

RBSANCHEZ PME CONSULTANTS & ASSOCIATES, INC.

PROVEN, RELIABLE AND COST-EFFECTIVE SOLUTIONS



Unit 3603, 36F Makati Executive Tower II, Buendia Ave. cor. Dela Rosa St. Brgy. Pio Del Pilar, Makati City Philippines 1230



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www.rbs-engineers.com



PRINCIPAL ENGINEER ENGR. ROSENDO B. SANCHEZ PME, ASEAN, ACPE, ASHRAE

- HVAC ENGINEER of the "WORLD'S TALLEST BUILDING" THE BURJ KHALIFA TOWER Dubai, UAE. Served as "HVAC DESIGN MANAGER" and "HVAC ENGINEER ON RECORD". Year 2006-2007.
- MECHANICAL ENGINEERING BOARD TOPNOTCHER (1st PLACE) with the Highest Score Achievement in the government Licensure Examinations for Mechanical Engineers in 1981, with CUMLAUDE honors graduate in the University of the Philippines, Diliman.
- PSME "TOME AWARDS" as "THE MOST OUTSTANDING MECHANICAL ENGINEER" in Research and Innovations Consultancy by National P.S.M.E. (Philippine Society of Mechanical Engineers) and by the Professional Regulation Commission at SMX PSME Convention Center of Year 2018.



SOCRATES NOMINATION COMMITTEE

2 Woodin's Way, Oxford, OX1 1HF · United Kingdom www.awards.ebaoxford.co.uk +441865794362



The nomination and award to





ENGR. ROSENDO B. SANCHEZ PME, ASEAN, ACPE



Awarded for 'Manager of the Year" 2020 for contributing to International Engineering Design Projects for the Burj Khalifah Dubai "WORLD'S TALLEST BUILDING"

As the "HVAC DESIGN MANAGER" and "HVAC ENGINEER ON RECORD". Engr. Rosen Sanchez is the official signatory of all building's HVAC construction drawings of Years 2006-2007.







Featured by the PHILIPPINE DAILY INQUIRER, issue September 21, 2008 Metro Global Section A18 – half page as the Filipino HVAC Design Manager and engineer to watch.



PHILIPPINE NEWS ENGR. ROSENDO B. SANCHEZ PME, ASEAN, ACPE

FEATURED IN A **DUBAI NEWSPAPER** AS HVAC DESIGN MANAGER for the LANDMARK DUBAI Project.

NEWS EMARATALYOUM: Issued last September 29,

2006 page 38 as the selected "HVAC Design Manager" to watch in the Dubai Burj Khalifah Project.







AWARDS AND RECOGNITION

ENGR. ROSENDO B. SANCHEZ PME, ASEAN, ACPE

- TOME AWARDEE "THE MOST OUTSTANDING MECHANICAL ENGINEER" in Consultancy by National P.S.M.E. (Philippine Society of Mechanical Engineers) and by the Professional Regulation Commission at SMX PSME Convention Center of Year 2011.
- "THE BEST MECHANICAL ENGINEERING DESIGN AND CONSULTANCY SERVICES" by the ASIA PACIFIC EXCELLENCE AWARDS COUNCIL (APAC), Awarded December 15, 2018.







RBS PHILOSOPHY on WORK/LIFE

Trust in the Sciences/Truth and on Filipino Engineers and Countrymen



- REALISTIC AND WORKABLE PROJECT CONTEXT/LOCALIZED SOLUTIONS
- ECONOMICAL & OPTIMIZED ENERGY / ENVIRONMENTAL APPROACH
- LONG-TERM AND MUTUALLY-BENEFICIAL SOLUTIONS/RELATIONSHIPS
- HONEST AUTHENTIC COMMUNICATION: NON-JUDGMENTAL AND CONFIDENTIAL
- HAS A CODE OF ETHICS AND WITH MUTUAL RESPECT
- TEAMWORK & DEDICATION: A VISION FOR PHILIPPINE INDUSTRIALIZATION
- ETERNAL MISSION & STRUGGLE: HOW TO "SEEK THE TRUTH FROM FACTS"

OUR SERVICES "Single-Point Responsibility" in Engineering Sciences

and Consultancy, from Design of High-end Hotels and Residences, Leisure Parks, Industrial Plants, 24/7 Operations and manning Services, Testing and Commissioning, Trouble-shooting to Plant Maintenance and retrofit Services with specialization in:

- Integrated "All disciplines" Design & Consultancy Services for I.T. Server Farms, Semiconductor Fab Cleanrooms, Logistics Warehouses and systems, Bio-Chem facilities, Food and Medical Services, Oil & Gas, Chemical and Process Plants, Chiller Systems, Water and Waste Water Distribution networks, Mining, Power Plants, Malls, Medical, Commercial & BPOs, Real Estate Development, etc.
- Plant Operation & Maintenance (O&M) and Instrumentation and Controls Upgrade. running your plant efficiently and reliably onshore/offshore on a 24/7/365 basis and design of Controls and Instrumentation and upgrades
- Improving Reliability and Energy Efficiency, Reliability-Centered-Maintenance RCM-II and Asset Operations and Asset Integrity Improvements.
- **Testing and Measurements and Analysis**, Troubleshooting and Test and Commissioning works in the commercial, industrial, and both onshore and offshore industrial Oil & Gas, Mining and Semi-Conductor, Server and Solar Farms, etc, testing on HVAC, air & gases, weather & environment, water and viscous and Bingham fluids.
- Computational Fluid Dynamics (CFD), Simulations, Numerical Modelling, and complex Mathematical techniques to predict conditions using supercomputers for the ff fluids: Weather and Climate Change, Wind and Water, Viscous fluids, Sludge and Non-Newtonian and Mining fluids, Environmental Gases and Pollutants and Soot and Waste Sludge pumping and Wastewater treatment. Newtonian, Bingham and Heterogenious and slurry fluid flows.



LIST OF PROJECTS AND CLIENTS

DESIGN AND CONSULTANCY

YCO CLOUD CENTER Data Center (Philippines)

Light Industry and Science Park IV, Batangas February to July 2023.





US\$500M DATA CENTER to rise in Batangas (2023 News Bulletin today)

12-MW YCO CLOUD DATA CENTER is certified to TIA 942 Rated III and ISO 22237

The design team is headed by U.S. based Gensler Architects and Manila-based JSLA Architects.

RBS is the CFD consultant.







RBS is responsible for the HVAC CFD Design Consultancy and Airflow/Ventilation Consultancy for DATA CENTER HALLS, SERVER RACKS and CABINETS, HVAC units,i.e. Precision CRAH/PAHU equipment Cooling Airflows and the external cooling of the high-power density 2.5MW multiple DIESEL GENERATORS as well as cooling of the mission-critical battery/UPS power supplies.

Western Digital Storage Technologies (Philippines) Corp.

- HGST Plant. 109 Technology Ave SEPZ, Laguna Technopark Sta Rosa, Laguna, from February Years 2022-2023.
- To,000 sqm WD PLANT EXPANSION to capacity of 150mu with CLEANROOMS designed to ISO CLASS 100.



RBS will design the ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL, MECHANICAL, ELECTRONIC, I.T. & DATA INFRASTRUCTURE of the WD PLANT.







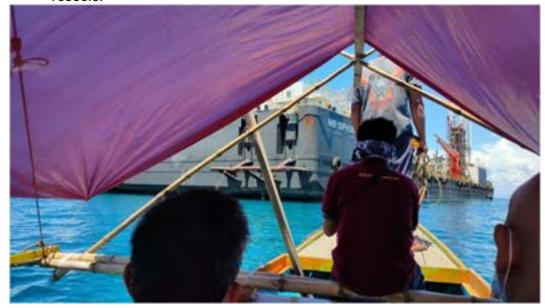
WD has contracted **RBS** as a "singlepoint responsibility" for the engineering design of the plant's new 3000sqm CLEANROOM to ISO CLASS 100 levels.

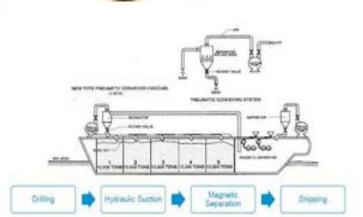
SCIENTIFIC CONSULTANCY and MINING OPERATIONS SERVICES FOR THE PHILS. LARGEST OFFSHORE MINING PROJECT

• Offshore in Cagayan, Phillippines, July 2021 and ongoing 2023.

RBS supplies the Scientific. Geological Mining, Structural and Mathematical Modelling and Mechanical Engineering expertise and the Operations and Maintenance Services for Offshore Platform Sand Extraction and On board Mineral Processing Plant of JDVC Corp.

The operation requires a capesize siphon vessel with a width of 32 meters on average and a length of about 300 meters. Complete with three (3) full sets of magnetic separators, ejector system for deep-sea pump-up siphoning from down to 200 meters after the sea bed, washer apparatus, drying apparatus, and loading facilities for mineral transfer to export vessels.



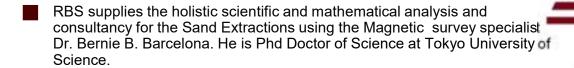




RBS CONSULTANCY FOR THE OFFSHORE MINING MAGNETIC SURVEY PROJECT.

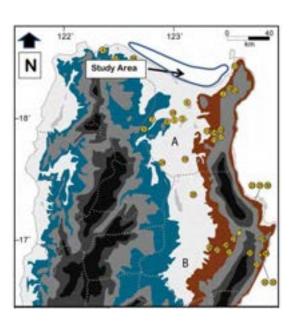


Offshore in Cagayan, Phillippines, Sept 12 to current t

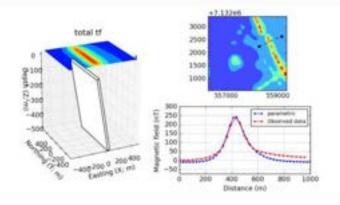




GEOPHYSICAL EQUIPMENT USED. Magnetic Transponders. PASI Resistivity Meter, RM-1 Model (3x) SEISMIC REFRACTION/MASW - GEOMETRIX-24 CHANNELSSCHMIDT HAMMER FOR ROCKS AND CONCRETE THERMAL RESISTIVITY INSTRUMENT (THERMTEST) TERRAMETER TERRALOC PRO GPRs – GSSI









DESIGN OF LAS PINAS PUMPING STATION MAYNILAD 2023

Maynilad

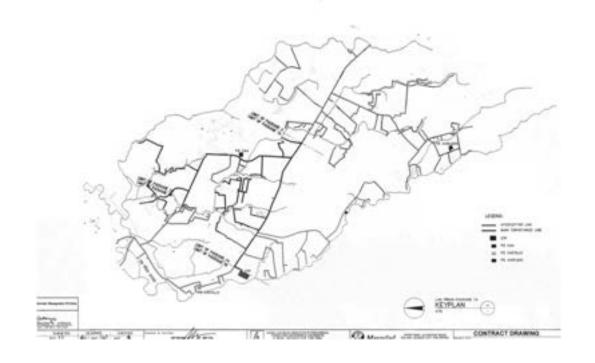
Las Pinas Maynilad, Paranaque City, Metro Manila

DESIGN and CONSULTANCY SERVICES for to-be-constructed 25 Million liters a day WATER PUMPING STATION AND PIPING @ LAS PINAS, METRO MANILA.





Scope is the Mechanical Pumping, Environmental, Structural, Civil, Safety, Sanitary and Fire Protection and Architectural services. 2022 to 2023



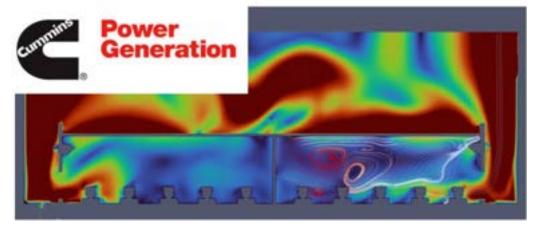
CONSULTANCY SERVICES FOR PLDT DATA CENTER 20MW POWER PLANT

PLDT DATA CENTER, Nicanor Garcia, Makati, Metro Manila



RBS SUPERCOMPUTERS POWERS THE CFD STUDIES AND CONSULTANCY SERVICES FOR THE 20MW DIESEL POWER FOR SERVER FARMS PLDT IN MAKATI CITY, October 2022







2.4 Thermophysical and Energy Models

Thermophysical models are used to describe cases where the thermal energy, compressibility, and/or mass transfer is important. OpenFOAA allows thermophysical properties to be constant, or functions of temperature, pressure and composition. Thermal energy can be described either in tool of enthalpy or internal energy [3, 6]. Detailed explanations of this models are presented in the guide available colors. Transport equations for specific kinetic energy $k=\sqrt{2}$ can be obtained by multiplying the momentum equation to the $c_{\rm c}$

$$v_1 \mu \frac{Dv_2}{dh} = v_1 \mu \frac{\partial v_2}{\partial t} + v_2 \mu \frac{\partial (v_2 v_1)}{\partial x_2} = -v_1 \frac{\partial \mu}{\partial x_1} + v_1 \frac{v_2}{\partial x_2} + v_2 \rho f_1$$
Note that the left hand side of Equation 11 can be equated to

$$\omega \frac{Dr_1}{R^2} = \frac{\sigma}{2} \frac{D(r_1r_2)}{R^2} = \frac{Dh}{\sigma R^2}$$
 (12)

 $=\mu \frac{D(r)}{DR} = \frac{\sigma}{2} \frac{EV(r)(r)}{DR} = \frac{\sigma^2 EV(r)}{EV}$ (12) and, thus allowing to rewrite the transport equation for the specific binetic energy and internal energy into

$$\rho^{DH}_{TM} = -v_i \frac{\partial \mu}{\partial x_i} + v_i \frac{\partial \gamma_i}{\partial x_i} + v_i \mu f_i$$
 (13)

$$\mu \frac{Du}{Dt} = -\mu \frac{\partial \nu_1}{\partial x_1} + v_1 \frac{\partial v_1}{\partial x_2} - \frac{\partial q^n}{\partial x_1} + q^m.$$
 (14)

where g^{μ} is conductive heat flux and g^{μ} is the volumetric heat source. Adding Equations 13 and 14, the total energy transport equation dictated by $e = h + \mu$ is formed as:

$$\rho \frac{Dc}{Dt} = \rho \frac{D(k + u)}{Dt} = \frac{\partial (v_i \sigma_{ij})}{\partial \sigma_i} - \frac{\partial q_i^{\mu}}{\partial \sigma_i} + q^{\mu\nu} + v_i \rho f, \qquad (98)$$

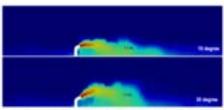
MANILA WATER INC. DESIGN AND CFD CONSULTANCY PROJECT EAST BAY R.O. WATER TREATMENT PLANT

- Laguna Lake Reverse Osmosis Plant, Phillippines Laguna Lake, August 2021
- RBS supplies consultancy for the CFD Engineering and environmental marine expertise for the diffusion and dispersal of inflows and outflows from the Plant.
- MANILA EAST BAY WATER TREATMENT Reverse-Osmosis PLANT Tedagua with Philippine construction company First Balfour secured a contract in December 2020 for the design and construction of the East Bay Drinking Water Treatment Plant.









Name in Companion of this Research Streets America State of America IV and IV

Asper the equation above, the enterprished release coefficient for the Cells, of pagins 21° and 30° profession of ECCATA, and the Cells, and the coefficient of the Cells and the Cells

annery.

The models of the fee field distance values at DT were conting to cost 3 with inaggethesis described difference at a cost a sensity analysis. The super difference of the less cause seen the terminal heaging difference as a possible property. The super difference of the less cause acre that control heaging the control of the planes were 1.7 motions compared to the 1.7 the planes were 1.2 motions compared to the 1.2 the planes were 1.2 motions of the less of the less of the planes were 1.2 motions of the less of the le

5.4 Case 4: 30" jet profiniplion and proferentive current. Sincle to the approach date in case I and I to delevance the applicant changes, if there are, where the arise are changed to 10". As observed from figure I, the difference is the lay field dilution are are circle to that of case I is a presented in class took in figure I that the diffusion chape is similar and the diffusion feets are storcincted. The difference seams originalized advancements in the feet did to call an absorbed to these storce difference are more considered to the east field. Reset before, the difference part of this originalized acids from plant of searchinology.

LAGUNA LAKE PROJECT. The contract is for the design and construction of a Drinking Water Treatment Plant (DWTP) sludge with a production capacity of 50,000m3 per day in the Pakil Lake area, Laguna Lake, east of Manila.

CONSULTANCY SERVICES FOR NEW CHILLER SYSTEM CAPEX OF THE PHILIP MORRIS PLANT IN BATANGAS



Bulacan | June 2023









■ RBS optimizing the existing chilled water distribution, chiller piping and pumps loads as well as the "Sequence of Operations" of Siemens controls and instrumentation of the plant.

CONSULTANCY SERVICES FOR COMPRESSED AIR SYSTEM CDA OF THE PHILIP MORRIS PLANT IN BATANGAS



- Sto Tomas, Batangas∣ August 2022
- RBS design and consultancy services for CDA Air compressor systems for EFFICIENCY and ELECTRICAL SAVINGS







- RBS to optimized the existing CDA system and
 - and cooling tower system as well as the "Sequence of Operations" of the PLC controls and instrumentation of the plant.

ENERGY SAVINGS CONSULTANCY for CHILLED WATER OF THE MARIKINA PLANT PRODUCTION AREA 1 & 2



Brgy. Fortune Marikina City| May to July 2021

RBS delivered MERALCO ELECTRICAL SAVINGS savings of 109kw.

■ This saved PHP2M MERALCO electricity charges annually only by controls adjustments (without any upgrade of equipment or other expenses).



RBS optimized the existing "Sequence of Operations" of controls and instrumentation of the plant.







WHOLE CHILLER PLANT EFFICIENCY ASSESSMENT KW/TON AND STUDY for HITACHI SEMI-CONDUCTOR PLANT



- HGST Plant. 109 Technology Ave SEPZ, Laguna Technoparkm. August 2021 to current.
- RBS supplies DESIGN AND CONSULTANCY SERVICES for the Kw/ton evaluation, capex upgrade and remodelling for the existing HGST plant.





HGST has requested and RBS agreed to have a "single-point responsibility".

RBS will be responsible for the complete design of ARCHITECTURAL, STRUCTURAL, CIVIL WORKS. ELECTRICAL, MECHANICAL I.T. & DATA INFRASTRUCTURE & ALL OTHER TRADES REQUIRED FOR THE PLANT.

DESIGN AND CONSULTANCY OF MECHANICAL SYSTEM FOR STEEL ASIA MANUFACTURING PLANT

Plaridel, Bulacan

RBSanchez Inc is the design engineer and consultant for the Steel Manufacturing Plant Year 2016 to 2017





WHOLE CHILLER PLANT EFFICIENCY ASSESSMENT KW/TON AND STUDY for HITACHI SEMI-CONDUCTOR PLANT



- HGST Plant. 109 Technology Ave SEPZ, Laguna Technoparkm. August 2021 to current.
- RBS supplies DESIGN AND CONSULTANCY SERVICES for the Kw/ton evaluation, capex upgrade and remodelling for the existing HGST plant.







