HIGHLIGHTS OF THE MASTERPLAN NKHOMA HOSPITAL

Table of Contents

1 Executive summary ........................................................................................................................................ 1
  1.1 Statement of purpose ............................................................................................................................... 1
  1.2 Highlights of hospital’s achievements ..................................................................................................... 2
  1.3 Proposal investment and financing plan ................................................................................................. 2

2 Organisational description ................................................................................................................................ 2
  2.1 Introduction .................................................................................................................................................. 2
  2.2 Location .................................................................................................................................................... 3
  2.3 Medical Work in Nkhoma Synod ............................................................................................................. 3
  2.4 Mission, Vision, core values .................................................................................................................... 3
  2.5 Services offered ........................................................................................................................................... 4

3 Organisational structure .................................................................................................................................. 5

4 Market environment ......................................................................................................................................... 5

5 Investment plan ............................................................................................................................................... 5
  5.1 Situational analysis ..................................................................................................................................... 5
  5.2 Motivation for Plan B ................................................................................................................................. 8
  5.3 Practical considerations Master plan ...................................................................................................... 11

6 Financial data / Risk analysis ............................................................................................................................ 13

1 Executive summary

1.1 Statement of purpose

Nkhoma hospital has been in existence for 99 years. The Nkhoma hospital team would like to continue with the vital service it renders to the 250,000 member community it serves. To efficiently carry out its duties and apply evidence based current medical treatment plans, the old hospital infrastructure needs to be replaced with a new building. With proper planning the overcrowding in the children’s ward, where 2 or 3 children share a bed, can be prevented; the nearly blind cataract patients can walk over an even surface to their bed; the premature baby born too early can receive proper care when the room where the babies are kept is of adequate size. Part of the current buildings will provide accommodation for the hospital staff needed to manage the increased capacity once the new structures have been built. With the completion of the project, the hospital management would like to say:

“NKHOMA HOSPITAL HAS NEW FACILITIES AND IS READY to care and serve better in the FUTURE”.

1
1.2 Highlights of hospital’s achievements

The longstanding track record with the surrounding community and health clinics has been improved in the last 5 years. A service level agreement from 2006 with the Malawi government has resulted in free care for maternal and under five patients and increased attendance earlier in the illness process which has resulted in the reduction of mortality in both these groups. An extensive maternal health program forming “Safe motherhood groups” has increased the institutional deliveries to 96% and resulted in marked reduction in maternal mortality (from 1518 per 100,000 live births in the year 2008 to 226 in the year 2012.).

The malaria indoor residual spraying program in the last 3 years has resulted in a more than 50% reduction in malaria related admissions to the children’s ward in the peak malaria season period.

In the year 2012 there were 3,400 patients that received their eyesight due to the Nkhoma cataract program (more than 50% of all cataract surgeries done in Malawi happen at Nkhoma).

The community/hospital initiatives could be further strengthened and, with proper infrastructure and planning, the positive trends could be further supported.

1.3 Proposal investment and financing plan

The proposal is to build a modern hospital which will alleviate the challenges faced working in a 99 year old facility built without a master plan. This document will highlight the following: the inadequate patient care and privacy, the challenges nurses face moving patients up and down a hill, the frustration of staff working in a facility with poor infrastructure under constant maintenance to update and replace electrical units and plumbing.

Donors are sought who can help with financing this plan to improve the lives of rural Malawians. The hospital accounts are audited every year by external auditors, and the hospital can provide a list of partners and projects that the hospital has been involved with to show its capacity to manage large infrastructure and community projects.

2 Organisational description

2.1 Introduction

At the end of the year 2008, the management of the Nkhoma Hospital asked the Dutch foundation Malawi Mission Work Team (MMWT) to support the developing of a future hospital plan and to give advice on the feasibility of the plans. At the beginning of the process, a number of people thought we would be renovating the current hospital only, but soon it became clear that the hospital also needed to look at possible extensions to be ready for their future role in providing modern health care for the surrounding community.

The planning team considered plan A: renovation of the current hospital and construction of a number of new buildings, and plan B: to construct a new hospital on a new site while developing a number of buildings for new activities on the present site.

