

Appendix C

Drainage Analysis

DRAFT- MARCH 2003

NAPLES PARK COMMUNITY CHARACTER STUDY
Preliminary Engineering Opinion of Probable Construction Cost
Analysis
Potential Drainage Solutions
11/21/2002
EXHIBIT A

Alternatives

The most current drainage study, "Drainage Study of Naples Park Area Drainage System," prepared by Agnoli, Barber, and Brundage, Inc. (ABB) in June 1988, focused on improvements to the Primary drainage system between 91st and 92nd Avenues and also along 8th Street. That study, and subsequent physical improvements, (replacing the major outfall ditches there with an underground storm drain) were possible without adding expensive water quality treatment because of the role that the roadside swales play in cleansing stormwater before it flows into the new storm drain. However, roadside swales often preclude other important public improvements, such as sidewalks and street trees. Additional consideration was given to alternatives to roadside swales that can provide equivalent water quality treatment.

Three alternatives are considered by this analysis. They are:

- A. Completion of the Phase 2 elements of the Naples Park Drainage Study as stated in the 1988 study;**
- B. Completion of the improvements made possible by Collier County Ordinance 98-1.**
- C. Modification of B, above, implementing new technology.**

Alternative A.

Alternative A includes the work necessary to address the existing drainage issues in Naples Park as designed and estimated in the Naples Park Drainage Study of 1998. These improvements consist of regrading swales and replacing damaged and undersized culverts in approximately 1/3 of the Naples Park area.

A cost opinion of this work was presented in the Study. Approximately \$2,360,000 was estimated in 1988 dollars for these improvements. There has been an estimated increase in construction cost of 53% (CPI) in the past 14 years since the Report was issued, yielding a potential cost of \$3,610,800 in 2003 construction dollars for these improvements.

There are roughly 26 miles of secondary roads within Naples Park. The estimated cost per linear foot of roadway for this option is, therefore, approximately \$26.30/LF on an overall basis. This cost would break down to approximately \$13.15 per front foot assuming work would occur on both sides of the street.

Since these improvements only affect 1/3 of the project, the cost per affected road foot would be approximately \$79 per linear foot of roadway or \$40.00 per affected lot front foot.

This option will NOT enclose the existing open drainage system.

Alternative B.

Collier County Ordinance No. 98-1 was created to address the necessary requirements of roadside swale enclosure within Naples Park. The special cross section included within the Ordinance would allow for all of the swales within the project to be enclosed using a "Rock Trench" design incorporating a slotted pipe located under a shallow swale for local drainage purposes. This design would serve both water quality and storm protection purposes.

This option WOULD enclose all open swales.

Item	Amount per LF	Unit	LF	Cost
Fill	\$1	CY/LF	264,000	\$264,000
Sodding	\$20	SF/LF	264,000	\$5,280,000
Rock Trench W/Slotted Pipe	\$49	LF	264,000	\$12,936,000
Swale Grading	\$2	LF	264,000	\$528,000
Utility Relocates	\$20	LF	264,000	\$5,280,000
Inlets	\$20	LF	264,000	\$5,280,000
Driveway Repairs	\$10	LF	264,000	\$2,640,000
	\$122		Total	\$32,155,200
	Per front foot			plus soft costs *
	\$61			
	Per road LF			

*Soft costs could range from 20 to 30% for surveys, design, permitting, inspections, financing expenses and contingencies.

Alternative C.

This alternative is a modification of alternative B, and implements the use of some relatively new technology know as inlet skimmer boxes. A manufacturer's cut sheet of the device is shown on page 5.7.

This option WOULD enclose all open swales.

Item	Amount per LF	Unit	LF	Cost
Fill	\$1	LF	264,000	\$264,000
Sodding	\$20	LF	264,000	\$5,280,000
Pipe (18"-24")	\$26	LF	264,000	\$6,864,000
Swale Grading	\$2	LF	264,000	\$528,000
Utility Relocates	\$20	LF	264,000	\$5,280,000
Inlets incl. Skimmer	\$38	LF	264,000	\$10,032,000
Driveway Repairs	\$10	LF	264,000	\$2,640,000
	\$117		Total	\$30,835,200
	per front foot			plus soft costs*
	\$58			
	per road LF			

*Soft costs could range from 20 - 30% for surveys, design, permitting, inspections, financing expenses and contingencies.

