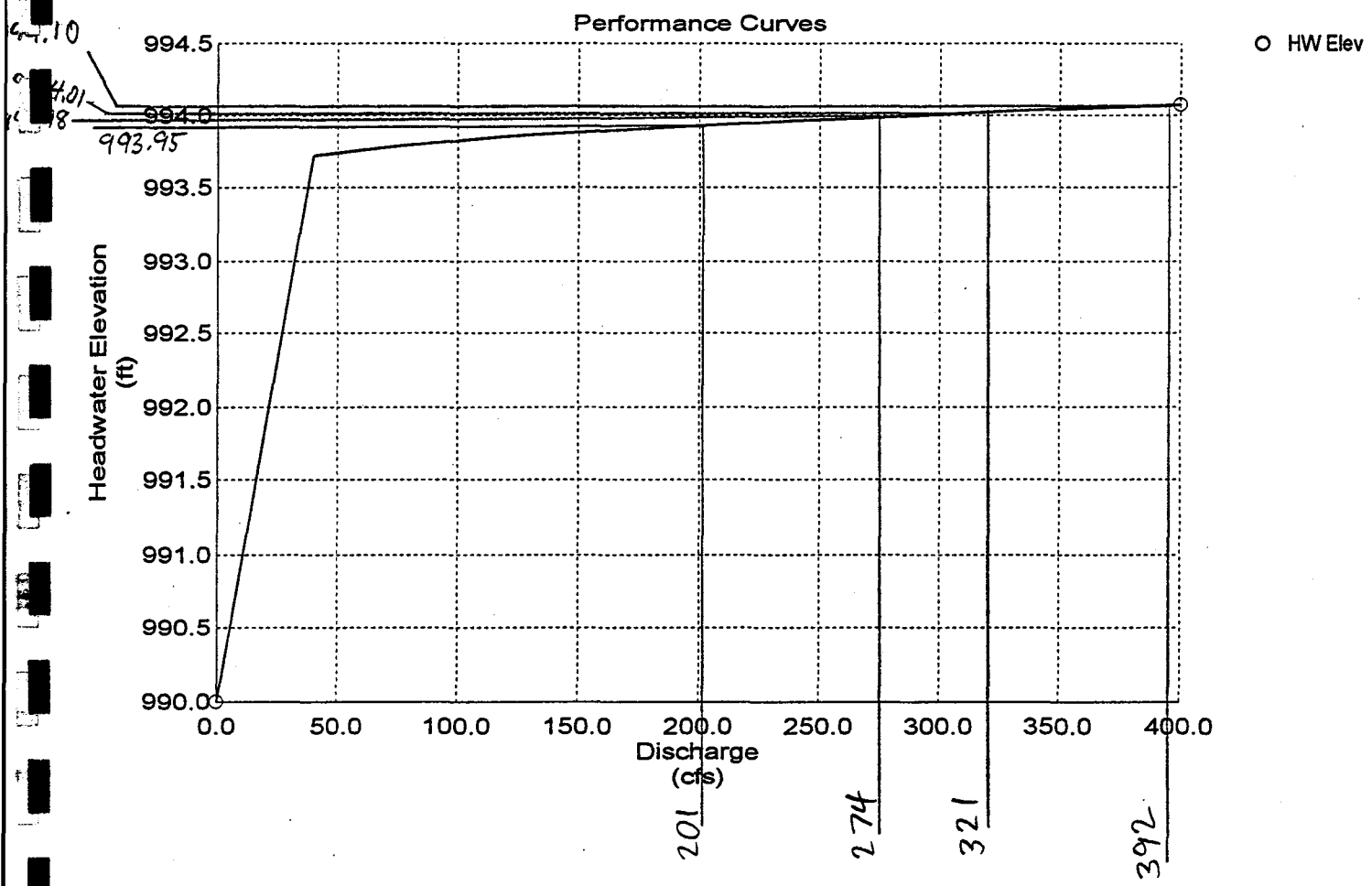
Hydraulic Component(s): Roadway					
Discharge	392.27	cfs	Allowable HW Elevation	994.1	ft
Roadway Width	28.0	ft	Overtopping Coefficient	2.98	US
Low Point	993.5	ft	Headwater Elevation	994.1	ft
Discharge Coefficient (Cr)	2.98		Submergence Factor (Kt)	1.00	
Tailwater Elevation	993.5	ft			

994.10

Sta (ft)	Elev (ft)
5,350.0	995.2
6,200.0	993.5
7,400.0	994.7

Performance Curves Report
CPRC 100

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	400.00	40.00 cfs



SVERDRUP

JOB 013545 MDOT On Call

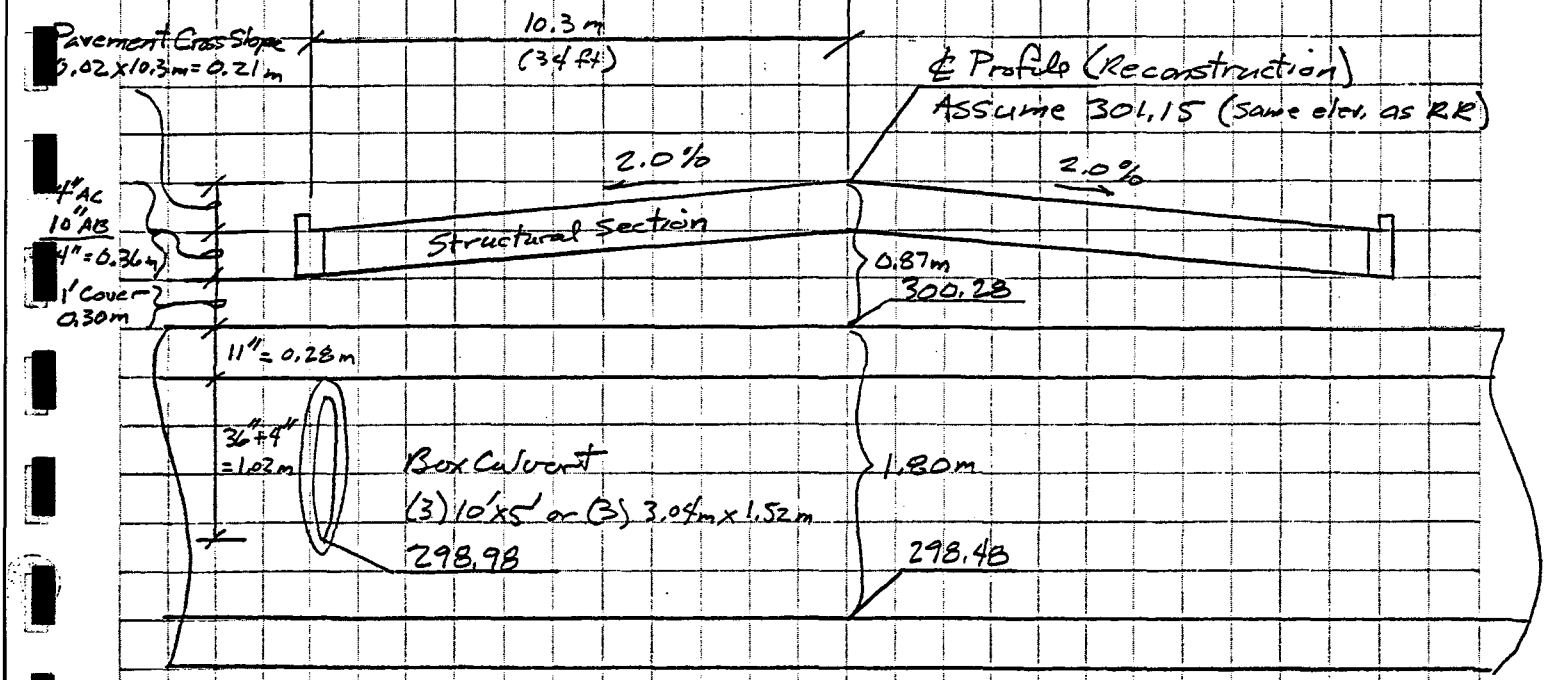
COMPUTATIONS FOR Drainage

SHEET NO. _____ OF _____

DATE 2/24/97

BY BDO CHKD RWN

Set bottom of box culvert and invert of storm drain



Note: For this preliminary analysis the slope of the box was ignored.

