

TECHNICAL ANALYSIS  
FOR THE DESIGN AND CONSTRUCTION  
OF THE MOH AND CENTRAL SERVICES  
INFRASTRUCTURE

Fritz Tjong Ayong, MSc. Arch.

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## Contents

1.INTRODUCTION.....	3
2.TECHNICAL ASSESSMENT OF EXISTING CONDITIONS .....	4
3.TECHNICAL JUSTIFICATION FOR THE PROJECT INTERVENTION .....	18
4. ARCHITECTURAL BRIEF .....	20
5. ARCHITECTURAL PROGRAMMING (SPACE REQUIREMENTS) .....	22
7. ANALYSIS OF POSSIBLE SCENARIOS .....	36
8.DESIGN CRITERIA.....	48
9. CLIMATE CHANGE CONSIDERATIONS .....	51
10. REQUEST FOR PROPOSALS (RfP) REQUIREMENTS AND DELIVERABLES. ....	51
ANNEX I: PICTURES .....	80
ANNEX III: Survey .....	88
ANNEX III: Ministry of Public Works Technical Report .....	90

## 1.INTRODUCTION

In July 2017, the Government of Suriname (GoS) requested the support of the Inter-American Development Bank (IDB) for the preparation and financing of a program to reduce the burden of communicable and non-communicable diseases (NCDs).

The Health Services Support Project (HSSP) operation (SU-L1054) seeks to contribute for the reduction of the burden of disease in Suriname by improving access to high quality and integrated primary care services, and by enhancing the effectiveness of the health sector while addressing priority epidemiological challenges.

As part of the support toward Suriname's health challenges, SU-L1054 has included a component for institutional strengthening for the Ministry of Health (MOH), aiming the improvement of the MOH's leadership and governance functions in: setting priorities; designing effective policies and interventions; and ensuring their efficient implementation toward the areas of prevention, management, and control of NCDs. This component includes the improvement of the administrative and central service facilities, by upgrading the existing MoH compound located in Rode Kruislaan, in Paramaribo.

This study, financed by the IDB through the technical cooperation (TC) Design and Implementation Support for Health Services Support Project (SU-T1100), collects all relevant information and technical analysis needed for the preparation of the Request for Proposals (RfP). This RfP will be used for the construction design of the Rode Kruislaan Compound, located in Rode Kruislaan and will be financed by the loan SU-L1054.

## 2. TECHNICAL ASSESSMENT OF EXISTING CONDITIONS

### 2.1 Ministry of Health



Figure 1: MOH facilities location

The MoH facilities are currently located in different buildings scattered throughout the city of Paramaribo. The facilities mainly consist of the MoH Headquarter, located at the historic center of Paramaribo, and the Bureau of Public Health (BOG) and other facilities, located in Rode Kruislaan, central area of Paramaribo. Some of the facilities (Pharmaceutical Inspections, for example) are located within other medical facilities, far from the main ones.

### 2.2 Headquarters



Figure 2: MOH Headquarters

The MoH HQ, located at the historic center of Paramaribo, consists of three historical buildings which are part of the List of Monuments of Suriname. The entirely wooden structures have serious maintenance problems and structural defeats, and it lacks anti-fire systems, accessibility measures, cooling system and technological infrastructure. The historic compound is comprised of two adjacent buildings, connected by a bridge on the first and third floors. The Pan-American Health Organization (PAHO) is located within the same compound. All the buildings are property of the Government of Suriname.





Figure 3: MOH Headquarters - exterior



Figure 4: MOH Headquarters - exterior



Figure 5: MOH Headquarters - Main meeting room



### 2.3 Rode Kruislaan Compound

The Rode Kruislaan Compound, located in the central area of Paramaribo, is comprised of two adjacent lots. The lots are property of the State, and currently occupied by different MoH institutions and services. In the image below, the first lot is about 1,1 hectares and the second one is about 1,4 ha, summing 2,5 ha of terrain to be used for either restoration of the existing buildings or construction of new ones. Additionally, lots 3 and 4 accommodate other health related institutions, including the Red Cross, the Central Blood Bank and the Central Laboratories.

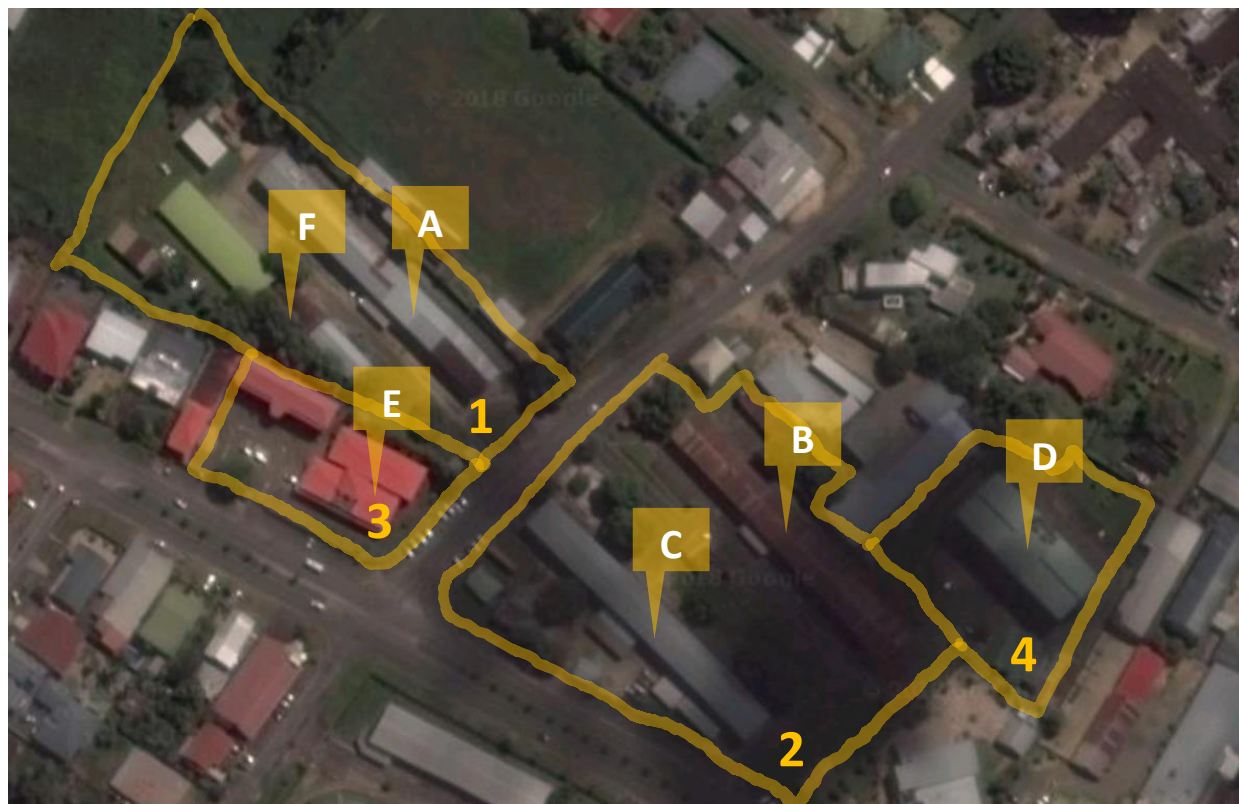


Figure 6: Rode Kruislaan Compound

The map shows the current situation of the Health compound, including:

**Building A:** Offices for the Bureau of Health

**Building B:** Vaccination services and storage

**Building C:** Sanitary Inspections, Family Health, and Medical Education Bureau

**Building D:** Central Laboratories

**Building E:** Red Cross and Central Blood Bank

**Building F:** Breastfeeding Center

### 2.4 General information

- A. **Legal issues:** Land is property of the GoS and no maps are included in the Management Institute for Land Registration and Land Information System (MI-GLIS).
- B. **Maps:** Public Works produced measurements from their own survey (attached to this report).
- C. **Construction Restrictions:** Zoning, design guidelines, and deed restrictions and requirements, does not applied.

- D. **Mobility considerations:** About 30 percent arrive with private transport (cars and motorbikes) and about 30 percent arrive by public transport.
- E. **Utilities:** Water, electricity and telephone are available on the site, since it is an existing building compound continuing in function, see also the technical report of the current situation.
- F. **Topography:** Flat land in an inhabited neighborhood.
- G. **Views:** N/A
- H. **Surroundings:** Military barracks, school buildings and private houses.
- I. **Climate:** Humid tropical climate, with dry and rainy seasons
- J. **Vegetation and wildlife:** Abundant vegetation with doves and other birds around. Bats and termites have infested one of the abandoned buildings.

## 2.5 Inspection of the Rode Kruislaan Compound.

**2.5.1 Inspection of the sites lot #1 and lot # 2**  
**Configuration of the site:** The two lots are located on opposite locations of the Rode Kruislaan street, property of the GoS and already occupied by MoH facilities. **Lot # 1:** The area, of about 1,1 Ha, is located on the west side of Rode Kruislaan Street. The ground is flat and there is one entrance from the Rode Kruislaan Street. The south side of the area borders with the Red Cross building and the Central Blood Bank. The north side borders with a soccer field. The lot does not present problems of flooding during heavy rains.

**Lot # 2:** The area, of about 2,5 Ha, is located on the east side of Rode Kruislaan Street. The lot lies on a cross section of two streets, the Gravenberch street on the south side and the Rode Kruislaan on the west side. The ground is lower than lot # 1, making the area more prone to heavy rain floods. During rainy season, the water does not flow easily, and the area tend to get flooded for a couple of hours. The problem is mainly caused by an underperforming/insufficient street drainage system.

**General Buildings description:** The main characteristics of buildings A, B and C are the following:

- **Structure:** Two story buildings with a concrete structure consisting of concrete columns, covered with asbestos (which will be removed), concrete beams and concrete floor slabs.
- **External walls:** made in cement blocks on both floors
- **Internal partitions:** mostly triplex with wooden frame
- **Ceiling:** triplex ceilings with wooden frame.
- **Roofs:** corrugated galvanized sheets on a construction of wooden trusses and rafters.

**Connection, mobility and parking:** The entries are not directly connected to each other and the buildings are to be reached through sandy car driveways. On lot # 1 the driveway forms a one-way turn, around the building A, with parking lots next to the building, connecting all the other buildings. On lot # 2 the drive way is around a not well-kept lawn, located between buildings B and C, with possibility to park next to the buildings. Besides that, secondary entrances are on the Gravenberch street which borders the compound on the southern side.



Figure 7: Entrance to lot #2

**Vegetation:** Both lots are vegetated by randomly planted brush wood flowers, mango trees and other species. The terrain and its vegetation are overall not well maintained.

**Pest infestation:** Parts of the existing buildings were partially emptied when their functions were transferred to another location. The abandoned parts of the buildings became an ideal environment for pests. Particularly, termites and bats found shelter under the abandoned roof and the mango trees within the Health compound became their nourishment.



Figure 8: Building B - termites infestation



Figure 9: Building B - bats infestation

**Material hazards:** The existing buildings might include asbestos within the construction. The asbestos is said to have been used for the roofing and columns.

**Drainage:** The area gets flooded when heavy rains occurs, approximately four times a year, because of an insufficient/not maintained drainage system. According to people interviewed during the visit, this is relatively a new phenomenon, probably due to the lack of maintenance or upgrade of the system.

**2.5.2 Inspection of the existing buildings (done by a Ministry of Public Works team, in April 2018)**<sup>1</sup>The inspection of the three main existing buildings (A, B and C) was limited to a visual observation, placing special attention to possible defects in the construction;<sup>2</sup> the technical conditions of the following components were observed:

- a. Facades and walls
- b. Ceilings and roofs
- c. Windows and doors
- d. Stairs
- e. Installations
- f. Overall impression of the construction
- g. Location of the buildings and quality of the site.

#### BUILDING A



ESTIMATED DIMENSION:	Ground floor: ±850 m²	Total area 1760 m²
	Second floor: ±910 m²	
FUNCTIONS:	Offices for the Bureau of Health	
DESCRIPTION:	The entire building is used for the offices of the Bureau of Health.	
EMPLOYEES:	100	
CONDITIONS:	Fair/poor, with no abandoned portions.	

<sup>1</sup> The full report (in Dutch) is attached to this document, in Annex II.

<sup>2</sup> In case the buildings will be renovated to be used again, an additional investigation of the construction will be necessary to judge the quality of the construction by testing the concrete construction on strength.

<b>USAGE:</b>	Generally underuse, with roughly 50-70% of available space used.		
<b>REMARKS:</b>	a. Outer walls, facades :	<ul style="list-style-type: none"> <li>• Construction in cement blocks</li> <li>• Paint peeling</li> <li>• No cracks in the walls</li> <li>• No sacking in the flooring</li> </ul>	
	b. Roofs and ceilings	<ul style="list-style-type: none"> <li>• Ceiling boards, rotten, pest infested</li> <li>• Rain pipes rusted</li> <li>• Galvanized roof rusted</li> <li>• Leaking roofs</li> </ul>	
	c. Windows and doors	<ul style="list-style-type: none"> <li>• Windows old and defective</li> <li>• Doors ok</li> </ul>	
	d. Stairs and banisters	<ul style="list-style-type: none"> <li>• Outside stair, concrete affected with concrete rot</li> <li>• Indoor stairs ok</li> </ul>	
	e. Electrical installations	<ul style="list-style-type: none"> <li>• Fuse boxes, most are obsoleted, some are new</li> <li>• Electric system, outdated</li> </ul>	
<b>SUB ANNEXES</b>	Old archive	±125 m <sup>2</sup>	NA
	Breast feeding programme	±95 m <sup>2</sup>	3 people
	Garage	±590 m <sup>2</sup>	8 people



## BUILDING B



ESTIMATED DIMENSION:	Ground floor: ±850 m <sup>2</sup>	Total area 1760 m <sup>2</sup>
	Second floor: ±910 m <sup>2</sup>	
FUNCTIONS:	Vaccines storage and services on the groundfloor.	
DESCRIPTION:	Aproximately half of the ground floor of this is building is used by the vaccination department, for patients’ treatments (malaria, yellow fever) and for central stockroom for vaccines, medicines and tools. The second floor is entirely abandoned and infested by pests. The collapsing roof poses a hazard on the subjacent vaccine center and the presence of pests and their escrementes challanges the accomplishment of basic hygiene. Certainly the vaccine area is underdimensioned, getting easily crowded, at the point that people need to sit outside before being called for the services.	
EMPLOYEES:	19	
CONDITIONS:	Ground floor (Vaccines storage and services) fair conditions.  First floor, abandoned, extreme bad conditions (infested with termites and bats, covered in bats excrement, roof is collapsing).	
USAGE:	75% of building (entire 1F and 50% GF): abandoned since 2008.	
REMARKS:	a. Outer walls, facades	<ul style="list-style-type: none"><li>• Construction in cement blocks</li><li>• Paint layer is peeling off</li><li>• No cracks in the walls</li><li>• No subsidence detected in the building</li></ul>
	b. Roofs and ceilings	<ul style="list-style-type: none"><li>• The ceiling panels are partly rotten, loose and must be demolished</li><li>• The drain pipes are rusted/rotten</li><li>• The zinc plates are rusted/rotten</li><li>• Leaking roofs</li></ul>

	c. Windows and doors	<ul style="list-style-type: none"> <li>• The window frames are outdated and affected</li> <li>• The interior doors are in good condition</li> </ul>	
	d. Stairs and balustrades	<ul style="list-style-type: none"> <li>• The outdoor stairs are in a bad condition, presenting signs of concrete rot</li> <li>• Indoor stairs are ok</li> </ul>	
	e. Electrical installations	<ul style="list-style-type: none"> <li>• Fuse boxes are mostly old and obsolete. Some switch and security cabinets are renewed/new.</li> <li>• Electric system and cabling is outdated.</li> </ul>	
<b>SUB ANNEXES</b>	Electric generators	N/A	N/A

## BUILDING C



ESTIMATED DIMENSION:	Ground floor: ±850 m <sup>2</sup>	Total area 1760 m <sup>2</sup>
	Second floor: ±910 m <sup>2</sup>	
FUNCTIONS:	Health Inspection Department, Medical Education Bureau, Family Health Program, School for Midwives, Medical Commission	
DESCRIPTION:	On the ground floor there is the Health Inspection Department (HID) and the Medical Education Bureau (MEB). About 120 people work in this facility, among which about 50% work in the field. On the second floor there are the Family Health division and the School for Midwives.	
EMPLOYEES:	120 on ground floor, 30 on second floor.	
CONDITIONS:	Fair, with no abandoned areas.	
USAGE:	Some areas, like the HID, seem overcrowded while others appear to be underused. For example, in the area designated for the MEB, no one was seen during the visits. Same for the rest of the building.	
REMARKS:	a. Outer walls, facades	<ul style="list-style-type: none"><li>• Construction in cement blocks</li><li>• Paint peeling</li><li>• No cracks in the walls</li><li>• No sacking in the flooring</li></ul>
	b. Roofs and ceilings	<ul style="list-style-type: none"><li>• Ceiling boards, rotten, pest infested</li><li>• Rain pipes rusted</li><li>• Galvanized roof rusted</li><li>• Leaking roofs</li></ul>
	c. Windows and doors	<ul style="list-style-type: none"><li>• Windows old and broken</li><li>• Doors are ok</li></ul>

	d. Stairs and banisters	<ul style="list-style-type: none"> <li>• Outside stair, concrete affected with rottenness,</li> <li>• Indoor stairs ok.</li> </ul>
	e. Electrical installations	<ul style="list-style-type: none"> <li>• Fuse boxes, most are obsoleted, some are new.</li> <li>• Electric system, outdated.</li> </ul>
<b>SUB ANNEXES</b>	N/A	

The following table resumes the findings for each component.

NO	COMPONENT	APPRECIATION	OBSERVATION
1	Brickwork	Reasonable	Local crumbling of the walls
1a	Cracking	Good	No cracks have been detected
2	Outside frames (wood)	Very bad	Wood rot attack. Must be replaced
3	Outside windows (dome windows)		
4	Exterior doors (wood)	Reasonable	Must be painted
5	Interior doors (wood)	Reasonable	Must be painted
6	Interior door frames	Reasonable	Must be painted.
7	Hinges and locks	Reasonable	
8	Plaster work	Very bad	Plaster work crumbles locally
9	Painting	Bad	Peeling off the facades
10	Floor	Reasonable	No subsidence
11	Walls	Reasonable	No cracks have been detected
12	Roof gutter	Bad	Must be replaced.
13	Ceiling	Bad	Must be completely replaced.
14	Roof	Bad	Leaks in almost all rooms
15	Group Cabinet	Bad	Obsolete / unsafe
16	Wiring	Bad	Deprecated
17	Terrain disposal	Reasonable	Deprecated
18	Kick	Good	No

Additionally, the Ministry of Public Works (MoPW) have analyzed all the main building components to roughly predict and estimate the kind of works that each building require to function properly. The analysis is done according to the following scores:

<b>SCORE (%) :</b>	<b>QUALITY :</b>	<b>DESCRIPTION</b>	<b>DIAGNOSIS</b>
100-81	Excellent	The element is in good condition.	No renovation
81-74	Good	The element shows no defects and/or aging appearance.	No renovation, only painting
73-70	Reasonable	The aging process of the element has started. Occasional malfunction can occur.	Small renovation (±US\$60/m <sup>2</sup> )
69-60	Moderate	The aging process clearly has the element in its grip. Malfunctions occur locally and/or have already occurred.	Small renovation (±US\$150/m <sup>2</sup> )
59-51	Bad	The function fulfillment of the element is no longer guaranteed. The end of the technical life has almost been reached. Serious defects occur regularly.	Major renovation (±US\$240/m <sup>2</sup> )
50-0	Very Bad	The function fulfillment of the element is no longer guaranteed. The end of the technical life has been reached.	Major renovation, with partial replacement (±US\$360-510/m <sup>2</sup> )

<b>BUILDING A</b>		
<b>Subject :</b>	<b>Description</b>	<b>Score (%)</b>
Decoration	Paint, steps, rainwater drainage, gutters and pipes	50
Finishing	Walls, facades, windows, doors, floors, construction details.	45
Structure	Roof-bearing, floor construction.	45
Installation	Electricity, water, sewerage.	60
<b>Average</b>		<b>52.5</b>
<b>Comments</b>	Conditions varies from moderate to very bad. The building is in average in bad condition and would require a major renovation.	

BUILDING B		
Subject :	Description	Score (%)
Decoration	Paint, steps, rainwater drainage, gutters and pipes	40
Finishing	Walls, facades, windows, doors, floors, construction details.	50
Structure	Roof-bearing, floor construction.	40
Installation	Electricity, water, sewerage.	50
<b>Average</b>		<b>45</b>
<b>Comments</b>	Conditions varies from bad to very bad. The building is in average in bad condition and would require a major renovation with partial replacements.	

