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**Physical Rehabilitation Centre / Erbil (PRC/ERB)**

**FEASIBILITY NOTICE**

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![Physical Rehabilitation Centre Plan](image-url)
Physical Rehabilitation Humanitarian Impact Bond (PRP HiB)
FEASIBILITY STUDY

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List of Acronyms

BoQ  Bill of Quantities  
CD   Concept Design  
DD   Developed Design  
DoH  Directorate of Health  
ERC  Erbil Refugee Council  
ESD  Erbil Statistics Directorate  
EVA  Ethylene-vinyl acetate  
FEA  Feasibility study  
ICRC International Committee of the Red Cross  
IDP Internally Displaced Persons  
IKMaa Iraqi Kurdistan Mine Action Agency  
IKR (or KRI) Iraqi Kurdistan Region (Kurdistan Region of Iraq)  
IQD  Iraqi Dinar  
KDP (or PDK) Kurdistan Democratic Party  
KEU  Kurdistan Engineers Union  
KRG  Kurdistan Regional Government  
MoE  Ministry of Environment  
MoH  Ministry of Health  
MoHE Ministry of Higher Education  
MoLSA Ministry of Labour and Social Affairs  
P&O  Prosthetic and Orthotic  
PP  Polypropylene  
PRC  Physical Rehabilitation Centre  
PRP  Physical Rehabilitation Programme  
PT  Project Team (ICRC – ERB/BAG based)  
PUIK  Patriotic Union of Kurdistan  
PwD  Persons with Disabilities  
TD  Technical Design  
TF  Task Force (ICRC – GVA based)  
UNHCR United Nations High Commissioner for Refugees  
USD United States Dollars ($)  
UXO Unexploded Ordnance  

Locations

BAG  Baghdad  
EBA  Erbil Annex (existing PRC in Erbil)  
ERB  Erbil  
GVA  Geneva
Physical Rehabilitation Humanitarian Impact Bond (PRP HiB)
FEASIBILITY STUDY

Executive summary
The ICRC Erbil PRC plays a strategic role in ensuring the physical rehabilitation sector in IKR through its long term stability in providing quality and appropriate service provision for persons with disabilities (PwD) but also in trainings provided to clinicians working in this sector. This stability has ensured services for PwD in Iraqi Kurdistan Region (IKR) and neighbouring governorates, especially over recent years due to the recent instability (security and financial).

The feasibility report, at this stage of the PRP-HIB process is for the ICRC to take full responsibility for the management and budget of the centre functioning.

The PRP-HIB would play one part in a larger Iraq PRP strategy which aims to shift from the substitution mode of activities towards a more supportive model within the next 5-10 years of collaboration. This is to ensure a successful and sustainable handover with the MoH, through transparent, specific negotiations at appropriate timeframes to see how each of the stakeholders can best ensure ongoing service provision in Erbil PRC. The level of ownership of the partners is assured from day one due to the land and building belonging to the MoH and the intent to enter all negotiations is one of sharing of responsibilities between the ICRC and project partners.

The existing PRC is not in a position to be handed over to the MoH because of the lack of space on the existing plot for enlargement of services and the presence of the counter terrorism directorate (CTD).

The adjacent plot was the headquarters of the official security organization in IKR, Assayesh, till December 2015 when, due to their increased importance and set-up, they moved to another location. Before that, in 2012, since their first plan was to take over the plot of the existing PRC, ICRC was asked to move and even a project was commissioned by the Ministry of Interior for a new PRC and delivered in September 2013. This initial proposal was finally abandoned and they decided rather to build a new headquarters elsewhere.

Over the last year, PRP started negotiations with the Erbil Governorate in order to obtain a plot of land to construct a new PRC. In March 2016 the Erbil Governorate proposed a first plot whose surface was about 8'000m² but unluckily, and according to the plot area estimation attached to the PRP HiB - Iraq proposal, the proposed plot wasn't enough big. The second and final plot of land was identified just shortly afterwards and the temporary plot title delivered to ICRC by the Presidency of Municipality in November 2016. The total plot surface is 14’630m² approximately.

Since the MoH/DoH in IKR they don’t have the financial resources to commit to a project 3 years in the future, the PRP proposal for this stage is that the management of the centre will be the full responsibility of the ICRC. Therefore, the human resources needed to ensure a quality, interdisciplinary approach for the centre have been adjusted: from 79 resident staff (MoH/DoH set-up) to 64 resident staff (ICRC set-up). In both scenarios, the number of technical staff required for the running of the centre (Rehabilitation doctors, P&O technicians, bench workers, physiotherapists etc.) remains unchanged and equal to 47.

The proposed design comprises already the possible future expansion of services to include other allied health professions (occupational therapy /speech and language therapy) and the capacity for administrative positions according to a full MoH structure (which can be either maintained - if agreed upon in further negotiations - or removed). The estimated Total Floor Area of the new Erbil PRC is 4’606 m² (Net Floor Area 4’145 m²)

This feasibility study also identifies the requirements for the project and it describes the architectural and engineering related topic. There are neither architectural nor engineering major difficulties expected since the construction industry has been quite dynamic over the past ten years in Iraqi Kurdistan Region. But it is worth highlighting that particular attention must be paid to certain design choices (like building’s form, skin and fixture) in order to reduce uncomfortable conditions created by extremes of heat and dryness characteristic of hot arid climate and high running and maintenance costs.

The PRP-HIB Project Team confirm the feasibility of the PRP-HIB for the Erbil PRC.
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A. Project framework

The Iraq Delegation feasibility report for the PRP-HIB in Erbil, is one piece in the larger strategy for the ICRC Delegation and PRP and physical rehabilitation sector in Iraq. The PRP-HIB must link and be relevant to key documents to ensure its relevance and sustainability within ICRC Iraq delegation. These include the NAME Regional Strategic Framework, ICRC Health Strategy and the Iraq PRP Strategy. The PRP strategy for Iraq is under process but for IKR, there has been for more than 4 years, the intention of sharing responsibilities of the existing ICRC Erbil PRC with the Directorate of Health, Erbil Governorate, IKR.

The initial vision for PRP-HIB Erbil was finalized in March 2016 and underlines the need for the ICRC to physically relocate the existing centre for security reasons, and to take the opportunity of this relocation to bring back to the table with the MoH, the concept of handover to the local authorities. Both of these issues have been discussed with the IKR authorities in the past and are not new to them, however with the current issues facing the region, it is a difficult time for them to commit to activities three years in the future.

The relevant issues of both the institutions approach in the region and the reality of the context today ensure the PRP-HIB feasibility

- Protracted conflicts both inside and outside of Iraq which impact on healthcare in the IKR region, and the humanitarian impact of the recently initiated Mosul operation
- Loss of healthcare / PRP services within some governorates (Anbar, Tikrit, Kirkuk, Mosul) and a lack of access for persons to access services in different governorates
- Economic crises with low oil prices, significant budget issues throughout Iraq for DoH and PRCs, heavy military expenditure, and a reduction in government salaries in IKR
- With the western and northern parts of the country being retaken by the Iraqi Government, the future humanitarian needs including an increase in needs for PRP services is not in doubt
- Strengthened coordination with partners (MoH) and other organizations (MoH, NGOs) and mapping of services available for persons with disabilities and ensuring referral links between is important.
- An advantage of ICRC Erbil PRC is their flexibility to improve proximity to beneficiaries with transport, accommodation and food support, or if necessary moving to other PRCs to provide support and respond to regional needs. The impact on the beneficiary and their families can also be measured within ICRC Erbil PRC
- PRP activities that ensure a continuum of care within Health (especially for those not accessing the Lebanon WTTC program) and ensuring transversal links with other departments including Health in Detention, Protection and EcoSec

From the perspective of location, the existing centre is not in a position to be handed over to the MoH because of the lack of space on the existing plot for enlargement of services and the presence of the counter terrorism directorate (CTD) in the adjacent plot. The elite security agency in KRG presence next door has created new challenges and reinforced the need to move. This includes the requirement from the CTD to have concrete walls and watchtowers erected around the PRC as for their facility. The perception of the ICRC PRC remains an issue in this circumstance as a challenge to the institutions principals but fortunately, most beneficiaries know the ICRC well enough.

The relocation of the centre is to ensure a long term viability of the centre (in view of a hand-over), to allow for provision of additional services, to solve the perception issue, and to further reduce our security concerns.

The situation in the Iraqi Kurdistan Region (IKR) remains – from a security perspective – largely stable with the region experiencing mostly secondary effects of the conflict, most notably the continued presence of large IDP and refugee populations, a factor contributing to the severe economic pressure facing the authorities. Controversial issues between Kurdistan and Government of Iraq surrounding budget, independence of the regions, oil revenues and the sharing of power simmers away, waiting for a brighter security outlook. Of note is the budget crisis directly affecting people’s lives, as many have not received their salaries since months. In a time where the IKR is feeling stronger than ever in its fight against ISg, financial liability on Baghdad remains key in its search for independence.

Iraq acceded to the United Nations Convention on the Rights of Persons with Disabilities in 2013, followed by the law number 38 on the “Care of Persons with Disabilities and Special Needs”. Most of the legal framework on
disability passed, is not yet implemented. The formation of an Institution for the Care of Persons with Disabilities and Special Needs under the Ministry of Labor and Social Affairs (MoLSA) took place in March 2015 with the aims of addressing the rights and comprehensive needs of persons with disabilities in Iraq.

The existing ICRC Erbil PRC is a reference centre and strong pillar for physical rehabilitation services within Iraq, the NAME region and the ICRC PRP worldwide. The only other fully ICRC managed PRCs are based in Afghanistan. There is also no doubt that ICRC Erbil PRC has and continues to provide a significant amount of the physical rehabilitation services for Erbil governorate, but also other governorates within IKR and neighboring governorates. This is further elaborated in section A2 where we also note that the other centres in IKR are barely functioning. The existing physical rehabilitation needs are exceeding by far the capacities of operational structures nationwide.

Both the existing and new Erbil PRC provides services for PwD directly (weapon wounded, mine/ERW) and indirectly (displaced, lack of access to healthcare) affected by the conflict. In addition, responses are required with regards to

- population increase in the catchment area of Erbil PRC (and outside)
  - natural increase
  - IDPs and refugees
  - those accessing services from neighboring governorates
- decreased access or movement for PwD to access local services
- destruction of previously existing health and PRC structures in neighboring regions
- a decrease in government services due to budget, including a reduction in salaries paid to government employees in IKR
- Mosul Operation Response 2016 / 2017 onwards
- a rise in public health issues / disability as a result of the factors listed including non-communicable diseases (diabetes, hypertension as discussed in the health strategy)
- other potential changes in the geo-political landscape including the wish for an independent Kurdistan

The ICRC ownership of the PRC has also allowed for the service provision to provide some flexibility to the service provision according to the mandate of the ICRC (support to IDPs, refugees and detainees).

Educational institutions in prosthetics/orthotics and physiotherapy in Iraq today are few, and the current levels are far from reaching recognized international standards, compromising the sustainability. Erbil PRC is the only training facility within the IKR for P&O and provides regular trainings to clinical/technical staff. It is also used as a training centre for mobile staff and could be used as an ‘onboarding facility’ within the ICRC PRP as part of their strategy (under progress). It is used for the briefing, familiarization process for new PRP resident staff within Iraq and mobile staff, new to the ICRC, so that they are aware of the standards we expect from all the centres we support.

The operational strategies for the physical rehabilitation program in Iraq focuses on these main aspects:

- Improve accessibility to physical rehabilitation services for the most vulnerable persons with disabilities. Special attention will be given to IDPs and refugees in efforts to reduce their vulnerability. Moreover, a stronger focus on accessibility for women is a priority as women represent only 13 % of the overall service users. Additionally, strengthen referral mechanisms for detainees with disabilities in prioritized places of detention to increase access to physical rehabilitation services.
- Support of prosthetic and orthotic materials, wheelchairs and walking aids to physical rehabilitation centres as a result of shortcomings in the existing national supply chain.
- Improve quality of service provision in wheelchair, clubfoot and cerebral palsy management
- Continue to support national standards for the physical rehabilitation sector and a strategy for education through the collaboration with main national/regional disability stakeholders.
- Support the development of physical rehabilitation professionals according to international standards (ISPO and WCPT) as one main element in ensuring quality and sustainability of services.
- Strengthen the social inclusion of persons with disabilities. The aim is to develop the program in collaboration with main partners to also encompass aspects outside of the traditional perceptions of physical rehabilitation strongly linked to institutional facilities, and to advocate for the overall situation of
persons with disabilities, beyond the scope of the health sector.

The ultimate aim is for persons with disabilities and their families to be able to fully participate in the social, cultural and economic aspects of their respective communities. In the Iraqi Kurdistan Region and adjacent regions, persons with disabilities have access to the Erbil PRC, where services are provided with good quality and the centre sustains the role as a national reference on service provision within physical rehabilitation.

We would envisage these PwD being provided with rehabilitation services complying with recognized quality standards for patient care, device production and service management. All service users would be correctly assessed in a multidisciplinary approach, using clinical reasoning as a tool. Monitoring of quality will be systematized through a formal process of patient feedback and technical (device) assessments for service users.

Through a gradual handover of responsibilities, taking contextual factors and unpredictable environments into consideration, the centre can be an important step in facilitating better integration into school, the labour market, local community and recreational activities.
A.1 Project partner

The partners for the ICRC in the planning and implementation of the ICRC PRP-HIB and onwards are all under the Kurdistan Regional Government (KRG) of Iraq. They are:

- KRG Ministry of Health (MoH)
- KRG Ministry of Higher Education (MoHE)
- KRG, Erbil Governorate, Directorate of Health (DoH)

To ensure the centre within the public sector for long term sustainability is the obvious choice. The physical rehabilitation sector remains for the most part under the responsibility of the Ministry of Health (MoH), although the Ministry of Environment (MoE) also has a victim-assistance component through its Directorate of Mine Action, formally responsibility for all matters related to ERWs. The Ministry of Labour and Social Affairs also has a role to play in addressing the needs of PwD, especially through the ICoPwD (section A).

The building of a new PRC in Erbil and a handover to the IKR MoH is not a new concept, with the intention and support from all sides having been present since 2012. In 2013, an agreement was reached in which the KRG would be responsible for the construction of a PRC and staff salaries, with support from the ICRC in ensuring services and materials (in the initial stages). A draft Memorandum of Understanding is available within PRP records outlining a process of sharing of responsibilities and handover. Unfortunately, due to a large and ongoing deficit in the IKR budget, all new projects in KRG (including the construction of a new Erbil PRC) were put on hold.

The physical rehabilitation sector within Iraq or IKR does not have a documented long term strategy. However the MoH have relied on the functioning of the ICRC Erbil PRC as part of their network of physical rehabilitation actors in IKR. From the distribution of centres in the map (section A2), you can see the ICRC Erbil PRC is seen as ‘the’ PRC for Erbil within MoH planning. The centre is seen as part of the MoH health services within IKR with MoH representatives regularly visit the centre for data and report on ICRC activities within their government reporting. The MoH acknowledge and rely on the ICRC Erbil PRC as a reference centre for physical rehabilitation services, requesting trainings for their staff from other centres.

In spite of the financial crisis, the willingness of the partner to share responsibilities of the centre (within their capacity) has been shown through their ongoing support in the identification and transfer of ownership of a plot of land for a new PRC. The ICRC PRP and Erbil Governorate have worked together, and the land is under final process to be donated to the MoH / Erbil Governorate DoH. According to law, the building or facility constructed on that land will be registered and therefore owned) by the MoH/ Erbil Governorate DoH.

With the intention and support from the MoH guaranteed and their own systems and structures available to be replicated in the future for Erbil PRC, they currently do not have the financial resources to commit to a project three years in the future.

Therefore, for this stage of the feasibility report, the management of the centre will be the full responsibility of the ICRC.

To ensure a successful and sustainable handover with the MoH, it is essential for us to have transparent, specific negotiations within appropriate timeframes to see how each of the stakeholders can best ensure ongoing service provision in Erbil PRC.

