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PRELIMINARY REPORT

FOR:

CITY OF KEY WEST
FREDERICK DOUGLASS GYM

TASK 'A" – STRUCTURAL ASSESSMENT

111 OLIVIA STREET, KEY WEST, FLORIDA

PROJECT NUMBER & TASK ORDER NUMBER: 12.0D01A

JULY 15, 2013

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aa26001260

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EXECUTIVE SUMMARY

The structural integrity of the existing building was tested per the requirements of the task order. The specific results of the testing are shown in later sections of this report. The purpose of evaluating the building structure at this point is to make a go/no go decision.

The City must determine whether it is appropriate to continue using the Frederick Douglass gymnasium for recreational services and programs. In considering the various options for use, we are doing so with the understanding that the anticipated life cycle of the building will be for at least another 30 years. Additionally, there are historic and sentimental issues that also are part of this decision making process. With that understanding we will examine the possible options.

The four possible courses of action and possible costs are as follows:

A. Do nothing, close the building and demolish it. Anticipated costs are expected to be $200,000 - $250,000.

B. Allow the exiting gymnasium to remain as is without any renovation. And replace the one-story portion to the west of the gymnasium with new office & restroom facilities. Anticipated costs are expected to be $1,050,000 - $1,210,000.

C. Given that the building is a contributing structure within the Bahama Village National Historic District provide alternative approaches to comply with the intent of the FBC and thereby extend the useful life of the building. This approach includes replacing the one-story portion to the west of the gymnasium and new office & restrooms. Anticipated costs are expected to be $1,260,000 - $1,410,000.

D. Bring the building into compliance with the requirements of the 2010 Florida Building Code and 2010 Florida Fire Prevention Code. Anticipated costs are expected to be $2,360,000 - $2,710,000.

TASK 'A' - STRUCTURAL ANALYSIS

Per Task 'A' of the Task Order, the structural testing and evaluation was performed and included the following:

- Roof Deck: The roof deck appears to be composed of cementitious fiber board on bulb tee concrete tertiary members on intermediate steel bar joists running perpendicular to the main steel structural trusses. The existing roof steel framing system has been evaluated and the results are provided in the enclosed report by McCarthy & Associates. The roof membrane and its integrity will be tested during Task B.

- Concrete Walls: Upon visually inspecting the concrete columns and masonry walls of the gymnasium it was decided that Subsurface Interface Radar would be used to determine the size and location of steel reinforcing. This testing method is less invasive than taking concrete core samples. This testing method also allowed determination of the steel reinforcing within the horizontal concrete tie beams above and below the walls without impacting their structural integrity. The results of this testing are contained in the report by Concrete Analysis & Testing Laboratories.

- Floor/Foundation System: Since concrete compression testing was necessary to determine the compressive capacity of the concrete, a mid-wall footing was chosen as destructive testing at this location will have the least impact on the integrity of the structural system. Six core samples were taken and break tests were conducted. The results of these test are found in the report by Concrete Analysis & Testing Laboratories.

- Subsurface Soil Conditions: Soil borings were taken to identify the potential soil qualities and bearing capacities should any future work be undertaken. The results of these tests are included in the report by Wingerter Laboratories.

- Compliance with the 2010 Florida Building Code: The building testing information obtained from the above operations on member sizes, locations and connections was used to perform a structural analysis of the building and create a suggested approach for retrofitting the building to meet 2010 Florida Building Code and hurricane requirements. The results of that analysis and design approach are included within the report and drawings of McCarthy & Associates

POSSIBLE COURSES OF ACTION

The four possible courses of action exist for this building, and are as follows:

A. Do nothing, close the building and demolish it.

B. Allow the exiting gymnasium to remain as is, with the renovation of the gym roof to extend the useful life of the building by another 25-30 years. This assumes that the one-story portion to the west of the gymnasium is completely separated from the high bay gym and restroom facilities are provided to comply with the 2010 Florida Building Code – Existing Building and 2010 Florida Plumbing Code.

C. Given that the building is a contributing structure within the Bahama Village National Historic District it meets the definition of 'Historic Building' under Section 1102 of the 2010 Florida Building Code – Existing Building. Sections 1104, 1105 and 1106 provide alternative approaches to comply with the intent of the FBC and thereby extend the useful life of the building with limited renovation. This approach anticipates the removal of up to 30% of the roof deck and structural roof member augmentation, or covering the roof with a completely new deck that meets current code, replacement of the existing windows and miscellaneous envelope upgrades and repainting. The one-story portion to the west of the gymnasium is completely separated and office/restroom/storage facilities are provided to comply with the 2010 Florida Building Code – Existing Building and 2010 Florida Plumbing Code.

D. Bring the building into compliance with the requirements of the 2010 Florida Building Code and 2010 Florida Fire Prevention Code. Under this approach a completely new steel structural frame is installed from within the building, the exterior building envelope and all windows/doors are replaced with equipment that meets current code, a new foundation system and gym floor is installed, and miscellaneous other improvements to finishes and repainting are provided. The one-story portion to the west of the gymnasium is completely separated and office/restroom/storage facilities are provided.

POTENTIAL COSTS

A. Demolish & Remove the Building	Low	High
Demolition	$100,000	$120,000
Removal	$60,000	$80,000
Land Fill	$40,000	$50,000
	$200,000	$250,000

B. Gym to remain as is with replacement of the One Story Restrooms & Offices		
Roof	$125,000	$160,000
Miscellaneous	$175,000	$250,000
One Story Building Replacement	$750,000	$800,000
	$1,050,000	$1,210,000

C. Limited renovation of the Historic Gym with Replacement of the One Story Restrooms & Offices		
Roof	$175,000	$200,000
Windows	$85,000	$110,000
Miscellaneous	$250,000	$300,000
One Story Building Replacement	$750,000	$800,000
	$1,260,000	$1,410,000

D. Bring the Gym into Compliance with the 2010 FBC & FFPC, replace the One Story Restrooms & Offices		
Roof	$175,000	$200,000
Structural System	$900,000	$1,000,000
Windows	$85,000	$110,000
Miscellaneous	$450,000	$600,000
One Story Building Replacement	$750,000	$800,000
	$2,360,000	$2,710,000

APPENDIX A:

Soil Boring, Subsurface Interface Radar & Pachometer Exploration

REPORT OF
VISUAL STRUCTURAL INSPECTION,
SUBSURFACE INTERFACE RADAR SERVICES &
SUBSURFACE SOIL EXPLORATION WITH
STANDARD PENETRATION TEST BORINGS

PROJECT:

FREDERICK DOUGLASS RECREATION CENTER - BAHAMA VILLAGE
111 Olivia Street
Key West, Monroe County, Florida

JUNE 2013

Prepared for:

CONCRETE ANALYSIS & TESTING LABORATORIES, INC.
P. O. Box 500875
Marathon, Florida 33050

WINGERTER LABORATORIES, INC.
1820 N.E. 144th Street
North Miami, Florida 33181

WINGERTER
LABORATORIES INC.
Engineering Testing and Inspection Service
Established 1949

June 18, 2013

Concrete Analysis & Testing Laboratories, Inc.
Attention: Ms. Lisa Littlefield
P. O. Box 500875
Marathon, Florida 33050

Services: Visual Structural Inspection, Subsurface Interface Radar Services, and Subsurface Soil Exploration with Standard Penetration Test Borings
Project: Frederick Douglass Recreation Center - Bahama Village
Location: 111 Olivia Street, Key West, Monroe County, Florida
WLI Order No. 13-1194

Ladies/Gentlemen:

We are pleased to present this report of our visual structural inspection, subsurface interface radar (SIR) services, and subsurface soil exploration with standard penetration test borings for the subject site. Also provided is our geotechnical engineering evaluation of subsurface conditions. These services were performed in general accordance with our Professional Service Agreement dated June 5, 2013. This report presents our field data together with our engineering evaluation for the restoration/renovation of the 50+ year old historical recreation center building.

This report was prepared in compliance with the 2010 Florida Building Code.

We appreciate this opportunity to be of service to you during this phase of the project. If you have any questions or comments regarding the information contained in this report, please contact the undersigned at 305-944-3401, extension 2 or at rhs@wingerterlab.com.

Respectfully Submitted,
WINGERTER LABORATORIES, INC.

ROBERT H. SCHULER LICENSE No. 34715 STATE OF FLORIDA PROFESSIONAL ENGINEER

Robert H. Schuler, P.E., P.G., Chief Engineer
Florida Professional Engineer No. 34715
Florida Professional Geologist No. 1030
Florida Special Inspector No. 400

In accordance with Rule 61G15-23.001 of The Florida Administrative Code, an original signature is hereby provided for the owner (or owner's representative) and the building official.