BUILDING C		
Subject :	Description	Score (%)
Decoration	Paint, steps, rainwater drainage, gutters and pipes	50
Finishing	Walls, facades, windows, doors, floors, construction details.	40
Structure	Roof-bearing, floor construction.	50
Installation	Electricity, water, sewerage.	60
<b>Average</b>		<b>52.5</b>
<b>Comments</b>	Conditions varies from moderate to very bad. The building is in average in bad condition and would require a major renovation.	
OLD ARCHIVE AND BREASTFEEDING CENTER		
<b>Comments</b>	Conditions are very bad. It is suggested to demolish them completely.	
GARAGE		
<b>Comments</b>	Conditions are overall good.	



RESUME	
Overall rating:	Moderate /bad
Conclusion:	<ul style="list-style-type: none"> <li>- The buildings show no cracks in the walls and no subsidence in the floors. It is still in good condition.</li> <li>- The ceilings have many leaks. The entire hood and the ceiling must be changed.</li> <li>- It is necessary to repaint.</li> <li>- There are wood lice in the building.</li> <li>- Unhealthy and unsanitary environment for staff.</li> </ul>
Recommendation:	Have a thorough investigation of all defects in order to prepare a correct approach for renovation / restoration.
Advise :	Appoint a reputable agency for preparation / execution in consultation with the MoPW.

### 3. TECHNICAL JUSTIFICATION FOR THE PROJECT INTERVENTION

Chapter 2, Annex I and Annex II describe the current situation of the MoH infrastructure, showing a serious status of decay, outdated structure and systems for all the buildings that houses the offices and central services operated and managed directly by the MoH.

The HQ, an entirely wooden structure, presents serious maintenance problems, structural defeats, lacks anti-fire systems and accessibility measures, as well as cooling system and technological infrastructure. The Rode Kruislaan buildings, housing MoH offices and central facilities, present conditions that vary from abandoned and infested by pests to fair condition, with none of them being in good condition. Current MOH facilities do not offer the conditions for the MOH staff to perform core functions in a healthy, safe and accessible environment. Basic salubrity and safety requirements are not met within the current settings. For example, the vaccination center is located within a building that is mostly abandoned. The roof overlying the center is collapsing and the building is infested by bats and termites, representing a threat for the health and safety of patients and workers.

Additionally, the distance between offices and central services results in potential lack of communication and inefficiencies in management. The time spent by employees going from building to building could be reduced since it generates a waste of resources at a times.

A survey undertaken among employees in May 2018,<sup>3</sup> showed that the infrastructure is considered, on average, bad in all aspects<sup>4</sup> and employees spend, on average, one hour a week moving between the facilities to attend meetings, spending almost 7 hours a week in meetings out of their building.

The infrastructure needs an upgrade and improvement in order for the MoH to perform in a healthy, safe, free from hazards and accessible environment.

**The importance of co-location and indoor environment on productivity.** Several studies show that physical proximity facilitates multi-sector work by improving communication, information exchange and team-building, fostering a collaborative working culture<sup>5</sup> and resulting in greater efficiency, effectiveness in decision making and higher productivity<sup>6</sup>. Additionally, indoor environment—including noise, lighting, temperature, existence of windows and others<sup>7</sup> - in an office has a great influence on employees' attitudes, behaviors, satisfaction and works performance<sup>8</sup>. Andrian Laeman stated that "people who are unhappy with temperature, water quality, lighting and noise conditions in their offices are more likely to say that this affects their concentration at work"<sup>9</sup>. Because of the very hot and wet tropical climate characterizing Suriname, one of the most incident factors is building

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<sup>3</sup> Annex III.

<sup>4</sup> The aspects included in the survey were: Natural light, artificial light, temperature, space (m<sup>2</sup>), furniture, art and decoration-plants, meeting rooms, dining room, sanitary services, recreation and leisure areas, accessibility to enter the building, accessibility to move around the building, equipment (computers, printers, etc.), parking, safety from fire. The average ratings resulted in 2.6 out of 5, being 2 = bad.

<sup>5</sup> Multi-Agency Working and Information Sharing Project 2013; The Effects of R&D Team Co-location on Communication Patterns among R&D, Marketing, and Manufacturing. Van den Bulte, Christophe, Moenart, Rudy K. Management Science. Nov98 Part 2 of 2, Vol. 44 Issue 11, pS1-S18. 18p. 3.

<sup>6</sup> Zenun M.M.N., Loureiro G., Araujo C.S. (2007) *The Effects of Teams' Co-location on Project Performance*. In: Loureiro G., Curran R. (eds) *Complex Systems Concurrent Engineering*. Springer, London.

<sup>7</sup> Kamarulzaman et al. (2011). *An Overview of the Influence of Physical Office Environments Towards Employee*. Procedia Engineering Volume 20, 2011, Pages 262-268

<sup>8</sup> Crouch, A., & Nimran, U. (1989). Perceived facilitators and inhibitors of work performance in an office environment. *Environment and Behavior*, 21, 206–226

<sup>9</sup> Adrian Leaman, (1995) "Dissatisfaction and office productivity", *Facilities*, Vol. 13 Iss: 2, pp.13 - 19

thermal control. Numerous studies have shown that especially indoor climate impacts both health and performance, which in turn affect productivity. Among them, Lorsch and Abdou (1994), "shows that when the air-conditioning system was introduced, employees feel that their work space becomes more comfortable and the productivity tends to increase by 5-15 percent because they can concentrate on their work<sup>10</sup>. Literature review indicate that productivity decreases by 2% per each degree over 25°C and presented the link between a decrement in productivity and high indoor temperature<sup>11</sup>.

Therefore, the MoH is willing to move its HQ to the Rode Kruislaan compound, accommodating all its offices and the central facilities in one site.

The Rode Kruislaan compound lays on approximately 2,5 Ha, divided over two lots located on the opposite sides of the Rode Kruislaan Street. Adjacent to these lots, there are also other health related facilities, such as the Central Laboratory, built in 2008, the Red Cross and the Central Blood Bank.

The land, property of the GoS, is suitable for being the main MoH center, and would allow to either reuse the existing infrastructure, or to build new pavilions.

The following chapters will analyze the needs of the MoH and will discuss the possible interventions for the Rode Kruislaan compound.

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<sup>10</sup> Vischer & Jacqueline (1989), — Environmental quality in office. Van nostrand neinholt. New York

<sup>11</sup> Niemelä et al. (2001) reported a decrement in productivity of call center workers corresponding to 1.8% per °C when the temperature was above 25 °C. In a second experiment performed in the same call center, Niemelä et al. (2002) reported a productivity decrease of 2.2% per °C when the temperature increased above 25 °C. Federspiel et al. (2002) measured the productivity of call center workers in the US. They found no significant relationship of temperature to productivity in the comfort zone but reported a 15% decrease in work speed as the temperature increased from 24.8 to 26 °C. Link and Pepler (1970) measured productivity in an apparel factory. They found a reduction of 8% in productivity in sewing work as the temperature increased from 23.9 to 32.2 °C.

## 4. ARCHITECTURAL BRIEF

The MoH is willing to move its HQ to the Rode Kruislaan compound, accommodating all its offices and the central facilities in one site, which mainly include:

### **Offices**

- Office of the Minister
- Directorate of health policy and PH programs
- Directorate of health inspections
- Pan-American Health Organization (PAHO)

### **Services**

- Medical Education Bureau
- Communicable Diseases - Bureau of Lung Diseases
- PH Medical Services - Special Vaccination Center
- PH Medical Services - Parasitic Infections and suspected rushes

### **Other functions open to public**

- Library
- Insectary (small museum with insects exposition)

### **Other functions for employees**

- Gym for employees
- Kids room and playground for employees' children
- Outdoor sport facilities for employees and external users (running ring, outdoor gym equipment)

The MoH has expressed the following needs for the design:

- The character of the buildings must mainly be an open space office, with exception of a limited amount of closed cabinets and rooms for special activities, such as the minister room, meeting rooms, library etc.
- The design needs to allow natural light and avoid narrow corridors.
- The building design will enhance the interactions of the occupants in a positive way, as the surroundings will be more appealing than the current ones.
- Every building should have its specific character, within the similarity to the other buildings of the compound.
- The aesthetic and psychological impact of the design must be better than the current set up, having a modern appearance and look.
- Special attention must be paid to flexibility, allowing possible changes in the future.

- The interior partitions must be transparent; therefore, glass will be used as much as possible.
- There must be sufficient entrances, stairs, public spaces, washrooms, kitchenettes, which will divide the open offices into smaller sections.
- The PAHO office will also be part of this building, but with a separate entrance and independent of the MoH's accommodations.
- The vaccination, the sanitary inspection, the medical education center, the family health and the midwifery (obstetrics, breastfeeding) are places where people from the outside come to be treated. Special attention is required to guide them, so there is no disturbance of other activities, maybe a special entrance for each. These activities should be apart from the normal offices functions.

Additionally, the MoH has expressed the following needs for the construction phase:

- As the compound is already used, construction works must take without interfering with the normal development of activities. It will be important to carefully plan the construction phases, in order to mitigate all possible inconveniences that the construction works might bring along.

The MoH has provided the following information:

- Organigram and list of people currently working in the facilities.
- Guided site visits to assess existing conditions and define needs.
- Verbal explanation of the organigram structure and specific functions.

## 5. ARCHITECTURAL PROGRAMMING (SPACE REQUIREMENTS)

The architectural programming is the research and decision-making process that identifies the scope of work to be designed and translate it into space requirements. It represents the first step before starting to design a building, since it helps defining all the activities and functions that the building needs to include, order, and dimension.

The dimensions of spaces have been based on a 120 x 120cm (4 x 8 ft) grid, which will be helpful to organize and order the layout.

The following base measures will be used for the needed spaces:

- The open space unit (smallest individual working space) was fixed at  $2.40 \times 2.40 = 5.76\text{m}^2$
- The smallest enclosed space is  $2.40 \times 3.60 = 8.64\text{ m}^2$
- The junior enclosed space is  $3.60 \times 3.60 = 12.96\text{ m}^2$
- The senior staff enclosed space is  $3.60 \times 4.80 = 17.28\text{ m}^2$  (or shared office for two people)
- The director's office room is  $4.80 \times 6.00 = 28.8\text{ m}^2$  (or shared office for three people)
- The Ministers office  $4.80 \times 7.20 = 34.56\text{ m}^2$
- Meeting room 8 persons =  $17.28\text{ m}^2$
- Meeting room 16 people =  $28.8\text{ m}^2$

The following table shows the resume of the architectural program, by main areas.

No.	SPACES	TOTAL AREA (M <sup>2</sup> )
<b>1</b>	<b>MINISTRY OF HEALTH - OFFICES</b>	
1.1	OFFICE OF THE MINISTER	264.00
1.2	OFFICE OF THE DIRECTOR OF HEALTH POLICY AND PH PROGRAMS	258.00
1.3	DIRECTORATE OF HEALTH POLICY AND PH PROGRAMS	1440.00
1.4	OFFICE OF THE DIRECTOR OF HEALTH INSPECTIONS	72.00
1.5	DIRECTORATE OF HEALTH INSPECTIONS	678.00
1.6	OTHER SPACES	342.00
1.7	SERVICE SPACES	246.00
1.8	OPERATION AND MAINTENANCE	420.00
1.9	CANTEEN	138.00
	Subtotal	3858.00
	Walls and circulation 10%	385.8
	Total	4243.80



<b>2</b>	<b>PAHO</b>	
<b>2.1</b>	<b>OFFICES</b>	<b>288.00</b>
	Subtotal	288.00
	Walls and circulation 10%	28.8
	Total	316.80
<b>3</b>	<b>MINISTRY OF HEALTH - BUREAU OF PUBLIC HEALTH - SERVICES TO POPULATION</b>	
<b>3.1</b>	Medical Education Bureau	540.00
<b>3.2</b>	Communicable Diseases - Bureau of Lung Diseases	186.00
<b>3.3</b>	PH Medical Services - Special Vaccination Center	108.00
<b>3.3</b>	PH Medical Services - Parasitic Infections and suspected rushes	84.00
	Subtotal	918.00
	Walls and circulation 10%	91.8
	Total	1009.80
<b>4</b>	<b>MINISTRY OF HEALTH - STOCKROOMS</b>	
<b>4.1</b>	OFFICE SUPPLY STORAGE	90.00
<b>4.2</b>	ENVIRONMENTAL STORAGE SUPPLY	138.00
<b>4.3</b>	OFFICE SUPPLY STORAGE	144.00
	Subtotal	372.00
	Walls and circulation 10%	37.2
	Total	409.20
<b>Total</b>		<b>5979.60</b>

The following table includes a detailed list of spaces and measures.

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M²)	TOTAL AREA (M²)	
1	MINISTRY OF HEALTH - OFFICES					
1.1	OFFICE OF THE MINISTER					
	Office of the Minister	1	1	35.00	35.00	private office
	Minister's meeting room (16 people)	-	1	35.00	35.00	meeting room
	Minister's dressing room and bathroom	-	1	10.00	10.00	service
	Office of the Minister's Personal Secretary	1	1	10.00	10.00	private office
	Office of the Policy Advisors' coordinator	1	1	10.00	10.00	private office
	Office of the Policy Advisors	4	4	5.00	20.00	open space
	Internal Control personnel	6	6	5.00	30.00	open space
	Secretariat	3	3	5.00	15.00	open space
	Public Relations	2	2	5.00	10.00	open space
	Meeting room (8 people)	-	1	15.00	15.00	meeting room
	Waiting room	-	1	10.00	10.00	waiting room
	Kitchenette	-	1	5.00	5.00	service
	Archive	-	1	5.00	5.00	service
	Future open space positions	2	2	5.00	10.00	open space
	Subtotal				220.00	
	Walls and circulation 20%				44.00	
	Total	20			264.00	
1.2	OFFICE OF THE DIRECTOR OF HEALTH POLICY AND PH PROGRAMS					
	Office of the Director	1	1	25.00	25.00	private office
	Director's dressing room and bathroom	-	1	5.00	5.00	service
	Secretariat	3	3	5.00	15.00	open space

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Legal Affairs coordinator	1	1	5.00	5.00	open space
	Legal Affairs personnel	5	5	5.00	25.00	open space
	Information, Communication and Technology - Coordinator	1	1	5.00	5.00	open space
	Information, Communication and Technology - Personnel	4	4	5.00	20.00	open space
	Executive Bureau of NAR	4	4	5.00	20.00	open space
	Pharmaceutical registration	3	3	5.00	15.00	open space
	Medical Screening	2	2	5.00	10.00	open space
	Meeting room (8 people)	-	1	15.00	15.00	meeting room
	Archive	-	1	5.00	5.00	service
	Future open space positions	3	3	5.00	15.00	open space
	Meeting room (16 people)	-	1	35.00	35.00	meeting room
	<b>Subtotal</b>				<b>215.00</b>	
	<b>Walls and circulation 20%</b>				<b>43.00</b>	
	<b>Total</b>	<b>27</b>			<b>258.00</b>	
<b>1.3</b>	<b>DIRECTORATE OF HEALTH POLICY AND PH PROGRAMS</b>					
	Office of the Deputy Director - Policy Planning	1	1	15.00	15.00	private office
	Secretariat of the Deputy Director - Policy Planning	3	3	5.00	15.00	open space
	Research, Planning and Monitoring - Coordinator	1	1	5.00	5.00	open space
	Research, Planning and Monitoring - Personnel	12	12	5.00	60.00	open space
	Office of HR for Health Planning - Coordinator	1	1	5.00	5.00	open space
	HR for Health Planning - Personnel	10	10	5.00	50.00	open space

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Office of International Relations - Coordinator	1	1	5.00	5.00	open space
	International Relations - Personnel	7	7	5.00	35.00	open space
	Office of Health, Communication and Information - Coordinator	1	1	5.00	5.00	open space
	Health, Communication and Information - Personnel	8	8	5.00	40.00	open space
	Meeting room (8 people)	-	1	15.00	15.00	meeting room
	Record studio for the Health, Communication and Information (Studio, Audio and Record)	-	3	15.00	45.00	room
	Archive	-	1	10.00	10.00	service
	Future open space positions	4	4	5.00	20.00	open space
	Office of the Deputy Director - Administrative services	1	1	15.00	15.00	private office
	Secretariat of the Deputy Director - Administrative services	2	1	5.00	5.00	open space
	General Affairs - Coordinator	1	1	5.00	5.00	open space
	General Affairs - Personnel	2	2	5.00	10.00	open space
	Logistics - Coordinator and personnel	0	0	5.00	0.00	
	Facility Management - Coordinator	0	0	5.00	0.00	
	Facility Management - Personnel	0	0	5.00	0.00	
	Security - Coordinator	0	0	5.00	0.00	
	HRM - Coordinator	1	1	5.00	5.00	open space
	HRM - Personnel	2	2	5.00	10.00	open space
	Personal Affairs (Salary administration, personal administration, training and capacity)	19	19	5.00	95.00	open space
	Personal Care - Personnel	2	2	5.00	10.00	open space
	Documentation and Information - Coordinator	1	1	5.00	5.00	open space

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Documentation and Information - Personnel	8	8	5.00	40.00	open space
	Meeting room (8 people)	-	1	15.00	15.00	meeting room
	Archive	-	1	10.00	10.00	service
	Future open space positions	5	5	5.00	25.00	open space
	Office of the Deputy Director - Finance and Procurement	1	1	15.00	15.00	private office
	Secretariat of the Deputy Director - Administrative services	2	2	5.00	10.00	open space
	Budgeting and Procurement - Coordinator	1	1	5.00	5.00	open space
	Budgeting and Procurement - Personnel	19	19	5.00	95.00	open space
	Financing, Monitoring and Evaluation - Coordinator	1	1	5.00	5.00	open space
	Financing, Monitoring and Evaluation - Personnel	6	6	5.00	30.00	open space
	Meeting room (8 people)	-	1	15.00	15.00	meeting room
	Archive	-	1	10.00	10.00	service
	Future open space positions	3	3	5.00	15.00	open space
	Office of the Deputy Director - Bureau of Health	1	1	15.00	15.00	private office
	Secretariat of the Bureau of Health	4	4	5.00	20.00	open space
	Program Development - Coordinator	1	1	5.00	5.00	open space
	Public Health Evaluation - Coordinator	1	1	5.00	5.00	open space
	Non-communicable Diseases - Personnel	11	11	5.00	55.00	open space
	Communicable Diseases - Personnel	21	21	5.00	105.00	open space

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Family and Community Health - Personnel	11	11	5.00	55.00	open space
	Epidemiology	19	19	5.00	95.00	open space
	Meeting room (16 people)	-	1	35.00	35.00	meeting room
	Archive	-	1	10.00	10.00	service
	Future open space positions	5	5	5.00	25.00	open space
	<b>Subtotal</b>				<b>1200.00</b>	
	<b>Walls and circulation 20%</b>				<b>240.00</b>	
	<b>Total</b>	<b>200</b>			<b>1440.00</b>	
<b>1.4</b>	<b>OFFICE OF THE DIRECTOR OF HEALTH INSPECTIONS</b>					
	Office of the Director	1	1	25.00	25.00	private office
	Director's dressing room and bathroom	-	1	5.00	5.00	service
	Secretariat	3	3	5.00	15.00	open space
	Meeting room (4 people)	-	1	10.00	10.00	meeting room
	Future open space positions	1	1	5.00	5.00	open space
	<b>Subtotal</b>				<b>60.00</b>	
	<b>Walls and circulation 20%</b>				<b>12.00</b>	
	<b>Total</b>	<b>5</b>			<b>72.00</b>	
<b>1.5</b>	<b>DIRECTORATE OF HEALTH INSPECTIONS</b>					
	Office of the Deputy Director - Inspection Public Health	1	1	15.00	15.00	private office
	Secretariat of the Deputy Director - Inspection Public Health	2	2	5.00	10.00	open space
	Pharmaceutical Inspectors	7	7	5.00	35.00	open space
	Food and consumables Inspectors	11	11	5.00	55.00	open space
	Environmental Inspectors	100	20	5.00	100.00	open space
	Meeting room (8 people)	-	1	15.00	15.00	meeting room