If the PRP-HIB is confirmed for Erbil, a meeting will be immediately arranged with the Minister of Health who will identify key persons from the relevant government departments which will form the steering committee to work with the ICRC. Preliminary meetings have already taken place with the MoH responsible of the Rehabilitation and Disability Prevention Department (and Directorate of Planning) about the plans to build a new PRC in Erbil, which would be progressively handed over to the MoH / DoH with the sharing of responsibilities and costs.

The steering committee will work with the ICRC to coordinate and facilitate the activities of construction, training and service provision; from conception, through the five year HIB mechanism and beyond. The ICRC will not be isolated from the MoH / DoH.
There are two examples of ‘handover’ of centres from non-governmental organisations (NGO) to the MoH in IKR from which the ICRC can learn from to ensure success (Emergency and KORD, both in Sulaymaniyah). The key factors for the success would need to include:

- adequate time for specific and transparent negotiations,
- a clear action plan / road map for all parties,
- the recognition of years of service for the staff when included within the MoH salary structure,
- an appropriate timeframe for handover, and
- a strong, collaborative management in the area of service provision transferred from the ICRC to MoH

The current approach (at the time of the feasibility report document) ensures a clear and coherent road ahead for the next five years and will assure the success of the PRP-HIB. However, there is also a clear intent from the ICRC (on confirmation of the PRP-HIB for Erbil) to collaborate with the MoH on a clear road map of sharing of responsibilities towards handover. Confirmation of a budget and timeframe would allow specific and transparent negotiations (and agreements) that ensure this approach.

As stated, the ICRC Erbil PRC does not work in isolation of the health system in IKR / Iraq, which can be seen through their regular contact with the MoH and their role in the Higher Committee for Physical Rehabilitation in IKR. In 2011, the ICRC encouraged the newly formed (at that time) KRG MoH Rehabilitation and Disability Prevention department to initiate their own higher committee as was set up in Baghdad. The committee took some time to eventuate, and due to financial constraints (lack of budget available for travel) the meetings have been irregular. ICRC continues to ensure that the stakeholders are meeting at least once per year.

The Republic of Iraq, Ministry of Health, Medical Operations and Specialized Services Directorate updated the Operating Guidelines of Rehabilitation and Disability Prevention Department in 2014. MoH IKR representatives were influential in the content and five MoH centres from within the IKR region are mentioned within them. Within these guidelines are specific policies, duties and tasks of different stakeholders providing services under the coverage of the Rehabilitation and Disability Prevention department.

The ICRC PRP through their work in the higher committees uses these guidelines as a standard reference for collaboration and support to the sector. They are constantly under revision with the support of the higher committees.

The guidelines specifically mention of ‘the registration of persons with disability in Iraq’ (chapter seven) adopted since 2013 in cooperation with the World Health Organisation (WHO). This database ‘locates persons with disability and registers their personal information, type and reason of disability, and medical and rehabilitation services’. The PRP-HIB Erbil PRC would include this database as one of the steps to being part of the network of MoH centres.

The MoHE in IKR have confirmed their support and collaboration with regards to sending students from IKR abroad for formal education opportunities as part of the PRP-HIB following a meeting with the advisor to the MoHE. The students will be sent abroad for trainings under the conditions and ownership of the MoH / MoHE in collaboration with the ICRC.

Management tools for service provision are under confirmation within the ICRC, but include already existing tools including the Patient Management System (PMS) and Standard Operating Procedures of which Erbil PRC are currently utilising. In January 2017, a tool to measure quality of service and receive beneficiary feedback will be introduced. ICRC Erbil PRC have often been at the forefront of these innovations within the ICRC due to its strong, efficient and quality driven management and service provision, and commitment to improving the work of the PRP within the ICRC.

Until further information is known in the meantime, the existing Erbil PRC will continue to provide services for PwD, trainings to external staff and support to the physical rehabilitation sector in Iraq / IKR (higher committee and education workshop).
A.2 Catchment area of the centre; needs and referral system

The catchment area of this centre is, in theory, primarily Erbil Governorate with a population of 2 million persons. However, the reality is that the centre has a catchment area of all governorates within IKR (7 million persons) and neighbouring governorates due to the reasons mentioned in section A.

Quality demographic data is lacking in Iraq and there has been no census completed which can give accurate figures of persons with disabilities (PwD) in Iraq. Some examples of numbers available in Iraq include

- the World Health Organisation estimation of 0.5 % then in Erbil Governorate alone, 100,000 PwD and in IKR 350,000 PwD in need of service
- from 1996 – 2016, more than 11,000 service users have been registered within ICRC Erbil PRC provided with more than 950 walking aids, 16,260 prosthetic and orthotic devices and 1692 wheelchairs.
- the Iraq Household Socio Economic Survey, 2007 reported that nearly half of the 3.5 million Iraqis with disabilities, have difficulties related to mobility
- the Iraq MoH registration database includes only the numbers of persons who have received services at their centres.

Despite a lack of reliable data, there is no doubt the needs are present and likely increasing due to both the direct and indirect impact of the current context, including the lack of access to functioning health services, a lack of material provision to support physical rehabilitation, the previous and protracted conflicts, and the strain of increased population (refugees, IDPs) on services.

It is also important to remember that the disabilities addressed are usually lifelong. According to the International Society for Prosthetics and Orthotics (ISPO), the replacement of assistive devices should take place every 3 years. This in addition to a large number of children with disabilities in Iraq and global health trends such as the rise in non-communicable diseases like diabetes, hypertension (cause of stroke) with rehabilitation services required to meet the relevant sequelae.

The confirmed presence of the ICRC Erbil PRC as a quality service provider is evidenced through the recording of its highest service provision in 20 years of working (started in 1996), and at the same time having its longest waiting list for service, now 2.5 months. This is also evidenced in the high number of service users accessing services at the ICRC Erbil PRC for the first time.

The MoH IKR currently has eight centres under their ownership (see map on the following page)

- Prosthetics Centre in Dohuk
- Early Detection of Disabled Children Centre, Dohuk
- Helena Centre for Disabled Children, Erbil
- Diyana Centre, Erbil Governorate
- Kurdistan Organisation for the Disabled Centre (KORD), Sulaymaniyah
- Teaching Children Rehabilitation Centre, Sulaymaniyah
- Emergency Physical Rehabilitation Centre*
- Halabcha Centre for Prosthetics, Halabcha

In addition, there are three repair workshops present in Rania, Penjwin and Khalar.

* Emergency PRC is a special case, as although it is classed as a MoH centre, it is managed under Emergency operating procedures while fulfilling its commitments to the MoH. The staff receive the MoH salary from the government (years of service were recognised when it was handed over in 2004), with incentives paid by Emergency, to assure working hours (same working hours as ICRC Erbil PRC). Emergency is also responsible for the budget for all materials, including imported technology.
In the neighboring governorates (outside of IKR) there are currently no physical rehabilitation services available.

- In 2014, Ninawa governorate had one workshop providing prosthetic and orthotic services, under the management of the Iraqi Red Crescent Society (one prosthetist / orthotist). The MoH were also in the process of constructing a rehabilitation centre. Both were located in Mosul.
- In Anbar, recent reports state that Fallujah PRC (previously supported by the ICRC) has an intact building and infrastructure, but has had some machines and all materials removed. There have not been any visits by the MoH Rehabilitation and Disability Prevention Department to the centre to date with security and access not confirmed.
- There has never been a PRC in Diyala governorate.

As part of the ICRC PRP strategy in Iraq, there are currently two proposals of short term support to both Kirkuk and Tikrit (Salah Al Din Governorate) PRCs to reinitiate services within these centres. The ICRC is pending confirmation from the authorities to proceed.

The level of functioning of the existing centres listed above can be found in the table below provided by the Ministry of Health, IKR. With regards to the three paediatric centres highlighted with an asterisk (*) on further analysis and discussion, the numbers in the orthotic service provision column include all service users (some of which received orthoses).

**IKR PRC Device Provision 2015**

<table>
<thead>
<tr>
<th>Centre</th>
<th>Governorate</th>
<th>Prostheses</th>
<th>Orthoses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helena Centre *</td>
<td>Erbil</td>
<td>15</td>
<td>1840</td>
<td>1855</td>
</tr>
<tr>
<td>Diyana Centre</td>
<td>Erbil</td>
<td>85</td>
<td>94</td>
<td>176</td>
</tr>
<tr>
<td>ICRC Erbil PRC</td>
<td>Erbil</td>
<td>518</td>
<td>708</td>
<td>1226</td>
</tr>
</tbody>
</table>
Statistics for 2016 were not available from the MoH IKR. From discussions with managers of KORD and Helena Centres in September 2016, we would imagine statistics to have dropped significantly due to the lack of material supply and budget to provide purchase more. A physical rehabilitation higher committee meeting on 14 December 2016 will shed more light on this issue.

In comparison to this, the existing ICRC Erbil PRC is on its way to reaching its highest yearly service provision since it started service provision in 1996. In line with the lack of services available at other centres, it also has its longest waiting list (2.5 months) in its 20 year history.

The policy of the ICRC Erbil PRC to ensure service for all those that are in need (according to the ICRC principals) means that PwD who are from outside of the formal catchment area, are IDPs, refugees or detainees can receive service. The centre continues to have strong links with the other departments with the ICRC to assure the most vulnerable PwD can be served.

In 2015 more than 530 refugees from Syria and Turkey were provided services, with the majority through the outreach service provided by the ICRC Erbil PRC teams in the refugee camps.

Up until 30th November 2016, the following numbers of PwD receiving services from the following governorates (which includes IDPs) is listed below. This is equal to 42% of the total service users in this time period.

- Ninawa 471
- Salah Al Din 145
- Anbar 565
- Diyala 65
- Baghdad 54
- Kirkuk 446.

The number of refugees with disabilities receiving services from the centre total 206 persons, 162 from Syria and 44 from Turkey.

**Physical Rehabilitation Services**

The services provided in the new Erbil PRC will be strongly based on the *existing services* provided in the ICRC Erbil PRC, i.e. the provision of mobility aids and devices through a strong multidisciplinary approach including the provision of physiotherapy. This means:

- provision of prosthetic, orthotic (polypropylene technology) wheelchairs and other mobility devices

- provision of physiotherapy related to the provision of devices as above, including all musculoskeletal and neurological (peripheral and central) conditions

- assessment of persons with other disabilities / conditions, advice, education and referral to other services available for those that fall outside the current scope of services of the ICRC Erbil PRC

- service users with Cerebral Palsy; although the ICRC Erbil PRC cannot provide ongoing physiotherapy treatments / interventions for this condition, they all receive a comprehensive assessment, education and advice. They are also included in the ‘Hambisela’ parent / family / caregiver education sessions and provided with an orthotic device to maximize participation in activities of daily living (if appropriate)

- continuing its role as a reference centre for physical rehabilitation services in IKR / Iraq through provision of trainings for its own staff and other physical rehabilitation professionals in IKR and neighbouring governorates
A resident Social Worker position has been budgeted for 2017 onwards within ICRC Erbil PRC which will strengthen the links of the centre with other services for persons with disabilities in the region and ensure better networking and referral. This role will especially focus on the social inclusion pillar to ensure service users can integrate fully in society following the physical rehabilitation. This would be through the provision of services that promote social inclusion, including advocacy, vocational training, work and business opportunities, microeconomic initiatives, sport, schooling)

Through the PRP-HIB additional services will be added that are clearly in line with the physical rehabilitation sector within IKR / Iraq and the future needs of a PRC which is planned to be under the responsibility of the MoH. These include:

- addition of a specialist rehabilitation doctor within the multidisciplinary team in the PRC (timeframe to be negotiated with the MoH in 2017)
- implementation of modular technology (e.g. Ottobock / European standard) which is the standard for service in Iraq. Plans within the PRP-HIB are to ensure the staff are trained and capable of using this technology (in time for 2020), but the provision of all of the materials and components for ongoing service provision will be the responsibility of the MoH according to their budget and priorities.
- introduction of clubfoot services utilizing the internationally recognized Ponsetti protocol (serial casting and bracing). Due to the nature of the service, this will be done in collaboration with an orthopaedic surgeon identified by the MoH, but with strong links to the PRC for bracing and referral. The Ponsetti protocol for the management of clubfoot is not existing in IKR, with management strongly linked to surgical treatments (to be initiated within ICRC Erbil PRC during 2018)
- orthopaedic shoe making through the availability of machines existing within the current PRC. These are not being utilized, there is an increase in non-communicable diseases and its sequelae affecting prosthetic and orthotic management. In addition, improving orthopaedic surgery techniques will minimize amputations resulting in the need for specific orthopaedic shoes to accommodate deviations
- possibility to introduce other orthotic services in the future where a demand is assured, but requires the appropriate skilled human resources to implement e.g. spinal orthotics (according to MoH)

The new Erbil centre building has been planned with the concept of flexibility to integrate other services within the existing structure (e.g. allied health, including occupational therapy and speech and language therapy) or additional buildings on the large plot size. It is also to be noted that Medical Rehabilitation Centres / Hospitals are not present in IKR like in other areas of Iraq, so the Erbil PRC (existing ICRC and future MOH) provides more comprehensive services.

In discussions over recent weeks, both the MoH and the Hawler Medical University have identified the need for the centre to have the capacity to be used as a clinical training centre for physiotherapy students and the plot to be the site of a P&O school in the future. These strategies for IKR are being developed outside of the PRP-HIB mechanism within the greater Iraq ICRC PRP 5-10 year strategy.

Due to the large catchment area, numbers of identified service users, and the role the centre plays within and outside Erbil and IKR regions, the existing support services (dormitory and laundry) will need to be continued. The addition of a cafeteria is a minimum standard of all government organizations which provides services for staff, services users, dormitory, family and external persons.

**Service Users and Mobility Devices**

When outlining the numbers of service users and devices that will be provided, it is important to recognize the provision of services to persons with disabilities does not always include provision of a mobility device, and that a device does not work in isolation. The details of service users and mobility device provision for the years of the PRP-HIB are outlined in the table below. The numbers in the table account for new devices only.
<table>
<thead>
<tr>
<th>Device</th>
<th>Year</th>
<th>2016</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostheses</td>
<td></td>
<td>553</td>
<td>600</td>
<td>700</td>
</tr>
<tr>
<td>Orthoses</td>
<td></td>
<td>958</td>
<td>1000</td>
<td>1200</td>
</tr>
<tr>
<td>Walking Aids</td>
<td></td>
<td>997</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Wheelchairs</td>
<td></td>
<td>385</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Physiotherapy and Follow Up / Repairs</td>
<td></td>
<td>2400</td>
<td>3400</td>
<td>4050</td>
</tr>
<tr>
<td>TOTAL Service Users</td>
<td></td>
<td>5293</td>
<td>6250</td>
<td>7200</td>
</tr>
</tbody>
</table>

These numbers have been determined based on experience of the existing ICRC Erbil PRC and rely on a confirmed availability of the human resources (and salaries), working hours (8 hours / day) and budget to provide the local and imported materials for production. It also requires sound efficient management of these resources.

We believe that if managed correctly, the centre will further increase production after 2021 due to the last returning graduates arriving mid-2021.

For the provision of walking aids and wheelchairs, we have been conservative in our estimates based on potential budgets, but if availability is higher, then provision can also increase using the existing human resources (see further information below).

Based on the 20 years of service provision at the ICRC Erbil PRC and knowledge of the physical rehabilitation sector, we can imagine that there will continue to be some growth. According to the architectural planning handbook ratios, the existing ICRC Erbil PRC is functioning at 150% based on the floor area of the PRC. The new Erbil PRC is designed to expand to have an increase in services and service provision, but will not meet the needs of all of IKR for the future. This centre is one of nine centres in the region. The ICRC PRP strategy to strengthen the physical rehabilitation sector in IKR relies on a strong Erbil PRC being the reference centre for the region and providing education opportunities for the future, according to direction of MoH.