Box Culvert at -0+122, 115th Avenue

SVERDRUP

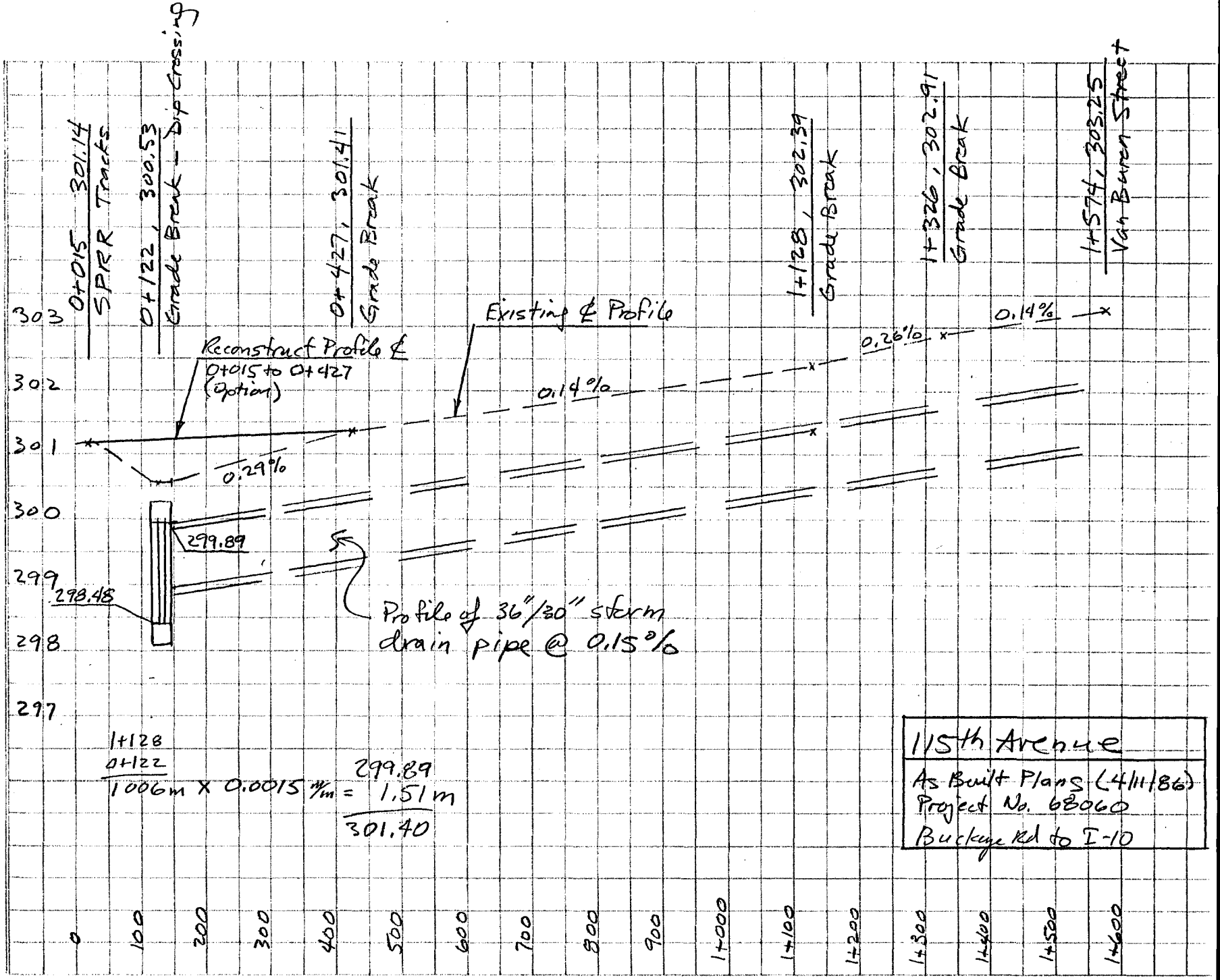
JOB 013545 MCDOT On Call

COMPUTATIONS FOR Drainage (115th Ave Profile) MC85 to Van Buren

SHEET NO. ____ OF ____

DATE 2/24/97

BY BDO CHKD Rum



1+128
0+122
1006m X 0.0015 m/m = 1.51m
299.89
301.40

115th Avenue
As Built Plans (4/11/86)
Project No. 68060
Buckeye Rd to I-10

SVERDRUP

JOB 013545 MDOT On Call

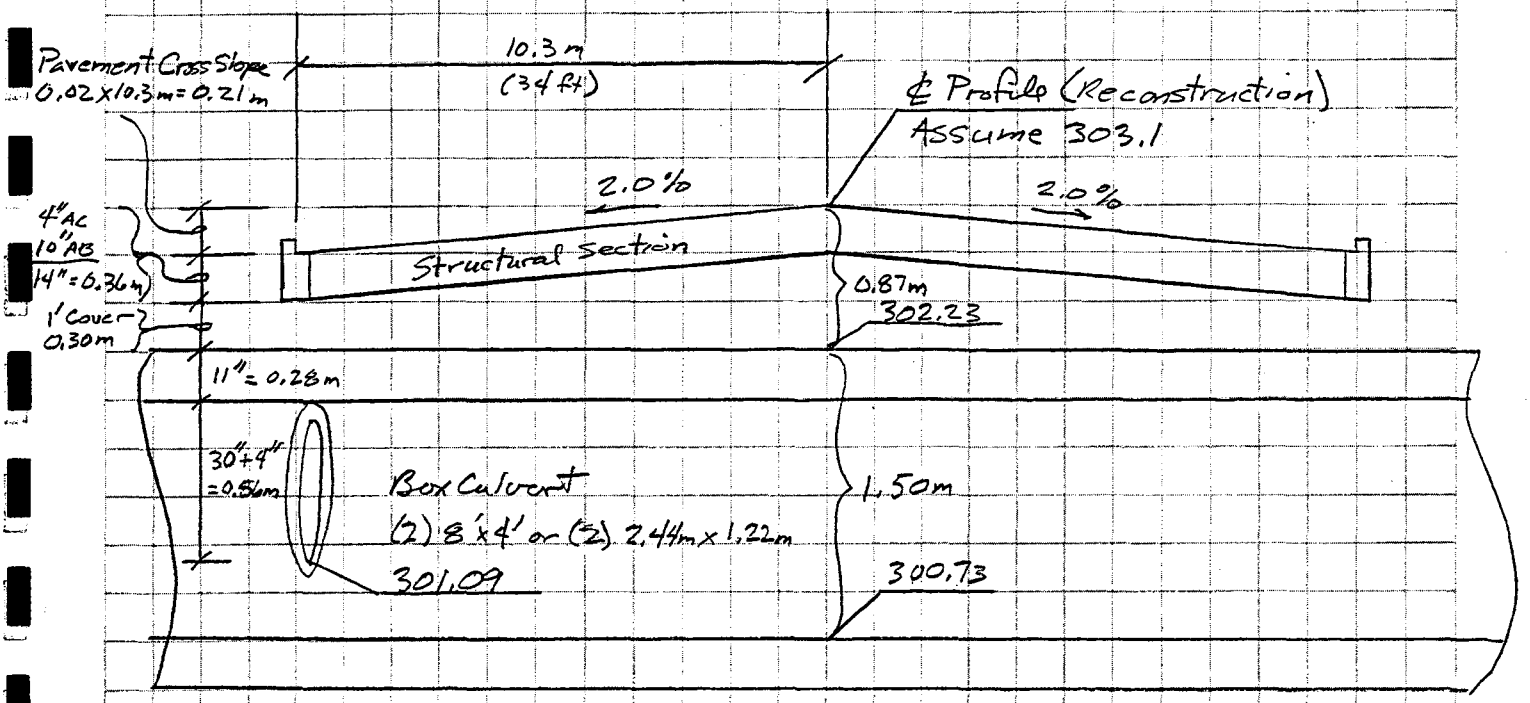
COMPUTATIONS FOR Drainage

SHEET NO. ____ OF ____

DATE 2/24/97

BY BDO CHKD RWM

Set bottom of box culvert and invert of storm drain



Note: For this preliminary analysis the slope of the box was ignored.

Box Culvert at 1+890, 115th Avenue

SVERDRUP

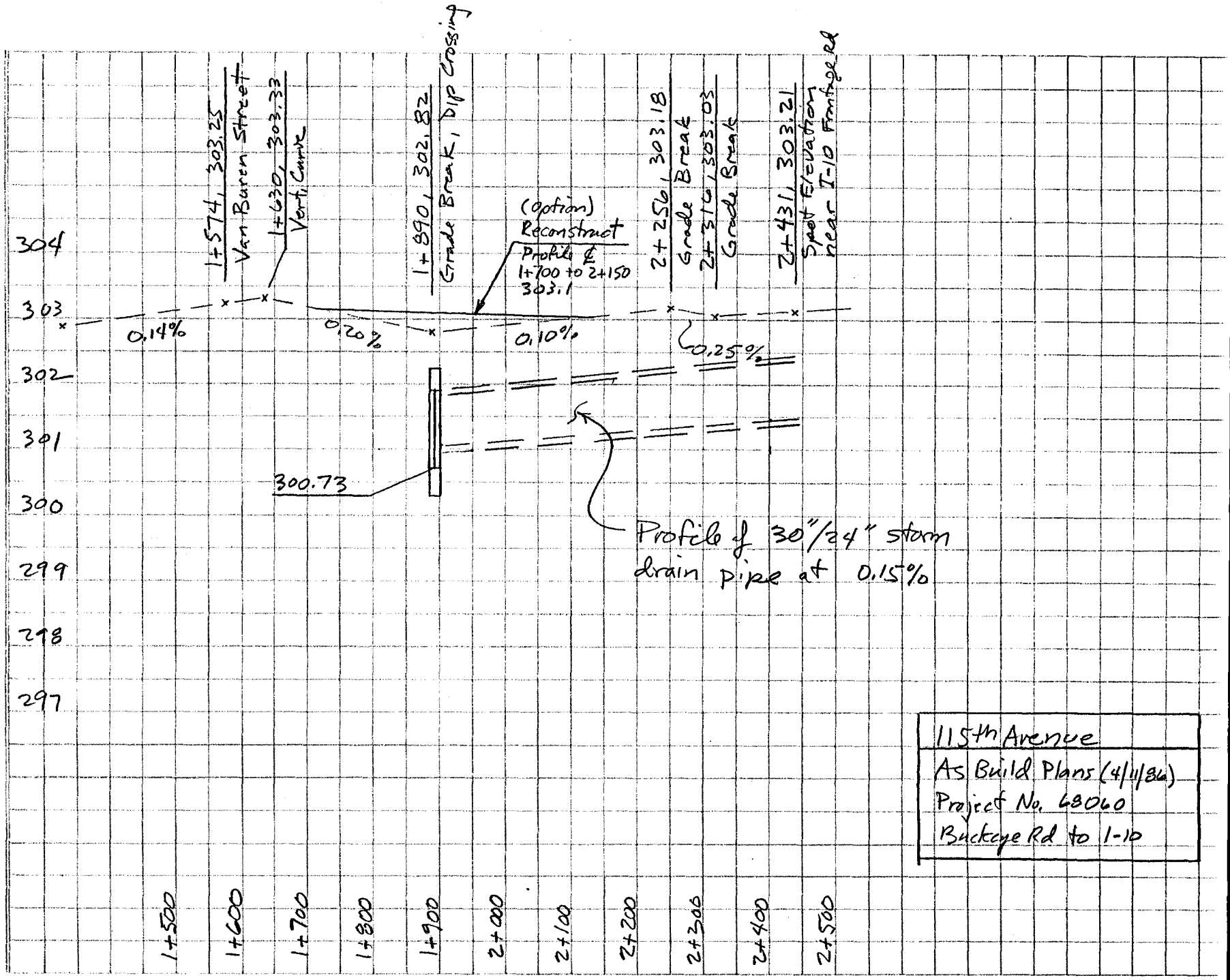
JOB 013545 MCDOT On Call

COMPUTATIONS FOR Drainage (115th Ave Profile) Van Buren to I-10

SHEET NO. ____ OF ____

DATE 2/24/97

BY BDO CHKD RWN



115th Avenue
As Build Plans (4/11/84)
Project No. 68060
Buckeye Rd to I-10

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: trap_car

Comment: Channel parallel w/ SPRR, 115th Ave to Agua

Solve For Depth

Given Input Data:

Bottom Width.....	20.00 ft
Left Side Slope..	1.00:1 (H:V)
Right Side Slope.	1.00:1 (H:V)
Manning's n.....	0.020
Channel Slope....	0.0020 ft/ft
Discharge.....	950.00 cfs

Computed Results:

Depth.....	4.89 ft
Velocity.....	7.80 fps
Flow Area.....	121.75 sf
Flow Top Width...	29.78 ft
Wetted Perimeter.	33.83 ft
Critical Depth...	3.85 ft
Critical Slope...	0.0045 ft/ft
Froude Number....	0.68 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: trap_car_VB

Comment: Channel parallel w/ Van Buren, 115th to Agua

Solve For Depth

Given Input Data:

Bottom Width.....	8.00 ft
Left Side Slope..	1.00:1 (H:V)
Right Side Slope.	1.00:1 (H:V)
Manning's n.....	0.015
Channel Slope....	0.0020 ft/ft
Discharge.....	400.00 cfs

Computed Results:

Depth.....	4.05 ft
Velocity.....	8.18 fps
Flow Area.....	48.88 sf
Flow Top Width...	16.11 ft
Wetted Perimeter.	19.47 ft
Critical Depth...	3.64 ft
Critical Slope...	0.0030 ft/ft
Froude Number....	0.83 (flow is Subcritical)

SVERDRUP

JOB MCDOT ONCALL

SHEET NO. 1 OF 2

DATE 12-10-96

COMPUTATIONS FOR PRECIPITATION DEPTHS

BY DES CHKD SDO

TOLLESON PRECIPITATION 24-HR

AREA	RAINFALL RATIO	10-YR	25-YR	50-YR	100-YR
0.01	1.00	2.41	3.02	3.42	3.99 ✓
10	0.94	2.27	2.84	3.21	3.75 ✓
20	0.91	2.19	2.75	3.11	3.63 ✓
30	0.90	2.17	2.72	3.08	3.59 ✓
40	0.88	2.12	2.66	3.01	3.51 ✓
50	0.87	2.10	2.63	2.98	3.47 ✓
60	0.86	2.07	2.60	2.94	3.43 ✓

CREATED HEC-1 CLONES → TOL.010 TOL.025 TOL.050 TOL.100

WEST OF BULLARD WASH ON CR 85
(RAINFALL DEPTHS READ FROM FIG 2.10, 2.11, 2.12, & 2.13)

AREA	RAINFALL RATIO	10-YR	25-YR	50-YR	100-YR	
0.001	1.00	2.51	3.25	3.60	4.11	(WAS 4.03)
10	0.94	2.36	3.06	3.38	3.86	(WAS 3.99)
50	0.87	2.18	2.83	3.13	3.58	(WAS 3.83)
100	0.842	2.11	2.74	3.03	3.46	(WAS 3.76)
200	0.817	2.05	2.66	2.94	3.36	(WAS 3.70)

CREATED HEC-1 CLONES → ADMS_H1.010 ADMS_H1.050
ADMS_H1.025 ADMS_H1.100

BULLARD WASH @ CR85

AREA	RATIO	10-YR	25-YR	50-YR	100-YR	
0.001	1.00	2.40	3.10	3.45	4.03	(WAS 4.03)
10	0.94	2.26	2.91	3.24	3.79	(WAS 3.99)
50	0.87	2.09	2.70	3.00	3.51	(WAS 3.83)
100	0.842	2.02	2.61	2.90	3.39	(WAS 3.76)
200	0.817	1.96	2.53	2.82	3.29	(WAS 3.70)

PER FCDMC HYDROLOGY MANUAL CH. 2

CREATED FILES BUL_010.1H1, BUL_025.1H1

SVERDRUP

JOB MCDOT ON-CALL

COMPUTATIONS FOR PRECIPITATION DEPTHS

SHEET NO. 2 OF 2

DATE 12-10-96

BY DFS CHKD BDO

BUCKEYE PRECIPITATION

AREA	RAINFALL RATIO	10-YR	25-YR	50-YR	100-YR
0.01	1.00	2.51	3.22	3.62	4.10
6	0.964	2.42	3.10	3.49	3.95
25	0.905	2.27	2.91	3.28	3.71
61	0.860	2.16	2.77	3.11	3.53

CREATED BF24D010.1H1, BF24D025.1H1, BF24D050.1H1

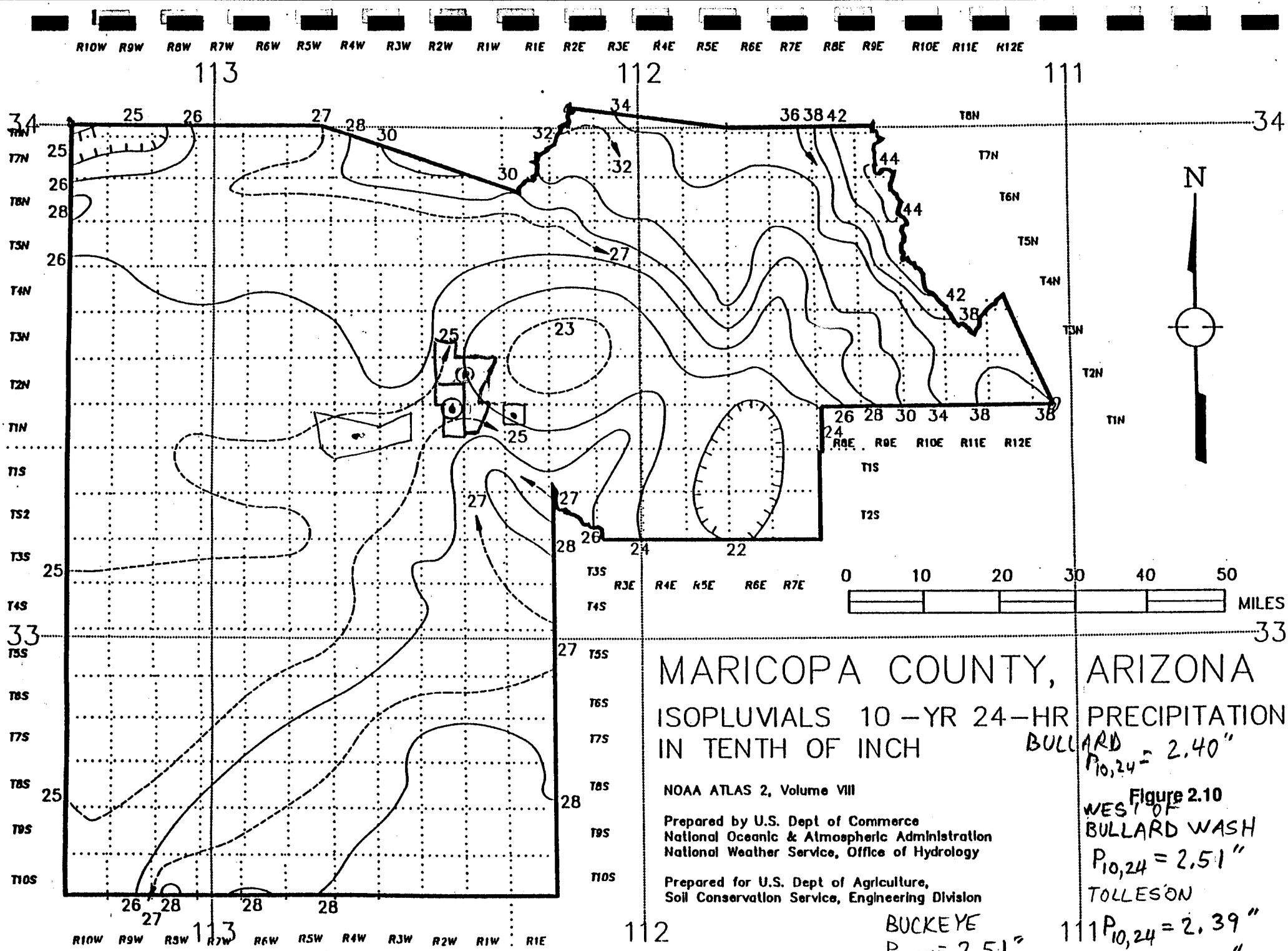
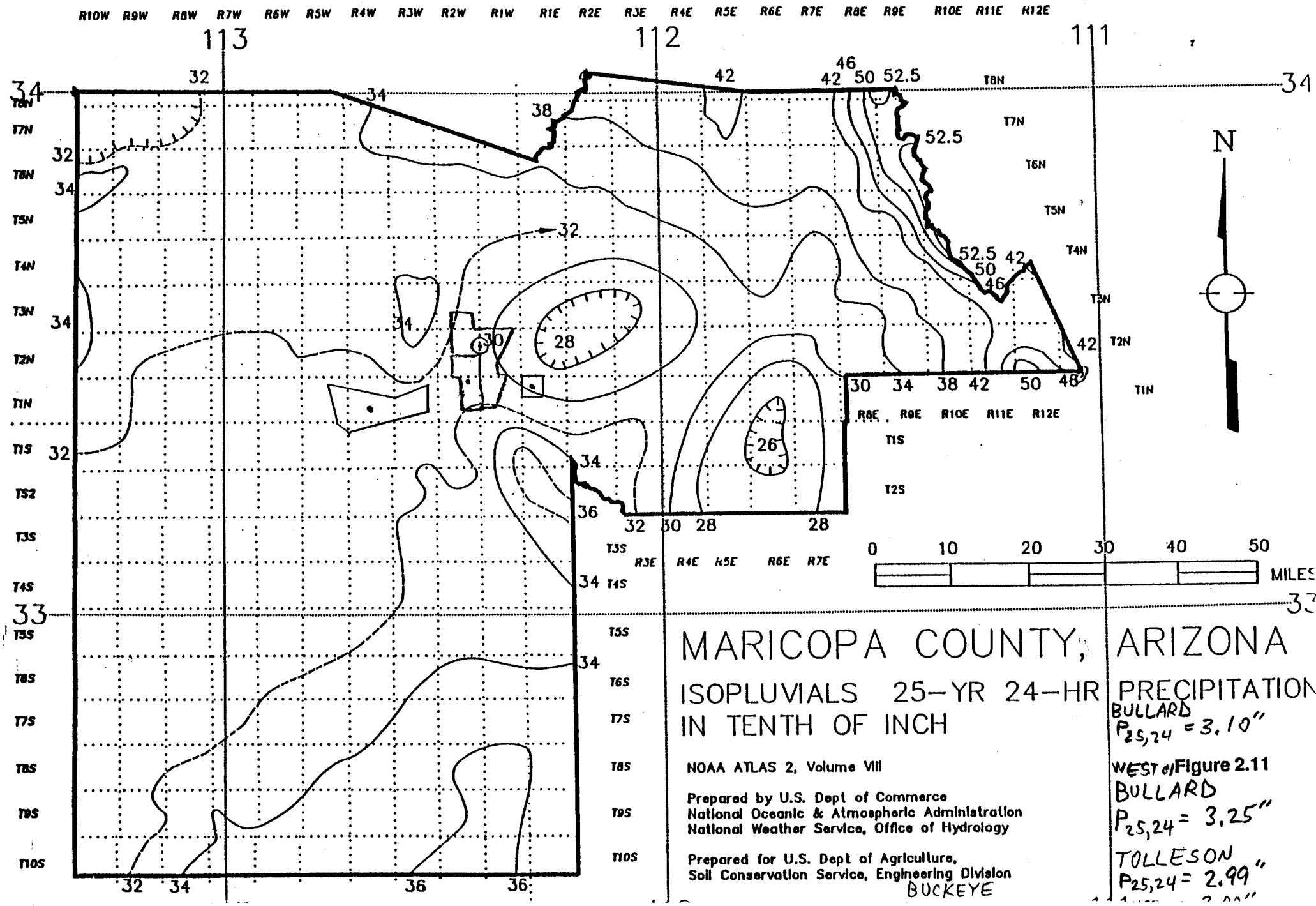

MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 10-YR 24-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
N
MILES
0 10 20 30 40 50
BULLARD
$P_{10,24}$ = 2.40"
WEST OF
BULLARD WASH
$P_{10,24}$ = 2.51"
TOLLESON
$P_{10,24}$ = 2.39"
USE 2.41"
BUCKEYE
$P_{10,24}$ = 2.51"

Figure 2.10



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 25-YR 24-HR PRECIPITATION IN TENTH OF INCH

NOAA ATLAS 2, Volume VIII

Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure 2.11

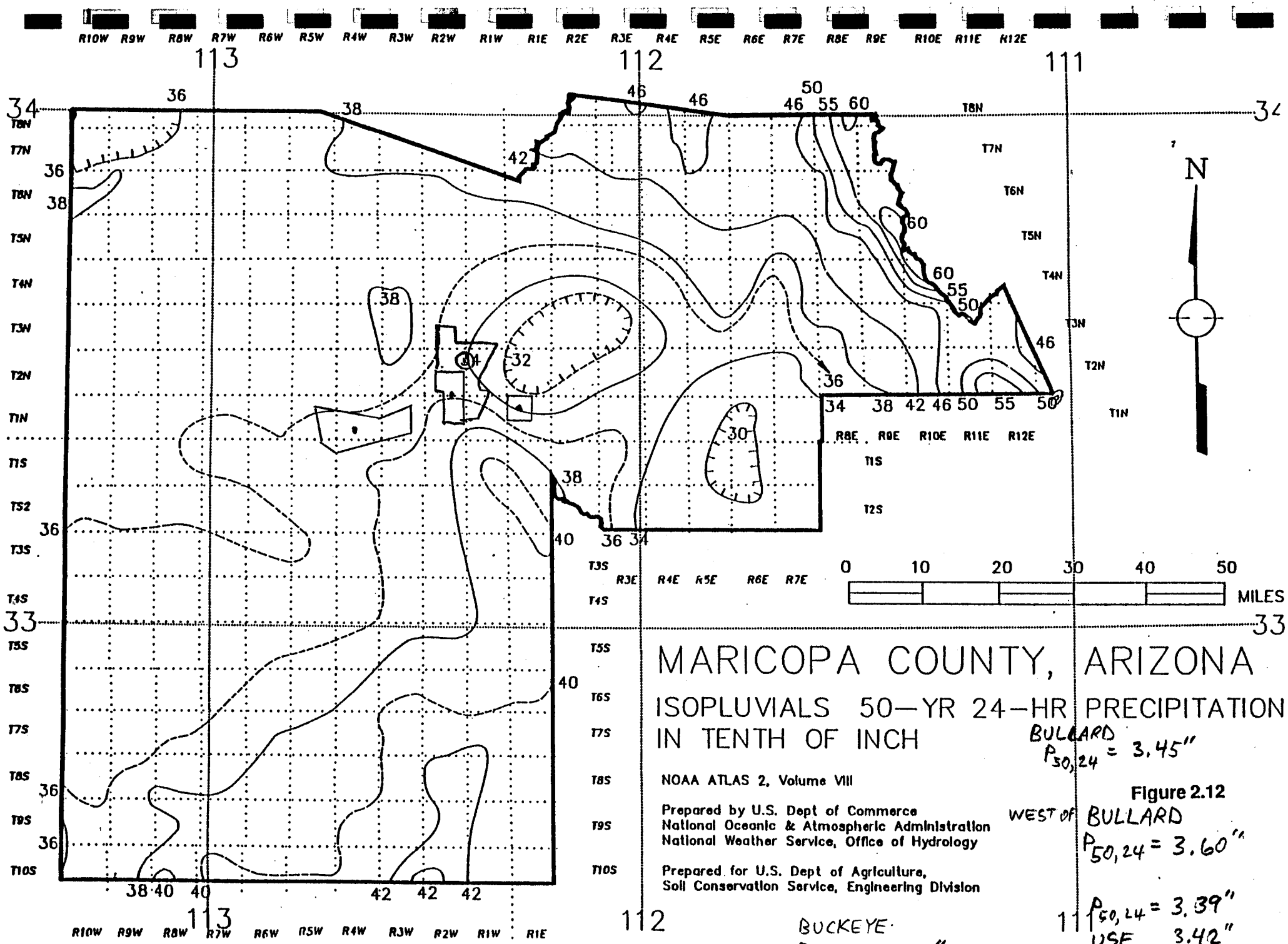

MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 50—YR 24—HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
N
0 10 20 30 40 50
MILES
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
113
112
111
34
33
BULLARD
$P_{50,24}$ = 3.45"
WEST OF BULLARD
$P_{50,24}$ = 3.60"
$P_{50,24}$ = 3.39"
USE 3.42"
BUCKEYE
$P_{50,24}$ = 3.62"