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Reception and waiting room	-	1	15.00	15.00	waiting room
	Archive	-	1	10.00	10.00	service
	Future open space positions	4	4	5.00	20.00	open space
	Office of the Deputy Director - Inspection Personal Health	1	1	15.00	15.00	private office
	Secretariat of the Deputy Director - Inspection Personal Health	2	2	5.00	10.00	open space
	Medical Inspectors	7	7	5.00	35.00	open space
	Nursing Inspectors	16	16	5.00	80.00	open space
	Obstetrics Inspectors	11	11	5.00	55.00	open space
	Laboratories Inspectors	7	7	5.00	35.00	open space
	Inspectors waiting room (Food and Nursing)	-	1	15.00	15.00	waiting room
	Meeting room (8 people)	-	1	15.00	15.00	meeting room
	Archive	-	1	10.00	10.00	service
	Future open space positions	4	4	5.00	20.00	open space
	<b>Subtotal</b>				<b>565.00</b>	
	<b>Walls and circulation 20%</b>				<b>113.00</b>	
	<b>Total</b>	<b>173</b>			<b>678.00</b>	
<b>1.6</b>	<b>OTHER SPACES</b>					
`	Hall and Reception	-	1	50.00	50.00	waiting room
	Kids Room (for employee's children)	-	1	30.00	30.00	meeting room
	Training rooms (large)	30	3	35.00	105.00	meeting room
	Indoor Gym	-	1	50.00	50.00	meeting room
	Gym Changing rooms and bathrooms - Male and Female	-	2	10.00	20.00	service
	Public Bathrooms - Male and Female	-	6	5.00	30.00	service

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	<i>Subtotal</i>				<b>285.00</b>	
	<i>Walls and circulation 20%</i>				<b>57.00</b>	
	<b>Total</b>	<b>660</b>			<b>342.00</b>	
<b>1.7</b>	<b>SERVICE SPACES (TO BE LOCATED IN EVERY FLOOR OF EVERY BUILDING)</b>					
	Kitchenette	-	6	10.00	60.00	service
	Public Bathrooms - Male and Female	-	10	5.00	50.00	service
	Cleaning Storage	-	6	5.00	30.00	service
	Photocopies room	-	6	5.00	30.00	service
	Additional storage	-	6	5.00	30.00	service
	Floor electrical room	-	1	5.00	5.00	service
	<i>Subtotal</i>				<b>205.00</b>	
	<i>Walls and circulation 20%</i>				<b>41.00</b>	
	<b>Total</b>	<b>0</b>			<b>246.00</b>	
<b>1.8</b>	<b>OPERATION AND MAINTENANCE</b>					
	Logistics - Coordinator and personnel	15	15	5.00	75.00	open space
	Facility Management - Coordinator	1	1	5.00	5.00	open space
	Facility Management - Personnel	19	19	5.00	95.00	open space
	Security - Coordinator	1	1	5.00	5.00	open space
	Data center	-	1	30.00	30.00	service
	Changing rooms for facility management personnel and cleaning (Female and Male)	-	4	15.00	60.00	service
	Maintenance workshop	-	1	10.00	10.00	service
	Deposit	-	1	10.00	10.00	service
	Main electrical room	-	1	15.00	15.00	service
	HVAC room	-	1	30.00	30.00	service



No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Solid waste deposit	-	1	10.00	10.00	service
	Cleaning Storage	-	1	5.00	5.00	service
	<b>Subtotal</b>				<b>350.00</b>	
	<b>Walls and circulation 20%</b>				<b>70.00</b>	
	<b>Total</b>	<b>0</b>			<b>420.00</b>	
<b>1.9</b>	<b>CANTEEN</b>					
	Kitchen	-	1	20.00	20.00	service
	Food storage	-	1	10.00	10.00	service
	Food display	-	1	10.00	10.00	service
	Lunch room	-	1	50.00	50.00	meeting room
	Cleaning Storage	-	1	5.00	5.00	service
	Bathroom	-	2	10.00	20.00	service
	<b>Subtotal</b>				<b>115.00</b>	
	<b>Walls and circulation 20%</b>				<b>23.00</b>	
	<b>Total</b>	<b>0</b>			<b>138.00</b>	
<b>2</b>	<b>PAHO</b>					
<b>2.1</b>	<b>OFFICES</b>					
	Office of the Representative	1	1	25.00	25.00	private office
	Representative's dressing room and bathroom	-	1	5.00	5.00	service
	Representative's Personal Secretary	1	1	5.00	5.00	open space
	Administrator	1	1	5.00	5.00	open space
	Finance	4	4	5.00	20.00	open space
	Administrative Staff	2	2	5.00	10.00	open space
	Other Staff	12	12	5.00	60.00	open space
	Meeting room (16 people)	-	1	35.00	35.00	meeting room

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Waiting room	-	1	10.00	10.00	waiting room
	Kitchen	-	1	10.00	10.00	service
	Lunch room	-	1	10.00	10.00	service
	Copy room	-	2	5.00	10.00	service
	Storage	-	3	5.00	15.00	service
	Public Bathrooms - Male and Female	-	2	5.00	10.00	service
	Future open space positions	2	2	5.00	10.00	open space
	<b>Subtotal</b>				<b>240.00</b>	
	<b>Walls and circulation 20%</b>				<b>48.00</b>	
	<b>Total</b>	<b>23</b>			<b>288.00</b>	
<b>3</b>	<b>MINISTRY OF HEALTH - BUREAU OF PUBLIC HEALTH - SERVICES TO POPULATION</b>					
<b>3.1</b>	<b>Medical Education Bureau</b>					
	Medical Education Bureau - Coordinator	1	1	15.00	15.00	private office
	Office of Administration	3	1	15.00	15.00	shared office
	Meeting room (8 people)	-	1	15.00	15.00	meeting room
	Psychologist	3	3	10.00	30.00	consulting room
	Social Workers	2	2	10.00	20.00	shared office
	Logopedics	2	2	10.00	20.00	consulting room
	Psychiatrist	1	1	10.00	10.00	consulting room
	Orthopedist	1	1	15.00	15.00	consulting room
	Physiotherapist	2	2	15.00	30.00	consulting room
	Ergotherapist	2	2	15.00	30.00	consulting room
	Home trainers	8	8	5.00	40.00	shared office
	Tests assistants	8	8	5.00	40.00	shared office
	Nurses	3	3	5.00	15.00	shared office

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Other therapists	3	3	10.00	30.00	consulting room
	Therapy Room	1	1	30.00	30.00	consulting room
	Observation daycare	-	2	15.00	30.00	consulting room
	Kitchen	-	1	10.00	10.00	service
	Storage	-	3	5.00	15.00	service
	Cleaning Storage	-	1	5.00	5.00	service
	Personnel Bathrooms - Male and Female	-	2	5.00	10.00	service
	Public Bathrooms - Male and Female	-	2	5.00	10.00	service
	Reception and waiting room	-	1	15.00	15.00	waiting room
	<b>Subtotal</b>				<b>450.00</b>	
	<b>Walls and circulation 20%</b>				<b>90.00</b>	
	<b>Total</b>	<b>7</b>			<b>540.00</b>	
<b>3.2</b>	<b>Communicable Diseases - Bureau of Lung Diseases</b>					
	Office of Administration	4	4	5.00	20.00	shared office
	Nurses	10	10	5.00	50.00	shared office
	Treatment room	1	1	15.00	15.00	consulting room
	Physician's office	1	1	15.00	15.00	consulting room
	Storage	-	3	5.00	15.00	service
	Cleaning Storage	-	1	5.00	5.00	service
	Personnel Bathrooms - Male and Female	-	2	5.00	10.00	service
	Public Bathrooms - Male and Female	-	2	5.00	10.00	service
	Reception and waiting room	-	1	15.00	15.00	waiting room
	<b>Subtotal</b>				<b>155.00</b>	
	<b>Walls and circulation 20%</b>				<b>31.00</b>	

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	<b>Total</b>	<b>16</b>			<b>186.00</b>	
<b>3.3</b>	<b>PH Medical Services - Special Vaccination Center</b>					
	Vaccination room	4	3	10.00	30.00	consulting room
	Storage	-	1	10.00	10.00	service
	Cleaning Storage	-	1	5.00	5.00	service
	Personnel Bathrooms - Male and Female	-	2	5.00	10.00	service
	Public Bathrooms - Male and Female	-	2	5.00	10.00	service
	Reception and waiting room	4	1	25.00	25.00	waiting room
	<b>Subtotal</b>				<b>90.00</b>	
	<b>Walls and circulation 20%</b>				<b>18.00</b>	
	<b>Total</b>	<b>8</b>			<b>108.00</b>	
<b>3.3</b>	<b>PH Medical Services - Parasitic Infections and suspected rushes</b>					
	Medical office	4	3	10.00	30.00	consulting room
	Cleaning Storage	-	1	5.00	5.00	service
	Personnel Bathrooms - Male and Female	-	2	5.00	10.00	service
	Public Bathrooms - Male and Female	-	2	5.00	10.00	service
	Reception and waiting room	4	1	15.00	15.00	waiting room
	<b>Subtotal</b>				<b>70.00</b>	
	<b>Walls and circulation 20%</b>				<b>14.00</b>	
	<b>Total</b>	<b>8</b>			<b>84.00</b>	
<b>4</b>	<b>MINISTRY OF HEALTH - STOCKROOMS</b>					
<b>4.1</b>	<b>OFFICE SUPPLY STORAGE</b>					
	Office	2	2	5.00	10.00	shared office
	Storage	-	1	50.00	50.00	storage

No.	SPACES	PEOPLE	PROPOSED AREA			TYPOLOGY
			UNITS (UN)	AREA (M <sup>2</sup> )	TOTAL AREA (M <sup>2</sup> )	
	Bathrooms	-	1	5.00	5.00	service
	Materials reception and delivery	-	1	10.00	10.00	reception
	<b>Subtotal</b>				<b>75.00</b>	
	<b>Walls and circulation 20%</b>				<b>15.00</b>	
	<b>Total</b>	<b>30</b>			<b>90.00</b>	
<b>4.2</b>	<b>ENVIRONMENTAL STORAGE SUPPLY</b>					
	Office for the Storage Personnel	2	2	5.00	10.00	shared office
	Storage for Environmental inspectors Equipment	-	1	50.00	50.00	storage
	Storage of chemicals	-	1	15.00	15.00	storage
	Changing room and bathroom for inspectors	-	1	20.00	20.00	service
	Materials reception and delivery	-	1	20.00	20.00	reception
	<b>Subtotal</b>				<b>115.00</b>	
	<b>Walls and circulation 20%</b>				<b>23.00</b>	
	<b>Total</b>	<b>46</b>			<b>138.00</b>	
<b>4.3</b>	<b>OFFICE SUPPLY STORAGE</b>					
	Office	3	3	5.00	15.00	shared office
	Vaccines storage	-	3	25.00	75.00	storage
	Bathroom	-	1	5.00	5.00	service
	Materials reception and delivery	-	1	10.00	10.00	reception
	Generators room	-	1	15.00	15.00	service
	<b>Subtotal</b>				<b>120.00</b>	
	<b>Walls and circulation 20%</b>				<b>24.00</b>	
	<b>Total</b>	<b>83</b>			<b>144.00</b>	

## 7. ANALYSIS OF POSSIBLE SCENARIOS

This chapter will analyze the possible scenarios for the development of the Rode Kruislaan Compound, in order to accommodate all the functions needed by the MoH. The inspection of the three main buildings concluded that, although the buildings are rather old, the concrete structure is solid. With a total area of 5.280,00 m<sup>2</sup>, the three buildings would almost cover the needs of the entire MoH facilities.

There are three possible solutions in this case which we will shortly indicate:

- A. Simple renovation of the current state
- B. Demolish completely and construct a new building
- C. Adapting the remaining part in a new building.

The available budget, with the IDB loan, has been indicated as US\$8,070.000,00.

Additional to the chosen scenarios, the following items should be considered to better estimate the cost of the construction:

- Desired quality
- Materials and design specifics
- Execution modality: in phases or complete
- Share of “new” in relation to “renovation within the project”.

### **A. Simple renovation of the current state<sup>12</sup>**

The current buildings are underused, being one of them 75% abandoned, a second one at its 50% capacity and a third one at its 75% capacity and in great state of decay. A renovation of the entire complex would allow to accommodate almost all the needed functions, restoring functionality within a low cost.

#### **ACTIONS TO UNDERTAKE:**

- All the interiors and rooves should be demolished
- All the rooves should be reconstructed (construction and sheeting)
- The interior partitions should be rearranged, and all interiors should be modernized
- The installations (electricity, water, air-condition, telephone and ICT) should be rearranged
- Windows and doors should be replaced by modern and efficient types
- Painting of the whole building

#### **PROS:**

- Lowest costs
- Shortest schedule for design (3 months)
- Shortest construction time (15 months)

---

<sup>12</sup> Nevertheless, it is advisable, prior to making plans to reuse the building in future plans, to undertake some structural tests on the concrete and steel and, depending on the results, undertake also some chemical tests on the quality of the steel used in the reinforcement.

- Low construction impact (noise, waste, etc.)
- The work can be executed in phases, but good planning is necessary

CONS:

- Less flexibility in layout and design
- No space for future expansion
- Need of an additional pavilion to accommodate all the needed space

ESTIMATED BUDGET: 4 million USD.

ESTIMATED TIMELINE FOR DESIGN: 3 months

ESTIMATED TIMELINE FOR CONSTRUCTION: 15 months

PROJECT LOGISTICS:

1. Renovation of Building B

- Building B, which is the least occupied, will be emptied first, and the activities currently implemented in this building (vaccination services and storage) will be housed in the other two buildings and/or in shipping containers which can be placed on the lot.
- Building B will be renovated
- The building will be finished to temporary house the activities of building A.

2. Building A

- Once empty, will be renovated
- The building will be finished according to plan to accommodate the activities of building C

3. Building C

- Once empty, will be renovated
- The building will be finished according to plan to accommodate the activities of HQ
- The building should be finished with a representative view and an entrance to the Gravenberch street.

**B. Constructing a new building**

The construction of a new building would allow great flexibility in design criteria, layout, functionality, materials, etc. That would certainly fit the aspirations of the MoH of having a modern infrastructure. Nevertheless, considering the amount of m<sup>2</sup> required, the budget and construction timeline would be higher.

ACTIONS TO UNDERTAKE:

- Depending of the location of the new building, executing can take place before demolishing of the buildings, or at least before part of them are demolished.

- Demolishing the whole existing buildings, including foundations and underground installations
- Removing all the demolition waste
- Might be necessary to relocate employees during construction period, depending on the new construction location and typology
- Inconvenience for the occupants during demolishing and transport of the surplus material.

#### PROS:

- Optimal layout
- Flexibility in design and space organization
- Compact building = space for future expansion on the ground

#### CONS:

- Higher costs
- Long schedule for design (8 months) and for demolition and construction (27 months)
- High construction impacts (noise, waste, etc.)

ESTIMATED BUDGET: 8.5 million USD

ESTIMATED TIMELINE FOR DESIGN: 8 months

ESTIMATED TIMELINE FOR CONSTRUCTION: 27 months

#### PROJECT LOGISTICS:

- The building will be built completely on lot # 2.
- While buildings B and C should be demolished, employees must move to a temporary location.
- Since lot # 1 with building A will not be removed immediately, this building can be used temporarily.
- The HQ will function until the project is finished. In case needed, some functions could temporarily move while construction takes place to the HQ.
- Lot # 2, the building site, must be prepared for the construction of the new building.

This option will bring about quite some annoyance to the environment, as the building activities are rather radical and cause noise and take more time. Also, the site must be emptied and rehabilitated.

#### **C. Adapting the current buildings.**

The current buildings are surely underused, one of them 75% abandoned, a second one at its 50% capacity and a third one at its 75% capacity. The adaptation of the entire complex would allow to accommodate almost all the needed functions, taking advantages of the parts of the existing buildings that are in good conditions (slabs, external walls, staircases and all concrete structure) allowing to restore functionality, while giving a completely new and modern look, and incorporating green and energy efficient measures.



#### ACTIONS TO UNDERTAKE:

- Stripping off the buildings (demolishing the rooves, interior walls, to obtain the skeleton (a walled in open space with a few closed rooms - bathrooms and storage rooms to be rearranged.
- The skeleton can be covered by a freestanding roof (umbrella) – and sun protections vertical walls to protect and make the building energy-efficient, in fact giving a completely modern look.
- Since the building is very long, more entrances and staircases could be introduced together with or in combination with core functions such as bathrooms, storages, reception station etc.

#### PROS:

- Cost in between option A and B
- No site layout changes
- Possible phasing in construction
- No need of excavations for new foundations
- Flexibility in interior for being adapted to the new needs and present a modern look
- Short execution time
- Low construction impact (noise, waste, etc.)

#### CONS:

- Less flexibility in layout and design
- Limited space for future expansion

ESTIMATED BUDGET: 5 million USD

ESTIMATED TIMELINE FOR DESIGN: 3 months

ESTIMATED TIMELINE FOR CONSTRUCTION: 15 months

#### PROJECT LOGISTICS:

##### 1. Building B

- Building B, which is the least occupied, will be emptied out first, and the activities currently implemented in this building (vaccination services and storage) will be housed in the other two buildings and/or in shipping containers which can be placed on the lot.
- Building B will be stripped completely.
- The free-standing roof will be constructed over the remaining part of the building.
- The building will be finished according to the plan, to temporary house the activities of building A.

##### 2. Building A

- Once empty, will be completely stripped
- The free-standing roof will be installed

- The building will be finished according to plan to accommodate the activities of building C

### 3. Building C

- Once empty, will be completely stripped.
- The free-standing roof will be installed.
- The building will be finished according to the plan to accommodate the activities of HQ.
- The building should be finished with a representative view and an entrance to the Gravenberch street.
- A reshuffling of the several functions must take place according to the nature of the activities.
- This scenario can be executed in phases and people can stay on the compound without much disturbance.

#### Cost estimate comparison:

ITEM	NEW BUILDING	TOTAL RENOVATION	TOTAL ADAPTATION
<b>CONSTRUCCION</b>			
Demolition of existing building	\$ 45,000.00	\$ 25,000.00	\$ 25,000.00
Land preparation	\$ 700,000.00	\$ -	\$ -
New building construction	\$ 6,000,000.00	\$ -	\$ -
Building adaptation	\$ -	\$ -	\$ -
Building renovation	\$ -	\$ 2,112,000.00	\$ 3,168,000.00
Landscaping	\$ 750,000.00	\$ 750,000.00	\$ 750,000.00
<b>OTHER GOODS</b>			
Furniture for 400 people	\$ 250,000.00	\$ 250,000.00	\$ 250,000.00
Equipment for 200 people	\$ 300,000.00	\$ 300,000.00	\$ 300,000.00
<b>CONSULTING SERVICES</b>			
Design (5% of construction cost)	\$ 374,750.00	\$ 144,350.00	\$ 197,150.00
Supervision of construction works (5%)	\$ 374,750.00	\$ 144,350.00	\$ 197,150.00
<b>TOTAL</b>	<b>\$ 8,794,500.00</b>	<b>\$ 3,725,700.00</b>	<b>\$ 4,887,300.00</b>

### Time estimate comparison:

Option 1: demolition + new building						
ITEM	months	year 1	year 2	year 3	year 4	year 5
Architect for PIU hired	1					
Preparation of bidding for D + C	2					
Publication of bidding for D + D	2					
Bidding procedures	4					
D + C contract signature	1					
Design phase	8					
Design approved	1					
Demolition and land preparation	3					
Building construction	24					
Construction finished						
<b>TOTAL</b>	<b>46</b>					

Option 2: total renovation						
ITEM	months	year 1	year 2	year 3	year 4	year 5
Architect for PIU hired	1					
Preparation of bidding for D + C	2					
Publication of bidding for D + C	2					
Bidding procedures	2					
D + C contract signature	1					
Design phase	3					
Design approved	1					
Building construction	15					
1 building delivered						
2 building delivered						
3 buildings delivered						
<b>TOTAL</b>	<b>27</b>					

Option 3: total adaptation						
ITEM	months	year 1	year 2	year 3	year 4	year 5
Architect for PIU hired	1					
Preparation of bidding for D + C	2					
Publication of bidding for D + C	2					
Bidding procedures	2					
D + C contract signature	1					
Design phase	3					
Design approved	1					
Building construction	18					
1 building delivered						
2 building delivered						
3 buildings delivered						
<b>TOTAL</b>	<b>30</b>					

## **DESCRIPTION OF THE SELECTED OPTION**

On May 8<sup>th</sup> the possible scenarios, including cost estimate and time schedule for design and construction, was presented to the Minister of Health and high management staff.

The solution chosen for the Rose Kruislaan Compound includes:

1. Construction of a new representative building
2. Adaptation of two of the existing buildings

### **ACTIONS TO UNDERTAKE:**

- Depending of the location of the new building: It has been suggested to be on lot # 2, which is more representative as it has an entrance.
- Execution can take place before demolishing of the buildings, or at least before part of them are demolished.
- Demolishing the whole existing building, including foundations and underground installations.
- Removing all the demolition waste.
- Might be necessary to relocate employees during construction period, depending on the new construction location and typology.
- Inconvenience for the occupants during demolishing and transport of the surplus material.