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INTRODUCTION

WINGERTER LABORATORIES, INC. (WLI) is pleased to present this report of our structural inspection, subsurface interface radar services, R meter tests and subsurface soil exploration with standard penetration test borings for the subject site. The purposes of this investigation were to obtain specific information regarding steel reinforcing present in the building's walls, columns and beams; determine beam reinforcing above the window openings and sill reinforcing below the window openings in the building's east and south walls; and advance two standard penetration test borings to determine recommended foundation design criteria.

In lieu of X-ray, we recommended utilizing the subsurface interface radar (SIR), also known as ground penetrating radar (GPR), to scan the east and south walls of the building to determine the reinforcing steel present in the walls, columns and beams. An R Meter was utilized as well. Our subsurface soil exploration consisted of a total of two Standard Penetration Test Borings performed to the depth of ten feet below land surface at the southwest and northeast exterior corner areas of the building, as shown in Appendix A of this report.

The following presents a review of the project information provided to us, our visual structural inspection at the site, SIR and R meter investigative scans findings, a discussion of the subsurface soil conditions, structural and geotechnical engineering evaluations as described above, and our Report of Test Boring Numbers B-1 and B-2.

PROJECT INFORMATION

Documents provided to us for our review and use include Sheets S-001 Foundation Plan & S101 Roof Framing Plan, prepared by Hayes Cumming Architects, P.A. of St. Petersburg, Florida in April 2013. Also, Mr. Alexander Smith of the firm met us on site. A man lift and operator were available for our use.

Our site inspection found the recreation center was originally a gymnasium building reportedly constructed in 1947. It is a concrete column and stucco covered block building with steel roof trusses.

For purposes of this report, columns are identified as F-1 through F-9 (building's southeast corner to northeast corner), for the east wall, and as A-1, B-1, etc. through F-1 (building's southwest corner to southeast corner), for the south wall. These two walls have high windows. The west wall of the gym building will remain, but the rectangular addition along the west side of the west wall, containing storage rooms and rest rooms/locker rooms, is scheduled for demolition. The north end of the building is improved with a performance stage. The main entrance is at the southwest corner; the other exit is near the northeast corner.

INVESTIGATIVE PROCEDURES

Subsurface Interface Radar System

Geophysical Survey Systems, Inc. Subsurface Interface Radar (SIR) System 20 was utilized with a 1.5 gigahertz antenna for shallow penetration. Profiling was accomplished by manually pushing the antenna across the surface areas to be scanned. This system could be considered the electromagnetic equivalent of a sonar submarine profiling system.

The transmitter produces a trigger pulse 98 times per foot. The receiving antenna detects pulses that are reflected from an interface in which the dielectric constant of the material changes. The receiver converts these electromagnetic (EM) signals to digital signals, which are then transmitted to the control unit for processing, and then displays on the screen. The depth of penetration of the electromagnetic (EM) pulse is dependent on the conductivity of the medium, since a high conductivity results in dispersion of the signal and less depth of penetration.

The screen display provides a continuous profile record corresponding to the interfaces one would see in the vertical wall of a trench cut along the line being surveyed. It is capable of indicating the strength of the reflections and detecting additional scatter which is useful in signal interpretation.

Pachometer

A James Instruments, Inc. rebar locator was utilized. This instrument is used to determine the location, depth and size of steel reinforcing bar in concrete, masonry brick and other construction materials. It may also be used for locating steel pipe, post tension cable, and conduit.

Standard Penetration Test Borings

Field work was performed using standard truck mounted drilling equipment. Soil samples (disturbed) were obtained in accordance with ASTM D-1586 utilizing a 2-foot long, 2-inch diameter split spoon sampler which is advanced by successive blows of a 140 pound hammer free-falling 30 inches. The number of blows for each six inches of penetration is recorded. The sum of the second and third blow counts for each 2-foot sampling interval constitutes the Standard Penetration Resistance in blows per foot, which is referred to as the "N" Value.

The Standard Penetration Test, "N" value curve shown on the boring logs indicates the general variation of the "N" value throughout the depth of the boring. This curve is plotted in a straight line which connects each "N" value. However, it should not be assumed that the changes in the "N" value are a linear function. The graphical representations shown on the boring logs should not be substituted for the actual material descriptions included in the logs.

Soil samples will be retained by **WLI** for a period of 30 days only unless specifically requested otherwise by the client.

Test borings were marked in the field by WLI personnel. Boring locations are, therefore, generally as shown on the provided site plan, but no degree of accuracy is stated or implied.

The following tables may be used in interpreting the consistency of the materials based on the "N" Value:

SOIL CONSISTENCY vs. "N VALUE"					
Cohesionless Soils		**Cohesive Soils**		**Rock and Gravels**	
"N Value" (blows/ft)	Consistency Designation	"N Value" (blows/ft)	Consistency Designation	"N Value" (blows/ft)	Consistency Designation
0 to 4	Very Loose	0 to 2	Very Soft	0 to 25	Loose or Soft
5 to 10	Loose	3 to 4	Soft	26 to 50	Medium Dense
11 to 30	Medium Dense	5 to 8	Medium	51 to 90	Dense
31 to 50	Dense	9 to 15	Stiff	-	-
50 or More	Very Dense	16 to 30	Very Stiff	-	-
-	-	31 or More	Hard	-	-

Elevations were not established for the test boring locations. Depths reported on the logs represent depths below ground surface as they existed on the date drilled. The client is cautioned that if subsequent filling or excavation of the site occurs, the reported depth must be so adjusted. WLI can not assume responsibility for the accuracy of reported depths if the site is disturbed subsequent to the date drilled.

TESTING PROGRAM AND CONDITIONS REVEALED

Our work was performed on site on June 6, 2013. Our work included a visual structural inspection. A subsurface interface radar survey was used to determine the reinforcing steel present in the walls, columns and beams. A James Instruments R meter was used to size the reinforcing steel. Rebar sizing by magnetic methods is not precise and can vary by one bar size for bars smaller than #6 and two bar sizes for bars #6 and above. Our subsurface soil exploration consisted of a total of two Standard Penetration Test Borings, conforming to the requirements of ASTM D 1586, performed to the depth of ten feet below land surface at the southwest and northeast exterior corner areas of the building, as shown in Appendix A of this report. The test boring locations are shown on the site plan provided in Appendix B of this report.

The discussions and evaluations contained in this report are based upon the conditions revealed in the referenced SIR scans, R meter readings and soil borings tests.

Subsurface Interface Radar Survey and R Meter Testing

The SIR survey, utilizing the 1.5 gigahertz antenna, included the south and east walls of the building interior and exterior. The R meter was also utilized on the same walls. We found that the square concrete columns are reinforced with four #9 bars with #3 ties at 12 inches on center.

The walls are formed of block with stucco on both sides. The block does not appear to be standard concrete masonry block, but has four circular voids per foot. We removed some loose stucco at a patched electrical box and exposed a small corner of the block. The block appears to be pyrobar block or a similar product. We have seen this block used in South Florida buildings to create fire rated interior walls. The block is generally four to five inches thick. We scanned the full length of the south wall, interior and exterior, and portions of the east interior wall, all below the windows, and did not find any reinforcing steel in the walls between the columns.

Scanning under the windows, we located a continuous concrete beam of eight to 12 inches high, with two #5 reinforcing steel bars and no ties. Above the windows, the beam varies between 12 to 18 inches in height, and is reinforced with four #5 reinforcing steel bars. We located only one tie, at about six inches away from the column.

Standard Penetration Test Borings

Boring Numbers B-1 and B-2 were installed to depths of ten feet below land surface, at the southwest and northeast exterior corner areas, locations shown in Appendix B. Test Boring No. B-1, located at the southwest exterior corner area, has medium dense surface layers of silty sand with trace fragmented limestone, followed by fragmented limestone with trace limesand to about four feet in depth. Very dense layers of fragmented limestone with some limesand were encountered to about eight feet in depth, followed by very dense layers of sand with some fragmented limestone to the maximum explored depth of ten feet. Test Boring No. B-2, located at the northeast exterior corner area, has medium dense surface layers of fragmented limestone with trace silty sand to about two feet in depth. Very dense layers of fragmented limestone with trace to equal amount silty sand, then fragmented limestone with trace limesand were encountered to the maximum explored depth of ten feet.

The ground water level at the time of our investigation was encountered at a depth of approximately three feet (3') below the existing land surface. Fluctuations in the ground water level should be expected due to seasonal climatic changes, tidal action, rainfall variation, surface runoff, construction activity and other site specific factors.

GEOTECHNICAL ENGINEERING EVALUATION

Evaluation of the subsurface data obtained from the test boring logs, using accepted geotechnical engineering criteria, indicates that the existing subsurface soil conditions can support spread footings founded directly on the virgin limestone on site.

The existing footings are on a hard cap rock limestone. The bearing capacity of this native limestone can be assumed to be 4,000 pounds per square foot.