Together with Nkhoma hospital management team, heads of departments and the Health board, both plans were developed and stakeholders in the community were informed. The general secretary of the Nkhoma Synod has been informed frequently about the progress on the master plan.

The master plan outlines the future hospital capacity, the care and policy vision, the vision on the
buildings and the site, future working methods and the costs of investments.

2.2 Location

Nkhoma village is situated in Malawi at about 50 kilometers distance from the capital Lilongwe. Malawi is one of the member states of the Southern Africa Development Community (SADC) grouping, the African Unity and the United Nations among other multilateral organizations. It lies in the Southern African Great Rift Valley. It is bordered by Zambia on the West, Mozambique on the South and East, and Tanzania on the North.

Malawi is one of Africa’s poorest countries. In 1995 Malawi was ranked as the ninth poorest country in the world in GNP per capita (US$170). The country still suffers from serious inequities in the distribution of income, with more than sixty (60) percent of the population living below the poverty line. Of an estimated work force of 3 million, less than half have paid employment which has an average monthly salary of USD$35. Poverty is rampant particularly among women.

Malawi’s health indicators are amongst the worst in the world. Despite the Nation’s efforts and progress made in implementing a number of health initiatives, the health indicators for Malawi have generally remained poor across the board. The life expectancy has, in the past few years, declined to 39 years mainly as a result of the impact of the HIV/AIDS pandemic. The impact of the pandemic is heavily pronounced on women as care givers and mothers.

2.3 Medical Work in Nkhoma Synod

Health delivery services in Nkhoma Synod began almost at the same time as the work of evangelism with the very first missionaries in 1889. Ordained ministers, who had completed a short course in medicine either in Edinburgh or London in addition to their theological training, undertook the first medical work. The first qualified medical doctor arrived in Malawi [then Nyasaland] in 1900. A hospital was built at Mvera in 1903 where various Malawian men and women trained as nurses, including Mrs. Sara Nabanda who began training in 1909 and served for 34 years.

At other stations only small clinics could be run, and the medical work of the Missions developed slowly. After the move of the headquarters of the Synod from Mvera in Dowa district to Nkhoma in Lilongwe district (50 km from the capital Lilongwe), a small hospital was built at Nkhoma in 1915. Over the years new wards were built and old ones were demolished, as money became available and as the need increased. Presently we have a well-equipped (for Malawi standards) 202 bed hospital with medical, surgical, pediatric, maternity, and ophthalmic isolation and TB wards, as well as very active community outreach programs. The facility is however not adequate for the current and future needs of medical services to be rendered.

The health department with other departments of the Synod, was handed over by the Dutch Reformed Church of South Africa to the local indigenous Malawian church in 1962. In 1966, the Nkhoma Synod Health Department joined the Christian Health Association in Malawi.

2.4 Mission, Vision, core values

2.4.1 The Mission Statement

Medical care and care as well as the nurse-care of people from a Christian perspective, while paying respect to other convictions is well outlined in the mission statement of the Hospital.
Nkhoma Synod Health Department will provide quality healthcare and training at all levels to the needy, irrespective of sex, race, religion, physical ability or state of development, in a respectful and protective manner; cooperating with all stakeholders using trustworthy, committed, professional and well motivated staff working in unison towards the attainment of the highest possible level of health by all peoples, motivated by the healing ministry of Jesus Christ.

In order to maintain well-motivated staff that work to provide the highest possible level of care, the working environment needs to be carefully evaluated and likely adjusted to suit the mission the hospital would like to reach.

2.4.2 The Vision Statement
The stakeholder workshop in 2004 developed the following mission statement:

*Nkhoma Synod Health Department will become a Christ-centered health provision and training service that is elaborate, innovative, high-tech, self-reliant, accessible and affordable.*

In line with the above-mentioned vision, the hospital needs to consider significant changes to the current infrastructure especially related to elaborate and high tech services.

2.4.3 Motto
The motto of the hospital is “Serving with love and care” and we believe the master plan outlines what needs to be done to have better care.

2.5 Services offered
The Nkhoma Hospital offers a comprehensive district health care service package of preventive, diagnostic and curative medical care, support and training services and has the ambition to increase and improve these services.