### **PROS:**

- Representative building with flexibility in design and space organization
- Medium costs

### **CONS:**

- Higher costs
- Long schedule for design (8 months) and for demolition and construction (27 months)
- High construction impacts (noise, waste, etc.)

ESTIMATED BUDGET: 6.5 million USD

ESTIMATED TIMELINE FOR DESIGN: 8 months

ESTIMATED TIMELINE FOR CONSTRUCTION: 27 months

### **PROJECT LOGISTICS:**

1. Building B
  - Building B, which is the least occupied, will be emptied out first, and the activities currently implemented in this building (vaccination services and storage) will be housed in the other two buildings and/or in shipping containers which can be placed on the lot.
  - Building B will be stripped completely.
  - The free-standing roof will be constructed over the remaining part of the building.

- The building will be finished according to the plan, to temporary house the activities of building C.
2. Building A
    - Once empty, will be completely stripped
    - The free-standing roof will be installed
    - The building will be finished according to plan to accommodate the activities of building C
  3. Building C
    - Once empty, demolition of Building C
  4. New building
    - Land preparation
    - New building construction to house MoH HQ and PAHO offices.

**COST ESTIMATE FOR THE SELECTED OPTION:**

ITEM	Cost per m2 (USD)	m2	TOTAL
<b>CONSTRUCCION</b>			<b>\$ 6,490,000.00</b>
Partial demolition of existing building			\$ 70,000.00
Land preparation	\$ 30.00	10000.00	\$ 320,000.00
Two Buildings renovation	\$ 470.00	3720.00	\$ 1,750,000.00
New construction	\$ 1,050.00	3000.00	\$ 3,150,000.00
Landscaping	\$ 48.00	25000.00	\$ 1,200,000.00
<b>OTHER GOODS</b>			<b>\$ 900,000.00</b>
Furniture for 400 people			\$ 500,000.00
Equipment for 200 people			\$ 400,000.00
<b>CONSULTING SERVICES</b>			<b>\$ 680,000.00</b>
Maintainance Plan			\$ 30,000.00
Design (5% of construction cost)			\$ 325,000.00
Supervision of construction works (5%)			\$ 325,000.00
<b>TOTAL</b>			<b>\$ 8,070,000.00</b>

**DETAILED COST ESTIMATE FOR RETROFIT OF TWO BUILDINGS:**

ITEM	COST	MITIGATION
demolition	\$ 12,500.00	
transport	\$ 1,000.00	
slabs	\$ 8,100.00	
piles	\$ 1,080.00	
floor tiles (G.FI)	\$ 36,000.00	
Floor tiles 1 fl.	\$ 36,000.00	
ceiling	\$ 59,400.00	
windows substitution	\$ 180,000.00	\$ 180,000.00
roof substitution	\$ 12,000.00	\$ 12,000.00
trusses/beams substitution	\$ 120,000.00	\$ 120,000.00
sunscreen	\$ 20,000.00	\$ 20,000.00
rafters	\$ 4,900.00	\$ 4,900.00
roofing sheets	\$ 3,000.00	\$ 3,000.00
stairs	\$ 4,000.00	
separation walls	\$ 36,000.00	
sanitary	\$ 24,000.00	
painting	\$ 12,000.00	
Energy savings bulbs	\$ 47,192.00	\$ 47,192.00
Water efficiency measures	\$ 17,766.00	\$ 17,766.00
<b>TOTAL for material</b>	<b>\$ 621,438.00</b>	<b>\$ 404,858.00</b>
labor	\$ 93,215.70	
installation	\$ 99,430.08	
landscaping	\$ 24,000.00	
<b>TOTAL for one building</b>	<b>\$ 838,083.78</b>	<b>\$ 404,858.00</b>
<b>TOTAL for two buildings</b>	<b>\$ 1,676,167.56</b>	<b>\$ 809,716.00</b>

**TIME ESTIMATE FOR THE SELECTED OPTION:**

SELECTED OPTION						
ITEM	months	year 1	year 2	year 3	year 4	year 5
Architect for PIU hired	1					
Preparation of bidding for D + C	2					
Publication of bidding for D + C	2					
Bidding procedures	3					
D + C contract signature	1					
Design phase	5					
Design approved	1					
Demolition	3					
Building construction	18					
1 building delivered						
2 building delivered						
3 buildings delivered						
<b>TOTAL</b>	<b>36</b>					

## **SPACES DISTRIBUTION**

### **New building:**

The new building will be constructed with the main entrance to the Gravenberch street, after demolishing building C. The built area will be 2700 m<sup>2</sup> distributed over 4 floors. The function to be accommodated are the following:

- Office of the Minister
- Office of the Director of Health policy and PH programs
- Office of the Director of Health Inspections
- DIRECTORATE of Bureau of Health
- DIRECTORATE of Health Policy and Ph Programs
- DIRECTORATE - Administrative services
- DIRECTORATE - of Finance and Procurement
- Service Spaces
- PAHO Offices

### **Adaptation of existing buildings:**

The existing buildings have existing stairs in the middle, and the two emergency stairs on the extremities. Additionally, two new entrances will be added roughly at one quarter of the building.

The entrances, that will function as a reference point in the building and give access to the building, will house a reception, information desk, security, copy center, bathroom, and kitchen. These services will be replicated on every floor.

The ground floor will give access to the several divisions by direct entrances from the adjacent gardens. Depending of the functions the ground area can locally be enlarged with waiting areas etc., in the covering of the top roof.

### **Building A:**

The net total area is 1860 m<sup>2</sup>. The function to be accommodated are the following:

#### **GROUND FLOOR**

- Canteen (170 m<sup>2</sup>), Including dining room and kitchen for employees and guests
- Operation and Maintenance (426 m<sup>2</sup>)
- Stockrooms
- Office Supply Storage (90 m<sup>2</sup>)
- Environmental Storage Supply (170 m<sup>2</sup>)
- Service Spaces (160 m<sup>2</sup>)

#### **FIRST FLOOR**

- Directorate of Health Inspections (328 m<sup>2</sup>)
- Office of the Deputy Director - Inspection Personal Health (341 m<sup>2</sup>)

- Service Spaces (160 m<sup>2</sup>)
- Other Spaces (285 m<sup>2</sup>)
- Gym for employees
- Kids room and playground for employees' children

#### Building B:

The net total area is 1860 m<sup>2</sup>. The function to be accommodated are the following:

#### GROUND FLOOR

##### Bureau of Public Health

- Medical Education Bureau (552 m<sup>2</sup>)
- PH Medical Services - Special Vaccination Center (132 m<sup>2</sup>)
- PH Medical Services - Parasitic Infections and suspected rushes (116,64 m<sup>2</sup>)
- Breast Feeding center (50 m<sup>2</sup>)
- Service spaces (150 m<sup>2</sup>)

#### FIRST FLOOR

- Non-communicable Diseases (223 m<sup>2</sup>)
- Service spaces (150 m<sup>2</sup>)
- Communicable Diseases (511 m<sup>2</sup>)

##### Other functions open to public

- Library
- Insectary (small museum with insects exposition)

##### Other functions for employees

- Outdoor sport facilities for employees and external (running ring, outdoor gym equipment)



## POSSIBLE ADAPTATION OF EXISTING BUILDINGS



*Figure 10: Possible adaptation of the existing buildings*

## 8.DESIGN CRITERIA

### **FUNCTIONS DISTRIBUTION**

The renovated buildings will accommodate:

- Ministry of Health - Bureau of Public Health - services to population
  - Medical educational Bureau
  - Bureau of Lung Diseases
  - Vaccination Center
  - Parasitic infections and suspected rushes
- Operation and maintenance
- Canteen
- Stockrooms
  - office supply storage
  - environmental storage supply
  - vaccines supply storage

The new building will accommodate:

- Ministry of Health – offices
- PAHO - offices, with a separate entrance

### **ACCESSES, MOBILITY AND PARKINGS**

Access to the lot, internal mobility and parking spaces must be reorganized. Especially parking spaces need to be relocated from the middle of the lot, to avoid occupancy of common outdoor space located between the buildings.

### **LAYOUT**

- Services to populations require to be located on the ground floor, and having specific entrances
- Special attention must be made to the stockrooms, since they contain dangerous materials
- All floors need to have kitchenette, bathrooms, storage, cleaning room.
- Existing buildings must be integrated with additional staircases and multiple entrances, in order to guarantee safety in case of emergency

### **INTERIORS**

- The offices should have an open space layout, with exception of a limited amount of closed cabinets and rooms for special activities, such as the Minister's office, meeting rooms, library etc.
- The open space must have numerous meeting rooms of different sizes on each floor, to guarantee collaborative working spaces and/or enclosed space for making phone calls, without interfering with colleagues' work
- The character of the office will be open with much more daylight and no narrow corridors.
- Internal partitions must be mainly transparent
- Interiors must be flexible, allowing changing in the settings in the future, as the organigram and organization of the Ministry of Health may vary during time

## **APPEARANCE**

- Both the new building and the renovated ones must have a modern look, obtained by use of similar cladding materials, for example. The aesthetics of the existing Central Laboratories must be considered when selecting materials and finishing.
- The representative new building must have distinguished entrances especially for the high management
- Every building should have its specific character, within the similarity to the other buildings of the compound.
- The building design will enhance the interactions of the occupants in a positive way, as the surroundings will be more appealing than the current ones.

## **CONSTRUCTION SYSTEM**

- The construction should be light, if concrete is applied, preferably in steel, as it is lighter, prefabricated and faster in execution.

## **ENERGY-EFFICIENCY**

The application of energy efficiency measures in buildings generates energy savings during the operation of buildings and their equipment, compared to traditional buildings, which translates into savings of economic resources.

The design must take into consideration the following passive measures:

- Shape and orientation: The energy performance of a building is significantly influenced by its shape and orientation. In tropical climates orientation should aim at excluding direct exposure of the building to the sunlight and radiant heat at all times of the year while maximizing access to cooling breezes
- Materials: In tropical climates the use of lightweight construction materials (e.g. timber) with low thermal mass is preferable, particularly on the building parts exposed to the sun. Lightweight materials combined with appropriate insulation will help to avoid overheating and reduce building's cooling load
- Insulation: Insulation acts as a barrier to heat flow and is essential for minimizing heat transfer through exterior elements. In hot and humid climate mild level of insulation is usually sufficient and should be accompanied by adequate amount of shading in order to prevent the captured by insulation heat from accumulating inside the building ('oven' effect). In these climates the insulation of roofs and ceiling is usually the most important to reduce heat gain. It should be combined with sufficient roof space ventilation to reduce moisture content of the air. In order to prevent excessive condensation reflective foil sarking or foil-backed building blanket can be used.
- Building sealing: Excessive air leakage increases energy consumption for cooling system. Therefore, air tightness of the building envelope is very important in an energy efficient building, especially at connections between different elements.
- External shading: In high humidity climates it may be beneficial to use shades for windows, uninsulated and dark colored walls, as well as outdoor living spaces throughout the year. External shading requires a thorough design, as it may reduce incoming daylight and, therefore, increase the need for artificial lighting. Shading can be natural, through surrounding vegetation, or artificial. Light colors are preferable for façade shading systems.
- Cool roof: A cool roof has a higher solar reflectivity of the surface and lower level of heat absorption than a conventional one. It is achieved by utilizing the light color of a roof surface and special highly reflective and emissive materials, which can reflect at least 60% of sunlight

The design must include, at least, the following measures:

- External Shading Devices
- Insulation of Roof
- Ceiling Fans for Office Spaces
- Energy-Saving Light Bulbs in internal and external spaces

**CLIMATE CHANGE ADAPTATION MEASURES:**

The new building must be elevated from the ground, in order to prevent water to invade it during floods occurring due to heavy rainfalls. Additionally, waterproofs-water resistant materials must be used for the renovation of the existing buildings.

**MAINTAINANCE**

The design must use materials and construction systems that are sturdy, durable and require low maintenance. Locally available materials need to be considered, in order to ease substitution and replacement of parts, when needed.

**LANDSCAPE**

The landscape design must include vegetated areas (with trees, plants and flowers), outdoor running path, outdoor gym.

In order to adapt to the vulnerability scenario, the landscaping of the lot will be designed to include floodable areas and will privilege the use of permeable materials for pavements.

## 9. CLIMATE CHANGE CONSIDERATIONS

### 9.1 Suriname Climate overview

Paramaribo features a tropical rainforest climate, under the Köppen climate classification. The city has no true dry season but does experience noticeably wetter and drier periods during the year: "Autumn" (September through November) is the driest period of the year. Common to many cities with this climate, temperatures are relatively consistent throughout the course of the year, with average high temperatures of 31 degrees Celsius and average low temperatures of 22 degrees Celsius. Paramaribo on average receives roughly 2200 mm of rainfall each year, and all 12 months average more than 60 mm of rainfall.

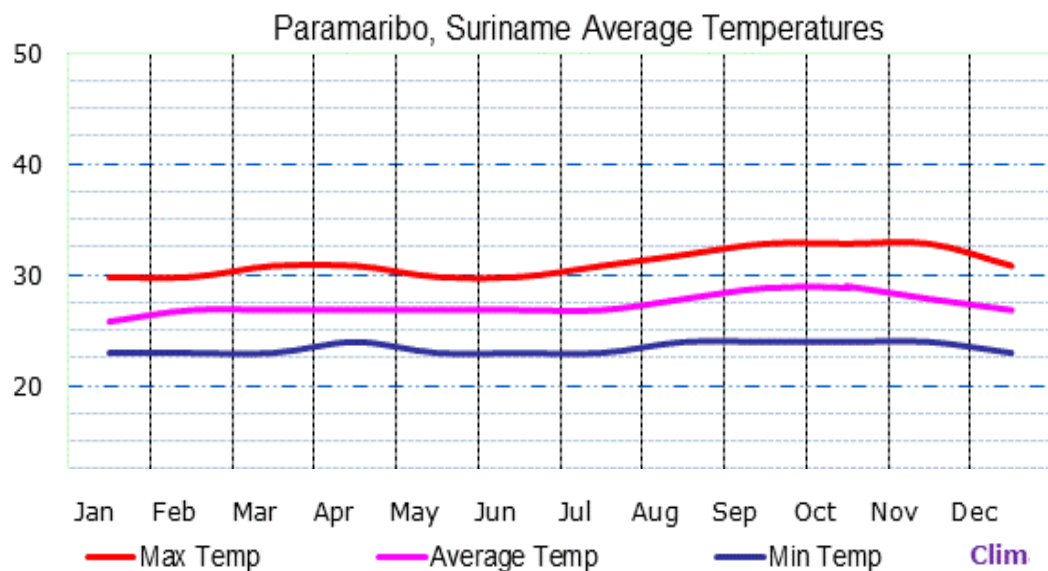


Figure 12:

Average temperature and precipitation in Paramaribo

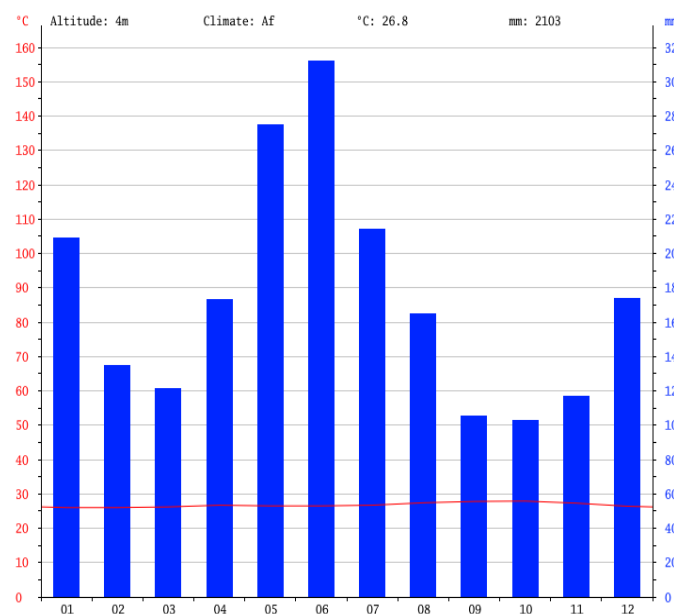


Figure 11: Average monthly precipitation

## 9.2 Climate change overview

Suriname is highly vulnerable to the effects of climate change, specifically due to river and coastal floods, and has already suffered extensive losses and damages. Sea level rise represents a very significant development challenge for the future of a country with almost 30% of the land, including the capital, located within a few meters above sea level<sup>13</sup>. Impacts are projected to affect over 40% of the GDP and the well-being of more than 80% of the population, including residents of Paramaribo<sup>14</sup>.

Thus far, Suriname has had to undertake adaptation interventions and build climate resilience, while discussing whether to continue to invest heavily in adaptation or relocate and rebuild its entire economy away from the threat of the rising sea.

In this sense, the decision to relocate the entire MoH facilities to the Rode Kruislaan compound, shows the intention of prioritizing infrastructure investments towards the inlands, far away from the threats of coastal and river flooding.

A study undertaken by the IDB-Emerging and Sustainable Cities, shows that the location chosen for the project will not be affected by coastal flood risks due to climate change, with a period of return of 100 years.

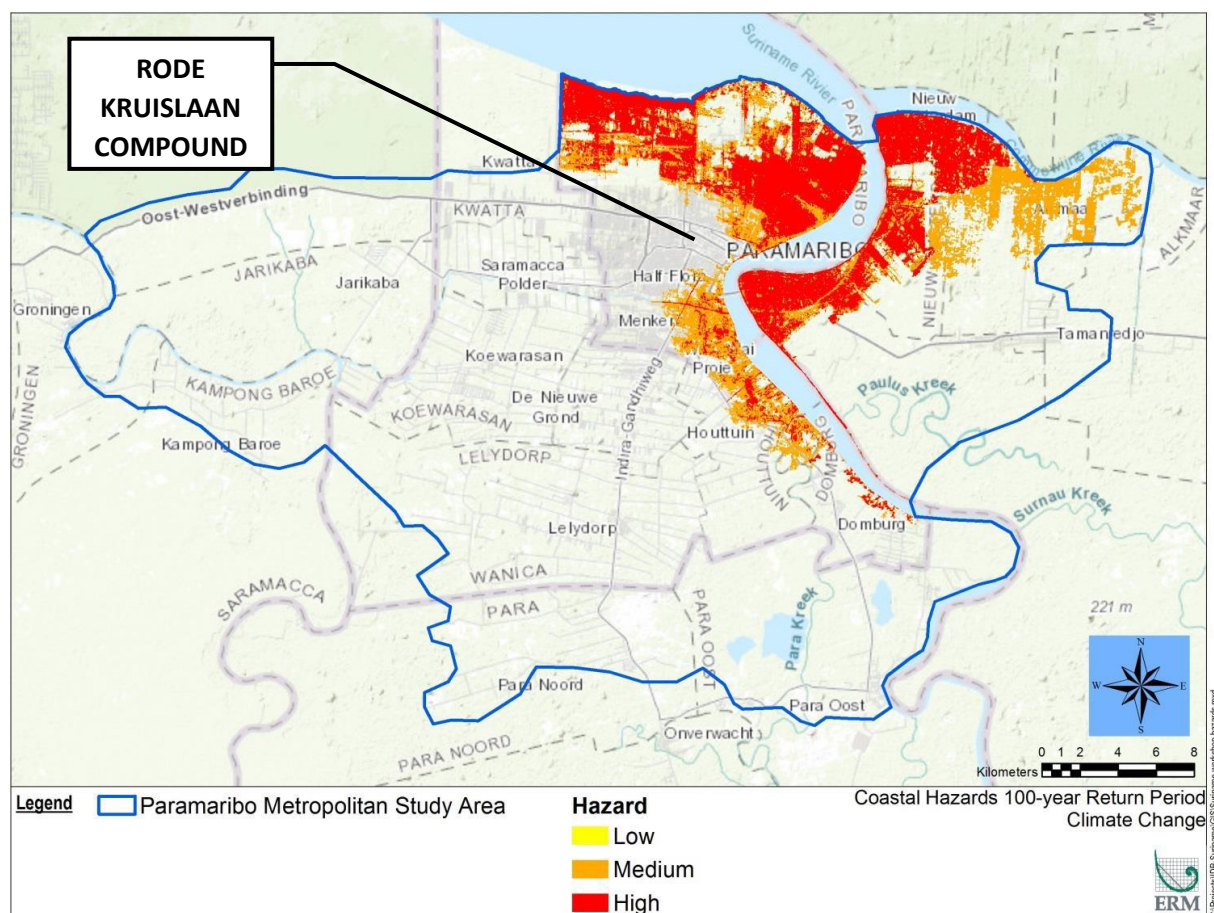


Figure 13: Coastal Flooding Hazard Map for a 100-year Return Period under Climate Change for 2050 Horizon.  
Source: ERM, 2017, Sustainable Paramaribo Action Plan – Hazard and Risk Study.