SPECIAL REMARKS & ANNOTATIONS

In dealing with the unseen subsurface dimension, a prudent test boring program acts to identify the general range of conditions and to reduce, but not eliminate, the risks of unknown conditions. Therefore, **WLI** cannot offer a warrantee, expressed or implied, that materials or conditions other than those revealed in the test borings will not be encountered, nor that the relative proportions and density of the materials will not vary from those reported.

The objective of any geophysical survey is to define the existence and/or configuration of subsurface anomalies. However, these anomalies may bear a highly complex relationship to the geophysical measurements recorded. Therefore, those conclusions drawn, regardless of how logically supported, should not be misconstrued as fact.

Furthermore, **WLI** assumes no responsibility for the accuracy of the reported depths should any excavation, filling or alteration of the site grade occur, subsequent to the date of the drilling operation, without surveying the existing conditions.

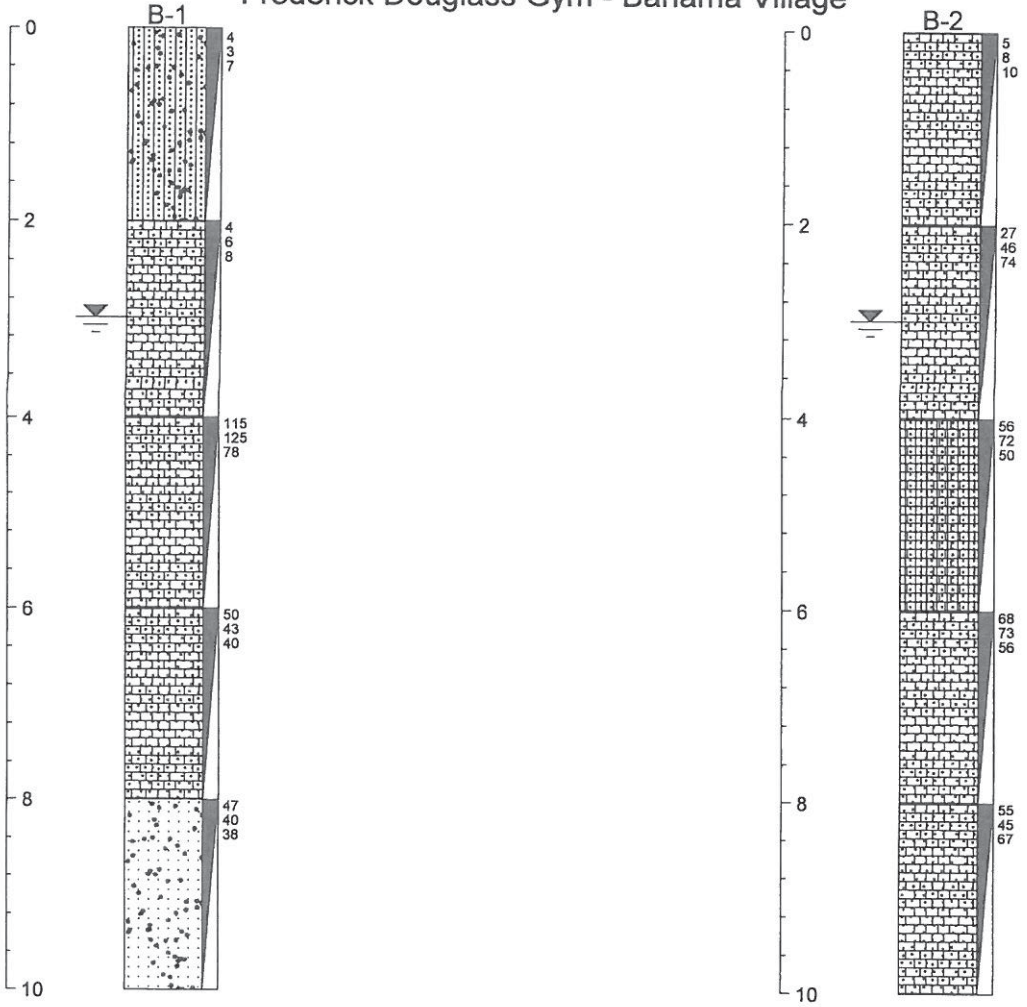
Also, since the criteria furnished to **WLI** constitutes our total knowledge and understanding of the project; inaccuracies, deviations or alterations of the criteria may invalidate these recommendations to the extent they impact the magnitude, distribution, and elevation of applied loads, or impact the nature of the construction.

APPENDIX A

TEST BORING LOGS

LOG OF BORINGS

Frederick Douglass Gym - Bahama Village



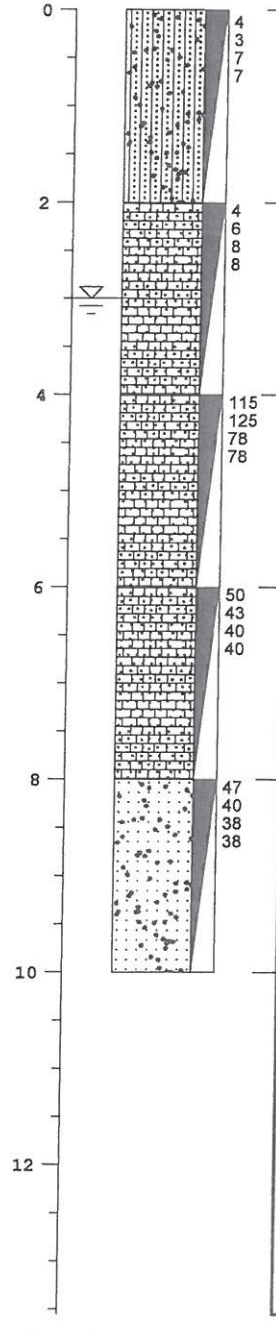
WINGERTER LABORATORIES INC.
Professional Engineering & Testing

LOG OF TEST BORING

BORING NO.: B-1

PROJECT: *Frederick Douglass Gym - Bahama Village*
CLIENT: *Concrete Analysis & Testing Laboratories, Inc.*
LOCATION: *111 Olivia Street, Key West Florida*
DRILLER: *JC*
DRILL RIG: *CMS*
DEPTH TO WATER> INITIAL *3.0 feet 3.0 feet*

PROJECT NO.: *13-1194*
DATE DRILLED: *6/06/2013*
ELEVATION: *existing*
LOGGED BY: *SC*



ELEVATION/ DEPTH	SOIL SYMBOLS, SAMPLERS AND TEST DATA	Description	STANDARD PENETRATION TEST			
			SAMPLE NO.	DEPTH	N	N-Value Curve
		Gray SILTY SAND with trace fragmented limestone	1	0.0-2.0	10	
		Tan FRAGMENTED LIMESTONE with trace limesand	2	2.0-4.0	14	
		Tan FRAGMENTED LIMESTONE with some limesand	3	4.0-6.0	203	203 →
		Tan FRAGMENTED LIMESTONE with some limesand	4	6.0-8.0	83	83 →
		Tan SAND with some fragmented limestone	5	8.0-10.0	78	78 →
		Boring terminated at 10 feet below existing land surface.				

N-Value Curve: 10 20 30 40 50 60

Near southwest exterior corner of building

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Figure

WINGERTER LABORATORIES INC.
Professional Engineering & Testing

LOG OF TEST BORING

BORING NO.: B-2

PROJECT: *Frederick Douglass Gym - Bahama Village*
CLIENT: *Concrete Analysis & Testing Laboratories, Inc.*
LOCATION: *111 Olivia Street, Key West Florida*
DRILLER: *JC*
DRILL RIG: *CMS*
DEPTH TO WATER> INITIAL *3.0 feet 3.0 feet*

PROJECT NO.: *13-1194*
DATE DRILLED: *6/06/2013*
ELEVATION: *existing*
LOGGED BY: *SC*

ELEVATION/ DEPTH	SOIL SYMBOLS, SAMPLERS AND TEST DATA	Description	STANDARD PENETRATION TEST			
			SAMPLE NO.	DEPTH	N	N-Value Curve
0	5 8 10 10	Tan FRAGMENTED LIMESTONE with trace silty sand	1	0.0-2.0	18	
2	27 46 74 74	Tan FRAGMENTED LIMESTONE with trace silty sand	2	2.0-4.0	120	120 →
4	56 72 50 50	Tan FRAGMENTED LIMESTONE and SILTY SAND	3	4.0-6.0	122	122 →
6	68 73 56 56	Tan FRAGMENTED LIMESTONE with trace limesand	4	6.0-8.0	129	129 →
8	55 45 67 67	Tan FRAGMENTED LIMESTONE with trace limesand	5	8.0-10.0	112	112 →
10		Boring terminated at 10 feet below existing land surface.				
12						

N-Value Curve: 10 20 30 40 50 60

Near northeast exterior corner of building

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

WINGERTER LABORATORIES, INC. 1820 N.E. 144th Street * North Miami, FL 33181 (305) 944-3401 1-800-345-SOIL

