DRAINAGE REPORT

for:

Castro Residence
12715 Rolling Road Drive, Pinecrest, FL.

Portion of Lot 6, Block 2 “TOWN AND RANCH ESTATES” (Plat Book 50, Page 46)

Section 13, Township 55 South, Range 40 East,

Village of Pinecrest, Florida

September, 2024

Revised June, 2025

Prepared by:

DEVECON, INC.
8006 S.W. 173rd Terrace
Palmetto Bay, Fl. 33157
(305) 989-0587

Ricardo Herrera

Digitally signed by Ricardo Herrera
Date: 2025.06.05 16:04:00 -04'00'

Ricardo Herrera, P.E.

State of Florida Reg. No. 45896

Summary Report

Generated On : 7/13/2023

Property Information	
Folio:	20-5013-003-0180
Property Address:	12715 ROLLING ROAD DR Pinecrest, FL 33156-5646
Owner	ANTONIO J CASTRO &W CAROL DIAZ CASTRO
Mailing Address	12715 ROLLING ROAD DR MIAMI, FL 33156-5646
PA Primary Zone	2300 ESTATES - 1 ACRE
Primary Land Use	0101 RESIDENTIAL - SINGLE FAMILY : 1 UNIT
Beds / Baths / Half	4 / 3 / 0
Floors	1
Living Units	1
Actual Area	Sq.Ft
Living Area	Sq.Ft
Adjusted Area	3,327 Sq.Ft
Lot Size	44,987 Sq.Ft
Year Built	Multiple (See Building Info.)

Assessment Information			
Year	2023	2022	2021
Land Value	$1,638,120	$1,062,564	$885,470
Building Value	$256,046	$259,506	$199,753
XF Value	$15,164	$15,340	$15,516
Market Value	$1,909,330	$1,337,410	$1,100,739
Assessed Value	$725,957	$704,813	$684,285

Benefits Information				
Benefit	Type	2023	2022	2021
Save Our Homes Cap	Assessment Reduction	$1,183,373	$632,597	$416,454
Homestead	Exemption	$25,000	$25,000	$25,000
Second Homestead	Exemption	$25,000	$25,000	$25,000

Note: Not all benefits are applicable to all Taxable Values (i.e. County, School Board, City, Regional).

Short Legal Description
13 55 40 1.03 AC M/L
TOWN & RANCH ESTS PB 50-46
LOT 6 LESS SELY 150 FT BLK 2
LOT SIZE 51832 SQ FT
OR 11609-1203 1182 1

Taxable Value Information			
	2023	2022	2021
County			
Exemption Value	$50,000	$50,000	$50,000
Taxable Value	$675,957	$654,813	$634,285
School Board			
Exemption Value	$25,000	$25,000	$25,000
Taxable Value	$700,957	$679,813	$659,285
City			
Exemption Value	$50,000	$50,000	$50,000
Taxable Value	$675,957	$654,813	$634,285
Regional			
Exemption Value	$50,000	$50,000	$50,000
Taxable Value	$675,957	$654,813	$634,285

Sales Information			
Previous Sale	Price	OR Book-Page	Qualification Description
07/01/2005	$1,100,000	23649-3685	Sales which are qualified
11/01/1982	$192,500	11609-1203	Sales which are qualified
06/01/1972	$65,000	00000-00000	Sales which are qualified

50-46 L

TOWN and RANCH ESTATES

IN SECTION 13 TWP. 55 S. RGE. 40 EAST
DADE COUNTY FLORIDA
TWO SHEETS

TOWN AND RANCH ESTATES, INC.
OWNERS

ZURWELLE-WHITTAKER, INC.
Structural Engineers & Surveyors

SCALE 1"= 100'

MAY 9, 1950

SHEET 1 OF 2

NOT INCLUDED IN THIS PLAT.

SECTION 13-55-40
SCALE: 1" = 1500'

DETAIL "A"
No Scale

INTRODUCTION

Purpose

This report and calculations have been prepared to accompany an application to the Village of Pinecrest as part of the building permit process.
Property Address:12715 Rolling Road Drive, Pinecrest, FL.
Property Folio: 20-5013-003-0180
All structures on the subject property will be demolished and the proposed development will consist of one (1) single family residence.