ELECTRICAL, MECHANICAL I.T. & DATA INFRASTRUCTURE & ALL OTHER TRADES REQUIRED FOR THE PLANT.

DESIGN AND CFD CONSULTANCY FOR ENVIRONMENTAL PROJECT EAST BAY WATER TREATMENT PLANT



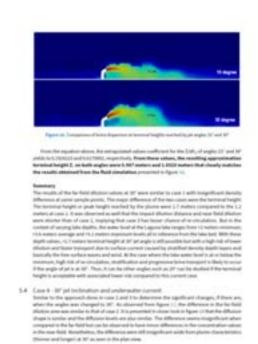
Laguna Lake Reverse Osmosis Plant, Phillippines Laguna Lake, August 2021





- RBS supplies consultancy for the CFD Engineering and environmental marine expertise for the diffusion and dispersal of inflows and outflows from the Plant.
- MANILA EAST BAY WATER TREATMENT RO PLANT (REVERSE OSMOSIS plant) Tedagua with Philippine construction company First Balfour secured a contract in December 2020 for the design and construction of the East Bay Drinking Water Treatment Plant.





LAGUNA LAKE PROJECT. The contract is for the design and construction of a Drinking Water Treatment Plant (DWTP) sludge with a production capacity of 50,000m3 per day in the Pakil Lake area, Laguna Lake, east of Manila.

DESIGN OF VISCOUS PUMPING SYSTEMS OF LA CARLOTA SUGAR REFINERY

- La Carlota Sugar Refinery, Negros Occidental | August 2020
- Tanks, Piping and pump system design using CFD simulation to predict and model the design of the VISCOUS FLUIDS behavior for molasses and magma pumping systems.





RBSanchez Inc. is a long-term Partner with Global Horizons Inc. in various industrial projects.

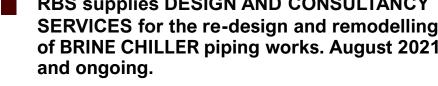




BRINE CHILLER TEST AND MEASURE OPERATIONAL STUDY for THE HITACHI SEMI-CONDUCTOR PLANT

PHITACHI Plant. Laguna Technopark. August 2021

RBS supplies DESIGN AND CONSULTANCY SERVICES for the re-design and remodelling of BRINE CHILLER piping works. August 2021













CONSULTANCY SERVICES FOR CLASS 100 to CLASS 10,000 MEDICAL DEVICES CLEANROOMS

ARTHRO LOGIC, INC. Plant, Brgy. Fortune, Marikina City, MM, June 2021

RBS is the HVAC PME Engineering Consultancy Services for the design of new Cleanrooms, and Controls system designer for the Plant.

Project starts June 1, 2021.

ARTHRO LOGIC, INC. Plant will manufacture medical orthopedic devices and implants under Class 100 and 10k cleanroom conditions.



Typical TKA System VS. Logic 1.0 TKA System





Less instruments. Less instruments. Less surgical time. Less inventory. Less cost.

CONSULTANCY SERVICES FOR CHILLED WATER ENERGY AND COOLING OF THE MARIKINA PLANT PRODUCTION AREA 1 &



Brgy. Fortune Marikina City May to June 2021

RBS delivered MERALCO ELECTRICAL SAVINGS savings of 109kw.

■ This saved **PHP2M MERALCO** electricity charges annually without any upgrade of equipment or expenses.



RBS optimized the existing "Sequence of Operations" of controls and instrumentation of the plant.

Project done from Jan to April, 2021.







CFD CONSULTANCY FOR MANILA WATER & FF CRUZ CONSTRUCTION INC.



CONSULTANCY SERVICES FOR BALARA WATER TREATMENT PLANT 1



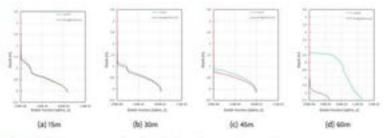


Figure 10. Sludge concentration along basin depth at different sections, r = 24 hours

OPTIMAL AND COST-EFFECTIVE SLOPE AND SUMP PIT INTERVALS

Using measurements and results of the CFD model, the recommendation is to have a basin bed slope of 1:300 at sump pit intervals every 60 meters. These figures were realized after series of parametric studies and cost effective solutions analysis.



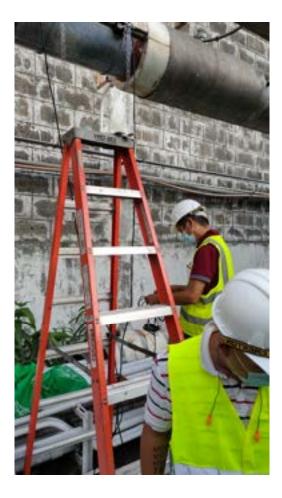
CHILLER PLANT EFFICIENCY ASSESSMENT @ HGST SEMI-CONDUCTOR WAFER PLANT

- Western Digital

 Delivering the possibilites of data
- HGST Plant. 109 Technology Ave SEPZ, Laguna Technoparkm. August 2021 to November 2021
- RBS supplies HVAC CONSULTANCY SERVICES for the assessment, evaluation, and operational chiller upgrades and CFD fluid modelling and design of chillers, pumps, cooling towers and piping works for the HGST plant.





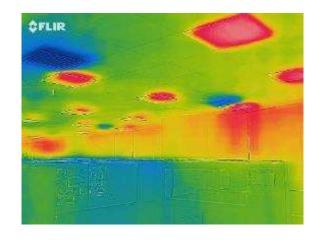


ASSESSMENT AND AUDIT CONSULTANCY FOR CHEVRON MSSC HVAC



- RCBC Plaza, Makati, Manila | July 2019-Feb 2020
- HVAC HEAT
 MAPPING, CFD
 Analysis and
 Consultancy for the
 Improvement for
 Chevron BPO Offices, a
 10,000 sqm, total of 12
 floors in RCBC
 Building, Ayala, Makati
 CBD.
 - System consultancy for Cooling load Improvement, airflows of AHUs, fans, ducting, ACH, cooling and ensure proper room





aanditiana

MECHANICAL DESIGN CONSULTANCY SERVICES FOR MANILA WATER



Balara Water Treatment Plant 1 and 2. Quezon City, Manila | Jan 2020

Analysis of Gravity Induced Sludge Collection and Removal by Suction Pumps for Sedimentation Basin 1 and 2 of Balara Treatment Plant 1

RBSanchez PME Consultants and Associates Inc. 1

*Door Data Torre, Machanison Engi. RESERCHET PME Committeets and Acousticities Inc., 20th Fb. Mokest Executive Tower J Car. Data Base St. Mokest. Bisholar waves the originates com Plagmanning Department.

Executive Summary

The proposed studge removal method on the less continuous sedimentation basin are investigated prior to their notific. The system includes 3 samp pits such with a transfer pump and placed at every 60 meters along the basin. The bestion floor is sisped treased to every pit at a 1.201 gradient for growing indused transport of studge.

CFD simulations were conducted to determine the behavior of pertinent parameters such as flow field, shalps detection, discensions of the task, dusligs zone depth and devolutional properties to the far the accumulation period and fatiring shalps removal operations. Operfrom solver distillutionare was originated to perform the saturation for mass and examinate another period and storing shalps and examinate communities communities to be placed flow flow flow as a minimate. Applying the motion examination for two places and the continuous phases and the continuous phase are continuous phase and the continuous phase and the continuous phase are continuous phase and the continuous phase and the continuous phase are continuous phase are continuous phase and the continuous phase are continuous phase are continuous phase are continuous phase and the continuous phase are continuous phase are

Measurements and validation tests were conducted to verify numerical school predictions. Caption was exercised in using available data on heal offset basis to represent actival into conditions.

The findings of the study are summarized in the following:

- The initial design for sindige collection and sensors will not be effective for long term operation.
 (a) Capacity reduced transport of studge to the sump by financings of 1300 in insufficient.
- Youper slopes and shortened distance to samp pit and will improve sludge collection and removal.
 Increasing the samp bit internal will proportionally increase area of effect of suction jumps beeing to before collection.
- Selected pump capacity suffices as the studge pump is operated intermittently to does studge out of the basis.
- Numerical solver well extinctes witting time in satisfation experiments and predicts studge concentration curves at different points in the basis.

From those findings, the corresponding recommendations are hence proposed:

marks

- Retain the puncy of collection points (sump pills) at every 62 maters.
 Increase basin their stope to 150 for effective studge transport transmit the sump pill.
- 2. Adjust floor at sump pit section to approach sump pit have to ensure shelps transport from the sales of the
- 4. Salest pump capacity considering studge obsessity sanging from EV refers.
- If a necessary is tend not studge operation to set optimum intend for each section of the beam or that issues
 provisely discussed an excelled.







© BALARA WATER TREATMENT PLANT 1 AND 2

- Balara Treatment Plant (BTP) Sedimentation Basin 1 and
 2 facilities Quezon City, Manila | 2019-2020
- Computerized Fluid Dynamics simulation to predict the sedimentation through the basins and sludge accumulation. CFD results to be used as a basis for design for continuous sludge pumping system.



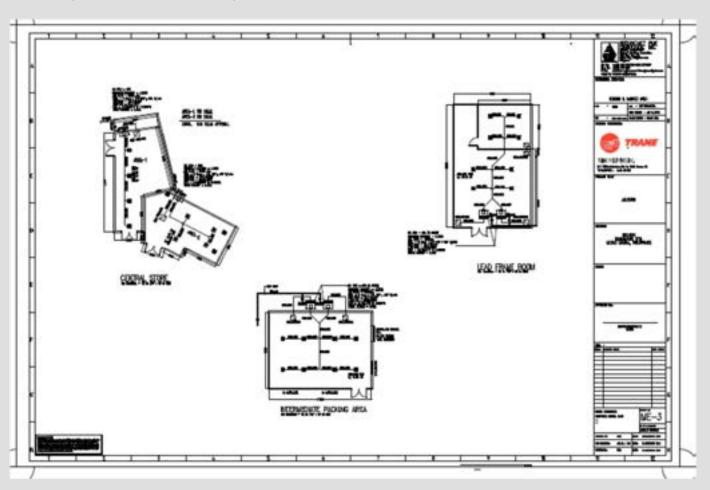






HVAC DESIGN AND CONSULTANCY OF ALLEGRO MICROSYSTEMS PHILS INC.

Sampaguita, Marimar Village, Parañaque





AVON PLANT DESIGN OF CLEANROOMS









AVON PHIL. CORP

Analysis of Chilled Water and HVAC Plant with RBS as Consultant 2006

HVAC system design consultant

CONSULTANCY SERVICES FOR CHILLERS OF THE BATANGAS PLANT

First Philippine Industrial Park Batangas, Sto Tomas | January 2021 to April 2021



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RBS is the HVAC PME Engineering
Consultancy Services for the Optimization,
Trouble-shooting and retrofit for the Chilled
water system, Air Side AHUs and
Cleanrooms, and Controls system
designer for the Plant.

Project starts Dec 1, 2020.





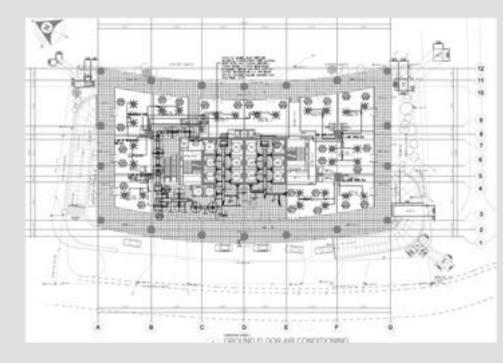
BPO LEED 4.0 COMPLIANT HIGH RISE DESIGN AND CONSULTANCY OF ARANETA CYBERPARK TOWER 3

Cyberpark
ARANETA CENTER

Araneta Center, Cubao, Manila | Years 2020 to 2023

- al
- HVAC System Design and Consultancy for Mechanical Systems of Araneta Cyberpark Tower 3 of 33 floors (90,000 sqm) high rise building. Araneta Cyberpark Tower 3 is a LEED 4.0 Compliant Design.
- RBSanchez PME is the Mechanical Systems Design Consultant





CFD AND DESIGN CONSULTANCY SERVICES FOR DESIGN OF GLAS TOWER PROJECT



- Ruby St, Ortigas Commercial Center | Aug 2020
 - RBS is the HVAC System Design Engineer and PME CFD Consultant. For the first double-glazed, triple Low-E glass tower in Ortigas @ 188-meter with are of 102,000 square meters with 9MW gensets.

Multi use building for BPOs, Offices and Hotel. (Year 2020)





HIGH RISE BUILDING HVAC DESIGN AND CONSULTANCY WYNDHAM RESORT HOTEL TOWER



- Quezon City | 2018 to 2019
- HVAC System Design and Consultancy for Mechanical Systems of a 22-storey, 100-meter high tower with 800TR of chilled water systems.
- Using the latest technology of SMARDT Chillers with multiple Turbocore compressors for energy savings.

The First Wyndham Garden Hotel in the Philippines









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- Aseana Business Park, MOA, Mall of Asia, Metro Manila | Sept 2020
 - RBS is the CFD (Computerized Fluid Dynamics) and PME Consultant for Carpark Ventilation for Monarch Parksuites. It is an 17-storey composed of four towers that stands on a lot area of 18,000+ square meters. It is Multi use luxury building (Sepr 2020)

Figure 10 describes the filtered streamlines seeded in the genset patch boundary. The streamlines shows the air patterns from different sources. It can also be seen that indistinguishable amount air were drawn out from the basement level. In this result, it is empirical to have a fresh air injection system on the basement to compensate the drawn air.

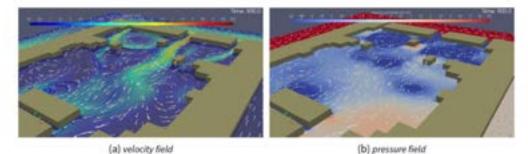


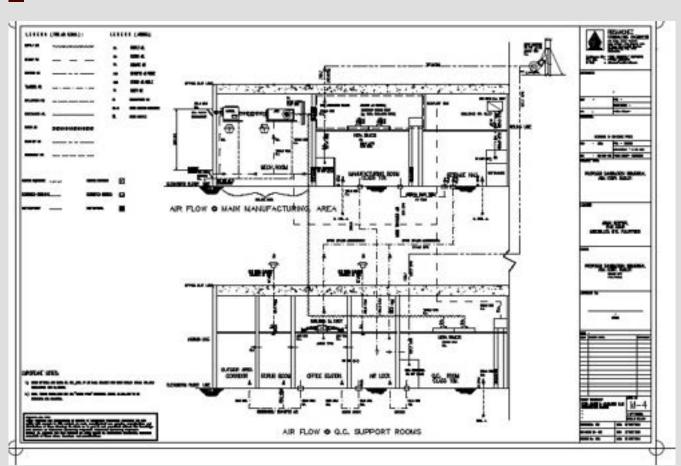
Figure 10. Streamlined flow with arrow lines seeded from the generator patch at t = 900 seconds



DESIGN AND CONSULTANCY OF SANGRATECH INC. BIO-MEDICAL CLASS 100 CLEANROOMS FOR BLOOD TRANSFUSIONS/STERILIZATION

Asian Hospital, Alabang, Muntinlupa City, Metro Manila

■ SANGRATECH INTERNATIONAL CORP. CLEANROOM DESIGN FOR HVAC.

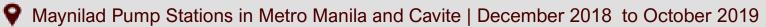






CONSULTANCY SERVICES AND PUMP PERFORMANCE ASSESSMENT AND RE DESIGN OF TWELVE (12) METRO MANILA PUMP STATIONS





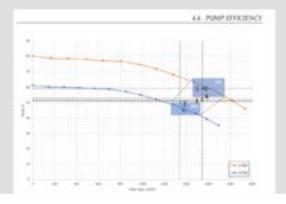


RBSanchez Inc. is the Mechanical Consultant for the Maynilad Water System Assessments, measurements and analysis for 120 pumping units in various pumping stations for a total of 120 large water pumps under the GHD contract.



RBSanchez Inc. was also tasked by GHD to select and manage electrical consultant as subcontractor.





DESIGN OF 200TR "PAINT BOOTHS" HVAC FOR MAU "ONCE THROUGH" AND "CHILLERS IN SERIES"



▼ Toyota Special Economic Zone, Sta. Rosa, Laguna

RBS Design of Plant HVAC with Xtreme Engineering for "Once Through" and "Chillers-in-Series and MAU/AHUs design for 100% Fresh air supply for the Paint Spray Booths car painting works.



RBS is the HVAC system design consultant.





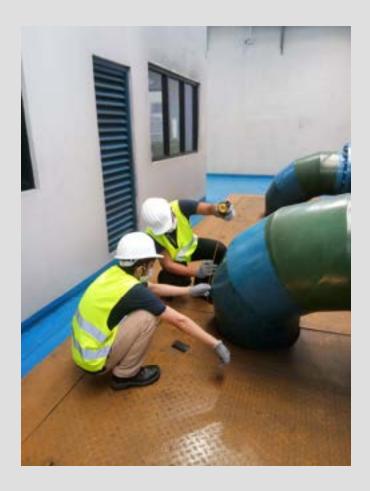
OTHER SERVICES DONE FOR MAYNILAD:

ULTRASONIC PIPE THICK NESS MONITORING, VIBRATION ANALYSIS, LIGHTHING ASSESSMENT, RELIABILITY CENTERED MAINTENANCE RCM 2 ASSESSMENT FOR LONG TERM ASSET MANAGEMENT SERVICES.



Maynilad Pump Stations in Manila and Cavite | 2019









CONSULTANCY SERVICES AND PUMP PERFORMANCE ASSESSMENT OF 120 **PUMPS IN MAYNILAD PUMPING STATIONS**

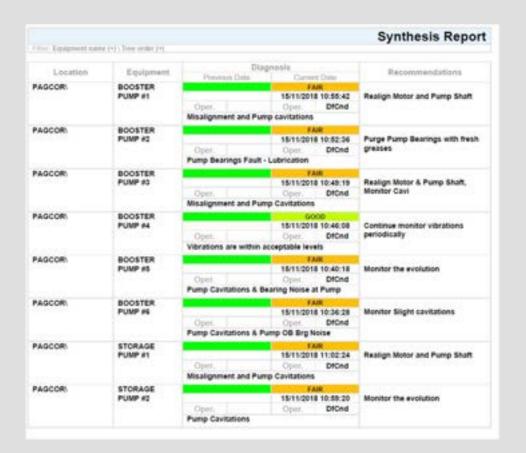
Maynilad Pump Stations in Metro Manila and Cavite | 2019

Maynilad











DESIGN AND CONSULTANCY FOR THE BMS CONTROLS AND INSTRUMENTATION OF CENTRIS STATION MALL

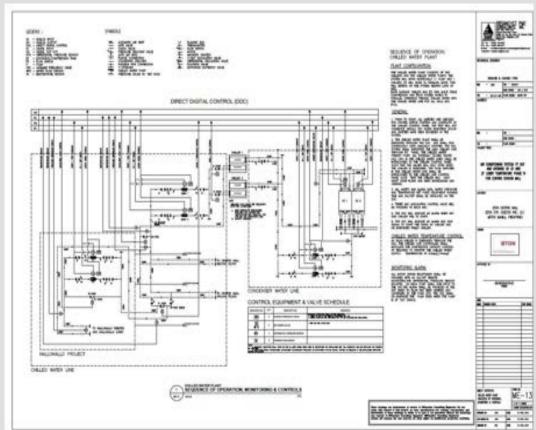




Quezon Ave, Diliman, Quezon City, M. Manila | 2019 to present

RBSanchez Inc. is the HVAC system design consultant and BMS controls system





DESIGN AND OPERATIONS SERVICES

FABRICATION PLANT FAB 1 SEMICONDUCTOR

 Supply of HVAC Design Consultancy and Chiller Operations Services in Cleanroom environments



P Laguna Technopark, Biñan, Laguna



RBS has own personnel deployed on-site from Years 2007-2014 on a non-stop on a 24/7/365 basis.