Eye department
The eye department forms an important part of the services rendered at Nkhoma hospital. Services are rendered at both Nkhoma hospital, and also as outreach in various locations. Services include: Comprehensive eye examinations, refractions, pre- and post-op assessments, minor surgeries (i.e. chalazion, foreign body removal), cataract surgery, retinal laser surgery for diabetes patients, optical dispensary and production and supply of spectacles. **The final decision, Eye department is part of the new hospital, will be taken at the end of the year 2014.**

Nkhoma Synod Health centers
Administrative and pharmaceutical coordinating for the ten (10) health centers under Nkhoma Synod is also part of the health department. These health centers are rural clinics of Nkhoma Synod congregations scattered in the Central region of Malawi. They offer 24-hour service. They are not in close proximity to Nkhoma hospital nor do they refer cases to the hospital with the exception of the occasional surgical patient. The first line of medical care given at these health centers is mobile and static under-five and antenatal clinics. These clinics are operated in close collaboration with the Malawi government. The health surveillance assistants are government health workers who are responsible for the immunization programme. Considering that the national figure for immunization coverage is more than 70%, this is very positive with so many aspects of the health services that are underperforming.

*These health centers however, are not included in the Master plan outlined in the master plan as they are geographically between 70 and 180 kilometers away from Nkhoma Hospital.*

Comment [RH1]: Suggest we delete this sentence. You are saying you have finished the masterplan, but now there are some final decisions to be made. In the end the cost is not so much different

Comment [RH2]: Suggest delete section as you only want highlights. The details will be available in the complete masterplan
3 Organisational structure
Nkhoma Hospital and its ten health centers have around 450 employees in total. They are managed by a team of ten heads of department. The management team comprises the Medical Director, Deputy Medical Director, Principal Nursing Officer, Principal Hospital Administrator, Principal for Nkhoma Nursing College, Primary Health Care Coordinator, Director of Eye Department, Hospital Chaplain and the Hospital Accountant.
Decision-making at Nkhoma Hospital is bottom-up to ensure that decisions made are accepted by staff members. This is achieved through involvement of staff in various committees whose decisions are forwarded to Management for consideration and endorsement. Another forum for debate and input is the general staff meetings where issues are thoroughly discussed, questions are answered and clarification is given on issues unclear to some members of staff. The management has also established a line of middle managers that comprise of the Clinical superintendent and ward in charge. As a result, there is high staff retention rate with some staff having worked for more than fifteen years.
The management report to the Health Board, which meets quarterly. The hospital management team also has to implement directives and policy set by the health board.

4 Market environment
Demand, target market and customer base
The catchment population of Nkhoma Hospital includes 243,000 inhabitants in 2012 and it is estimated that the population will increase up to 365,000 people in the year 2025. The total number of beds needed for a new hospital is calculated in consideration of the expected number of inhabitants in the year 2025. The activities/capacities of the outpatient departments, emergency, laboratory, X-ray, pharmacy and the facility management activities are based on the number of beds. For Nkhoma Hospital it means 365 beds (1 bed per 1000 of the population) for 365,000 people.
Provision is also made for an estimated future increase in the size of the hospital (after 2025).

Due to certain patients requiring closer observation, the master plan makes provision for an additional 22 special (High Care/critical care) beds.

Capacity of beds
For the Nkhoma Hospital, the capacity will be 365 minus 45 beds (365-45 =320 beds) which will be in the Eye Hospital. Due to certain patients requiring closer observation, the master plan makes provision for an additional 22 special (High Care/critical care) beds (320 +22= 342 beds).
In one of the OPD buildings, two (2) five (5) bedded observation rooms will be located next to the two(2) emergency rooms equaling ten(10) beds in total.

5 Investment plan
5.1 Situational analysis
The situation and the condition of the current site, plus the buildings and the infrastructure of Nkhoma Hospital, are described in this section. In summary the conditions of the current site, plus the buildings and the infrastructure of Nkhoma Hospital are overall bad to average.

The analysis will be described in the following sections: patient care, nursing care, infrastructure and clinical care. The motivation for a new plan(described as plan B) will be outlined in the same categories.

➢ Patient care
Patient privacy
Many years ago the design of the buildings gave very little privacy to the patients. The morgue for example is located in an inconvenient location in the middle of the guardian’s facilities with no privacy at all. There is no privacy for adult consultations and in the era of HIV, personal questions need to be asked to determine patients at risk.

