Water Authority of the Cayman Islands

Inspection and Cleaning of Air Conditioning Ducts, Water Authority Administration and Operations Buildings, Red Gate Road

PLEASE READ THIS IMPORTANT NOTE:

The Tender Documents for the above project can be obtained from the Deputy Director, Water Authority, 13G Red Gate Road, George Town.

The Tender Documents can also be downloaded directly from the Water Authority's website at www.waterauthority.ky

All companies who obtain a set of the Tender Documents from the above website must immediately acknowledge receipt of these documents by sending an e-mail to ContractReview@waterauthority.ky, and include the company name, company physical address and contact e-mail address.

This acknowledgement is essential in order to be able to provide potential tenderers with any Tender Addenda when issued.

For additional information contact us at ContractReview@waterauthority.ky

Water Authority of the Cayman Islands

Inspection and Cleaning of Air Conditioning Ducts, Water Authority Administration and Operations Buildings, Red Gate Road

Tender Documents

14 August 2017

Introduction

This document is the standard document for the construction of building works, used by the Water Authority of the Cayman Islands in connection with the Video Inspection and Cleaning of Air Conditioning Ducts at Water Authority Administration and Operations buildings, Red Gate Road.

It is based on, and should be read in conjunction with the "Short Form of Contract, First Edition (1999)", as prepared by the Federation Internationale Des Ingenieurs Conseils (FIDIC), modified and added to as indicated. A copy of these conditions is attached to this document),

Brief Description of the Works

The Works comprise the video inspection and cleaning of the air conditioning ducts at the Water Authority Administration and Operations buildings, Red Gate Road, George Town

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FIDIC Short Form of Contract	attached
Tender Drawings and Specifications	attached

Instructions for Tendering

Introduction

1. These instructions are to be used as a guide to Tendering for this project. Failure to comply with these Instructions may result in the rejection of the Tender.

Relevant Documents

2. Tenderers shall study all the "Tender Documents" comprising the Conditions of Contract, Specifications, Tender Drawings, Agreement (comprising Offer, Acceptance and Appendix) and Schedule (including Schedule of Rates). The whole of the Tender Documents shall be read and their true intent and meaning ascertained before the Schedule of Rates is priced.

3. No unauthorised alteration or addition is to be made to the Specifications, Tender Drawings, Agreement and Schedule of Rates. Any qualification made to a Tender may result in the Tender being rejected.

4. Except in so far as may be directed by the Water Authority in writing neither the Water Authority, nor any agent or servant in their employment has any authority to make any representation or explanation to Tenderers as to the meaning of these Tender Documents, or as to anything to be done or not to be done, or as to these instructions, or as to any other thing or matter, so as to bind the Water Authority as to the execution of these proposals.

5. Should any alteration or addition to the Tender Documents be deemed necessary prior to the date for submission of Tenders, these shall be issued by e-mail by the Deputy Director of the Water Authority to Tenderers in the form of a Tender Addendum.

   If a Tenderer is in doubt about the meaning of any item in the Tender Documents he shall notify the Water Authority by e-mail not later than 7 days before the due date for tender submission (ContractReview@waterauthority.ky). The Deputy Director of the Water Authority shall then issue to all Tenderers an explanation in the form of a Tender Addendum.

   Each Tender Addendum shall have a serial number and Tenderers shall acknowledge receipt of each Tender Addendum by e-mail to ContractReview@waterauthority.ky .. Failure to acknowledge may result in a Tender being rejected. All Tender Addenda so issued become a part of the Tender Documents.

6. The Contract shall be carried out on a Firm Price basis and no adjustment shall be made to any amounts payable by the Water Authority to the Contractor as a consequence of any variations in the cost of labour, plant, materials or transport.

7. Tenders shall only be accepted for the whole of the Works.

8. Tenderers shall treat the Tender Documents and all details contained therein as private and confidential.

Rates to be Entered

9. All items in the Bill of Quantities shall either be priced or alternatively the word "included" shall be entered in the rate or price column, whether quantities are stated or not. If neither of these two alternatives are adopted the Tenderer shall be held to have included for any such item left blank in his other prices or rates in the Schedule of Rates.

10. All rates submitted shall be in Cayman Islands dollars

Rates to be Inclusive

11. The prices to be inserted in the Schedule of Rates are to be the full inclusive value of the work described in the Specification and under the several items, including all costs and expenses which may be required in and for the construction of the work described, together with all general risks, liabilities and obligations set forth or implied in the documents on which the tender is based.

12. Persons tendering are cautioned that no variations or extras whatsoever shall be acknowledged or paid for by the Employer unless an order in writing signed by the Employer's Representative and specifying the nature, extent and character of each particular item or items to be paid for as an extra has been obtained by the Contractor before such work has been carried out.

Time for Completion

13. Attention is directed to the fact that if the Contractor shall fail or neglect to complete the works within the time specified in the Appendix he shall pay to the Employer as liquidated and ascertained damages and not by way of penalty a sum detailed in the Appendix for each day during which any part of the work shall, by the Contractor's default, remain unfinished after the expiration of the period for completion. If in the opinion of the Water Authority the work has been delayed owing to abnormal bad weather, the Water Authority may extend the time for completion of the work as they may consider fair and reasonable.

Preparing Tender

14. Contractors who submit a Tender shall be held to have by their own independent observations and enquiries fully informed and satisfied themselves as to the nature, extent and practicability of the Works, the means of access to the Works, the places where materials can be obtained and disposed of, and all other points which can in any way affect the rates inserted in the Schedule of Rates.

    It is mandatory that Contractors arrange a visit to the properties to familiarize themselves regarding the site conditions, the extent of the work etc. Please make any request for a site visit by e-mail (ContractReview@waterauthority.ky).

15. The Water Authority shall not be responsible for any costs or expenses incurred in the preparation and submission of the Tender.

16. The Water Authority shall not be responsible for the omission, by the Contractor, of any items that are detrimental to the successful completion of the Works.

Return of Tenders

17. Tenderers shall be supplied with an electronic copy of the following documents: the Tender Documents, which includes the Specification; the FIDIC Short Form of Contract; and the Tender Drawings. One copy of the Tender Documents, which for the purpose of identification shall have each page signed by the Contractor, shall be duly completed, and sealed in an envelope (which envelope shall bear no name or mark indicating the Tenderer, but shall be marked 'Returned Tender for the Inspection and Cleaning of Air Conditioning Ducts at Water Authority buildings at Red Gate,) and delivered to:

    Deputy Director
    Water Authority - Cayman
    PO Box 1104
    13G Red Gate Road, George Town
    Grand Cayman KY1-1102

no later than 12:00 noon on Monday 04 September 2017.

18. Only tenders received on time will be accepted. Faxed or e-mailed summaries of tenders shall not be accepted as a substitute.

19. All entries and signatures shall be in indelible ink. No tender may be altered or amended after having been opened other than those alterations necessary to correct any arithmetic errors. Rates shall prevail where there is an arithmetic error in extension. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favour of the correct sum.

Information to be submitted by the Tenderer.

20. The Tenderer shall provide a list of the Sub-Contractors he proposes to use on the Works and the activities that each of the Sub-Contractors is to carry out, for approval by the Employer.

21. The Water Authority shall not be seen to have approved all or any part of the information submitted by the Tenderer unless the Tenderer is so notified in writing.

Award of Contract

22. Certain elements of the Tender are mandatory, failure to submit any mandatory information will determine that the tender is non-compliant and will be rejected.

    Mandatory Information (Pass or Fail):

    a. One completed and signed hard copy of the Tender Documents, incl. completed Agreement (page 8).

    b. Written descriptions of video inspection and cleaning methods to be utilized.

    c. References confirming the company's performance and quality on at least three (3) completed projects of similar scope.

    d. References confirming the project manager's performance on three (3) previously completed projects.

    e. Description of company's personnel and details of all equipment to be utilized on this Contract.

    f. Provide any affiliations that the company may have with recognised professional bodies related to the inspection and cleaning of air conditioning ducts.

23. All tenderers will be notified by e-mail of the outcome of the evaluation.

24. The Water Authority shall not be bound to accept the lowest or any of the Tenders. The Water Authority reserves its right to reject any or all Tenders, including, without limitation, the rights to reject any or all non-conforming, non-responsive, unbalanced or conditional Tenders, and to reject the Tender of any Tenderer if the Employer believes that it would not be in its best interest to make an award to that Tenderer, whether because the Tender is not responsive or fails to meet any other pertinent standard or criteria established by Employer.

25. Tenderers shall include in their tender submission a statement confirming that their business is "operating in compliance with all relevant Laws and Regulations of the Cayman Islands". Failure to include this statement will result in the tender not being accepted.

26. The award will be made on the basis of that Tender from the lowest responsive Tenderer which, in the Employer's sole and absolute judgment, will best serve the interest of the Employer.
27. The Employer will give the Successful Tenderer a Letter of Acceptance within thirty (30) days after the Tender Opening.

Conditions of Contract

The Conditions of Contract shall be Clauses 1 through 15 of "Short Form of Contract, First Edition (1999)", as prepared by the Federation Internationale Des Ingenieurs Conseils (FIDIC), modified and added to as shown below. A copy of the Conditions of Contract is attached to this Document.

Modifications and additions to Clauses

Clause 7 Time for Completion

Add the following at the end of sub-clause 7.2

"The Contractor shall maintain adequate staff and plant to comply with the approved Programme for the Works.

Clause 11 Contract Price and Payment

Add the following at the end of sub-clause 11.3:

"The Employer may withhold interim payments until he has received and approved a current and valid programme for the Works, as per sub-clause 7.2."

Delete sub-clause 11.8 and substitute with:

"In the event of the failure of the Employer to make payment within the times stated, the Employer shall pay to the Contractor interest upon all sums unpaid at a rate per annum equivalent to the interest rate at which the Cayman National Bank and Trust Company Limited would pay for such a deposit on the date upon which such payment first becomes overdue. In the event of any variation in the said Bank Rate being announced whilst such payment remains overdue the interest payable to the Contractor for the period that such payment remains overdue shall be correspondingly varied from the date of each such variation."

Clause 15 Resolution of Disputes

Delete the entire clause and replace with the following:

"Unless settled amicably, any dispute or difference which arises between the Contractor and the Employer out of or in connection with the Contract shall be settled by arbitration in accordance with the Cayman Islands Arbitration Law, 2012.

AGREEMENT

The Employer is The Water Authority of the Cayman Islands, P.O. Box 1104, 13G Red Gate Road, Grand Cayman KY1-1102, Cayman Islands.

The Contractor is _____ of

_____

The Employer desires the execution of certain Works known as **Inspection and Cleaning of Air Conditioning Ducts at Water Authority Administration and Operations Buildings, Red Gate Road**

OFFER

The Contractor has examined the documents listed in the Appendix, which forms part of this Agreement, and offers to execute the Works in conformity with the Contract for the sum of

_____ (in words)

_____ (in figures)

or such other sum as may be ascertained under the Contract.

This offer, of which the Contractor has submitted one signed original, may be accepted by the Employer by signing and returning a copy of these documents to the Contractor on or before 02 October 2017.

The Contractor understands that the Employer is not bound to accept the lowest or any offer received for the Works.

Signature: _____ Date: _____

Name: _____ Authorized to sign on behalf of: (organization name)

Capacity: _____ _____

ACCEPTANCE

The Employer has, by signing below, accepted the Contractor's offer and agrees that in consideration for the execution of the Works by the Contractor, the Employer shall pay the Contractor in accordance with the Contract. This Agreement comes into effect on the date when the Contractor receives one original of this document signed by the Employer.

Signature: _____ Date: _____

Name: _____ Authorized to sign on behalf of:

Capacity: _____ Water Authority of the Cayman Islands

In the presence of:

Name: _____

Capacity: _____

APPENDIX

This Appendix forms part of the Agreement.

Item	Sub-Clause	Data
Documents forming the Contract listed in the order of priority	1.1.1	
(a) The Agreement		
(b) Conditions of Contract		
(c) The Specification		
(d) The Drawings		See Attached List
(e) The Contractor's design		
(f) The Schedule of Rates		
Time for Completion	1.1.9	35 days
Law of the Contract	1.4	Cayman Islands Law
Language	1.5	English
Provision of Site	2.1	On the Commencement Date
Authorized person	3.1	Director of the Water Authority
Name and address of Employer's representative	3.2	Tom van Zanten, Deputy Director PO Box 1104, Grand Cayman KY1-1102
Performance security	4.4	None
Requirements for Contractor's design	5.1	None
Programme:		
Time for submission	7.2	Within 14 days of the Commencement Date
Form of programme	7.2	Gantt Chart with (as a minimum) detailed information on the activities identified in the Schedule of Rates
Amount payable due to failure to complete	7.4	CI$ 200.00 per day up to a maximum of 10% of the sum stated in the Agreement
Period for notifying defects	9.1 & 11.5	91 days calculated from the date stated in the notice under Sub-Clause 8.2

Continued on next page .....

Item	Sub-Clause	Data
Valuation of the Works		
Lump sum price with schedule of rates	11.1	As per completed Schedule of Rates
Percentage of value of materials and Plant	11.2	Not Applicable
Percentage of retention	11.3	10% of work done reduced to 5% at commencement of defects period
Currency of payment	11.7	Cayman Islands Dollars (CI$)
Insurances	14.1	
Type of Cover		Amount of Cover
The Works, Materials, Plant and fees	14.1.a	The sum stated in the Agreement plus 15%
Third Party injury to persons and damage to property	14.1.b	CI$ 500,000 for any one incident, and unlimited number of incidents
Workers	14.1.c	CI$ 500,000 for any one incident, and unlimited number of incidents

SCHEDULE OF RATES

Brief Description of the Works

The Water Authority – Cayman wishes to ensure that the indoor air quality of both its Administration and Operations buildings at Red Gate Road meet appropriate levels of well-being for its staff. As part of this contract the air conditioning ducts are to be video inspected before and after cleaning, cleaned and returned to normal operation. The supply air ducts comprise either galvanized metal, duct-board or flex ducting. The return air to the AHUs generally utilizes the ceiling plenums, ducted into the AHUs and through or over fire separation walls; the return air for the laboratory system is entirely ducted. Prior to commencing work the Contractor shall submit, for approval by the Engineer, a written procedure for the entire works together with a list of all materials and full details, including MSDS documents, for any proposed cleaning agents. Upon completion the Contractor shall submit a complete written report, including before and after video footage, and/or photographs, on the findings and processes carried out during the cleaning.

Note: Inspection of the AHUs,condenser units, and ceiling plenums does not form part of this contract

The Contractor shall carry out the Work in accordance with the General Specification and original construction drawings, which are supplied for information. Work on the individual air conditioning systems may be carried out separately or concurrently.

Administration Building

The air conditioning systems for the Administration building were originally installed and commissioned in late 1998. The installation was part of the original building construction contract.

The air conditioning system is currently split into three separate and independent sections:

a. General administration office

b. Laboratory

c. Lobby

The air conditioning system for the Laboratory area was replaced entirely in the latter half of 2010.

The air-handling units (AHUs) and condenser units (CUs) for the general administration office were replaced in mid-2012.

The lobby was provided with its own separate AHU and CU in mid-2012.

Operations Building

The air conditioning systems for the Water Authority Operations building were originally installed and commissioned in 2008. The installation was part of the original building construction contract.

The air conditioning system is currently split into two separate and independent sections:

a. Ground Floor

b. Second Floor

The sizes of the existing air conditioning systems are as follows:

Administration Building AHUs as follows:

1. Main office building: 2 x 15 ton units
2. Laboratory: 1 x 12.5 ton unit
3. Lobby: 1 x 5 ton unit

Operations Building AHUs as follows:

1. Ground floor: 1 x 20 ton unit
2. Second floor: 1 x 15 ton unit

All air conditioning systems are maintained quarterly including replacement of all filters.