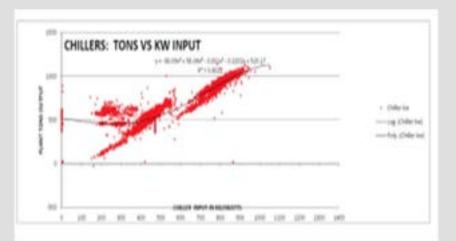
CONSULTANCY SERVICES FOR THE CHILLER PLANT SYSTEM HVAC ENERGY OPTIMIZATION

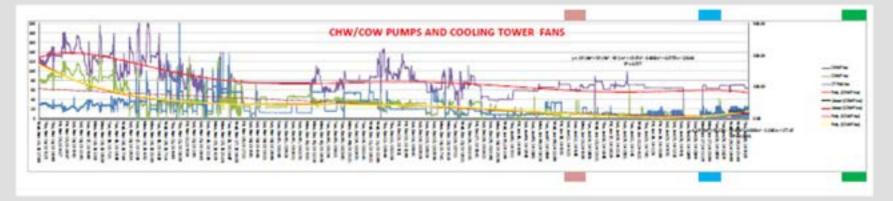




▼ FPIP, Sto.Tomas , Batangas

- The HVAC optimization and control system design results to drop in energy consumption and optimization of operations of the plant as shown.
- The optimization also recommended the removal of the primary pumps of chiller plant leading to drop in energy consumption.



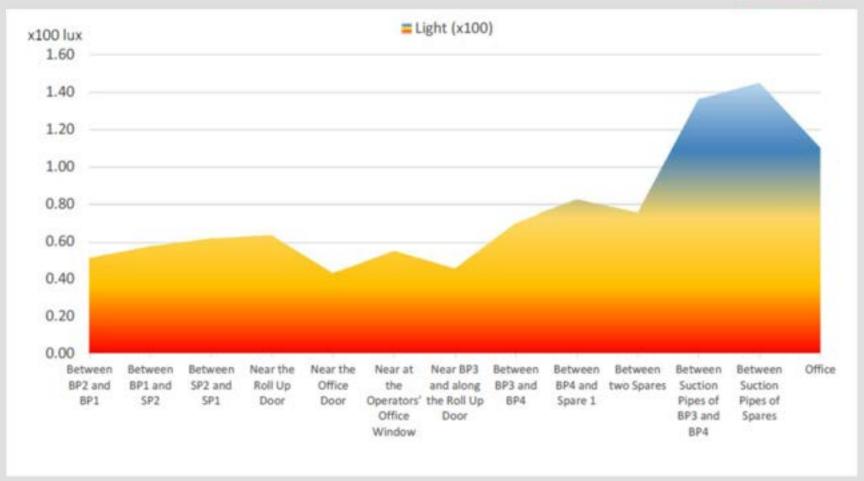


ENVIRONMENTAL AND MAINTENANCE ASSESSMENT OF MAYNILAD PUMP STATIONS IN METRO MANILA





Maynilad Pump Stations in Manila and Cavite | 2019



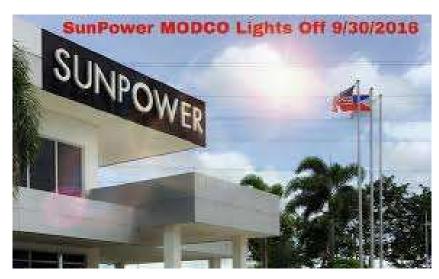
MODCO DESIGN AND OPERATIONS CLEANROOM SERVICES SUNPOWER®

P East Main Ave, Laguna Technopark Sta. Rosa, Laguna

MODCO MODULE SEMICON SunPower Corporation Supply of HVAC Consultancy and Trane Chiller Operations Services for MODCO Module Manufacturing Plant

RBS has own personnel deployed on-site from Years 2007-2016 on a non-stop on a 24/7/365 basis.

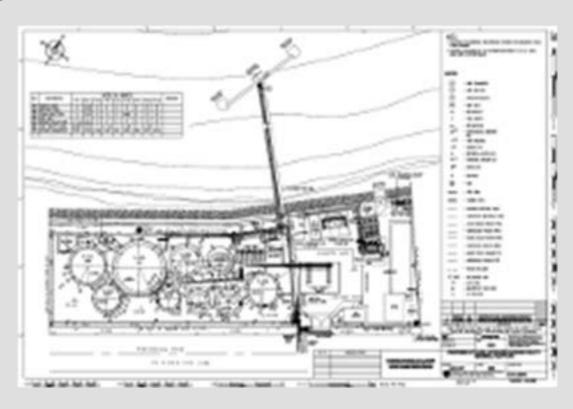




ILIGAN LANAO SHELL TERMINAL ETHANOL AND BLENDING FACILITY



- lligan, Lanao del Norte
- Mechanical Design and Consultancy of the Iligan Depot Ethanol and Blending Facilities.





CONSULTANCY SERVICES OF THE FIRE-TUBE BOILER REINSTALLATION

PHILIP MORRIS

- PMFTC Plant C&D, Marikina, Manila | Sept 2019
- Consultancy services and management of various teams and discipline for the boiler transfer from Batangas Factory to Marikina Factory. The project management includes the decommissioning phases, system passivation, packaging, hauling and transport, installation, testing and commissioning works in conformance to local standards and codes.



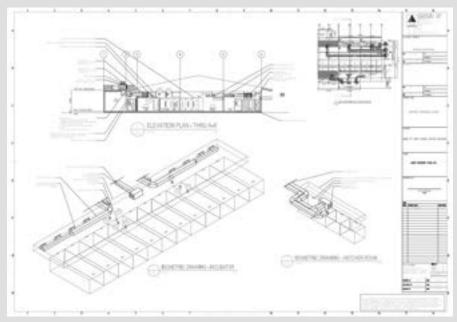


DESIGN AND CONSULTANCY FOR THE HVAC OF BULACAN HATCHERY BREEDER FARM



- Math Breeder Farm Inc., Bustos, Bulacan | 2019
- Design and consultancy services for a cleanroom HVAC. Math Breeder Farm is biological area serving setters and hatchers of chicken and egg.
- RBSanchez Inc. is the HVAC system design consultant of the Math Breeder Farm.





DESIGN, CONSULTANCY AND ANALYSIS OF HGA-15 CLEANROOM HVAC SYSTEM FOR HITACHI GLOBAL TECHNOLOGIES



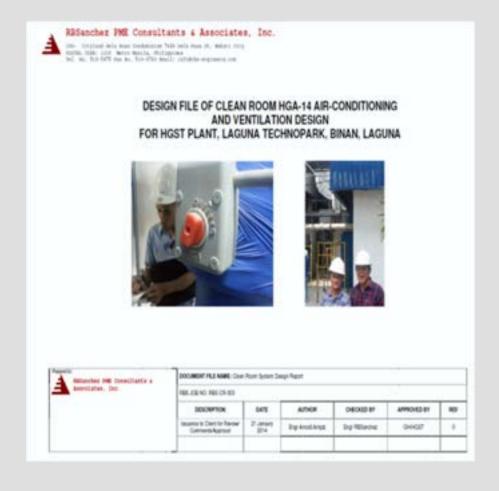
- HGST, Laguna Technopark, Biñan, Laguna | September 2014
- HVAC Analysis and Consultancy for System retrofit for Class 10,000 cleanroom to balance airflows among three (3) air handling units, resizing of fans, ducting, ACH, cooling and ensure proper room pressurization for the 1,150 sqm cleanroom space.
- RBSanchez Inc is the Mechanical Systems Design Consultant of HGST Philippines.



REDESIGN OF PROBLEMATIC MAU AND AHU SYSTEM OF CLEANROOMS HGA-14 FOR HITACHI GLOBAL TECHNOLOGIES



- HGST, Laguna Technopark, Biñan, Laguna | December 2012
- Psychrometric design and specifications of coil for Make-up Air units, ducting and fan systems to enable accurate relative humidity control without the use of reheat. Ensure even cleanroom room temperature, uniform movement, and balance cooling.
- RBSanchez Inc is the Mechanical Systems Design Consultant of HGST Philippines.



KARFT FOODS HVAC DESIGN OF PHASED COOLING OF FOOD GRADE CHEESE COOLING TUNNEL PRODUCTION LINE



CLASS 10K CLEANROOMS OF KRAFT FOOD CORP

RBS Design of New Chilled Water Plant and COOLING TUNNEL DESIGN with Trane Phils. Inc. with Air cooled 230 ton TRANE chillers

2007 HVAC system design



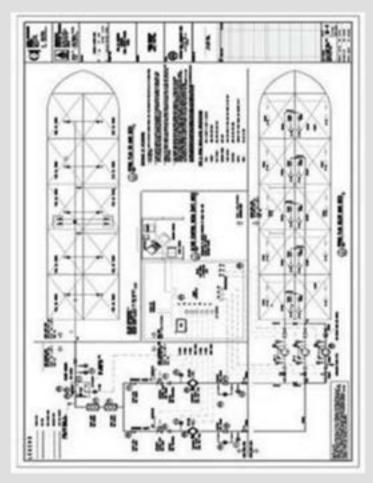


SHELL SWIFT PROJECT VESSELS

DESIGN OF INSTRUMENTATION, PUMPS & PIPING FOR FUEL OIL BLENDING FACILITIES FOR PANDACAN TERMINALS

- 💡 Pandacan, Metro Manila
- A Shell Marine Swift project, of pump and piping design project for the fuel oil blending of four (4) vessel designs of Floating Fuel Oil Blending Facilities for transfer of Pandacan Terminals is a design project of RBS Engineering (now RBSanchez Inc).







DESIGN AND CONSULTANCY OF LITHIUM-BROMIDE STEAM ABSORPTION INDUSTRIAL CHILLER



SYSTEM Bagumbayan, Libis, Quezon City, Metro Manila



Design and Installation of green energy lithium-bromide steam absorption chiller for the Oleochemical Processing Plant's HVAC system.





Lithium-Bromide STEAM ABSORPTION CHILLER & HVAC SYSTEM (800 TONS) OLEO-FATS INC.

HVAC AND CHILLER PLANT ENERGY OPTIMIZATION FOR THE MANILA COATS TEXTILE PLANT





Marikina City, Marikina Metro Manila

The HVAC optimization yields to a savings of Php 480k per month of MERALCO bills (See letter from Coats Manila Bay Inc.). RBSanchez Inc. is the Mechanical Design Consultant for Manila Coats.





MR. RENE LAFIGUERA Facilities Managor MANILA BAY SPINNING MILLS INC. COATS MANILA BAY INC. Coats Manile Bay, Inc.

Lopez Jaona Street Tarlong, Morkina City 1804 Philippines

Tel. No.: (632) 941-9590 to 99 General Fax: (632) 541-3677

12th January 2006

SUBJECT: PROJECT REFERENCE PERMISSION

"RBS Engineering Technologies (through the consultancy services of Engr Rosen Sanchez) was able to save our company a total of 120,000 kilowatthours of energy (Savings approx @Pesos 4.00 /kw-hr = PHP480,000.00 / month) for every month of operation".

"We are pleased with their in-depth analysis and low-cost yet effective solutions they have recommended in improving our plant's energy efficiency."

I hereby give my consent for RBS Engineering Technologies or its assignees to use my commenta quoted above for the purpose of reference. I understand that I will receive no comment of compensation for this population.

MR. RENE LAFIGUERA
Facilities Manager
MANILA BAY SPINNING MILLS INC.
Lopez Jaena St, Bo. Tanong, Marikina City
Metro Manila, Philippines (Tel Nos. 941-9590 to 99)

CONSULTANCY SERVICES FOR THE DESIGN OF TOBACCO DRYER and LEAF DRYING FACILITIES

PHILIP MORRIS

PMFTC Cagayan De Oro, Misamis Oriental | June to August 2019



RBSanchez Inc. is the Dryer Leaf HVAC Design Consultant.

The dryer must perform and adapt to the product specs and ambient conditions at all times of the year, to minimize the losses due to over and under/over drying of tobacco leaves through different phases and air conditions.







CONSULTANCY SERVICES FOR DISCUSSIONS WITH NINE (9) PHILIP MORRIS PLANTS WORLDWIDE



- PMFTC Plant C&D, Marikina, Manila | Year 2019
- RBS services includes the Training and Discussion groups on Energy Savings schemes for HVAC Chillers Systems, Boilers and Compressed Air for Plant operation, Maintenance and Energy Efficiency Optimization.

Held in PMFTC Marikina Plant with thirty (30) Philip Morris Plant Engrs (Local and Foreign) in attendance.

Affiliate	Location
Pakistan (Sahiwal)	Sahiwal
Russia (Izhora)	St. Petersburg
Russia (Kuban)	Krasnodar
Kazakhstan (Almaty)	Almaty Oblast
Ukraine (Kharkiv)	Kharkiv
Turkey (PHILSA)	Izmir
Indonesia (Sukorejo)	Sukorejo
Indonesia (Karawang)	Karawang
Korea (Sanmak)	Yangsan-si, Gyeongsangnam

DESIGN AND CONSULTANCY OF NEW FOOD GRADE 10K CLEANROOMS FOR NESTLE WYETH

Wyeth Nutrition

- Canlubang Factory, Cabuyao, Laguna
- Psychrometric design and specifications of coil for Make-up Air units, CLEANROOM Class 10000, food grade for AHU and coli selection and equipment, ducting and fan systems to enable accurate relative humidity control without the use of reheat. Ensure even cleanroom room temperature, uniform movement, ACH and balance cooling.
- Nestle Wyeth Canlubang Plant is a food-grade milk canning and dryer cleanrooms with AHU and fresh air system design.



DESIGN AND CONSULTANCY OF NEW HVAC CHILLER PLANT SYSTEM TERUMO and MEDICAL 10K CLEANROOMS



- Laguna Technopark, Biñan, Laguna
- Design and Installation of new chiller system including the piping and pumping system, air handling units, and fan coil units for cleanrooms as well as the control systems for the Terumo Plant.





SHELL TABANGAO OIL REFINERY DESIGN OF SHELL LABORATORY HVAC AND AIR AND EXHAUST SYSTEM

▼ Tabangao Refinery, Batangas

An HVAC and Exhaust Design system for toxic fumes ventilation system at Pilipinas Shell Petroleum Oil Refinery.



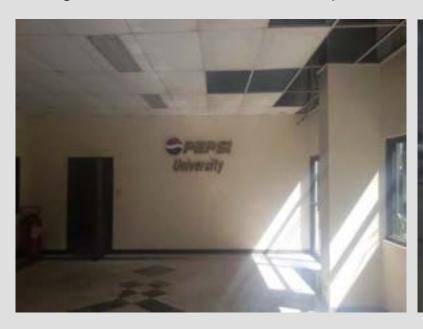




DESIGN AND CONSULTANCY FOR THE HVAC CLEANROOMS AND FIRE PROTECTION OF NEW PEPSICO SNACK PLANT



- PEPSI Snack Plant Cabuyao, Laguna
- RBSanchez Inc. is the HVAC Design Consultant and Fire protection system design engineer for the New PEPSICO Pepsi Snack Plant Clean rooms food grade for a total of 15,000 sqm.



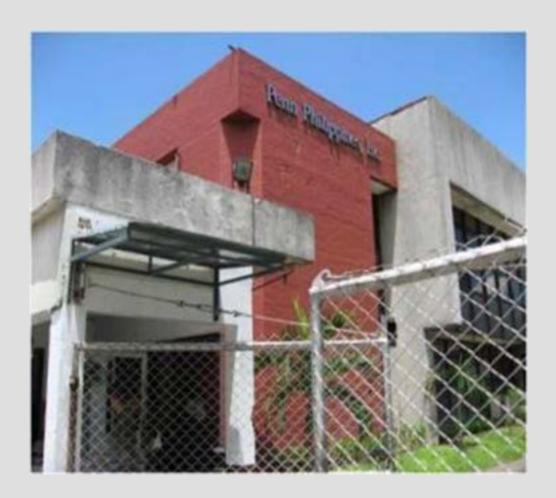


DESIGN AND CONSULTANCY OF HVAC SYSTEM FOR INDUSTRIAL TEXTILE PLANT WITH EVAPORATIVE COOLING WASHERS



FTI Complex, Taguig, Taguig

HVAC Design and consultancy services for PENN Philippines Textile plant with Evaporative Washers and 430-TR Trane Chillers.



CFD DESIGN AND CONSULTANCY

"GREEN" NATURAL VENTILATION

TAGAYTAY HIGHLANDS BADMINTON COURT

Tagaytay City | 2006

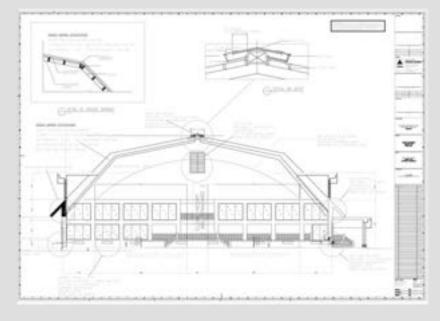












DESIGN AND CONSULTANCY OF NEW AIR-COOLED CHILLED WATER PLANT FOR CLEANROOMS



- Corinthian Plaza, Legazpi Village, Makati, Metro Manila
- Design and consultancy services for the new 120-TR air cooled chilled water plant with new AHU and ducting system for the Rolex Corinthian Plaza.