Uneven terrain
The Nkhoma Hospital had been built against a mountain slope, which is why the site has different levels. The Hospital departments are located in separate buildings. A covered walkway connects some of the buildings. Most of the patients come to the Hospital on foot or by bicycle. Few patients travel to the Hospital by car. The last part of the tarmac road to the present site is steep and for many people not very easy. This is also the situation on the Hospital site where the paths between the different buildings are mostly steep. The difference in altitude ranges from 1 to 14 meters. It is therefore not easy for the patients, the visitors and the staff in transporting patients, goods or supplies from building to building. It is especially a burden for the eye patients who have to walk over unfamiliar and uneven terrain with their poor eyesight prior to surgery.

Hospital signposting
The signposts to the Hospital are minimal. The main entrance is not clearly marked. Signage in the hospital is considered to be insufficient and bad. As the hospital gradually increased in size on an ad hoc basis over the 97 years of its existence, the layout is illogical and very confusing to patients and visitors.

Parking and visitor logistics
The current guardian’s facilities are totally inadequate and not well designed. There is very limited space available for extension. A small parking area is available for patients, visitors and ambulances, but it is, by far, too small for the demand. A bicycle shed with security for bicycles is not available for the numerous visitors from the surrounding community. Next to the main gate of the Hospital local people have their businesses. No formal facilities are available, and it’s therefore in the open air.

➢ Nursing care

Bed capacity
The 15 km road from the main road (M1) to Nkhoma was a dirt track till 2007. In the year 2007 a tarmac road was completed that greatly increased accessibility of the hospital and the number of patients. With the signing of the under five service agreement in March 2009 the out patient numbers went from 3500 to 5200 in one month!! Since the routine supervision of the surrounding health centers started the out patient attendance has increased by 30% with a comparable increase in admissions to the hospital. Some wards (e.g. children’s ward) have a bed occupancy of 134 % on average. For four months of the year the children’s ward especially is extremely busy, with bed occupancies getting close to 200%. The “kangaroo care” that the hospital is currently providing uses inexpensive and appropriate technology that saves the lives of premature infants as they are attached to the mother’s chest to regulate their temperature. The facility is at the moment overcrowded, which makes infection prevention practices difficult to maintain.

Working environment
The current facility was designed for smaller numbers. This leaves the nurse searching for bed and stretcher space instead of attending to the patients. Currently there is no common meeting place for staff to interact away from patients. This would help to foster good working relationships and camaraderie.

Improved hospital health centre interaction
Nkhoma hospital has embarked on a program to improve the medical services of its catchment area,
with a focus on maternity and childcare. Ten health centers that refer patients to Nkhoma for diagnostic or surgical interventions surround it.

**Housing options for current staff**
Professional staff with irregular working hours is entitled to housing provided by the hospital. In the Nkhoma village no decent accommodation is available. It is tiring to commute on a daily basis from Lilongwe town 50km away. For nursing staff with after hours work this option is not practical. With the growth of the hospital more staff needs to be employed. The limited accommodation makes it impossible to do so at the present.

- **Infrastructure**

  **Logistics**
The different administration offices are located in different buildings scattered throughout the hospital premises which developed as the need arose for more office space. This makes it difficult for the administration team to function effectively.
The logistics of all the supplies, drugs, food, linen, dirty goods, etc. is difficult in the current situation, and the same is true with the transportation of patients. It is also very difficult for the suppliers to reach the different stores, etc.
The pharmacy is currently not situated at a central place in the hospital, and there is no space available for extension of the inadequate space for this important part of the hospital operations.

  **Utilities Infrastructure**
The utilities infrastructure (roads, paths, rain water discharge, sewerage interior and exterior, water supply, electricity is very old and was built on an “as-needed” basis. It is therefore difficult to make good, lasting improvements at the current hospital site. It is not known where and how the installations were installed. Revisions (drawings, etc.) are not available. The capacity of the different infrastructure entities is also unknown. It will be an enormous task to construct a complete new infrastructure (water, sewerage, electricity, ICT) because the hospital is build on a slope.