Andover Continuum Building Management Software is used to automate and control the air conditioning systems

The Contractor must ensure that at the beginning of each business day (Monday – Friday) the air conditioning systems can be operated as designed (i.e. all service openings must be closed). The air conditioning system for the Laboratory cannot be off for more than 8 hours consecutively and must be reactivated for at least 12 hours before being interrupted again.

All materials and equipment necessary to complete the Works shall be supplied by the Contractor. The cost of all materials shall be included in the Contractor's rates. The Contractor shall satisfy himself about the materials he is to supply.

The Contractor shall provide all necessary safety equipment to ensure a safe working environment for all Water Authority staff as well as his own staff. The Contractor shall also provide adequate protection of the person and property of Water Authority Staff.

The Water Authority may wish to include the air conditioning duct cleaning as part of its annual maintenance programme, accordingly the Contractor shall include the cost of annual cleaning for the next three years in the Schedule of Rates.

Note:

Water Authority cannot confirm that the existing Air-Conditioning Systems as installed are in strict accordance with the original Construction Drawings

Programme of Works

The Contract shall be completed in 35 calendar days (i.e., 5 weeks).

All work shall be carried out between the hours of 5.30 pm and 6.30 am on business days (Monday through Friday) and at any time of day on weekends and Public Holidays, however work on weekends and Public Holidays must be approved in advance by the Water Authority. The Water Authority and Contractor will agree in advance of the works a sequence/schedule of areas to be inspected and cleaned. The works in the Laboratory will require seven days advance notice from the contractor prior to carrying out any works.

Preamble to Schedule of Rates

Introduction

This Preamble has been provided to clarify the intent, which the Water Authority of the Cayman Islands had in the preparation of the Schedule of Rates. This intent is to provide clearly such information as shall enable Tenderers to submit bids, which are readily comparable.

To avoid unnecessary length, item descriptions in the Schedule of Rates generally identify the component of the Works and not the tasks to be carried out by the Contractor. The exact nature and extent of the work is to be ascertained from the Drawings, Specification and Conditions of Contract.

All items required to complete the Works specified or shown on the Drawings but not included in the Schedule of Rates shall be considered incidental to those set forth in the Schedule of Rates.

The Schedule of Rates shall be used for the preparation of interim payment certificates. The Contractor shall submit with each interim payment request, a revised Schedule of Rates that shows the percentage of each item completed as of the submission date. No payment shall be made for any goods or materials delivered on the Site, and not yet incorporated in the Works.

Insurances

This item is to cover all the costs of providing and maintaining all the insurances required by the Contract (see Clause 14 of the Conditions of Contract).

The Contractor shall include this item in the first Monthly Statement.

Mobilization

The item is to allow the Contractor to include for his mobilization costs to the site.

This item shall not exceed ten percent (10%) of the total tender amount for this contract.

The Contractor shall include for this item on his first Monthly Statement.

Construction Works

The sums entered in the Schedule of Rates against the items shall include for the provision of materials, the installation of the materials, and for all the work involved in the satisfactory completion of the item in compliance with the Drawings and Specifications, which includes restoring the adjacent site and any facilities affected by the Work to a condition acceptable to the Engineer.

The Contractor shall include in all of his rates for delivery of all materials to and storage within the Working Area (as indicated on the Drawings), and for the uplift and transport of all materials to the position where they are to be incorporated in the Works. Facilities for loading and unloading vehicles shall be provided by the Contractor and included for in the rates.

The Contractor shall include in all of his rates the expense of all work involved in carrying out remedial measures and of all temporary work including the use of any materials and equipment. No payment shall be made in respect of losses or delays occasioned by the carrying out of remedial works.

List of Existing Drawings and Specification

Drawing Title

01 Operations Building Air Conditioning System Layout - Ground Floor

02 Operations Building Air Conditioning System Layout - Second Floor

03 Administration Building Air Conditioning System Layout - Floor Plan

04 Administration Building Air Conditioning System Layout - Attic Plan

M-02 Administration Building – Laboratory Air Conditioning System Layout - Floor Plan

Specification Title

General Specifications for the Cleaning and Restoration of Commercial Air Conditioning Ducts

Specification for CCTV Inspection of Air Conditioning Ducts

SCHEDULE OF RATES

			Amount (CI$)
PART 1	**PRELIMINARIES**		
1.1	**ALL INSURANCES AS REQUIRED BY CONTRACT**	Sum	_____
1.2	**MOBILIZATION**	Sum	_____
	PART 1 TOTAL		
PART 2	**ADMINISTRATION BUILDING – GENERAL OFFICE**		
2.1	**INITIAL VIDEO INSPECTION AND REVIEW**	Sum	_____
2.2	**DUCT CLEANING**	Sum	_____
2.3	**VERIFICATION INC. POST CLEANING VIDEO**	Sum	_____
2.4	**CLEANUP**	Sum	
	PART 2 TOTAL		
PART 3	**ADMINISTRATION BUILDING – LOBBY**		
3.1	**INITIAL VIDEO INSPECTION AND REVIEW**	Sum	_____
3.2	**DUCT CLEANING**	Sum	_____
3.3	**VERIFICATION INC. POST CLEANING VIDEO**	Sum	_____
3.4	**CLEANUP**	Sum	_____
	PART 3 TOTAL		
PART 4	**ADMINISTRATION BUILDING – LABORATORY**		
4.1	**INITIAL VIDEO INSPECTION AND REVIEW**	Sum	_____
4.2	**DUCT CLEANING**	Sum	_____
4.3	**VERIFICATION INC. POST CLEANING VIDEO**	Sum	_____
4.4	**CLEANUP**	Sum	_____
	PART 4 TOTAL		

Contractor's Initials or Stamp :

PART 5	**OPERATIONS BUILDING**		
5.1	**INITIAL VIDEO INSPECTION AND REVIEW**	Sum	_____
5.2	**DUCT CLEANING**	Sum	_____
5.3	**VERIFICATION INC. POST CLEANING VIDEO**	Sum	_____
5.4	**CLEANUP**	Sum	_____
	PART 5 TOTAL		
PART 6	**REPORT**		
6.1	**PROVIDE WRITTEN REPORT**	Sum	_____
	PART 6 TOTAL		

TOTAL TENDER AMOUNT (PART 1 THROUGH PART 6) (TO AGREEMENT ON PAGE 8): _____

COST PER YEAR FOR ANNUAL VIDEO INSPECTION AND CLEANING OF ALL AIR CONDITIONING DUCTS AT ADMINISTRATION AND OPERATIONS BUILDINGS FOR THREE SUBSEQUENT YEARS _____

NOTE: ORIGINAL LAYOUT AND DESIGN PROVIDED BY OBM LTD., ARCHITECTS AND ARISTA ENGINEERING CO. LTD., CONSULTING MECHANICAL ENGINEERS

SCALE

0' 10' 20'

GENERAL NOTES
(APPLY TO THIS SH. ONLY)

A. WHERE FLEX SIZE VARIES FROM VAV BOX INLET SIZE, PROVIDE ROUND TO ROUND TRANSITION CONNECTED TO BOX.
B. ALL ROUND TAKE-OFFS SHALL BE PROVIDED WITH THE SPIN-IN HAVING VOLUME DPR. & AIR SCOOP.

LEGEND NOTES
(APPLY TO THIS SH. ONLY)

1. ALUM. EXH. LOUVER W/ SCREEN. LOUVER IN SOFFIT OF ROOF OVERHANG
2. TRANSFER AIR DUCT
3. LOCKABLE COVER ON T'STAT
4. TERMINATION POINT OF REF. PIPING U.G. CONDUIT. STUB UP 2" ABOVE FINISHED FLOOR AND SEAL. EXTEND PIPING UP TO MECH. RM. SEE SH. M-3 FOR CONTINUATION.
5. 14X5-1/2 G.S.M. DUCT DN. TO 14X10 TYPE "E" R.A.G. BOTTOM OF GRILLE SET AT 18" A.F.F.
6. 6"ø DN. & CONN. TO EXHAUST OUTLET ON BLUE LINE MACHINE. EXPOSED DUCT SHALL BE ALUM. METALFLEX.

NOTE:
SUPPLEMENTARY LOBBY SPLIT A/C SYSTEM NOT TO BE ASSESSED IN THE FINAL DESIGN. CAN BE USED TO PROVIDE COOLING DURING SHUTDOWN OF MAIN SYSTEM

SUPPLEMENTARY LOBBY SPLIT SYSTEM AHU UNIT

SUPPLEMENTARY LOBBY SPLIT SYSTEM A/C COMPRESSOR

SOAK AWAY

REFRIG. PIPE

CONC. PAD PROVIDED UNDER SEPARATE DIVISION.

1" COND. DR.

ALL ROUND TAKE-OFFS SHALL BE FITTED WITH SPIN-IN WITH VOLUME DAMPER & AIR SCOOP U.N.O.

RISE INTO ATTIC

SHADED AREA NOT IN WORKS (ZONES 20-22 INC.)

WAC PROJECT NO.	
P78	
DRAWING NO.	
WAC AC-01	
SCALE	VIEW
3/16"=1'-0"	
SHEET	REV
1	

REPLACEMENT OF AIR CONDITIONING EQUIPMENT
WAC ADMINISTRATION BUILDING

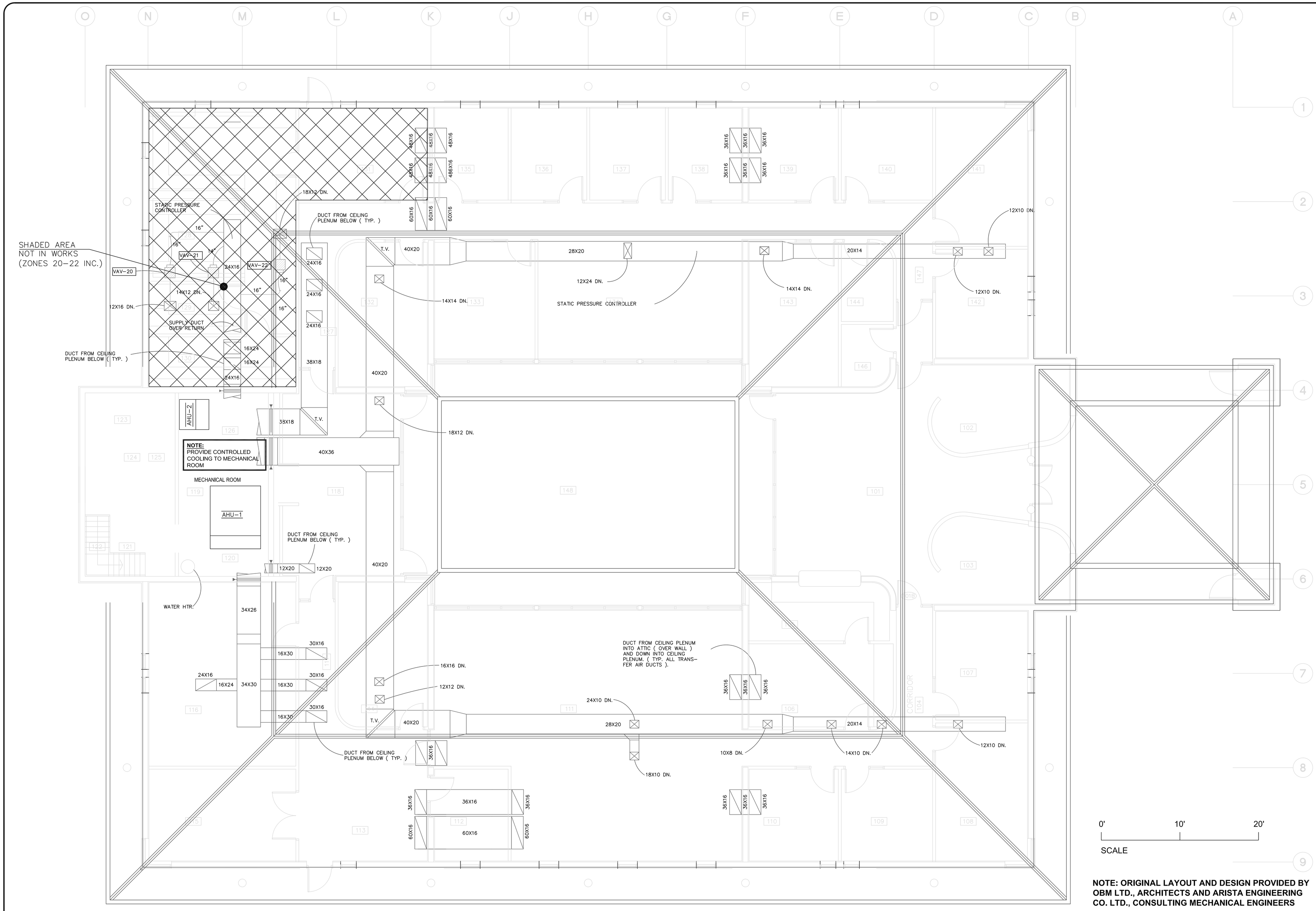
FLOOR PLAN

AIR CONDITIONING - RECORD DRAWING AC-1

WATER AUTHORITY - CAYMAN
P.O. BOX 1104, GT
CAYMAN ISLANDS
345-949-2837

REV	DATE	BY	DESCRIPTION
1	03/11/11	MBT	ISSUE FOR TENDER
0	26/10/11	MBT	ORIGINAL RELEASE - ISSUE FOR REVIEW

DATE:	26/10/11
DRAWN BY:	MBT
CHECKED:	
PROJECT NO.	P78



NOTE: ORIGINAL LAYOUT AND DESIGN PROVIDED BY OBM LTD., ARCHITECTS AND ARISTA ENGINEERING CO. LTD., CONSULTING MECHANICAL ENGINEERS