The growth of prosthetic (blue line below) and orthotic (orange line) service provision at the ICRC Erbil PRC is shown in the graph below. Orthotic provision was initiated in 2003 with a gradual, progressive increase in the types of orthotics provided up until 2013 when there was a significant increase in the numbers provided. This was due to a confirmed capacity of the ICRC Erbil PRC to provide most kinds of orthotics (including specialized products), the large numbers of IDP and refugees provided service (mainly orthotic patients) and a culmination of trainings and confirmed supervision by the P&O. In the current climate we would expect the needs for orthotic devices in the population to increase. With regards to prosthetic devices, (currently at a plateau) prosthetic device production, this could increase as a result of the territory taken by ISg in neighbouring governorates in 2014, and operations by the IKR and Iraq forces to retake these areas, allowing access to health services for that population.
The graph below indicates the growth in delivery of mobility aids in the ICRC Erbil PRC. The rise in the provision of mobility aids (blue line) from 2012 is in direct relation to the financial crisis in IKR, resulting in other centres unable to provide the mobility aids due to lack of budget. The growth in wheelchairs has been a result of an institutional approach to providing wheelchairs and the provision of training.

The needs for both wheelchair and mobility aids are high, and increasing according to the graph. The maximum numbers indicated in these graphs are as a result of a ceiling effect, based on a fixed budget, not as a result of having met all the needs.

The position of the existing and future Erbil PRC as part of the referral and networking system within IKR / Iraq is confirmed and evidenced through a number of factors:

- the high number of service users each month accessing ICRC Erbil PRC for the first time
- the highest recorded service provision in 2016 and the longest waiting list (2.5 months) since service provision started in 1996
- it is already considered as part of the health services within IKR and the activities are already being reported on by the MoH
- all DPO’s, NGO’s, INGO’s are aware of the centre and services provided through provision of awareness raising activities, leaflets, briefings and centre visits
- it is included in the UN mapping of services
- through the extensive links ICRC has with other departments of the MoH and other KRG departments alongside its own internal transversal links
- its role as a reference centre for physical rehabilitation services in IKR and Iraq

The recruitment of a social worker in 2017 is to strengthen the mapping of and referral to existing social inclusion services within the regions. This is to build on existing links with the paralympic association and DPOs in the region.

### A.3 Human resources for the centre

The human resource requirements to ensure a quality, multidisciplinary approach for the centre are outlined in the table below. As part of the ICRC PRP strategy for the ICRC Erbil PRC, from 2017 the centre will recruit a social worker and in line with the MoH centres in Iraq, facilitate a rehabilitation doctor to work within the team. The numbers also assure a staffing of male and female clinicians to work in the gender specific clinical areas. All staff numbers indicated in the table below are resident staff positions.

<table>
<thead>
<tr>
<th>Erbil Physical Rehabilitation Centre</th>
<th>Staff Numbers 2020 - 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prosthetics and Orthotics Department</strong></td>
<td></td>
</tr>
<tr>
<td>P&amp;O professional with Master degree / HoD</td>
<td>1</td>
</tr>
<tr>
<td>ISPO Cat.I / Bachelor Degree / Responsible</td>
<td>1</td>
</tr>
<tr>
<td>ISPO Cat.I / Bachelor Degree</td>
<td>1</td>
</tr>
<tr>
<td>ISPO Cat.II (full)</td>
<td>2</td>
</tr>
<tr>
<td>Trained P&amp;O professionals from non-ISPO recognized schools</td>
<td>6</td>
</tr>
<tr>
<td>P&amp;O personnel without training working with service users</td>
<td>1</td>
</tr>
<tr>
<td>Shoemakers (18 month training)</td>
<td>1</td>
</tr>
<tr>
<td>Bench worker / HoD</td>
<td>1</td>
</tr>
<tr>
<td>Bench worker</td>
<td>6</td>
</tr>
<tr>
<td>Bench worker</td>
<td>7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>27</strong></td>
</tr>
</tbody>
</table>

| **Wheelchair Department** | |
| Wheelchair technician “bench worker” | 2 |
| **TOTAL** | **2** |

<p>| <strong>Physiotherapy Department</strong> | |
| Physiotherapist (Bachelor) / HoD | 1 |
| Physiotherapist (Bachelor) | 1 |</p>
<table>
<thead>
<tr>
<th>Physiotherapist assistant (diploma level)</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapist assistant (diploma level)</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Other Clinical Personnel</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Worker</td>
</tr>
<tr>
<td>Rehabilitation Doctor</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Erbil Physical Rehabilitation Centre</strong></th>
<th><strong>Staff Numbers 2020 - 2021</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Administration and Management</strong></td>
<td></td>
</tr>
<tr>
<td>Centre Director</td>
<td>1</td>
</tr>
<tr>
<td>Administrator</td>
<td>1</td>
</tr>
<tr>
<td>Assistant Centre Director</td>
<td>1</td>
</tr>
<tr>
<td>Assistant Administrator</td>
<td></td>
</tr>
<tr>
<td>Store keeper</td>
<td>1</td>
</tr>
<tr>
<td>Store keeper</td>
<td>1</td>
</tr>
<tr>
<td>Receptionist</td>
<td>1</td>
</tr>
<tr>
<td>Database Manager</td>
<td>1</td>
</tr>
<tr>
<td>Receptionist and Database Manager</td>
<td>1</td>
</tr>
<tr>
<td>Dormitory Responsible</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Support Staff</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Guard</td>
</tr>
<tr>
<td>Cleaner</td>
</tr>
<tr>
<td>Cleaner</td>
</tr>
<tr>
<td>Kitchen / Cafeteria Responsible</td>
</tr>
<tr>
<td>Maintenance</td>
</tr>
<tr>
<td>Gardener</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
</tr>
</tbody>
</table>

The need for the PRP human resources is essential to the increased services and functioning of the new centre. In addition to the staff list, there is potential within the centre from both human resource and space perspectives to expand the services to include other allied health professions including occupational therapy and speech and language therapy (according to identified needs). There is also additional capacity for administrative positions according to a full MoH structure which can be included if agreed upon in further negotiations. The KR are currently in a process of reform with regards to government employees, with many government structures planning on reducing the number of employees. The numbers of staff identified ensure the service provision, without adding additional staff which the MoH may not wish to take responsibility for in the future.

The addition of an additional database manager is to ensure the implementation of the MoH registration system. Within the existing PRP-HIB feasibility study timeframe, all human resources will be funded completely by the ICRC. This could change through specific and transparent negotiations with the partners from 2017 onwards.
This assures the retention of the staff (and therefore services, and the success of the PRP-HIB) within the new centre. It gives time (on confirmation of the PRP-HIB for Erbil) for the ICRC to negotiate with the MoH to ensure recognition of years of service for existing PRC staff to maximize the numbers of staff transferring from the existing centre to the new centre. The retention of trained, experienced staff is essential to the success of the new centre. Recent evidence supports the retention of 29 staff to the new centre.

The Erbil PRP-HIB proposes one Prosthetist-Orthotist and one Physiotherapist to be part of the PRP-HIB from September 2019. This is to allow for trainings, ensure ongoing capacity of the centre during the physical move and to assure the quality and appropriate service provision in the new centre.

For further information surrounding the budget, please see section A4.

**Formal Education Opportunities**

The formal education opportunities offered within the HIB will support both the physical rehabilitation services within the centre but also the physical rehabilitation sector within IKR. The table below outlines the proposed qualifications and location of study. The type of training and location have been carefully considered to ensure the most successful outcome for this centre.

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Location of Study</th>
<th>Number of Students</th>
<th>Timeframe</th>
<th>Return to Erbil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Physiotherapy</td>
<td>Beirut Arab University, Lebanon</td>
<td>2</td>
<td>4 years</td>
<td>2021</td>
</tr>
<tr>
<td>Diploma of P&amp;O</td>
<td>Cambodia School of P&amp;O, Phnom Penh</td>
<td>2</td>
<td>3 years</td>
<td>2020</td>
</tr>
<tr>
<td>Bachelor of P&amp;O</td>
<td>SSPO, Mahindol University, Bangkok, Thailand</td>
<td>1</td>
<td>4 years</td>
<td>2021</td>
</tr>
<tr>
<td>Bachelor of P&amp;O* (upgrading from Diploma)</td>
<td>SSPO, Mahindol University, Bangkok, Thailand</td>
<td>1</td>
<td>2 years</td>
<td>2019 or 2020</td>
</tr>
<tr>
<td>Orthopaedic Shoe Technology</td>
<td>Vietnamese Training Centre for Orthopaedic Technologists, Hanoi</td>
<td>1</td>
<td>18 months</td>
<td>2020</td>
</tr>
</tbody>
</table>

* There is currently one diploma graduate from the Cambodia School of P&O, working within Erbil PRC. We would like to think he would take the opportunity of this training which is a two year upgrading in Thailand. The return to Erbil date potentially 2020 due to the applications for the 2017 intake closed. If this doesn’t happen, then we would suggest, 2 Bachelor and 2 Diploma students.

The need to offer training abroad is to ensure that the professionals working within the centre have a strong background in their respective professions which enables them to work as independent professionals, using clinical reasoning as part of a multidisciplinary team approach. The internationally recognized qualifications assures them future opportunities for higher education and gives them the skills to provide training to those working or studying within the profession in Iraq.

Currently within the Iraqi Kurdistan region there is no P&O training available. The Diploma in P&O in Baghdad is not internationally recognized, and residents of IKR would not consider to study in Baghdad at this time.

For Physiotherapy, there has been a diploma course in Erbil Polytechnic (TMI) from 1995 which was recently ‘upgraded’ to a Bachelor degree with no additional resources in place (i.e. curriculum, teachers) to ensure minimum standards are being met. It is not internationally recognized.

As part of the ICRC Iraq PRP strategy, the team are facilitating links between Hawler Medical University, Erbil and an educator in the United States in order to produce a curriculum which will meet the World Confederation of Physiotherapy (WCPT) guidelines and receive international accreditation.

The ICRC PRP have met with both MoH and MoHE representatives within IKR who assured the ICRC that they successfully send students on scholarships abroad on a yearly basis. The graduates are bonded to government structures for five years. The MoH / MoHE representatives indicated that special agreements could be made with the ICRC to ensure the government system is responsible for this activity with input and conditions agreed to by the ICRC.
Internal Trainings

Training will continue to be an integral part of the activities within the Erbil PRC. Specific rooms have been included in the new Erbil PRC layout added to ensure

- a location for staff to complete continuing professional development (CPD) activities. This is a long term initiative which is in line with the pillars of sustainability and quality within the PRP,
- space within the production areas for five trainees in the field of prosthetics and orthotics
- ongoing use of the centre for ‘onboarding’ of ICRC staff both resident and mobile within Iraq and potentially in the larger global PRP strategy
- a clinical location for Physiotherapy students from Erbil Polytechnic to complete summer internships. Between 2012 and 2015, 121 physiotherapy students have benefited.
- an area for specific trainings for the centre staff and those working within the sector in IKR

Since 2008, the ICRC Erbil PRC has over more recent years provided trainings to different health professionals working in the area of physical rehabilitation in both IKR and Iraq including rehabilitation doctors (34), prosthetists / orthotists (166), physiotherapists (191), bench workers (24), wheelchair technicians (2) and six administration staff.

The topics are varied but were specific to the needs identified at that time. The most common topics are listed below:

- physiotherapy management of lower limb amputees
- manufacturing of prosthesis (trans-tibial, trans-femoral, upper limb)
- bench worker skills and work
- wheelchair service provision
- orthotics training for physiotherapists

These confirm the role of the centre as a reference centre for physical rehabilitation services in IKR / Iraq.

In addition, the following two internal trainings are planned to ensure the new services

- Clubfoot Service training and Implementation 2018
- Lamination / Modular Technology 2019
A.4 Centre functioning provisional budget and partner financial participation

At this feasibility stage of the PRP-HIB process, the ICRC will assume all management and budget commitments for the PRP-HIB Erbil PRC for the whole five years. This has been due to factors both internal and external to the ICRC.

The capacity of the MoH IKR to take over full financial responsibilities of the centre in three years’ time (2020) considering the current context of IKR / Iraq is unreasonable due to a number of factors:

- Fragile context with protracted conflicts both inside and outside of Iraq which impact on healthcare in the IKR
- Humanitarian impact and costs associated with the recently initiated Mosul operation
- Ongoing economic / budget crises with low oil prices and heavy military expenditure
- No physical rehabilitation material provision from federal stocks
- Reduction in government salaries within IKR
- Loss of services or access to services (Health / PRP) within neighboring governorates (Anbar, Tikrit, Kirkuk, Mosul)
- Western and northern areas of Iraq being retaken under Iraqi administration, resulting in increased needs and access of PwD to services

The existing ICRC Erbil PRC has been providing appropriate and quality services for PwD for 20 years, and the ICRC has chosen not to risk this service provision or support in a period of instability and uncertainty in the context of IKR / Iraq.

In addition, this responsibility ensures working hours of the centre from 0800 – 1600, five days per week, maximising access to service provision for PwD. The official working hours of MoH centres are 0800 – 1400, but in reality they are less. In the current context, we can say the working hours are significantly less due to the reduction in salaries being paid by the government. In some government structures, staff are being rostered three out of the five days to cover minimal services.

As stated, the ICRC will assume the management and budget commitments for this PRP-HIB at this feasibility stage.

There is however, a clear intent and commitment from the ICRC and the MoH (on confirmation of the PRP-HIB for Erbil) to collaborate on a clear road map. This would allow negotiations and agreements that focus on a gradual sharing / handover of financial (and managerial) responsibilities, in line with other centres within IKR.

As documented in section A1, to ensure a successful, sustainable handover with the MoH it is essential for us to have transparent, specific negotiations within appropriate timeframes to see how each of the stakeholders can best ensure ongoing service provision in Erbil PRC. The construction of a new centre (using the PRP-HIB) assist the ICRC in transitioning from its existing location and allowing the first step in this progressive handover.

According to the Republic of Iraq, Ministry of Health Medical Operations and Specialized Services Directorate, Operating Guidelines with regards to cost of services / devices (including charging of a registration fee), the most up to date information is that this is currently free for all persons with disability who meet the following criteria.

- Children less than 5 years
- Institute of Care of PwD (ICoPwD) identification
- Medical reports proving long term disability
- PMU / security forces
- Destitute

The persons who may not meet these criteria include those with a temporary disability such as peripheral nerve palsy (e.g. drop foot) that may resolve over time, but would benefit from an assistive device in the short term for safety or to facilitate function. In addition, all of those receiving devices from ICRC donated material receive the device free of charge.

There is no doubt that this approach may change in the future, with persons able to pay for services themselves, introduction of private health insurances and an increasing demand for physical rehabilitation services. It will be the responsibility of all future planning to discuss criteria for service, including free service, registration fees and investigate cost calculations and cost recovery systems with the stakeholders.
This will be done in line with government policies and ensure that the most vulnerable PwD can still access services.

All materials except for polypropylene technology raw materials and components (CRE) needed to produce prosthetic and orthotic devices can be found locally in IKR. There are often issues with regards to the availability of sizes and/or the quality of materials which could have an impact on the quality of service provision.

In addition, walking aids, wheelchairs toilet chairs are also available locally, with numerous importers available to supply these products in the region.

The purchase of these local materials required for the Erbil Centre will be negotiated with the DoH within an appropriate time frame prior to the centre opening in 2020.

NB: Excel sheets with proposed expenses attached

A.5 Our capacity to influence centre activities management

The capacity of the new centre to achieve the service provision outlined in this report are based on a number of factors.

The ICRC Erbil PRC provides a leading and stable role in the physical rehabilitation sector in IKR / Iraq and has done since 1996. It is a reference centre for physical rehabilitation due to its consistent role in appropriate, quality service provision for PwD and conducting trainings for staff those working in the physical rehabilitation sector.

The centre continues to be a well-known and respected service provider within other departments of the KRG, civil society and especially with PwD due to s work and long-term presence in the region.