**Life span of the hospital buildings**
The buildings are old and maintenance is overdue, so it is hard to make them presentable. The cost of maintenance is also high. In some of the buildings, old construction methods were used (e.g. roofing tiles, no ring beam). It will need major reconstruction efforts to get the buildings up to the desired standard.

- **Clinical care**

  **Evidence based practice**
The hospital was designed to suit the situation at that particular time. New evidence-based approaches to patient care make it necessary to make infrastructure changes incorporating the latest innovative approaches.
The hospital has made some improvements in creating a room, for example, to care for babies born too early. This innovative approach is called 'Kangaroo Care', but the current room specifically warmed up for these vulnerable patients, is too small to accommodate all the mothers with their babies needing this care.

**Hospital layout**
The labour ward is at one end of the hospital and the operating theatre on the other end. If a patient needs emergency delivery by a caesarean section, getting the patient from one end to the other currently wastes unnecessary time. After the surgery some emergency patients need to be pushed up the slope to the ward where they are to recover. The current infrastructure, with limited privacy, does not allow for men to be involved in the delivery of their children although some would like to do so.
**Hospital capacity**
Many patients have to wait in the open air, often having to sit on the ground, as the hospital was originally designed for much smaller numbers. In some of the wards, especially the children’s ward, the inadequate capacity results in 2 or 3 patients that need to share a bed in the peak malaria season. Patients sometimes need to lie on the ground in the medical ward due to an insufficient number of beds.

**Infection prevention practices**
The TB ward and the ward for other infectious disease where patients must be isolated is very close to the other wards. It is especially considering the era of multidrug resistance that this is going to become more and more important. Currently the incinerator is located at a very short distance from the hospital buildings and that is not advisable in proper hospital planning.

**Security**
It is advisable to separate OPD patients/visitors from ward patients/visitors for infection prevention purposes. In the current situation, that is not possible in any way. Therefore, it stays very crowded on the hospital premises with poor control of human traffic and materials. The site has a wire fence with gates. At the main gate and at two side entrances security guards are on duty. The other entrances have no guards due to limited personnel.

5.2 **Motivation for Plan B**

- **Patient is our guest**

  **Patient privacy**
  - The OPD consultations rooms will be designed to provide visual and auditory privacy for the patients.
  - In plan B the morgue will be located in the basement with easy access and with more privacy should the family want to meet before departing from the hospital.
  - In plan B every ward has its own toilets and showers inside the building which is far more convenient for the patients than the current outside facilities.

- **Uneven terrain**
  - In plan B the hospital will be built on an even surface for daily patient care while in the basement a number of support services/facilities will be located (laundry, kitchen, stores, morgue, personal room, maintenance, chapel, guardians facilities). So all the buildings related to daily patient care will have easy access.
  - The plan makes provision for the eye patients with poor eyesight to move on an even surface before and after surgery as all the activities will take place on an even surface.

- **Hospital signposting and design**
  - The newly designed hospital will have a planned orderly layout that will be signposted for patients and visitors to easily find their way around. The main entrance will be the first entry point for all coming to the hospital, with a reception area that would point visitors in the right direction. Provision will be made for possible future expansions so that, should there be a need in future, the same logical layout will continue even with the extensions.
  - The pharmacy in plan B is located in a central place and will be reached easily from both the wards and the OPD buildings.
Parking and visitor logistics

- A specific bicycle shed will be constructed for securing the bicycles as guardians bring patients and clients for treatment at the hospital. The hospital would like to encourage men involvement in reproductive health care, but the current infrastructure makes it difficult, as there is little security for their valuable transport asset.
- Plan B can be realized without disturbing the activities in the current hospital. Continuing with renovating the hospital results in inconveniences for patients, visitors and the hospital staff over a prolonged period of time. The renovations will require temporary facilities and one phase will usually to be completed before the next one can start. It will therefore require a longer renovation time than plan B.
- In plan B facilities like cooking places, laundry and drying, dish washing, a central sitting room, small single-bed sleeping rooms and toilets and showers, of a good standard will be constructed. The sleeping rooms will be designed so that 75% of the rooms are for women and 25% for men. This facility will be called “Guardians Plaza”.
- Provision is possible in the new design for small businesses to be in close proximity to the entrance of the hospital for the visitors’ benefit. In plan B the number of parking places will be sufficient, as a specific area will be allocated for this purpose.