DATE: 26/10/11
DRAWN BY: MBT
CHECKED:
PROJECT NO.
P78

REV	DATE	BY	DESCRIPTION
1	03/11/11	MBT	ISSUE FOR TENDER
0	26/10/11	MBT	ORIGINAL RELEASE – ISSUE FOR REVIEW

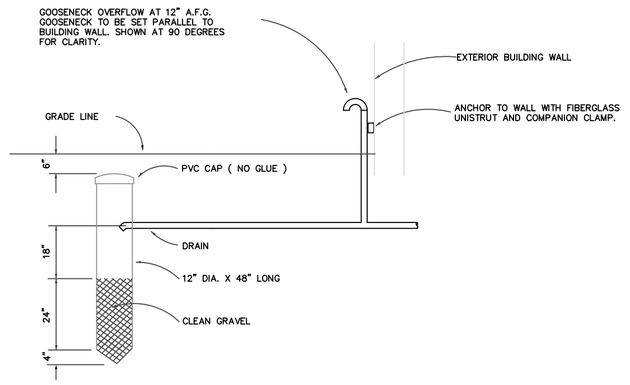
WATER AUTHORITY – CAYMAN
P.O. BOX 1104, GT
CAYMAN ISLANDS
345–949–2837

REPLACEMENT OF AIR CONDITIONING EQUIPMET
WAC ADMINISTRATION BUILDING

ATTIC PLAN

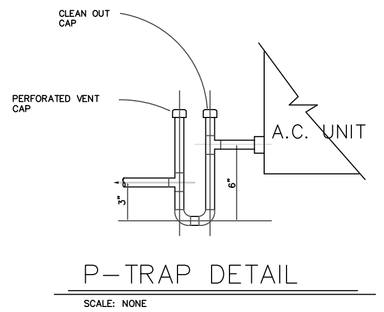
AIR CONDITIONING – RECORD DRAWING AC–2

WAC PROJECT NO.	
P78	
DRAWING NO.	
WAC AC–02	
SCALE	VIEW
3/16"=1'–0"	
SHEET	REV
	1



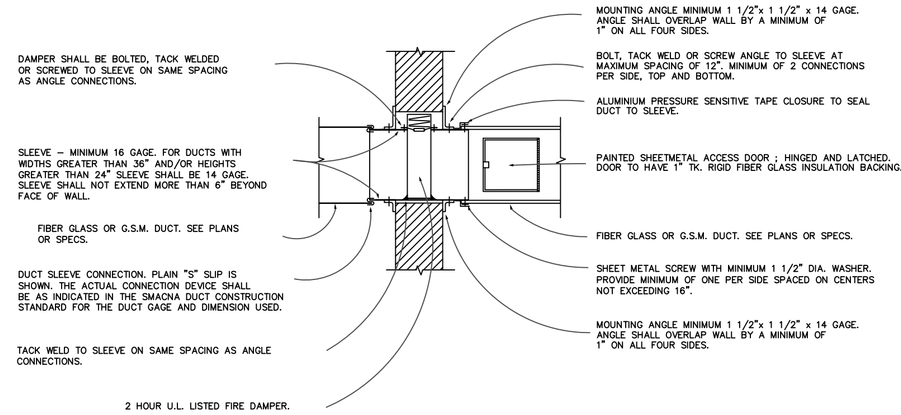
SOAK AWAY DETAIL

SCALE: NONE



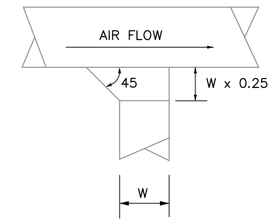
P-TRAP DETAIL

SCALE: NONE



FIRE DAMPER MOUNTING DETAIL

SCALE: NONE



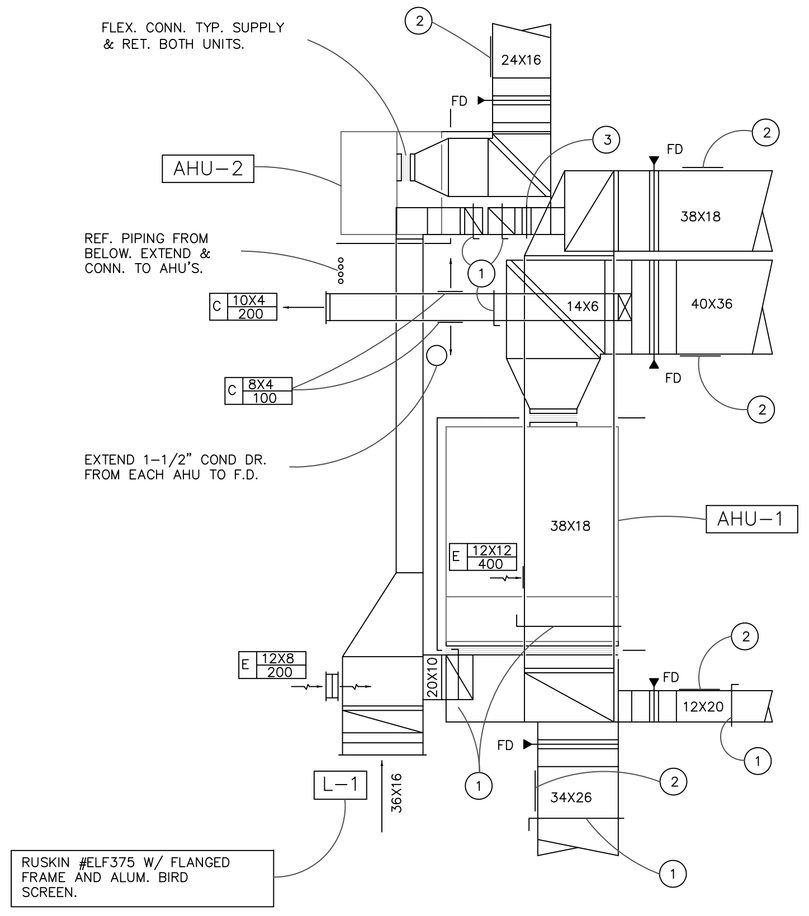
SUPPLY DUCT LATERAL TAKE-OFF

SCALE: NONE

LEGEND NOTES

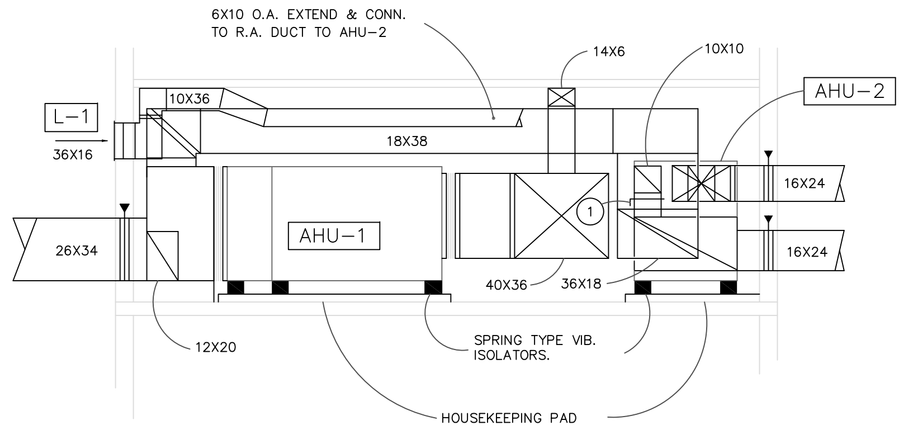
(Apply to this sheet only)

1. OPPOSED BLADE VOLUME DAMPER.
2. FIRE DAMPER ACCESS PANEL.
3. BACK DRAFT DAMPER. SET FLOW TO AHU-2.



MECHANICAL ROOM FLOOR PLAN

SCALE: 1/4" = 1'-0"



SECTION THRU MECHANICAL ROOM

SCALE: 1/4" = 1'-0"

DATE: 26/10/11
DRAWN BY: MBT
CHECKED:
PROJECT NO. P78

REV	DATE	BY	DESCRIPTION
0	26/10/11	MBT	ORIGINAL RELEASE – ISSUE FOR REVIEW
1	03/11/11	MBT	ISSUE FOR TENDER

WATER AUTHORITY – CAYMAN
P.O. BOX 1104, GT
CAYMAN ISLANDS
345-949-2837

REPLACEMENT AIR CONDITIONING EQUIPMENT WAC ADMINISTRATION BUILDING

MECH. ROOM PLAN AND DETAILS
AIR CONDITIONING RECORD DRAWING AC-3

WAC PROJECT NO. P78
DRAWING NO. WAC AC-03
SCALE: As shown
VIEW:
SHEET:
REV: 1

FAN SCHEDULE

MARK	TYPE	CFM	EXT. S.P.	MOTOR SIZE	VOLTAGE	REMARKS
EF-1	CEILING MTD.	940	0.25"	296W	120-1	PROVIDE SOLID STATE WALL MOUNTED SPEED CONTROLLER. (MAX SONES 6.0)
EF-2	CEILING MTD.	105	0.25"	50W	120-1	WIRE FAN WITH LIGHT SWITCH (MAX SONES 2.0)
EF-3	CEILING MTD.	840	0.25"	265W	120-1	NOTE #1 (MAX SONES 5.0)
EF-4	CEILING MTD.	250	0.25"	125W	120-1	INTERLOCK TO RUN WITH AHU-1 (MAX SONES 3.0)
EF-5	4"Ø INLINE	90	0.20"	43W	120-1	NOTE #1
EF-6	INLINE	250	0.25"	125W	120-1	NOTE #1 (MAX SONES 3.0)

NOTE #1: ON - OFF WALL MOUNTED SWITCH TO SPEED CONTROLLER MOUNTED ABOVE LAY-IN CLG. SPEED CONTROLLER TO BE PROVIDED WITH FAN.

AIR HANDLING UNIT SCHEDULE

MARK	COOLING (MBH)		CFM	EXT. S.P.	MOTOR SIZE	VOLTAGE	REMARKS
	SENS.	TOTAL					
AHU-1	295.6	360.0	12000	1.8"	15.0	208-3	480 FPM MAX. COIL FACE VELOCITY.
AHU-2	75.6	90.0	3000	1.25	3.0	208-3	510 FPM MAX. COIL FACE VELOCITY.

SCHEDULE NOTES!
AHU-1: E.A. 76.5° d.b., 63.6° w.b. - L.A. 55.0° d.b., 54.3° w.b. - 95° AMBIENT.
AHU-2: E.A. 71.8° d.b., 61.2° w.b. - L.A. 55.0° d.b., 53.8° w.b. - 95° AMBIENT.

FAN COIL SCHEDULE

MARK	COOLING (MBH)		CFM	EXT. S.P.	MOTOR SIZE	VOLTAGE	REMARKS
	SENS.	TOTAL					
FCU-1	0.56	0.90	260	—	SEE CU-3	120-1	WALL MOUNT DUCTLESS SYSTEM FRIEDRICH #MW09C1B OR EQUAL.

AIR COOLED CONDENSING UNIT SCHEDULE

MARK	TONS	VOLTAGE	FLA	MCA	MAX FUSE	SEER	REMARKS
CU-1	30.0	208-3	130.8	—	—	16.0	3 STEPS OF CAPACITY REDUCTION (0, 25, 50, 75, 100)
CU-2	7.5	208-3	28.1	—	—	16.0	STEPS OF CAPACITY REDUCTION (0, 25, 50, 75, 100)
CU-2	.75	120-1	10.0	—	15.0	12.0	WALL MOUNT DUCTLESS SYSTEM FRIEDRICH #MW09C1C OR EQUAL.
SUPPLIMENTARY A/C UNIT	2.0	120-1	—	—	15.0	13.0	WALL MOUNT SPLIT SYSTEM CAIC

GRILLE REGISTER AND DIFFUSER SCHEDULE

MARK	TYPE	STYLE	MODEL & MFG.	FINISH	REMARKS
A	CEILING DIFFUSER	24"X24" LAY-IN	METAL AIRE #9000-3	WHITE	PROVIDE DUCT BOARD PLENUM CAN
B	CEILING DIFFUSER	SURFACE MOUNTED	METAL AIRE #9000-1	WHITE	PROVIDE #OBDR DAMPER
C	SIDEWALL REGISTER	SURFACE MOUNTED	METAL AIRE #H400/D	WHITE	
D	RETURN AIR GRILLE	LAY-IN ALUM. EGG CRATE	METAL AIRE #CCS-TBC	WHITE	
E	RETURN AIR GRILLE	SIDEWALL SURFACE MOUNTED	METAL AIRE #RHE	WHITE	
F	RETURN AIR GRILLE	SURFACE MTD. EGG CRATE	METAL AIRE #CCS	WHITE	

NOTE: ORIGINAL LAYOUT AND DESIGN PROVIDED BY OBM LTD., ARCHITECTS AND ARISTA ENGINEERING CO. LTD., CONSULTING MECHANICAL ENGINEERS

VAV TERMINAL SCHEDULE

MARK	SIZE	MAX. CFM	MIN. CFM	MANUFACTURER
VAV-1	8"	495	150	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-2	8"	545	164	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-3	14"	1890	567	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-4	8"	740	222	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-5	8"	520	156	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-6	6"	270	81	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-7	6"	265	80	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-8	6"	265	80	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-9	6"	265	80	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-10	8"	590	177	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-11	6"	170	51	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-12	8"	300	90	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-13	12"	1335	400	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-14	8"	890	267	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-15	8"	425	128	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-16	8"	375	113	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-17	8"	400	120	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-18	8"	800	240	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-19	12"	1445	434	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-20	10"	1165	350	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-21	8"	780	234	METAL AIRE #40TH CONTROL SEQUENCE #151
VAV-22	12"	1355	407	METAL AIRE #40TH CONTROL SEQUENCE #151

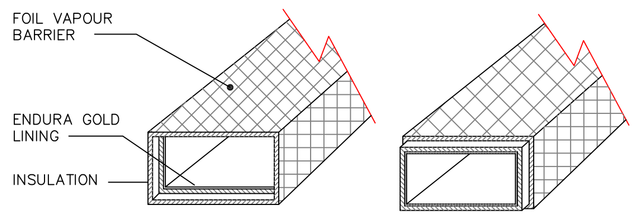
WAC PROJECT NO. P78
DRAWING NO. WAC AC-04
SCALE N/A VIEW
SHEET 1 REV

REPLACEMENT OF AIR CONDITIONING EQUIPMENT
WAC ADMINISTRATION BUILDING
SCHEDULES
AIR CONDITIONING RECORD – DRAWING AC-4

WATER AUTHORITY – CAYMAN
P.O. BOX 1104, GT
CAYMAN ISLANDS
345-949-2837

REV	DATE	BY	DESCRIPTION
1	03/1/11	MBT	ISSUE FOR TENDER
0	26/10/11	MBT	ORIGINAL RELEASE – ISSUE FOR REVIEW

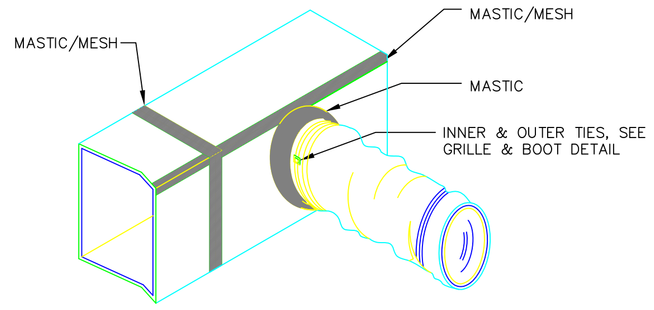
DATE: 26/10/11
DRAWN BY: MBT
CHECKED:
PROJECT NO. P78



1. MALE & FEMALE ENDS TO BE GLUED TOGETHER AND COATED WITH MASTIC.
2. INTERIOR OF DUCT TO BE A CONTINUOUS ANTI-BACTERIAL ENDURA GOLD COATING. NO EXPOSED INSULATION IN AIR STREAM.
3. FOIL VAPOUR BARRIER TO BE LAPPED, GLUED AT JOINTS AND COATED WITH MASTIC.

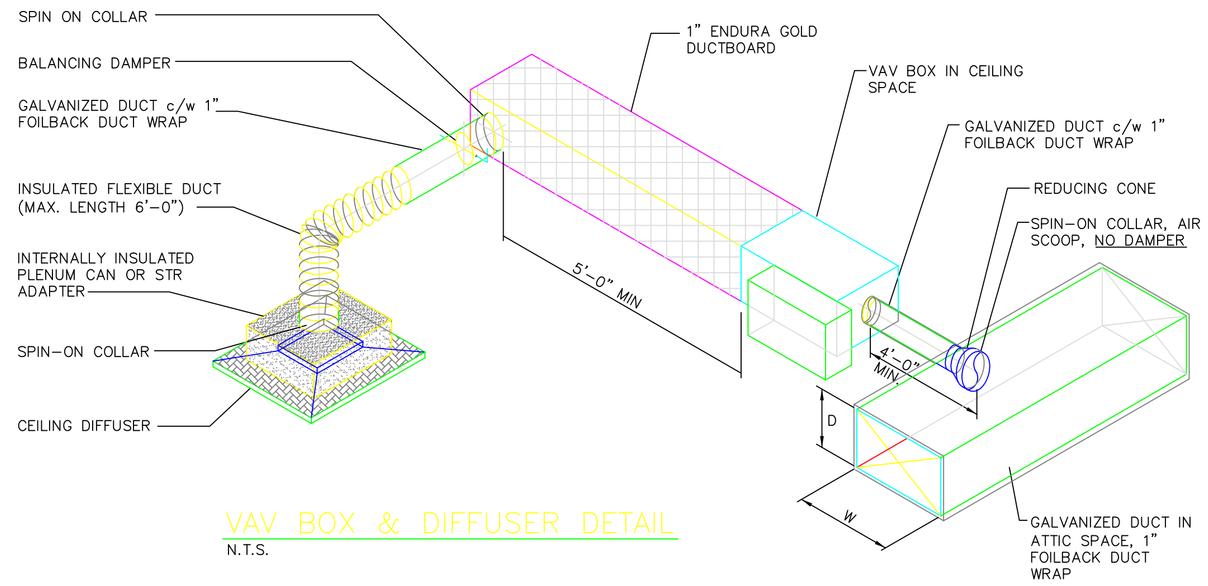
DUCT BOARD DETAIL

N.T.S.