As mentioned earlier in the report, there is no doubt about the existing and increasing needs of PwD to receive these physical rehabilitation services and the responsibility of the Erbil PRC in providing these services. In addition, the Erbil PRC provides a wider range of services and devices, not always available in other regions of IKR.

The ongoing development of standard operating procedures for the ICRC Erbil PRC will be necessary to ensure the continuation of both quality and quantity of service provision within the new centre. The ICRC will also be responsible for training of management personnel with provision of appropriate tools and resources. These, along with the MoH Operating Guidelines and ultimately the regulations of the DoH will ensure the sustainability of the human resources to manage and operate the centre.

The willingness of the ICRC to continue the process of handover (despite the lack of money for MoH to continue with the original construction), the MoH and Erbil Governorate are working with the ICRC to ensure the plot of land identified is transferred to the ownership to the MoH despite of the lack of money to continue with the original construction.

In addition, as explained in section A1, the owners of the plot of land identified and the new centre built on it will be the MoH. The strong links existing now and a planned sharing of responsibilities for the future will continue as part of the larger strategy for ICRC PRP in Iraq and the PRP-HIB if confirmed.

The PRP-HIB allows for sustainability of the centre and service through construction of a new centre, and with a progressive handover through the PRP strategy.

Most recently in 2016, the ICRC building a new centre in IKR has been announced by the ICRC Head of Delegation and welcomed by high officials within the IKR government including Prime Minister Barzani.

PRP representatives met with MoH representatives in October 2016, Pakhshahn Mahmood Asaad (Rehabilitation and Disability Prevention Directorate) and Delman Salah Othman (Directorate of Planning) where the concept of the new centre was discussed with the participants. The main discussion was around a confirmed sharing of responsibilities (financial and managerial) and that this would be at the forefront of all future negotiations. ICRC representatives advised this was not negotiable and that a partnership between the MoH and ICRC was essential to the sustainable success of the centre. There was a clear willingness expressed by the MoH representatives to be in partnership with the ICRC according to their resources available.

Since October 2016, the Iraqi Government (including the IKR government) have initiated a military response to retake Mosul and surrounding areas from ISg control. This has put significantly greater pressure on the health
and physical rehabilitation sectors in both regions due to the increased needs and ensuring access for persons who have been deprived of such services for long periods. Meetings planned with the Minister of Health and Governor of Erbil in November / December were not confirmed by the time of this report.

Without requiring full commitment now for an activity in 2020 from authorities, the PRP-HIB allows the ICRC PRP to ensure that the current services being provided to be handed over in an appropriate, sustainable way. It promotes the partners to take over, giving them time to adjust to the responsibility and arranged in a sustainable, road map which will be defined once we have a clear framework within which to discuss.
### Summary Comparison Tables ICRC Erbil PRC 2016 and Erbil PRC 2021

<table>
<thead>
<tr>
<th>Partner</th>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td></td>
<td>Kurdistan Regional Government:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ministry of Health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ministry of Higher Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Erbil Governorate, Directorate of Health</td>
</tr>
</tbody>
</table>

### Area of Coverage

<table>
<thead>
<tr>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three Kurdistan Governorates: Dohuk, Erbil and Sulaymaniyah and neighbouring governorates of Ninawa, Kirkuk and Tikrit</td>
<td>Three Kurdistan Governorates: Dohuk, Erbil and Sulaymaniyah and neighbouring governorates of Ninawa, Kirkuk and Tikrit</td>
</tr>
</tbody>
</table>

### Service Provision

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostheses</td>
<td>553</td>
<td>700</td>
</tr>
<tr>
<td>Orthoses</td>
<td>958</td>
<td>1200</td>
</tr>
<tr>
<td>Wheelchairs</td>
<td>385</td>
<td>250</td>
</tr>
<tr>
<td>Walking Aids</td>
<td>997</td>
<td>1000</td>
</tr>
<tr>
<td>Physiotherapy, Follow Up / Repairs</td>
<td>2400</td>
<td>4050</td>
</tr>
<tr>
<td><strong>Total Service Users</strong></td>
<td><strong>5293</strong></td>
<td><strong>7200</strong></td>
</tr>
</tbody>
</table>

### Services to be Provided

<table>
<thead>
<tr>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multidisciplinary Service Provision (P&amp;O and PT)</td>
<td>Multidisciplinary Service Provision (Doctor, P&amp;O, PT and Social Worker)</td>
</tr>
<tr>
<td>Prosthetic and Orthotic Services (CRE technology)</td>
<td>Prosthetic and Orthotic Services (CRE technology)</td>
</tr>
<tr>
<td>Wheelchair, Walking and functional aid provision</td>
<td>Wheelchair, Walking and functional aid provision</td>
</tr>
<tr>
<td>Physiotherapy involved in all service provision, and Cerebral Palsy Education</td>
<td>Physiotherapy involved in all service provision, and Cerebral Palsy Education</td>
</tr>
<tr>
<td>Clubfoot Services</td>
<td>Clubfoot Services</td>
</tr>
<tr>
<td>Orthopaedic Shoe Provision</td>
<td>Orthopaedic Shoe Provision</td>
</tr>
<tr>
<td>Prosthetic and Orthotic Services (Ottobock) according to MoH</td>
<td>Prosthetic and Orthotic Services (Ottobock) according to MoH</td>
</tr>
</tbody>
</table>

### Working Hours

<table>
<thead>
<tr>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday to Thursday</td>
<td>Sunday to Thursday</td>
</tr>
<tr>
<td>0800-1230 and 1330 - 1600</td>
<td>0800-1230 and 1330 - 1600</td>
</tr>
<tr>
<td>35 hour working week</td>
<td>35 hour working week</td>
</tr>
</tbody>
</table>
### Summary Comparison Tables ICRC Erbil PRC 2016 and Erbil PRC 2021

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length of Stay</strong></td>
<td><strong>According to the pathology and presentation of the service user</strong></td>
<td><strong>According to the pathology and presentation of the service user</strong></td>
</tr>
<tr>
<td><strong>PRP Service Provision</strong></td>
<td><strong>1996 - ongoing under ICRC Iraq / PRP strategy</strong></td>
<td><strong>2020 - 2021 (HIB) and onwards under ICRC Iraq / PRP strategy</strong></td>
</tr>
<tr>
<td><strong>Resident Staff</strong></td>
<td>Clinical / Technical: 25</td>
<td>Clinical / Technical: 47</td>
</tr>
<tr>
<td></td>
<td>Management and Administration: 4</td>
<td>Management and Administration: 6</td>
</tr>
<tr>
<td></td>
<td>Support Staff: 7</td>
<td>Support Staff: 12</td>
</tr>
<tr>
<td><strong>Mobile Staff</strong></td>
<td>No P&amp;O</td>
<td>1 P&amp;O: 2 years and 4 months</td>
</tr>
<tr>
<td></td>
<td>1 Physiotherapist</td>
<td>1 Physiotherapist: 2 years and 4 months</td>
</tr>
<tr>
<td><strong>Formal Education Opportunities</strong></td>
<td>Upgrading to Bachelor P&amp;O</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td>Bachelor P&amp;O</td>
<td>1 person (2 years)</td>
</tr>
<tr>
<td></td>
<td>Diploma P&amp;O</td>
<td>1 person (4 years)</td>
</tr>
<tr>
<td></td>
<td>Bachelor Physiotherapy</td>
<td>2 persons (3 years)</td>
</tr>
<tr>
<td></td>
<td>Orthopaedic Shoe Technology</td>
<td>2 persons (4 years)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 person (18 months)</td>
</tr>
<tr>
<td><strong>Operational costs</strong></td>
<td>400,000 CHF / year</td>
<td>500,000 CHF / year</td>
</tr>
<tr>
<td><strong>Mobile staff costs</strong></td>
<td>200,000 CHF / year</td>
<td>400,000 CHF / year</td>
</tr>
<tr>
<td><strong>Resident staff salaries</strong></td>
<td>568,000 CHF / year</td>
<td>1,400,000 CHF / year</td>
</tr>
<tr>
<td><strong>Education costs</strong></td>
<td>Nil</td>
<td>500,000 CHF (total, to be confirmed)</td>
</tr>
<tr>
<td><strong>Indirect costs (all IQ DEL)</strong></td>
<td>IQ Delegation</td>
<td>IQ Delegation</td>
</tr>
<tr>
<td><strong>Furniture and Equipment</strong></td>
<td>IQ Delegation</td>
<td>160,000 CHF (total, to be confirmed)</td>
</tr>
</tbody>
</table>

**NB:**
Resident Staff salaries for 2021 were projected and not based on the 2016 levels.
The value of total service users for MSR ASSORT in 2016 will be less as repairs are not included.
B. Architectural notice

B.1 Architectural programme

B.1.1 General dimensioning

This project should provide a qualitative and quantitative response to the specific needs of people with disabilities in the Erbil Governorate and possibly the entire Iraqi Kurdistan Region. The full range of rehabilitation services will be offered: orthopaedic devices (orthotics and prosthesis), physiotherapy, walking aids (pairs of crutches) and wheelchairs.

The beneficiaries of these services are persons with a physical disability: persons with upper and lower limb amputations, persons suffering from post-polio syndrome or other types of disabilities such as spinal cord and limb injuries, and children with clubfoot or cerebral palsy.

In 2021, its second year of activity, the centre will allow a total number of 7,200 service users to benefit from physical rehabilitation aids, according to the following breakdown: 700 prostheses, 1200 orthoses, 1000 walking aids, 250 wheelchairs and 4050 beneficiaries of physiotherapy, repair and follow-up services.

Since the MoH/DoH in IKR they don’t have the financial resources to commit to a project 3 years in the future, the PRP proposal for this stage is that the management of the centre will be the full responsibility of the ICRC. Therefore, the human resources needed to ensure a quality, interdisciplinary approach for the centre have been adjusted: from 79 resident staff (MoH/DoH set-up) to 65 resident staff (ICRC set-up). In both scenarios, the number of technical staff required for the running of the centre (Rehabilitation doctors, P&O technicians, bench workers, physiotherapists etc.) remains unchanged and equal to 47.

Since it has been developed following the area breakdown of the last Project Brief – Vision, the proposed design comprises already the possible future expansion of services to include other allied health professions (occupational therapy /speech and language therapy) and the capacity for administrative positions according to a full MoH structure (which can be either maintained if agreed upon in further negotiations or removed).

The Total Floor Area of the new Erbil PRC is 4’606 m².

NOTA BENE: The vision of the centre does not incorporate the “Outdoor sports court” because sports for persons with disabilities are available within society (a National Paralympic Committee is present in Iraq) and they are part of sport institutions.

B.1.2 PRP projects which served as reference

For the design of the new PRC in Erbil, the layouts of Physical Rehabilitation Centres designed and built in countries with similar climate conditions and cultural backgrounds have been used as reference and, in particular, the one is Sa’ada, Yemen. The feasibility study of Sa’ada – in 2013 - was the first to be developed with the support of a preliminary draft of the PRC Architectural Programming Handbook.

The project has been adapted to the Erbil cultural context (less conservative than the Sa’ada one) and to the "local building style”.

B.1.3 User’s flow and main streams

In order to guide the design process and facilitate understanding of the functionality of the new Erbil PRC, the relationships of the various parts of the facility were set out on the basis of the PRC Handbook flow charts and adapted to the Iraqi Kurdistan Region context.

Together with the Program Responsible of the about 20 years old existing PRC in Erbil and the PRP Manager of Iraq, three main flows were established: (i) Patient flow, (ii) P&O manufacturing flow and the (iii) Physiotherapy activities flow.
For the patient flow, the priority was given to the majority of the patient’s case (prosthetics and orthotics patients). However also considering clubfeet and cerebral palsy flows. After an initial assessment, the patient is referred to the casting room to take the negative mould and waits until the prosthetics or orthotics device is ready to be tested. When the device is prepared to be used, the patient is sent to the fitting room, to adjust and correct the device according to the patient’s characteristics. When the P&O device is adapted to the patient, s/he starts the physiotherapy process.

Prosthetics and orthotics manufacturing flow starts in the casting room, where the negative mould of the patient is taken and then sent to the rectification room. After having been filled with plaster and rectified, the resultant positive is sent to the thermoforming room where the first component of the prosthetics/orthotic device is made in polypropylene (ICRC standard). Subsequently the propylene component passes through several stages in the machine and assembly room, until the process is complete and the prosthetics or orthotics device is delivered to the patient in the fitting room. The flow of the manufacturing prosthetics and orthotics devices should consider the possibility of reversal of the process in all stages, with staff constantly moving between areas.

Through the PRP-HIB, the implementation of modular technology (e.g. Ottobock / European standard) which is the standard for service in Iraq will be added. Plans within the PRP-HIB are to ensure the staff are trained and capable of using this technology (in time for 2020), but the provision of all of the materials and components for ongoing service provision will be the responsibility of the MoH according to their budget and priorities.

**B.1.4 Bubble diagram**

After the definition of the main flows, a functional chart with the full architectural program of the new PRC was developed and proposed. This chart contains all areas and services of the new PRC, representing graphically the location and functional relation between them. It proposes as well the organization of services considering the gender segregation, made through two-divided circulation (refer to Annex 2 for higher resolution).
### B.1.5 List of rooms and area

The initial area breakdown from the Vision document (30.05.2016) was adapted in accordance with the PRC Handbook. A further revision has been done in preparation of the three days meetings held in Erbil from 4th to 6th of October 2016.

On 05.10.2016 this updated version of the document has been discussed between the GVA Task Force (Barbara Rau and Samuel Bonnet) and the Project Team / ERB-BAG (Sara Drum, Srood Suad Nafie Rashid and Maria Cristina Ruggeri). The outcome was a document referred to as Project Brief, which describes the areas/activities of the new Erbil PRC.

The a/m Project Brief has remained almost unchanged except for the introduction of two rooms: a 25 m² room for ICRC office and a 28 m² room for the Continuing Professional Development (CPD) of the staff, in accordance with the "PRP HIB Erbil IRAQ Vision" dated 18.11.2016 (refer to Annex 3 for the Preliminary layout).