<sup>13</sup> Global Facility for Disaster Reduction and Recovery, <https://www.gfdrr.org/en/suriname>

<sup>14</sup> Suriname's INDC, 2005



Nevertheless, the area where the Rode Kruislaan Compound is located, is currently affected by heavy rains floods, which occur, according to employees and neighbors, approximately 4 times a year.

A study undertaken by the IDB-Emerging and Sustainable Cities, confirms that the location chosen for the project will be affected by flood risks with a medium hazard level due to rainfalls, with a period of return of 100 years.

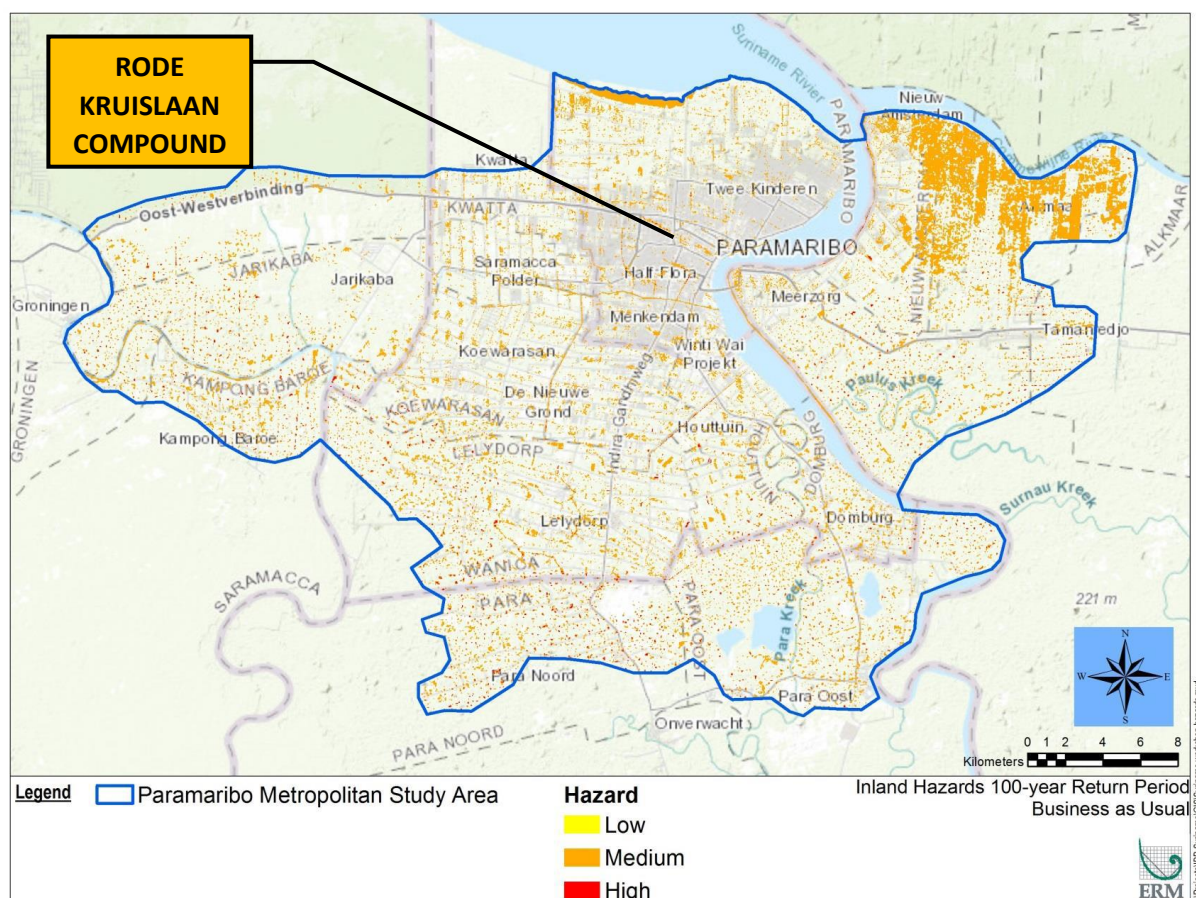


Figure 14: Inland Flooding for a 100-Year Rainfall Event under Business-As-Usual and 2050 Climate Change  
Source: ERM, 2017, Sustainable Paramaribo Action Plan – Hazard and Risk Study.

### 9.3 MoH commitment

The Ministry of Health, along with the Government of Suriname, has expressed its commitment towards implementing green policies as an effort towards climate resilience and sustainable development. Among this, is the inclusion of green and climate change mitigation and adaptation measures in the infrastructure component of the loan operation, for all the infrastructure works to be financed by the loan, which include:

1. the construction of a new pavilion (approximately 2500 m<sup>2</sup>)
2. the adaptive reuse of an abandoned building and of an underused one (summing approximately 3720 m<sup>2</sup>)
3. Landscape design of approximately 2.5 Ha.

**Project objectives:** The infrastructure component has the objective of (i) adapting to CC, by relocating all MOH infrastructure to an area that is not affected by coastal flooding and including adaptation

measures to the new infrastructure to mitigate the risks of inland floods caused by heavy rains and (ii) mitigating CC, by incorporating to both the retrofitted and new building bioclimatic principles and energy efficient measures, that will allow the project to exceed available standards and comply with the requirements of the EDGE certification.

**Project overview:** The overall design has been guided by sustainability and green principles: the decision to reuse an abandoned and an underused building has been guided by the idea of recycling the existing structure, avoiding the generation of tons of construction waste and reducing the emissions generated by new materials production, transportation, and future disposal, while still having a solid structure useful to be reused. Additionally, the overall design requirements for the architectural intervention on the existing buildings has been centered in improving energy efficiency and thermal performance.

To achieve this goal, the main selected works have been:

- Substitution of the existing non-insulated roof with a cool and insulated roof.
- Substitution of all existing non-insulated windows frame with Low-E coated glass.

Regarding the new building, the overall design has been conceived around bioclimatic principles. This has implied the inclusion of both passive and active measures in the design requirements, mainly directed at improving the energy efficiency of the building. Within the tropical climate characterizing Paramaribo, the most important elements to be considered are the building envelope, the cooling technology, and the efficiency of the appliances (including lights).

Additionally, considering the vulnerability scenario of inland flooding of the construction site, caused by heavy rains, it has been indicated that the new building should be elevated from the ground, in order to improve its resilience.

As a verification and to evaluate the impact of the measures included in the designs (new and existing), the EDGE tool was used. The set of selected measures were carefully chosen to reach at least the 20% savings required by the EDGE certification. The high results obtained with the tool (47.81% and 50.81% in energy, 46.56% and 43.51% in water, 29.57% and 65.09% in materials, respectively for the new building and the renovated ones) show that the selected measures encompass largely the minimum requirements, demonstrating that it would be possible to certify the buildings.

The following paragraphs explain in detail the measures that were adopted for each case.

#### **9.4 New building construction**

An adequate passive design, along with the application of energy efficiency measures in buildings can generate energy savings during the operation of buildings and their equipment, compared to traditional buildings, which translates into savings of economic resources.

The most important elements to be considered carefully in tropical climate are the design of the building envelope, the cooling technology and the efficiency of the appliances; all crucial factors in reducing energy consumption.

The design of the MoH compound will take into consideration the following passive measures:

- Shape and orientation: The energy performance of a building is significantly influenced by its shape and orientation. In tropical climates orientation should aim at excluding direct exposure of the building to the sunlight and radiant heat at all times of the year while maximizing access to cooling breezes
- Materials: In tropical climates the use of lightweight construction materials (e.g. timber) with low thermal mass is preferable, particularly on the building parts exposed to the sun. Lightweight materials combined with appropriate insulation will help to avoid overheating and reduce building's cooling load
- Insulation: Insulation acts as a barrier to heat flow and is essential for minimizing heat transfer through exterior elements. In hot and humid climate mild level of insulation is usually sufficient and should be accompanied by adequate amount of shading in order to prevent the captured by insulation heat from accumulating inside the building ('oven' effect). In these climates the insulation of roofs and ceiling is usually the most important to reduce heat gain. It should be combined with sufficient roof space ventilation to reduce moisture content of the air. In order to prevent excessive condensation reflective foil sarking or foil-backed building blanket can be used.
- Building sealing: Excessive air leakage increases energy consumption for cooling system. Therefore, air tightness of the building envelope is very important in an energy efficient building, especially at connections between different elements.
- External shading: In high humidity climates it may be beneficial to use shades for windows, uninsulated and dark colored walls, as well as outdoor living spaces throughout the year. External shading requires a thorough design, as it may reduce incoming daylight and, therefore, increase the need for artificial lighting. Shading can be natural, through surrounding vegetation, or artificial. Light colors are preferable for façade shading systems.
- Cool roof: A cool roof has a higher solar reflectivity of the surface and lower level of heat absorption than a conventional one. It is achieved by utilizing the light color of a roof surface and special highly reflective and emissive materials, which can reflect at least 60% of sunlight

As a verification and to evaluate the impact of the measures included in the designs (new and existing), the [EDGE tool](#) was used. The set of selected measures were carefully chosen to reach at least the 20% savings required by the EDGE certification.

Energy efficiency measures: 47.97%

- Reflective Paint/Tiles for Roof -Solar Reflectivity (albedo) of 70
- External Shading Devices - Annual Average Shading Factor (AASF) of 0.58 AASF
- Insulation of Roof - U Value of 0.507 W/m<sup>2</sup> K
- Insulation of External Walls - U Value of 0.44 W/m<sup>2</sup> K
- Higher Thermal Performance Glass - U Value of 1.95 W/m<sup>2</sup> K and SHGC of 0.28
- Ceiling Fans for Office Spaces
- Energy-Saving Light Bulbs - Internal Spaces
- Energy-Saving Light Bulbs - External Spaces

Water efficiency measures: 45.22%

- Low-Flow Faucets in Bathrooms - 1 Lt./min Lt./min 1
- Dual Flush for Water Closets in Bathrooms - 4 Lt./1st flush and 2 Lt./2nd flush 1st - Lt./flush 4
- Water-Efficient Urinals in all Bathrooms - 0.5 Lt./flush Lt./flush 0.5
- Water-Efficient Faucets for Kitchen Sinks - 4 Lt./min Lt./min

Materials efficiency measures: 28.99%

- Floor Slabs: In-Situ Concrete with >25% GGBS
- Roof Construction; Aluminum-Clad Sandwich Panel
- Internal Walls: Cored (with Holes) Bricks with Plaster on Both Sides
- Walls insulation: Cellulose
- Roof Insulation: Cellulose

Additionally, in order to adapt to the vulnerability scenario, the new building will be elevated from the ground, to prevent water to invade the ground floor during floods occurring due to heavy rainfalls.

### **9.5 Adaptive reuse of existing buildings**

The renovation design of the existing buildings has been guided by the MoH need to reduce their monthly consumption, especially related with electricity bills.

All the interventions included within the design have been carefully selected in order to improve the energy efficiency of the buildings and the comfort of the users.

The following measures will be included in the renovation of two of the existing buildings, which will account for approximately 1860 m<sup>2</sup> each building, summing 3720 m<sup>2</sup>.

The main works selected to achieve this goal are:

- Substitution of the existing non-insulated roof with a cool and insulated roof.
- Substitution of all existing non-insulated windows frame with Low-E coated glass

Energy efficiency measures: 45.31%

- Reflective Paint/Tiles for Roof -Solar Reflectivity (albedo) of 70
- External Shading Devices - Annual Average Shading Factor (AASF) of 0.58 AASF
- Insulation of Roof - U Value of 0.507 W/m<sup>2</sup> K
- Low-E Coated Glass - U-Value of 3 W/m<sup>2</sup> K and SHGC of 0.45
- Ceiling Fans for Office Spaces
- Energy-Saving Light Bulbs - Internal Spaces
- Energy-Saving Light Bulbs - External Spaces

Water efficiency measures: 47.75%

- Low-Flow Faucets in Bathrooms - 1 Lt./min Lt./min 1
- Dual Flush for Water Closets in Bathrooms - 4 Lt./1st flush and 2 Lt./2nd flush 1st - Lt./flush 4
- Water-Efficient Urinals in all Bathrooms - 0.5 Lt./flush Lt./flush 0.5
- Water-Efficient Faucets for Kitchen Sinks - 4 Lt./min Lt./min

Materials efficiency measures: 57.75%

- Floor Slabs: Re-Use of Existing Floor slab
- Roof Construction; Aluminum-Clad Sandwich Panel
- External Walls: Re-Use of Existing Wall
- Internal Walls: Cored (with Holes) Bricks with Plaster on Both Sides



- Roof Insulation: Cellulose

Also, waterproofs-water resistant materials will be used for the ground floors of the renovated existing buildings.

### 9.6 Landscape design of 2.5 Ha.

Additionally, the landscaping of the lot will be designed to include floodable areas and will privilege the use of permeable materials for pavements, in order to adapt to the vulnerability scenario of medium inland flooding risks.

The following images will guide the architects during the landscape design phase.



Figure 15: Enghavenparken, Copenhagen, designed to cope with climate change.



Figure 16: Church Street and Paddington Green is an area in London with over-capacity drainage and flooding.



Figure 17: Kunshan Cultural Plaza. Image: CRC Water Sensitive Cities

## 9.7 Consulted bibliography

UN Environment. *Guidebook for the development of nationally appropriate mitigation actions (NAMAs). A primer on energy efficient buildings in tropical and subtropical climates.*

Waraporn Rattanongphisata and Wathanyoo Rordprapatb (2014). *Strategy for energy efficient buildings in tropical climate.* Energy Procedia 52 (2014) 10 – 17

Karam M. Al-Obaidin, Mazran Ismail, Abdul Malek Abdul Rahman, *Passive cooling techniques through reflective and radiative roofs in tropical houses in Southeast Asia: A literature review.* Frontiers of Architectural Research (2014) 3, 283–297

## 9.8 EDGE Results New building



### Project Details

Project Name : MOH NEW	Address Line1 : Rode Kruislaan
Number of Distinct Buildings : 1	Address Line2 :
Number of EDGE Subproject(s) : 1 associated	City : Paramaribo
Total Project Floor Area : 3,000 m <sup>2</sup>	State/ Province :
Project Owner Name : MOH	Postal Code :
Project Owner Email : liviam@iadb.org	Country : Suriname
Project Owner Phone : 2028137716	Project Number : 1000149469

#### Associated Subproject(s):

MOH NEW

### Subproject Details

Subproject Name : MOH NEW	Address Line1 : Rode Kruislaan
Office Name : MOH NEW	Address Line2 :
Subproject Multiplier for the : 1 Project	City : Paramaribo
Certification Stage : Preliminary	State/ Province :
Status : Self-Review	Postal Code :
Auditor :	Country : Suriname
Certifier :	Subproject Type : New Building

### Location Data

Country : Suriname  
City : Paramaribo



Created By: Livia Minoja

File Number: 18052210032425

EDGE Version : 2.1.4

Modified By: Livia Minoja

Project No.: 1000149469

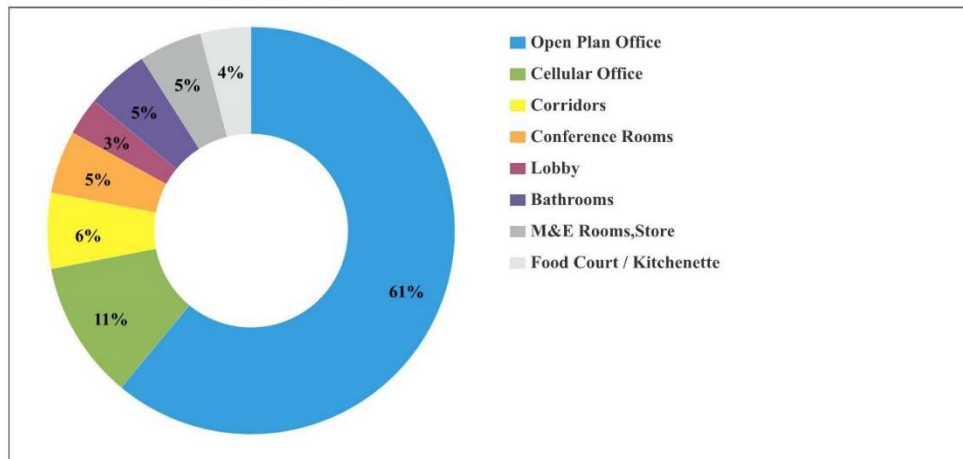
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### Building Data

		Default	User Entry
Gross Internal Area Excluding Car Parking :	3,000 m <sup>2</sup>	Occupancy Density :	12 m <sup>2</sup> /Person
Floors Above Grade :	4 no.	Operational Hours :	10 Hours/Day
Floors Below Grade :	0 no.	Working Days :	5 Days/Week
Floor-to-Floor Height :	3.5 m	Holidays :	12 Days/Year
Food Court / Kitchenette :	Yes		
Cellular Office :	No		



	Default	User Entry
Open Plan Office :	1,830	m <sup>2</sup>
Private/Closed Office :	330	m <sup>2</sup>
Corridors :	180	m <sup>2</sup>
Conference Rooms :	150	m <sup>2</sup>
Lobby :	90	m <sup>2</sup>
Bathrooms :	150	m <sup>2</sup>
M&E Rooms, Store ** :	150	m <sup>2</sup>
Food Court / Kitchenette :	120	m <sup>2</sup>
<b>Gross Internal Area :</b>	<b>3,000</b>	<b>m<sup>2</sup></b>

\*\* The M&E Rooms, Store field is equal to the remaining space required to total the Built-up Area Excluding Car Parking.

### Building Orientation

Floor Plan Depth*** :	10.0 m
Main Orientation*** :	Equal

\*\*\* These parameters will be used to estimate building dimensions. If the exact details of the dimensions and orientation are available, then complete the User Entry fields in the Building Lengths section. The orientation of the building will have a direct effect on energy consumption.