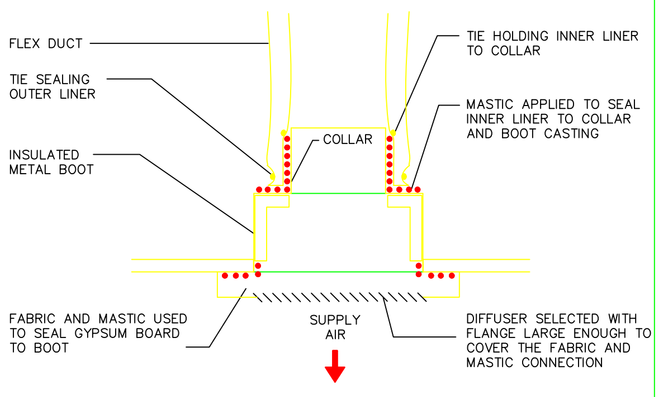
FLEX TAKEOFF FROM RIGID DUCT

N.T.S.



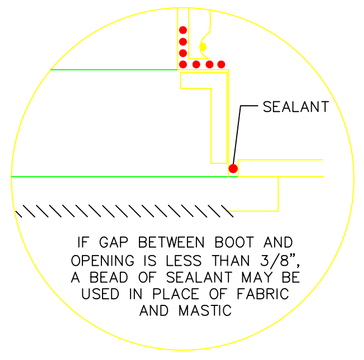
VAV BOX & DIFFUSER DETAIL

N.T.S.



GRILLE AND BOOT CONNECTIONS AT DRYWALL CEILING

N.T.S.



ALTERNATIVE DETAIL

N.T.S.

MECHANICAL SPECIFICATIONS

1. ALL DUCTWORK AS PER ASHRAE, SMACNA AND 1997 STANDARD MECHANICAL CODE. DUCTS NOT MEETING THESE STANDARDS WILL BE REPLACED AT THE CONTRACTOR'S EXPENSE. ALL NON-METALLIC DUCTS MUST COMPLY WITH THE STANDARD MECHANICAL CODE. ALL DUCT MATERIALS TO BE OF CANADIAN/AMERICAN MANUFACTURE.
2. ALL DUCTS UPSTREAM OF THE VAV BOXES TO BE GALVANIZED SHEETMETAL. RECTANGULAR DUCTS DOWNSTREAM OF THE VAV BOXES TO BE 1 INCH DUCTBOARD EQUAL TO OWENS CORNING WITH ENDURA GOLD LINING. PRODUCTS BY MANSVILLE, OR KNAUPF WITH AN INTERIOR COATING EQUAL TO ENDURA GOLD. BUTT END JOINTS ARE NOT ALLOWED.
3. GALVANIZED DUCTS UPSTREAM OF THE VAV BOXES SHALL BE SEALED WITH A LAYER OF SEALANT AND THEN WRAPPED WITH A REINFORCING FIBRE GLASS MESH WHILE SEALANT IS WET. FIRST COAT OF SEALANT WILL BE ALLOWED 24 HOURS TO DRY AND THEN A SECOND COAT OF SEALANT TO BE APPLIED. THE SEALANT AND CLOTH SHALL BE OF THE SAME MANUFACTURER, EQUAL TO DURODYNE OR FOSTERS AND SUITABLE FOR A MEDIUM PRESSURE APPLICATION. NO INSULATION TO BE APPLIED UNTIL AFTER THE DUCT SEALANT CAN BE INSPECTED BY THE ENGINEER OR OWNER'S REPRESENTATIVE.
4. IF ELBOWS ARE NOT FULL RADIUS THEY SHALL HAVE TURNING VANES, WHETHER INDICATED ON DRAWINGS OR NOT.
5. INSULATE ALL DUCTS UPSTREAM OF THE VAV BOXES WITH A 1 INCH FOIL-BACK DUCT WRAP. SEAL ALL INSULATION JOINTS AND SEAMS WITH 2½" FOIL TAPE. CONTINUOUS VAPOUR BARRIER IS REQUIRED. INSULATION MATERIALS TO COMPLY WITH THE STANDARD MECHANICAL CODE.
6. INSTALL DUCT MOUNTED SMOKE DETECTORS, SUPPLIED BY OTHERS. PERFORM ANY CONTROL WIRING TO FACILITATE FAN SHUT DOWN.
7. AIR BALANCE SYSTEMS AND SUBMIT REPORT. SUBMIT PRELIMINARY & FINAL REPORTS. CALIBRATE EACH VAV BOX AND TEMPERATURE SENSOR BY VERIFYING RESULTS WITH A FLOW HOOD AND DIGITAL THERMOMETER.
8. SUPPLY ALL NECESSARY SOLENOIDS, CONTROL RELAYS AND TRANSFORMERS. ALL LOW VOLTAGE WIRING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTROL CABLES TO BE PLENUM RATED, NEATLY RUN, SUPPORTED BY CADDY J-HOOKS AND FASTENED WITH TIE-WRAPS.
9. SUBMIT FIVE (5) COPIES OF SUBMITTALS ON ALL MATERIALS TO BE SUPPLIED.
10. LEAVE ALL EQUIPMENT WITH CLEAN FILTERS INSTALLED.
11. CONTRACTOR TO DEMONSTRATE SYSTEM PERFORMANCE TO ENGINEER'S SATISFACTION. DEMONSTRATION INCLUDES BUT IS NOT LIMITED TO REPRODUCTION OF AIR FLOW MEASUREMENTS TO PROVE CONTROL CALIBRATION.
12. THESE DRAWINGS ARE DIAGRAMMATIC ONLY & ARE NOT INTENDED TO SHOW ALL FITTINGS. REVIEW ARCHITECTURAL & STRUCTURAL DRAWINGS PRIOR TO SUBMITTING A BID.
14. FULLY COORDINATE THERMOSTAT LOCATIONS AND BACKBOX REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR.
15. NON-METALLIC INSULATED FLEX DUCTS NOT TO EXCEED 6 FEET IN LENGTH. FLEX DUCTS REQUIRE 1" INSULATION AND A CONTINUOUS VAPOUR BARRIER. PULL DUCTS TIGHT AND SUPPORT SO THAT THEY DO NOT DROOP. FLEX DUCTS TO COMPLY WITH FLAME/SMOKE RATINGS OF STANDARD MECHANICAL CODE.
16. THESES SPECIFICATIONS TO BE READ IN CONJUNCTION WITH THOSE IN DIVISION 15 OF WRITTEN PROJECT SPECIFICATIONS.

NOTE: ORIGINAL LAYOUT AND DESIGN PROVIDED BY OBM LTD., ARCHITECTS AND ARISTA ENGINEERING CO. LTD., CONSULTING MECHANICAL ENGINEERS

DATE:	26/10/11
DRAWN BY:	MBT
CHECKED:	
PROJECT NO.	P78

REV	DATE	BY	DESCRIPTION
1	03/11/11	MBT	ISSUE FOR TENDER
0	26/10/11	MBT	ORIGINAL RELEASE – ISSUE FOR REVIEW

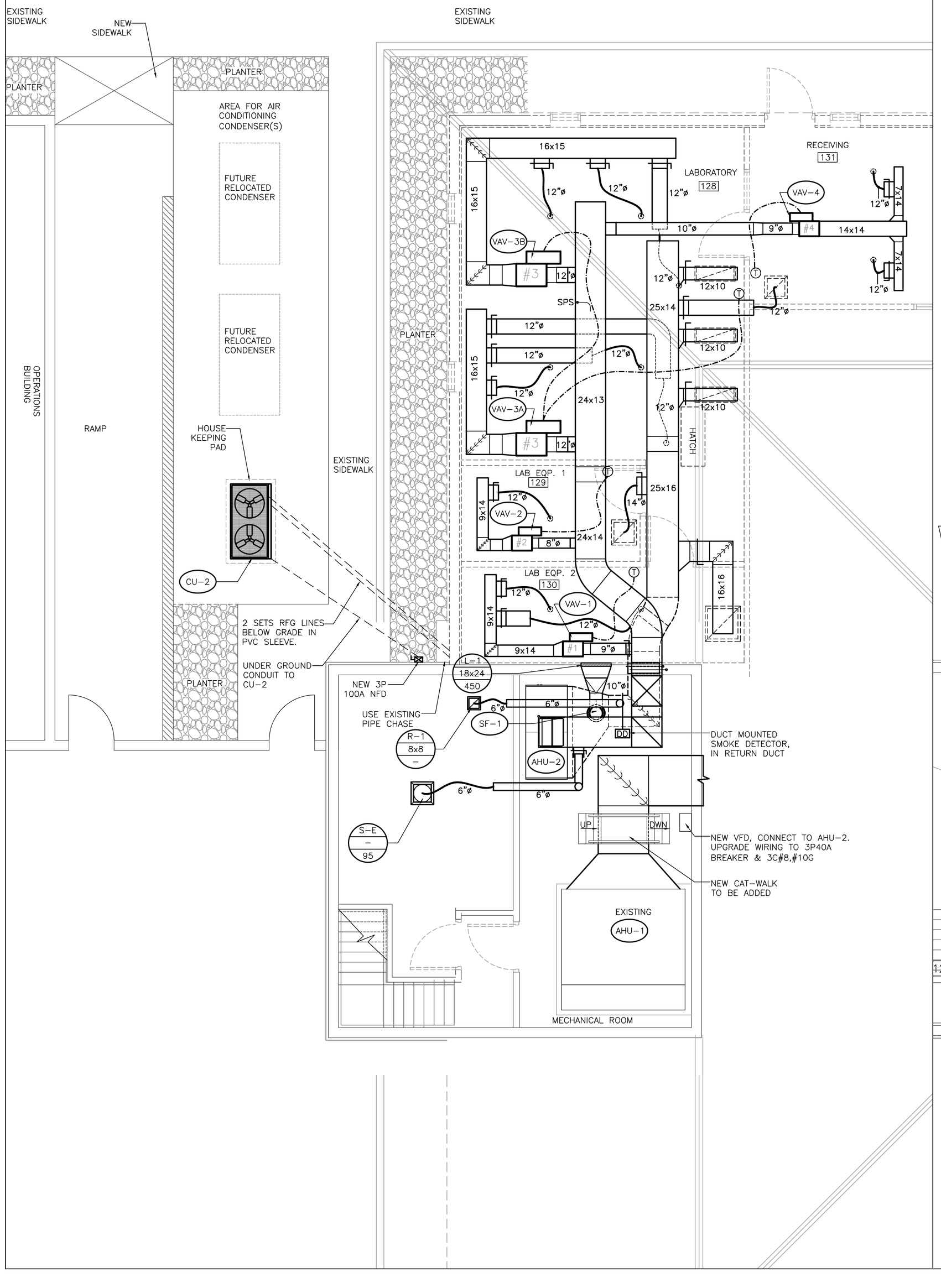
WATER AUTHORITY – CAYMAN
P.O. BOX 1104, GT
CAYMAN ISLANDS
345-949-2837