Figure 2.12

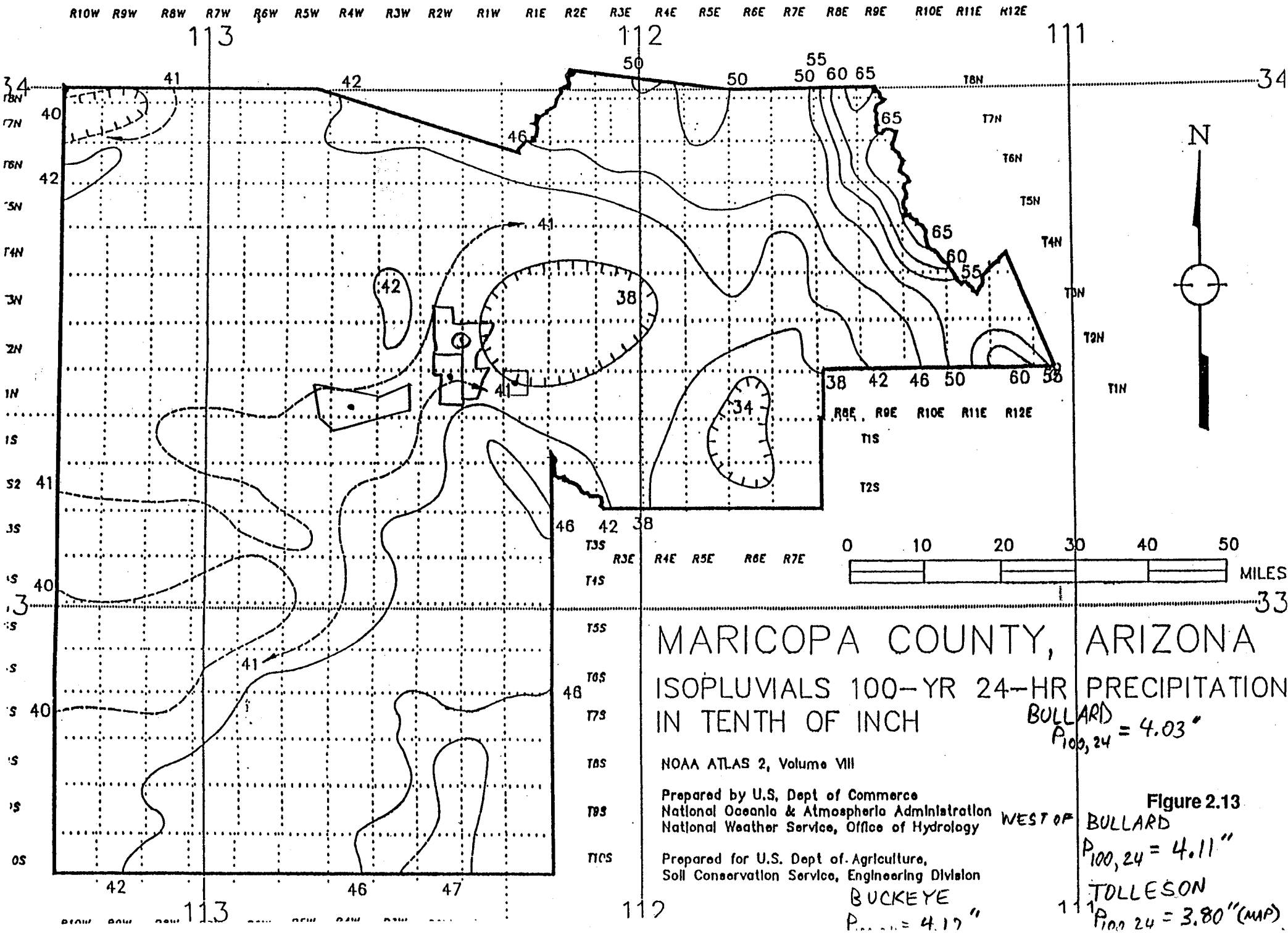

MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 100-YR 24-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
BULLARD
$P_{100,24}$ = 4.03"
WEST OF BULLARD
$P_{100,24}$ = 4.11"
TOLLESON
$P_{100,24}$ = 3.80" (MAP)
BUCKEYE
P... = 4.17"
N
MILES
0 10 20 30 40 50
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
113 112 111
34 33

Figure 2.13

Table 2.1a
Depth-Area Reduction Factors for 24-Hour Duration Rainfall

Area Square Miles	Ratio to Point Rainfall
0	1
10	0.94
20	0.91
30	0.90
40	0.88
50	0.87
60	0.86
70	0.856
80	0.855
90	0.846
100	0.842
110	0.838
120	0.834
130	0.833
140	0.829
150	0.825
200	0.817
300	0.80
400	0.79
500	0.78

SVERDRUP

JOB 115TH AVE – MC85 TO McDOWELL RD

COMPUTATIONS FOR QUANT CALCS. – NO BUILD

SHEET NO. 1 OF

DATE 1/29/97

BY RWM CHKD BDO

CHIP SEAL

10.363 (2) (91.44 − 31) = 1253 m^2

(10.363 + 4.267) ½ (198.12 − 91.44) = 780

(10.363 + 4.267) ½ (396 − 91.44) = 2228

(4.267) (396 − 198) = 845

(4.267) (2) (1390.74 − 396) = 8,489

(4.267 + 6.706) ½ (2) (1512.66 − 1390.74) = 1,338

(6.706) 2 (1630.68 − 1512.66) = 1,583

(6.706 + 4.267) ½ (2) (1752.60 − 1630.68) = 1,338

(4.267) (2) (2146.46 − 1752.60) = 3,361

(2.192 + 4.267) ½ (2538.60 − 2146.46) − (6.1 + 2.4) ½ (91) = 2840 (MEDIAN)

(4.267) (2203 − 2146.46) = 241

(14.021 + 4.267) ½ (2489.87 − 2203.46) = 2619

(14.021 + 15.24) ½ (2538.60 − 2489.87) = 713

NORTH OF I-10

(6.706) (2) (3167.37 − 2803.50) = 4,880

32,508 m^2

STRIPING 2 LINES

3167 − 31 = 3136

SVERDRUP

JOB 115TH AVE – MC 85 to McDOWELL RD

SHEET NO. 1 OF

DATE 12/30/96

COMPUTATIONS FOR QUANT CALCS. – MIN. BUILD

BY RWM CHKD BDO

WIDENING STRIP

75 mm (3") AC, 150 mm (6") ABC, PRIME COAT, FOG SEAL & SUBGRADE PREP

(396 − 213)(4.267)½	=	390
(1391 − 396)(4.267)	=	4246
(1513 − 1391)(4.267 + 1.829)½	=	372
(1631 − 1513)(1.829)	=	216
(1753 − 1631)(4.267 + 1.829)½	=	372
(2203 − 1753)(4.267)	=	1920
(2403 − 2203)(4.267)½	=	427
		7943 m²

7943 (.2) = 1588.6 ~~SAY~~ 1500 m³

CHIP SEAL

12.7 (2403 − 396) =	=	25,489
(1513 − 1391)(2.4)½	=	146
(1631 − 1513)(2.4)	=	283
(1753 − 1631)(2.4)½	=	146
		26,064 m²

STRIPING

2403 − 213 = 2190 m

CAR SPREAD SHEETS PREPARED 11/22/96/tjp

SUBGRADE PREPARATION AND PAVEMENT UNIT COST COMPUTATION SHEET

Unit Cost Derivation for Arterall 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	$8.00	$4.20
315.07000	Bituminous Prime Coat (0.4 gal per SY)	Ton	0.0016	$300.00	$0.48
	Tack Coat	SY	1	$0.16	$0.16
321.03100	Asphalt Concrete, C 3/4 (4")	Ton	0.2189	$25.00	$5.47
333.07100	Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$240.00	$0.10
301.02000	Subgrade Preparation (Under new pavement only)	SY	1	$2.50	$2.50
	Pavement and Subgrade Preparation Cost Per SY				$12.91
	Pavement and Subgrade Preparation Cost Per SQ M				$15.44
Rounded	Unit Cost Per SQ M for 100 mm over 250 mm			Total	Use $15.25

Calculated at 1.89 tons per CY for 1 SY of 10" AB (.5250 tons/SY)
Calculated at 8.0 lbs per gal for 1 SY of Prime (0.0016 Tons/SY)

Calculated at 1.97 Tons per CY for 1 SY of 4" AC (0.2189 Tons/ SY)
Calculated at 8.3 lbs per gal for 1 SY of Fog (0.0004 Tons/SY)
Variable; this work includes constructing fill sections and misc grading.

Unit Cost Derivation for 50 mm A C Overlay:		Metric	Actual	Used	See
4	Asphalt Concrete Thickness 50 mm	50 mm	1.969"	2"	Computations
					Below
Item #	*Description*	*Unit*	*Quantity*	*Unit Cost*	*Total*
	Tack Coat	SY	1	$0.16	$0.16
321.03100	Asphalt Concrete, C 3/4 (2")	Ton	0.1094	$25.00	$2.74
333.07100	Fog Seal (Diluted 50/50; 0.1 gal per SY)	Ton	0.0004	$240.00	$0.10
	2" Asphalt Overlay Per SY				$2.99
	50 mm Asphalt Overlay Per SQ M				$3.58
Rounded	Cost Per SQ M for 50 mm Overlay			Total	Use $3.60

Includes Surface Preparaation
Calculated at 1.97 Tons per CY for 1 SY of 2" AC (0.1094 Tons/ SY)
Calculated 8.3 lbs per gal for 1 SY of Fog (0.0004 Tons/SY)

SVERDRUP

JOB 115TH AVE – MC 85 TO McDOWELL RD

COMPUTATIONS FOR QUANT. CALCS. – LOW COST

SHEET NO. 1 OF

DATE 12/30/96

BY RWM CHKD SDO

ROADWAY EXC

Assume 0.3m (1') EXC. FOR NEW PVMT

(198 − 31)(1 + 6.5) ½	=	626
(396 − 66)(0 + 6.5) ½	=	1073
(396 − 198)(6.5)	=	1287
(1391 − 396)(6.5)2	=	12,935
(1513 − 1391)(6.5 + 4.1) ½ (2)	=	11,293
(1631 − 1513)(4.1)2	=	968
(1753 − 1631)(4.1 + 6.5) ½ (2)	=	1,293
(2146 − 1753)(6.5)(2)	=	5109
(2203 − 2146)(6.5)		370
(2436 − 2203)(6.5 + 0) ½	=	757
(2472 − 2146)(6.5 + 0) ½	=	1060
(2862 − 2804)(0 + 3.6) ½	=	104
(2977 − 2804)(0 + 3.6) ½	=	311
(3167 − 2862)(3.6)	=	1098
(3167 − 2977)(3.6)	=	684
		28,968

VAN BUREN

(1068 − 1000 − 11)(3.6)(2) + (1000 − 11 − 932)(3.6)(2)		828
(1160 − 1069)(3.6) ½ + (1401 − 1069)(3.6) ½ + (932 − 840)(3.6) ½ + (932 − 596)3.6(½)	=	1532
		31,328 m²

31,328 m²(0.3 m) = 9,398 say 9,000

SVERDRUP

JOB 115TH AVE — MC 85 TO McDOWELL RD

SHEET NO. 2 OF

DATE 12/30/96

COMPUTATIONS FOR QUANT. CALCS — LOW COST

BY RWM CHKD BDO

BORROW

NO BORROW ANTICIPATED

RETENTION BASIN EXC

BETW RR TRACKS & VAN BUREN	4 (1000)	=	4,000
BETW VAN BUREN & STA 1+889	1 (800)	=	800
BETW STA 1+889 & I-10	2 (900)	=	1,800
			6,600 m³