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand with trace fragmented limestone

Limestone with trace limesand

Sand with trace fragmented limestone

Fragmented limestone and silty sand

Misc. Symbols

Water table during drilling

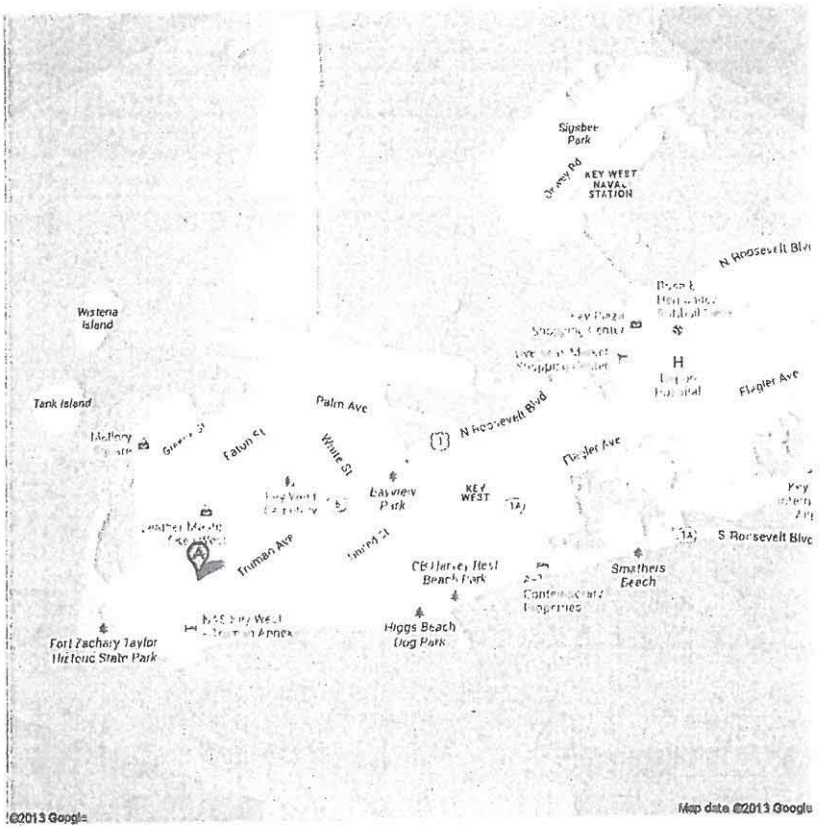
Soil Samplers

Standard penetration test

APPENDIX B

TEST BORING LOCATION MAP

SITE LOCATION MAP



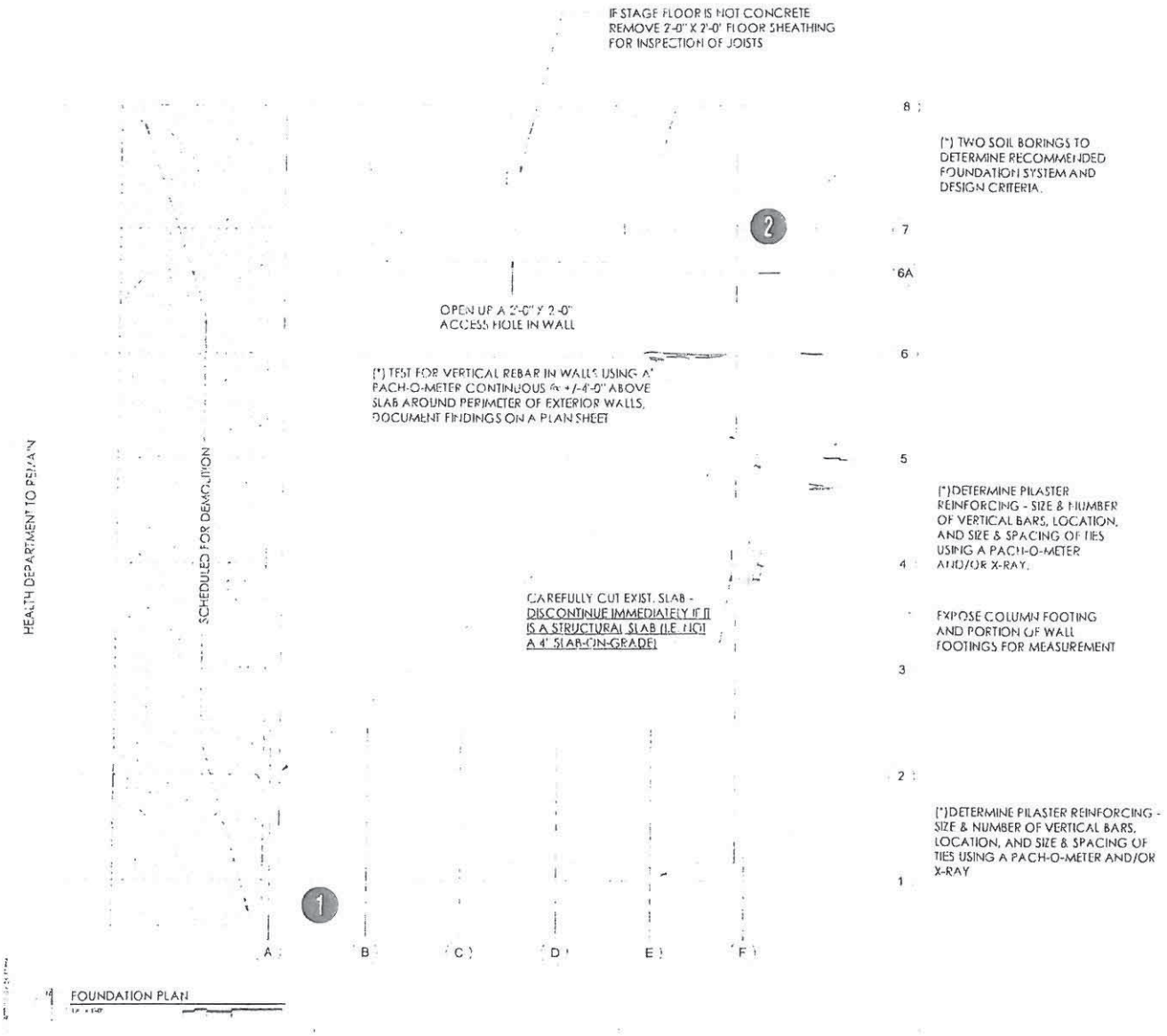
WINGERTER LABORATORIES INC.

Professional Engineering & Testing

1820 N.E. 144th Street, North Miami, Florida 33161

Concrete Analysis & Testing Laboratories, Inc.
Project: Frederick Douglass Recreation Center - Bahama Village
111 Olivia Street, Key West Florida
WLI Order No. 13-1194

TEST BORING LOCATION MAP



● Test Boring Location

WINGERTER LABORATORIES INC.

Professional Engineering & Testing

1820 N.E. 144th Street, North Miami, Florida 33161

Concrete Analysis & Testing Laboratories, Inc.
Project: Frederick Douglass Recreation Center - Bahama Village
111 Olivia Street, Key West Florida
WLI Order No. 13-1194

APPENDIX B:

Cores & Compressive Strength Testing

Concrete Analysis & Testing Laboratories, Inc.

PO Box 500875
Marathon, FL 33050
305-743-5555 Office 305-743-0635 Fax
FDOT# I04014 & CMEC Certified

June 10, 2013

hayes | cumming architects, pa
2210 Central Avenue, Suite 100
St. Petersburg, FL 33712

FREDERICK DOUGLASS RECREATION CENTER - Project #12.0D01

Column 4, Line F

The column is 14.5 inches X 16 inches and runs the height of the building. The pile cap is 66 inches X 60 inches and a depth of 11 inches. There were 3 test cores drilled and labeled 1, 2, and 3. Core #1 was drilled horizontally into the column to a depth of 12 inches, a #3 hoop was found at a height of 15 inches above the top of the pile cap.

Core #1 and Core #2 were drilled from the pile cap. Core #1 was drilled the entire depth of the pile cap. It's length was 11 inches with 2-#5 rebars one located at 1.5 inches from the bottom of the pile cap and the other was 2.5 inches from the bottom of the pile cap. Core #2 was drilled the entire depth of the pile cap. It's length was 9 inches with 1-#5 rebar located at the very bottom of the pile cap.

The concrete floor was 5 inches in thickness with no vapor barrier found, and reinforcement was wire mesh 6 inches X 6 inches #10. There was no void between the concrete and limerock fill material. The concrete floor was not connected or tied to the pile cap (non structural).

The grade beam is 16 inches wide and the depth varied +/-16 inches. It was placed directly on top of the solid limerock strata. There is no indication of settling, but it appears some areas have a high chloride content.