	Building Lengths	
	Default	User Entry
North	14.0	0 m
South	14.0	0 m
East	14.0	0 m
West	14.0	0 m
Northeast	14.0	0 m
Northwest	14.0	0 m
Southeast	14.0	0 m
Southwest	14.0	0 m

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2



## Building Systems

Does building design include an AC system? : Yes

Does building design include space heating system? : No

## Key Assumptions for the Base Case

	Default	User Entry
Fuel Used for Electric Generator :	Diesel	Diesel
Fuel Used for Cooking :	Electricity	Electricity
Fuel Used for Space Heating :	Electricity	Electricity
% of Electricity Generation Using Diesel :	5%	% Ave. Yrly
Cost of Electricity :	0.890	\$/kWh
Cost of Diesel Fuel :	0.830	\$/L
Cost of LPG/Natural Gas :	0.000	\$/L
Cost of Water :	0.120	\$/kL
CO <sub>2</sub> Emissions from Electricity Generation :	838.00	g/kWh
Window to Wall Ratio :	40.00%	%
Solar Reflectivity for Paint - Wall :	30.00%	%
Solar Reflectivity for Paint - Roof :	30.00%	%
Roof U - Value :	1.99	W/m <sup>2</sup> K
Wall U - Value :	1.86	W/m <sup>2</sup> K
Glass U - Value :	5.90	W/m <sup>2</sup> K
Glass SHGC :	0.50	Factor
Cooling System :	ASHRAE 90.1.2007	ASHRAE 90.1.2007
AC System Efficiency :	2.83	COP
Heating System :	ASHRAE 90.1.2007	ASHRAE 90.1.2007
Heating System Efficiency :	1.00	COP

### Monthly Average Outdoor Temperature (deg.C)

	Default	User Entry
Jan :	25.8	
Feb :	26.0	
Mar :	26.2	
Apr :	26.2	
May :	26.2	
Jun :	25.8	
Jul :	26.0	
Aug :	26.6	
Sep :	27.0	
Oct :	27.1	
Nov :	26.8	
Dec :	26.2	
Latitude :	5.50	Deg
Annual Average Rainfall :	300.00	mm

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3

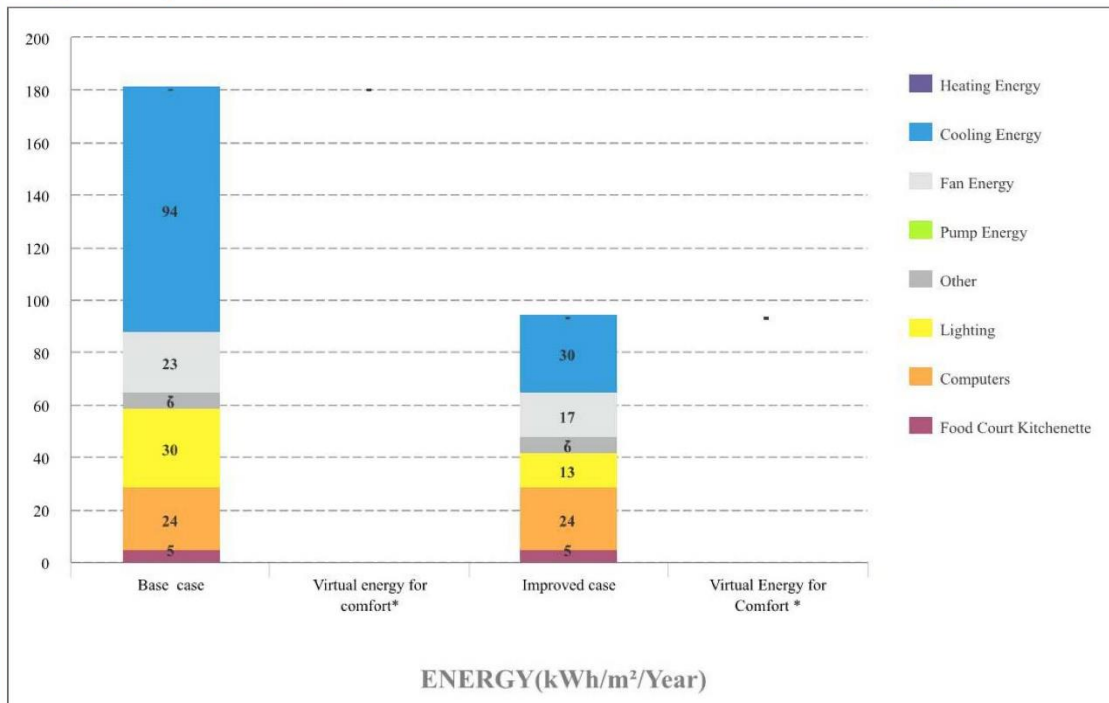
## RESULTS

Final Energy Use : 23,792.59 kWh/Month	Operational CO <sub>2</sub> Savings : 209.42 tCO <sub>2</sub> /Year
Final Water Use : 275.10 m <sup>3</sup> /Month	Embodied Energy Savings : 791.42 MJ/m <sup>2</sup>
Base Case Utility Cost : 39,061.78 \$/Month	Incremental Cost : 117,470.03 \$
Utility Costs Reduction : 18,675.76 \$/Month	Payback in Years : 0.52 Yrs.
Energy Savings : 261.59 MWh/Year	Water Savings : 2077.40 m <sup>3</sup> /Year
Embodied Energy in Material : 2374.25 GJ Savings	Aggregate Floor Space : 3000.00 m <sup>2</sup> including Multiplier

## Energy Efficiency Measures 47.81%

## ENERGY SAVINGS

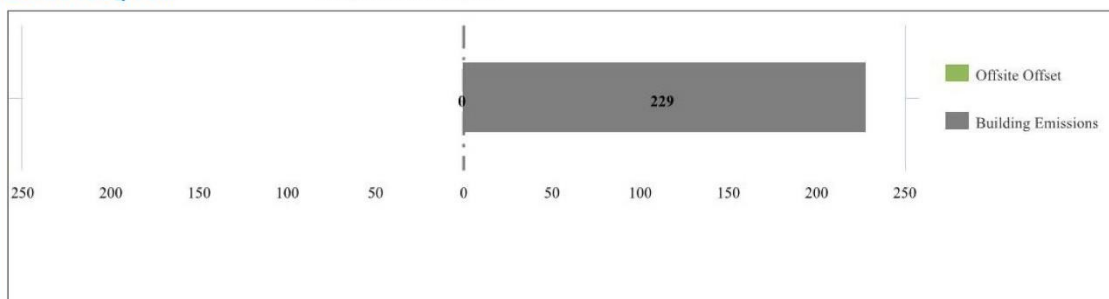
## Meets EDGE Energy Standard



\*Virtual energy is the amount of energy that will be required based on the assumption that the office will eventually install air conditioning or heating.

## 228.60 tCO<sub>2</sub>/Year

## CARBON SAVINGS



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4

No	OFE01 Reduced Window to Wall Ratio - WWR of 30%	North	
		South	
		East	
		West	
		Northeast	
		Northwest	
		Southeast	
		Southwest	
Yes	OFE02 Reflective Paint/Tiles for Roof -Solar Reflectivity (albedo) of 70	SR	
No	OFE03 Reflective Paint for External Walls -Solar Reflectivity (albedo) of 70	SR	
Yes	OFE04 External Shading Devices - Annual Average Shading Factor (AASF) of 0.58	AASF	
Yes	OFE05 Insulation of Roof - U Value of 0.68	W/m <sup>2</sup> K	0.68
Yes	OFE06 Insulation of External Walls - U Value of 0.56	W/m <sup>2</sup> K	0.56
No	OFE07 Low-E Coated Glass - U-Value of 3 W/m <sup>2</sup> K and SHGC of 0.45	W/m <sup>2</sup> K	
		SHGC	
Yes	OFE08 Higher Thermal Performance Glass - U Value of 1.95 W/m <sup>2</sup> K and SHGC of 0.28	W/m <sup>2</sup> K	
		SHGC	
No	OFE09 Natural Ventilation with Operable Windows and No A/C		
Yes	OFE10 Ceiling Fans for Office Spaces		
No	OFE11 Variable Refrigerant Flow (VRF) System - COP of 3.5	COP	
No	OFE12 Air Conditioning with Air Cooled Screw Chiller - COP of 3.3	COP	
No	OFE13 Air Conditioning with Water Cooled Chiller - COP of 6.1	COP	
No	OFE14 Ground Source Heat Pump - COP of 4.65	COP	
No	OFE15 Absorption Chiller Powered by Waste Heat - COP of 0.7	COP	

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No	OFE16	Radiant Cooling and Heating System - COP of RC 2.83		
No	OFE17	Recovery of Waste Heat from the Generator for Space Heating		
No	OFE18	Variable Speed Drives on the Fans of Cooling Towers		
No	OFE19	Variable Frequency Drives in AHUs		
No	OFE20	Variable Speed Drives Pumps		
No	OFE21	Sensible Heat Recovery from Exhaust Air - Efficiency of 60%	% Eff.	
No	OFE22	High Efficiency Condensing Boiler for Space Heating - Efficiency of 90%	% Eff.	
No	OFE23	Air Economizers During Favorable Outdoor Conditions		
Yes	OFE24	Energy-Saving Light Bulbs - Internal Spaces		
Yes	OFE25	Energy-Saving Light Bulbs - External Spaces		
No	OFE26	Lighting Controls for Corridors and Staircases		
No	OFE27	Occupancy Sensors in Bathrooms, Conference Rooms, and Closed Cabins		
No	OFE28	Occupancy Sensors in Open Offices		
No	OFE29	Daylight Photoelectric Sensors for Internal Spaces		
No	OFE30	Solar Photovoltaics - 25% of Total Energy Demand	% of Annual Electricity Use	
			Capacity (kWp)	-
No	OFE31	Other Renewable Energy for Electricity Generation	Source type	Biomass
			% of Annual Electricity Use	
No	OFE32	Offsite Renewable Energy Procurement - Equal to 100% of total Operational CO2	% Annual Operational CO2	
			kWh/Year	-
No	OFE33	Carbon Offset-100% of Total CO2	% Annual Operational CO2	
			tCO2/Year	-

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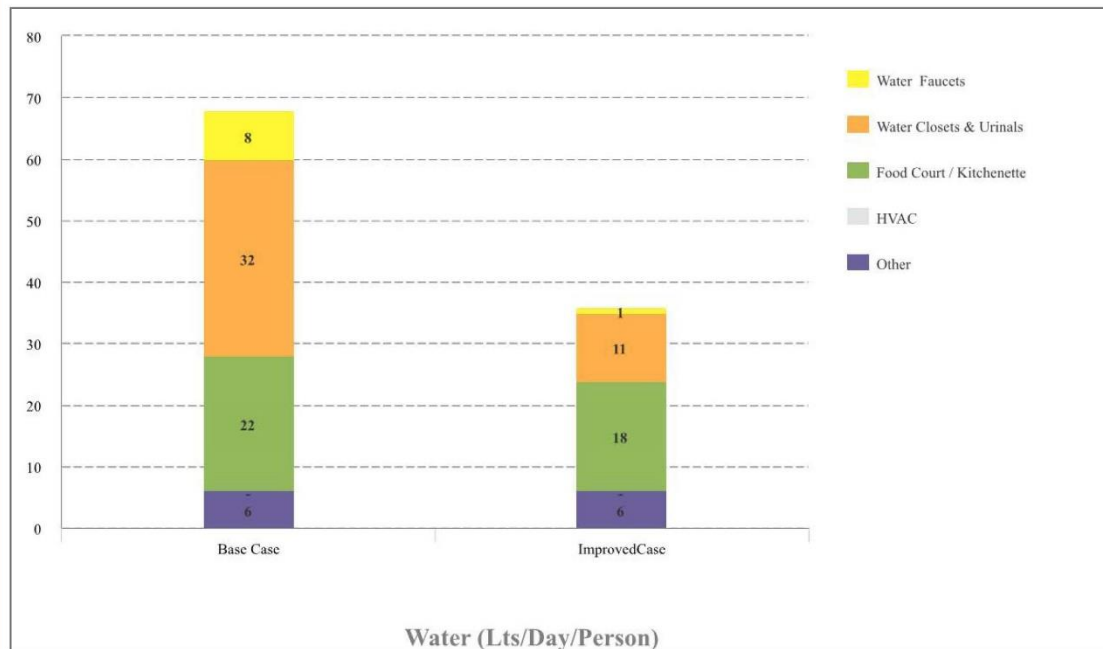
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6

**Water Efficiency Measures 46.56%**

**WATER SAVINGS**

**Meets EDGE Water Standard**



Yes	OFW01	Low-Flow Faucets in Bathrooms - 1 lt./min	Lt./min	1
Yes	OFW02	Dual Flush for Water Closets in Bathrooms - 4 lt./1st flush and 2 lt./2nd flush	1st - Lt./flush	4
No		Single Flush/Flush Valve	2nd - Lt./flush	2
Yes	OFW03	Water-Efficient Urinals in all Bathrooms - 0.5 lt./flush	Lt./flush	0.5
Yes	OFW04	Water-Efficient Faucets for Kitchen Sinks - 4 lt./min	Lt./min	
No	OFW05	Condensate Water Recovery		
No	OFW06	Rainwater Harvesting System - 50% of Roof Area Used for Collection	% of Roof Area Used	
No	OFW07	Grey Water Treatment and Recycling System		
No	OFW08	Black Water Treatment and Recycling System		

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Project No.: 1000149469

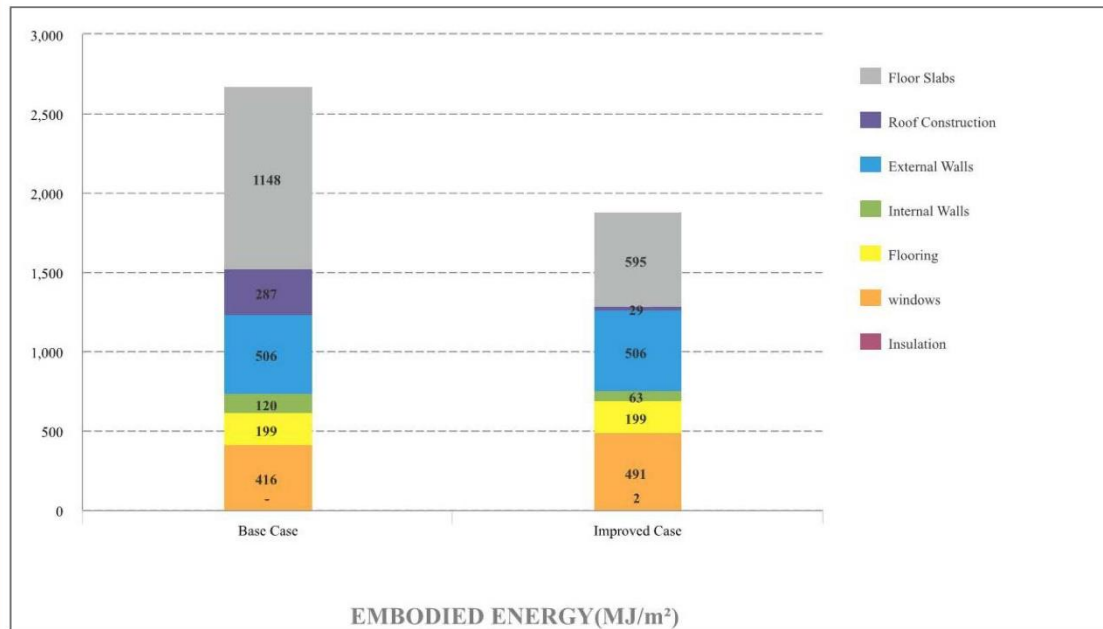
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7

Materials Efficiency Measures 29.57%

EMBODIED ENERGY SAVINGS

Meets EDGE Material Standard



OFM01 Floor Slabs

In-Situ Reinforced Concrete Slab  
350 mm  
Steel : 35 kg/m²

In-Situ Concrete with >25% GGBS

Proportion %

Thickness

Steel Rebar

mm

kg/m²

OFM02 Roof Construction

In-Situ Reinforced Concrete Slab  
350 mm  
Steel : 35 kg/m²

Type 1 Aluminum-Clad Sandwich Panel

100 %

mm

kg/m²

OFM03 External Walls

Common Brick Wall with Internal & External Plaster  
200 mm

Type 1 Common Brick Wall with Internal & External Plaster

100 %

mm

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Project No.: 1000149469

Date Time: 22-Jun-2018 11:32:56

8

		Proportion %	Thickness
<b>OFM04 Internal Walls</b>			
Common Brick Wall with Plaster on Both Sides	Type 1 Cored (with Holes) Bricks with Plaster on Both Sides	100 %	mm
100 mm			
<b>OFM05 Flooring</b>			
Ceramic Tile	Type 1 Ceramic Tile	100 %	
<b>OFM06 Window Frames</b>			
Aluminium	Type 1 Aluminium	100 %	Double Glazing
Single Glazing			
<b>OFM07 Wall Insulation</b>			
No Insulation	Cellulose		mm
U : ~ 1.86 W/m <sup>2</sup> k			
<b>OFM08 Roof Insulation</b>			
No Insulation	Cellulose		mm
U : ~ 1.99 W/m <sup>2</sup> k			

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EDGE Version : 2.1.4

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Project No.: 1000149469

Date Time: 22-Jun-2018 11:32:56

9

## 9.9 EDGE Results Existing Buildings (2 identical buildings)



### Project Details

Project Name : MOH	Address Line1 : Rode Kruislaan
Number of Distinct Buildings : 1	Address Line2 :
Number of EDGE Subproject(s) : 1 associated	City : Paramaribo
Total Project Floor Area : 1,860 m <sup>2</sup>	State/ Province :
Project Owner Name : MOH	Postal Code :
Project Owner Email : liviam@iadb.org	Country : Suriname
Project Owner Phone : 2028137716	Project Number : 1000140766
<b>Associated Subproject(s):</b> MOH	

### Subproject Details

Subproject Name : MOH	Address Line1 : Rode Kruislaan
Office Name : MOH REUSE	Address Line2 :
Subproject Multiplier for the : 1 Project	City : Paramaribo
Certification Stage : Post-Construction	State/ Province :
Status : Self-Review	Postal Code :
Auditor :	Country : Suriname
Certifier :	Subproject Type : Existing Building
Year of Construction : 1998	

### Building Utility Data

Annual Measured Electricity Consumption :	kWh/Year	<b>Existing Building Energy Performance Index</b>
Annual Measured Water Consumption :	m <sup>3</sup> /Year	0.00 kWh/m <sup>2</sup> /Year
Annual Measured Natural Gas Consumption :	m <sup>3</sup> /Year	<b>Existing Building Water Usage Index</b>
Annual Measured Diesel Consumption :	kL/Year	0.00 Lts/Person/Day
Annual Measured LPG Consumption :	Kg/Year	

### Location Data

Country : Suriname  
City : Paramaribo



Created By: Livia Minoja

File Number: 18041710028497

EDGE Version : 2.1.4

Modified By: Livia Minoja

Project No.: 1000140766

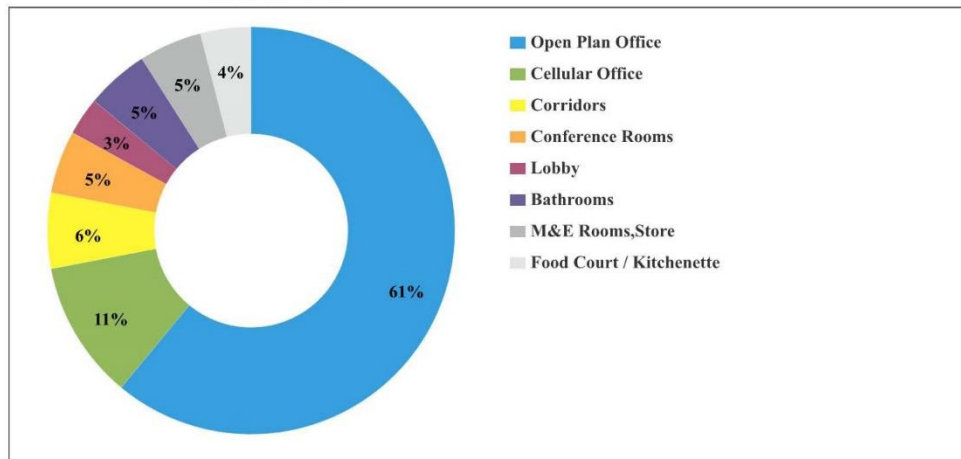
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1



## Building Data

		Default	User Entry
Gross Internal Area Excluding Car Parking :	1,860 m <sup>2</sup>	Occupancy Density :	12 m <sup>2</sup> /Person
Floors Above Grade :	2 no.	Operational Hours :	10 Hours/Day
Floors Below Grade :	0 no.	Working Days :	5 Days/Week
Floor-to-Floor Height :	3.5 m	Holidays :	12 Days/Year
Food Court / Kitchenette :	Yes		
Cellular Office :	No		



	Default	User Entry
Open Plan Office :	1,135	m <sup>2</sup>
Private/Closed Office :	205	m <sup>2</sup>
Corridors :	112	m <sup>2</sup>
Conference Rooms :	93	m <sup>2</sup>
Lobby :	56	m <sup>2</sup>
Bathrooms :	93	m <sup>2</sup>
M&E Rooms, Store ** :	93	m <sup>2</sup>
Food Court / Kitchenette :	74	m <sup>2</sup>
<b>Gross Internal Area :</b>	<b>1,860</b>	<b>m<sup>2</sup></b>

\*\* The M&E Rooms, Store field is equal to the remaining space required to total the Built-up Area Excluding Car Parking.

## Building Orientation

		Building Lengths	
		Default	User Entry
Floor Plan Depth*** :	10.0 m	North	15.6 0 m
Main Orientation*** :	Equal	South	15.6 0 m
		East	15.6 0 m
		West	15.6 0 m
		Northeast	<del>15.6</del> 100 m
		Northwest	<del>15.6</del> 10 m
		Southeast	<del>15.6</del> 10 m
		Southwest	<del>15.6</del> 100 m

\*\*\* These parameters will be used to estimate building dimensions. If the exact details of the dimensions and orientation are available, then complete the User Entry fields in the Building Lengths section. The orientation of the building will have a direct effect on energy consumption.