The spaces outlined below make up the complete architectural program of the new Erbil PRC:

#### PRC/ERB - PROJECT BRIEF - VISION

<table>
<thead>
<tr>
<th>Room List</th>
<th>Quantity (room)</th>
<th>User(s)</th>
<th>Unit area (m²)</th>
<th>UA (m²)</th>
<th>SA (m²)</th>
<th>CA (m²)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration area (ADM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centre Director office</td>
<td>1</td>
<td>1</td>
<td>23</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant of the Centre Director office</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secretary of the Manager office</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehabilitation Doctor office</td>
<td>1</td>
<td>1</td>
<td>18</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrator office</td>
<td>1</td>
<td>1</td>
<td>20</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration office (Account. &amp; Admin. Ass.)</td>
<td>1</td>
<td>2</td>
<td>21</td>
<td>21</td>
<td></td>
<td></td>
<td>Access to Archives from Database manager office only</td>
</tr>
<tr>
<td>Database Manager office</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td>20</td>
<td></td>
<td></td>
<td>More standard system to be checked</td>
</tr>
<tr>
<td>Cashier</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of P&amp;O &amp; Head of PT office</td>
<td>1</td>
<td>1</td>
<td>28</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICRC Office</td>
<td>1</td>
<td>3</td>
<td>25</td>
<td>25</td>
<td></td>
<td></td>
<td>Office location: between P&amp;O and PTD</td>
</tr>
<tr>
<td>Continuing Professional Development (CPD) room</td>
<td>1</td>
<td>8</td>
<td>28</td>
<td>28</td>
<td></td>
<td></td>
<td>3 persons capacity</td>
</tr>
<tr>
<td>Meeting / Training room</td>
<td>1</td>
<td>30</td>
<td>68</td>
<td>68</td>
<td></td>
<td></td>
<td>Library and 8 desk for books consultation (1 x 0.6m² each desk)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 people’s capacity (2 m²/person), possibility to share in two meeting rooms with a 15 person’s</td>
</tr>
<tr>
<td>Facility (for office staff)</td>
<td>Capacity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>----------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Kitchen</td>
<td></td>
<td>43</td>
<td>43</td>
<td>43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cafeteria / Dining room (Staff / Service Users / Visitors)</td>
<td>60</td>
<td>150</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kitchen / Laundry staff Changing room (with Bathroom)</td>
<td>4</td>
<td>18</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff changing room (M)</td>
<td></td>
<td>33</td>
<td>47</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff changing room (F)</td>
<td></td>
<td>17</td>
<td>32</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning room</td>
<td></td>
<td></td>
<td>9.5</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet for ADM Staff (PwD)</td>
<td></td>
<td>15</td>
<td>6</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guard room (with Toilet)</td>
<td></td>
<td>2</td>
<td>12</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>691</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Kitchenette (for office staff)</strong></td>
<td></td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Kitchen**
- Food reception and dispatch, dishwashing area, kitchen tools and dishes storage
- Floor ratio: 2sqm/person, 35 service users/visitors and 25 staff; 60 users in total. 80% PECA* / 20% PECAs**, including Kitchenette for Staff

**Cafeteria / Dining room**
- Adequate circulation space must be allocated at the entrance/exit points to/from the Meeting room

**Kitchenette (for office staff)**
- Around 60 persons (in total) wearing a uniform.
  - Ratio: 65% Male staff / 35% Female staff. Including bathrooms

**Staff changing room (M)**
- Around 50 persons (in total) wearing a uniform.
  - Ratio: 65% Male staff / 35% Female staff. Including bathrooms

**Cleaning room**
- 

**Toilet for ADM Staff (PwD)**
- 

**Guard room (with Toilet)**
- 

**Subtotal**
- 

**Clinical area (CLI)**
- No gender segregation needed
- Access from Database manager only

**Reception**
- 15 person's Capacity. No gender segregation needed

**Waiting area 1**
- 15 person's Capacity. No gender segregation needed

**Waiting area 2**
- Gender segregation / Efficiency

**Assessment room**
- Gender segregation / Efficiency

**First Fitting room**
- Gender segregation / Efficiency

**Wheelchair provision**
- Room location: between CLI and Wheelchair assembly room

**Paediatric room**
- Linked to Cerebral Palsy room - Clubfoot room - Exercise room

**Social services office**
- Office location: nearby Head of P&O-PT office

**Allied health office**
- Office location: nearby Head of P&O-PT office

**Toilet for Service Users/Relatives (PwD)**
- 

**Subtotal**
- 

**Prosthetics & Orthotics Department (POD)**
- 

**Casting room**
- Gender segregation needed

**Rectification room**
- Two rectification tables: 8 working places each, 16 working places in total; 11 P&O + 5 Students/Trainees

**Gypsum room**
- Good access to garbage collection area

**Cast breaking room**
- 3 Ovens for PP-EVA, 2 ovens for Lamination technology, 4 (2+2) Enveloping Suction Tubes, 1 Cutting table, 1 PP-EVA Storage

**Thermoforming room**
- For production of Laminated modular components

**Lamination room**
- 34 benches for bench workers, 8 benches for P&O and 2 benches for students/trainees. A suction top for workbench (suction of adhesive vapours) may be needed

**Assembly room**
- The number of machines needed (mainly of socket routers and grinders) will give us an idea of the surface needed. PRP to answer

**Metal room**
- Including production of corner chairs, standing frames and repairing

**Machine room**
- 

**Wheelchair assembly room**
- 

**Sewing room**
- 

**Toilet for POD staff**
- 

**Subtotal**
- 

**Physiotherapy Department (PTD)**
- Gender segregation. The two individual treatment cubicles are included, separation by curtains

**Exercise and Individual treatment cubicals (adults)**
- 

**Cerebral palsy room (family training)**
- 

**Outdoor advanced training court (covered)**
- PECA (Partially Enclosed and Covered Area)

**Clubfoot room**
- A waiting area in the corridor for 2 services users with relatives has to be foreseen

**Physiotherapy Office & Storage**
- 

**Toilet for Service Users/Relatives (PwD)**
- 

**Subtotal**
- 

**Service User Accommodation (SUA)**
- 4 persons / room
- 2 rooms for 4 persons / 1 room for 2 persons

**Dormitory M**
- 

**Dormitory F**
- 

**Bathroom M**
- 

**Subtotal**
-
### Bathroom F
- 2 WC + 2 showers + 2 washbasins + 1 washbasin for laundry + 1 Bathroom PwD. Including laundry
- Including bathroom

### Dormitory responsible room
- 1
- 2
- 22
- 22

### Communal area M (indoor)
- 1
- 13
- 35
- 35

### Communal area F (indoor)
- 1
- 10
- 35
- 35

### Outdoor communal area (covered)
- 1
- 50
- 90
- 90

### Prayer room
- 2
- 10
- 16
- 32

### Laundry
- 1
- 2
- 45
- 45

### External drying area
- 1
- 2
- 18
- 18

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### Services area (SER)

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<tr>
<td>Maintenance room</td>
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<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Waste management (garbage collection area)</td>
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<tr>
<td>Waste management (domestic garbage collection area)</td>
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<tr>
<td>Generator room</td>
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<td>Transformer room</td>
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<tr>
<td>Main Distribution room (nearby GenSet)</td>
<td>1</td>
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<td>13</td>
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<td>Electrical room</td>
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<tr>
<td>Borehole room</td>
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<tr>
<td>Pumps room</td>
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<td>Water tower</td>
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<tbody>
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### Storage (STO)

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<tbody>
<tr>
<td>Main storage</td>
<td>1</td>
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<td>Daily storare</td>
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<td>Gardening storage</td>
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<td>Laundry storage</td>
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<td>Dormitory storage</td>
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<td>UA ISO 9836:2011 para. 5.1.7</td>
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<td>Ratios</td>
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### NET FLOOR AREA

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### TOTAL FLOOR AREA

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<tr>
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<tr>
<td>PLOT RATIO (PR) = TFA/PA*</td>
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### PLOT AREA

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<tbody>
<tr>
<td>14630</td>
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</table>

As showed above, the Net Floor Area (NFA) has been multiplied by 10% to calculate the Total Floor Area (TFA), resulting in a total of 4'606 m².

These TFA figures will be used for cost estimation.

---

1 NFA/TFA ratio of Sa'ada PRC (Yemen) is 0.82 and the NFA/TFA ratio of Faizabad PRC (Afghanistan) is 0.88 / Physical Rehabilitation Centres – Architectural Programming Handbook – ICRC, December 2014
B.2 Site analysis

B.2.1 Erbil

"Erbil, also spelt Arbil or Irbil, and also known as Hewler (or Hawler), is the capital city of Erbil Governorate and of Iraqi Kurdistan Region. It has an ethnically diverse population of Kurds, Assyrians, Arabs, Armenians, Turcomans, Yezidis, Shabakis and Mandaeans. It is equally religiously diverse, with believers of Sunni Islam, Shia Islam, Christianity, Sufism, Yezidism, Yarsan, Shabakism and Mandeanism extant in and around Erbil. It is located approximately 350 kilometres (220 miles) north of Baghdad".2

The relatively stable security environment has allowed economic progress in KRI before 2014. After achieving a semi-autonomous status in 2005, KRI’s economy expanded every year, and its real economic growth rate was about 8 percent in 2013 (Invest In Group – KRG Department of Foreign Relations 2014), driven primarily by oil production. In the past few years, the construction sector has been an important source of growth followed by agriculture and services.

[...]Projections show that the economy’s growth rate was about 3 percent in 2014 compared with a previous baseline of 8 percent growth.3

After the unification in 2006 of the two separate governments (one based in Erbil and headed by the Kurdistan Democratic Party - KDP and one based in Slemani - or Sulaymaniyah - and headed by the Patriotic Union of Kurdistan - PUK), the modern Kurdistan Regional Government (KRG) was formed and one of the priorities for the new government was to create a legal foundation that could attract investment.

"As a result of a favorable investment law, a burgeoning private sector, a forward thinking government, and a strong security environment, the Kurdistan Region continues to register impressive economic growth and now seeks to assert itself as a new investment hub in the Middle East".4

According to a profiling assessment conducted in December 2015 as a result of a partnership between United Nations Agencies (within them UNHCR) and Iraqi Kurdish Agencies (within them ERC and ESD):

"In the last 5 years, a total of 77,600 displaced families, or 335,000 individuals, have sought refuge in the urban areas of Erbil Governorate (257,400 IDPs and 77,600 Syrian refugees)5. These recently displaced populations have been added to an urban host community of about 1.35 million inhabitants6. IDPs and refugees now comprise about 25% of the total urban population in Erbil Governorate.

The displaced population is clustered across the governorate in different patterns (see Figure beside). 3 out of 4 Syrian refugees are located in Erbil district centre, with most of the remainder spread in the peri-urban districts and a minority in towns. When looking at IDPs, 44% are located in Erbil district periphery (mostly Baharka and Daratu), 40% within Erbil district centre and 16% in towns. In addition to the IDPs and refugees hosted in urban areas, some displaced households established themselves in the rural areas of Erbil Governorate (about 5,500 refugees and 76,800 IDPs), while some others sought shelter in camps (about 31,200 refugees and 17,900 IDPs)7.

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2 Source: https://en.wikipedia.org/wiki/Erbil#cite_note-2
3 The Kurdistan Region of Iraq. Assessing the Economic and Social Impact of the Syrian Conflict and ISIS. World Bank Group, 2015
4 http://investingroup.org/review/236/determined-to-grow-economy-kurdistan/
5 Data for Syrian refugees facilitated by UNHCR’s registration database (ProGres) and data for IDPs facilitated by KRISO’s Comprehensive Registration of Displaced People (CRDP)
B.2.2 Existing PRC in Erbil

As already mentioned, the existing centre is not in a position to be handed over to the MoH because of the lack of space on the existing plot for enlargement of services and the presence of the counter terrorism directorate (CTD).

The adjacent plot was the headquarters of the official security organization in IKR, Assayesh, till December 2015 when, due to their increased importance and set-up, they moved to another location. Before that, in 2012, since their first plan was to take over the plot of the existing PRC, ICRC was asked to move and even a project was commissioned by the Ministry of Interior for a new PRC and delivered in September 2013 (refer to Annex 4). This initial proposal was finally abandoned and they decided rather to build a new headquarters elsewhere.

B.2.3 Plot and Topographic

The plot allocated for the project has an elongated and irregular rectangular shape with an aspect ratio\(^8\) equal to 4:1. Its longer sides are about 234 and 242 m respectively and the shorter sides about 55 and 68 m: the longer sides are oriented towards North – East. According to the survey carried out by the surveyors of the Land Registry and of the Municipality, the total plot surface is 14'630,75 m\(^2\) approximately.

The plot is located in the new South-West expansion area, city zone SW15 (plot n° 15/1 K – 20 Qatawi) under the administration of the Municipality 6 (see figure below).

![Six Municipalities of Erbil. Source: Directorate of Municipality Three\(^9\)](image)

The coordinates of the four landmarks have not been provided with the first/temporary plot title delivered to ICRC by the Presidency of Municipality in November 2016: a basic survey of the GPS coordinates of the four landmarks have been done by ICRC.

Taking into consideration the simple topography and morphology of the plot, a detailed topographic survey has not been considered strictly needed at this stage of the study.

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\(^8\) The aspect ratio of a geometric shape is the ratio of its sizes in different dimensions. For example, the aspect ratio of a rectangle is the ratio of its longer side to its shorter side – the ratio of width to height, when the rectangle is oriented as a “landscape”. Source: Wikipedia

• Topographic survey
A Topographic Survey test needs to be carried out at the beginning of the next design phase, DD. Four companies have been contacted to have a cost estimation for the topographic survey and, in average, the quotation received is 100-150 USD for 2'500 m² land. Taking into account the size of the plot, the expected estimation of cost is maximum 900 USD (930 CHF).

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Mobile</th>
<th>E-mail address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Consulting Bureau</td>
<td>Kirkuk road, opposite of Tangram Hotel</td>
<td>0750 446 3111</td>
<td><a href="mailto:rojgarq@gmail.com">rojgarq@gmail.com</a></td>
</tr>
<tr>
<td>Ava Land Bureau for Surveying</td>
<td>Zaza street, Al-Atrushi building</td>
<td>0750 445 2817 /</td>
<td><a href="mailto:rizgar.ubaed@gmail.com">rizgar.ubaed@gmail.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0750 716 1111</td>
<td><a href="mailto:dlovanhawleri@gmail.com">dlovanhawleri@gmail.com</a></td>
</tr>
<tr>
<td>Swar Company for Land Surveying</td>
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<td>0750 446 3525</td>
<td>-</td>
</tr>
<tr>
<td>Rizgar Aziz Mawlood Company for Surveying</td>
<td>60 meter street, Shoresh Bridge,</td>
<td>0750 419 2834</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>opposite of Dentist College</td>
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</tr>
</tbody>
</table>

B.2.4 UXO
"Iraq is one of the worst-off countries in the world in terms of minefield and projectile pollution, with 25 million land mines and other unexploded ordnances scattered across the country. The concentration is especially dense in Iraqi Kurdistan, and efforts to clear the land are meeting with a number of obstacles. [...] Some 1.5 billion square meters (about 580 square miles) of land in Iraq contain mines, according to a 2015 US State Department report on surveys conducted in 2006 and 2011. The Kurdistan Regional Government (KRG) estimates 314 million square meters (121 square miles) of land are contaminated across that region. Most of these unexploded mines are the result of the Iran-Iraq War, according to the US State Department, but more accumulated during the 1990-1991 armed conflict and the 2003 invasion into Iraq by the US-led coalition. The Islamic State (IS) and other parties continue to add to the mine count today."[10]

That said, WeC/BAG requested to the Iraqi Kurdistan Mine Action Agency (IKMAA) to have any relevant information about the allocated plot. According to their report, the area (as well as the entire city of Erbil) was verified using Information Management System for Mine Action (IMSMA)[11] database and the outcome is that it

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[11] The Information Management System for Mine Action (IMSMA) is a software designed to support the needs of the mine action community for decision support, monitoring and reporting
isn’t a Suspected Hazardous Area. Refer to Annex 5 for IMSMA map for the overall weapon contamination situation in the Northern Iraq (*for Internal Use Only*).

**B.3 Climate data**

- **Climate classification**

According to the Köppen-Geiger Climate classification, Iraq vast majority is classified in the Group B – Arid (subgroup BWh, Tropical and subtropical desert climate) characterized by constant high temperatures all 12 months of the year.

The south part of the Iraqi Kurdistan Region is still classified in the Group B – Arid but in the subgroup BSh, Mid-latitude steppe and desert climate. On the contrary, because of its proximity with mountains mainly along the border with Iran, the north part of is classified in the Group C – Warm temperature (subgroup CSa, Mediterranean climate)

Erbil, situated at about 400 - 440 meter above sea level, is in border between the two main groups which characterize the Iraqi Kurdistan Region: the climate is mainly semi-arid continental, very hot and dry in summer and cold and wet in winter.

Spring is the most beautiful season in Kurdistan and the time when Kurds celebrate Nawroz, the Kurdish New Year, on the spring or vernal equinox. Mean high temperatures range from 13-18 degrees in March to 27-32 degrees in May.

The summer months from June to September are very hot and dry. In July and August, the hottest months, mean highs are 39-43 degrees and often reach nearly 50 degrees.

Autumn is dry and mild, and like spring is an ideal time of year to travel in the Region. Average temperatures are 24-29 degrees in October, cooling slightly in November.

Winters are mild, except in the high mountains. Mean winter high temperatures are 7-13 degrees Celsius, and mean lows are 2-7 degrees Celsius.\(^\text{12}\)

![Climate classification at Erbil. Source: ICRC Geoportal](image)

According to the modified Köppen-Geiger Climate classification scheme, differences between BSh and CSa subgroups.\(^\text{13}\)

\(^\text{12}\) Source: US Air Force Combat Climatology Centre according to Kurdistan Regional Government (KRG) website.