Nursing care

Bed capacity

- In plan B the bed capacity will be 333 beds (norm is 342, excluding 10 observation beds in OPD). The maximum capacity, if the current hospital is expanded, will be an increase from 202 beds to 294 beds only. In plan B it is possible to construct another two wards while this is not possible in plan A.
- If more bed space and personnel are available, the hospital could go into a service level agreement with the Dedza District health office. In this case patients will only have to travel 12-30km (depending from which health centre the patient is coming) to Nkhoma (instead of the usual 50-70km to Dedza). We believe this agreement could be life saving.
- More room in the “kangaroo care” room will reduce the risk of infection for these very small, vulnerable, premature infants and increase their chance of survival.

Working environment

- In the OPD buildings there are two (2) observation rooms planned with ten (10) beds in total to manage a higher volume of emergency patients.
- In plan B a personnel room with a cafeteria for food and social interaction is planned for in the basement. Such a facility in plan A is not possible.

Improved hospital health centre interaction

- The increased infrastructure will enable the hospital to continue with the health centre interaction and provide the necessary infrastructure to support this initiative.

Housing options for current staff

- The Nkhoma Hospital is responsible for providing staff accommodation, as no proper accommodation is available for staff members in the Nkhoma town. In plan B a number of old buildings will be converted into apartments about thirty (30) and only twenty (20) new staff houses will need to be constructed. The increased availability of accommodation will enable the hospital to accommodate staff in separate apartments. The proposed staff accommodation planned in the master plan will greatly alleviate the need for accommodation and will help to solve the challenge the hospital has had is all its years of existence. We trust that this in turn will help with attracting staff to Nkhoma.
Infrastructure

Logistics
- In plan B (on a level surface) suppliers can easily reach the basement where the hospital support service facilities are located. The hospital buildings can be reached easily from the basement for distribution of food, drugs, linen etc.
- For the electricity supply, Nkhoma hospital is dependent on ESCOM. The supply of electricity is very unreliable and also of poor quality (voltage often too low) so Nkhoma hospital often has to use the backup generator. In the final design, a decision has to be made if it is possible to generate electricity more economically with bio-diesel generators. ESCOM will then be used as the backup electricity supplier. In the final design, the use of LED lighting and Solar energy will be included. This is easier when planning a new facility (plan B) than when adding it to an existing facility (plan A).
- To control all the facilities well, it is necessary to organize the facility management for the maintenance of the ground, the buildings, installations, ICT, cleaning, laundry, security, catering, transport and logistics, including waste. It is also necessary to make an inventory of the materials that have to be used and what kind of training must be given to the staff to do their jobs professionally. With a new facility (plan B), it is easier to arrange the buildings according to modern accepted standards of facility management and to train the staff accordingly.

Utilities Infrastructure
- The supportive infrastructure (water, electricity, ICT, sewerage) in plan B can be established in the basement so that buildings can be connected very simply and an exact location can be documented for future maintenance work.
- In plan B the waste-water from the basins and the showers will be collected and used as flush water for the toilets to reduce consumption of the water.

Life span of the hospital buildings
- The current hospital buildings are old and therefore need more maintenance (more costs). After about fifteen (15) years, another major renovation will be necessary. Plan B has new buildings only, so maintenance costs will be substantially reduced.

Clinical care

Evidence based practise
- The provision of medical care based on the latest medical evidence with high care rooms in every ward will greatly help to give patients a high level of care.

Hospital layout
- In the new facility the wards that need the operating theatre will be located in close proximity to the operating theatre for easy and fast access, which is especially important in emergency situations.
- It will also be much easier to move patients around on wheelchairs and stretchers on the even ground that is planned for the new facility.
- The newly designed labour ward will make it possible for men to be involved in the delivery of their children. We are confident that this will increase their involvement in the care for their spouses before, during and after the actual delivery as well as their care for the child later in life.

Hospital capacity
- The increased capacity planned both for the hospital and for the staff accommodation will help to have adequate number of personnel working in a more pleasant environment.
Infection prevention practices

- In plan B the isolation ward is planned to be about 50 meters away from the hospital buildings to reduce the risk of infection.
- The incinerator in plan B will be located about 300 meters away from the buildings and at a favourable direction to the wind.