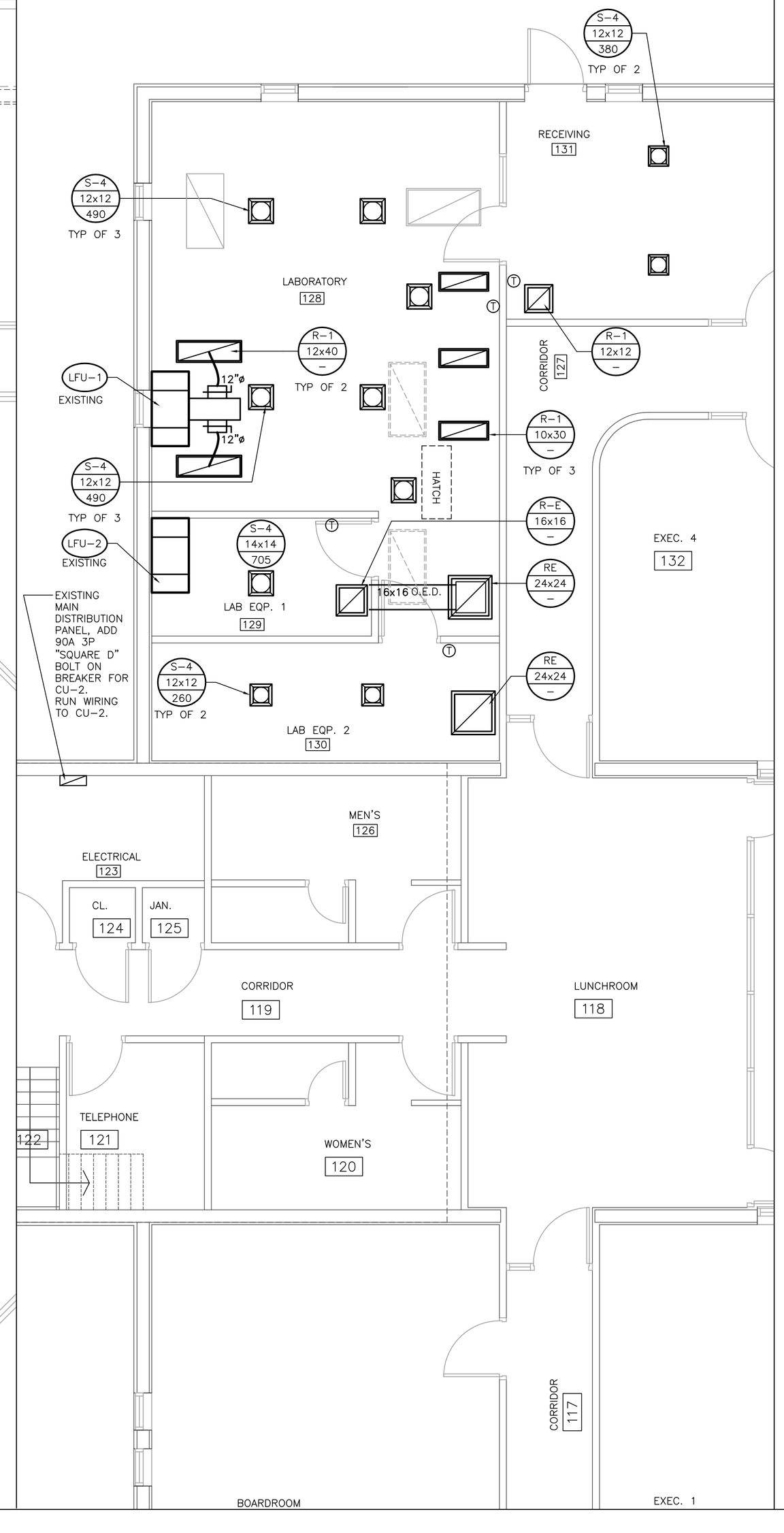
REPLACEMENT OF AIR CONDITIONING EQUIPMENT
WAC ADMINISTRATION BUILDING

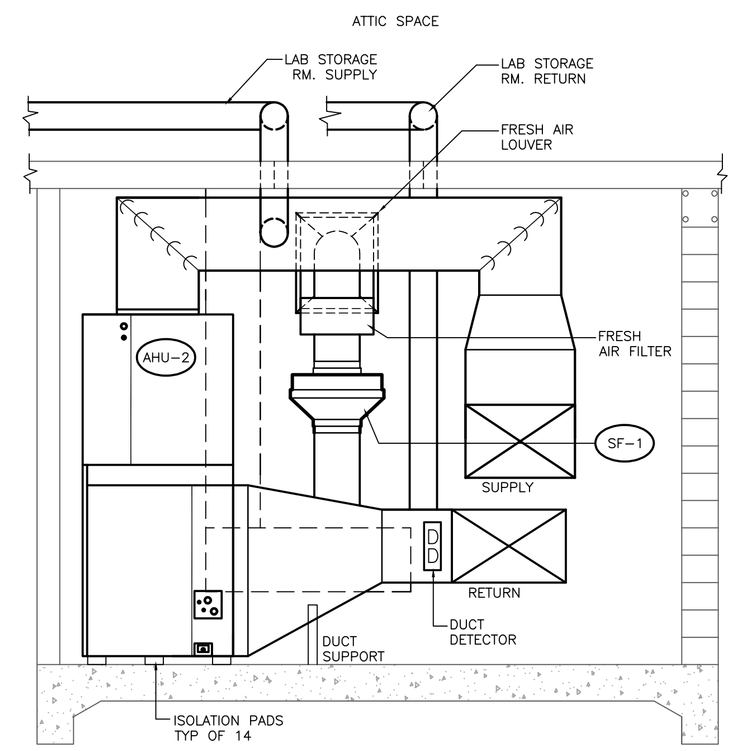
DETAILS

AIR CONDITIONING RECORD – DRAWING OPS BUILDING – AC-3/4

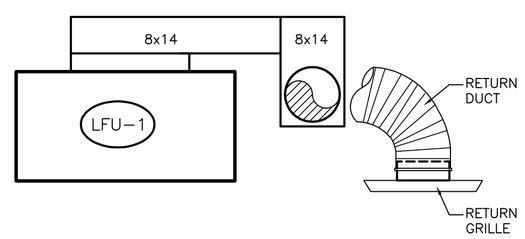
WAC PROJECT NO.	P78
DRAWING NO.	WAC AC-05
SCALE	N/A
VIEW	
SHEET	
REV	1







MECHANICAL RM. SECTION
NTS



LAMINAR FLOW UNIT DETAIL
NTS

CONSULTANTS

ARISTA
ENGINEERING CO., LTD.

MECHANICAL & ELECTRICAL CONSULTING ENGINEERS

P. O. Box 30541 SMB
#6 Tropic Centre II, Earth Close
Grand Cayman, B.W.I.

Tel: (345) 945-2610
Fax: (345) 945-2680
Email: arista@candw.ky

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF THE ENGINEER AND THE REPRODUCTION IN WHOLE OR IN PART IS PROHIBITED WITHOUT PRIOR WRITTEN CONSENT OF THE ENGINEER.
2. THE CONTRACTOR IS TO CHECK AND VERIFY ALL LEVELS, DATUM AND DIMENSIONS AND REPORT ANY DISCREPANCY OR OMISSION TO THE ENGINEER PRIOR TO CONSTRUCTION.
3. DO NOT SCALE DRAWINGS.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STRUCTURAL, ELECTRICAL, AND/OR ANY OTHER CONSULTANTS' DOCUMENTATION AS MAY BE APPLICABLE TO THE PROJECT.

PROJECT
WATER AUTHORITY
LAB EXPANSION
GRAND CAYMAN
CAYMAN ISLANDS, B.W.I.

DRAWING TITLE
MECHANICAL LAYOUT
PLANS & DETAILS
-

PROJECT NO.
10-MDS-05

REVISIONS

No.	DESCRIPTION	DATE
0	PRELIMINARY	JAN 10
1	ISSUED FOR REVIEW	MAR 2/10
2	REVISED FOR EXISTING CEILING	MAR 22/10

SCALE	AS NOTED	DWN	DJR
REV	2	CHD	MSW
DATE	JANUARY 2010		

DRAWING NO.
M-1

VFD DRIVE

TAG No.	VOLTAGE	MODEL & MFR.	HORSE POWER RATING	REMARKS
VFD-1	208/3/60	TECO PA7300-2-075-N1	7.5	UL LISTED DRIVE, NEMA 1 ENCLOSURE, INTERFACE FOR EXISTING ANDOVER SYSTEM, INPUT/OUTPUT PHASE LOSS PROTECTION.

APR CONTROL

REMARKS
RAWAL APR CONTROL, MODEL # APR-410-3. INSTALL IN CONDENSING UNIT ON LEAD COMPRESSOR. SUPPLY BALL VALVE SHUT-OFFS FOR EACH CONNECTION, SUPPLY TEES FOR SUCTION LINE CONNECTIONS, SUPPLY TEES FOR HOT GAS CONNECTION. SET HOT GAS VALVE TO OPEN AT 101 PSI. INSTALL IN ACCORDANCE W/ MANUFACTURER'S INSTRUCTIONS.

DISCHARGE AIR CONTROLLER

REMARKS
COMPATIBLE W/ EXISTING ANDOVER SYSTEM. STAGES TWO COMPRESSORS FOR A 55°F, LEAVING UNIT DISCHARGE AIR TEMPERATURE

REGISTERS, DIFFUSERS, & GRILLES

TAG No.	TYPE	STYLE	MODEL & MFR.	FINISH	REMARKS
S-4	CEILING SUPPLY REGISTER	SURFACE MOUNTED	METAL AIRE MODEL 9000-1	WHITE	ALUMINUM ADJUSTABLE MODULAR CORE CEILING DIFFUSER. OB DAMPER. SET FOR 4 WAY THROW. SEE DWG'S FOR NECK SIZE.
S-E	EXISTING SUPPLY REGISTER	-	-	-	RE-USE EXISTING
R-E	EXISTING RETURN GRILLE	-	-	-	RE-USE EXISTING
R-1	CEILING RETURN	SURFACE MOUNTED	METAL AIRE MODEL CC5-1	WHITE	ALL ALUMINUM CUBE CORE RETURN GRILLE W/ DAMPER. SEE DRAWINGS FOR NECK SIZE.
L-1	FRESH AIR LOUVER	SURFACE MOUNTED	RUSKIN EME 6625D	KYNAR 500 WHITE	DADE COUNTY LARGE MISSILE IMPACT APPROVED, DRIVING RAIN RESISTANT, VERTICAL BLADE LOUVER. C/W BIRD SCREEN. SEE DRAWINGS FOR SIZE.

AIR HANDLERS

TAG No.	NOM. CFM	MOTOR HP	VOLTAGE	ESP	REMARKS
AHU-2	5000	5.0	240V/1PH/60	5.0	R 410A, NOMINAL 15 TON DUAL CIRCUIT AIR HANDLER, YORK MODEL ND180, HIGH STATIC DRIVE KIT. UPGRADE MOTOR SHEAVE TO 2VP56.

CONDENSING UNITS

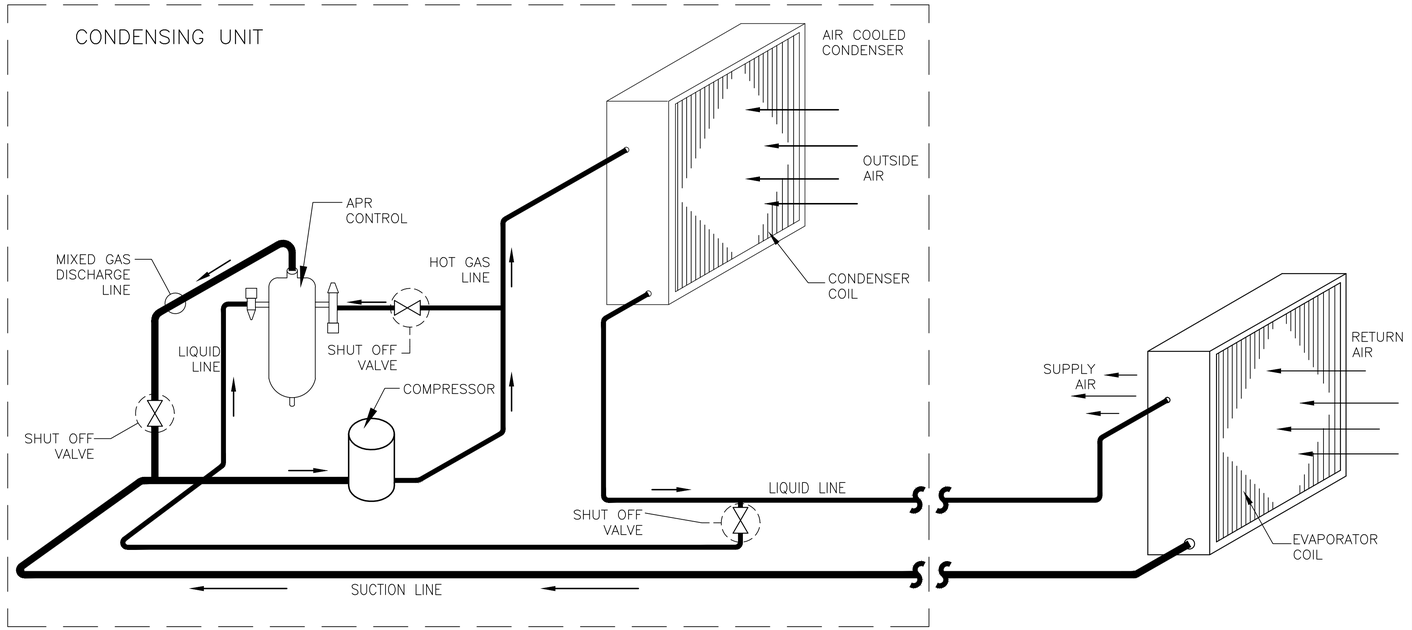
TAG No.	VOLTAGE	MCA	M.O.C.P.	REMARKS
CU-2	208V/3PH/60	68	90	YORK MODEL YD-150, DUAL CIRCUIT R410A NOMINAL 12.5 TON CONDENSING UNIT. TECHNICAL PROTECTION. SPORLAN LIQUID LINE FILTER DRYER. ON EACH CIRCUIT SPORLAN INDICATING SIGHT GLASS ON EACH CIRCUIT. APR SYSTEM FIELD INSTALLED ON BOTH COMPRESSORS. CONDENSING UNIT BOLTED DOWN TO HOUSE KEEPING PAD.

VARIABLE AIR VOLUME BOXES (VAV)

TAG No.	MODEL & MFR.	AIR FLOW (CFM) MAX	AIR FLOW (CFM) MIN	INLET SIZE	OUTLET SIZE (WxD)	REMARKS
VAV-1	TITUS MODEL No. DESV 09	710	225	9"ø	14"x13"	PRESSURE INDEPENDENT VAV BOX c/w 1" MICRO-LOC LINING AND DIGITAL ACTUATOR, COMPATIBLE W/ EXISTING ANDOVER SYSTEM.
VAV-2	TITUS MODEL No. DESV 08	525	190	8"ø	12"x10"	PRESSURE INDEPENDENT VAV BOX c/w 1" MICRO-LOC LINING AND DIGITAL ACTUATOR, COMPATIBLE W/ EXISTING ANDOVER SYSTEM.
VAV-3A	TITUS MODEL No. DESV 12	1470	750	12"ø	16"x15"	PRESSURE INDEPENDENT VAV BOX c/w 1" MICRO-LOC LINING AND DIGITAL ACTUATOR, COMPATIBLE W/ EXISTING ANDOVER SYSTEM.
VAV-3B	TITUS MODEL No. DESV 12	1470	750	12"ø	16"x15"	PRESSURE INDEPENDENT VAV BOX c/w 1" MICRO-LOC LINING AND DIGITAL ACTUATOR, COMPATIBLE W/ EXISTING ANDOVER SYSTEM.
VAV-4	TITUS MODEL No. DESV 09	760	225	9"ø	14"x13"	PRESSURE INDEPENDENT VAV BOX c/w 1" MICRO-LOC LINING AND DIGITAL ACTUATOR, COMPATIBLE W/ EXISTING ANDOVER SYSTEM.

FRESH AIR FAN

TAG No.	CFM	VOLTAGE	MOTOR	REMARKS
SF-1	450	115V/1PH/60	196W	FANTECH MODEL FG10XL, INLINE BACKWARD INCLINED FAN, GALVANIZED HOUSING, C/W SPEED CONTROLLER, RUN NEW CIRCUIT TO POWER FAN.



APR CONTROL DETAIL

NTS

MECHANICAL SPECIFICATIONS

1. RECTANGULAR DUCT WORK TO BE GALVANIZED TO SMACNA THICKNESS. USE EITHER TDF JOINTS OR SLIP AND DRIVE CLEATS. USE PITTSBURGH SEAMS, NO BUTTON LOCK.
2. IF CLEATS ARE USED FOR JOINTS IN LIEU OF TDF FLANGES, THE JOINT SEALING WILL BE AS FOLLOWS. APPLY A THIN LAYER OF MASTIC TO JOINT THEN WRAP WITH A REINFORCING MESH AND ALLOW JOINTS 24 HOURS TO DRY. APPLY A SECOND THIN COAT OF MASTIC.
3. PITTSBURGH SEAMS AND SCREW HOLES ARE TO BE SEALED WITH MASTIC.
4. THE MAIN SUPPLY DUCTS UPSTREAM OF THE VAV BOXES WILL BE TESTED FOR LEAKAGE. INSTALL MAIN TRUNKLINE AND BRANCH TAKE OFF FITTINGS. CAP THE TAKE OFF FITTINGS FOR THE TEST. BLANK OFF AN UPSTREAM PORTION OF THE SUPPLY DUCT IN THE MECHANICAL ROOM AND INSTALL A 5" DIAMETER TESTING TAP IN THIS ENDCAP.
5. RECTIFY ANY LEAKS AS REQUIRED TO PASS A 2" LEAKAGE CLASS 12 TEST.
6. AFTER PASSING THE SUPPLY AIR LEAKAGE TEST, INSULATE SUPPLY DUCTS WITH A 2" FOIL BACK DUCT WRAP. USE PINS AND CLIPS. PINS TO BE EITHER SPOT WELDED OR CEMENTED TO THE DUCT. SELF ADHERING STICK ON PINS ARE UNACCEPTABLE.
7. RETURN DUCT TO BE SEALED AND TESTED IN A SIMILAR MANNER AS THE SUPPLY DUCT.
8. RETURN DUCT TO BE INSULATED WITH A 1" FOIL BACK DUCT WRAP UTILIZING PINS AND CLIPS.
9. ROUND SUPPLY AND RETURN DUCTS LONGER THAN 6 FET TO BE GALVANIZED SNAP LOCK. SEAL JOINTS WITH MASTIC-MESH-MASTIC. SEAL SEAMS WITH MASTIC. INSULATE WITH 1.5 INCH FOIL BACK DUCT WRAP.
10. ROUND SUPPLY AND RETURN DUCTS LESS THAN OR EQUAL TO 6 FEET IN LENGTH TO BE INSULATED NON-METALLIC FLEX WITH 1.5" FOIL BACK INSULATION.
11. RECTANGULAR DUCT WORK DOWNSTREAM OF VAV BOXES TO BE GALVANIZED TO SMACNA STANDARDS, SLIP AND DRIVE CLEATS, INTERNALLY LINED WITH 1 INCH ARMAFLEX SHEET LINER TO ATTENUATE SOUND. SEAL JOINTS WITH MASTIC-MESH-MASTIC, SEAL SCREWS AND SEAMS WITH MASTIC. INSULATE WITH 1" FOIL BACK DUCT WRAP AFTER DUCT SEALING HAS BEEN INSPECTED.
12. SEAL ALL DUCT PENETRATIONS OF SHEET ROCK CEILINGS WITH CAULKING OR EXPANDING FOAM.
14. CONDENSING UNIT TO BE BOLTED DOWN . INSTALL SPORLAN INDICATING SITE GLASS AND LIQUID LINE FILTER DRYER ON EACH CIRCUIT.
15. FABRICATE FILTER BOX TO ACCOMMODATE 14X14 X 1" THROW AWAY FILTER FOR FRESH AIR. PROVIDE REMOVABLE COVER WITH 5/16 HEX HEAD SCREWS TO CHANGE FILTER. FILTER BOX TO BE 8 INCH DEEP.
16. VAV CONTROLLERS TO BE COMPATIBLE WITH EXISTING ANDOVER SYSTEM. ALL ZONE SENSORS TO HAVE PLUS/ MINUS 2F SLIDE. ALL CONTROLS TO BE COMPATIBLE W/ EXISTING ANDOVER SYSTEM.
17. PROVIDE CONTROL TECHNICIAN TO ASSIST OWNERS AIR BALANCER.
18. RUN ALL CONTROL POWER IN SHIELDED CABLE. CABLING TO BE NEATLY RUN AND TIE WRAPPED TO DUCT HANGER RODS.
19. SUBMIT 5 HARD COPIES OF SUBMITTALS.
20. PROVIDE DISCHARGE AIR CONTROLLER (ANDOVER COMPATIBLE) TO SEQUENCE 2 COMPRESSORS.