NEW PVMT

ARTERIAL SECTION : 100mm (4") AC, 250 mm (10") ABC, PRIME COAT TACK COAT, FOG COAT & SUBGRADE PREP

FROM ROADWAY EXC 31,328 m²

OVERLAY EXIST AC PVMT

(91-31)(10.3) 2		1236
(198-91)(10.3+4.3) ½	=	1781
(396-91)(10.3+4.3) ½	=	2226
(396-198)(4.3)		851
(1391-396)(4.3) 2	=	8557
(1513-1391)(4.3+6.7) ½ (2)	=	1342
(1631-1513)(6.7) 2	=	1581
(1753-1631)(6.7+4.3) ½ (2)	=	1342

SVERDRUP

JOB 115TH AVE – MCESS TO MCDOWELL RD

COMPUTATIONS FOR QUANT. CALCS. – LOW COST

SHEET NO. 3 OF

DATE 12/30/96

BY RWM CHKD BDO

(2146-1753)(4.3)(2) = 3,380

(2436-2342)(4.3+0)½ = 202

(2431-2146)(8.6+20.1)½ = 4090

(2862-2804)(0+6.7)½ = 194

(2957-2804)(0+6.7)½ = 512

(3167-2862)(6.7) = 2044

(3167-2957)(6.7) = 1407

29,745

VAN BUREN

(1069-1000-11)(6.7)(2)+(1000-11-932)(6.7)(2) = 1541

(1160-1069)(6.7+4.3)½+(1401-1069)(6.7+4.3)½+(932-840)(6.7+4.3)½ = 2833

+(932-596)(6.7+4.3)½ = 1848

35,967

SAY 36,000

CURB & GUTTER

355+358+55(4) (V.B.) = 933

TRAFFIC STRIPING

(3167-33)+(1401-596) = 3939

CATCH BASINS

I-10 to McDOWELL 8 CATCH BASINS

Shoulder Inlets 14

22

MANHOLES

I-10 to McDOWELL 4

SVERDRUP

JOB 115TH AVE - MC85 TO McDOWELL RD SHEET NO. 4 OF

DATE 12/30/96

COMPUTATIONS FOR QUANT. CALCS - LOW COST BY RWM CHKD BDO

610 mm RGRCP & SMALLER

RETENTION BASINS 7(39.6) = 277

STORM DRAIN (I-10 TO McDOWELL) 450 + 90 = 540

Driveways 10 + 7 + 7 + 10 + 6 + 6 + 8 + 5 + 5 + 6 + 8 + 8 + 5 + 6 + 7 + 20 = 124

1001

Helwig

IRR. DITCH

CONC DITCH

42" 24" 24" 42" 30"

1007.5 + 15 + 214 + 315 + 336 = 1887.5 ≅ 1900

229 - 24"

336 - 30"

1322.5 - 42"

IRRIGATION JUNCTION BOXES

Sta 0+780 ± Rt 1

Sta 2+375 Lt

BOX CULVERT

@ Sta 0+121 3-10'x5' x100 = 3000 SF = 279 SM

279 ($300/SM) = 83,700 SAY $85,000

SVERDRUP

JOB 115TH AVE - MC85 TO McDOWELL RD

COMPUTATIONS FOR QUANT. CALCS - LOW COST

SHEET NO. 5 OF

DATE 2/27/97

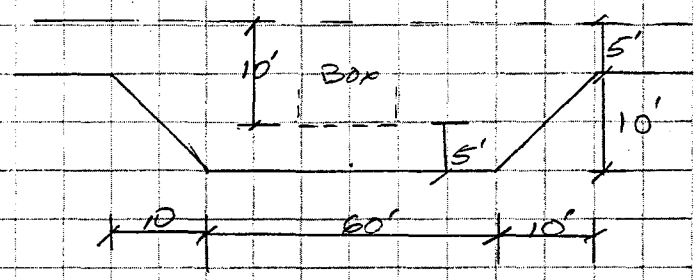
BY RWM CHKD BDO

20" GAS LINE RELOCATION

BOX CULVERT NORTH OF RR

3-10x5 = 30' + 15(2) = 60'

5' VERTICAL CLEARANCE REQ'D BY EL PASO



TOTAL NEW PIPE = 80'

$400/LF = GIVEN BY EL PASO FOR SMALL QUANTIES BLOWING OUT PIPES, SHUTTING PIPES OFF REROUTING GAS, LOST GAS PRODUCT

SAY 25m

$32,000/25 = $1280/m

SVERDRUP

JOB 115TH AVE – MC 85 TO McDOWELL RD

SHEET NO. 1 OF

DATE 12/30/96

COMPUTATIONS FOR QUANT. CALCS – FULL COST

BY RWM CHKD BDO

ROADWAY EXC

ASSUME 0.3m (1') EXC FOR NEW PVMT

(198 – 25)(1+6.0)½	= 606
(396 – 198) 6.0	= 1188
(396 – 25)(0+6.0)½	= 1113
(1391 – 396)(6.0)(2)	= 11,940
(1513 – 1391)(6.0+3.6)½(2)	= 1,171
(1631 – 1513)(3.6) 2	= 1850
(1753 – 1631)(3.6+6.0)½(2)	= 1171
(2146 – 1753)(6.0)(2)	= 4716
(2203 – 2146) 6.0	= 342
(2532 – 2146)(6.0+0)½	= 1158
(2532 – 2203)(6.0+0)½	= 1987
(2862 – 2804)(3.6)½	= 104
(2957 – 2804)(3.6)½	= 275
(3167 – 2862)(3.6)	= 1098
(3167 – 2957)(3.6)	= 756
(3233 – 3167)(3.6) 2	= 475
(3299 – 3233)(3.6)½	= 119
(3618 – 3233)(3.6)½	= 693

SVERDRUP

JOB 115TH AVE – MC85 TO MCDOWELL RD

COMPUTATIONS FOR QUANT CALCS. – FULL COST

SHEET NO. 2 OF

DATE 12/30/96

BY RWM CHKD BDD

VAN BUREN (FROM L.C.) 828 + 1532 = 2360 m²

31,122 m²

31,122 (.3) = 9,337 m³ SAY 9,000

BORROW

NO SIGNIFICANT BORROW REQ'D

NEW PVMT

ARTERIAL SECTION (SEE L.C.)

FROM ROWY EXC - 29,592

OVERLAY EXIST PVMT

FROM L.C. 35,967

NORTH OF MCDOWELL (3233-3167)(6.7)(2) = 884

(3353-3233)(6.7+4.3)½(2) = 1320

(3618-3353)(4.3)(2) = 2279

40,450

SAY 40,500

CURB & GUTTER

1175 + 1175 + 1331.5 + 1331.5 + 355 + 358 = 5,726

STRIPING

(3618 - 25) + (1401 - 596) = 4,398

SVERDRUP

JOB 115TH AVE – MC 85 TO McDOWELL RD

COMPUTATIONS FOR QUANT. CALCS. – FULL COST

SHEET NO. 3 OF

DATE 12/30/96

BY RWM CHKD RDD

TRAFFIC SIGNALS

VAN BUREN	1
McDOWELL	1/2

CATCH BASINS

I-10 to McDOWELL	8
1+889 to I-10	10
Van Buren to Sta 1+889	4
RR Tracks to Van Buren	24
	46

MANHOLES

I-10 to McDOWELL	4
Sta 1+889 to I-10	5
VAN BUREN TO Sta 1+889	2
RR tracks to Van Buren	12
	23

610 mm RGRCP OR SMALLER

I-10 to McDOWELL		540
Sta 1+889 to I-10	340 + 110	450

SVERDRUP

JOB 115TH AVE – MC 85 TO McDOWELL RD

COMPUTATIONS FOR QUANT. CALCS – FULL COST

SHEET NO. 4 OF

DATE 12/30/96

BY RWM CHKD BDO

VAN BUREN TO STA 1+889 300 + 45 = 345

RR TRACKS TO VAN BUREN 275 275

1620 m

760 mm + 910 mm (30" to 36") RGRCP

STA 1+889 to I-10 340 340

RR TRACKS TO VAN BUREN 750 + 750 1500

1840 m

Hdwl

IRR 2 + 1 = 3

CONC IRR DITCH

24" 24" 30"
15 + 214 + 336 = 565

DIRT IRR DITCH

3 286

BOX CULVERTS

@ STA 0+121 3-10'x5' x 100' = 3000
@ STA 1+889 2-8'x4' x 100' = 1600
4600 SF = 427 M²

427 M² ($300/m²) = $128,100 / 2 = 64,050 SAY $65,000

SVERDRUP

JOB 115TH AVE - MC85 TO McDOWELL RD

SHEET NO. 5 OF

DATE 2/27/97

COMPUTATIONS FOR QUANT. CALCS - FULL COST

BY RWM CHKD BDO

20" GAS LINE RELOCATION

BOX CULVERT NORTH OF RR

SEE LC

BOX CULVERTS NORTH OF VAN BUREN

2 - 8 x 4 = 16 + 15(2) = 46 SAY 50'

50 + 20 = 70

60 + 20 = 150' = 45.72 = 45m

SVERDRUP

JOB 115TH AVENUE – MC85 to McDOWELL RD

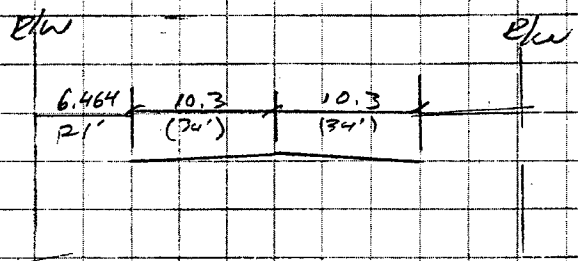
COMPUTATIONS FOR AUXILIARY LANE R/W

SHEET NO. 1 OF

DATE 1/29/97

BY PWM CHKD BDD

115TH @ MC85



FULL COST

ADD SB DUAL ~~LEFT~~ + 3.0 m (10') = 4.2 + 3.0 = 7.2 m (24') WIDE ~~LEFT~~ TURN LANE

ADD SB RT + 3.6 m (12') =

6.6 m (22')