Legal Description

See attached Boundary and Topographic Survey

Design Criteria

The storm water management and drainage system designed for this property is based on following design criteria:

1. Retain and treat (through the use of exfiltration trenches) the greater of:
    a. 1" of generated run-off over the entire site or,
    b. 2½" times the percentage of the impervious areas
    c. The difference between the pre-development and post-development run-off

Water Quality Calculation

Total Project Area: 44,960 ft² (1.032 acres)
Total Impervious Area: 17,044 ft² (0.391) acres (37.91%)

- Building Area: 8,407 ft² (0.193 acres) (18.70%)
- Pool, decks, walks, and driveways: 8,637 ft² (0.198 acres) (19.21%)

Total Pervious Area: 27,916 ft² (0.641 acres) (62.09%)

For water quality treatment, the first inch of runoff from the site open land area, or the amount of 2½ inches times the percentage of imperviousness shall be treated, whichever is greater.

1. First inch of runoff:
    a. Volume required = 0.083[1] ft x 44,960 ft² = 3,732 ft³
2. 2½ inches times the percentage of imperviousness[2]:
    a. Volume required = 2½ x 0.1921 = 0.48 inches
    b. Volume to be treated = 0.04[3] x 44,960 ft² = 1,799 ft³
3. Difference between pre- and post-development runoff: 2,511 ft³
    a. See attached "Pre vs. Post development analysis
4. Condition 1 is greater than Conditions 2 or 3 therefore:
5. Volume to be treated**: 3,732 ft³** (0.086 acre-feet)

Drainage trench required:

1. *30* LF (see attached drainage calculations)
2. 80 LF drainage trench provided (see attached drainage calculations).

---

[1] 1" ÷ 12" = 0.083 ft.
[2] Pursuant to SFWMD Permit Manual (2013), roof area may be deducted from site area for water quality calculation purposes (Part IV – Stormwater Quality, Section 4.2.2(c).
[3] 0.48" ÷ 12" = 0.04 ft.

Water Quality Treatment provided:

1. If 30 LF exfiltration trench (required-see drainage calculations) stores expected runoff
    a. Runoff=CiA = 0.6082 x 6.2 iph x 1.032 acres = 3.8915 ac/in. = 0.3243 ac/ft.
2. Then 80 LF exfiltration trench (provided) will provide 10.377 ac/in.= 0.865 ac/ft.
    a. $\frac{Exfil.\ trench_{(required)}}{Volume\ treated_{(Q\ required)}} = \frac{Exfil.Trench_{(provided)}}{Volume\ treated_{(Q\ provided)}} = \frac{30\ LF}{3.8915\ \frac{acre}{inches}} = \frac{80\ LF}{x\ \frac{acre}{inches}} =$
    b. $30x = 3.8915 \times 80$
    c. x=10.377$\frac{acre}{inches}$ = 0.865 $\frac{acre}{feet}$
3. 0.865 $\frac{acre}{feet}$ (provided) > 0.086 $\frac{acre}{feet}$(required)
4. Safety factor: 0.865 / 0.086 = 10.1

Conclusion

1. This analysis and corresponding calculations confirm that the storm water retention system designed for this project exceeds the local and state requirements for storm water management systems.

Pre-development vs. Post-development Runoff Analysis

Project: **Castro Residence**

Date: 7/13/2023 Job No. 24-103

Design Data

Rainfall Depth (P):	9.0	(per SFWMD 25yr - 24hr map)
Design Ground Water Elev.(H_{WT}):	4.0	(per MDPW WC-2.2)

Area Distribution

Pre-development					Post-development			
Description	*ft³*	*Acres*	*%*		*Description*	*ft³*	*Acres*	*%*
Total:	44960	1.03	100%		Total:	44960	1.03	100%
Pervious:	35311	0.81	78.54%		Pervious:	27916	0.64	62.09%
Impervious:	9649	0.22	21.46%		Impervious:	17044	0.39	37.91%

Compacted Water Storage (CWS) Calculation

	High Elevation	Low Elevation	Average Elevation	Hwt	Depth	Storage (CWS)	Storage Capacity (SSC)
Pre-Development:	19.02	17.00	18.01	4.00	14.01	8.18	**6.42**
Post-Development:	19.87	16.90	18.42	4.00	14.42	8.18	**5.08**