\(^\text{13}\) [https://www.britannica.com/science/Koppen-climate-classification](https://www.britannica.com/science/Koppen-climate-classification)
• **Temperature**  
  Average temperatures with precipitation

![Temperature Graph]

• **Rainfall**  
  According to KRG – Kurdistan’s Geography and Climate, the annual rainfall is 375-724mm.

![Rainfall Graph]

• **Sunshine**  
  The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

![Sunshine Graph]

• **Wind speed**  
  Highlight: as resumed in the Abstract of the article “Sand and dust storm events in Iraq” published on “Natural Science” (Vol.5 No.1 0(2013), Article ID: 37734,11 pages).

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15 Idem (as above)
16 Derived from the Global Agro-Ecological Zones Study, Food and Agriculture Organization of the United Nations (FAO), Land and Water Development Division (AGL), with the collaboration of the International Institute for Applied Systems Analysis (IIASA), 2000. Data averaged over a period of 37 years. Raster data-set has been exported as ASCII raster file type
18 Idem (as above)
“Iraq is one of the most affected countries in the Middle East concerning the occurrences of sand and dust storms. The frequency of the occurrence has increased drastically in the last decade and it is increasing continuously. The events of sand and dust storms are either regional or local. The former, however, is more frequent than the latter. The regional event, generally extends outside the Iraqi territory, into different directions, but usually covers part of Syria, crossing the Iraqi territory towards Kuwait and Saudi Arabia, and/or towards the Arabian Gulf, and less frequently extends to Iran. The main causes in the development of sand and dust storms, in Iraq are discussed. The causes are also either regional or local. The former, however, causes more economic losses and harsh effect on the human’s health, as compared with the latter. One of the main reasons behind the development of sand and dust storms is the climatic changes within the region, especially the drastic decrease in the annual rate of rainfall, besides environmental changes, such as drying of the marshes, land degradation, and desertification. From the local causes, the most effective reason is the haphazard driving and military operations, especially in the Iraqi Southern Desert. Prudent management of water resources by using non-conventional resources and adapting suitable irrigation methods can greatly help to overcome this phenomenon and minimize the number of dust storm.”

As mentioned above, this dust phenomenon has a relevant impact on the human’s health – and not only – and, accordingly, on the way people interact with buildings, for instance: use – or better not-use – of windows for natural ventilation, large consumption of clear water for cleaning etc.

B.4 Building Physics

- Thermal comfort
Thermal comfort is influenced by a combination of physical factors:
1) Air Temperature;
2) Mean radiant temperature
3) Air speed (wind)
4) Humidity
5) Occupant metabolic rate
6) Occupant choice of clotting

Thermal comfort within a building is affected by:
1) The choice of building fabric
2) Insulation / Protection from solar thermal gains

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21 As per Feasibility Notice for the Myitkyina PRC: Arup, Engineering Concept Report Volume 1 – Main report Main Compound, Juba, 2013
3) The choice of air conditioning (if required) and ventilation systems
4) Building use, user control, user sensitivity (and, to a degree, cultural perceptions)

The climate of hot-dry zones is in general characterized by high temperatures (40 – 50 °C in summer), with sharp variations in both diurnal (day/night) and seasonal (summer/winter) temperatures; and precipitation (rainfall, snow) which is scarce, irregular and unreliable, but may nevertheless cause severe floods. Cold winds and dust/sandstorms prevail in winter. The solar radiation intensity is high and enhanced by the radiation reflected from the ground. The air humidity is low and this climate is generally healthier than those of warm-humid lands.

The main goal of climatic design, on a macro (settlement) and micro (building) level, is hence to reduce uncomfortable conditions created by extremes of heat and dryness. Buildings must be adapted to extreme summer/winter and day/night conditions to achieve a well-balanced indoor climate. Not only cooling is needed; passive heating may also be needed in winter and during cold nights. Protection is required from the intense radiation from the sun, ground and surrounding buildings, from dust, sandstorms and insects (flies).

The factors which affect the design of a building in hot arid climate are topography, water, ground surface, vegetation, windbreaks and orientation. The design features in hot arid climate include features like compact form, use of materials with absorptive, insulation, and high thermal capacity, evaporative cooling, use of internal courtyards, use of reflective surfaces and brise-soleils or sun breakers. Passive energy conserving climate control is the use of the building itself to provide warmth in winter and comfortable temperatures in the summers. This can be achieved with insulation, window shading, and placement of the building to admit the breeze or keep it away as required i.e. thermal conductivity and form of the building. Since light colors tend to reduce building heat gain in summer, buildings with large thermal mass with light colored walls and reflective surfaces are suitable for climates which require heating in winter and cooling in summer and can reduce the energy needed considerably.

In the design of a building in this type of climate, the main recommendations can be summarized as follows:

- Compact and massive design, mainly inward-facing buildings.
- Minimize surface areas and openings exposed to the east and west sun and orient the building accordingly.
- Allow heat gain and storage in winter.
- Create thermal barriers (non-habitable rooms, such as stores, toilets etc.) on the east and especially on the west side of the building.
- Promote ventilation and access to cooling winds.
- Provide sufficient natural lighting (no excessively deep rooms).
- Shade roofs, walls, openings and windows and outdoor spaces.
- Include small enclosed courtyards with arcades/colonnades for light and air and outside day-to-day activities. Courtyards provide shade, cool air pools, and protection from hot and dusty winds.
- Treat the external space as carefully as the building itself to reduce glare and reflected heat radiation.

Since the centres will be handed over to our local partners, the Water & Habitat Department in Geneva has promoted the use of the free EDGE software in order to determine the most cost-effective options for the centres resource-efficient design (environment, running cost, etc.). Taking into account the climate data, the building shape and the cost for utilities (water, electricity, and fuel), the results for the new Erbil PRC show that by using:

- Reflective paint for external walls and roofs.
- Insulation of roof surfaces and external walls.
- Natural ventilation for corridors, lobbies, waiting areas and service user’s rooms.
- High efficiency boilers for water heating (efficiency of 90%).
- Energy-saving light bulbs for internal and external spaces.
- Low-flow showerheads (7lit/min), faucets (2lit/min) etc.
- Water-efficient landscaping - 4 lit/m2/day

It will possible to save 21.8% on energy and 22.3% on water. Refer to Annex 6 for the full EDGE report.

The sustainability and energy efficiency are greatly affected by a building’s skin (walls and roof), therefore external cladding for the walls and “gravel roof” (flat / low-slope roof) can be suggested as exterior and finish systems.
Walls. External cladding system is a non-loadbearing skin or layer attached to the outside of a home to shed water and protect the building from the effects of weather. The primary roles of cladding are to control the infiltration of weather elements and the egress of water vapor while providing a durable, aesthetically pleasing appearance. Secondary roles can include sound and thermal insulation, fire resistance, and the capacity for cleaning in dusty, polluted environments. The external cladding system has widely been used in Erbil over the last 10/15 years, most likely because of its aesthetic appeal rather than for its performance, indeed most of the time the insulating elements (between the support walls and the cladding itself) are omitted. The most common external cladding walls are marble, metallic and ceramic/porcelain (with stone or metallic effects).

The porcelain panels (see pictures below) are normally 10 mm thick and mounted on an aluminium structure anchored to the brick walls and to the bearing elements (columns and beams) of the buildings: the total thickness of the external cladding is 90/100 mm. The estimated cost – in average - for this sort of external cladding (including insulating elements) is 120 US/m² (125 CHF/ m²) of façade.

The marble panels are normally 15/20 mm thick and mounted on an adjustable steel structure anchored to the bearing elements (columns and beams) of the buildings (see picture below, steel structure only): the total thickness of the external cladding is 150/200 mm. The estimated cost – in average - for this sort of external cladding (including insulating elements) is 130 US/m² (135 CHF/ m²) of façade.

The bricks normally used for the masonry walls are the 20 cm thick light hollow concrete bricks (refer to Annex 7 for a list of the most common bricks available in the local market). Cellular or aerated autoclaved concrete block, called “Thermostone”, are available too within Iraq but they are not yet particularly used in Erbil.

The external cladding recommended for the new Erbil PRC is either the cladding made of metallic panels or of porcelain (with stone/metallic effect) panels or the combination of these two. But, since the adoption of this
façade system may have a relevant impact on the total construction costs, the use may possibly limited to the façades the most exposed to the rain (and dust) and to the main entrance block/building.

**Roofs.** The choice of an appropriate finishing layer, able to ensure a good reflectivity of the roof’s surface, will reduce the heat conducted to the conditioned space below and increase the energy efficiency. The adoption of “gravel roof” (also knew as “tar and gravel roof”) as roofing system may be considered to improve the thermal comfort.

**B.5 Architectural concept and design**

The present feasibility study does not intend to propose a definitive architectural design, but it lays down certain principles to meet the functional requirements defined by the PRP (and summarized in the user’s flow and main streams at chapter B.1) and the constraints arising from the site and the climatic conditions.

According to local customs, the main façade and entrance of public buildings in Erbil must be on the main road which, in the Masterplan of the city of Erbil, will be the south road: the entire masterplan of the new Erbil PRC has been conceived following this important indication.

The proposed design considers as main guidelines: the flow of service users, the sequence of fitting and manufacture of prosthetics and orthotics devices and the location of physiotherapy areas. Because of the elongated and irregular rectangular shape of the plot (aspect ratio22 4:1), avoiding interference between the flows and reducing - as much as possible - the walking distances have been the two main factors for the design of the layout.

The centre is articulated in a public to private sequence along the east/west axis with access from south/east. The main entrance to the new Erbil PRC compound is located in the south / east corner of the site and, in a sequence from east to west, the different facilities follow: the main building (which host most part of the centre activities), the “ancillary services” building (cafeteria/kitchen and laundry) and – at the end – the service users accommodations.

A central location has been chosen for the cafeteria since it will provide services for the staff, services users and for families/external persons. At the same time, the “ancillary services” building demarcates the line between the public area on its right and the private area on its left.

Since the existing Erbil PRC is already experiencing a high influx of IDPs and Syrian refugees, another important aspect considered in the design is the gender segregation, culturally required for these service users. The mix of male and female service users, in the clinical and in some of the physiotherapy areas, can be an inhibiting factor for the adherence to treatment by female users.

The main building, whose NFA (Net Floor Area) is around 3’000 m², consists of six blocks interconnected by corridors. This compact layout follows the recommendations for design of settlement and buildings in hot-arid climate: both of them must be adapted to extreme summer/winter and day/night conditions to achieve a well-balanced indoor climate. The two inner courtyards improve the natural lighting and ventilation while ensuring protection from the intense radiation from the sun, dust and sandstorms.

For individual rooms, the following points are taken into account:

**Reception and Waiting area:** their location should be at the main entrance and close to assessment and casting rooms. For the waiting area, no need for gender segregation has been expressed.

**Fitting rooms:** special attention must be given to the location and flow between the fitting rooms and the exercise rooms. Also after having started using the device in the exercise area, the service users might return to the fitting room for readjustment and, therefore, the P&O staff needs to go and come back from the assembly and machine rooms. In this centre, to have one service user at a time in each fitting room has been requested.

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22 The aspect ratio of a geometric shape is the ratio of its sizes in different dimensions. For example, the aspect ratio of a rectangle is the ratio of its longer side to its shorter side – the ratio of width to height, when the rectangle is oriented as a “landscape”. Source: Wikipedia
Casting rooms: their location is just beside the two assessment rooms and close to the rectification room. The staff of the casting rooms might be the same as that of the rectification room.

Prosthetics and Orthotics Department: the spatial organization of the department’s activities/areas should facilitate the movement of the staff according to the manufacturing stage/phase of prosthetics and orthotics devices. Staff will be moving constantly between areas/rooms.\(^{23}\) The proposed configuration “in line” considers the sequence of manufacturing phases.

Assembly room: It is the core of the Prosthetics and Orthotics Department and it should have direct access to thermoforming and machine rooms, since staff will use the equipment/machines several times during the production process.

For the sizing of the assembly room, space for the installation of fourteen benches for bench workers, six benches for P&O staff and two benches for students/trainees (plus space for circulation and equipment along the perimeter walls) has been considered.

Rectification room: it should be well ventilated and big enough to have an area dedicated to the filling of negative casts with Plaster of Paris (and storage of plaster bags), therefore, a Gypsum room has been added. For sizing the rectification room, adequate space has been considered for establishing two rectification tables consisting of 8 workstations each (16 in total: 11 P&O – 5 Trainees).

Metal room: since this room will be mainly used for the assembly of wheelchairs and walking aids and seldom for P&O activities, its location is just in front of the Wheelchair assembly room.

Physiotherapy Department: it is important to provide an efficient flow between the fitting rooms, the exercise rooms and the advanced training court, since physiotherapy staff will circulate between these areas constantly. Due to the context, a fitting room and exercise room have been foreseen for each gender: part of each exercise room will be separated by curtain walls to have the two individual treatment cubicles.

Since the functional training performed in the advanced training court are not culturally sensitive, this room/area will be gender shared and accommodated in an open covered space.

Administration Department: its location is close to the main entrance and does not interfere with the busy areas of the centre.

Service User Accommodation: its location is separated from the daytime busy areas of the centre and located in a strategical position to have an easy access to the Physiotherapy Department and to the Cafeteria.

Accessibility: the building should preferably be located at ground level and be single storey, nevertheless, in case of possible ground level differences, communication will be through ramps. In addition, convenient access to service users and circulation of wheelchairs in all areas of the facility must be provided following recommendations for disability and universal design (ISO 21542).

- **Boundary feature**

According to the last report drafted by the surveyors of the Land Registry of the city of Erbil, the plot allocated by the Erbil Governorate has almost a rectangular shape, a surface of 14'630.75 m² (against the 14912 m² initially estimated) and a perimeter of about 650 meters.

If the Feasibility notice will be institutionally approved and the successive phases of the project will be carried out (including contacts with Local and Regional Authorities / Partners), a first temporary “light“ fencing can be proposed in order to delimitate the whole area.

An important decision to be taken during the next design phase (DD) is about the size of permanent boundary wall. From an initial estimate, about 15-20% of the available area won’t be used (north-west corner) for the construction of the new Erbil PRC but of course it could be used for future extensions (for instance dormitories, garden area with alternative re-using of effluents etc.).

\(^{23}\) The Prosthetics and Orthotics Department consists in: casting rooms, rectification room, lamination room, thermoforming room, assembly room, machine room, metal & maintenance room, wheelchair assembly room and sewing room.
C. Engineering notice

C.1 Civil engineering

The allocated land is located in an expansion area – the South Industrial Area - still quite poor in infrastructures since many of the investments initially planned in the city masterplan have not been developed due to economic crisis.

The main conclusion from the discussions with the different authorities (mainly Municipality, Directorate of Water and Directorate of Environment) is that the new Erbil PRC should work – as much as possible – as a standalone building since many of the network needed for its functioning, water supply system and waste water disposal are not yet either reliable or even existing.

The perimeter road network deserves a special note. Since according to local customs the main façade and entrance of public buildings in Erbil must be on the main road, the entire masterplan of the new PRC has been conceived following this important indication. But, as explained in the following section (C.1.1 – Road design), this path doesn’t exist yet: it is strongly recommended to include this point on the future negotiations with the interlocutors to avoid a significant change of the general layout.

C.1.1 Road design

According to the original Erbil Master Plan, the plot will be surrounded/defined by four roads and the main road will be normally - in future - the south road, which will be concentric (inside) to the 120m Road and with direct access from/to Makhmur Road.

Because of the lack of funding and consequent slowdown (and sometimes interruption) of construction works for the main roads, the entire surrounding road network has been compromised: within the four roads above mentioned, only the north one already exists and its current size does not correspond to that of the project.

It is worth reminding that when this second and last plot was “allocated” to ICRC by the Erbil Governorate for the possible construction of a new PRC, they have committed themselves to build the surrounding road network and infrastructures (i.e. sewerage) as per Masterplan.