CONSULTANCY SERVICES FOR THE SHELL AGUSAN TERMINAL NEW PUMPING FACILITIES



- Cabadbaran, Agusan, Mindanao
- Mechanical Design and Consultancy of the new <u>SHELL PUMPING</u> <u>FACILITIES</u>, The design of Shell Ethanol and Blending Storage Facilities in Cabadbaran, Agusan, Mindanao





CONSULTANCY SERVICES FOR NEW SHELL CAGAYAN DE ORO PUMPING FACILITIES

Cagayan de Oro



Mechanical Design and Consultancy of the new <u>SHELL PUMPING</u> <u>FACILITIES</u>, The design of Shell Ethanol and Blending Storage Facilities in Cagayan de Oro Shell Depots



Pilipinas Shell	Petroleum Corporation 200 91.2011	
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DESIGN AND CONSULTANCY OF A CLEANROOM HVAC SYSTEM FOR HITACHI GLOBAL TECHNOLOGIES

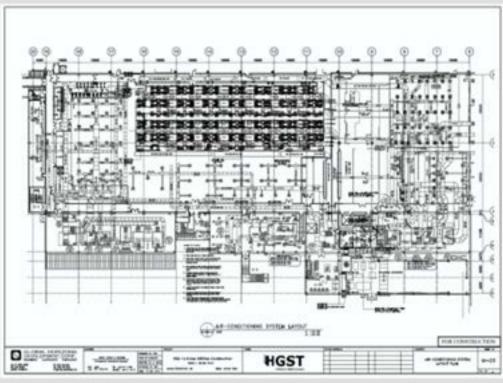


🗣 HGST, Laguna Technopark, Biñan, Laguna | May 2014



- Complete HVAC System design for a CLASS 1000 1,200 sqm cleanroom with a 750 kVA equipment load to ensure moisture balance and uniform cooling and room pressures, and controllable relative humidity without the use of 65 kW Reheat.
- RBSanchez Inc is the Mechanical Systems Design Consultant of HGST Philippines.





DESIGN AND CONSULTANCY OF THE NEW FILINVEST FESTIVAL SUPERMALL EXPANSION

SUPERMALL FILINVEST-ALABANG

🗣 Fil-Invest Festival Mall, Alabang, Muntinlupa



- The Fil-Invest Festival Supermall is a 12.5 hectares air conditioned area and the first mall in the Philippines with a low energy-friction drop chilled water piping system, using reverse-return piping technique of a 5,350-TON dual-compressor chiller plant design.
- A
- RBSanchez Inc was subcontracted by AECOM Inc to serve as its HVAC System Design Consultant for the Year 2012 to 2016.

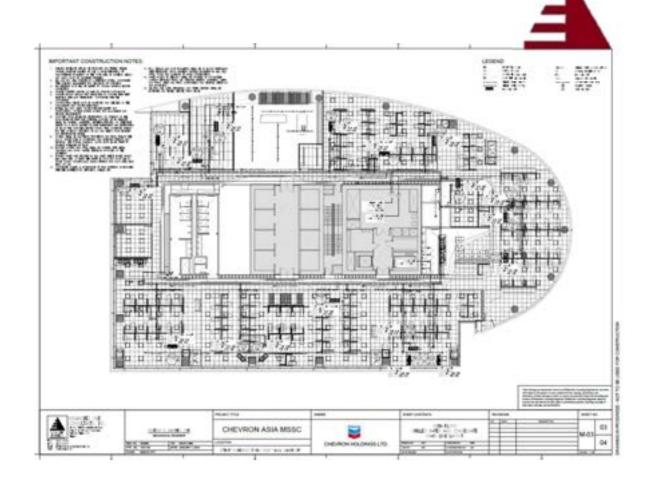




DESIGN AND CONSULTANCY FOR CHEVRON MSSC OFFICES HVAC SYSTEM – PHASE 2

- RCBC Plaza, Makati, Manila | September 2019 to February 2020
- System HVACDesign andConsultancyservices
- RBS was also tasked to handle Testing And Commissioning Services





Chevron

BPO COMMERCIAL BUILDING HVAC DESIGN AND CONSULTANCY OF THE MERIDIAN PLAZA



- Pouble Dragon Plaza, Pasay City, Manila
- RBSanchez Inc is the HVAC system design engineer and consultant for the 278,131 sqm for a total of 11 floors of the Double Dragon Plaza located at Edsa Extension corner D. Macapagal Avenue in Pasay City near the Mall of Asia.





DESIGN AND CONSULTANCY FOR DESIGN OF THE NEW CHILLED WATER PLANT

*starmall

- San Jose del Monte City, Bulacan
- Design and Consultancy services for the Upgrade of HVAC DX System to a new Chilled Water Plant for the 50,000 sqm commercial mall.
- RBSanchez Inc. is doing the complete design and consultancy services for the Manuela Properties.





Presenting this commendation to Engr. Resends B. Sanchez (PME) for exemplary handling airconditioning system design in our San Juse del Monte, Bulacan Starmall. Despite the challenges of high collings and with ne place for additional ducts within corridors nor celling cavities, he managed to find a way to make the airconditioning system work. Furthermore, he made it in such away that the duct and piping design blended well with the architectural requirements, thus minimum renewations were made resulting to a lower cost.

The quality of sir inside the mall is now undeniably better, requiring just a slight air movement and pressure, producing a comfort cooling inside without draft and moisture problem.

Overall, we are very satisfied with the work he has done. Engr. Sanches proved to have an in-depth RVAC knowledge, and could take up unconventional challenges.

GIVEN THIS EITS DAY OF MAY 1013

STARMALLS INC.

WORLD WIDE CORPORATE CENTER

SHAW BLVD. MANDALUYONG CITY

BY: MR. JERRY M. NAVARRETE PRESIDENT

DESIGN AND CONSULTANCY OF WHOLE PLANT HVAC CHILLED WATER SYSTEM OPTIMIZATION

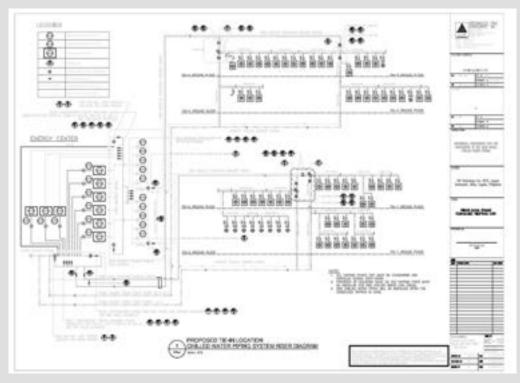


HGST, Laguna Technopark, Biñan, Laguna | 2018



- Chilled water equipment system redesign of existing main chilled water pipeline supply and return, sub-branches & main chilled water pipeline in Phase 1-5.
- RBSanchez Inc is the Mechanical Systems Design Consultant of HGST Philippines Year 2020.





DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF STARMALL PRIMA TAGUIG



Levi Mariano Ave., Taguig, Metro Manila | June 2017

RBSanchez Inc. is the HVAC Design Consultant for the Starmall Prima Taguig located at L. Mariano Ave. Taguig beside Camella Greenville and Pacific Residences.



CONSULTANCY SERVICES FOR HVAC

ASCOTT HOTEL AND GLORIETTA 4 HVAC SYSTEM HVAC Consultancy and Chiller Operations/Maintenance. RBS has technical personnel deployed on-site on a 24/7/365 basis.





Years 2007-2018







BPO HIGH RISE BUILDING HVAC DESIGN AND CONSULTANCY OF A ARANETA CYBERPARK TOWER 2

A

Araneta Center, Cubao | Years 2016 to 2017

HVAC Design Engineer and Consultancy for Mechanical Plant Systems of Araneta Cyberpark Tower 2 of a total of 86,689 sqm high rise building.







DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF ROBINSONS MALL ORMOC

ROBINSONS LAND CORPORATION

YOUR DREAMS, OUR FOUNDATION

Carigara, Ormoc City, Leyte | 2016

RBSanchez Inc. is the HVAC Design Consultant for the 35,80 sqm mall building at Ormoc, Leyte.







DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF NCCC MALL BUHANGIN



- Puhangin District, Davao City, Davao del Sur | 2016
- RBSanchez Inc. is the HVAC Design Consultant for the 26,704 sqm commercial mall building, New City Commercial Corp. located at Davao City, Davao del Sur.





DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF ROBINSONS TACLOBAN TERMINAL

ROBINSONS RETAIL HOLDINGS, INC.

Tabuan, Marasbaras, Tacloban City, Leyte | 2017

RBSanchez Inc. is the HVAC System
Design engineer and consultant for the
whole air-conditioning system of
Robinson's Place Tacloban Terminal in
Tabuan, Tacloban in Leyte.

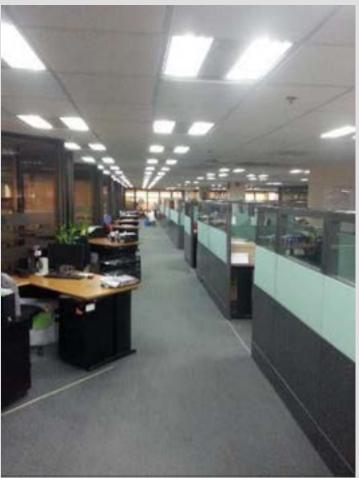




HVAC DESIGN AND
CONSULTANCY OF ALASKA HEAD
OFFICES

RBS Design of New Chilled Water Plant and Cooling System of ALL Offices

2007 HVAC system design





DESIGN AND CONSULTANCY OF MEP FOR ST. LUKES HOSPITAL AT THE FORT

₹ 5th Avenue, Global City, Taguig, Metro Manila | 2008

MEP Design and Consultancy Services of St. Luke's Medical Center Global City and RBS was subcontracted by Meinhardt Philippines Inc. for the designs analysis.





St. Luke's Medical Center

Quezon City - Global City



TESTING AND COMISSIONING OF CHILLED WATER SYSTEM AND AIR SIDE SYSTEM FOR ST. LUKES HOSPITAL AT THE FORT

§ 5th Avenue, Global City, Taguig, Metro Manila | 2008



St. Luke's Medical Center

Quezon City - Global City

HVAC Test and Commissioning Services and Consultancy to TRANE Philippines Inc for Chillers and Medical AHU systems





CHEVRON Inc. CONSULTANCY PHASE 1

HVAC HEAT MAPPING,

Analysis and Consultancy for the Improvement for Chevron BPO Offices, a 10,000 sqm, total of 12 floors in RCBC Building, Ayala, Makati CBD.

System consultancy for Cooling load Improvement, airflows of AHUs, fans, ducting, ACH, cooling and ensure proper conditions.

2018 December







RBSanchez PME Consultants & Associates, Inc.

DESIGN AND CONSULTANCY FOR AIR-CONDITIONING SYSTEM OF NATIONAL GRID CORP OFFICES

A NGCP

Quezon Ave. Diliman, Quezon City | 2015

HVAC system design engineer and consultant for 1,400 sqm building using psychrometric design and specifications of coil for make-up air units, ducting and fan systems.



HVAC CONSULTANCY, OPERATIONS & MAINTENANCE SERVICES

■ WELLS FARGO LLC Wells Fargo Drive, McKinley Hill, Upper McKinley Road, Taguig City, Metro Manila







RBS has personnel deployed on-site from Years 2017-2020 on a 24/7/365 basis.





MAINTENANCE SERVICES

A

■ GLAXO SMITH KLINE

Chino Roces Avenue, **Pasong Tamo** Ext. Makati City



RBS has own personnel deployed on-site from Years 20017-2019 on a non-stop on a 24/7/365 basis.



ENERGY SAVINGS AND MAINTENANCE SERVICES ROBINSONS

■ ROBINSONS

MALLS MAGNOLIA Supply of HVAC Consultancy and Trane

Chillers Operators Maintenance Services from Year 2013-2019



DESIGN AND CONSULTANCY FOR CHILLED WATER SYSTEM AND PIPING FOR CHEESE CLASS 1K CLEANROOMS



Sucat, Parañaque City

Design and consultancy for the cooling tunnel process for Class 1000 cleanrooms FOOD GRADE in Kraft Foods Inc. Plant.



RBSanchez Inc. was also the HVAC system design consultant.









FB AMMARA and RBSANCHEZ jointly serves the Consultancy for the WGA SHIPPING LINES Cargo Handling Improvement Systems Operations at the PORT, PIER 15, MANILA.

System consultancy for Improvement of availability and reliability of CARGO handling equipment of WG&A thru the DELMARINE CORP. for the nationwide expansion of shipping fleet of WG&A company (Year 2002-2003)





DESIGN OF NEW CHILLER, AHU AND CONTROL SYSTEM IN GLAXO SMITHKLINE INC. MEDICAL SUPPLIES

Chino Roces Ave., Makati City

RBSanchez was the HVAC system design consultant of the new Chiller plant and AHU systems, including the pipe and pumping system, fan coil units and control systems of Glaxo SmithKline Inc.





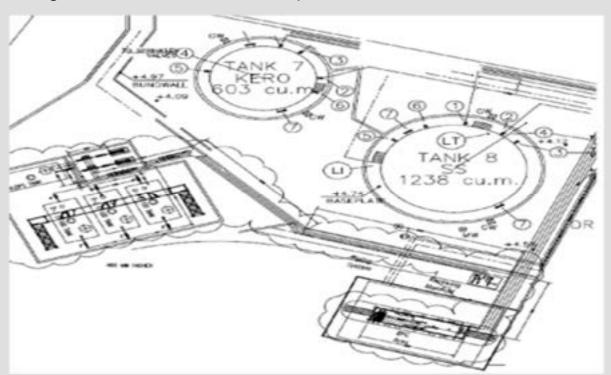


NEW ANIBONG LEYTE SHELL ETHANOL PLANT

Anibong, Tacloban, Leyte



Mechanical Design and Consultancy of the new Anibong Depot Ethanol and Blending Storage Facilities for SHELL Depot facilities.





DESIGN AND CONSULTANCY FOR NEW HVAC CHILLER PLANT OF STARMALL METROPOLIS



Alabang, Muntinlupa, Metro Manila | June 2012

RBSanchez Inc. is the HVAC Design Consultant of brand new 4500 TR Chiller Plant yielding to save a Php 3M – 4M per month in actual MERALCO bills as per Starmall records.





DESIGN AND CONSULTANCY FOR NEW HVAC SYSTEM OF STARMALL EDSA

- Mandaluyong, Metro Manila | June 2012
- Design and Consultancy Services for the Upgrade of Chiller System for the 50,000 sqm commercial mall. RBSanchez Inc doing the complete design and consultancy services. The design yields to a monthly savings of Php. 1.5M on MERALCO bills as per Manuela records.











RESIDENTIAL BUILDING HVAC DESIGN AND CONSULTANCY FOR SM BLOOM RESIDENCES



SM Bloom Residences, Parañaque City | 2017

RBSanchez is the HVAC system design engineer and consultant for the 450,546 sqm residential building of SM Bloom Properties from the Year 2016 to 2017.





DESIGN AND CONSULTANCY OF CLEANROOMS FOR SMDC SHOWROOMS AT FMC PROPERTY

DEVELOPMENT

Chino Roces Avenue, Makati, Metro Manila | 2016

 Complete HVAC system design and consultancy services for the cleanroom designs of SMDC Showrooms at FMC Property.









DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF ROBINSONS MALL SAN PEDRO





RBSanchez Inc. is the HVAC Design Consultant for the 104,500 sqm mall building of Robinson's San Pedro.





DESIGN AND CONSULTANCY OF NEW FIRE PROTECTION SYSTEM OF OFFICE TOWER AYALA 6780

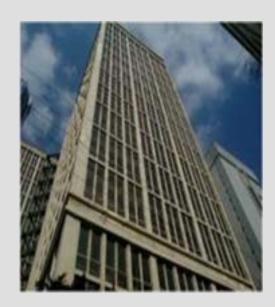
- 🖣 Ayala Avenue, Makati City, Manila
- Fire Protection System Design and Consultancy for the NEW Fire alarm and sprinkler, Fire Tank and Pump system of the 15-storey building as contracted by LANDEV Corp of RCBC Inc. Group.











CONSULTANCY FOR TROUBLE SHOOTING AND RETROFIT DESIGN FOR HVAC SYSTEM OF CENTURY HOTEL





FB Harrison St, Manila | 2005

This project is the start of RBSanchez Inc. services as Design Consultant for

many other projects for Century properties.



CENTURY PARK SHERATON HOTEL

Trouble-shooting, Cooling Load Analysis and retrofit of the chilled-water HVAC system and AHU duct distribution. Successful completion of the project saved PHP8M from the ordered purchase of new units of AHUS.



21st December, 2005

"RBS Engineering Technologies (through the consultancy services of Engr Rosen Sanchez) was able to save our company PHP8.0 Million worth of new AHUs from being purchased. Our AHUs are 25 years old and were on the verge for replacement. RBSanchez suggested keeping the old AHUs but has recommended some changes. A year has passed now and the hotel is still cool using our old AHUs. This is even with the passing of the hottest summers of 2005"

"I know Mr. R.B. Sanchez applies in-depth design analysis and investigation but recommends practical solutions. His engineering skills, hands-on analytical approach and good engineering judgment is very valuable and hard to find these days."

MR. EDGARDO NAKPIL

Chief Engineer, CENTURY PARK HOTEL 599 P. Ocampo St., 1004 Malate, Manila City, Philippines

DESIGN AND CONSULTANCY FOR NEW HVAC SYSTEM OF AYALA MALL AND BPO IN BACOLOD



Pacolod, Negros Occidental | July 2016

RBSanchez Inc. is the HVAC Design Engineer and Consultant for the 13,353 sqm commercial Ayala Malls Bacolod in Negros Occidental.



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DESIGN AND CONSULTANCY OF HVAC FOR ONE SHANGRI-LA (OSP) TOWER AND MALL COMPLEX

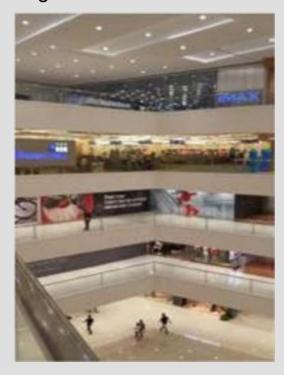
Ortigas Center, Mandaluyong, Metro Manila | 2009





RBS Engineering (now RBSanchez Inc) was sub contracted by Meinhardt Philippines Inc. for a special design and consultancy for HVAC services of One Shangri-La Towers.







DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF ROBINSONS BOGO TERMINAL



♀ Cayang, Bogo City, Cebu | 2017



RBSanchez Inc. is the HVAC System Design engineer and consultant for the whole air-conditioning system of Robinson's Place Bogo Terminal in Bogo City at Cebu.





DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF ROBINSONS MALL PLACE ANTIQUE





- San Jose de Buenavista, Antique | 2016
- RBSanchez Inc. is the HVAC System Design engineer and consultant for the 18,242 sqm building at Robinson's Place Antique.





DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF STARMALL LAS PIÑAS



- CV Starr Avenue, Las Piñas, Manila | June 2015
- RBSanchez Inc. is the HVAC Design Consultant for the 20,673 commercial mall building of Starmall Las Piñas.









DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF STARMALL TALISAY CEBU



- ▼ Talisay, Cebu | September 2016
- RBSanchez Inc. is the HVAC Design Consultant for the 26,404 commercial mall building of Starmall Talisay at Cebu.





DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM OF STARMALL MALOLOS



- RBSanchez Inc. is the HVAC Design Consultant for the 30,654 sqm commercial mall building.