Runoff Calculation

	Rainfall (P)	Storage Capacity (SSC)	Runoff (R) (in.)	Runoff Area (A) (ft²)	Total Runoff (V_{Tot}) (ft³)
Pre-Development ($R_{(Pre)}$):	9.0	6.42	4.21	44960	***15772***
Post-Development ($R_{(Post)}$):	9.0	5.08	4.88	44960	***18283***

$$R = \frac{(P - 0.2SSC)^2}{(P + 0.8SSC)}$$

Runoff Volume to be Retained On-Site

$\Delta V_{(Tot)} = V_{(Tot)(Post)} - V_{(Tot)(Pre)}$: ***2511*** ft³

Pre-development vs. Post-development Runoff Analysis

Project: **Castro Residence**
Date: 7/13/2023 Job No. 24-103

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DEVECON, INC.
8006 S.W. 173rd TERRACE
Palmetto Bay, FL. 33157
305-989-0587

PROJECT: **Castro Residence**
JOB No: **24-103**

DATE: 9/8/2024

VOLUME TREATED (V) $V = C_w \times A \times R$

TRENCH LENGTH FORMULAS **

$$L = \frac{V}{K(H_2W + 2H_2D_U - D_U^2 + 2H_2D_S) + 1.39 \times 10^{-4}(WD_U)}$$

**** Taken from South Florida Water Management District Permitting Information Manual (2013).**

BASE DATA

Grate Elevation:	16.80	(N.G.V.D.)	
Water-Table Table Elev:	4.00	(WC 2.2.)	(Wt)
Trench Depth (ft):	15		
Bottom Trench Elevation:	1.80		(bottom)
Impervious Area Coefficient:	0.90	(constant)	(Ci)
Sodded Swale Area Coefficient:	0.30	(constant)	(Cs)
Grassed Lot Area Coefficient:	0.40	(constant)	(Cg)
Roof Area Coefficient	1.00	(constant)	(Cr)
Rainfall (Inches):	6.20	(in.)	(i)
Trench width (ft):	3	(feet)	(w)
Depth to Water Table (H2)	12.80	(feet)	(H2)
Unsaturated Depth	11.13	(feet)	(Du)
Saturated Depth	2.20	(feet)	(Ds)

_____
Ricardo Herrera, P.E.
State of Florida Reg. No. 45896

Table

Drainage Area	Total
Gross Area (ft2):	44960
Lot Area (ft2):	44960
Grassed Area (ft2):	27916
Impervious Area (ft2):	8637
Roof Area (ft2):	8407
Weighted Coefficient (Cw):	0.6082
Volume of Runoff (Acre-inch.)(Q):	3.8923
Conductivity Coefficient (k)	4.92E-04

Length of Trench required (LF):	**30**
Trench length provided (LF):	***80***

Project Name: Castro Residence
Project Number: 2097

DYNATECH ENGINEERING CORP.
WWW.DYNATECHENGINEERING.COM

Miami, August 16, 2017

Mr. Tony Castro
12715 Rolling Road Drive
Miami, FL 33156

Re: Casa Grande @
12715 Rolling Road Drive
Miami, FL

Dear Mr. Castro:

Pursuant to your request, DYNATECH ENGINEERING CORP. (DEC) completed Percolation Tests on August 16, 2017 at the above referenced project. The purpose of our investigation was to help determine the hydraulic conductivity for storm drainage design.

The above hydraulic conductivity represents an ultimate value. The designer should decide on the required safety factor. This value is based on the existing soils at the location of the test. In the event the test location is changed or the soil removed and replaced; the test results will need to be re-evaluated.

Groundwater was measured immediately at the completion of each boring and was found at an average depth of approximately 16' below existing ground surface at the time of drilling. Existing ground surface elevation was not provided to us at the time of drilling. Design engineers must verify existing ground elevations as well as FEMA Flood and County highest and lowest groundwater elevation for their design. Fluctuation in water level **is anticipated** due to seasonal variations and run off as well as varying ground elevations, construction dewatering and pumping activities in the area and global warming. Site contractor must familiarize himself with site conditions in the event groundwater controls and dewatering is needed during construction. Surface flooding may result under hurricane conditions and should be taken into consideration in the design of the project. The contractor shall monitor and make sure that groundwater levels on adjacent properties are not adversely impacted due to the contractors dewatering activities. Specialty groundwater and water proofing contractors shall be consulted for all work below the groundwater level.