Security

- In plan B it is easy to separate the patient stream of the OPD and the wards by security personnel. This will help in infection prevention. It will also be easier in the new design to control working hours and the movement of commodities.

5.3 Practical considerations Master plan

In developing the construction section of the master plan a risk analysis was made. The details of this analysis will be concluded in close consultation with the architect/engineer and included in the general and administrative requirements of the project.

Before handing the documents outlining the general and administrative requirements and specifications of the project to potential implementing parties, it will be checked for accuracy and completeness by a lawyer and adjusted or supplemented where necessary. The implementation of the master plan should not be underestimated. It is not only the realization and design of buildings. Such a large project is not created in addition to the daily tasks of running a hospital.

Consequently the project need to be structured within the framework where the running the Nkhoma Hospital, the further development of the organization, guiding the planning of the master plan and the actual implementation of the master plan will receive sufficient attention and time by all responsible officers. The duties, responsibilities and authority structures will therefore need to be clearly defined for each phase.

The management of Nkhoma Hospital is responsible for the above-mentioned components namely the running and developing of Nkhoma Hospital, guiding the master plan and the implementation of the Master Plan.

- Project leader

For the implementation of the master plan a project leader need to be appointed (temporary position for the duration of the project). The project leader will be responsible for the daily management of the project from the time a contract is made with an architect/engineer to the completion and commissioning of the project master plan.

In broad terms, the responsibility of the project leader will involve time (planning), money (budget/budget control), quality (master plan principles and contents) and information sharing with different stakeholders. The project leader needs to be supported by an administrative assistant(s) in temporarily function(s) for the duration of the project. The task of these employee(s) will focus in particular on making appointments, keeping diaries, care of mail and correspondence, scheduling meetings, tracking schedules, drafting agenda, reports and resolutions made at meetings, checking progress of resolutions, support procurement activities, support / provide periodic reports.

The project leader is supported by the internal accounting records and Cure + Care Consultancy regarding the cost/administration on project-related costs and taking care of the quarterly report(s) and final report on the state of the available budgets. The required financial reporting format will be discussed beforehand with the external auditor-accountant who will produce a financial report every six months. In the final design stage until the commissioning the necessary input are needed from all departments of Nkhoma Hospital. In each phase the necessary skills and tasks of the different players will be outlined. The management team are responsible for ensuring that the department heads and staff for the different contributions have sufficient time available to participate in their field of expertise. It should be made clear that the project can only be a success with the attitude of all employees of the hospital organization:
“there is a project master plan, so now it begins for me.” The approach should not be “there is a project leader, so I don’t have to be involved.”

- **Implementation**
  For the final design stage the input from all the departments will be necessary. Consequently, an officer will be appointed to do the facility management (development, implementation, training / coaching staff). The Final Design stage determines the end result that will be achieved.
  The important steps are outlined: final floor plans for all departments based on assumptions in the master plan, deciding on furniture/other fixtures in the buildings (fixed and removable inventories), determining the connection facilities (electricity, water, ICT etc.), calculating and establishing infrastructure including reserve capacities, structures and detailing, documentation of contracts, apply materials and systems (tailored to the operation / maintenance), laws and regulations, document including general and administrative conditions, planning in broad outlines and comparison of estimate(s) with available budget.

  For the final design stages to completion an architect / engineer is contracted with experience in building a hospital and similar large-scale projects. The project leader provides a clear demarcation (who does what at what stage of the responsibilities and powers). Demarcation overview is part of the contract with the architect / engineer. For the implementation phase the project leader in consultation with the architect discusses which subjects is required and which person need to be consulted.

  The direction the project takes are determined by a core group. The steering and implementation are clearly separated by the appointment of a project leader.
  The **CORE GROUP** consists of the following members:
  - Management Nkhoma Hospital (including Public health director and Principal nursing officer), Pharmacist, Architect, Project leader and ad hoc staff with specific expertise is invited.

  To the members of the core group are assigned the following roles:

  - **Management**
    Client and budget management (including fundraising), monitoring hospital interest / business case / strategic plans,
    Approve phase(s), deciding on deviations, provide expertise and timeliness of staff.
    Providing information and communication to stakeholders and organization.
    Securing, monitoring and review of the master plan (progress, time, cost, process and final product, effort professionals, linking strategy and standards Nkhoma Hospital).