DESIGN AND CONSULTANCY FOR UPGRADE OF THE STARMALL SAN JOSE DEL MONTE PHASE 2



- San Jose del Monte City, Bulacan | September 2015
- HVAC System Design Engineer and Consultant for the 15,503 sqm commercial building.









DESIGN AND CONSULTANCY FOR THE HVAC SYSTEM AUDIT, RETROFITTING AND REDESIGN



- Quezon Ave, Diliman, Quezon City, M. Manila | 2018
- HVAC system assessment, retrofitting and redesign of the whole HVAC systems and upgrade.
- Serves as a consultant for the 18,673 mall building and its expansions.





HVAC CONSULTANCY, OPERATIONS & MAINTENANCE SERVICES

■ RCBC CORPORATE BLDG
THE FORT

25th St, Mckinley Hills, Taguig











RBS has own personnel deployed on-site from Years 2017-2020 on a 24/7/365 basis.

CHILLED WATER SYSTEM AND AHU DISTRIBUTION RETROFITTING AT CENTURY PARK SHERATON HOTEL



CENTURY PARK SHERATON HOTEL Retrofit of the chilled-water HVAC system and AHU duct distribution. project saved PHP8M from the ordered purchase of new units of AHUs. RBSanchez is the HVAC system design consultant of Century Park Hotel.









Design of Fire Protection, Electrical & HVAC Ducted Systems of 19, 20, & 21ST FLOORS at PBCOM TOWERS, AYALA.

(All disciplines)

Design & Consultancy



Filinvest Corporation, 1st, 2nd, 3rd Flr, COMPUTER & SERVER FARMS CyberGate Building, FILINVEST CITY

Technistock Corporation,PhilamLife Building, Ayala (All disciplines)

Linea Italia, Greenbelt 3 (All disciplines)



SHELL DESIGN FOR SHELL BUILDING (2003) (All disciplines).



MANDARIN HOTEL SMOKING ROOM VENTILATION



EAST WEST BANK OFFICES HVAC DESIGNS. All bank branches designed nationwide (2002- 2004).

Design & Consultancy for Retrofits







CENTURY PARK SHERATON HOTEL Troubleshooting, Cooling Load Analysis and retrofit of the chilled-water HVAC system and AHU duct distribution. Successful completion of the project saved PHP8M from the ordered purchase of new units of AHUS.



AVON MANUFACTURING PLANT, Batino Exit, South Superhighway. The HVAC analysis, and retrofitting consultancy services for the AVON PLANT in Laguna.



DRAGON MALL PROJECT – a MEP DESIGN of a proposed 3-storey 30,000 sqm mall located at the Alabang Zapote Road, Las Pinas.

Design & Consultancy for Retrofits





DRAGON MALL PROJECT – DESIGN of a proposed 3-storey 30,000 sqm mall located at the Alabang Zapote Road, Las Piñas.



RBS did the design and consultancy of the HVAC (chilled water systems), FIRE PROTECTION.
Mechanical Consultancy value:
Paid PHP1.2M for the Mechanical HVAC design.





Design & Consultancy for Fort Bonifacio Stopover Buildings

9

The FORT. Taguig, Metro Manila

DESIGN of a 2-storey 4,000 sqm mall and gas station. Architect is Environments Collaborative. Inc,

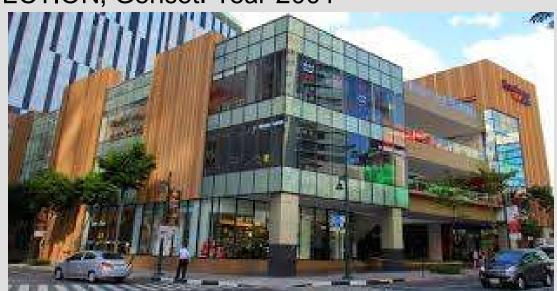
RBS did the design and consultancy of the HVAC and FIRE PROTECTION, Genset. Year 2001







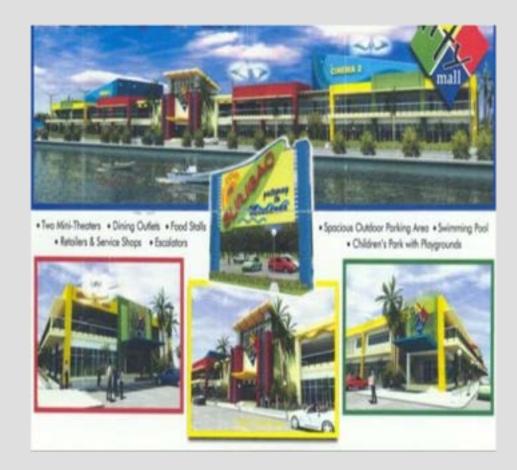




DESIGN AND CONSULTANCY FOR NEW HVAC SYSTEM OF CITYMALL SURIGAO



- Surigao City, Surigao del Norte | February 2016
- Design and Consultancy
 Services for the HVAC
 systems of an 8,570 sqm
 commercial building of
 CityMall Surigao.







DESIGN AND CONSULTANCY FOR NEW HVAC SYSTEM OF CITYMALL PAVIA



Old Iloilo – Capiz Rd. Pavia, Iloilo | February 2016



Design and Consultancy Services for the HVAC systems of a 9,989 sqm commercial mall building.





ENERGY SAVINGS AND MAINTENANCE SERVICES ROBINSONS

A

■ ROBINSONS

MALLS MAGNOLIA Supply of HVAC Consultancy and Trane

Chillers Operators Maintenance Services from Year 2013-2019



OPERATIONS & MAINTENANCE SERVICES

RCBC CORPORATE BLDG
THE FORT

25th St, Mckinley Hills, Taguig







Supply of HVAC Consultancy and Chiller Operators and Maintenance Services from Year 2017-2020

DESIGN AND CONSULTANCY OF HVAC SYSTEM FOR VARIOUS JOLLIBEE STORES

Jollibee

Various Jollibee Stores Nationwide

HVAC Design and consultancy services for various stores of Jollibee Corporation nationwide.









DESIGN AND CONSULTANCY OF HVAC SYSTEM FOR VARIOUS JOLLIBEE STORES



Various Jollibee Stores Nationwide

JOLLIBEE VARIOUS PROJECTS				
PROJECTS	AREA(sqm)	PROJECTS	AREA(sqm)	
JOLLIBEE AURORA	477.42	JOLLIBEE MAA ROAD	1,861.04	
JOLLIBEE WALTERMART	263.51	JOLLIBEE NORTH HARBOR	2,412.77	
JOLLIBEE TUNGKONG MANGGA	767.01	JOLLIBEE SM FAIRVIE ANNEX	275.33	
JOLLIBEE SM CITY BATANGAS	305.40	JOLLIBEE LERDA BUSTILLOS	1,753.40	
JOLLIBEE DAVAO LACHMI	357.21	JOLLIBEE SM BICUTAN ANNEX	278.58	
JOLLIBEE WALTERMART CABANATUAN	335.95	JOLLIBEE TANAY	2,286.12	
JOLLIBEE RONQUILLO	758.70	JOLLIBEE MOLAVE	1,905.89	
JOLLIBEE GAISANO CATARMAN	395.91	JOLLIBEE ORION	1,576.68	
JOLLIBEE PUREGOLD DEPARO	442.61	JOLLIBEE CASUNTINGAN MANDAUE	2,108.27	
JOLLIBEE TANDANG SORA	723.50	JOLLIBEE ATIMONAN	593.86	
JOLLIBEE PETRON DIEGO SILANG	659.42			

Design & Consultancy Services for Scaffolding of NAIA AIRPORT RAMP







NINOY AQUINO TERMINAL 3 AIRPORT, Pasay City, Metro Manila



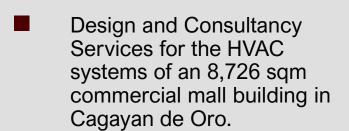
TERMINAL 3- NAIA AIRPORT CONSULTANCY for SAFETY STUDY OF ELEVATED ACCESS SCAFFOLD DESIGN (ear 2001)

RBS predicted the PHP50M collapse and damage of Terminal 3 Access Road undertaken by Wiley Australia and Takenaka Corp. Engr Rosen B Sanchez used the RBS copyrighted "SCAFFPRO Software" for stress and strength analysis of the structures.

EEI Corp purchased the US\$5,000 from RBS software hereinafter in 2002.

DESIGN AND CONSULTANCY FOR NEW HVAC SYSTEM OF CITYMALL BULUA CDO

Cagayan de Oro. Misamis Oriental | August 2015











DESIGN AND CONSULTANCY FOR NEW HVAC SYSTEM OF CITYMALL ISULAN



Tacurong City Rd., Isulan, Sultan Kudarat | August 2015



Design and Consultancy Services for the HVAC systems of an 8,160 sqm commercial mall building in Sultan Kudarat.





DESIGN AND CONSULTANCY OF HVAC & KITCHEN VENTILATION FOR VARIOUS CHOWKING STORES



Various Chowking Stores Nationwide

 HVAC Design and consultancy services for various stores of Chowking nationwide.





CK-Commonwealth	Section States
CK-Buhangin Davao	324.89
CK-Green Meadows	431.05
CK-Roxas Isabela	306.02
CK-GMA Cavite 381.00	
CK-San Nicolas 241.18	
CK-Matina 356.66	
CK-Valenzuela City Hall	430.08

DESIGN AND CONSULTANCY OF HVAC & KITCHEN VENTILATION FOR VARIOUS CHOWKING STORES



Various Chowking Stores Nationwide

 HVAC Design and consultancy services for various stores of Greenwich Stores nationwide.







GREENWICH GW-Cabahug 285.48	
GW-Dahlia Fairview QC	347.78
GW-Green Meadows	482.19
GW-Muntinlupa City Hall	362,52
GW-Taytay Uptown	170.79
GW-Valencia 285.65	
JB-Balayan Stop Over	587.36

VARIOUS DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM



Various Locations

GLAXO SMITHKLINE INC. OFFICES IN PASONG TAMO, MAKATI. Design and Installation of new chiller system, pipe and pumping system, AHUs, FCUs, and control system. August 2013.

HTMI CALL CENTER PROJECT, Libis, Quezon City, Metro Manila. – the design and construction consultancy of a 2-storey 3,000 sqm new call center building in The HVAC system was designed and constructed by Trane Phils. RBSanchez served as the design consultant of Trane Philippines for the design, construction and commissioning works of the project. (June 2005 to Feb 2006). Contract value awarded to RBSanchez: PHP1.05M for Mechanical design.

VARIOUS DESIGN AND CONSULTANCY FOR WHOLE HVAC SYSTEM



Various Locations

■ MEGAWORLD CORP. FORBESWOOD PROJECT. the design and consultancy for the RETAIL PROJECTS in Burgos Circle, the Fort. Design of HVAC Aircon, All HVAC ducting, and ventilation works and all related accessories. (May 2010 –July 2010).

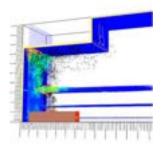
KINGS COURT RETROFITTING PROJECT, Makati City. the redesign, consultancy and commissioning of the new AHU and associated systems for Ground floor, 2nd, 3rd,4th, 5th and 6th floors, 500 tons total and effects on chiller units as well as associated ducting and accessories. To address moisture problems and chiller problems (July 2010- Aug 2010).

ADDITIONAL SHELL ETHANOL STORAGE FACILITIES, The design of Shell Depot, Ethanol and Blending Storage Facilities in Cabadbaran, Agusan, Mindanao, The design includes pumping stations, piping and tanks and loading gantry system. (June 2010 – August 2010).

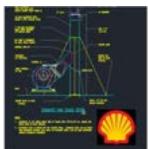
VARIOUS CFD PROJECTS

CFD DESIGN AND CONSULTANCY











CONSULTANCY SERVICES FOR BALARA WATER TREATMENT PLANT 1

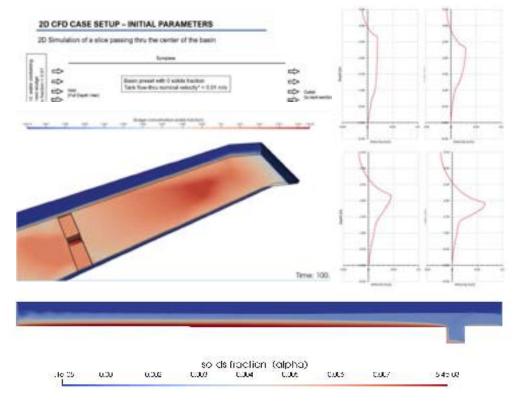
Solver: OpenFOAM v1902 – driftFluxFoam

Post-processing: Paraview

CFD simulation to predict the sedimentation through the basins and sludge accumulation. The results to be used as a confirmatory for design and reference for sludge pumping system. This includes parametric study of bed slopes and sludge pump pit intervals in the reference of velocity profile, effluent turbidity quality and concentration prediction along the depth of the basin.









CONSULTANCY SERVICES FOR BALARA WATER TREATMENT PLANT 1



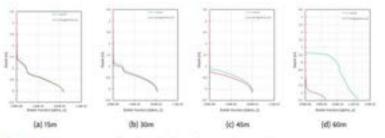


Figure 10. Sludge concentration along basin depth at different sections, t = 24 hours

OPTIMAL AND COST-EFFECTIVE SLOPE AND SUMP PIT INTERVALS

Using measurements and results of the CFD model, the recommendation is to have a basin bed slope of 1:300 at sump pit intervals every 60 meters. These figures were realized after series of parametric studies and cost effective solutions analysis.





Analysis of Gravity Induced Sludge Collection and Removal for Sedimentation Basin 1 and 2 of **Balara Treatment Plant 1**

RBSanchez PME Consultants and Associates Inc. 1

Affiliancher Engineering Department, Hokelt Executive Tower 2, Wokelt, Horelin

Executive Summary

The initial system includes three sump pumps in pits at 60 m interval along the 160 m basin. The floor were sloped at 1,000 for gravity induced slietge transport.

CTD simulations were conducted to determine the behavior of pertinent parameters such as flow field, sludge deterrises, bear dimensions, sludge zone depth and rheatagical properties both for the accumulation period and muring during minimal operation. Open PGAM solver criff had not not employed to perform the casculation for mail, and representant concernation for two-phase flow as a minture. Applying the minture model, water seas set as the continuous phase and the settle able dudge as droperted phase. Furthermore, the studge ass modeled as a non-hewtonian fluid with rheological properties similar to bingham plastics. Heasenments and californian tests were conducted to verify numerical native predictions. Caution was numerical in using available state on best effort basis to represent acts of sile conditions.

The following terms are summarrised as the findings and corresponding recommendation, as proposed.

- 1. Gravity induced transport of studge to the sump by floor stage of 5.000 is insufficient. The initial decign for studge collection and removal will not be effective for long term operation. In this steps, the transport is very minimal that the sludge were accumulated in the interval span even after sludge pump operations Recommendation: Increasing the slape to 1:510 to improve studge transport without significant effect to the sedimentation process. Although, steeper slopes were observed to greatly improve the transpart than 1:150 and shown in the concentration curves. Partial unlacity disturbance and minor edity formation may occur in the basin floor that may cause partial re-suspension in the floor depth.
- 2. Shortened distance between sump pits will improve the studge sollection and removal. Acids from increasing the player, another parametric study findings in decreasing the internal was observed. It was absenced that abortening the latercals significantly increases the collective rate averall at the area of remove is proportionally increased. However, further decreasing the interval may incur higher operational cost and maintenance cost as the studge pumps would require regular maintenance due to its purpose.

Recommendation: In depth and analysis are not included in this tender. Considering operational and majoritenesses cont. It is still recommended to reduce the interval up to 45 major interval from the 60interval. It is necessary to test run sludge operation to set optimum interval for each section of the basis on that issues previously discussed are avaided.

- 2. The study were set to consider an initial inlet of 300 KTU turbidity condition, as precided to be one of the highest in record. The study considered also a 100 NTU computational domain, however yields to insignificant findings difference compared to the 100 NTU domain, thus is not pursued further.
- 8. Adjust the floor slope of the sursplat section bewards the pump bear accordingly, to allow studge movement in the sump pit to be down towards the pump and ensure studge transport from the sides of the pit.
- E. Saferted pump specification isopacity and TDHI suffices as the studge pump is operated intermittently to show sludge out of the basis. In addition, writly the pump's capability at fluid electrics.

Amelionia (Invest)

April 10 personal distribution of

A Numerical Solver for the Hydrodyanimcs of Sedimentation Process

OpenFoam solver driftFloxFoam was employed to perform the calculation for mass and momentum. conservation for two-phase flow as a mixture. Applying the mixture model, water was set as the continuous phase and the settle-able sludge as dispersed phase. Furthermore, the sludge was modelled as a non-Newtonian fluid of theological properties that behaves similar to bingham plastics.

Mixture Continuity Equation By assuming multi-phase flow as a pseudo multi-phase mixture, only one set of governing equations is needed in solver 'driftfluxFears'. They are continuity equation and momentum equation for mixture and a continuity equation for dispersed phase. Theoretically, continuity and momentum equations can be derived from Eulerian-Eulerian model (Brennan 2000). Considering a two-phase flow, one phase is continuous basefluid and the other phase consists of dispersed solid particles. A continuity equation is required for each of the two phases:

$$\frac{d^2 d \omega p r^2}{2} + 2 \cdot (d \omega p r D r^2 = 0) \qquad (6)$$

$$\frac{\partial^{2} \phi_{\alpha \beta \gamma}^{i}}{\partial t} + \nabla \cdot (\phi_{\alpha} \rho_{i} U_{i})^{j} = 0 \qquad (3)$$

$$\frac{\partial^{2} \phi_{\alpha \beta \gamma}^{i}}{\partial t} + \nabla \cdot (\phi_{\alpha} \rho_{i} U_{i})^{j} = 0 \qquad (3)$$

where ρ_i and ρ_i are the densities of continuous phase and dispersed solid phase, respectively. φ₁ and φ₄ are the volume fractions of continuous phase and dispersed solid phase, respectively. Liand U, the velocities of continuous phase and dispersed solid phase, respectively.

If added (1) to (2), the result can be written as:

$$\frac{\partial \left(\phi_{i}\phi_{i}+\phi_{i}\phi_{i}\right)}{\partial t}+\nabla\cdot\left(\phi_{i}\phi_{i}U_{i}\right)+\phi_{i}\phi_{i}U_{i}^{2}=0$$
(3)

For the two-phase mixture, key properties and flow features can be estimated using Itshii and Grolmes, rull:

$$\rho_{\rm m} = \phi_{\rm DD} + \phi_{\rm mD}. \tag{4}$$

$$U_{l} = U_{l,m} + U_{m} \qquad (6)$$

$$U_{t} = U_{tm} + U_{m} \qquad (6)$$

$$\phi_{n}p_{n}U_{nm} + \phi_{m}p_{n}U_{nm} = 0 \qquad (7)$$

where U_{1:n} and U_{1:n} are relative velocities of continuous phase and dispersed solid phase to the machine, respectively. U_m is the velocity of the misture.