C.1.2 Storm water collection and disposal

Taking into account the size of the main building, its compact form and the proximity with the boundary wall, the management and disposal of storm water (both roof water and surface water) won’t be easy without a proper storm water drain system. The green areas surrounding the main building won’t be big enough to infiltrate all the water coming the roofs.

With that said, the development of the city sewerage system (which includes storm water drainages) together with the construction of the road network are the main infrastructures for which the involvement and commitment of the local Authorities is required (refer to section D.1.1.1 Memorandum of Understanding – MoU - strategy).
C.1.3 Solid waste management

In the existing Erbil PRC, part of the solid waste (domestic waste and plaster) is collected by the Municipality (or one of its private contractors) on a weekly basis. A Solid Waste Management Master Plan for Erbil Governorate has been developed by UNICEF with funding from the European Union (EU) between 2011 and 2012. Since the existing PRC and the plot allocated for the construction of the new PRC are in the same Municipality (n°6), the availability of the same service can be expected but, being the new plot located in the South Industrial Area, the frequency of collection must be verified. For temporary storage of workshop waste, a 32 m² garbage collection room is foreseen; for temporary storage of domestic waste, a 10 m² garbage collection room is foreseen.

Through the partnership between ICRC and Geocycle (refer to Annex 8), the wastes of PP (Polypropylene) and EVA (Ethylene-vinyl acetate) have been identified as a good co-processing material for the Lafarge-Holcim cement kilns present in the Sulaimaniya Governorate. From August 2016, a proper collection of this typology of waste has been done at the existing PRC and part of it has already been transferred to the Erbil Logistic Centre, where other waste (tyres, oil and barrels) is temporarily stored waiting to be collected by Geocycle. An agreement between ICRC and Geocycle on a minimum quantity of waste for collection needs to be found to allow a better waste management in the ICRC facilities.

Since the modular technology (e.g. Ottobock / European standard) will be implemented in the new Erbil PRC, the disposal of waste offcuts and obsolete devices must not be neglected and furtherly investigated. An incinerator was foreseen in the Annex to the "PRP HiB – Iraq Proposal". Among the about eighteen (18) hospitals – both public and private – apparently only three (3) hospitals have the permission to run their incinerator/s as waste treatment process (among them Nanakaly Hospital). Other hospitals normally dispose of incinerator/s but apparently their operation has been banned due to lack of air pollution and smoke control. That said and taking into account the quantity of medical waste a PRC might produce, the installation of an incinerator isn’t recommended.

C.2 Structural engineering

C.2.1 Geotechnical data

"Most of the Iraqi territory (~ 95%) occur within the northern part of the Arabian platform of the Arabian plate, whereas only a very limited portion extends within the Eurasian (Iranian) plate. This plate tectonic setting eventually was used to divide the Iraqi territory into two first order segments; the Arabian plate platformal part and the Shalair terrane of the Sanandaj – Serjan Zone of the Eurasian plate, separated by the Zagros Main Thrust.”

The city of Erbil is located in the Low Folded Zone which is part of the Western Zagros Fold – Thrust Best (WZFTB), the main deformed part of the Outer Platform.

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26 Source: http://www.ecomena.org/tag/erbil/
27 Geocycle is Holcim-Lafarge’s waste management brand. MoU between Geocycle and ICRC: by 2018, find sustainable and reliable treatment solution for the hazardous waste streams generated by ICRC activities worldwide
28 “Co-processing consist of treating waste to fully recover the energy and mineral content for beneficial reuse as fuel for energy generation and product additives for manufacturing”
29 The reference person at the Erbil Logistic Centre for this project is the Vehicle Fleet Manager
"The Western Zagros Fold - Thrust Belt (WZFTB) is the deformational product of the Arabian - Eurasian (Iranian) plate convergence since the Late Cretaceous. The belt consists of thick folded and faulted sequence of Paleozoic to Cenozoic sediments. The nature and magnitude of deformation vary considerably across the belt, and consequently the belt is subdivided into different tectonic zones with different structural characteristics by using the following tectonic and structural principles: the intensity of deformation and structural style, age of deformation, tectonostratigraphy and mechanical - structural properties of the deformed multilayer sequence, surface physiography and morphology. Therefore (WZFTB) has been subdivided into four zones striking subparallel to the Arabian plate margin. The Zones, from southwest to northeast are: the Low Folded Zone, the High Folded Zone, the Imbricate Zone and the Suture Zone."

"The Low Folded Zone (LFZ) of the Western Zagris is about 700 km long and 100 km wide belt, containing large number of folds of variable sizes and geometries both along and across the zone. The folds are reflected on the topography as anticlinal highs and synclinal lows expressing their young age. The folds maintain a fairly regular NW - SE trend though most of the zone, but gradually change to E - W trend northwestward towards the Turkish territory."

Map of the Arabian Peninsula and surrounding regions. The major geographic, tectonic, and geologic features are labeled. The plate boundaries are marked with yellow lines. Earthquakes and volcanoes are shown as blue circles and red triangles, respectively. White triangles represent the 10 stations that compose the North Iraq Seismological Network (NISN). The yellow triangles reflect the location of some Iraq Seismological Network (ISN) stations, currently not operational.

32 Source: Iraqi Bulletin of Geology and Mining – Special Issue, No.5, 2012 – Geology of the Low Folded Zone (S.F.A. Fouad)
33 idem
“Interaction between the Arabian, Eurasian, African, and Indian plates is the primary force defining the present-day seismotectonic framework of the Middle East. The beside map shows that interplate seismicity is significantly more important than intraplate activity. The plate margin seismicity is associated with a variety of boundaries that include spreading zones in the Gulf of Aden and the Red Sea, the transform fault along the Dead Sea rift and East Anatolia, the Bitlis suture in eastern Turkey, the northwest-southeast trending Zagros thrust zone, the Makran east-west trending continental margin and subduction zone, and the Owen fracture zone in the Arabian Sea. The apparently aseismic Arabian plate interior features an exposed young shield, a deformed platform and a foredeep that consists of extraordinarily thick layers of sediments and evaporites. Structural faults and folds cross these major tectonic regions.”

**Conclusion:** the city of Erbil is located in an area highly affected by earthquakes. This must be taken into consideration during the design and construction phases (refer to section D.1.4.1 – Seismic provisions).

- **Geotechnical survey (geology/expected ground conditions)**
  A comprehensive Geotechnical Investigation (GI) needs to be carried out during the next design phase, DD, to ensure results are available for the following phase, TD.

  According to Dr. Azad A. Ahmed, Director General of “ANDREA Engineering Tests Laboratory” (the oldest established testing and inspection laboratories in Iraq), taking into account the size of the plot, the drilling of six, maximum eight, boreholes (6-8 meters deep) will be needed to have a complete geotechnical survey of the area.

  **Time estimation:** the GI may be carried out in around twenty days, of which one week maximum “in situ” and the remaining days for the laboratory tests and the drafting of final report.

  **Cost estimation:** for the drilling of the a/m boreholes (quantity from 6 up to 8, depth from 6 down to 8 meters underground), the expected estimation of cost is 4’500-5’500 USD.

- **Percolation test (soil infiltration characteristics)**
  A percolation test needs to be carried out during the next design phase, DD, to ensure results are available for the following phase, TD.

  According to Dr. Azad A. Ahmed, taking into account the size of the plot, at least two or three percolation tests need to be done to have a complete understanding of the soil infiltration characteristics.

  **Time estimation:** the percolation tests may be carried out and shared in around one week (tests “in situ” and drafting of final report).

  **Cost estimation:** for each percolation test, the expected estimation of cost is 1’500 USD.

**C.2.2 Building structure**

As the centre will be in an earthquake high risk area, the building structure is a driving factor of the design and materiality of the project. There are several structural choices appropriated to resist lateral forces (earthquake shaking) but, taking into consideration the local practices, a Reinforced Concrete Frame with/without shear walls with masonry infills seems the most suitable.

All the buildings of the proposed Preliminary Layout are located on the ground floor.

If during the following phase (Developed Design), the possibility of vertical expansion (extra floors) will be considered as an option for some buildings or for some part of them, all structural components of these facilities must be conceived and built accordingly.

But since a PRC is a centre for Persons with Disabilities (PwD) and obviously accessibility provisions shall be strongly enforced, if the intent of extra floors will be taken into account, other structures must be added to the layout:

- Interior and/or Exterior staircase/s

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34 28th Seismic Research Review: Ground-Based Nuclear Explosion Monitoring Technologies – Seismic Characteristics of Northern Iraq and surroundings regions

35 Website: [http://andrealab.com/](http://andrealab.com/) - Dr. Azad A. Ahmed contact details: e-mail: azad@andrealab.com - Mob: +964(0)77701233278 or +964(0)7901336045
C.3 **Mechanical engineering**

C.3.1 **Heating / Cooling (Air conditioning)**

According to the climate graphs (refer to section B.3 - Climate data / Temperature), the daily higher temperatures during wintertime (November to February) are 20 °C or below and they can drop below 0 °C during the nights. That said, the installation of a heating system is recommended. The possible solutions offered by the companies established in Erbil are several: from central heating system, radiant heating system (including flooring heating system) and solar energy systems to the single reverse cycle air-conditioning units.

Since the warm/hot spring and summer days prevail on the cold winter days, the central heating systems are quite rare or even almost inexistent since they don't seem to be a cost effective investment. Common single reverse cycle air-conditioning units are installed in households and small / medium size offices. VRF (Variable Refrigerant Flow) – Heat Recover or Chilled Water system are instead installed in recently built public and private hospitals in Erbil since they work best when there is a need for some of the spaces to be cooled and some of them to be heated during the same period.

Taking into consideration the “medium” size of the new Erbil PRC, three possible options can be proposed, from the simplest of system to the more sophisticated one:

1. **Reverse cycle split air-conditioning** system (one-to-one system consisting of one evaporator - fan coil - unit connected to an external condensing unit);
2. **Multi-split system** (same principles as a split type air-conditioning system however in this case there are 'multiple' evaporator units connected to one external condensing unit);
3. **VRF systems** (similar to the multi-split system, but with flow of refrigerant continuously adjusted depending on the demand from the indoor units).

The advantages and disadvantages of the three systems are listed below.

- **Reverse cycle split air-conditioning system**

  **Advantages:**
  - Low initial cost, less noise and ease of installation;
  - Good alternative to ducted systems;
  - Each system is totally independent and has its own control.

  **Disadvantages:**
  - there is limitation on the distance between the indoor and outdoor unit i.e. refrigerant piping can’t exceed the limits stipulated by the manufacturer (usually 3m to 4,5m) otherwise the performance will suffer;
  - maintenance (cleaning/change of filters) is within the occupied space;
• limited air throw which can lead to possible hot/cold spots;
• impact on building aesthetics of large building because too many outdoor units will spoil the appearance of the building (refer to section D.1.4 – Building codes and standards)

• Multi-split system

Advantages:
• the fact that one large condenser can be connected to multiple evaporators within the building reduces and/or eliminates the need for ductwork installation completely;
• Multi-splits are suitable for single thermal zone (defined below) applications with very similar heat gains/losses.

Disadvantages:
• inability to provide individual control;
• Multi-split systems turn OFF or ON completely in response to a single thermostat/control station which operates the whole system. These systems are therefore not suitable for areas/rooms with variable heat gain/loss characteristics.

NOTA BENE: A thermal zone is referred to a space or group of spaces within a building with similar heating and cooling requirements. Each thermal zone must be ‘separately controlled’ if conditions conducive to comfort are to be provided by an HVAC system.

• VRF – Heat pump system or Chilled water system

The VRF – Heat pump system, on the contrary of the Heat Recover, permit heating or cooling in all of the indoor units but NOT simultaneous heating and cooling. When the indoor units are in the cooling mode, they act as evaporators; when they are in the heating mode, they act as condensers.

The VRF – Heat pump and the Chilled water systems have far fewer drawbacks if compared with previous proposed option but, being more sophisticated, they might be inherently less reliable when it comes to maintenance, availability of spare parts, potential training delivered by the manufacturer’s product etc.

The most appropriate solution for the heating and cooling system for the new PRC shall be found during the next design phase (DD) with the support of a specialist. The implementation of a system rather than another will certainly have an impact on the architecture itself, on the definition of the technical rooms and areas etc.

C.3.2 Ventilation

All the buildings/rooms of the new Erbil PRC shall be designed to optimize natural ventilation by using windows in the building’s façades, internal courtyards and/or roof (skylights).

Modern variation of the wind catchers36 (effective in warm and temperate climates) might be introduced even if they are normally more effective in multi-storey buildings rather than in single storey one.

Mechanical ventilation must be foreseen for the Rectification/Gypsum rooms (exposed to dust load of the manufacturing process) and for the Thermoforming room (exposed to the heat load of the ovens).

The pertinence of a mechanical ventilation system must be evaluated during the next design phase (DD) for the suction of adhesive vapours of the Assembly room (wall mounted extractor fans or bench-top fan units).

In the Lamination room (for modular technology, e.g. Ottobock) a bench-top cabinet with fan unit is normally foreseen on top of the workbench for lamination resin work for the selective suction of adhesive vapours.

Mechanical ventilation might be considered for spaces containing data processing equipment such as servers but without forgetting the high degree of cleanliness/positive pressure required to prevent ingress of dust/hazardous elements.

C.3.3 Pressurized air

Compressed air is required for many work steps in the orthopaedic workshop and namely for operating pneumatic devices and machines. One or more air compressors, including network pipeline and related fittings, should be provided to supply compressed air to the following rooms: Rectification, Thermoforming, Assembly, Machine, Metal & Maintenance and Wheelchair assembly.

36 Wind catcher (or wind tower) are traditional Persian architectural element to create natural ventilation in buildings.
To decrease the noise pollution of the air compressor/s, it/they can be possibly installed either outside under waterproof and ventilated shelter or inside with noise reduction hood as accessory.

C.4 Electrical engineering

C.4.1 Electricity demand
The estimated electrical demand load for the new Erbil PRC has not been calculated yet, since a specialist will be hired in the next design phase (DD). A comprehensive list of all machinery and of detailed requirements for each room has to be produced first of all.

C.4.2 Power distribution
Erbil has a public city power supply (230V/50Hz) and, as elsewhere in the IKR, the power generation capacity is primarily managed by the private sector.
While the demand for electricity in the Iraqi Kurdistan Region has increased from 925 MW in 2004 to nearly 4,000 MW in 2014, the KRG plans to fully meet the 6,000 MW demand by 2016, through the expansion of the electricity generating capacity. The KRG’s Ministry of Electricity further predicts electricity demand to grow 15% annually over the next three years.
Despite the Kurdish leadership’s emphasis on the important role of renewable energy in their strategic energy outlook, the installed capacity for renewable energy resources in the Kurdistan Region remains quite limited and open for investment.

A distribution station and a transformer are located at a distance of 150 meters from the plot.
For private buildings, the price imposed by the Ministry of Electricity for daily consumption between 1-600 kW is 25 IQD/kW (equal to 0.02 CHF/kW).
For governmental buildings, the price imposed by the Ministry of Electricity is 60IQD/kW for unlimited daily consumption.

C.4.3 Lighting
Alternative source of power might be used for the lighting of part of the new Erbil PRC, for instance, solar powered landscaping lights.
LED lights are normally used for this typology of lighting, which is one of the longest lasting lighting option (10 years or more) and one of the most sustainable solution for the environment (no carbon footprint, no mercury content, etc.). But it is worth reminding that solar landscape lights don’t usually offer the brightness of other lights and, when covered in dirt/dust, then they aren’t able to absorb sunlight and recharge.

Once the electrical demand load for the each area of the new Erbil PRC will be calculated, a detailed study must be carried out on the potential use of renewable energy technologies.

C.4.4 Earthing and bonding
An earthing (or grounding) system needs to be provided to ensure personnel safety and protection of installations against damage. All metal parts need to be bonded.