SEQUENCE OF OPERATIONS

EXISTING BMS SYSTEM STARTS AND STOPS SYSTEM AT TIMES DICTATED BY OWNER.

OCCUPIED MODE:
GLOBAL SET POINT ON THIS SYSTEM TO BE 68°F

AHU BLOWER STARTS AT SPEED DETERMINED BY VFD TO MAINTAIN 0.5" WATER COLUMN.

DISCHARGE AIR CONTROLLER STAGES COMPRESSOR WITH A TARGET LEAVING AIR TEMPERATURE OF 55F. COMPRESSORS FITTED WITH RAWAL APR SYSTEM IN LIEU OF HOT GAS BYPASS.

VAV BOXES MODULATE TO MAINTAIN 68F IN ZONES.

WITH FUME HOOD OFF, FRESH AIR IS AT MINIMUM POSITION AKA FRESH AIR FAN SF-1 IS OFF.

WHEN FUME HOOD IS ON , FRESH AIR FAN SF-1 STARTS AND FRESH AIR VOLUME IS SET USING SPEED CONTROLLER TO 450 CFM.

DUCT DETECTOR IN RETURN AIR STREAM SHUTS SOWN AIR HANDLER.

UNOCCUPIED MODE

SYSTEM IS SET UP TO MAINTAINED DESIRED NIGHT TIME TEMPERATURE. ZONE SENSORS ARE AVERAGED.

SYSTEM WILL CYCLE FIRST STAGE COOLING WITH VAV BOXES SET THE 50% .

FRESH AIR FAN SF-1 IS OFF.

LEGEND

- SUPPLY AIR
- RETURN AIR
- EXHAUST AIR
- DUCTWORK
- DUCTWORK IN DROP CEILING
- BALANCING DAMPER
- TURNING VANES
- C —— CONDENSATE LINE (ABOVE GRADE)
- — C — — CONDENSATE LINE (BELOW GRADE)
- REFRIGERANT LINES
- FLEXIBLE DUCTWORK
- T# THERMOSTAT
- # EQUIPMENT TAG
- TYPE
- SIZE
- CFM

SPS – STATIC PRESSURE SENSOR
AHU – AIR HANDLING UNIT
CU – CONDENSING UNIT
EF – EXHAUST FAN
S/A – SUPPLY AIR
R/A – RETURN AIR
E/A – EXHAUST AIR
FCU – FAN COIL UNIT

CONSULTANTS

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PROJECT
WATER AUTHORITY
LAB EXPANSION
GRAND CAYMAN
CAYMAN ISLANDS, B.W.I.

DRAWING TITLE
MECHANICAL LAYOUT
NOTES, DETAIL & SPECS
-

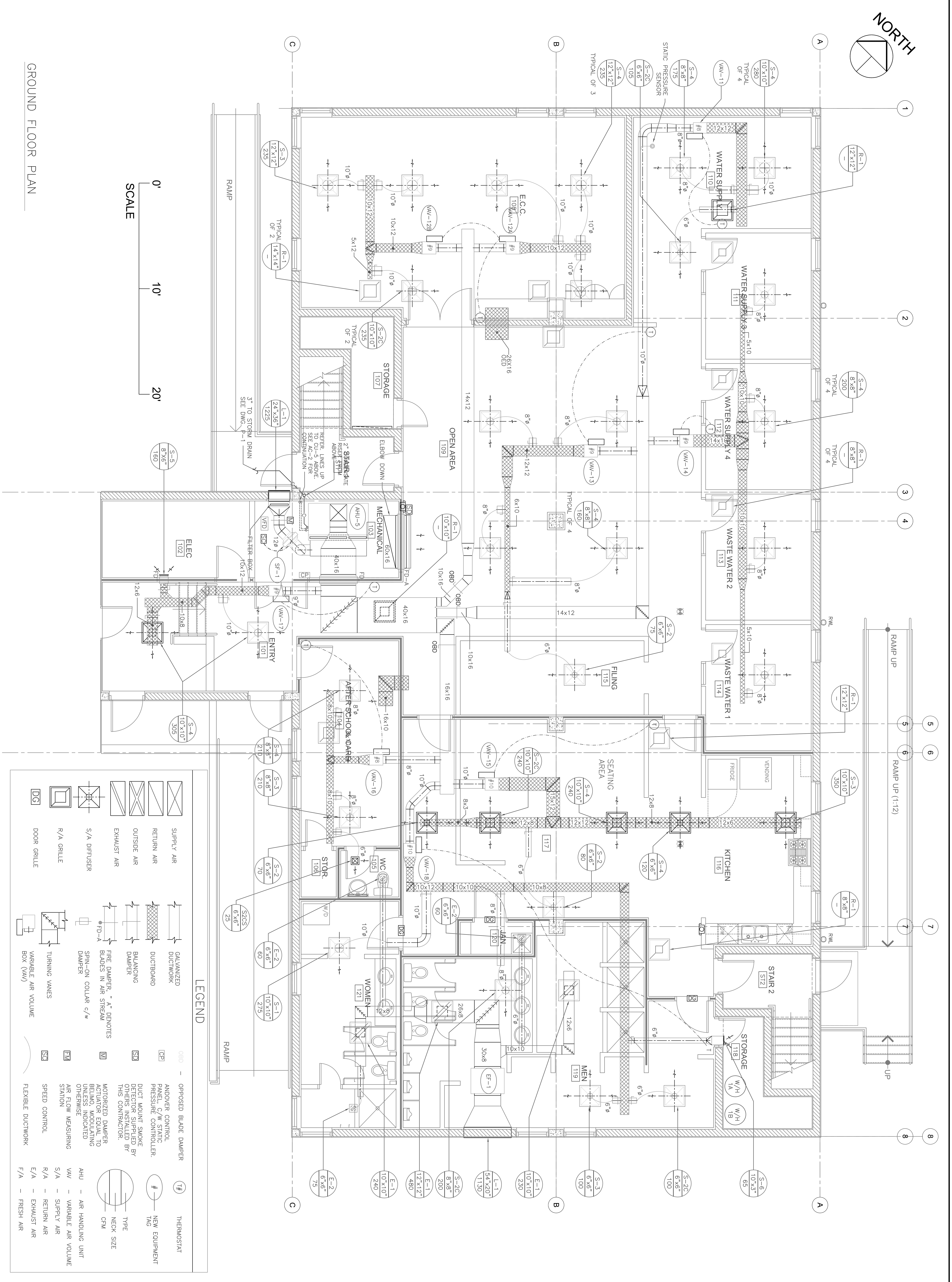
PROJECT NO.
10-MDS-05

REVISIONS

No.	DESCRIPTION	DATE
0	PRELIMINARY	JAN 10
1	ISSUED FOR REVIEW	MAR 2/10
2	REVISED FOR EXISTING CEILING	MAR 22/10

SCALE	AS NOTED	DWN	DJR
REV	2	CHD	MSW
DATE	-		

DRAWING NO.
M-2



WAC PROJECT NO.
P119
DRAWING NO.
01
SCALE
NTS
VIEW
SHEET
01
REV

CLEANING OF AIR CONDITIONING DUCTS

OPERATIONS BUILDING

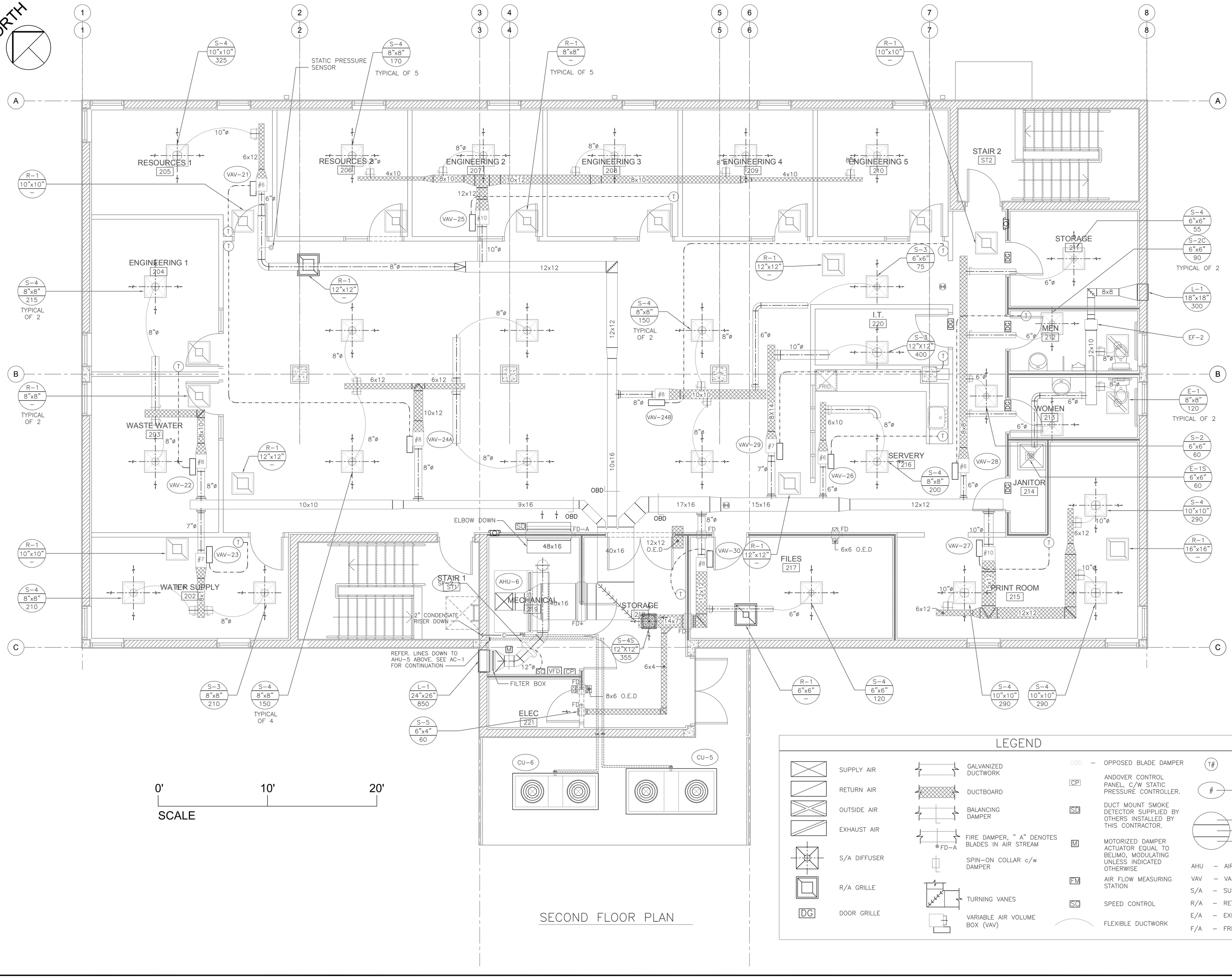
GROUND FLOOR

WAC

WATER AUTHORITY – CAYMAN
P.O. BOX 1104, GT
CAYMAN ISLANDS
345-949-2837

REV	DATE	BY	DESCRIPTION
0	03/01/17		ORIGINAL RELEASE – ISSUE FOR REVIEW

DATE: 03-01-17
DRAWN BY: MBT
CHECKED:
PROJECT NO.
P119



DATE: 03-01-17
DRAWN BY: MBT
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PROJECT NO.
P119

REV	DATE	BY	DESCRIPTION
0	03/01/17		ORIGINAL RELEASE – ISSUE FOR REVIEW

WATER AUTHORITY – CAYMAN
P.O. BOX 1104, GT
CAYMAN ISLANDS
345-949-2837

CLEANING OF AIR CONDITIONING DUCTS

OPERATIONS BUILDING
SECOND FLOOR

WAC PROJECT NO.
P119
DRAWING NO.
02
SCALE: NTS
VIEW:
SHEET:
REV: 01

GENERAL SPECIFICATIONS FOR THE CLEANING AND RESTORATION OF COMMERCIAL AIR CONDITIONING DUCTS

PART 1 - GENERAL

1.1 QUALIFICATION OF THE AIR CONDITIONING DUCT CLEANING CONTRACTOR

A. Experience - the contractor shall submit records of experience in the field of air conditioning duct cleaning as requested by the Engineer. Tenders shall only be considered from firms which are regularly engaged in air conditioning duct inspection, cleaning and restoration.

1.2 STANDARDS

A. National Air Duct Cleaners Association (NADCA) Standard for Assessment, Cleaning and Restoration (ACR) of HVAC Systems.

B. National Air Duct Cleaners Association (NADCA): “Assessment, Cleaning & Restoration of HVAC Systems (ACR).”

C. Underwriters’ Laboratories (UL): UL Standard 181.

D. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): “HVAC Duct Construction Standards - Metal and Flexible,” 1985.

E. North American Insulation Manufacturers Association (NAIMA): "Cleaning Fibrous Glass Insulated Air Duct Systems," 1993.

1.3 RELATED SECTIONS: Refer to the following sections for related work:

A. Specification for CCTV Inspection of Air Conditioning Ducts

1.4 SCOPE OF WORK

A. The Scope of Work shall include:

1. Video survey of all ducts between AHUs and diffusers prior to any work being carried out (excluding AHUs)
2. Clean all ducts, dampers, supply registers, grills and any ancillary items
3. Verify cleanliness of all items between AHUs and supply registers by post cleaning video survey (excluding AHUs)
4. Provide written report of work carried including before and after video and/or photos

PART 2 – PRODUCTS

A. ASSESSMENT AND SURVEY

A. Prior to the commencement of any cleaning work, the contractor shall perform a video assessment to determine extent of works; tools and equipment required and cleaning methods required to complete the project.