REQ'D LT TURN LENGTH = 67.5 m (221.5') (TRAFFIC ANALYSIS REPORT, p 5-7)

" RT TURN " = 97.5 m (320') (" " " ")

TAPER LENGTH 40 m (131')

137.5 m (451')

107.5 m (353')

WEST SIDE R/W REQ'D

EXIST R/W = 15.24 m (50')

REQ'D R/W = 55' + 12' + 10' (½) = 72' say 70' (21.336 m)

× 137.5 m (450')

EAST SIDE R/W REQ'D

EXIST R/W = 13.716 m (45')

REQ'D R/W = 55 + 10 (½) = 60' × 107.5 m (353')

325' Thru parcel 101-01-001B

SVERDRUP

JOB 115TH AVENUE – MC85 TO MCDOWELL RD

SHEET NO. 2 OF

DATE 1/29/97

COMPUTATIONS FOR AUXILIARY LANE R/W

BY RWM CHKD ASDO

115TH @ VAN BUREN

NO AUXILIARY LANES REQ'D FOR 2020 VOLUMES (TRAFFIC STUDY)

115TH @ McDOWELL RD

FULL COST:

NB

		WEST	EAST
RT TURN LANE	+3.6m (12')	12+5' = 17	5'
DUAL LEFT TURN LANE	+3.0m (10')		
49m + 40 = 89m (292')		70' EAST 60' WEST	

SB NO AUXILIARY LANE REQ'D

WB

RT TURN LANE +3.6m (12') = 55+12 = 67 USE 65'

52.5 + 40 = 92.5m (303')

EB

		SOUTH	NORTH
DUAL RT TURN LANES	7.3 (24')	24+5 = 29'	
DUAL LT TURN LANES	3.0m (10')		5'
		55+29 = 84'	55+5 = 60
SOUTH LENGTH = 105m + 50 = 155m (508')		USE 85'	
NORTH LENGTH = 49 + 40 = 89m (292')			65' NORTH ALREADY

SVERDRUP

JOB 115TH AVE — MC 85 TO McDOWELL RD

SHEET NO. 2 OF

DATE 12/30/96

COMPUTATIONS FOR RETENTION BASIN SIZING

BY RWM CHKD

BETW. RR TRACKS & VAN BUREN

VOL = 1000 m^3

TRY X = 15

$L = 1000/22.5 = 44.4 = 45m \times 22.5$

$156667 - 15.24 = 1551.43/8 = 194 \cong 200m$

SVERDRUP

JOB 115TH AVE - MC85 TO McDOWELL RD

SHEET NO. 1 OF

DATE 12/30/96

COMPUTATIONS FOR RETENTION BASIN SIZING

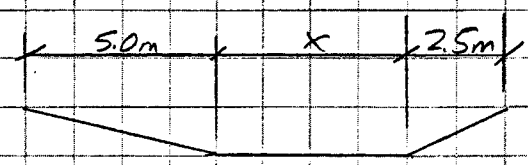
BY RWM CHKD RSO

BETW. I-10 & LOW PT @ 1+889.76

VOL = 900 m³ x 2 BASINS

ASSUME RET. BASIN DEPTH OF 1.2m (4')

4:1 FRON SLOPE & 2:1 BACK SLOPE



SLOPE CROSS SECTION AREA = $5.0(1.2)\frac{1}{2} + 2.5(1.2)\frac{1}{2} = 4.5\,m^2$

SPACE EQUIDISTANCE FROM LOW SPOT TO I-10

$2555.63 - 1889.76 = 665.87\,m / 4 = 166.5\,m$

TRY X = 20 m $20(1.2) + 4.5 = 28.5$

$L = 900/28.5 = 31.58\,m$

TRY x = 15m $15(1.2) + 4.5 = 22.5$

$L = 900/22.5 = 40\,m$ 15+5+2.5

40 x 22.5 m

BETW. VAN BUREN & LOW SPOT NORTH

VOL = 800 m³

TRY x = 15

$L = 800/22.5 = 35.5 = 36 \times 22.5$

$1889.76 - 1566.67 = 323\,m$

APPENDIX F

MCDOT ROAD SUMMARY REPORT

Maricopa County Department of Transportation
Road Management System
Road Summary Report

Count: 1

11/6/96
10:36 A

ROAD: 115th Ave

FROM: Avondale City Limits

TO: Mc Dowell Rd

Maintenance District:	MAINTENANCE DISTRICT 3	Jurisdiction:	
ARMS Classification:	SECTIONLINE	Supervisors District:	
Subdivision/Unit:			

Miles: 0.99 | # of Lanes: 2 | Road Width: 28.00 | Curb Gutter: No

LEFT SHOULDER

Type: LEFT SHOULDER WIDTH
Width: 10

MEDIAN

Type:
Width:

RIGHT SHOULDER

Type: RIGHT SHOULDER WIDTH
Width: 10

TRAFFIC

ADT:	* 3159
ADT Date:	06/15/1995
Peak Daily Traffic:	Hour: 12:00 AM
% Trucks:	2.0
% Trucks Date:	08/15/1995
Projected ADT:	
Projected Date:	

SURFACE

Type:	ASPHALTIC CONCRETE
Thickness:	2.00 inches
Date Paved:	02/04/1986
Base Type:	AGGREGATE BASE COURSE
Base Thickness:	10.00 inches
Last Work Date:	10/13/1992
Type of work:	CHIP SEAL

PCR

89 | Type: Field | Date: 07/11/1996
Rated By: Shewak, Stephen G

IRI

167.00 | Date: 09/19/1995
IRI
Rated By: Shewak, Stephen G

SUFFICIENCY

83 | Date: 01/01/1994
Rated By: Shewak, Stephen G

CAR# C97-2812-05-06

Maricopa County Department of Transportation
Road Management System
Road Summary Report

11/6/96
10:36 A

Count: 1

ROAD: 115th Ave

FROM: Avondale City Limits

TO: Mc Dowell Rd

CR DETAIL

	Deduct Value	Extent	Severity	Rating
ock Cracks	0	NONE	NONE	0
Excess Asphalt	3	Wheel paths < 50% lengt	Film thin	1
tigue Cracks	0	NONE	NONE	0
ongitudinal Cracks	0	NONE	NONE	0
tching	0	NONE	NONE	0
veling	0	NONE	NONE	0
Rutting	0	NONE	NONE	0
oving/Pushing/Corr.	5	Between intersections onl	Ride Discomfort Mild	2
ransverse Cracks	3	Spacing > 50 feet	Width < 3/8"	1

UFFICIENCY DETAIL

	Deduct Value	Extent	Severity	Rating
ttleneck	0	None	Low	0
Drainage	5	Poor	High	5
rizontal Sight	0	Good	Low	0
ane	0	Lane width = 14 ft	None	0
oulder	1	Left & Right Shoulder Wid	< or = 10 ft	1
rtical Sight	0	Good	Low	0

Maricopa County Department of Transportation
Road Management System
Road Summary Report

11/6/96
10:36 A

Count: 1

ROAD: 115th Ave

FROM: State Route 85

TO: Avondale City Limits

Maintenance District:	MAINTENANCE DISTRICT 3	Jurisdiction:	
RMS Classification:	SECTIONLINE	Supervisors District:	
Subdivision/Unit:			

Miles: 0.98 # of Lanes: 2 Road Width: 28.00 Curb Gutter: No

LEFT SHOULDER

Type: LEFT SHOULDER WIDTH
Width: 10

MEDIAN

Type:
Width:

RIGHT SHOULDER

Type: RIGHT SHOULDER WIDTH
Width: 10

TRAFFIC

ADT: *	3693
ADT Date:	06/02/1995
Peak Daily Traffic:	Hour: 12:00 AM
% Trucks:	
%Trucks Date:	
Projected ADT:	
Projected Date:	

SURFACE

Type:	ASPHALTIC CONCRETE
Thickness:	2.00 inches
Date Paved:	02/04/1986
Base Type:	AGGREGATE BASE COURSE
Base Thickness:	10.00 inches
Last Work Date:	10/13/1992
Type of work:	CHIP SEAL

PCR

86 Type: Field Date: 07/11/1996
Rated By: Shewak, Stephen G

IRI

168.00 Date: 09/19/1995
IRI
Rated By: Shewak, Stephen G

SUFFICIENCY

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

CAR# C97-2812-05-06

Generated by: Rick Boeger

Maricopa County Department of Transportation
Road Management System
Road Summary Report

11/6/96
10:36 A

Count: 1

ROAD: 115th Ave

FROM: State Route 85

TO: Avondale City Limits

PCR DETAIL

	Deduct Value	Extent	Severity	Rating
Block Cracks	0	NONE	NONE	0
Excess Asphalt	3	Wheel paths < 50% lengt	Film thin	1
Fatigue Cracks	0	NONE	NONE	0
Longitudinal Cracks	6	Centerline single	Width > 3/8"	4
Patching	0	NONE	NONE	0
Raveling	0	NONE	NONE	0
Rutting	0	NONE	NONE	0
Shoving/Pushing/Corr.	5	Between intersections onl	Ride Discomfort Mild	2
Transverse Cracks	0	NONE	NONE	0

SUFFICIENCY DETAIL

	Deduct Value	Extent	Severity	Rating
Bottleneck	0	None	Low	0
Drainage	5	Poor	High	5
Horizontal Sight	0	Good	Low	0
Lane	0	Lane width = 14 ft	None	0
Shoulder	1	Left & Right Shoulder Wid	< or = 10 ft	1
Vertical Sight	0	Good	Low	0

APPENDIX G

MCDOT ENVIRONMENTAL OVERVIEW

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

TRANSPORTATION PLANNING DIVISION

MEMORANDUM

DATE: December 11, 1996

TO: Tom Phelan, P.E. Project Manager
FROM: Kelly McMullen, Air Quality Analyst
SUBJECT: Candidate Project Assessments--Environmental Overview

I have the following comments regarding the candidate projects we looked at last week:

Maricopa County Route 85 from Miller Rd. To S.R. 85 @ Ogelsby Rd.