In case of existing structures, existing footings, new foundations and proposed drainage lines, provisions shall be made by the structural engineer, the civil engineer, and site contractor to protect all footings from future erosion, undermining and exposure. The geotechnical engineer shall be notified of these conditions to evaluate the applicability of his recommendations. The drainage system installation depth and dimension must be verified in the field during construction.

750 WEST 84TH STREET, HIALEAH, FL 33014 PHONE (305) 828-7499 FAX (305) 828-9598 EMAIL:INFO@DYNATECHENGINEERING.COM

Re: 12715 Rolling Road Drive, Miami, FL

This report was prepared in compliance with the 2014 Florida Building Code, 5th edition. Site elevations were not provided to us for the test locations. Depths reported on the field boring logs represent the depth below existing ground surface as they existed on the date of drilling. In the event of subsequent filling, excavations or site work, the reported depths must be adjusted to represent proper depths.

The boring log (s) attached present (s) a detailed description of the soils encountered at test location (s). The soil stratification shown on the boring log (s) is based on the examination of the recovered soil samples and interpretation of the driller's field log (s). It indicates only the approximate boundaries between soil types. The actual transitions between adjacent soil types may be gradual. Regardless of the thoroughness of a geotechnical exploration there is always the possibility that conditions may be different from those of the test locations, the nature and extent of such variations may not become evident until, during or after construction; therefore; therefore, DYNATECH ENGINEERING CORP. does not guarantee any subsoil conditions between the bore test holes. In accepting and using this report the client understands and accepts that all data from the borings are strictly for foundation analysis only and are not to be used for excavation or back filling estimates and pricing. Owner and site contractor must familiarize themselves with site conditions prior to bidding. Client recognizes that actual conditions in areas not tested by DEC may differ from those anticipated in DEC's report. Client understands and accepts that this can significantly increase the cost of construction for its future projects. Client agrees that DEC shall not be responsible or liable for any variations in the actual conditions of areas not tested by DEC. This report is not a Phase I and/or Phase II Environmental Site Assessments. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. The scope of services performed in the execution of this investigation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations is at the risk of said user. Said user must contact DEC in writing to verify applicability of this report for their use. All work must be conducted under the supervision of our geotechnical engineer. The discovery of any site or subsurface conditions during construction which deviate from the information obtained from our subsoil investigation is always likely and should be reported to us for our evaluation. All work shall be conducted in compliance with the Florida Building Code FBC and OSHA workers protection rules and all applicable Federal, State, County and City rules and regulations.

It has been a pleasure working with you and look forward to do so in the near future.

Sincerely yours,

Wissam

Wissam Naamani, P. E.
DYNATECH ENGINEERING CORP.
Florida Reg. No. 39584
Special Inspector No. 757
Certificate of Authorization No.: CA 5491

WISSAM SAAD NAAMANI
LICENSE
No. 39584
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

PERCOLATION TEST

DYNATECH ENGINEERING CORP.
WWW.DYNATECHENGINEERING.COM

PERCOLATION TEST ACCORDING TO S.F.W.M.D.
D.O.T. STANDARD TEST

DATE	**: August 16, 2017**
CLIENT	**: MR. TONY CASTRO**
PROJECT	**: Casa Grande @**
PROJECT LOCATION	: 12715 Rolling Road Drive, Miami, FL
LOCATION OF TEST	**: SAS**
DIAMETER OF HOLE	**: 7"**
TEST NO.	**: P-1**

TEST DEPTH (feet)	**0-15'**
AVERAGE FLOW (GPM)	**12.8**
AVERAGE K (CFS/Sq. Ft-Ft Head)	**5.20×10^{-4}**

*** The above hydraulic conductivity represents an ultimate value. The designer should decide on the required safety factor. This value is based on the existing soils at the location of the test.**

Water Table 16'-6" **Below existing ground surface.**

SUBSURFACE INVESTIGATION

Depth Below Ground Surface	Soil Description
0'-0" to 0'-6"	Topsoil and grass
0'-6" to 1'-6"	Brown medium sand w/rock fragments
1'-6" to 3'-0"	Light tan medium sand w/rock fragments
3'-0" to 15'-0"	White sandy limerock

Field Tech: A.S.