B. Work Plans - prior to the commencement of any work, the contractor shall provide a written work plan including the following information:

1. Extent of work, along with specific environmental controls required for each workspace, and any unique requirements.
2. Means and methods of cleaning to be used on the project.
3. Project schedule outlining dates and times that the work will take place.
4. Product submittals listing all general use and/or products specific to the project, along with Material Safety Data Sheets (MSDS) for all chemical products to be used on the project.

B. ENGINEERING CONTROLS

A. The Contractor shall ensure worker and occupant safety, and prevent cross-contamination. The contractor shall follow specified industry standards and guidelines specific to the type of work.

B. Equipment Maintenance & Use - all equipment shall be maintained in good working order, it shall be cleaned and inspected to ensure that it will not introduce contaminants and limit

possible cross-contamination from poor hygiene, and/ or unsafe operating conditions.

1. Any activity requiring the opening of vacuum collection equipment on-site, such as servicing or filter maintenance shall be performed in a suitable area outside of the building.
2. Vacuum collection equipment exhausting within the building envelope shall utilize equipment fitted with HEPA filtration and the equipment shall have a collection efficiency of 99.97% at 0.3 micron particle size.

C. Disposal of Materials - all material shall be disposed of to prevent cross-contamination and shall be properly contained prior to removal from the building and from the site.

D. Control of Product Emissions - any cleaning agents or other chemicals shall be used in strict accordance with manufacturer's recommended procedures and product application instructions.

PART3 - EXECUTION

3.1 CLEANING

A. All cleaning and restoration procedures shall achieve the minimum level of Visibly Clean as defined in NADCA Standard ACR for all components in the scope of works.

B. Service Openings - the contractor shall utilize service openings, as required for proper cleaning, at various points of the air conditioning ducts for physical and mechanical entry, and inspection.

1. The contractor shall utilize any existing service openings installed in the ducts where possible.
2. Any new service openings installed into the duct system shall not degrade the integrity of the system and shall be created such that proper closure can be made and shall not hinder, restrict, or alter the airflow within the air ducts, using methods and materials acceptable to the Engineer
3. All closures must be properly insulated and sealed to prevent heat gain or condensation on surfaces within the system.
4. Any access and closure of service openings installed in fibrous glass shall ensure that there are no exposed fibrous glass edges within the airstream.
5. All service openings shall be closed with materials meeting UL 181 for smoke generation and flame spread.
6. All service openings capable of being re-opened for future inspection or remediation shall be clearly marked and have their location reported to the Engineer in project report documents.
7. Cutting service openings into flexible duct is not permitted. Flexible duct shall be disconnected at the ends as needed for proper cleaning and inspection and shall be properly reconnected.

C. Cleaning Methods -

1. The contractor shall select cleaning methods that will render the ducts and components Visibly Clean and capable of passing cleanliness verification methods as described in NADCA Standard ACR. Acceptable methods will only include those which will not damage the integrity of the duct, nor damage porous surface materials such as liners inside the duct or system components.
2. Wet cleaning processes are not allowed.
3. Cleaning agents shall never be applied to electrical, fibrous glass or other porous components.

D. Particulate Collection – all collection methods shall use vacuum collection devices that are operated continuously during cleaning. The vacuum collection device must be of sufficient power such that containment of debris and the protection of the indoor environment are assured.

E. Containment - debris removed during cleaning shall be collected securely and not otherwise dispersed.

F. Controlling Odors - measures shall be employed to control odors

G. Air Duct and Component Cleaning -

1. The contractor shall clean air ducts to remove all non-adhered substances so that they are capable of passing NADCA cleanliness verification tests using approved methods to remove particulate, debris, surface contamination and capture dislodged substances with a vacuum collection device.
2. Cleaning methods that could damage any components shall not be used.
3. Mark the position of dampers and any air-directional mechanical devices prior to cleaning and restore them to their marked position upon completion.

H. Antimicrobial Agents – any antimicrobial agents used in the works must be approved for the application for which they will be used.

1. Application of any antimicrobial agents to control the growth of biological contaminants shall be performed after the removal of surface deposits and debris.
2. When used, antimicrobial agents shall be applied in strict accordance with the manufacturer's written recommendations and EPA registration listing.
3. Provide all relevant MSDS Data sheets

3.2 CLEANLINESS VERIFICATION

A. All components shall achieve, at a minimum, the level of Visibly Clean. Cleanliness verification shall be performed on specified components as described in NADCA Standard ACR.

B. Verification

1. Cleanliness verification will be determined immediately after cleaning and prior to use in operation and before the application of any treatment or introduction of any treatment-related substance including biocidal agents and coatings.

C. Visual Inspection - visual inspection of all components shall be conducted to assess that the system is Visibly Clean.

1. If no contaminants are evident through visual inspection, the system shall be considered clean.
2. If visible contaminants are evident through visual inspection, those portions of the system where contaminants are visible shall be re-cleaned and subjected to re-inspection for cleanliness.

3.3 POST-PROJECT DOCUMENTATION

A. At the conclusion of the project the contractor shall provide a report on all the work performed. The documentation shall include the following:

1. Videos and/or photo images and other supporting documents such as submittal forms for materials used and/or warrantees or guarantees.
2. Type of cleaning methods used.
3. Cleanliness verification and acceptance by the Engineer.
4. Areas found to be damaged and/or in need of repair.
5. Listing of any new service access points created for re-use.
6. Report on work carried out

END OF SECTION

SPECIFICATION FOR CCTV INSPECTION OF AIR CONDITIONING DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes internal video (CCTV) inspection of air conditioning ducts.
   1. Inspect air conditioning duct interiors using video camera.
   2. Video inspections are required before and after cleaning of air conditioning ducts to identify the extent of cleaning needs, and post-cleaning duct condition.
   3. Do not start any work in relation to cleaning of the air conditioning ducts until the Engineer has reviewed the initial video footage.
   4. Document before and after inspections on digital media with audio and written narrative.

B. Related Sections: Refer to the following sections for related work:
   1. General Specifications for the Cleaning and Restoration of Commercial Air Conditioning Systems

1.3 SUBMITTALS

A. Submit digital media before and after cleaning. Digital media must be recorded in a non-proprietary video format to allow for playback on any PC computer.

B. Maintain copies of all inspection documentation (video, databases, and logs) for duration of Work and defects period.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. The purpose of digital CCTV inspection recording is to supply a visual and audio record of the duct conditions.
   1. The recording shall be free of electrical interference and shall produce a clear and stable image.
   2. The audio shall be an oral report that is clear and discernible.
   3. The audio shall be recorded during the actual inspection work describing the conditions observed during the inspection.

B. Video System:
   1. The video system (camera, lens, lighting, cables, monitor and recorders) shall be capable of providing a picture quality acceptable to the Engineer, and if unsatisfactory, equipment shall be replaced with acceptable equipment.
   2. The camera shall be colour and shall provide a minimum of 1080p resolution.
   3. The camera shall be specifically designed and constructed for the inspection of all types of air conditioning duct.
   4. Illumination for the camera shall be suitable to allow a clear in-focus picture.
   5. Equipment shall have an accurate distance counter that displays on the video output
   6. A sufficient length of cable shall be provided necessary to complete the works.
   7. The Contractor shall have all video and necessary playback equipment readily accessible for review by the Engineer during the project.

C. The duct inspection shall allow identification of a location within the duct segment.

D. Digital media: Acceptable types: DVD-R, DVD-RW, DVD+R, SD Card, USB Drive.
   1. Identify each unit, include Project Name, date of inspection, duct segment(s) included.
      a. All inspections shall be provided to the Engineer along with the respective inspection field logs.

PART 3 - EXECUTION

3.1 CCTV INSPECTION

A. The inspection will be done one section at a time. The Contractor may be allowed to complete inspections in multiple sections.

B. The interior of each duct to be inspected to determine the condition
   1. Record the nature, location, and orientation of any observed defect.

C. Should the televising equipment become lodged in any duct, it shall be removed by the Contractor at his expense, including repair of the duct and surface restoration. Re-televise any line segment in which equipment became lodged after it has been removed to demonstrate that no damage exists as a result of the televising operations.

3.4 VIDEO AND TELEVISION INSPECTION LOG

A. The Contractor shall record the video inspections on recordable digital media.

B. Video inspection documentation shall include duct identifiers.

C. Screen text on the video recording shall be clearly displayed on a contrasting background.

D. The video shall include a visual and audio narrative noting:
   1. Date, time of day
   2. Location
   3. Size of duct
   4. Duct material
   5. Location (start and end counter distances in feet from the beginning)

E. During video inspection the date of inspection shall be included on the recording.

F. Digital video recording playback shall be at the same speed that it was recorded.

G. Inspection Logs:
   1. Provide an Inspection Log which shall contain the same information as the video.
   2. Supply the Inspection Log in both hard copy and in electronic format.

3.5 FIELD QUALITY CONTROL

A. Engineer will review inspection reports and digital video recordings.
   1. Media shall display a continuous image of the internal surface of the ducts.
   2. The Contractor shall re-televise, at no additional cost, any segment for which the disk does not present a clear image of the duct and/or is accompanied by an incomplete log.
   3. Submittals shall be reviewed by the Engineer within 2 days of submission. Any out-of-focus video recordings or portions thereof shall be cause for rejection of the recording and will necessitate re-televising

B. If any duct, in the sole opinion of Engineer, is not adequately clean, it shall be re-cleaned and Video-inspected by Contractor at no additional cost.

END OF SECTION

AGREEMENT

GENERAL CONDITIONS

SHORT FORM of Contract

RULES FOR ADJUDICATION

NOTES FOR GUIDANCE

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FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS
INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS
INTERNATIONALE VEREINIGUNG BERATENDER INGENIEURE
FEDERACION INTERNACIONAL DE INGENIEROS CONSOLTORES

FOREWORD

These Conditions of Contract have been prepared by the Fédération Internationale des Ingénieurs-Conseils (FIDIC) and are recommended for engineering and building work of relatively small capital value. However, depending on the type of work and the circumstances, the Conditions may be suitable for contracts of greater value. They are considered most likely to be suitable for fairly simple or repetitive work or work of short duration without the need for specialist sub-contracts.

The main aim has been to produce a straightforward flexible document which includes all essential commercial provisions and which may be used for all types of engineering and building work with a variety of administrative arrangements. Under the usual arrangements for this type of contract, the Contractor constructs the Works in accordance with design provided by the Employer or by his representative (if any). However, this form may also be suitable for contracts which include, or wholly comprise, contractor-designed civil, mechanical and/or electrical works.

In addition, the Employer has a choice of valuation methods. Furthermore, although there is no reference to an impartial Engineer, the Employer may appoint an independent Engineer to act impartially, should he wish to do so.

The form is recommended for general use, though modifications may be required in some jurisdictions. FIDIC considers the official and authentic text to be the version in the English language.

The intention is that all necessary information should be provided in the Appendix to the Agreement, the latter incorporating the tenderer's offer and its acceptance in one simple document. The General Conditions are expected to cover the majority of contracts. Nevertheless, users will be able to introduce Particular Conditions if they wish, to cater for special cases or circumstances. The General Conditions and the Particular Conditions will together comprise the Conditions governing the rights and obligations of the parties.

To assist in the preparation of tender documents using these Conditions, Notes for Guidance are included. These Notes will not become one of the documents forming the Contract. Finally, applicable Rules for Adjudication are also included.

The attention of users is drawn to the FIDIC publication "Tendering Procedure", which presents a systematic approach to the selection of tenderers and the obtaining and evaluation of tenders.

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The preparation was carried out under the general direction of the FIDIC Contracts Committee comprising John B Bowcock (Chairman), Consulting Engineer, UK; Michael Mortimer-Hawkins, SwedPower, Sweden; Axel-Volkmar Jaeger, Schmidt Reuter Partner, Germany; and KB (Tony) Norris (Special Adviser), Consulting Engineer, UK.

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FIDIC wishes to record its appreciation of the time and effort devoted by all the above.

The ultimate decision on the form and content of the document rests with FIDIC.

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General Conditions

1 General Provisions

1.1 Definitions

In the Contract as defined below, the words and expressions defined shall have the following meanings assigned to them, except where the context requires otherwise:

The Contract

1.1.1 "**Contract**" means the Agreement and the other documents listed in the Appendix.

1.1.2 "**Specification**" means the document as listed in the Appendix, including Employer's requirements in respect of design to be carried out by the Contractor, if any, and any Variation to such document.

1.1.3 "**Drawings**" means the Employer's drawings of the Works as listed in the Appendix, and any Variation to such drawings.

Persons

1.1.4 "**Employer**" means the person named in the Agreement and the legal successors in title to this person, but not (except with the consent of the Contractor) any assignee.

1.1.5 "**Contractor**" means the person named in the Agreement and the legal successors in title to this person, but not (except with the consent of the Employer) any assignee.

1.1.6 "**Party**" means either the Employer or the Contractor.

Dates, Times and Periods

1.1.7 "**Commencement Date**" means the date 14 days after the date the Agreement comes into effect or any other date agreed between the Parties.

1.1.8 "**day**" means a calendar day.

1.1.9 "**Time for Completion**" means the time for completing the Works as stated in the Appendix (or as extended under Sub-Clause 7.3), calculated from the Commencement Date.

Money and Payments

1.1.10 "**Cost**" means all expenditure properly incurred (or to be incurred) by the Contractor, whether on or off the Site, including overheads and similar charges, but does not include profit.

Other Definitions

1.1.11 "**Contractor's Equipment**" means all apparatus, machinery, vehicles, facilities and other things required for the execution of the Works but does not include Materials or Plant.

1.1.12 "**Country**" means the country in which the Site is located.

1.1.13 "**Employer's Liabilities**" means those matters listed in Sub-Clause 6.1.

1.1.14 "**Force Majeure**" means an exceptional event or circumstance: which is beyond a Party's control; which such Party could not reasonably have

provided against before entering into the Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party.

1.1.15 "**Materials**" means things of all kinds (other than Plant) intended to form or forming part of the permanent work.

1.1.16 "**Plant**" means the machinery and apparatus intended to form or forming part of the permanent work.

1.1.17 "**Site**" means the places provided by the Employer where the Works are to be executed, and any other places specified in the Contract as forming part of the Site.

1.1.18 "**Variation**" means a change to the Specification and /or Drawings (if any) which is instructed by the Employer under Sub-Clause 10.1.

1.1.19 "**Works**" means all the work and design (if any) to be performed by the Contractor including temporary work and any Variation

1.2

Interpretation

Words importing persons or parties shall include firms and organisations. Words importing singular or one gender shall include plural or the other gender where the context requires.

1.3

Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. If an ambiguity or discrepancy is found in the documents, the Employer shall issue any necessary instructions to the Contractor, and the priority of the documents shall be in accordance with the order as listed in the Appendix.

1.4

Law

The law of the Contract is stated in the Appendix.

1.5

Communications

Wherever provision is made for the giving or issue of any notice, instruction, or other communication by any person, unless otherwise specified such communication shall be written in the language stated in the Appendix and shall not be unreasonably withheld or delayed.

1.6

Statutory Obligations

The Contractor shall comply with the laws of the countries where activities are performed. The Contractor shall give all notices and pay all fees and other charges in respect of the Works.

2 The Employer

2.1

Provision of Site

The Employer shall provide the Site and right of access thereto at the times stated in the Appendix.

2.2

Permits and Licences

The Employer shall, if requested by the Contractor, assist him in applying for permits, licences or approvals which are required for the Works.

2.3
Employer's Instructions

The Contractor shall comply with all instructions given by the Employer in respect of the Works including the suspension of all or part of the Works.