Attachments:

- Chloride Content Report
- Compressive Strength Report Cores #1, #2, and #3
- Pile Cap and Column Diagram (Core Locations)

Respectfully Submitted,

William L Mathews
Laboratory Manager

REPORT OF CORED CYLINDER TEST

Concrete Analysis & Testing Laboratories, Inc
PO Box 500875 Marathon, FL 33050

Report Date: 6/17/13

Project Number: Frederick Douglass Rec Center Report Number: 1
Project: Frederick Douglass Recreation Center, Key West, FL
Client: Hayes/Cumming Architects, PA
Address: 2210 Central Avenue, Suite 100
St. Petersburg, FL 33712
Attn: Alexander Smith

SAMPLING INFORMATION (ASTM C 42)

Date Sampled: 6/6/2013 Time Sampled: NA

Technician: WLM

Date Placed:

Location of Sample: See Cover Letter

Supplier: NA

Mix Number: NA

Design Strength: NA

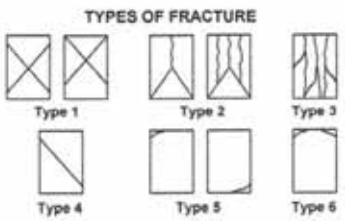
LABORATORY TEST RESULTS (ASTM C 39)

Specimen	Test Date	Age	Load	Diameter	Area	Un-capped Height	Capped Height	Strength	Percent of Design	Type of Fracture
A			7055	1.72	2.32	3.98		3040		3
B			9540	1.72	2.32	3.98		4110		3

Remarks: Cores Prepared to Length & Planeness
Perpendicularity.

Age: +/- 30 years

Copies to:



Reported by:

William Mathews
Concrete Laboratory Supervisor

REPORT OF CORED CYLINDER TEST

Concrete Analysis & Testing Laboratories, Inc
PO Box 500875 Marathon, FL 33050

Report Date: 6/17/13

Project Number: Frederick Douglass Rec Center Report Number: 2
Project: Frederick Douglass Recreation Center, Key West, FL
Client: Hayes/Cumming Architects, PA
Address: 2210 Central Avenue, Suite 100
St. Petersburg, FL 33712
Attn: Alexander Smith

SAMPLING INFORMATION (ASTM C 42)

Date Sampled: 6/6/2013 Time Sampled: NA

Technician: WLM

Date Placed:

Location of Sample: See Cover Letter

Supplier: NA

Mix Number: NA

Design Strength: NA

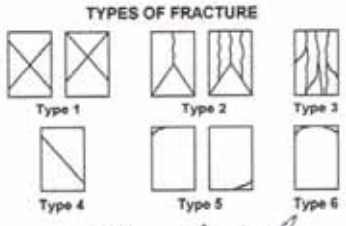
LABORATORY TEST RESULTS (ASTM C 39)

Specimen	Test Date	Age	Load	Diameter	Area	Un-capped Height	Capped Height	Strength	Percent of Design	Type of Fracture
A			8590	1.72	2.32	3.98		3700		3
B			9130	1.72	2.32	3.98		3940		3

Remarks: Cores Prepared to Length & Planeness
Perpendicularity.

Age: +/- 30 years

Copies to:



Reported by: _____

William Mathews
Concrete Laboratory Supervisor

REPORT OF CORED CYLINDER TEST

Concrete Analysis & Testing Laboratories, Inc
PO Box 500875 Marathon, FL 33050

Report Date: 6/17/13

Project Number: Frederick Douglass Rec Center Report Number: 3
Project: Frederick Douglass Recreation Center, Key West, FL
Client: Hayes/Cumming Architects, PA
Address: 2210 Central Avenue, Suite 100
St. Petersburg, FL 33712
Attn: Alexander Smith

SAMPLING INFORMATION (ASTM C 42)

Date Sampled: 6/6/2013 Time Sampled: NA

Technician: WLM

Date Placed:

Location of Sample: See Cover Letter

Supplier: NA

Mix Number: NA

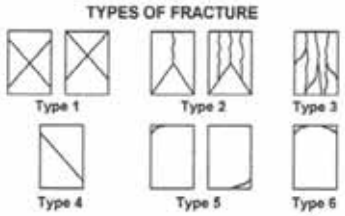
Design Strength: NA

LABORATORY TEST RESULTS (ASTM C 39)

Specimen	Test Date	Age	Load	Diameter	Area	Un-capped Height	Capped Height	Strength	Percent of Design	Type of Fracture
A			4665	1.72	2.32	3.98		2010		3
B			5170	1.72	2.32	3.98		2230		3

Remarks: Cores Prepared to Length & Planeness
Perpendicularity.
NOTE:Air Voids During Placement(Lack of Vibrating)
Age: +/- 30 years

Copies to:

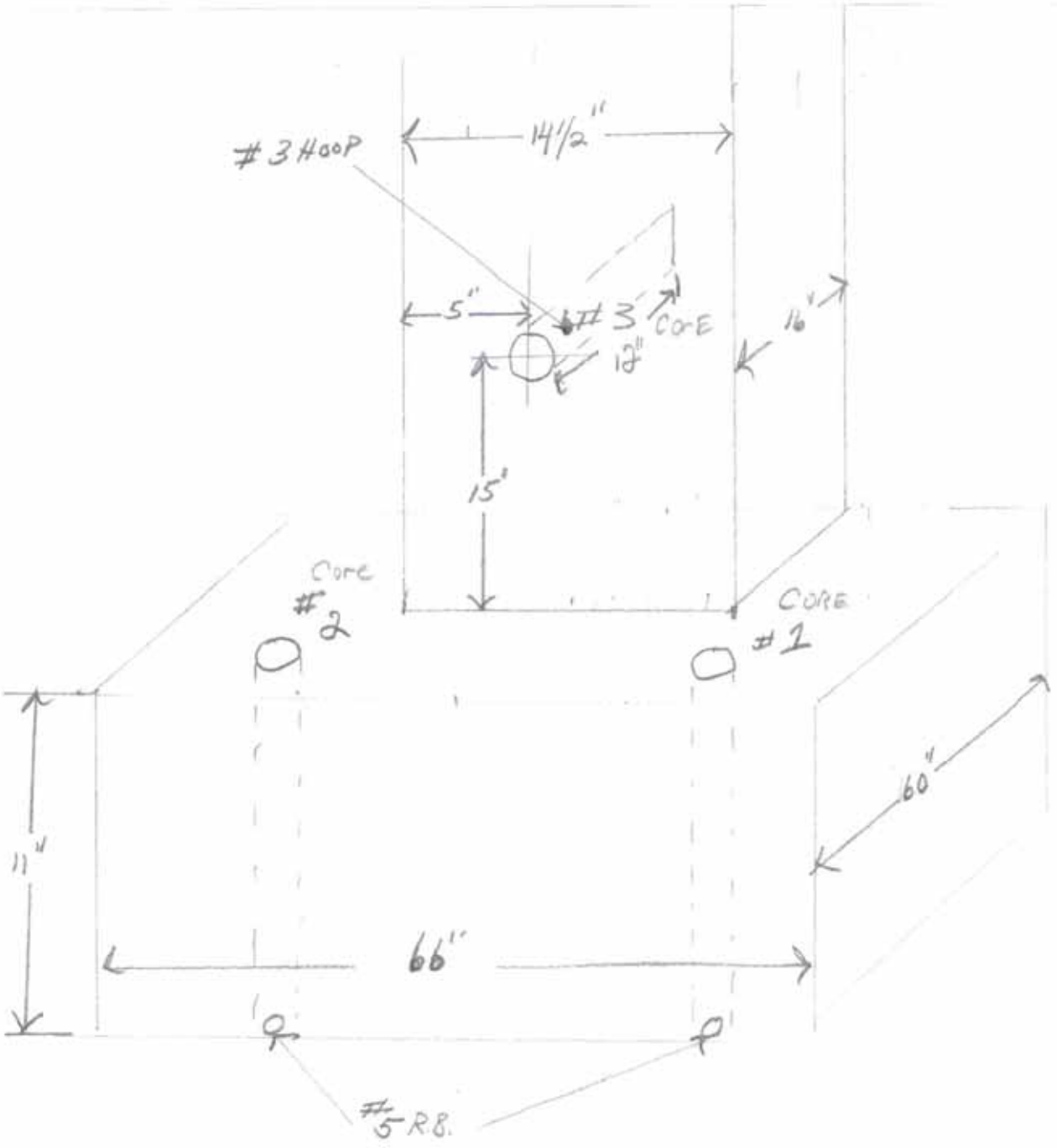


Reported by:

William Mathews
Concrete Laboratory Supervisor

Concrete Analysis & Testing Laboratories, Inc.