Respectfully submitted,

Wissam Naamani, P. E.
DYNATECH ENGINEERING CORP.
Florida Reg. No. 39584
Certificate of Authorization No.: CA 5491

WISSAM SAAD NAAMANI No. 39584 STATE OF FLORIDA PROFESSIONAL ENGINEER

DYNATECH ENGINEERING CORP.
WWW.DYNATECHENGINEERING.COM

PERCOLATION TEST ACCORDING TO S.F.W.M.D.
D.O.T. STANDARD TEST

DATE	**: August 16, 2017**
CLIENT	**: MR. TONY CASTRO**
PROJECT	**: Casa Grande @**
PROJECT LOCATION	: 12715 Rolling Road Drive, Miami, FL
LOCATION OF TEST	**: SAS**
DIAMETER OF HOLE	**: 7"**
TEST NO.	**: P-2**

TEST DEPTH (feet)	**0-15'**
AVERAGE FLOW (GPM)	**11.4**
AVERAGE K (CFS/Sq. Ft-Ft Head)	**4.63×10^{-4}**

*** The above hydraulic conductivity represents an ultimate value. The designer should decide on the required safety factor. This value is based on the existing soils at the location of the test.**

Water Table 16'-6" **Below existing ground surface.**

SUBSURFACE INVESTIGATION

Depth Below Ground Surface	Soil Description
0'-0" to 0'-6"	Topsoil and grass
0'-6" to 1'-0"	Tan medium sand
1'-0" to 15'-0"	White sandy limerock

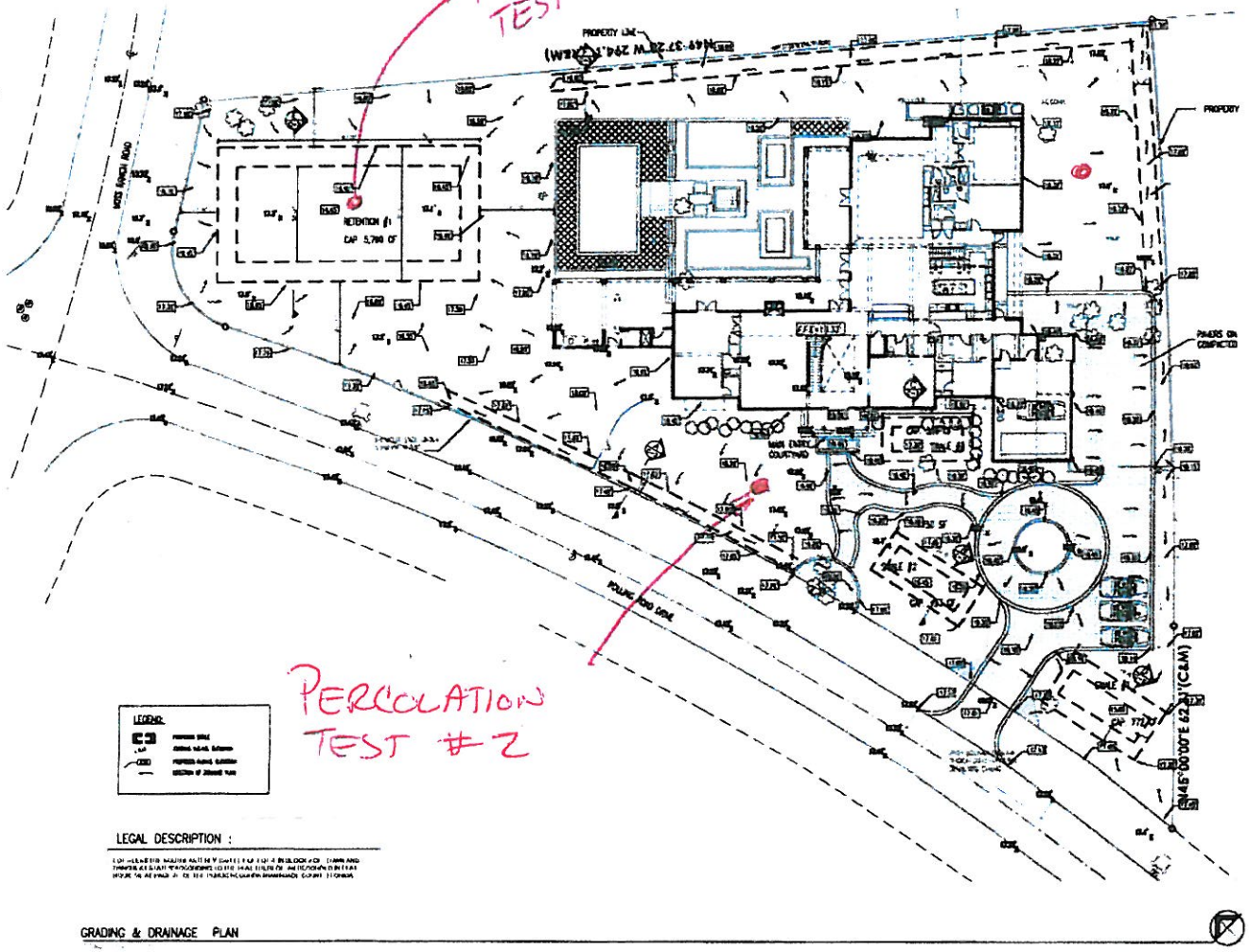
Field Tech: A.S.