Then the contents in the second bracket of (1) can be rewritten as:

$$\phi_1 \rho_1 U_{1n} + \phi_2 \rho_1 U_{1n} = \rho_n U_n$$
 (8)

Therefore, (1), the continuity equation for the two phases can be written in a very similar form as: that for a normal single phase flow:

$$\frac{\Delta \rho_m}{\Delta t} + \pi \cdot 1 \rho_m U_m I = 0$$
(9)

in solver 'driftFluxFoam', (1) is not used directly in any header files. However, it will be used implicitly in file 'ptops.H' for pressure-velocity correction.

Mixture Momentum Equation - Momentum equations for continuous and dispersed solid phases. can be given as:

| Continuous Sedimentation CFD Analysis

For the two-phase mixture, key properties and flow features can be estimated using (Ishii and Grolmes, nd):

$$\rho_m = \phi_f \rho_f + \phi_s \rho_s \qquad (4)$$

$$U_f = U_{fm} + U_m$$
 (5)

$$U_x = U_{xm} + U_m \qquad (6)$$

$$\phi_f \rho_f U_{fm} + \phi_s \rho_s U_{sm} = 0 \qquad (7)$$

where U_{fm} and U_{sm} are relative velocities of continuous phase and dispersed solid phase to the mixture, respectively. U_m is the velocity of the mixture.

Then the contents in the second bracket of (3) can be rewritten as:

$$\phi_f \rho_f U_{fm} + \phi_s \rho_s U_{sm} = \rho_m U_m \qquad (8)$$

Therefore, (3), the continuity equation for the two phases can be written in a very similar form as that for a normal single phase flow:

$$\frac{\partial \rho_m}{\partial t} + \nabla \cdot (\rho_m U_m) = 0 \qquad (9)$$

In solver 'driftFluxFoam', (9) is not used directly in any header files. However, it will be used implicitly in file 'pEqn.H' for pressure-velocity correction.

Mixture Momentum Equation Momentum equations for continuous and dispersed solid phases can be given as:

| Continuous Sedimentation CFD Analysis 24

Free Surface For free surface, symmetry boundary is applied here. Similar to zeroScadient for scalars, the normal component is set to zero for vectors.

Physical Properties of Activated Studge: Sewage studge exhibits Bingham Plastic behaviour as was shown from several studies. Two quantities need to be specified in order to characterise this rheology, namely the yield stress, r_g, and the plastic viscosity, q. A constitutive relationship for settling velocity is also needed in order to carry out numerical simulations with the Drift Flux model.

Yield stress and plastic viscosity vary with concentration. Various authors as reviewed by (Casey and Newman 1883), have formulated exponential relationships for these quantities. They have the general form:

$$\Phi = aC^{ba}$$
 (26)

where Φ is the physical property in question, a is the solids fraction and a and b are constants. The exponent stet, C, is generally the natural logarithm base a, or the base 10.

The exponent from the experimentally derived settling velocity can be adjusted using equation 22. This essentially scales the physical properties of the sludge used in initial cases for other experiments.

$$\Phi = aC^{\frac{n-1+kl}{2m}+a}$$
(22)

The coefficients used for the calculation of sludge properties from are summarized in Table 2 - 5.
Several sets of sludge properties have been opted to determine extent of effects of their properties to the workability of the proposed sludge removal method. Since there are no sludge scrapers to be installed, sludge displacement have been left virtually on gravitational effects included by basis floor sloping.

Table 2. Coefficients used to estimate sludge properties

Property	Coefficient a		Exponent b		
			a),in > 0.000	$a_1 a = 0.003$	
Yield Stress	5.55E-05	kg/(m.s ²)	1050.8	951.25	
Bingham Viscosity	2.31E-04	kg/m.s.	179.26	179.26	
Settling Velocity	-2.30E-03	min	285.84	285.84	

Table 3. Coefficients used to estimate sludge properties dow density):

Property	Coefficienta		Exponent b	
			$\rho_0 = 1042 kg/m^3$	
Yield Stress	5.55E-05	kg/(m.s ²)	39.95	
Bingham Viscosity	2.31E-04	kg/m.s	7.35	
Settling Velocity	-2.20E-03	m/s	12.97	

Table 4. Coefficients used to estimate sludge properties (medium density)

Property	Coefficient a		Exponent b $\rho_d = 2000 kg/m^3$
Vield Stress	5.55E-05	kg/(m.s ²)	951.25
Bingham Viscosity	2.316-04	kg/m.s	179.26
Settling Velocity	-2.20E-03	m/s.	285.84

| Continuous Sedimentation OFD Analysis



CONSULTANCY SERVICES FOR BALARA WATER TREATMENT PLANT 1



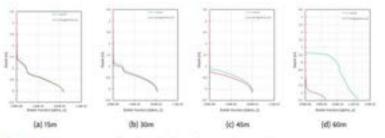


Figure 10. Sludge concentration along basin depth at different sections, t = 24 hours

OPTIMAL AND COST-EFFECTIVE SLOPE AND SUMP PIT INTERVALS

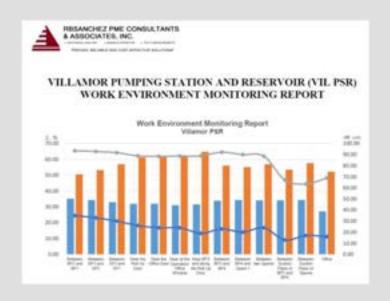
Using measurements and results of the CFD model, the recommendation is to have a basin bed slope of 1:300 at sump pit intervals every 60 meters. These figures were realized after series of parametric studies and cost effective solutions analysis.



ENVIRONMENTAL ASSESSMENTS OF ALL MAYNILAD PUMPING STATIONS



- Maynilad Pump Stations in West Manila and Cavite | 2019
- RBSanchez Inc. is the Mechanical Consultant for the Maynilad Water HVAC and Environments System Assessments, measurements and Analysis of Building of pumping stations.



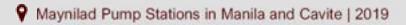




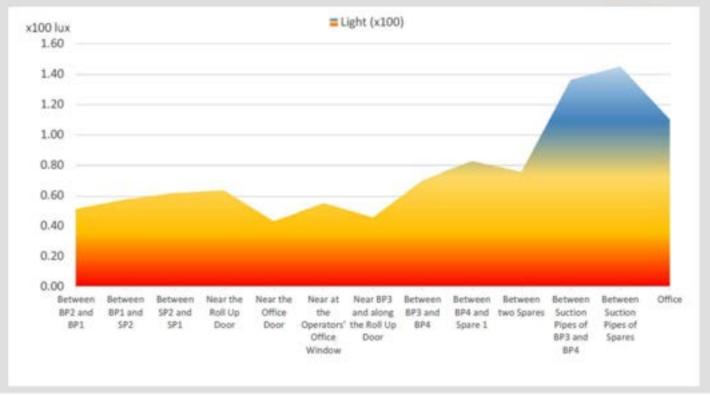


ENVIRONMENTAL ASSESSMENT OF PUMPS STATIONS







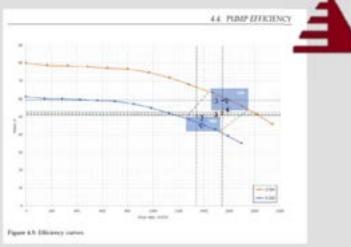


CONSULTANCY SERVICES AND PUMP PERFORMANCE ASSESSMENT of MAYNILAD PUMP STATIONS



- Maynilad Pump Stations in Metro Manila and Cavite | December 2018 to October 2019
- RBSanchez Inc. is the Mechanical Consultant for the Maynilad Water System Assessments, measurements and analysis for 120 pumping units in various pumping stations to 1100 hp water pumps.





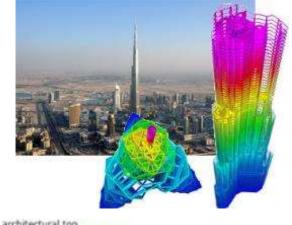
RBS contributes to the CFD designs for the TALLEST BUILDING IN THE WORLD

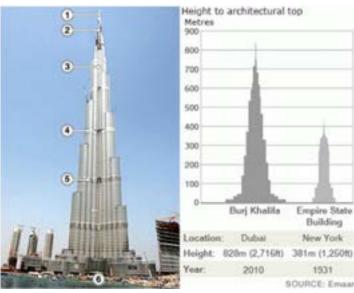
"WORLD'S TALLEST BUILDING"
THE BURJ KHALIFA TOWER Dubai,
UAE.

ARMANI HOTEL HVAC DESIGN. The only Armani branded Hotel in the world.



Engr. Rosen Sanchez is the official signatory of all Khalifa Bldg HVAC and CFD construction drawings in the Year 2006-2007.







Actual CFD Simulations

CFD FOR FLUE GAS MODELLING

OF

SHELL REFINERY IN TABANGAO,
BATANGAS

Done by RBS ASSOCIATE

ENGR FRANCISCO AMARRA



CFD FOR REFINERY GAS EMISSIONS IN SHELL **TABANGAO REFINERY**

Program: AERMOD and AERMET

CFD analysis done by our associate Engr Francisco Amarra to study the SO₂ and NO_x concentrations from stack emissions in the Shell Tabangao Refinery

Input Data Required for AERMOD:

- Meteorological Pathways
 - -Site data for surface climate & upper air stations
- -Study site data
- Surface Parameters
 - -Albedo, Bowen ratio, surface roughness
- AERMAP
 - -Terrain files converted to USGS-DEM format
- AERMET
- -Raw data: Surface Climate Surface File
- -Raw data: Upper Air

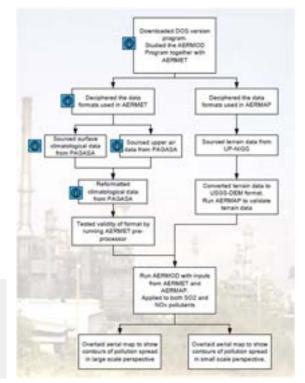
Profile File





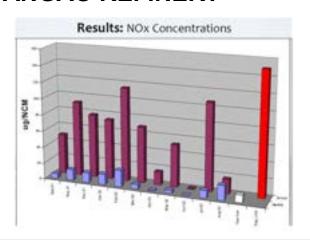
INPUTS AND DATA GATHERING ON THE TOPOGRAPHY

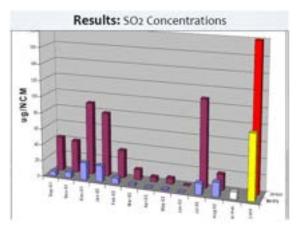
Detailed study in the area of study were conducted including the terrain mapping around the refinery using available data from different sources.





CFD FOR REFINERY GAS EMISSIONS IN SHELL TABANGAO REFINERY

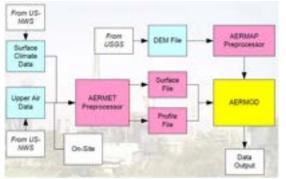




RESULTS OF THE STUDY

Results shown above are the actual gathered and measured concentrations on site. The following concentrations are used for basis of calculations for recommendation and conclusion.







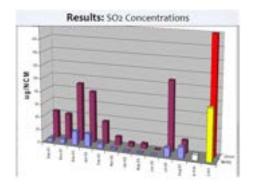
CFD FOR REFINERY GAS EMISSIONS IN SHELL TABANGAO REFINERY

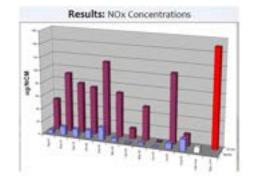
CONCLUSION

- Shell Tabangao Refinery emission concentrations were below the regulatory limits.
- Problems were encountered during acquisition of raw data:
 - Surface climate data not in required format;
 - Upper air climate data is not always available due to budget limitations
 - Terrain data is not readily available and expensive to produce.
- Conversion of raw data was successful. AERMOD program is applicable in the Philippines and was successfully applied using the Shell Tabangao Refinery.

RECOMMENDATION

- Air Dispersion Models EMB should focus on encouraging industries to make use of air modeling programs.
- Surface and Upper Climatological Data bring up-to-date all encoding requirements for surface data and convert to CD-144 format: including encode of upper air data into CLICOM system and convert to TD-6201 formats
- Terrain Data NAMRIA should develop digitized map in USGS-DEM format.



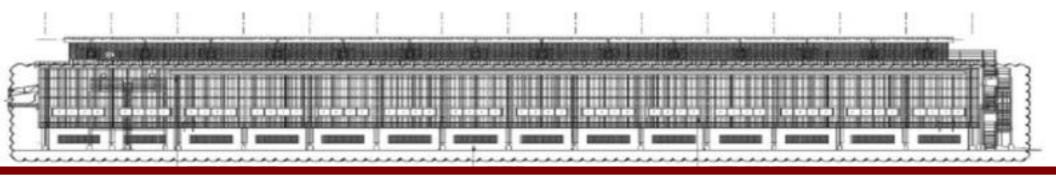




COMPUTERIZED FLUID DYNAMICS (CFD) STUDIES of ZAMA PRECISION DIE-CASTING LINES

By:





CFD ANALYSIS OF ALUMINUM-DIE CAST WAREHOUSE AT ZAMA PRECISION

Solver: Fire Dynamic Simulation (FDS) Ver 6 and SmokeView and PyroSim

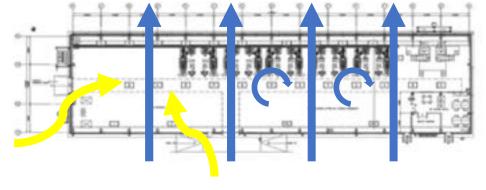
CFD simulation to solve the smog and high particle concentration PM2,5 inside the warehouse. Different options were designed and simulated to best address the air quality, including additional upper vents and enlargement of lower vents to follow natural buoyancy laws, cross-flow ventilations and local push-pull option as recommendation.

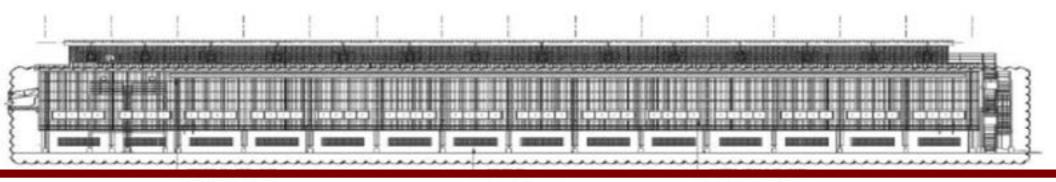
NO "CROSS VENTILATION" AT THE NORTHERN SIDE OF THE WAREHOUSE

Current velocity measurements shows that the air is only recirculating "plan-wise" (and not exhausting) across the building in the northern side near the furnaces.

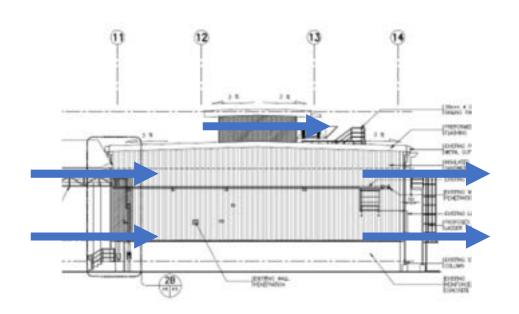


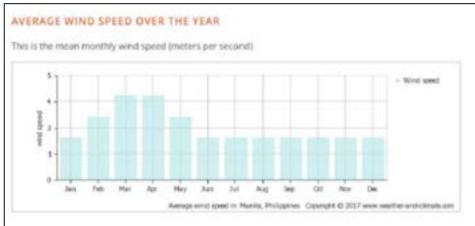






CFD ANALYSIS OF ALUMINUM-DIE CAST WAREHOUSE AT ZAMA PRECISION





NO "CROSS VENTILATION" AT THE NORTHERN SIDE OF THE WAREHOUSE

As a recommendation, we recommended to take advantage of the natural wind power at 322,900 cfm.





CFD ANALYSIS OF ALUMINUM-DIE CAST WAREHOUSE AT ZAMA PRECISION

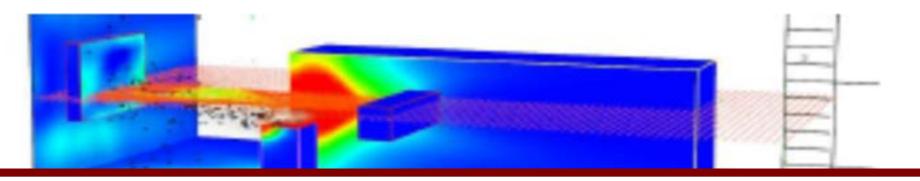
PARTICLE ACCUMULATION OCCURS AT GROUND LEVEL OUTSIDE THE BUILDING AT NORTHEASTERN SIDE

Particles on the rooftop tends to fall off due to the layout of the fans relative to the roof profile and the gooseneck exhaust layouts. As a standard, exhausted air and particles shall be vented to the atmosphere at high levels for proper dispersion. Particle readings show higher levels of PM2.5 matter in the area with 705 ug/m3 especially when furnace exhausts are in operation.

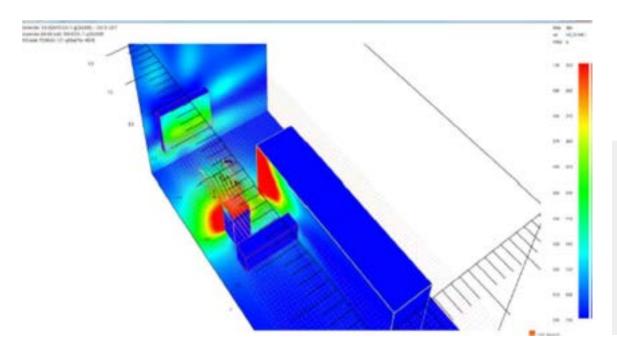


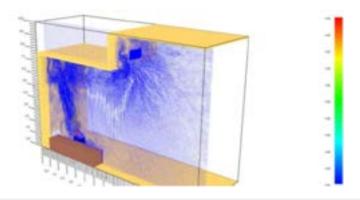






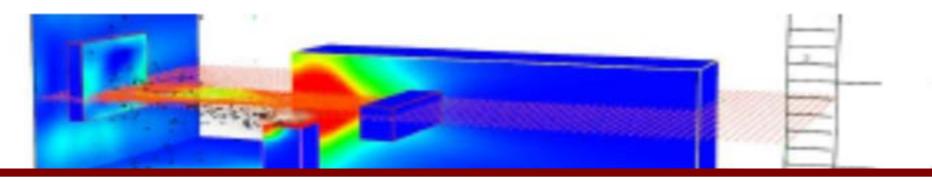
CFD ANALYSIS OF ALUMINUM-DIE CAST WAREHOUSE AT ZAMA PRECISION





LOCAL EXHAUSTS VENTILATIONS SUCH AS PUSH-PULL OPTIONS WITH MULTIPLE CFD SCHEMES

Different schemes were exercised and validated to identify the optimum solution for the exhaust of the particles from the furnaces. The following options were derived from different validated cases and studies and investigated if applicable in the warehouse situation.