PO Box 500875
Marathon, FL 33050
305-743-5555 Office 305-743-0635 Fax
FDOT# I04014 & CMEC Certified



FREDERICK DOUGLAS RECREATION BUILDING

LINE F
COLUMN 4

Concrete Analysis & Testing Laboratories, Inc.

PO Box 500875
Marathon, FL 33050
305-743-5555 Office 305-743-0635 Fax
FDOT# I04014 & CMEC Certified

June 10, 2013

FREDERICK DOUGLASS RECREATION CENTER - Project #12.0D01

Respectfully Submitted,

William L Mathews
Laboratory Manager

APPENDIX C:

Structural Assessment & Design for Compliance with 2010 FBC

McCarthy and Associates, Inc.
CONSULTING•ENGINEERS

FREDERICK DOUGLAS RECREATION CENTER

Building Location:
111 Olivia Street
Key West, Florida

Limited Structural Assessment
Task A
McCarthy Project No.13178

Prepared by:
McCarthy and Associates, Inc.

July 8, 2013

McCarthy and Associates, Inc.
CONSULTING•ENGINEERS

2555 Nursery Road, Suite 101
Clearwater, FL 33764
Phone: (727) 536-8772
Fax: (727) 538-9125
www.mccarthyassoc.com

July 8, 2013

Mr. Andrew Hayes
Hayes/Cumming Architects P.A.
2210 Central Avenue, Suite 100
St. Petersburg, FL 33712

Re: Frederick Douglas Recreation Center
Limited Structural Assessment – Task A
111 Olivia Street
Key West, Florida
McCarthy Project No. 13178

Dear Andy:

At your request, we have completed Task A which includes an on-site structural analysis and structural evaluation. An assessment report is enclosed.

Sincerely,
McCarthy and Associates, Inc.

E. M. McCarthy

E. Michael McCarthy, P.E.
President

Enclosure: Assessment Report

TABLE OF CONTENTS

A. Background . . . . . Page 2

B. Task and Scope . . . . . Page 2

C. Limitations. . . . . Page 2

D. Description. . . . . Page 2

E. Current Code Analysis. . . . . Page 3

F. Summary . . . . . Page 4

G. Attachments . . . . . Page 4

1. Photographs
2. Foundation Plan
3. Roof Framing Plan

A. Background:

The Frederick Douglas Recreation Center was originally built in the 1950's with a subsequent addition and renovations at a later date. The scope of this project is limited to the original 1950's gymnasium section. The adjacent health department and single story area containing offices, restrooms, kitchen, and entry canopy are not included. The single story area on the south side of the gymnasium was evaluated under a separate project and is currently reinforced with temporary shoring.

B. Task and Scope:

1. Specify on-site testing (exploratory demolition, and repair will be performed by a contractor).
2. Review readily accessible areas of the building to evaluate its structural integrity.
3. Review testing results.
4. Identify structural concerns and deficiencies.
5. Document the existing structural system for use in analysis.
6. Analyze the building to determine compliance with 2010 Florida Building Code (FBC).
7. Recommend repairs needed to restore the building to its original condition.
8. Recommend upgrades needed to meet the 2010 FBC.
9. Prepare a structural assessment report.
10. Meet with City officials and Hayes/Cumming in Key West to answer questions.

C. Limitations:

Information for this structural assessment was obtained solely from visual observations at the site and the results from on-site testing and exploratory demolition. The testing and exploratory demolition reports are not included in this report but may be obtained separately. The original construction documents were not available. Additionally, non-structural engineering services and flood analysis were not included in our scope of services.

D. Description:

The gymnasium is a single story facility with an elevated stage and moveable bleachers. Please refer to the attached photographs. The roof appears to be constructed with fiberboard on bulb tees. Typically, there is poured gypsum on top of the fiberboard and the bulb tees are welded to the supporting joists. This was a common roof system in the 1950's. The bulb tees are supported

by steel bar joists which in turn are supported by steel girder trusses. The girder trusses bear on concrete columns. The exterior walls consist of 4 – 5" thick unreinforced masonry with concrete beams at the roof and above and below the horizontal windows. The ground floor slab is 5" thick concrete and reinforced with welded wire fabric. The slab bears on grade without a vapor barrier. The foundations for both columns and load-bearing walls are conventional concrete spread footings bearing directly on the lime rock strata below. The building appears to have been designed for wind loads in the longitudinal directions using two horizontal "trusses" to carry forces to the exterior walls. Wind loads in the transverse direction are transferred to the concrete columns by moment-resisting end connections.

The gymnasium appears to be well maintained considering its age and no significant structural deficiencies or concerns were found.

E. Current Code Analysis:

The current building code in effect is the 2010 Florida Building Code (FBC) as adopted by the Code of Ordinances City of Key West. The unimproved existing building does not need to comply with the current code but the City may voluntarily upgrade all or a portion of the building to meet the current code. Specifically, structural loading requirements for this building under the 2010 FBC include:

1. Roof live load = 20 psf
2. Ultimate basic wind speed = 200 mph (3 sec gust)
3. Equivalent nominal basic wind speed = 155 mph (3 sec gust)
4. Risk Category = III
5. Exposure Category = C
6. Enclosed building internal pressure coefficient = +/- 0.18
7. Wind born debris region

The results of our analysis indicate the roof deck, lateral wind resisting system, steel joists, steel girder trusses, and exterior walls would have to be reinforced in order to meet the 2010 FBC. Specific structural upgrades are listed below and shown graphically on the attached plans:

1. Remove the existing roof and install new metal decking, insulation, and roofing.
2. Cut free the bottom chord connection to the concrete column at each end of each girder truss.
3. Reinforced specific web members at each girder truss.

4. Install new steel beams and columns inside all exterior walls.
5. A generous contingency should be included to account for unforeseen conditions.

F. Summary:

We found the gymnasium portion of the existing building to be in fairly good condition considering its age. No significant structural concerns, such as cracking, deflections, deterioration were found. The unimproved building does not need to meet the current 2010 FBC but may be all or partially reinforced to comply on a voluntary basis. Specific structural upgrades are recommended herein.

G. Attachments:

1. Photographs
2. Foundation Plan
3. Roof Framing Plan

Frederick Douglas Recreation Center – Photographs
Limited Structural Assessment – Task A
McCarthy Project No. 13178

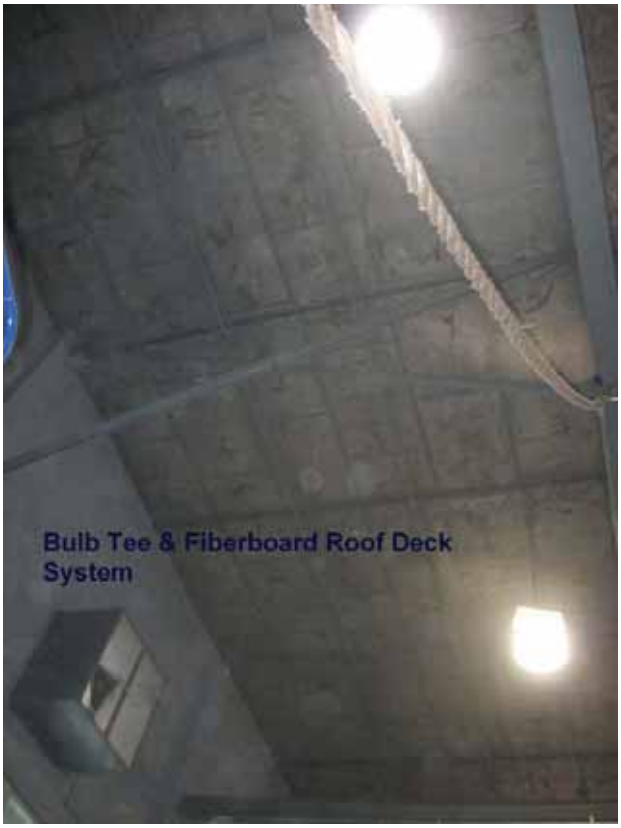


Photo #01

Photo #02

Frederick Douglas Recreation Center – Photographs
Limited Structural Assessment – Task A
McCarthy Project No. 13178

Photo #03

Photo #04

Frederick Douglas Recreation Center – Photographs
Limited Structural Assessment – Task A
McCarthy Project No. 13178