Created By: Livia Minoja

File Number: 18041710028497

EDGE Version : 2.1.4

Modified By: Livia Minoja

Project No.: 1000140766

Date Time: 22-Jun-2018 11:30:09

2

## Building Systems

Does building design include an AC system? : Yes

Does building design include space heating system? : No

## Key Assumptions for the Base Case

	Default	User Entry
Fuel Used for Electric Generator :	Diesel	Diesel
Fuel Used for Cooking :	Electricity	Electricity
Fuel Used for Space Heating :	Electricity	Electricity
% of Electricity Generation Using Diesel :	5%	% Ave. Yrly
Cost of Electricity :	0.890	\$/kWh
Cost of Diesel Fuel :	0.830	\$/L
Cost of LPG/Natural Gas :	0.000	\$/L
Cost of Water :	0.120	\$/kL
CO <sub>2</sub> Emissions from Electricity Generation :	838.00	g/kWh
Window to Wall Ratio :	40.00%	%
Solar Reflectivity for Paint - Wall :	30.00%	%
Solar Reflectivity for Paint - Roof :	30.00%	%
Roof U - Value :	1.99	W/m <sup>2</sup> K
Wall U - Value :	1.86	W/m <sup>2</sup> K
Glass U - Value :	5.90	W/m <sup>2</sup> K
Glass SHGC :	0.50	Factor
Cooling System :	ASHRAE 90.1.2007	ASHRAE 90.1.2007
AC System Efficiency :	2.66	COP
Heating System :	ASHRAE 90.1.2007	ASHRAE 90.1.2007
Heating System Efficiency :	4.00	COP

### Monthly Average Outdoor Temperature (deg.C)

	Default	User Entry
Jan :	25.8	
Feb :	26.0	
Mar :	26.2	
Apr :	26.2	
May :	26.2	
Jun :	25.8	
Jul :	26.0	
Aug :	26.6	
Sep :	27.0	
Oct :	27.1	
Nov :	26.8	
Dec :	26.2	
Latitude :	5.50	Deg
Annual Average Rainfall :	300.00	mm

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File Number: 18041710028497

EDGE Version : 2.1.4

Modified By: Livia Minoja

Project No.: 1000140766

Date Time: 22-Jun-2018 11:30:09

3

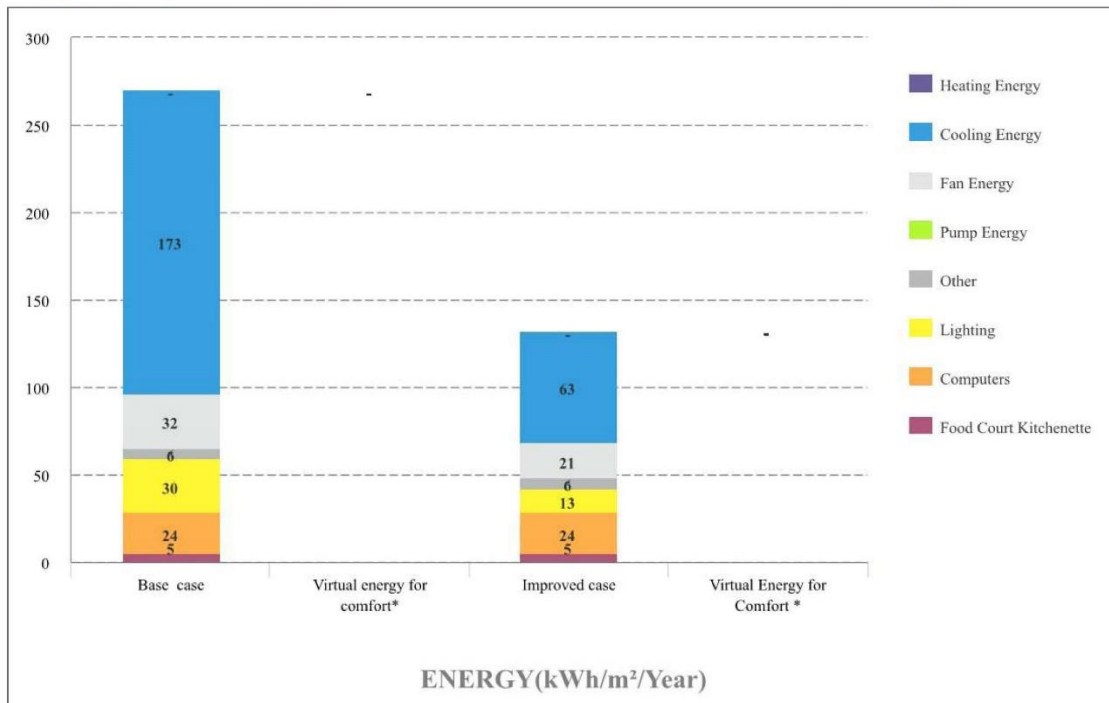
## RESULTS

Final Energy Use : 20,570.05 kWh/Month	Operational CO <sub>2</sub> Savings : 204.11 tCO <sub>2</sub> /Year
Final Water Use : 192.92 m <sup>3</sup> /Month	Embodied Energy Savings : 2,167.64 MJ/m <sup>2</sup>
Base Case Utility Cost : 35,810.98 \$/Month	Incremental Cost : 235,993.42 \$
Utility Costs Reduction : 18,192.83 \$/Month	Payback in Years : 1.08 Yrs.
Energy Savings : 254.96 MWh/Year	Water Savings : 1287.99 m <sup>3</sup> /Year
Embodied Energy in Material : 4031.82 GJ Savings	Aggregate Floor Space : 1860.00 m <sup>2</sup> including Multiplier

### Energy Efficiency Measures 50.81%

### ENERGY SAVINGS

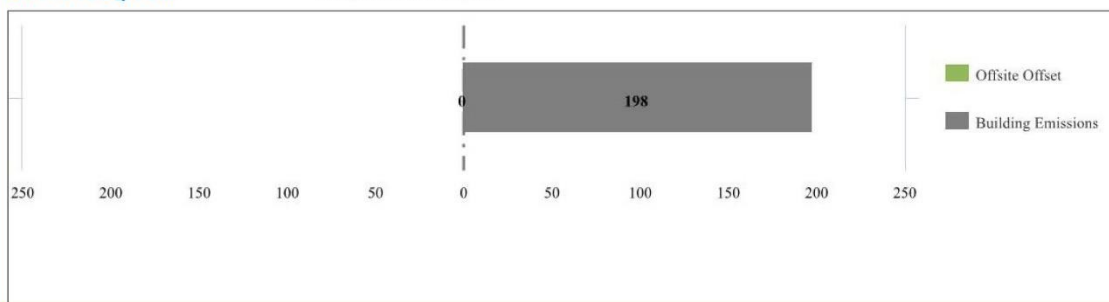
### Meets EDGE Energy Standard



\*Virtual energy is the amount of energy that will be required based on the assumption that the office will eventually install air conditioning or heating.

### 197.70 tCO<sub>2</sub>/Year

### CARBON SAVINGS



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Date Time: 22-Jun-2018 11:30:09

4

No	OFE01 Reduced Window to Wall Ratio - WWR of 30%	North	
		South	
		East	
		West	
		Northeast	
		Northwest	
		Southeast	
		Southwest	
Yes	OFE02 Reflective Paint/Tiles for Roof -Solar Reflectivity (albedo) of 70	SR	
No	OFE03 Reflective Paint for External Walls -Solar Reflectivity (albedo) of 70	SR	
Yes	OFE04 External Shading Devices - Annual Average Shading Factor (AASF) of 0.58	AASF	
Yes	OFE05 Insulation of Roof - U Value of 0.68	W/m <sup>2</sup> K	0.68
No	OFE06 Insulation of External Walls - U Value of 0.44	W/m <sup>2</sup> K	
Yes	OFE07 Low-E Coated Glass - U-Value of 3 W/m <sup>2</sup> K and SHGC of 0.45	W/m <sup>2</sup> K	
		SHGC	
No	OFE08 Higher Thermal Performance Glass - U Value of 1.95 W/m <sup>2</sup> K and SHGC of 0.28	W/m <sup>2</sup> K	
		SHGC	
No	OFE09 Natural Ventilation with Operable Windows and No A/C		
Yes	OFE10 Ceiling Fans for Office Spaces		
No	OFE11 Variable Refrigerant Flow (VRF) System - COP of 3.5	COP	
No	OFE12 Air Conditioning with Air Cooled Screw Chiller - COP of 3.3	COP	
No	OFE13 Air Conditioning with Water Cooled Chiller - COP of 6.1	COP	
No	OFE14 Ground Source Heat Pump - COP of 4.65	COP	
No	OFE15 Absorption Chiller Powered by Waste Heat - COP of 0.7	COP	

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Modified By: Livia Minoja	Project No.: 1000140766	Date Time: 22-Jun-2018 11:30:09	5

No	OFE16	Radiant Cooling and Heating System - COP of RC 2.66		
No	OFE17	Recovery of Waste Heat from the Generator for Space Heating		
No	OFE18	Variable Speed Drives on the Fans of Cooling Towers		
No	OFE19	Variable Frequency Drives in AHUs		
No	OFE20	Variable Speed Drives Pumps		
No	OFE21	Sensible Heat Recovery from Exhaust Air - Efficiency of 60%	% Eff.	
No	OFE22	High Efficiency Condensing Boiler for Space Heating - Efficiency of 90%	% Eff.	
No	OFE23	Air Economizers During Favorable Outdoor Conditions		
Yes	OFE24	Energy-Saving Light Bulbs - Internal Spaces		
Yes	OFE25	Energy-Saving Light Bulbs - External Spaces		
No	OFE26	Lighting Controls for Corridors and Staircases		
No	OFE27	Occupancy Sensors in Bathrooms, Conference Rooms, and Closed Cabins		
No	OFE28	Occupancy Sensors in Open Offices		
No	OFE29	Daylight Photoelectric Sensors for Internal Spaces		
No	OFE30	Solar Photovoltaics - 25% of Total Energy Demand	% of Annual Electricity Use	
			Capacity (kWp)	-
No	OFE31	Other Renewable Energy for Electricity Generation	Source type	Biomass
			% of Annual Electricity Use	
No	OFE32	Offsite Renewable Energy Procurement - Equal to 100% of total Operational CO2	% Annual Operational CO2	
			kWh/Year	-
No	OFE33	Carbon Offset-100% of Total CO2	% Annual Operational CO2	
			tCO2/Year	-

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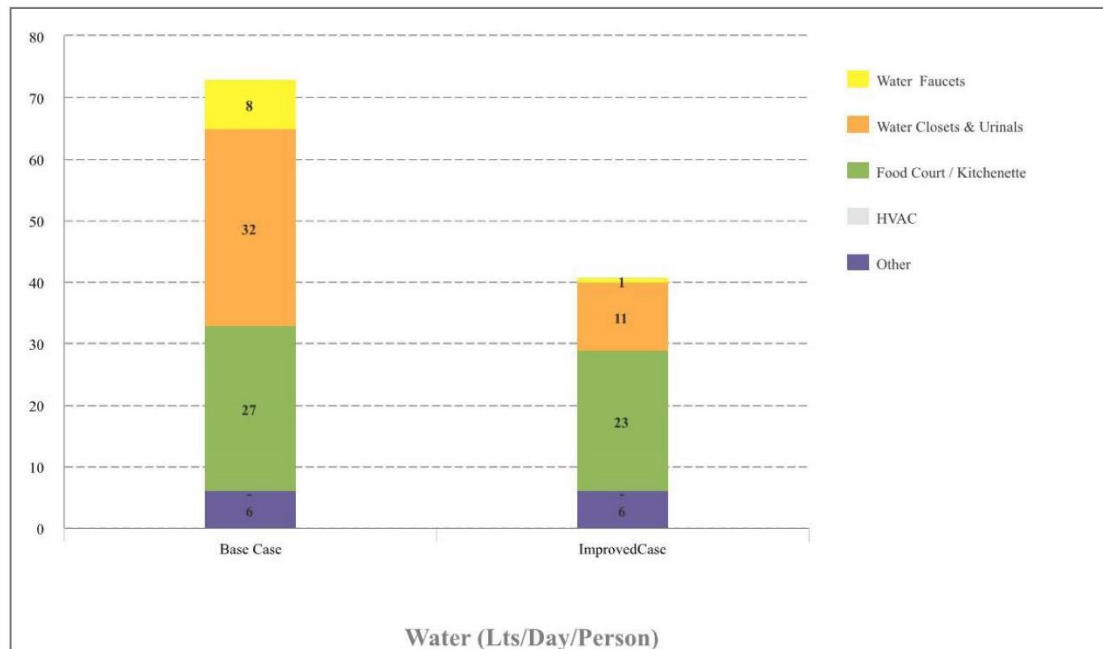
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6

**Water Efficiency Measures 43.51%**

**WATER SAVINGS**

**Meets EDGE Water Standard**



Yes	OFW01	Low-Flow Faucets in Bathrooms - 1 lt./min	Lt./min	1
Yes	OFW02	Dual Flush for Water Closets in Bathrooms - 4 lt./1st flush and 2 lt./2nd flush	1st - Lt./flush	4
No		Single Flush/Flush Valve	2nd - Lt./flush	2
Yes	OFW03	Water-Efficient Urinals in all Bathrooms - 0.5 lt./flush	Lt./flush	0.5
Yes	OFW04	Water-Efficient Faucets for Kitchen Sinks - 4 lt./min	Lt./min	
No	OFW05	Condensate Water Recovery		
No	OFW06	Rainwater Harvesting System - 50% of Roof Area Used for Collection	% of Roof Area Used	
No	OFW07	Grey Water Treatment and Recycling System		
No	OFW08	Black Water Treatment and Recycling System		

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EDGE Version : 2.1.4

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Project No.: 1000140766

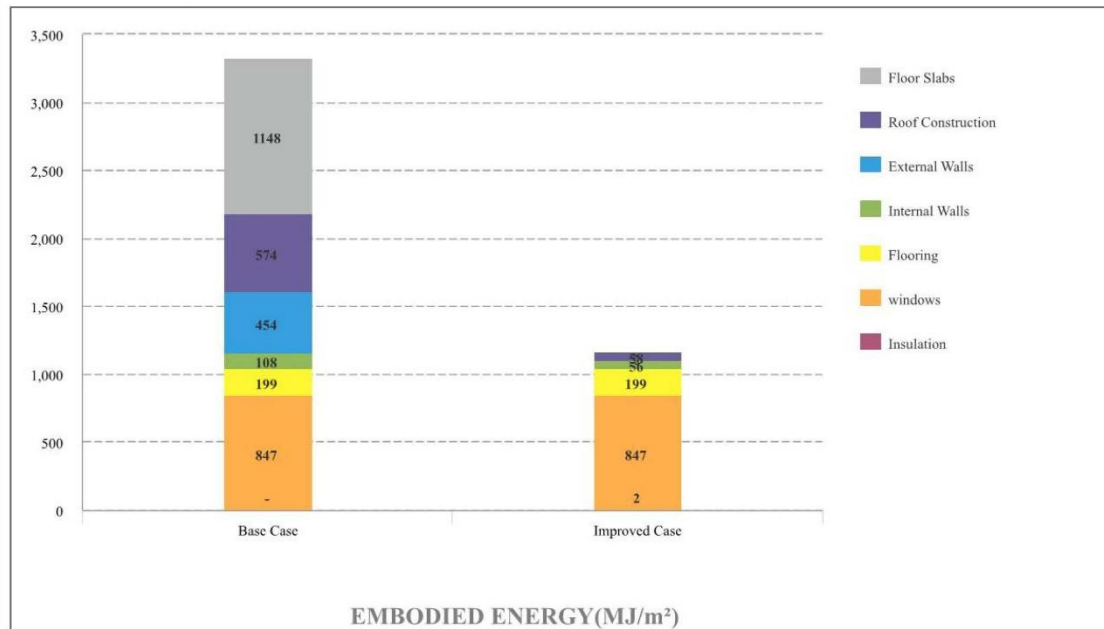
Date Time: 22-Jun-2018 11:30:09

7

Materials Efficiency Measures 65.09%

EMBODIED ENERGY SAVINGS

Meets EDGE Material Standard



OFM01 Floor Slabs

In-Situ Reinforced Concrete Slab  
350 mm  
Steel : 35 kg/m²

Re-Use of Existing Floorslab

Proportion %

Thickness

Steel Rebar

mm

kg/m²

OFM02 Roof Construction

In-Situ Reinforced Concrete Slab  
350 mm  
Steel : 35 kg/m²

Type 1 Aluminum-Clad Sandwich Panel

100 %

mm

kg/m²

OFM03 External Walls

Common Brick Wall with Internal & External Plaster  
200 mm

Type 1 Re-Use of Existing Wall

100 %

mm

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Project No.: 1000140766

Date Time: 22-Jun-2018 11:30:09

8

		Proportion %	Thickness
<b>OFM04 Internal Walls</b>			
Common Brick Wall with Plaster on Both Sides	Type 1 Cored (with Holes) Bricks with Plaster on Both Sides	100 %	mm
100 mm			
<b>OFM05 Flooring</b>			
Ceramic Tile	Type 1 Ceramic Tile	100 %	
<b>OFM06 Window Frames</b>			
Aluminium	Type 1 Aluminium	100 %	Single Glazing
Single Glazing			
<b>OFM08 Roof Insulation</b>			
No Insulation	Cellulose		mm
U : ~ 1.99 W/m²k			

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EDGE Version : 2.1.4

Modified By: Livia Minoja

Project No.: 1000140766

Date Time: 22-Jun-2018 11:30:09

9



## 10. REQUEST FOR PROPOSALS (RfP), REQUIREMENTS AND DELIVERABLES.

In order to compete in the selection process, there will be a procedure for the interested architects to join the PROPOSAL. Candidates will need to provide an estimate for the costs of delivering the design, definite drawings, construction calculation and drawings. Moreover, the candidate will be requested to perform a cost calculation, execution planning, as well as calculate the costs of supervising the project.

**Architect (Project Manager). Master's Degree in Architecture with at least 10 years of professional experience.**

- The candidate will have specialized knowledge of international and local construction practices and standards. Experience working in Suriname, a country with a humid tropical climate, is also required.
- Familiarity with local construction rules and regulations is required.
- Familiarity with energy efficiency measures and green buildings is a plus.
- The candidate will have proven experience as a Project Manager (team leader) and will be the spokesperson responsible for the Consultancy Firm's entire team vis-à-vis of the MOH and IDB.
- Deliver a portfolio of designs of equivalent buildings and/or projects.
- Deliver proof of successful concluded projects, within the budget and within the requested time scheme.
- Knowledge in and experience with the principles of sound architectural design in a tropical climate is an asset.
- The candidate must know how to work with computer platforms: Microsoft Office, specially Microsoft Word and Excel, and AutoCad.

**Structural Engineer: Bachelor's Degree in Civil/Structural Engineering with at least 8 years of relevant professional experience.**

- The candidate will have proven an established track record in design and construction works.
- Familiarity with local construction rules and regulations are required.
- The candidate must be able to evaluate and advice on (technical) issues related to the project put forward by the Contractor or Supervisor including any alternative proposals.
- Knowledge of occupational safety is an asset.
- The candidate must know how to work with computer platforms: Microsoft Office, specially Microsoft Word and Excel, and AutoCad.

**Electrical Engineer: Bachelor's Degree in Electrical/Mechanical Engineering with at least 5 years of relevant professional experience.**

- Familiarity with local construction and electrical rules and regulations is required.
- The candidate must be able to evaluate and advice on electrical/mechanical issues related to the project put forward by the Contractor or Supervisor including any alternative proposals.
- Experience in the design, supervision, and construction of architectural works, including experience in the design and construction of public buildings and offices.

- Languages: English, fluency spoken and written is required. Fluent Dutch is preferable.

**Landscape Designer: Bachelor's Degree in Landscape Design or relevant field, with at least 5 years of relevant professional experience**

- The candidate will have specialized knowledge of international and local practices and standards. Experience working in Suriname, a country with a humid tropical climate, is also required.
- Familiarity with flood resilience in landscape design is a plus.
- Deliver a portfolio of designs of equivalent landscape areas as the one in consideration.
- The candidate must know how to work with computer platforms: Microsoft Office, specially Microsoft Word and Excel, and AutoCad.

The design will be judged by the candidate's solutions in relation to:

- Climate control: making use of the natural climate in combination with air -conditioning when needed.
- Natural light.
- Contact with the outside, large windows, and view.
- Universal accessibility: entrances to the public facilities must be easily accessible and recognizable, preferably at the outside of the building.
- Adapted to kids and handicapped people.
- Energy efficiency criteria, mainly passive (orientation, cross ventilation, insulation, materials, solar control, use of vegetation, etc.).
- Introduction of "green building" items and environment friendly materials and sustainability in design. (Reuse of existing construction will reduce the CO<sub>2</sub> burden).

The information needed by the MoH to permit the execution of the works, for example:

- Specification of building materials and system.
- Specification drawings.
- Structural calculations and drawings.
- List of materials with descriptions and quantity.
- Definite budget for tendering.
- Executing schemes.

Available executing time 120 days, 6 months per building.

Deliverables by the Architect for the new building (estimated time of delivery 210 days):

- Preliminary Design, floor plans, cross sections and facades, within 60 days, to be approved by the client
- Definite Design, with indication of the construction and cost estimate, adapted to the definite design, within 60 days after approval of the preliminary design, to be approved by the client.

Within 90 days after approval of definite design:

- Specification of building materials and system.