Respectfully submitted,

Wissam Naamani, P. E.
DYNATECH ENGINEERING CORP.
Florida Reg. No. 39584
Certificate of Authorization No.: CA-5491

WISSAM NAAMANI LICENSE NO. 39584 STATE OF FLORIDA PROFESSIONAL ENGINEER

SITE PLAN



LEGAL DESCRIPTION :

GRADING & DRAINAGE PLAN

GENERAL NOTES:

1. IF DISCREPANCIES FOUND ON THESE PLANS ARE BETWEEN THESE PLANS AND ACTUAL FIELD CONDITIONS OR ANY OMISSIONS OR ERRORS THAT MIGHT PRODUCE DAMAGES DERIVED FROM THIS DESIGN, IT SHALL BE BROUGHT TO THE ENGINEERS PRIOR TO BIDDING OR START OF ANY CONSTRUCTION
2. CONTRACTOR, PRIOR TO START OF ANY CONSTRUCTION, SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES ON THE FIELD WITH THE APPROPRIATE UTILITY COMPANY IN THE AREA THAT MAY ADJUSTMENT BE NECESSARY DUE TO A DISCREPANCY FOR UTILITY LOCATION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER 48 HOURS BEFORE PROCEEDING. THE CONTRACTOR SHALL EXERT CARE AND CAUTION IN PROTECTING ALL UTILITIES DURING THE COMPLETION OF HIS WORK. IN THE EVENT OF ANY DAMAGE THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE APPROPRIATE UTILITY COMPANY AND ALL COSTS INCURRED DUE TO DAMAGE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. FOR 811 (48 HOURS BEFORE DIGGING CALL SUNSHINE, TOLL FREE 1-800-432-4770).
3. EXISTING UTILITY LOCATIONS SHOWN ON SWDE PLANS ARE APPROXIMATE. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF EXISTING UTILITIES SHOWN OR FOR ANY EXISTING UTILITIES NOT SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING UTILITIES FOR WHICH HE FAILS TO REQUEST LOCATIONS FROM THE UTILITY OWNER AND IS RESPONSIBLE AS well FOR DAMAGE TO ANY EXISTING UTILITIES WHICH ARE PROPERLY LOCATED
4. IF UPON EXCAVATION, AN EXISTING UTILITY IS FOUND TO BE IN CONFLICT WITH THE PROPOSED CONSTRUCTION OR TO BE OF A SIZE OR MATERIAL DIFFERENT FROM THAT SHOWN ON THE PLANS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER
5. ALL OPEN TRENCHES AND HOLES ADJACENT TO ROADWAYS OR WALKWAYS SHALL BE PROPERLY MARKED AND BARRICADED TO ASSURE THE SAFETY OF BOTH VEHICULAR AND PEDESTRIAN TRAFFIC
6. ALL FILL AND LIMEROCK BASE COURSE SHALL BE TESTED WITH DENSITY TESTS ACCORDING TO AASHTO SPECIFICATION T-180. COPIES OF RESULTS SHALL BE PROVIDED TO ENGINEER OF RECORDS PRIOR TO PLACING ASPHALT PAVEMENT.
7. NO MODIFICATIONS TO THESE PLANS ARE ALLOWED WITHOUT THE WRITTEN CONSENT OF THE ENGINEER. NO AGENCY INSPECTOR, CONTRACTOR, NOR THE OWNER ARE AUTHORIZED TO UNILATERALLY MODIFY THESE PLANS
8. IT IS THE INTENT OF THE PLANS TO BE IN ACCORDANCE WITH APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION. ANY DISCREPANCIES BETWEEN THESE PLANS AND APPLICABLE CODES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER
9. ALL DIMENSIONS IN THESE PLANS SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD
10. ALL WORK SHALL MEET CITY CORAL GABLES PUBLIC WORK DEPARTMENT STANDARDS
11. ALL ELEVATIONS SHOWN ARE REFERRED TO NORTH GEODETIC VERTICAL DATUM 1929 (N.G.V.D.29)
12. UNDERGROUND CONTRACTOR SHALL COMPLY WITH THE TRENCH SAFETY ACT NO 3183, FLORIDA STATUTES
13. ALL MUCK, PEAT, AND/OR CLAY WITH HIGH PERCENTAGE OF ORGANIC MATERIAL AND OR EXISTING UNSUITABLE FILL MATERIAL SHALL BE REMOVED FROM PROPOSED RIGHT OF WAY OR PROPOSED PAVEMENT AREAS IF ANY.
14. WATER TABLE PER NOPMD WC 2.2 IS 2.00 N.G.V.D.
15. FLOOD INSURANCE RATE MAP, ZONE X BASE FLOOD NOT DETERMINED MAP NUMBER 12086C0448L, MAP REVISED SEPT 11, 2009
16. SHOWN INFORMATION FOR EXISTING UTILITIES AS IT WAS RECEIVED BY UTILITIES OWNERS UNDER CHAPTER 556, FLORIDA STATUTES
18. THIS ENGINEERING PLAN WAS PREPARED USING SITE PLAN FROM ARCHITECT CARMEN DIAZ AND SURVEY FROM EDUARDO SUAREZ