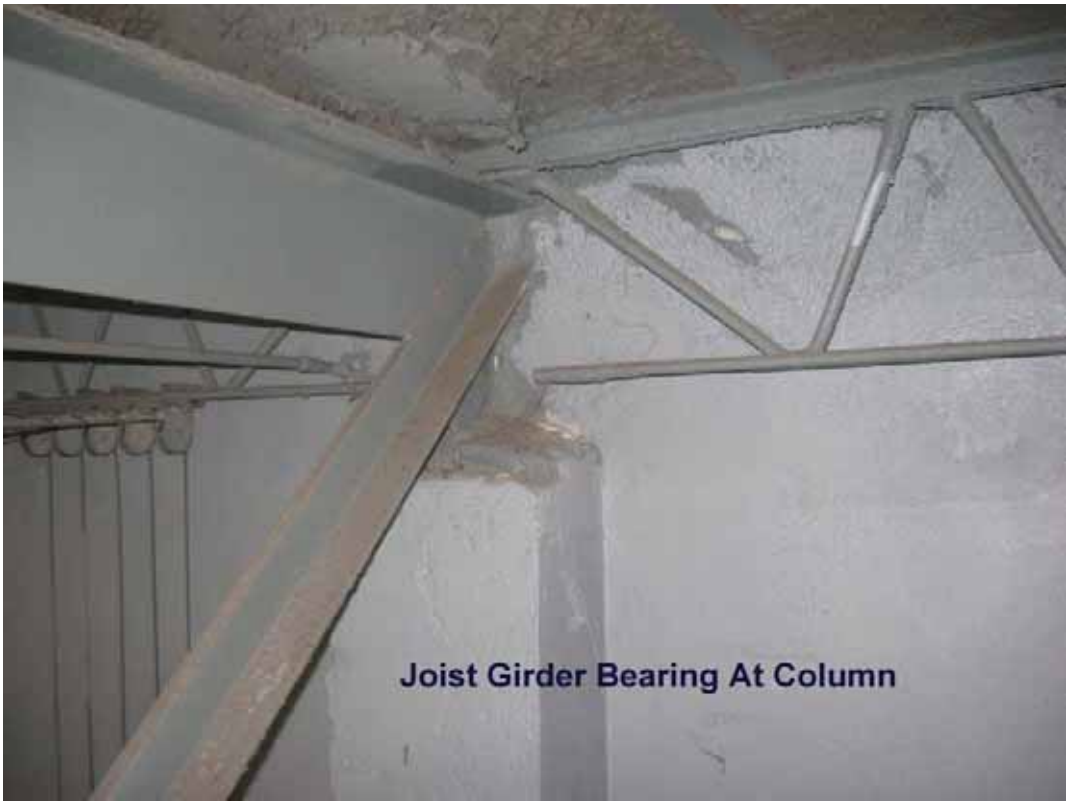


Photo #05

Photo #06

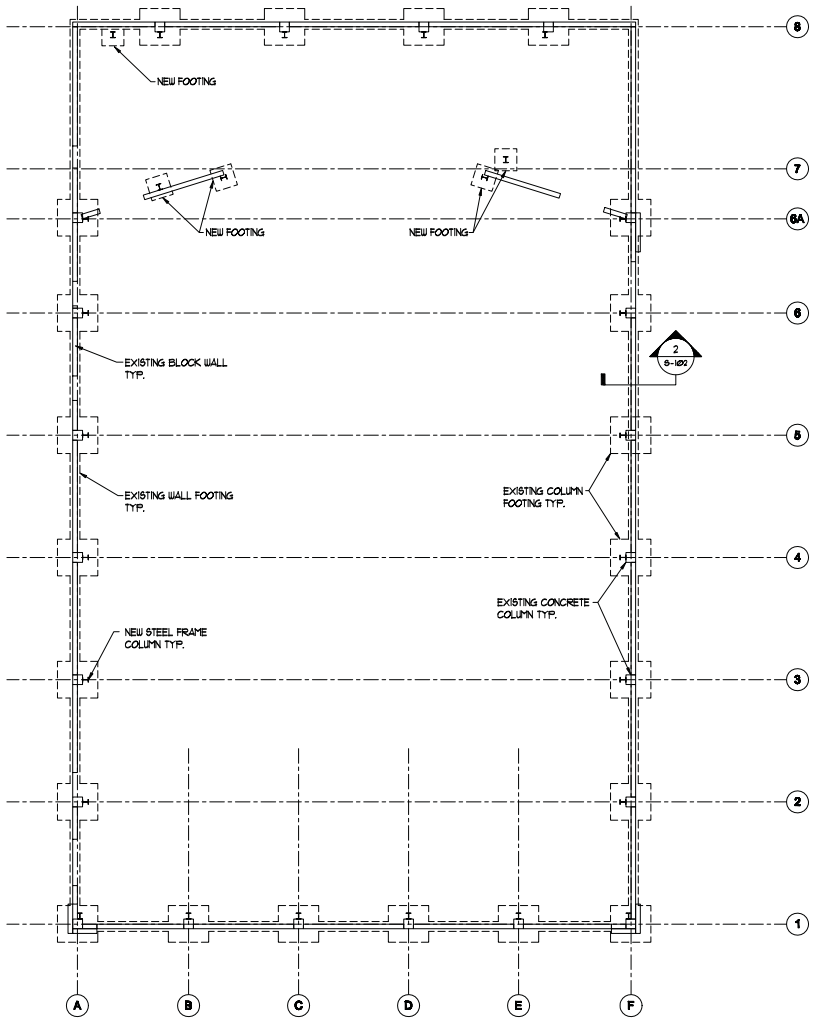
Frederick Douglas Recreation Center – Photographs
Limited Structural Assessment – Task A
McCarthy Project No. 13178

Photo #07

Photo #08

Frederick Douglas Recreation Center – Photographs
Limited Structural Assessment – Task A
McCarthy Project No. 13178

Photo #09



EXISTING FOUNDATION PLAN

SCALE: 1/8" = 1'-0"

DESIGN CRITERIA:

2010 FLORIDA BUILDING CODE

GRAVITY DESIGN LOADS:

AREA	SUPERIMPOSED LIVE LOAD	TOTAL DEAD LOAD
ROOF	20 PSF	15 PSF

WIND DESIGN CRITERIA:
ULTIMATE BASIC WIND SPEED: VULT = 200 MPH (3 SECOND GUST)
EQUIVALENT NOMINAL BASIC WIND SPEED VASD = 155 MPH (3 SECOND GUST)
RISK CATEGORY = III
EXPOSURE CATEGORY = C
ENCLOSED BUILDING INTERNAL PRESSURE COEFFICIENT, GCPI= +/-0.18
WIND BORNE DEBRIS REGION

FOUNDATION PLAN NOTES:

ACCORDING TO THE VISUAL STRUCTURAL INSPECTION REPORT BY WINGERTER DATED JUNE 18, 2013 AND THE MATERIAL TESTING PERFORMED BY CONCRETE ANALYSIS & TESTING LABORATORIES, INC. DATED JUNE 10, 2013, THE FOLLOWING INFORMATION WAS PROVIDED FOR THE EXISTING STRUCTURE.

1. SOIL BEARING PRESSURE= 4000 PSF
2. EXISTING CONCRETE COLUMNS: 14½"x16" (2010 PSI) W/ (4) #9 VERT. BARS & #5 @ 12" O.C.
3. EXISTING CONCRETE COLUMN FOOTINGS: 5'-6"x5'-0"x11" W/ #5 REBAR @ BOTTOM OF FOOTING.
4. EXISTING WALL FOOTINGS: 1'-4" WIDEx1'-4" DEEP CONTINUOUS FOOTING.
5. EXISTING CONCRETE SLAB-ON-GRADE: 5" THICK SLAB W/ 6"x6" #10 WIRE MESH.
6. EXISTING BLOCK WALLS: 4"-5" THICK BLOCK WALL W/ NO VERTICAL REINFORCING.
7. CONCRETE BEAMS ABOVE WINDOWS: 12"-18" IN HEIGHT W/ (4) #5 BARS CONT. & NO STIRRUPS.
8. CONCRETE BEAMS BELOW WINDOWS: 8"-12" IN HEIGHT W/ (2) #5 BARS CONT. & NO STIRRUPS.