  - **Public health director and Principal nursing officer**
    Monitor users interests, monitor user participation in working groups, monitoring functions
    Acceptance end result.

  - **Architect / Project leader**
    Feasibility planning, deployment of specialists, monitoring of quality work delivered, implement standardization(s), monitor changes, materials and technology to be used, budget report(s).

  With this structure, we (hope to) achieve the following:

  - Separation control and execution of the project master plan.
  - One project leader with far-reaching powers.
  - Major involvement from the hospital organization and unambiguous communication to hospital organization and stakeholders.
  - Contracted architect/engineer with experience in building a hospital and similar large projects.
  - Administrative requirements and specifications are checked by a lawyer before the tender.
- Cure + Care consultancy (company at Bilthoven the Netherlands) will produce the budget/cost report every quarter and the final budget report.
- An external accountant will produce an financial report every six months.
- Information and communications to donors/sponsors.

6 Financial data / Risk analysis

Costing Plan B

The costs for plan A and plan B mentioned are based on the renovations of the current site and the actual costs of the most recent renovation done at the hospital. The estimate for new buildings are also based on calculations from a local architect and quantity surveyor firm who has developed and built two (2) hospitals in Malawi.

The estimated costs for plan A is € 20,500,000 and for plan B the cost is € 21,000,000. Note that this costs are based on 2011/2012 price indicators.

The estimates are inclusive of: a glass fiber optic cable connection from the main road to Nkhoma, provision of accommodation for 50 staff members, a new sewerage/sanitation plant, a facility management system, bio diesel generators, purchase and transportation costs of equipment and costs for a project manager, accountant, lawyer and initial expenses.

Since the start of the project, the Malawi kwacha has devalued by more than 50%. The Nkhoma management team has therefore decided to cost the plan in Euro and not in the unstable local Malawi Kwacha currency.

Current hospital financial situation

The year 2013 income and costs percentages for the current Nkhoma hospital were as follows:

<table>
<thead>
<tr>
<th>INCOME</th>
<th>COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government 37 %</td>
<td>Salaries 59 %</td>
</tr>
<tr>
<td>Patient fee 32 %</td>
<td>Medication/supplies 23 %</td>
</tr>
<tr>
<td>Donors 31 %</td>
<td>Administration 7 %</td>
</tr>
<tr>
<td></td>
<td>Maintenance 11 %</td>
</tr>
</tbody>
</table>

For calculating future scenarios estimates (costs and income) for the years 2018, 2021 and 2025 was used.

Assumptions about the future

Nkhoma health department is rendering a vital health service to the poor rural communities in the Central region of Malawi. The Government at this very moment is only able to provide 63% of the health care to its population and therefore churches and NGO’s are involved. It is assumed that Nkhoma Hospital will have to continue with this role in the sub-district of Lilongwe and that part of the services will be rendered free of charge with the Malawi government paying for vulnerable members of the community. The assumption is made that the Ministry of Health will continue to pay for the salaries of Malawian health workers.

It is assumed that the economy Malawi will remain unstable. Due to the financial constraints of the community it serves, the Nkhoma Hospital will have to continue to solicit outside help for capital expenses and running costs of the hospital. All effort will therefore be made in the new design to have high efficiency, low maintenance and low running cost of the facility. It is assumed also that the facility will not become financially independent, but all effort will be made to minimize the need for outside help with the running costs of the facility.
Risk analysis
Risk analysis entails a procedure employed to: identify threats & vulnerabilities, analyse them to ascertain the exposures, and highlight how the impact can be eliminated or reduced. Risk analysis is part of the Risk Management framework, which is a tool put in place by organizations to manage risks in their respective areas in a systematic manner. The framework is simply for guidance and may not apply to all situations.
For example, clinical risks are identified and some procedures and controls are developed to ensure reduction or removal of the risk. These strategies are enforced and those flouting them are exposed and dealt with.

The risk assessment table (part of the complete masterplan document) will demonstrate how we have considered any potential risks in the planning, what the likelihood is of the actual happening of the factor under discussion, mitigating factors and the recovery plan.

The detailed Nkoma Hospital Master plan (46 pages and 11 appendixes) is available.