CFD ANALYSIS OF ALUMINUM-DIE CAST WAREHOUSE AT ZAMA PRECISION



COMMENT ON THE PROPOSAL TO COMPLETELY INSULATE THE WAREHOUSE TO REDUCE INTERNAL TEMPERATURES

We were invited to comment on the proposal of insulating the warehouse. We don't recommend the insulation in the attempt to lower the internal temperatures of the warehouse, as it will only cost money, time, and space and moreover, increase the internal temperatures (not decrease).

However, we recommended high "solar reflectance" radiant barriers coupled with "air/insulation" technologies.

CFD CONSULTANCY SERVICES FOR DESIGN OF GLAS TOWER PROJECT

A

Ruby St, Ortigas Commercial Center | Aug 2020

RBS is the HVAC System Design Engineer and PME Consultant. For the first double-glazed, triple Low-E glass tower in Ortigas @ 188-meter with are of 102,000 square meters.

Multi use building for BPOs, Offices and Hotel. (Year 2020)



RBSanchez Inc. is a long-term Asya Partner in Mechanical and Structural Design aspects of the Building.



CFD DESIGN OF VISCOUS PUMPING SYSTEMS OF LA CARLOTA SUGAR REFINERY



La Carlota Sugar Refinery, Negros Occidental | July 2020

Tanks, Piping and pump design with Fluid Dynamics and CFD simulation to predict the VISCOUS FLUIDS behavior for molasses and magma pumping systems.





RBSanchez Inc. is a long-term
 Partner with Global Horizons Inc.
 in various industrial projects.







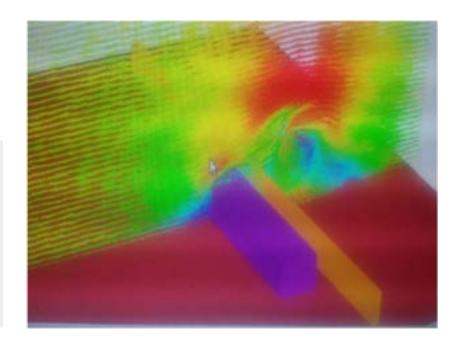


Different CFD schemes for the multiple configurations of the cooling towers based on orientation and layout arrangements. This includes single line tower configuration, separated towers at different tower orientation against prevailing wind direction.



OPTION 1 – SINGLE LINE TOWERS CONFIGURATION AT 90DEG AGAINST THE WIND

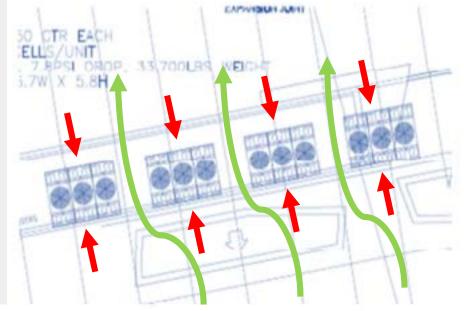
Results show that abnormal backflow occurs at the back side of the cooling towers suction influenced by the suction of the tower flows.





OPTION 2 – SEPARATED TOWERS CONFIGURATION AT 90DEG AGAINST THE WIND

Same configurations except that the towers are separated to allow natural wind to flow between towers. Although improved airflow is observed in this case, abnormal pressure changes can still be observed in the back side of the towers suction.

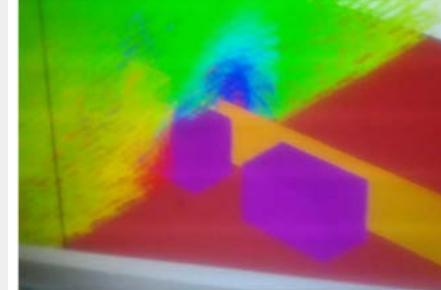






OPTION 2 – SEPARATED TOWERS CONFIGURATION AT 90DEG AGAINST THE WIND

Similar results are observed compared to option 1. However, this configuration resulted to less disturbed airflow at the back side of the tower influenced by the tower fans suction effect.





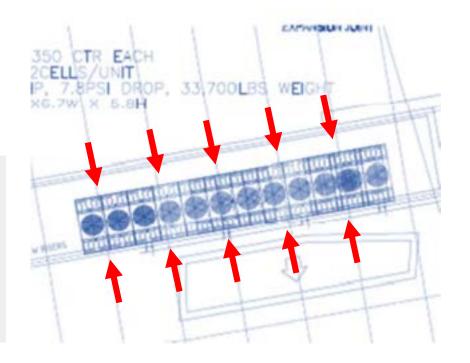


Different CFD schemes for the multiple configurations of the cooling towers based on orientation and layout arrangements. This includes single line tower configuration, separated towers at different tower orientation against prevailing wind direction.



OPTION 1 – SINGLE LINE TOWERS CONFIGURATION AT 90DEG AGAINST THE WIND

Aligned towers along the wind direction at one side of tower suction. This CFD run results to abnormal pressure changes on the back side due to the counter-acting forces from the wind blow and tower suction.





OPTION 3 – SEPARATED TOWERS CONFIGURATION AT 0DEG AGAINST THE WIND

Same configuration with the option 2 but with 0 degree orientation to the wind direction. In this configuration, the velocity profile shows good agreement and results at the downstream profile. Separation of towers and both suction faces results to almost uniform flow and acceptable pressure domains.





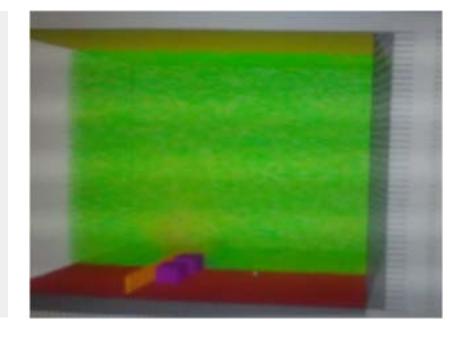


OPTION 3 – SEPARATED TOWERS CONFIGURATION AT 0DEG AGAINST THE WIND

This configuration shows good agreement compared to previous cases and options.

Additionally, this case shows most improved airflow profile upstream and downstream.

Thus, this option is the best configuration and was recommended to be tower layout and configuration.

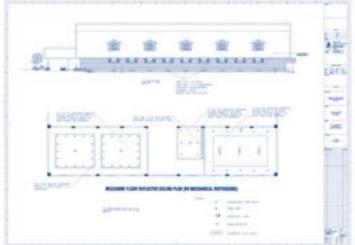


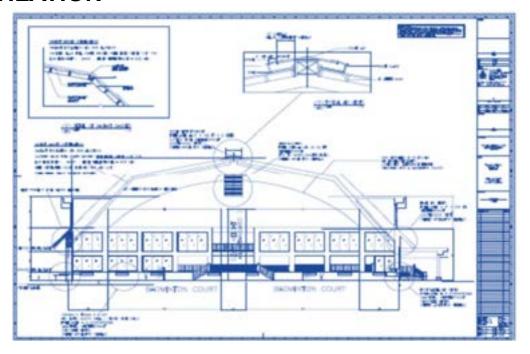




CFD ANALYSIS AND CALCULATION FOR TAGAYTAY HIGHLANDS NATURAL VENTILATION

Under roof solar shield with 13mm hot air gap for insulation, huge solar cap covers and cross flow air ventilation and high ridge vents.





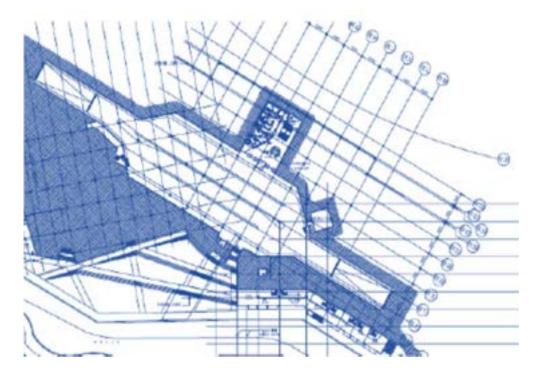


CFD ANALYSIS FOR AN UNDERGROUND SUPERMALL CARPARK TUNNEL

Solver: Fire Dynamic Simulation (FDS)

An underground road tunnel design for oxygen, car fire scenarios, carbon monoxide and carbon dioxide levels at such scenarios.

This tunnel design aims to determine the levels of dangerous pollutants that will occupy the tunnel and identify mitigating conceptual designs to counter the predicted conditions. This will also reduce the amount of time and money to be if such failure occurred in actual.

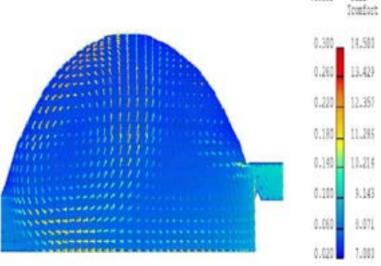




CFD ANALYSIS FOR THE METROPOLIS MALL AIR CAVERN CATCHER FOR NATURAL VENTILATION

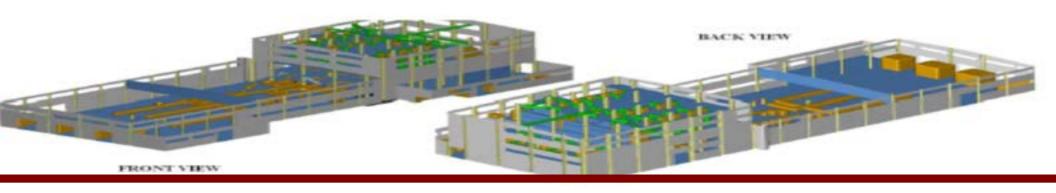
A 3600-TR mall natural ventilation study in the opening of the glass façade to accommodate and act as a wind catcher intake.



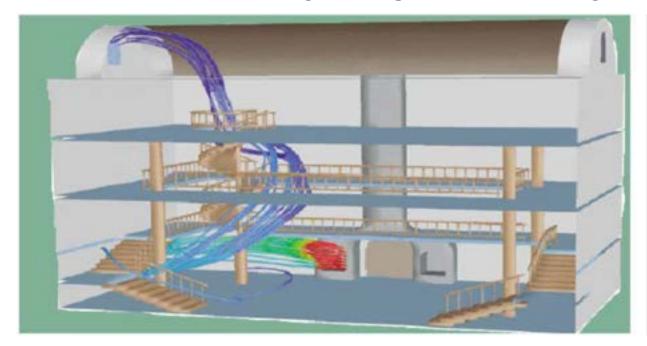


PRINCIPLES OF NATURAL VENTILATION

Different airflow principles that follows the law of natural ventilation and buoyancy were adopted in this project.



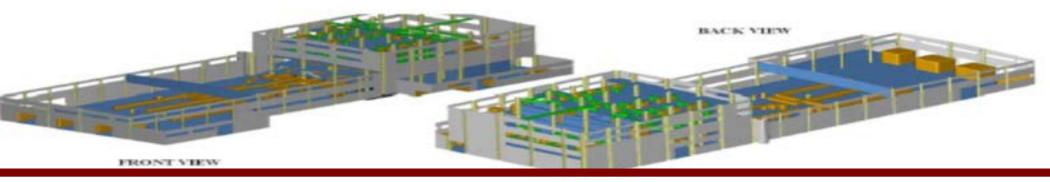
CFD ANALYSIS FOR THE METROPOLIS MALL AIR CAVERN CATCHER FOR NATURAL VENTILATION



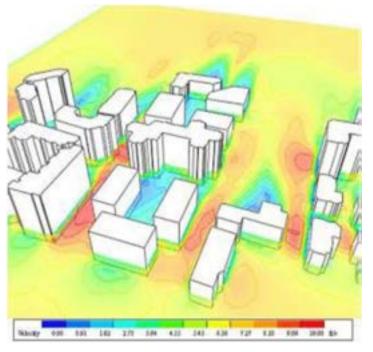
NATURAL VENTILATION - SPENT AIR

The use of the shuttered open the main hallways and corridors to serve as exit and entry of wind driven air. The use of spent cool air from the three lower floors to be released upward to assist in cooling the natural ventilation of 4th and 5th floors.

The design and provision (for occasional use during humid months) of swimming pool fountain as chilled water curtain air dehumidifier during hot and humid days to dry incoming air in the wind catcher intake. It is estimated int two to three months a year that the wind will be too hot and humid and need the cooling assistance from chilled water.

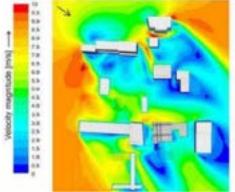


CFD ANALYSIS FOR THE METROPOLIS MALL AIR CAVERN CATCHER FOR NATURAL VENTILATION



NATURAL WIND PROFILE OVER THE AREA

The velocity and pressure profile over the buildings surrounding the malls. Study were conducted to determine the traverse air direction influenced by barriers.





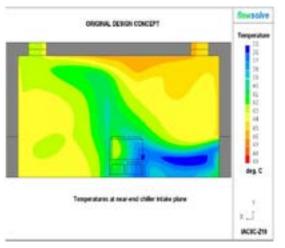
ROOF RIDGES DESIGNS

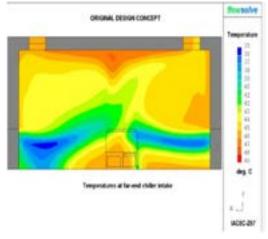
The design of the roof apex and ridges as winddriven cross ventilation, where natural wind will be pushed and sucked out the hot air trapped in the roof level. The design acts as a cool air intake and hot air exhaust from the influence of wind driven pressures.



CFD ANALYSIS FOR AN AIR COOLED CHILLER AIR INTAKE STUDY

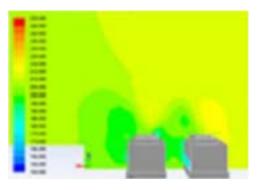
A study of air-cooled chiller configuration and the intake velocity and temperature profile in the near and far-end intake planes.

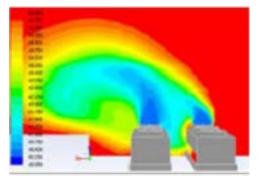




TEMPERATURE AND VELOCITY PROFILES

The results shows the velocity profiles (right) and temperature profiles (left) for the chiller intake and exhaust planes. The results agreed and validated the actual conditions on site.





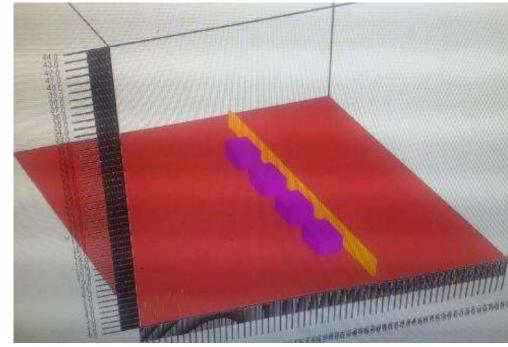


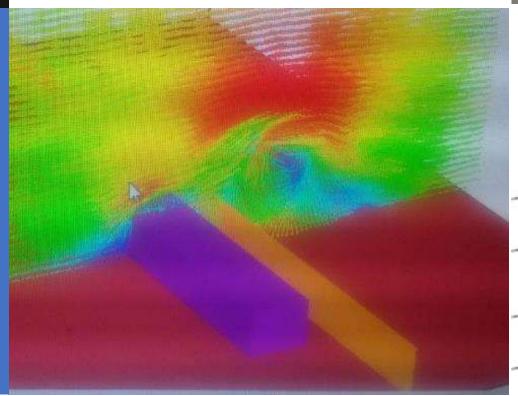
OTHER CFD PROJECTS HANDLED

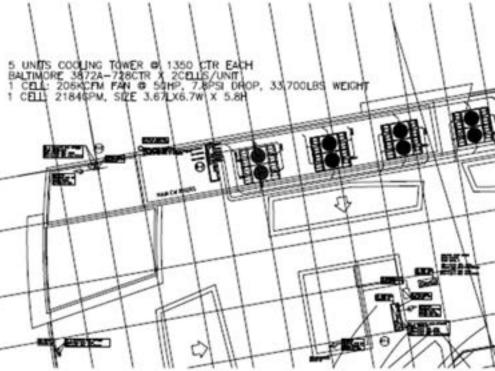
- Computer Server Farms and Server Rooms
- Industrial Plant Cleanrooms
- Healthcare Facilities and Cleanrooms
- Highrise Building Wind and Stack Effects
- Carpark and Underground Tunnels ventilation
- Underground Spaces
- Naturally Ventilation of Structures
- Kitchen Comfort and Hood Exhaust Design

"AS DESIGNED" CFD RUN ON COOLING TOWERS

NEW FESTIVAL SUPER MALI



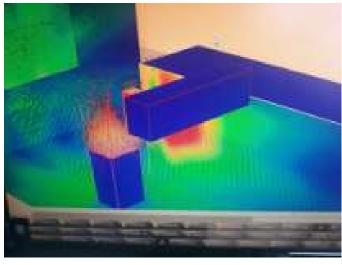




READINGS OF LOCAL VENTILATION PM2.5 PARTICLE CONCENTRATIONS















OPERATIONS & MAINTENANCE (O&M)



SUNPOWER®











FABRICATION PLANT 1

Supply of HVAC Consultancy and Chiller Operations Maintenance Services. RBS supplied consultancy and technical operations staff on a 24/7/365 basis for Years 2007-2014. Laguna Technopark, 100, East Main Avenue, Binan City







MODULE MANUFACTURING MODCO PLANT. SunPower Corporation Supply of HVAC Consultancy and Chiller Plant Operations and Maintenance for MODCO.

RBS supplied consultancy and technical operations staff on a 24/7/365 basis Year 2007-2016 Module Manufacturing (SPMM) Plant Binan, Laguna.







ASCOTT HOTEL / GLORIETTA 4

Supply of HVAC Consultancy and Chiller Operations and Maintenance Services to Trane Phils. Inc, from Year 2007-2018







■ WELLS FARGO LLC Wells Fargo Drive, McKinley Hill, Upper McKinley Road, Taguig City, Metro Manila





Supply of HVAC Consultancy and Trane Chiller Operators and Maintenance Services from Year 2017-2020

RCBC CORPORATE BLDG THE FORT

25th St, Mckinley Hills, Taguig





Supply of HVAC Consultancy and Trane Chiller Operators and Maintenance Services from Year 2017-2020

Makati Medical Center
 Ayala, Makati



 Supply of HVAC Consultancy and Chiller Operation and Services to Trane Phils. Inc. 2007-2013





MAINTENANCE SERVICES

GLAXO SMITH KLINE

Chino Roces Avenue, **Pasong Tamo** Ext. Makati City





Supply of Maintenance Services from Year 2017-2019

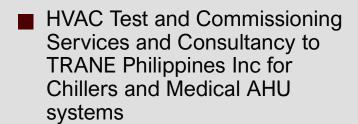
RBS has personnel deployed on-site.