GROSS ULTIMATE WIND LOADS MAIN ROOF
ROOFING MATERIALS

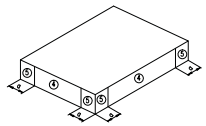
COMPONENTS AND CLADDING	ROOF ZONE		
	1	2	3
PRESSURE (psf)	41.3	41.3	41.3
SUCTION (psf)	-101.6	-170.5	-256.6

NET ULTIMATE WIND LOADS MAIN ROOF
JOISTS OR TRUSSES

COMPONENTS AND CLADDING	ROOF ZONE		
	1	2	3
PRESSURE (psf)	33.6	33.6	33.6
SUCTION (psf)	-93.8	-114.5	-120.5

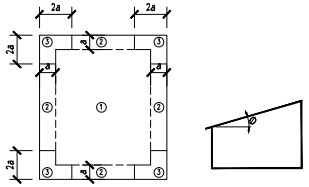
ULTIMATE WIND PRESSURES (PSF)
EXTERIOR DOORS, WINDOWS, WALLS

EFFECTIVE AREA (ft²)	ZONE 4		ZONE 5	
	PRESSURE	SUCTION	PRESSURE	SUCTION
1 TO 20	93.0	-100.7	93.0	-124.0
21 TO 50	88.7	-96.4	88.7	-115.4
51 TO 100	83.5	-91.3	83.5	-105.0
101 TO 150	79.2	-87.0	79.2	-96.4
151 TO 250	76.6	-84.4	76.6	-92.1
251 TO 500	74.0	-81.8	74.0	-86.1
501 + ABOVE	69.7	-77.5	69.7	-77.5



DOORS, WINDOWS AND WALLS

1. a= 7.5 FT
2. THIS BUILDING IS DESIGNED AS AN ENCLOSED STRUCTURE. ALL EXTERIOR COMPONENTS (DOORS, WINDOWS, ETC.) MUST BE DESIGNED TO WITHSTAND THE WIND LOADINGS SPECIFIED FOR THE DESIGN OF COMPONENTS AND CLADDING IN THE TABLES. IN ADDITION, ALL AREAS OF EXTERIOR GLAZING MUST BE CERTIFIED FOR MISSILE IMPACT OR PROTECTED BY WIND-BORNE DEBRIS BY A SCREEN BARRIER.
3. TO CONVERT THE (ASCE 7-10) ULTIMATE WIND PRESSURES IN THE TABLES ABOVE TO (ASD) WIND PRESSURES, MULTIPLY EACH VALUE BY 0.6.



FLAT ROOF ($\theta \leq 3°$)

COMPONENT AND CLADDING LOADING DIAGRAMS

THIS DRAWING IS NOT FOR CONSTRUCTION. IT HAS BEEN ISSUED FOR GOVERNMENTAL REVIEW AND/OR PRELIMINARY PRICING ONLY.

hayes | cumming
architects

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ph 727.321.0900
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AA26001260
hc-arc.com

andrew m. hayes, ala. lead bd+c
paul v. cumming, ala. lead bd+c

members of
American Institute of Architects

CONSULTANT:

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(727) 536-8772
Florida Coa 4187
E. Michael McCarthy, P.E.
Florida P.E. 32629
McCarthy Project No. 13178

CLIENT / PROJECT NAME:

FREDERICK DOUGLASS RECREATION CENTER STRUCTURAL ASSESSMENT TASK A

111 OLIVIA STREET
KEY WEST, FLORIDA

Original drawing is 24"x36". Scale accordingly if reduced.

SHEET TITLE:

EXISTING FOUNDATION PLAN WITH UPGRADES TO 2010 FBC

REVISIONS:

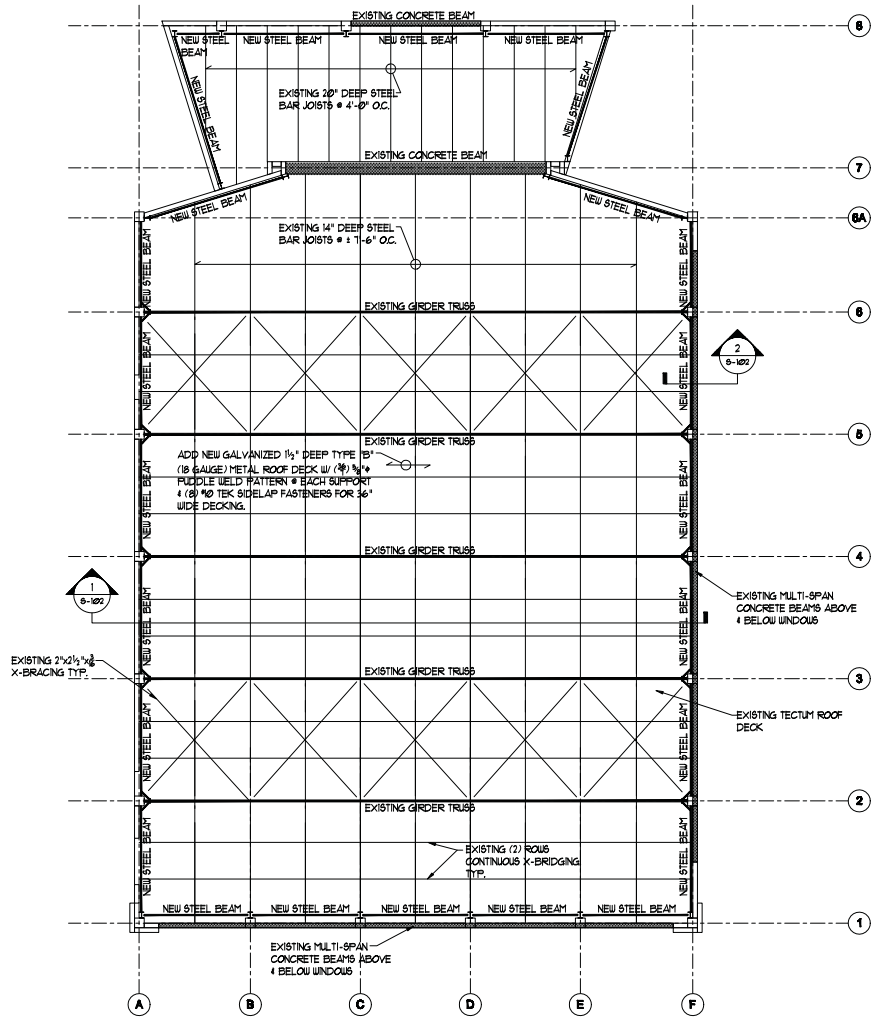
DATE ISSUED: JULY 08, 2013
PROJECT NO.: 12.0001

DRAWING NUMBER:

S-101 SHEET: OF 2

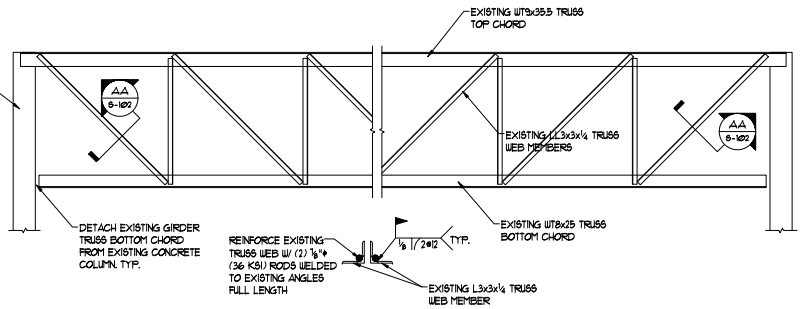
NOT FOR CONSTRUCTION - NOT FOR FINAL PRICING - SUBJECT TO CHANGE

07-02-2013 M1



EXISTING ROOF FRAMING PLAN

SCALE: ⅛" = 1'-0"

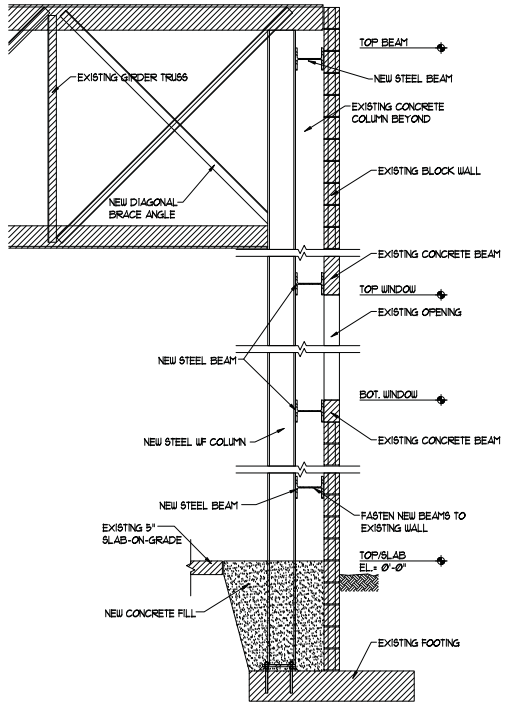


ADDITIONAL WEB REINFORCING

AA

EXISTING GIRDER TRUSS

1



NEW STEEL FRAME

2

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Florida Coa 4187
E. Michael McCarthy, P.E.
Florida P.E. 32629
McCarthy Project No. 13178

CLIENT / PROJECT NAME:

FREDERICK DOUGLASS RECREATION CENTER STRUCTURAL ASSESSMENT TASK A

111 OLIVIA STREET
KEY WEST, FLORIDA

Original drawing is 24"x36". Scale accordingly if reduced.

SHEET TITLE:

EXISTING ROOF FRAMING PLAN WITH UPGRADES TO 2010 FBC

REVISIONS:

NOT FOR CONSTRUCTION - NOT FOR FINAL PRICING - SUBJECT TO CHANGE

DATE ISSUED: JULY 08, 2013
PROJECT NO.: 12.0001

DRAWING NUMBER:

S-102 SHEET: OF 2

07-07-2013 M1