- Specification drawings.
- Structural calculations and drawings.
- List of materials with descriptions and quantity.
- Definite budget for tendering.
- Executing schemes.

Available construction time, 18 months, 540 days.

## ANNEX I: PICTURES

### 12.1 Ministry of Health - Headquarters



Figure 19: MoH Headquarters - interiors



Figure 18: MoH Headquarters - interiors



Figure 20: MoH Headquarters – interiors



Figure 21: MoH Headquarters - structural defects



## 12.2 Ministry of Health – Rode Kruislaan Compound – Building A



Figure 22: Building A - exteriors



Figure 23: Building A - ground floor



Figure 25: Building A - entrance

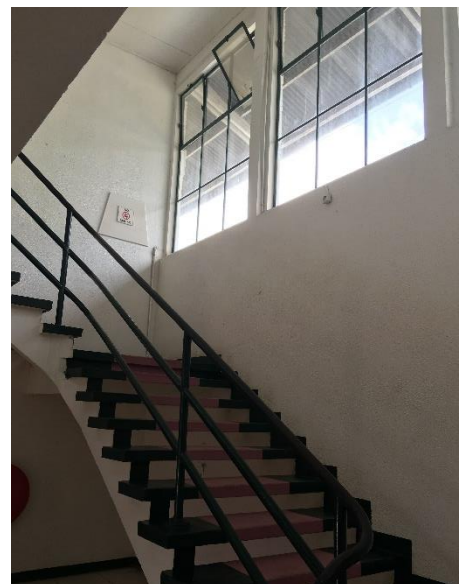


Figure 24: Building A - interior staircase





Figure 27: Building A – interiors



Figure 26: Building A - interiors

### 12.3 Ministry of Health – Rode Kruislaan Compound – Annexes to Building A



Figure 28: Breastfeeding Center



Figure 29: Parking lot



### 12.3 Ministry of Health – Rode Kruislaan Compound –Building B



Figure 30: Building B – exteriors



Figure 31: Building B - abandoned central laboratories



Figure 32: Building B - vaccines and medicines storage



Figure 33: Building B - vaccines and medicines storage





Figure 34: Building B - vaccines center



Figure 350: Building B - termites infestation



Figure 31: Building B - bats infestation

#### 12.4 Ministry of Health – Rode Kruislaan Compound –Building C



Figure 36: Building C – exteriors



Figure 37: Building C - internal staircase





Figure 38: Building C - interiors



Figure 35: Building C - interiors



Figure 36: Building C - interiors

## ANNEX III: Survey

The following survey was undertaken by IDB to MOH employees on May 2018.

### WORKING ENVIRONMENT SURVEY

**THANK YOU FOR YOUR RESPONSES. THEY WILL BE KEPT ANONYMOUS.**

P01 Where is your office currently located-address?

**Answer the following questions in reference to your usual office location.**

P02 How much time does it take you to reach your office from your home? Answer hours-minutes.

HOURS  
MINUTES


P03 ¿In the last 7 days much money did you spend in transportation from your home to your office, including public transportation, taxi, gasoline and parking?

SRD\$ per week \_\_\_\_\_.

P031 ¿In the last 7 days, how much time did you spend finding a parking facility at your office location?

HOURS  
MINUTES


P032 ¿In the last 7 days much money did you spend in parking at your office location?

SRD\$ per week \_\_\_\_\_.

P04 ¿During the last 7 days how many meetings did you have outside your office building?

NUMBER

P05 ¿During the last seven days how much time did you spend in meetings outside your office building?

HOURS  
MINUTES


P06 ¿During the last seven days how much time did you spend moving between the MoH Headquarter building and the Rode Kruislaan compound? (hours-minutes)

HOURS  
MINUTES


P07 ¿How much money do you spend in transportation from your office to outside meetings, including public transportation, taxi, gasoline and parking?

US\$ \_\_\_\_\_.

P08 ¿During the last 7 days how many meetings did you have in your office building?

DAYS

P09 ¿During the last seven days how much time did you spend in meetings in your office building? (hours-minutes)

HOURS  
MINUTES


P10 ¿During the last 7 days with how many colleagues did you collaborate in your usual work activities?

NUMBER

P11 Rate the following aspects of your working physical environment on a scale of 1 to 5

1=VERY BAD      2=BAD      3=OK      4=GOOD      5=EXCELLENT

A.	Natural light	<input type="text"/>
B.	Artificial light	<input type="text"/>
C.	Temperature	<input type="text"/>
D.	Space (m2)	<input type="text"/>
E.	Furniture	<input type="text"/>
F.	Art and decoration-plants	<input type="text"/>
G.	Meeting rooms	<input type="text"/>
H.	Dining room	<input type="text"/>
I.	Sanitary services	<input type="text"/>
J.	Recreation and leisure areas	<input type="text"/>
K.	Easy to enter the building	<input type="text"/>
L.	Easy to move within the building	<input type="text"/>
M.	Equipment (computers, printers, etc.)	<input type="text"/>
N.	Parking	<input type="text"/>
O.	Safety from fire	<input type="text"/>
Q.	Other	<input type="text"/>

P12 How many times in the last month there was no electricity in the building?

NUMBER

P13 On a scale of 1 to 10, where 1=not affected and 10=very affected, rate how the lack of electricity affected the tasks you needed to do

rating

P14 How many times in the last month there was no water in the building?

NUMBER

P15 On a scale of 1 to 10, where 1=not affected and 10=very affected, rate how the lack of water affected the tasks you needed to do

rating

P16 ¿On a scale of 1 to 10, in which you are extremely satisfied and 1 equals very unsatisfied, how would you rate the overall physical working environment?

rating

P17 Please check:

1	MALE	<input type="text"/>
2	FEMALE	<input type="text"/>

P18 ¿What is your age in years?

AÑOS:

P19 What is your usual work schedule:

Time start:	<input type="text"/>	<input type="text"/>
Time end:	<input type="text"/>	<input type="text"/>

The following table show the average answers to the survey.

How much time does it take you to reach your office from your home? Answer hours-minutes.	Minutes	43.8
¿In the last 7 days much money did you spend in transportation from your home to your office, including public transportation, taxi, gasoline and parking?	SRD	161.9
¿In the last 7 days, how much time did you spend finding a parking facility at your office location?	Minutes	17.8
¿In the last 7 days much money did you spend in parking at your office location?	SRD	2.3
¿During the last 7 days how many meetings did you have outside your office building?	Number	2.7
¿During the last seven days how much time did you spend in meetings outside your office building?	Hours	7.9
¿During the last seven days how much time did you spend moving between the MoH Headquarter building and the Rode Kruislaan compound? (hours-minutes)	Hours	1.0
¿How much money do you spend in transportation from your office to outside meetings, including public transportation, taxi, gasoline and parking?	USD	7.9
¿During the last 7 days how many meetings did you have in your office building?	Number	4.4
¿During the last seven days how much time did you spend in meetings in your office building? (hours-minutes)	Hours	8.4
¿During the last 7 days with how many colleagues did you collaborate in your usual work activities?	Number	9.4
Rate the following aspects of your working physical environment on a scale of 1 to 5 (1 = very bad; 2= bad; 3= ok; 4= good; 5=excellent	General rate	2.7
Natural light	Rate	3.5
Artificial light	Rate	3.3
Temperature	Rate	3.5
Space (m2)	Rate	3.4
Furniture	Rate	3.1
Art and decoration-plants	Rate	1.7
Meeting rooms	Rate	2.6

Dining room	Rate	1.1
Sanitary services	Rate	2.5
Recreation and leisure areas	Rate	1.5
Easy to enter the building	Rate	2.9
Easy to move within the building	Rate	3.1
Equipment (computers, printers, etc.)	Rate	2.5
Parking	Rate	2.6
Safety from fire	Rate	2.6
Other	Rate	0.0
How many times in the last month there was no electricity in the building?	Rate	0.4
On a scale of 1 to 10, where 1=not affected and 10=very affected, rate how the lack of electricity affected the tasks you needed to do	Rate	6.7
How many times in the last month there was no water in the building?	Rate	1.0
On a scale of 1 to 10, where 1=not affected and 10=very affected, rate how the lack of electricity affected the tasks you needed to do	Rate	5.1
¿On a scale of 1 to 10, in which you are extremely satisfied and 1 equals very unsatisfied, how would you rate the overall physical working environment?	Rate	5.5
1 MALE 2 FEMALE	Sex	1.8
AGE	Age	43.1
START WORK DAY	Starting hour	7.2
END WORK DAY	Ending hour	15.5

## ANNEX III: Ministry of Public Works Technical Report





# **MINISTERIE VAN OPENBARE WERKEN**

**DIRECTORAAT BOUWKUNDIGE WERKEN EN DIENSTVERLENING**

**ONDERDIREKTORAAT BOUWKUNDIGE WERKEN**

**AFDELING UTILITEITSBOUW**

**Mr. J. LACHMONSTRAAT 167 – PARAMARIBO – SURINAME**

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## **ONDERZOEK&RAPPORTAGE**

### **Inspectie Visuele en technische staat**

**Bureau Openbare Gezondheidszorg  
(Rodekruislaan)**

---

**Onderdeel : Onderzoek & Rapportage**

**Datum : 12 april 2018**

**Controleurs :     Algoe D.  
                          Amattaram A.  
                          Jainath N.  
                          Kidjo W.**

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## Inhoudsopgave

Inleiding .....	2
1    Technische staat.....	3
1.1    Controle bouwkundige aspecten Oud Centraal Lab.....	3
1.2    Controle bouwkundige aspecten M.O.B. gebouw.....	13
1.3    Controle bouwkundige aspecten Hoofdgebouw .....	20
1.4    Waarderingen en constatering en onderdelen .....	22
1.5    Bezetting van het gebouw .....	23
2    Prognose O.W.,T.&C. ....	24
Conclusie/ aanbeveling .....	26

## Inleiding

In opdracht van het hoofd van de afdeling Utiliteitsbouw is er een inspectie uitgevoerd van de gebouwen van het Bureau voor Openbare Gezondheidszorg (B.O.G.). Het B.O.G. is een dienstverlenend instituut en gevestigd aan de Rodekruislaan.

Vanuit het Ministerie van Openbare Werken is de volgende delegatie geweest:

- Mej. Algoe D., Afdeling Utiliteitsbouw
- Dhr. Amattaram A., Afdeling Utiliteitsbouw
- Dhr. Kidjo W., Afdeling Utiliteitsbouw
- Dhr. N. Jainath, Afdeling Volkswoningbouw

De bevindingen van de aangetroffen situatie zijn vervat in dit rapport. Het rapport heeft als doel het vaststellen van de huidige staat van het gebouw c.q. objecten d.m.v. een visuele inspectie.

De volgende onderdelen zijn behandeld:

- Waarderingen van diverse onderdelen: Visuele en technische staat;
- Constateringen en opmerkingen;

Aan de hand van afbeeldingen worden de diverse constateringen nader uitgelegd.

# 1 Technische staat

De bouwkundige aspecten die zijn gecontroleerd bij deze inspectie zijn:

- A. Gevels/wanden
- B. Plafond/dak
- C. Hang- en sluitwerk
- D. Trappen/balustrades
- E. Installaties

## 1.1 Controle bouwkundige aspecten Oud Centraal Lab

### A. Gevels/wanden

- Gevels: Bakstenen en 4" stenen
- Afbladdering van de verflaag op de gevels
- Geen scheuren in de muren
- Geen verzakkingen geconstateerd in het gebouw







### **B. Plafond en dak**

- De plafondplaten zijn deels totaal verrot, hangen los en moeten gesloopt worden.
- De afvoerbuizen zijn verroest/verrot.
- De zinkplaten zijn verroest/verrot.
- Er zijn lekkages in de gebouwen.













### **C. Hang- en sluitwerksx**

- De raamkozijnen zijn verouderd en aangetast.
- De binnendeuren zijn in een goede staat.



### **D. Trappen/ balustrades**

- De Buitentrap is in een slechte staat. Er zijn tekens van betonrot.





### **E. Installaties**

- Zekeringkasten zijn oud en van het oud systeem. Enkele schakel- en beveiligingskasten zijn wel vernieuwd/nieuw systeem. De subkasten zijn oud en van het oud systeem.
- Bekabelingen zijn al verouderd.









## 1.2 Controle bouwkundige aspecten M.O.B. gebouw

### A. Gevels/wanden

- Gevels: Bakstenen en 4" stenen
- Afbladderend van de verflaag op de gevels
- Scheuren in de muren op enkele locaties
- Geen verzakkingen geconstateerd in het gebouw









## **B. Plafond en dak**

- De plafondplaten zijn deels totaal verrot, hangen los en moeten gesloopt worden.
- De afvoerbuizen zijn verroest/verrot.
- De zinkplaten zijn verroest/verrot.
- Er zijn lekkages in de gebouwen.



## **C. Hang- en sluitwerk**

- De raamkozijnen zijn verouderd en aangetast.
- De binnendeuren zijn in een goede staat.

## **D. Trappen/ balustrades**

- De binnentrap is in een goede staat

## **E. Installaties**

- Zekeringkasten zijn oud en van het oud systeem. Enkele schakel- en beveiligingskasten zijn wel vernieuwd/nieuw systeem. De subkasten zijn oud en van het oud systeem.
- Bekabelingen zijn al verouderd.









### 1.3 Controle bouwkundige aspecten Hoofdgebouw

#### **A. Gevels/wanden**

- Gevels: Bakstenen en 4" stenen
- Afbladderende verf op de gevels
- Geen scheuren in de muren
- Geen verzakkingen geconstateerd in het gebouw





### **B. Plafond en dak**

- De plafondplaten zijn deels totaal verrot, hangen los en moeten gesloopt worden.
- De afvoerbuizen zijn verroest/verrot.
- De zinkplaten zijn verroest/verrot.
- Er zijn lekkages in de gebouwen.

### **C. Hang- en sluitwerk**

- De raamkozijnen zijn verouderd en aangetast.
- De binnendeuren zijn in een goede staat.

### **D. Trappen/ balustrades**

- De binnentrap is in een goede staat

### **E. Installaties**

- Zekeringkasten zijn oud en van het oud systeem. Enkele schakel- en beveiligingskasten zijn wel vernieuwd/nieuw systeem. De subkasten zijn oud en van het oud systeem.
- Bekabelingen zijn al verouderd.



## 1.4 Waarderingen en constatering onderdelen

De constatering van de diverse onderdelen zijn in navolgende tabel vervat.

No.	Onderdeel	Waardering	Constatering
1	Metselwerk	Redelijk	Plaatselijke afbrokkeling van de muren
1a	Scheurvorming	Goed	Geen scheuren geconstateerd
2	Buitenkozijnen (hout)	Matig	Houtrot aantasting, deze moeten vervangen worden
3	Buitenramen (stolpramen)		
4	Buitendeuren (hout)	Redelijk	Moeten worden geschilderd
5	Binnendeuren (hout)	Redelijk	Moeten geschilderd worden
6	Binnendeurkozijnen	Redelijk	Moet worden geschilderd.
7	Hang- en sluitwerk	Redelijk	
8	Pleisterwerk	Matig	Pleisterwerk brokkelt plaatselijk af
9	Schilderwerk	Slecht	Afbladdering op de gevels
10	Vloer	Redelijk	Geen verzakkingen
11	Wanden	Redelijk	Geen scheuren geconstateerd
12	Dakgoot	Slecht	Moet vervangen worden.
13	Plafond	Slecht	Moet geheel vervangen worden.
14	Dak	Slecht	Lekkages in haast alle ruimtes
15	Groepenkast	Slecht	Verouderd/onveilig
16	Bedrading	Slecht	Verouderd.
17	Terreinafvoer	Redelijk	Verouderd.
18	Trappen	Goed	Geen

### Toelichting van de waarderingen

#### **Waardering Omschrijving**

**Uitstekend** Het element verkeert in goede staat.

**Goed** Het element vertoont geen gebreken en/of verouderingsverschijnselen.

**Redelijk** Het verouderingsproces van het element is op gang gekomen. Incidenteel kan een storing in de functie van het element optreden.

**Matig** Het verouderingsproces heeft het element duidelijk in zijn greep. Storingen komen plaatselijk voor en/of zijn reeds voorgekomen.

**Slecht** De functievervulling van het element is niet meer gewaarborgd. Het einde van de technische levensduur is vrijwel bereikt. Regelmatig komen ernstige gebreken voor.

**Zeer slecht** De functievervulling van het element is niet meer gewaarborgd. Het einde van de technische levensduur is bereikt.

## 1.5 Bezetting van het gebouw

### **Oud Centraal Lab**

Oppervlakte:  $\pm 910\text{m}^2$

Oppervlakte Begane grond:  $\pm 850\text{m}^2$

In het gebouw van het Oud Centraal Lab zijn er in totaal .....personen werkzaam.

### **Gebouw M.O.B.**

Oppervlakte:  $\pm 910\text{m}^2$

Oppervlakte Begane grond:  $\pm 850\text{m}^2$

In het M.O.B. gebouw zijn er in totaal 120 personen werkzaam op de begane grond (administratie en technisch personeel).

Op de eerste verdieping zijn er 30 personen werkzaam.

### **Hoofdgebouw**

Oppervlakte:  $\pm 910\text{m}^2$

Oppervlakte Begane grond:  $\pm 850\text{m}^2$

In het Hoofdgebouw gebouw zijn er in totaal 100 personen werkzaam.

## 2 Prognose O.W.,T.&C.

### Toelichting scoring:

Percentage:	Conditie:	Constatering:
100-81	Goed	Geen renovatie
81-74	Redelijk	Geen renovatie, alleen achterstallig schilderwerk
73-70	Redelijk/matig	Kleine renovatie ( $\pm$ US\$60,- p/m <sup>2</sup> )
69-60	Matig	Kleine renovatie ( $\pm$ US\$150,- p/m <sup>2</sup> )
59-51	Matig/slecht	Grote renovatie ( $\pm$ US\$240,- p/m <sup>2</sup> )
50-0	Slecht	Grote renovatie ( $\pm$ US\$360-510,- p/m <sup>2</sup> )

### Prognose Oud Centraal Lab (Gebouw 1)

Onderdeel:	Omschrijving:	Score (%):
Het cosmetische	Schilder, stoepen, hemelwaterafvoer.	40
De afbouwconstructie	Wanden, gevels, ramen, deuren, vloeren, constructieaansluitingen.	50
Constructief	Kap, draag, vloer constructie.	40
Installatie	Elektra, water, rioleringsstelsel.	50
	<b>Gemd.:</b>	<b>45</b>

Gemiddeld 45% geeft aan:

1. Conditie slecht;
2. Grote renovatie vereist.

### Prognose Gebouw M.O.B. (Gebouw 2)

Onderdeel:	Omschrijving:	Score (%):
Het cosmetische	Schilder, stoepen, hemelwaterafvoer.	50
De afbouwconstructie	Wanden, gevels, ramen, deuren, vloeren, constructieaansluitingen.	40
Constructief	Kap, draag, vloer constructie.	50
Installatie	Elektra, water, rioleringsstelsel.	60
	<b>Gemd.:</b>	<b>52.5</b>

Gemiddeld 52.5% geeft aan:

1. Conditie matig/slecht;
2. Grote renovatie vereist.

### **Prognose Hoofdgebouw (Gebouw 3)**

<b>Onderdeel:</b>	<b>Omschrijving:</b>	<b>Score (%):</b>
Het cosmetische	Schilder, stoepen, hemelwaterafvoer.	50
De afbouwconstructie	Wanden, gevels, ramen, deuren, vloeren, constructieaansluitingen.	45
Constructief	Kap, draag, vloer constructie.	45
Installatie	Elektra, water, rioleringsstelsel.	60
	<b>Gemd.:</b>	<b>52.5</b>

Gemiddeld 52.5% geeft aan:

1. Conditie matig/slecht;
2. Grote renovatie vereist.

## Conclusie/ aanbeveling

Gebouw:	Bureau voor Openbare Gezondheidszorg
Algemene waardering:	Matig/slecht
Conclusie:	<ul style="list-style-type: none"><li>- Het gebouw toont geen scheuren in de muren en geen verzakkingen in de vloeren. Het is constructief nog in goede staat.</li><li>- Het plafond vertoont veel lekkages. De totale kap en het plafond moet verwisseld worden.</li><li>- Een schilderbeurt is noodzakelijk.</li><li>- Er zijn houtluizen in het gebouw.</li><li>- Ongezond en onhygiënisch milieu voor het personeel.</li></ul>
Aanbeveling:	Grondig onderzoek van alle gebreken te laten verrichten om een juiste aanpak voor renovatie/restauratie voor te bereiden.
Advies:	Aantrekken van een gerenommeerd bureau voor de voorbereiding/uitvoering in samenspraak met het Ministerie van Openbare Werken.