2.4

Approvals

No approval or consent or absence of comment by the Employer or the Employer's representative shall affect the Contractor's obligations.

3 Employer's Representatives

3.1
Authorised Person

One of the Employer's personnel shall have authority to act for him. This authorised person shall be as stated in the Appendix, or as otherwise notified by the Employer to the Contractor.

3.2

Employer's Representative

The Employer may also appoint a firm or individual to carry out certain duties. The appointee may be named in the Appendix, or notified by the Employer to the Contractor from time to time. The Employer shall notify the Contractor of the delegated duties and authority of this Employer's representative.

4 The Contractor

4.1
General Obligations

The Contractor shall carry out the Works properly and in accordance with the Contract. The Contractor shall provide all supervision, labour, Materials, Plant and Contractor's Equipment which may be required. All Materials and Plant on Site shall be deemed to be the property of the Employer.

4.2

Contractor's Representative

The Contractor shall submit to the Employer for consent the name and particulars of the person authorised to receive instructions on behalf of the Contractor.

4.3

Subcontracting

The Contractor shall not subcontract the whole of the Works. The Contractor shall not subcontract any part of the Works without the consent of the Employer.

4.4

Performance Security

If stated in the Appendix, the Contractor shall deliver to the Employer within 14 days of the Commencement Date a performance security in a form and from a third party approved by the Employer.

5 Design by Contractor

5.1
Contractor's Design

The Contractor shall carry out design to the extent specified, as referred to in the Appendix. The Contractor shall promptly submit to the Employer all designs prepared by him. Within 14 days of receipt the Employer shall notify any comments or, if the design submitted is not in accordance with the Contract, shall reject it stating the reasons. The Contractor shall not construct any element of the permanent work designed by him within 14 days after the design has been

submitted to the Employer or where the design for that element has been rejected. Design that has been rejected shall be promptly amended and resubmitted. The Contractor shall resubmit all designs commented on taking these comments into account as necessary.

5.2

Responsibility for Design

The Contractor shall remain responsible for his tendered design and the design under this Clause, both of which shall be fit for the intended purposes defined in the Contract and he shall also remain responsible for any infringement of any patent or copyright in respect of the same. The Employer shall be responsible for the Specification and Drawings.

6 Employer's Liabilities

6.1

Employer's Liabilities

In this Contract, Employer's Liabilities mean :

a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies, within the Country,
b) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war, within the Country,
c) riot, commotion or disorder by persons other than the Contractor's personnel and other employees, affecting the Site and/or the Works,
d) ionising radiations, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive nuclear assembly or nuclear component of such an assembly, except to the extent to which the Contractor may be responsible for the use of any radio-active material,
e) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
f) use or occupation by the Employer of any part of the Works, except as may be specified in the Contract,
g) design of any part of the Works by the Employer's personnel or by others for whom the Employer is responsible, and
h) any operation of the forces of nature affecting the Site and/or the Works, which was unforeseeable or against which an experienced contractor could not reasonably have been expected to take precautions.
i) Force Majeure,
j) a suspension under Sub-Clause 2.3 unless it is attributable to the Contractor's failure,
k) any failure of the Employer,
l) physical obstructions or physical conditions other than climatic conditions, encountered on the Site during the performance of the Works, which obstructions or conditions were not reasonably foreseeable by an experienced contractor and which the Contractor immediately notified to the Employer,
m) any delay or disruption caused by any Variation,
n) any change to the law of the Contract after the date of the Contractor's offer as stated in the Agreement,
o) losses arising out of the Employer's right to have the permanent work executed on, over, under, in or through any land, and to occupy this land for the permanent work, and
p) damage which is an unavoidable result of the Contractor's obligations to execute the Works and to remedy any defects.

7 Time for Completion

7.1
Execution of the Works

The Contractor shall commence the Works on the Commencement Date and shall proceed expeditiously and without delay and shall complete the Works within the Time for Completion.

7.2
Programme

Within the time stated in the Appendix, the Contractor shall submit to the Employer a programme for the Works in the form stated in the Appendix.

7.3
Extension of Time

Subject to Sub-Clause 10.3, the Contractor shall be entitled to an extension to the Time for Completion if he is or will be delayed by any of the Employer's Liabilities.

On receipt of an application from the Contractor, the Employer shall consider all supporting details provided by the Contractor and shall extend the Time for Completion as appropriate.

7.4
Late Completion

If the Contractor fails to complete the Works within the Time for Completion, the Contractor's only liability to the Employer for such failure shall be to pay the amount stated in the Appendix for each day for which he fails to complete the Works.

8 Taking-Over

8.1
Completion

The Contractor may notify the Employer when he considers that the Works are complete.

8.2
Taking-Over Notice

The Employer shall notify the Contractor when he considers that the Contractor has completed the Works stating the date accordingly. Alternatively, the Employer may notify the Contractor that the Works, although not fully complete, are ready for taking over, stating the date accordingly.

The Employer shall take over the Works upon the issue of this notice. The Contractor shall promptly complete any outstanding work and, subject to Clause 9, clear the Site.

9 Remedying Defects

9.1
Remedying Defects

The Employer may at any time prior to the expiry of the period stated in the Appendix, notify the Contractor of any defects or outstanding work. The Contractor shall remedy at no cost to the Employer any defects due to the Contractor's design, Materials, Plant or workmanship not being in accordance with the Contract.

The cost of remedying defects attributable to any other cause shall be valued as a Variation. Failure to remedy any defects or complete outstanding work within a reasonable time of the Employer's notice shall entitle the Employer to carry out all necessary work at the Contractor's cost.

9.2

Uncovering and Testing

The Employer may give instruction as to the uncovering and/or testing of any work. Unless as a result of any uncovering and/or testing it is established that the Contractor's design, Materials, Plant or workmanship are not in accordance with the Contract, the Contractor shall be paid for such uncovering and/or testing as a Variation in accordance with Sub-Clause 10.2.

10 Variations and Claims

10.1

Right to Vary

The Employer may instruct Variations.

10.2

Valuation of Variations

Variations shall be valued as follows:

a) at a lump sum price agreed between the Parties, or
b) where appropriate, at rates in the Contract, or
c) in the absence of appropriate rates, the rates in the Contract shall be used as the basis for valuation, or failing which
d) at appropriate new rates, as may be agreed or which the Employer considers appropriate, or
e) if the Employer so instructs, at daywork rates set out in the Appendix for which the Contractor shall keep records of hours of labour and Contractor's Equipment, and of Materials used.

10.3

Early Warning

A Party shall notify the other as soon as he is aware of any circumstance which may delay or disrupt the Works, or which may give rise to a claim for additional payment. The Contractor shall take all reasonable steps to minimise these effects.

The Contractor's entitlement to extension to the Time for Completion or additional payment shall be limited to the time and payment which would have been due if he had given prompt notice and had taken all reasonable steps.

10.4

Right to Claim

If the Contractor incurs Cost as a result of any of the Employer's Liabilities, the Contractor shall be entitled to the amount of such Cost. If as a result of any of the Employer's Liabilities, it is necessary to change the Works, this shall be dealt with as a Variation.

10.5

Variation and Claim Procedure

The Contractor shall submit to the Employer an itemised make-up of the value of Variations and claims within 28 days of the instruction or of the event giving rise to the claim. The Employer shall check and if possible agree the value. In the absence of agreement, the Employer shall determine the value.

11 Contract Price and Payment

11.1
Valuation of the Works

The Works shall be valued as provided for in the Appendix, subject to Clause 10.

11.2
Monthly Statements

The Contractor shall be entitled to be paid at monthly intervals:

a) the value of the Works executed,
b) the percentage stated in the Appendix of the value of Materials and Plant delivered to the Site at a reasonable time,

subject to any additions or deductions which may be due.

The Contractor shall submit each month to the Employer a statement showing the amounts to which he considers himself entitled.

11.3
Interim Payments

Within 28 days of delivery of each statement, the Employer shall pay to the Contractor the amount shown in the Contractor's statement less retention at the rate stated in the Appendix, and less any amount for which the Employer has specified his reasons for disagreement. The Employer shall not be bound by any sum previously considered by him to be due to the Contractor.

The Employer may withhold interim payments until he receives the performance security under Sub-Clause 4.4 (if any).

11.4
Payment of First Half of Retention

One half of the retention shall be paid by the Employer to the Contractor within 14 days after issuing the notice under Sub-Clause 8.2.

11.5
Payment of Second Half of Retention

The remainder of the retention shall be paid by the Employer to the Contractor within 14 days after either the expiry of the period stated in the Appendix, or the remedying of notified defects or the completion of outstanding work, all as referred to in Sub-Clause 9.1, whichever is the later.

11.6
Final Payment

Within 42 days of the latest of the events listed in Sub-Clause 11.5 above, the Contractor shall submit a final account to the Employer together with any documentation reasonably required to enable the Employer to ascertain the final contract value.

Within 28 days after the submission of this final account, the Employer shall pay to the Contractor any amount due. If the Employer disagrees with any part of the Contractor's final account, he shall specify his reasons for disagreement when making payment.

11.7
Currency

Payment shall be in the currency stated in the Appendix.

11.8
Delayed Payment

The Contractor shall be entitled to interest at the rate stated in the Appendix for each day the Employer fails to pay beyond the prescribed payment period.

12 Default

12.1
Default by Contractor

If the Contractor abandons the Works, refuses or fails to comply with a valid instruction of the Employer or fails to proceed expeditiously and without delay, or is, despite a written complaint, in breach of the Contract, the Employer may give notice referring to this Sub-Clause and stating the default.

If the Contractor has not taken all practicable steps to remedy the default within 14 days after the Contractor's receipt of the Employer's notice, the Employer may by a second notice given within a further 21 days, terminate the Contract. The Contractor shall then demobilise from the Site leaving behind Materials and Plant and any Contractor's Equipment which the Employer instructs in the second notice is to be used until the completion of the Works.

12.2
Default by Employer

If the Employer fails to pay in accordance with the Contract, or is, despite a written complaint, in breach of the Contract, the Contractor may give notice referring to this Sub-Clause and stating the default. If the default is not remedied within 7 days after the Employer's receipt of this notice, the Contractor may suspend the execution of all or parts of the Works.

If the default is not remedied within 28 days after the Employer's receipt of the Contractor's notice, the Contractor may by a second notice given within a further 21 days, terminate the Contract. The Contractor shall then demobilise from the Site.

12.3
Insolvency

If a Party is declared insolvent under any applicable law, the other Party may by notice terminate the Contract immediately. The Contractor shall then demobilise from the Site leaving behind, in the case of the Contractor's insolvency, any Contractor's Equipment which the Employer instructs in the notice is to be used until the completion of the Works.

12.4
Payment upon Termination

After termination, the Contractor shall be entitled to payment of the unpaid balance of the value of the Works executed and of the Materials and Plant reasonably delivered to the Site, adjusted by the following:

a) any sums to which the Contractor is entitled under Sub-Clause 10.4,
b) any sums to which the Employer is entitled,
c) if the Employer has terminated under Sub-Clause 12.1 or 12.3, the Employer shall be entitled to a sum equivalent to 20% of the value of those parts of the Works not executed at the date of the termination,
d) if the Contractor has terminated under Sub-Clause 12.2 or 12.3, the Contractor shall be entitled to the Cost of his suspension and demobilisation together with a sum equivalent to 10% of the value of those parts of the Works not executed at the date of termination.

The net balance due shall be paid or repaid within 28 days of the notice of termination.

13 Risk and Responsibility

13.1
Contractor's Care of the Works

The Contractor shall take full responsibility for the care of the Works from the Commencement Date until the date of the Employer's notice under Sub-Clause 8.2. Responsibility shall then pass to the Employer. If any loss or damage happens to the Works during the above period, the Contractor shall rectify such loss or damage so that the Works conform with the Contract.

Unless the loss or damage happens as a result of an Employer's Liability, the Contractor shall indemnify the Employer, the Employer's contractors, agents and employees against all loss or damage happening to the Works and against all claims or expense arising out of the Works caused by a breach of the Contract, by negligence or by other default of the Contractor, his agents or employees.

13.2
Force Majeure

If a Party is or will be prevented from performing any of its obligations by Force Majeure, the Party affected shall notify the other Party immediately. If necessary, the Contractor shall suspend the execution of the Works and, to the extent agreed with the Employer, demobilise the Contractor's Equipment.

If the event continues for a period of 84 days, either Party may then give notice of termination which shall take effect 28 days after the giving of the notice.

After termination, the Contractor shall be entitled to payment of the unpaid balance of the value of the Works executed and of the Materials and Plant reasonably delivered to the Site, adjusted by the following:

a) any sums to which the Contractor is entitled under Sub-Clause 10.4,
b) the Cost of his suspension and demobilisation,
c) any sums to which the Employer is entitled.

The net balance due shall be paid or repaid within 28 days of the notice of termination.

14 Insurance

14.1
Extent of Cover

The Contractor shall, prior to commencing the Works, effect and thereafter maintain insurances in the joint names of the Parties:

a) for loss and damage to the Works, Materials, Plant and the Contractor's Equipment,
b) for liability of both Parties for loss, damage, death or injury to third parties or their property arising out of the Contractor's performance of the Contract, including the Contractor's liability for damage to the Employer's property other than the Works, and
c) for liability of both Parties and of any Employer's representative for death or injury to the Contractor's personnel except to the extent that liability arises from the negligence of the Employer, any Employer's representative or their employees.

14.2
Arrangements

All insurances shall conform with any requirements detailed in the Appendix. The policies shall be issued by insurers and in terms approved by the Employer. The Contractor shall provide the Employer with evidence that any required policy is in force and that the premiums have been paid.

All payments received from insurers relating to loss or damage to the Works shall be held jointly by the Parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired.

14.3
Failure to Insure

If the Contractor fails to effect or keep in force any of the insurances referred to in the previous Sub-Clauses, or fails to provide satisfactory evidence, policies or receipts, the Employer may, without prejudice to any other right or remedy, effect insurance for the cover relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the Contractor.

15 Resolution of Disputes

15.1
Adjudication

Unless settled amicably, any dispute or difference which arises between the Contractor and the Employer out of or in connection with the Contract, including any valuation or other decision of the Employer, shall be referred by either Party to adjudication in accordance with the attached Rules for Adjudication ("the Rules"). The adjudicator shall be any person agreed by the Parties. In the event of disagreement, the adjudicator shall be appointed in accordance with the Rules.

15.2
Notice of Dissatisfaction

If a Party is dissatisfied with the decision of the adjudicator or if no decision is given within the time set out in the Rules, the Party may give notice of dissatisfaction referring to this Sub-Clause within 28 days of receipt of the decision or the expiry of the time for the decision. If no notice of dissatisfaction is given within the specified time, the decision shall be final and binding on the Parties. If notice of dissatisfaction is given within the specified time, the decision shall be binding on the Parties who shall give effect to it without delay unless and until the decision of the adjudicator is revised by an arbitrator.

15.3
Arbitration

A dispute which has been the subject of a notice of dissatisfaction shall be finally settled by a single arbitrator under the rules specified in the Appendix. In the absence of agreement, the arbitrator shall be designated by the appointing authority specified in the Appendix. Any hearing shall be held at the place specified in the Appendix and in the language referred to in Sub-Clause 1.5.

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Particular Conditions

Note

It is intended that the Short Form of Contract will work satisfactorily without any Particular Conditions. However, if the requirement of the project makes it desirable to amend any Clause or to add provisions to the Contract, the amendments and additions should be set out on pages headed Particular Conditions. Care should be taken with the drafting of such Clauses especially in view of the high priority given to the Particular Conditions by Sub-Clause 1.3.