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GENERAL NOTES:

1. THIS DETAIL TO BE USED IN CONJUNCTION WITH THE PROPOSED CONDITIONS DRAINAGE MAPS FOR NAPLES PARK AS PREPARED BY AGNOLI BARBER & BRUNDAGE, INC. FILE NO. 1795 FOR ISSUANCE OF COLLIER COUNTY PERMIT. THIS DETAIL IS NOT APPLICABLE TO 1116 AVE.
2. THE CONTRACTOR/COUNTY SHALL NOTIFY ALL APPROPRIATE UTILITY COMPANIES BEFORE BEGINNING CONSTRUCTION AND SHALL HAVE ALL SERVICE LINES LOCATED AND FLAGGED PRIOR TO EXCAVATION.
3. 16" SLOTTED ROP SHALL BE UTILIZED FOR UP TO 1 BLOCK FOR THE MOST UPSTREAM BLOCK BEGINNING AT THE HIGH POINT OF THE DRAINAGE DITCH, SUCH AS FROM 6TH TO 7TH STREET AS THE AVENUE DRAINS TOWARD 6TH STREET.
 24" OR 18"x30" SLOTTED ROP SHALL BE UTILIZED DOWNSTREAM OF THE FIRST CONTINUING FULL BLOCK LENGTH ONCE THE LENGTH OF THE DRAINAGE AREA EXCEEDS 1 FULL BLOCK.
 WHEN USING 24" OR 18"x30" SLOTTED ROP, THE ROCK TRENCH DIMENSIONS SHALL BE ADJUSTED TO PROVIDE 1" OR ROCK ON BOTH SIDES OF THE PIPE AND 6" OF ROCK ON THE TOP AND BOTTOM OF THE PIPE. THE TYPE C WELLS SHALL BE ROTATED AS NECESSARY TO ACCEPT THE LARGER PIPE SIZE.
4. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE SLODED WITH THE SAME TYPE SOG AS THE REMAINDER OF THE YARD. FINISHED ELEVATIONS MUST NOT PROJECT ABOVE THE EDGE OF PAVEMENT AND SHALL BE IN CONFORMANCE WITH THIS DETAIL AND THE COLLIER COUNTY PERMIT.
5. PERFORATED SMOOTH INTERIOR--WALLED HIGH DENSITY POLYETHYLENE OR PERFORATED ALUMINIZED STEEL TYPE 2 SMALL RIB (14 GAUGE MINIMUM) PIPE MAY BE USED AS AN ALTERNATIVE TO REINFORCED CONCRETE PIPE.

COLLIER COUNTY

BY: _____ P.E.
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 NAPLES, FLORIDA 34108

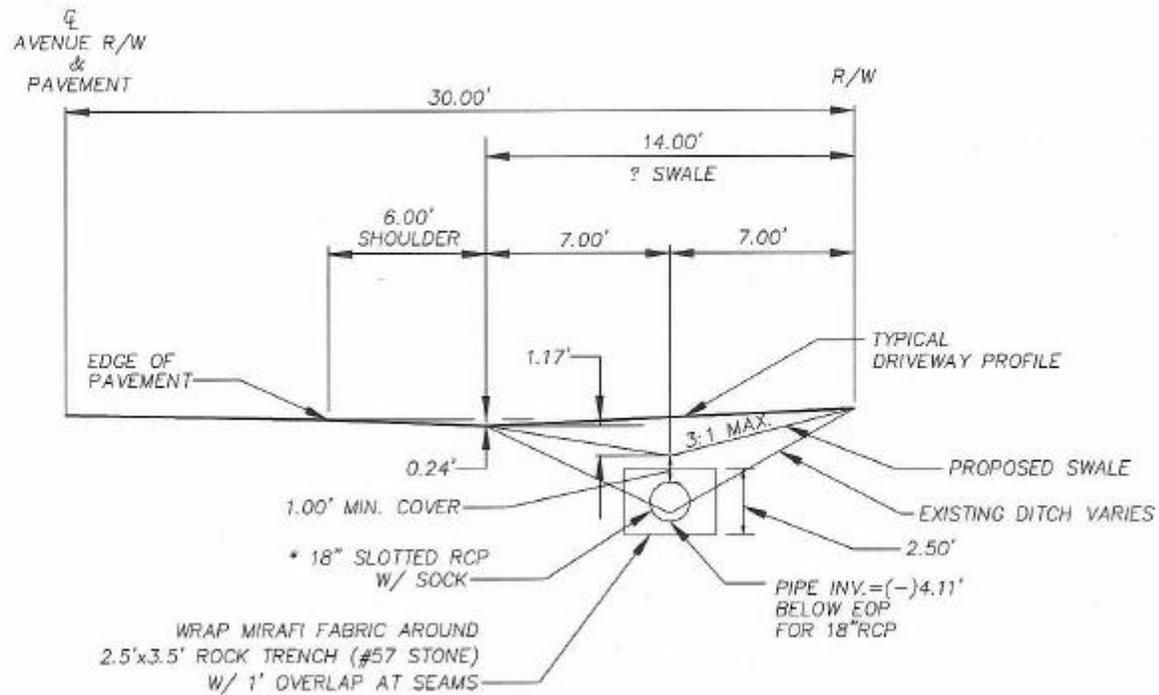
3301 TAMiami TRAIL EAST
 NAPLES, FLORIDA 34112
 NAPLES PARK
 SECONDARY DRAINAGE SYSTEM
 DATE: FEB. 10, 1997
 SHEET: 1 OF 3

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3301 TAMiami TRAIL EAST
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SECTION A-A FOR AVENUES

SCALE: 1"=5'