TESTING AND COMISSIONING OF CHILLED WATER SYSTEM AND AIR SIDE AHUS FOR ST. LUKES HOSPITAL AT THE FORT



5th Avenue, Global City, Taguig, Metro Manila | 2008











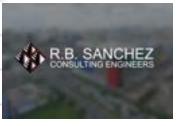
ASSOCIATES, PARTNERS, ENGINEERS & STAFF

ASSOCIATE DIRECTOR ROLANDO B. SANCHEZ



STRUCTURAL CIVIL An experienced Structural Engineer with more than 32 years of experience in design and analysis of high rise buildings up to 40-storey, industrial plants, oil refinery, mining, cement plants, communication towers, guyed tower, silos, piers, revetment structures, slope protection, rockfall analysis, civil works, mining primary crusher, etc. here and abroad.

Date	Position	Company
2001 – present	Managing Principal	RBSanchez Consulting Engineers
1996 – 2000	Structural Design Manager	R.S. Caparros and Associates
1992 – 1994	Rendered Structural Design Services	International Design Group – Canada
1989 – 1992	Structural Design Head	R.S. Caparros and Associates
1990 – 1992	Rendered Structural Design Services	Various Company
1987 – 1998	Structural Design Engineer	Design Management and Development Corporation





EDUCATION

- Advanced Structural Steel Design, Advanced Structural Analysis, Hydraulics and Hydrology, Engineering Economics University of Toronto, Canada
- Computer Aided Structural Analysis and Design Seneca College, Canada
- Bachelor of Science in Civil Engineering University of Sto. Tomas

ASSOCIATE PARTNER

MARIO ALIX, PEE

Professional Electrical Engineer and Systems **Specialist**

CORE SKILLS

- Detailed Design Engineering Electrical System and Analysis Construction ProjectManagement Cleanrooms ElectricalProvisions
- **Power Distributions**
- Industrial & Commercial Designand Applications

Owner of Mario A. Alix Philippines, Inc.

- The Outstanding Mapuan(TOM) Awardee 2008 in Professional **Practice in Electrical Engineering**
- Institute of Integrated Electrical Engineers Awardee 2012 of The Most **Outstanding Electrical Engineer**

EDUCATION

Bachelor of Science in Electrical Engineering Mapua Institute of Technology, Manila



ASSOCIATE PARTNER OSCAR RELUCIO

PME (PROFESSIONAL MECHANICAL ENGINEER)

BS IN MECH ENGG. - U.P. DILIMAN YEAR 1981

Major Experiences & Design

- Intel Technology Philippines, 2001-2007
- Amkor/Anam Phils Muntinlupa, 1991
- · American Microsystems Phils. Inc., 1993
- Sunpower Phils. Inc. Fab1/Fab2 Line Expansion,
- Microsemi Semi-Conductors Manila, 2015
- 30,000sqm HSBC Data Center Project at Hongkong
- · Mead Johnson (Phils) Inc., Johnson & Johnson (Phils), Inc.,
- Texas Instrument Phase 2 Bump Module Expansion, 2011
- Cypress Decatech Project Laboratory, 2010
- Procter & Gamble Beijing
- Ford Motors Phils Inc.
- Bayer Headquarters
- Knauf Manufacturing Facility at Batangas
- Nestle Phils. Inc
- Astra Head Office and Pharmaceutical Plant Complex, 1989
- Malt Extract Plant, Lipa, Batangas
- St. Lukes's Medical Center, BGC Taguig City
- · Philippine Orthopedic Center, Quezon City
- Taguig Hospital, Taguig City
- Eastern Visayas Regional Medical Center, Tacloban City
- · Ospital ng Makati, Makati City
- · Childrens Hospital, Pasig City
- · Okada Manila, Paranaque City



Date	Position	Company
2019 - present	Associate Director	RBSanchez PME Consultants & Associates
1998 – 2019	Mechanical Director	Meinhardt Philippines, Inc.
1993 – 1998	Mechanical Head & Project Manager	PT Arnan Pratama Consultants
1989 – 1993	Mechanical Engineering Manager	RN Ferrer Associates,
1984 – 1986	Senior Mechanical Designer & Estimator	OV Roy Construction Inc.
1982 – 1983	Junior Mechanical Designer	Trans-Asia Philippines, Inc.
1981 – 1982	Junior Mechanical Estimator & Designer	Capitol Industrial Construction Group, Inc.

ASSOCIATE PARTNER DR. ENRICO C. NERA

UP Diliman B.S. in Metallurgical Engineering

ASEAN Engg., APEC Engr., MSMEP, MAusIMM,
Masters in SME, AFEO Honorary Fellow
PRC Regulatory Board Member, Board of Metallurgical Engineering
Past President and CEO, Atlas Consolidated Mining and Development Corp



July 2021 - current	Offshore Mining Operations Manager, RBSanchez PME Consultants Inc.
September 2015 February 2020 CEO	President and CEO, Atlas Consolidated Mining and Development Corp.
September 2014 February 2018	EVP-Operations & Chief Operating Officer Carmen Copper Corporation
July 2007 – Mar 2015	President and Chief Operating Officer Minercon International
November 2002 – June 2007	Professional Regulation Commission Board Member, Professional Regulatory Board of Metallurgical Engineering
1988–1993	Philex Mining Corp.Benguet, Philippines Sr. Metallurgist
1983–1988	Marcopper Mining Corp.Marinduque, Phil. Metallurgical Engineer

ASSOCIATE PARTNER HIlbert M. Cardenas ACP Met. E. (PMRC), MAUSIMM



Education

Master of Management, 2004-2005

B.S. Metallurgical Engineering, 1986-1991 University of the Philippines, Diliman Metallurgical Plant Practice: Metals Industry Research and Development Center

Second Placer in 1992 PRC Board Exam for Metallurgical Engineer with a rating of 88% And **Registered Metallurgical Engineer** In the Professional Regulation Commission

Experience. Twenty (20) years of experience in Minging and Plant **metallurgy in major corporations, Consultancy** and **Operations management** inclusive of **15 years in senior roles**, Five (5) of which in **senior EXPATRIATE** roles in Vietnam and Tanzania.

Awards:

Outstanding Professional of the Year Award in the Field Of Metallurgical Engineering – PRC 2021
Professional Degree Award in Metallurgical Engineering – UP Alumni Engineers. 2021
Distinction Awardee in Metallurgical Engineering, Philippine Federation of Professional Associations Awards, 2022
DO-IT Award for Sustainability – OceanaGold Philippines Inc. 2017

ASSOCIATE ENGINEER

JOSE FRANCISCO R. SANCHEZ Mining Engineer / Specialist

Apex Mining Company, Incorporated, Mining Consultant - 2021

EHMC Consulting, Inc., Principal Geotechnical Engineer - 2019

Besra Gold Inc., Vietnam, Consultant and Project Manager – 2016

Besra Gold Inc., Malaysia, Senior Geotechnical Engineer - 2012 to 2014

Golder Associates, Australia, Senior Geotechnical Engineer - 2012

Olympus Pacific Minerals Inc., Malaysia, Environment Manager – 2010-2012

Kinbauri Gold Espana S.L., Spain, Chief Mining Engineer – 2008-2009

RRMI Lafayette Mining Ltd, Rapu-Rapu Mine, Mine Geotechnical Engineer – 2005

Lepanto Consolidated Mining Co., Senior Mining, Geotechnical Engineer - 1999-2005.

Philex Mining Corporation and Philex Gold Philippines Inc., Sibutad Project, Mining Engineer - 1996-1999

EDUCATION

- Board Topnotcher, 1st PLACER in the 1996 Mining Engineering Licensure Examination
- M.S. Civil Engineering, major in Geotechnical Engineering, Mapua Institute of Technology. 2014-2015
- B.S. Mining Engineering. Mapua Institute of Technology. 1996.



ASSOCIATE ENGINEER

RAFAEL M. SANCHEZ BSCE Masters in Science Structural Engineering, Civil Engg. and CPEng Onshore/Offshore

MSc Oil and Gas Structural Engineering, University of Aberdeen, Scotland, 2013

B.S., Civil Engineering, University of the Philippines, 2003

SPECIAL AWARDS

2005 - 2008

14th Place
Top Performer of the Month
With commendation award
Spotlight Award

Out of over 6000 examiners in the National CE board exam MPP Project – Worleyparsons
MSc in oil and gas structural Engineering
DOW/PIC Olefins II Kuwait Project - Fluor

November 2003 February 2016 September 2013 November 2006





2017 – 2020	Director / Senior Engineer – RMS Offshore Engineering Pty Ltd, Melbourne, Australia
2014 - 2017	Principal Civil and Structural Engineer - WorleyParsons, Al Khobar, Saudi Arabia
2008 - 2014	Civil and Structural Engineer – Woodgroup PSN, Melbourne, Australia

Civil and Structural Engineer – Fluor Corporation, Alabang,

RBSanchez PME Consultants & Associates, Inc.

Philippines



ENGINEERS & STAFF

DIRECTOR of ENGINEERING Nick Johnsonn B. Fernandez, BSME President Ramon Magsaysay State University

PRC Mechanical Board Exams 2018
Possible "12th PLACE", Board Licensure Score of 92%.



A WELL-ROUNDED Engineer who combines both theory and practical experience.

Excellent in complex math, programming in using CFD tools such as Open Foam, RHINO, Arduino, Grasshopper, BREAM, IESVE and LEED design, etc. down to ISO Cleanroom Class 100 and design of Server Farms, and final multi-discipline projects complete with testing and CX works, turover, maintenance and operations.

Expert in the use of test equipment and measurements to confirm CFD models for thermodynamics, hydrodynamics, environmental and CFD projects in IT SERVER airflows, heat island effects in cleanrooms in semiconductors, water treatment and chemical and sludge and viscuous slurries and mine processing plants.

ENGINEERING ASSOCIATE JOEY MICHAEL PEÑA PORTE PME (PROFESSIONAL MECHANICAL ENGINEER)



PRC Mechanical Board Exams 1996

Sixth (6th Placer) in the PRC Mechanical Engineer Board Licensure Examination

University of Nueva Caceres 1990-1995 Naga City, Philippines

WORK EXPERIENCE:

Mechanical Engineer - (HVAC, Plumbing , Drainage & Fire Fighting) Construction Development Company (CDC) / (2008-2017)

Doha, Qatar

2013 Ministry of Municipality in Urban Planning & Development Authority

Certified Mechanical Engineer - MM UPDA (Qatar)- Grade "A"

2021 U.S. Army Corps of Engineers (USACE)

Al Udied US Air Base - Qatar

Corps of Engineers and Naval Facility Engineering Command Training Course Construction Quality Management (CQM) - Certified Mechanical Engineer

MECHANICAL ENGINEER

ROBERTO F. MENDOZA JR., M.E.

DON MARIANO MARCOS MEMORIAL STATE UNIVERSITY – MLUC



San Fernando City, La Union Bachelor of Science in Mechanical Engineering 1983 - 1988

Mechanical Package Superintendent PT Saipem Indonesia LNG Tangguh Expansion -Train 3 March 14, 2021 – January 13, 2022

MECHANICAL ENGINEER

KYLE ADRIAN APONESTO, ME

Mapua University Bachelor of Science in Mechanical Engineering (2018-2022)



Board exam rating: 89.3

Skills: Autocad, Autodesk Fusion 360, Matlab

ADMIN MANAGER

ROSE R. SABIO

BACHELOR OF SCIENCE IN INFORMATION **TECHNOLOGY**

PHILIPPINE COLLEGE OF TECHNOLOGY(DAVAO CITY, 2012-2015)

COMPUTER HARDWARE SERVICING NC11 ASIAN BUSINESS INSTITUTE OF E-TECHNOLOGY (BACOLOD CITY, 2008-2009)

VIRTUAL ASSISTANT FOR 5 YEARS

*MANAGER OF EBAY STORES IN AUSTRALIA, U.S.A AND U.K ACCOUNTS (RESPONSIBLE TO TRAIN OTHER VA, SET-UP BUSINESS POLICIES, SEARCH PROFITABLE PRODUCTS, CUSTOMER SERVICES, HANDLE PAYPAL DISPUTES, AND DAILY SALES OF THE ACCOUNTS)

MCR Bles Foods Trading Co.

*ENCODER FOR 6 MONTHS

PHILIPPINE STATISTICS AUTHORITY

*OJT ENCODER FOR 3 MONTHS



ADMIN EXECUTIVE

Charo T. Tamayo

Administration Business Management (ABM) AMA Education System ABE International Business College Makati(2016-2019)



TECHNICAL ASSISTANT

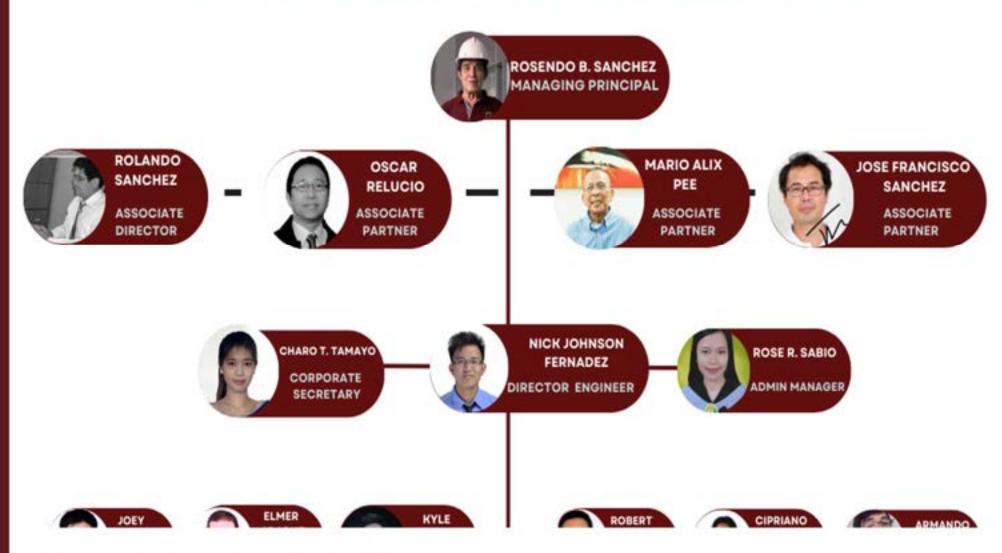
Cipriano T. Tamayo Jr.

Mechanical Field Technician Electrical-Acres Professional Institute Dagupan city (2009)

Experienced in Data gathering, logging and Instruments, IT, Electrical and Mechanical Field Technical Assistant



RBSANCHEZ PME CONSULTANTS & ASSOCIATES INC., PERSONNEL ORGANIZATIONAL CHART



RESOURCE/OFFICES:







With complete Personnel Support and resources for:

- AutoCad Drafting and Large format Plotting
- Complete Engineering softwares (with license): Elite Duct Size 3.0, PsychartHD 7.4, Flite FluidFlow Pipe and Duct Ver 3.0., ASHREA Fundamentals 2013, Trace 700 Cooling Load, CHVAC Heat Load, PipeSizer, Autocad Suite 2013, Cloud computing, and a lot more.
- 3. Dedicated FTP site for large file transfer

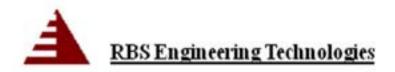


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RBSanchez PME Consultants & Associates, Inc.

GOVERNMENT LICENCES AND REGISTRATION PAPERS



BIR AND SSS REGISTRATION





Restrict to Prilophes SOCIAL SECURITY SYSTEM 2019 OCTOBER

CERTIFICATE OF REGISTRATION

This is to certify that

RBSANCHEZ PME CONSULTANTS

2210 LOBOT 28F CITYLAND PASONG TAND TOWER CHIND ROCES AVENUE, PIO DEL PILAR, CITY OF MAKATI, NCR 1230

has been duly registered with the Social Security System (SSS) as employer on 61 July 2010 with Employer Number 03-9248034-1-000.

Pursuant to the Social Security Law, the employer has the responsibility to report all its employees to the SSS for coverage, deduct from their monthly salaries their respective shares of the SS contributions and, with the corresponding employer's share, remit the same to the SSS. It also has the responsibility to deduct from the salaries of its employees, their monthly loan amortization, if any, and remit them to the SSS.

This certification is issued this 17th day of October, 2019.

AURORA C. IGNACIO President and CEO

2997 0204

SECURITIES AND EXCHANGE COMMISSION



PROFESSIONAL PRC PTR TAX & PME REGISTRATION

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BUSINESS PERMITS



SAMPLE TESTING AND MEASUREMENT PRECISION INSTRUMENTS









USE OF SUPERCOMPUTERS FOR "REALISTIC" PROBLEM-SOLVING SIMULATION OF DESIGN CONCEPTS AND OPERATIONAL PROBLEMS

THREE (3) SUPERCOMPUTER SERVERS units of Hewlett Packard Proliant Brand and HP DL-380 Servers each of 32-cores 3.0 MHz Intel Xeon Double Processors







SAMPLE CALIBRATION CERTIFICATES

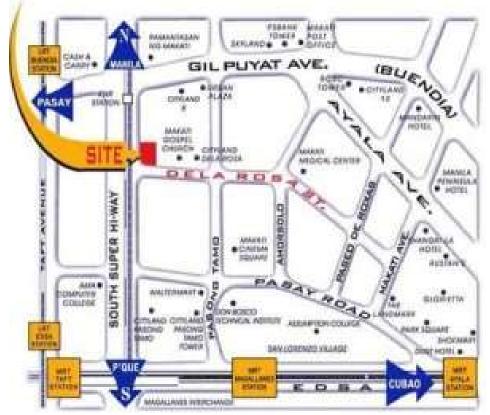




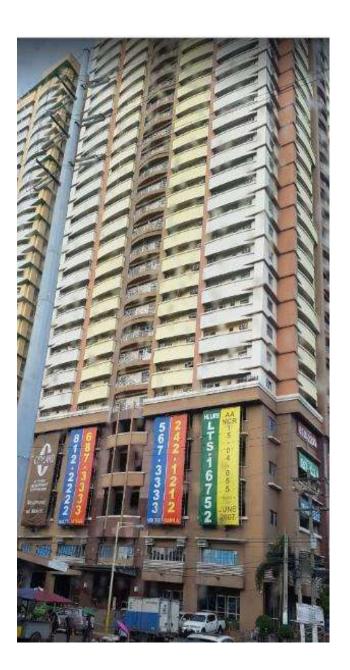
RBS Office Location

Unit 201, 2nd Floor Makati Executive Tower II, Buendia Ave. cor. Dela Rosa St. Brgy. Pio Del Pilar, Makati City Philippines Zip 1230

(in front of PNR Railway Buendia Station).



RBS has eight (8) private parking spaces at Cityland Complex CondoAlternatively, public may park just across the RBS offices is SM Hypermarket and also at nearby Cash and Carry Mall, Buendia Makati.



CONTACT US!

RBSanchez PME Consultants & Associates, Inc.



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(+63) 927-300-6000 / 947-507-000





www.rbs-engineers.com

Thank you!

RBSanchez PME Consultants & Associates, Inc.



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