This project is to widen the existing road from two to four lanes, plus center turn lane and bicycle lanes from the western edge of Buckeye to Ogelsby Rd. The area is primarily agrarian, with mostly previously disturbed areas. Predominant vegetation consists of desert broom, creosote, mesquite, palo verde, and some cacti. Riparian habitat is limited and there is no evidence of any wetlands. No threatened or endangered species are likely to occur in the project area. There is potential for cultural resources, therefore, a cultural resources survey will need to be completed as part of the environmental clearance process. There is an old gas station at the corner of MC 85 and Miller Rd. which is currently being used for a propane refilling station. The gasoline pumps have been removed. Testing for contamination will be necessary. Several old properties along the route appear to have potential historic value(including a WPA headwall at Rooks Rd.) and will need to be evaluated. Stormwater discharge from the project is limited on one side by the railroad and by the Buckeye irrigation canal, and therefore will be a design issue as well as the NPDES permit requirement. The addition of bike lanes will have air quality benefits by limiting re-entrained dust as the current road has dirt shoulders.

The widening of the road will result in minimal adverse impact to the natural environment. During construction, impacts to the vegetation should be limited to that necessary to conduct the construction activities.

Maricopa County Route 85, Litchfield Rd to Cotton Lane.

This project is to widen the existing road from two to four lanes, plus center turn lane and bicycle

lanes. The road passes through largely rural agricultural land that is previously disturbed. Predominant vegetation consists of desert broom, creosote, mesquite, palo verde, and some cacti. Riparian habitat is limited and there is limited evidence of wetlands at Bullard Wash crossing. No threatened or endangered species are likely to occur in the project area. There is potential for cultural resources, therefore, a cultural resources survey will need to be completed as part of the environmental clearance process. Stormwater discharge from the project is limited on one side by the railroad, and on the other side by the Buckeye irrigation canal, and therefore will be a design issue as well as the NPDES permit requirement. This will need to be coordinated with Maricopa County Flood Control district, as they have a project to construct a drainage structure north of the railroad, moving the bridge from Bullard Wash to a more westerly location, where the drainage will come under the railroad and roadway. The addition of bike lanes will have air quality benefits by limiting re-entrained dust as the current road has dirt shoulders.

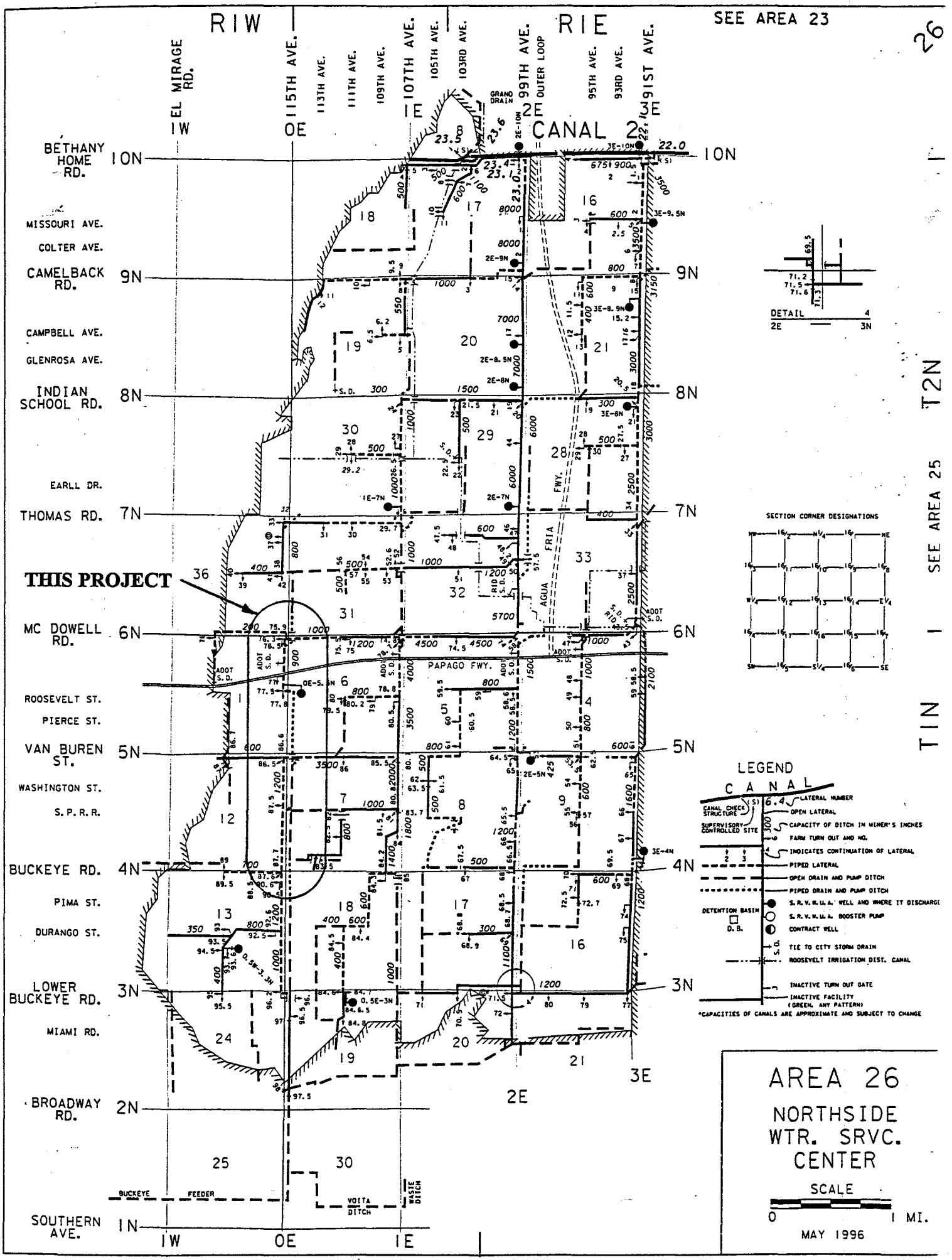
The roadway construction will result in minimal adverse impact to the natural environment. During construction, impacts to the vegetation should be limited to that necessary to conduct the construction activities.

115th Avenue, MC85 to McDowell Rd.

This project proposed to widen the roadway from 2 lanes to four lanes with center turn lane and bicycle lanes. The natural environment for the area has all been disturbed as agricultural fields. Predominant vegetation consists of desert broom, creosote, mesquite, palo verde, and some cacti. Riparian habitat is limited and there is no evidence of wetlands. No threatened or endangered species are likely to occur in the project area. There is potential for cultural resources, therefore, a cultural resources survey will need to be completed as part of the environmental clearance process. There are a few houses close to the roadway that may be impacted. The addition of bike lanes will have air quality benefits by limiting re-entrained dust as the current road has dirt shoulders. This project will eliminate a bottleneck, as 115th Ave. is currently four lane at both ends of the project.

APPENDIX H

IRRIGATION FACILITY MAP


SEE AREA 23
26
RIW
RIE
EL MIRAGE RD.
115TH AVE.
113TH AVE.
111TH AVE.
109TH AVE.
107TH AVE.
105TH AVE.
103RD AVE.
99TH AVE.
95TH AVE.
93RD AVE.
91ST AVE.
GRAND DRAIN
OUTER LOOP
CANAL 2
BETHANY HOME RD.
MISSOURI AVE.
COLTER AVE.
CAMELBACK RD.
CAMPBELL AVE.
GLENROSA AVE.
INDIAN SCHOOL RD.
EARLL DR.
THOMAS RD.
THIS PROJECT
MC DOWELL RD.
PAPAGO FWY.
ROOSEVELT ST.
PIERCE ST.
VAN BUREN ST.
WASHINGTON ST.
S. P. R. R.
BUCKEYE RD.
PIMA ST.
DURANGO ST.
LOWER BUCKEYE RD.
MIAMI RD.
BROADWAY RD.
SOUTHERN AVE.
BUCKEYE FEEDER
VOITA DITCH
WASTE DITCH
AGUA FRIA FWY.
RIO S.D.
ADOT S.D.
SEE AREA 25
T2N
T1N
DETAIL 4
2E 3N
SECTION CORNER DESIGNATIONS
LEGEND
CANAL
LATERAL NUMBER
OPEN LATERAL
CANAL CHECK STRUCTURE
SUPERVISORY CONTROLLED SITE
CAPACITY OF DITCH IN MINER'S INCHES
FARM TURN OUT AND NO.
INDICATES CONTINUATION OF LATERAL
PIPED LATERAL
OPEN DRAIN AND PUMP DITCH
PIPED DRAIN AND PUMP DITCH
DETENTION BASIN
D.B.
S.R.V.W.U.A. WELL AND WHERE IT DISCHARGE
S.R.V.W.U.A. BOOSTER PUMP
CONTRACT WELL
TIE TO CITY STORM DRAIN
ROOSEVELT IRRIGATION DIST. CANAL
INACTIVE TURN OUT GATE
INACTIVE FACILITY (GREEN, ANY PATTERN)
*CAPACITIES OF CANALS ARE APPROXIMATE AND SUBJECT TO CHANGE
AREA 26
NORTHSIDE WTR. SRVC. CENTER
SCALE
0
1 MI.
MAY 1996