CALL 48 HOURS BEFORE YOU DIG IT'S THE LAW 1-800-432-4770

AB ENGINEERS, INC.

REVISIONS

SHEET NAME: PAVING, DRAINAGE & GRADING PLAN
PROJECT: MR. & MRS. CASTRO RESIDENCE
PROJECT NO: TONY CASTRO RESIDENCE

C-1

Rolling Road
W. Miami, FL.

GENERAL NOTES

Soil borings on unmarked vacant property should be considered preliminary with further boring(s) to be drilled after building pad(s) are staked out.

Soil borings on existing structures that are to be demolished should be considered preliminary and additional borings would need to be performed after the structure(s) has been demolished and proposed new building staked out.

As a mutual protection to clients, the public and ourselves, all reports are submitted as confidential property of clients, and authorization for publication of statements, conclusions, extracts from or regarding our reports is reserved pending our written approval.

KEY CLASSIFICATION & SYMBOLS

Correlation of Penetration Resistance With Relative Density and Consistency

	Cone Penetration Tests (Kg/cm^3)	Standard Penetration (Blows/ft.)	Relative Density
Sands	0-16	0-4	Very Loose
	17-40	5-10	Loose
	41-80	11-20	Firm
	81-120	21-30	Very Firm
	Over 120	31-50	Dense
Silts & Clay	0-3	0-2	Very Loose
	4-9	3-4	Soft
	10-17	5-8	Firm
	18-31	9-15	Stiff
	32-60	16-30	Very Stiff
	Over 60	31-50	Hard

Particle Size

Boulders	> 12 in.
Cobble	3 in. to 1 in.
Gravel	4.76 mm to 3in.
Sand	0.07 mm to 4.67 mm.
Silt	0.005 mm. to 0.074 mm
Clay	< 0.005 mm

Modifiers

5% - 10 %	Slightly Silty or Clayey
10% - 30%	Silty or Clayey
30% - 50%	Very Silty or Very Clayey
0% - 5%	Slightly Trace
6% - 10%	Trace
11% - 20%	Little
21% - 35%	Some
> 35% And	

Rock Hardness Description

Soft	Rock core crumbles when handled
Medium	Can break with your hands.
Moderate Hard	Thin edges or rock core can be broken with fingers
Hard	Thin edges or rock core cannot be broken with fingers
Very Hard	Rock core rings when struck with hammer (cherts)