Since no Building Codes are available neither in Iraq nor in the Iraqi Kurdistan Region, the use of the following U.S. National Codes and Standards is recommended:
• National Electric Code (NFPA 70), 2017 Edition
• International Residential Code, 2015 Edition
• NECA 90-2015 - Standard for Commissioning Building Electrical Systems (ANSI)
• NECA 1-2015 - Standard Practice of Good Workmanship in Electrical Construction (ANSI)

C.4.5 Electricity supply and distribution
Due to the size of the new Erbil PRC and its electrical demand load, the provision of a dedicated transformer (pole mounted) will be certainly needed.
The approval from the Erbil "Directorate of Electricity Distribution" is a prerequisite for requesting the "Building permit" to the "Directorate of Municipality: the architectural master plan (DD) submitted must indicate the foreseen location of the transformer.

In a later stage (TD or after), the client/owner will have to submit an official letter to the Erbil "Directorate of Electricity Distribution" to express the need of a power source together with all drawings and documents to evaluate/check the related power capacity required.

The Directorate will normally establish a technical committee in charge of visiting the site to identify possible underground electrical and communication/data cables, the power source and to estimate the equipment and cables needed. According to them, seven days are needed to fulfil the process and get the approval.

Unluckily the city power supply isn't reliable (several power cuts are registered every day), therefore the provision of a Gen-Set will be needed too.

Since the estimated electrical demand load has not been calculated yet, it isn't possible to give an estimation of the size of needed generators.

Nowadays, the Gen-Set of the existing PRC consists in two generators of 250 kVA (a primary generator and a second as back-up) for the daytime (during working hours, 5 day a week) and a 70 kVA for night-time and weekends (stand-by rating). The fuel storage consists in two big fuel tanks (8'000 litres each) for the two big generators and in a smaller fuel tank (1500 litres) for the small one.

C.4.6 Communication systems and information technology (IT)

"Allai Newroz Telecom" is the main communication provider in Erbil and Dohuk Governorates, a private company established in 2005. Thanks to the 2006 investment law of KRG and a long term agreement with the Ministry of Transportation and Communication, this company has become one of the Public Private Partner of the Kurdish Regional Government.

Nowadays, thanks to considerable amount of advancement in technology and ubiquity of telecommunications, information technology, media outlets and internet in the Iraqi Kurdistan Region over the past ten years, the ICRC facilities have mixed provisions.

The communication system and information technology in Erbil Sub-Delegation are (without mentioning VSAT etc.):

- **Voice**: Landline, contract with "Allai Newroz Telecom" / GSM (prepaid and post-paid), Asiacell and Korek;
- **Data/Internet**: contract with O3 ("Allai Newroz Telecom" sub-contractor) for a P2P wireless network (for ICRC server) / contract with "Allai Newroz Telecom" for ADSL (Wi-Fi for Visitors).

The communication system and information technology in the existing Erbil PRC are:

- **Voice**: No Landline/ prepaid GSM (Asiacell and Korek) is integrated in the network as voice service;
- **Data/Internet**: contract with O3 ("Allai Newroz Telecom" sub-contractor) for a P2P wireless network (for ICRC server) / contract with "Allai Newroz Telecom" for ADSL (Wi-Fi for Visitors).

According to the information gathered, the area surrounding the plot is not yet provided with fibre-optic communication system by "Allai Newroz Telecom" but the installation can be foreseen in the near future. During the next design phases, DD and TD, the most appropriate communication system and information technology must be defined in collaboration with ICT/ERB, taking into account the development of the city fibre-optic communication system and the MoH/DoH in IKR standards.

**Interphone**: due to the centre scale and to facilitate the internal communication, an interphone has been requested in every working space, including kitchen, laundry and dormitory responsible room.

**Landline and internet access**: office workstations (with laptop or computer desk) should be provided with landline and internet access.

**TV cabling/satellite**: hanging around spaces (waiting area, dormitory common areas etc.) should be provided with a TV network.

ICRC network: a LAN network and internet access will be required for the ICRC office area of the new PRC, it will be designed and normally provided by ICT/ERB.

C.4.7 Fire alarm system

According to the "Requirements and Instructions" list used by the Technical Department of the "Directorate of Civil Defence of Erbil" (refer to section D.1.4.2 – Fire Safety provisions), the installation of an addressable fire alarm control panel systems is compulsory (refer to Annex 9 for the “Requirements and Instructions for Hospitals”) and, ideally, should be located in the main guard room.

As part of an Active Fire Protection (AFP), the automatic fire detection system should be combined with an automatic fire suppression system connected to a reliable water source:

- water sprinklers (automatically controlled, located at ceiling level);
- fire hose reels (manually controlled, located at strategic places in buildings, mainly in corridors);
- fire hydrants (manually controlled, located in the external area, parking area for instance)

And, clearly, with other manually controlled devices such as fire extinguishers (carbon dioxide, dry chemical powder or foam) to extinguish or control small fires.

Taking account of the characteristics of the raw materials used - and then stored - for the production of prostheses, orthoses and some of the walking aids (PP, EVA, OrthocrylR laminating resin for lamination, etc.), the most appropriate automatic and manual fire suppression system must be investigated during the next design phases, DD and TD.

Without forgetting to integrate in the design first and in the running of the structure later proper:

- Passive Fire Protection: "which includes compartmentalization of the overall building through the use of fire-resistance rated walls and floors. Organization into smaller fire compartments, consisting of one or more rooms or floors, prevents or slows the spread of fire from the room of fire origin to other building spaces, limiting building damage and providing more time to the building occupants for emergency evacuation or to reach an area of refuge."

- Fire prevention: "which includes minimizing ignition sources, as well as educating the occupants and operators of the facility, ship or structure concerning operation and maintenance of fire-related systems for correct function, and emergency procedures including notification for fire service response and emergency evacuation."

Since no Building Codes are available neither in Iraq nor in the Iraqi Kurdistan Region, the use of the following U.S. National Codes and Standards is recommended:

- National Fire Protection Association, NFPA 101 & NFPA 58

C.5 Plumbing

C.5.1 Water demand

Since no Building Codes are available neither in Iraq nor in the Iraqi Kurdistan Region on minimum water requirements per capita per day, the water demand can be only extrapolated by comparison with other PRCs but without forgetting the Iraqi context. For instance, according to a report drafted by the Swedish International Development Cooperation Agency: "Average amount of water (produced) is around 327 litres / capita per day. The average figure for aggregate per capita consumption in EU is about 150 litres per day".

As stated in the Myitkyina Feasibility study, "PRC is considered a nursing home rather than a hospital since any P&O/Physio specific activity does not demand a considerable quantity of water". When comparing the value considered for the Myitkyina PRC (136 l/person/day) with the water consumption of other PRC such as OC/KAB (128 l/person/day) and OC/HER (142 l/person/day) including gardening, the assumption of the EU water consumption per capita per day - 150 l/person/day - seems a reasonable figure.

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38 Source: https://en.wikipedia.org/wiki/Passive_fire_protection
39 idem
41 Myitkyina Feasibility notice (PRC/MYI Feasibility) – 2014 / Faizabad Feasibility notice (nOC/FAI: Feasibility) – 2010
• 78 staff plus 25 inpatients = 103 daily users (excluding daily visitors)
• 150 litres per user per day gives a daily water demand of 15'450 litres (for 103 daily users)

C.5.2 Site water supply system and storage (external storage including site)

A water supply system exists in Erbil and the percentage coverage of the water distribution network for Erbil city is considered to be close to 100%. The city is currently served by two types of water resources: ground water (deep water wells) and surface water (water treatment plants - WTP).

Hundreds of wells are scattered in the city (water from these wells is sporadically analysed) and they represent 40% of water supply system in the city. Three water treatment plants (Ifraz 1, 2 and 3) are located on the banks of the Great Zab River (in the North-West of Erbil) and a project for a fourth water treatment plants is foreseen due to the increase in the demand for drinking water in Erbil.

Nowadays the above mentioned water treatments plants supply in clean drinking water mainly the northern and the eastern part of the city of Erbil only. The neighbourhoods - for instance, the South Industrial Area - not connected to Ifraz still rely on deep wells owned by the city (but hotels and private enterprises within the city have their own well supplies).

According to the information received from the Directorate of Water, the city water supply system won’t be able to supply water to the new PRC because of its size and, therefore, a dedicated borehole is needed. At the end of the construction works, and upon submission of an official request, the Directorate can possibly allow the connection to the city network through a 1 inch diameter (or even less) pipeline as a back-up.

Since the minimum legal distance between two boreholes must be around five hundred (500) meters, an official request for proposal of drilling a borehole must be submitted to the Directorate of Underground Water Sources, whose technical department will visit the plot and define the suitable area for drilling.

Water storage: the construction of a water tower with sufficient height to pressurize the water supply system for the distribution of potable water must be foreseen. The possibility of installing a ground water tank must be evaluated during the next design phase (DD) according to the water storage requirements and the water treatment foreseen. It is worth highlighting that most part of the ground water tanks (for potable water and firefighting) and water tower tanks are made by modular metal panels (see pictures below) and none was able to tell us if a coating – other than metallic - is present inside.

Highlight: since the location of the borehole cannot be identified at this stage, the water storage/s, pump room, chlorine dosing device, etc. are not showed in the preliminary layout to avoid creating any confusion. Therefore,

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43 Source: Kurdistan Region of Iraq 2020 – A Vision for the Future, September 2013. Data from: Kurdistan Region Statistics Office and Iraq Knowledge
during the next design phase (DD), the submission of the request to the Directorate of Underground Water Sources must be a priority.

**NOTA BENE:** the Directorate of Water informed us that most part of the boreholes drilled in Erbil are 150 meters deep, since the water table is around 100 meters deep. Due to the current economic crisis, as for the other construction activities, the cost for drilling of boreholes has decreased of about 40\% in the past two years and the estimated price for linear meter is 55-60 USD, all works and tests included (borehole room and pump excluded).

- **Water quality and treatment**

  Since the new PRC won’t use the city water supply system as main water source and investigations on the location and characteristics of the deep well supplying the neighbourhoods would have been too time consuming, no water sample has been taken for laboratory testing.

  According to a study carried out to create a groundwater vulnerability map for Erbil in order to allow a better groundwater quality management, most of the studied areas are found to be classified within the Moderate level of vulnerability to contamination, exception made for the south-eastern part which has Highly vulnerability to pollution\(^{45}\).

  “In general, groundwater is widely used for irrigation, industrial activities, drinking, and domestic purposes. Rapid growth of population, urbanization, industrialization, and agriculture activities increase its exploitation, reduce availability, and enhance vulnerability to contaminate the quality of water. Ground water could be contaminated by disposal of urban and industrial wastes and agricultural chemicals. In urban areas, the disposal of wastewater, including human excreta in a septic tank is a common practice. In some regions of study area nitrate and alkalinity concentration exceeding the Iraqi and WHO standards (2008), so in these regions domestic wells suffer of contamination.”\(^{46}\)

  With that said, it is advisable to install an inline chlorine dosing device (chlorine gas dosing stations are normally implemented by ICRC in the stable areas of Iraq) as a preventive measure.

  Furthermore, since the ground water within Erbil province shows high level of total hardness, the possible installation of a water softener must be evaluated during the next design phase (DD) to extend for instance the lifetime of plumbing (piping, water heaters, etc.).


C.5.3 Domestic water supply (internal)
Taking into account the low temperatures during wintertime (November to March) hot water supply is needed for all the rooms where a water point is foreseen. If classical water heaters will be used for the production of hot water, it is worth mentioning that water heaters locally available (mainly imported from Turkey) are not wall mounted but free standing. That said, additional space must be provided in the bathrooms/toilets or technical rooms if outdoor installation wants to be avoided.

The possible installation of solar water heaters might be considered at the next design stages, DD and TD, since this technology seems to be available – but not widely diffused - in Iraqi Kurdistan Region.

C.5.4 Wastewater treatment and disposal (ST&SP)
In the aim to have a standalone building – as much as possible – since it would be too risky to rely on infrastructures not yet present, the wastewater treatment and its disposal must be conceived accordingly.

The main conclusion from the discussions with the different authorities (mainly Municipality, Directorate of Water and Directorate of Environment) is that the new PRC should work – as much as possible – as a standalone building since many of the network needed for its functioning, water supply system and waste water disposal are not yet either reliable or even existing.

To have a more ecological and efficient wastewater management, a proper separation of “black water” and “grey water” might be considered.

In practice, the “black water” (flush water from flush toilets, toilet hose sprays) might be collected first in septic tank/s and the liquid effluent disposed of by infiltrating into the ground (either soak away pits or infiltration trenches).

The “grey water” (water coming from domestic/non-industrial equipment other than toilets) might be collected and treated by ultrafiltration membranes (or other treatment plant for purification) to be reused for landscape irrigation.

Taking into account the drastic decrease in the annual rate of rain fall and a consequent shortage of potable water, reusing on-site greywater would help to reduce the amount of potable drinking water required by the landscape while allowing the landscape vegetation to flourish with the repurposed water. The mechanical engineer of PLAN BURAUEU mentioned a similar technology being already implemented in Erbil using devices produced by the Turkish company SISMAT (their website - www.sismat.com.tr – unluckily doesn’t work).

Highlights: common household’s sewage (black water only) consists in a “cesspool” either completely sealed (underground holding tank) or not sealed (soak away pit); grey water is freely discharged into the rain water channels although this is not formally permitted.

In both hospitals visited, PAR Hospital and West Erbil Emergency Hospital (also known as Rojawa Emergency Hospital, its Kurdish name), no source separation is done. Both black and grey waters are first collected in an underground septic tank to be later treated by a chlorine dosing pump system and sent to a ground metal tank before being disposed into city sewage. It was “felt”, none of the two treatment plants is working.
D. Project management notice

D.1 Legal framework

D.1.1 AHJ (authorities having jurisdiction)/interlocutor mapping
The partners for the ICRC in the planning and implementation of the ICRC PRP-HIB and onwards are all under the Kurdistan Regional Government (KRG) of Iraq. The physical rehabilitation sector remains for the most part under the responsibility of the Ministry of Health (MoH), although the Ministry of Environment (MoE) also has a victim-assistance component and the Ministry of Labour and Social Affairs also has a role to play in addressing the needs of PwD.

- KRG Ministry of Health (MoH)
- KRG Ministry of Higher Education (MoHE)
- KRG, Erbil Governorate, Directorate of Health (DoH)

All building permits are managed at Erbil Governorate level by the following Authorities Having Jurisdiction:

- Presidency of Municipality - Erbil +964 66 2230647
- Directorate of Municipality/6 +964 66 2509115
- Directorate of Property Tax +964 66 2512793
- Directorate of Sewerage -
- Directorate of Water +964 66 2552213
- Directorate of Electricity Distribution +964 66 2519614
- Post Office -
- Directorate of Antiquities +964 (0) 7504983229
- Directorate of Civil Defence 115
- Directorate of Environment +964 7504553161

The consultancy team (including architect, structural engineer, mechanical engineer and electrical engineer) hired in IKR for the design and construction site follow-up of a major/large buildings must be licensed/registered with:

- Kurdistan Engineers Union – Council of Union (Mr. Abdulrehman Ali Kurde, President / Mob: +964 (0)750 4456330 / e-mail: aakurde@yahoo.com)

The Contractor responsible to carry out the construction works must be licensed/registered with the: Kurdistan Contractors Union – High Board (Mr. Rizgar Jamal Kareem, Head of KCU / Mob: +964 (0) 7504464247)

D.1.1.1 Memorandum of Understanding (MoU) strategy
If the Feasibility Notice will be institutionally approved, in the working table with the steering committee identified by the Ministry of Health the following points need to be addressed to the interlocutors and an agreement needs to be reached between all parties about:

- Official assignment of the plot by the KRG/Erbil Authorities and registration as a property of the MoH/DoH in IKR.
- Permanent closure or move of the temporary dirt road crossing nowadays the plot.
- Move of the improvised open drainage channel crossing nowadays the plot just along the a/m dirt road.
- Development of the road network surrounding the plot.
- Development of the sewerage system, including storm water and rain water drainages etc.

D.1.2 Land tenure
The plot belongs to the Erbil Governorate and its boundary were already defined in the Erbil Masterplan. This second plot has been identified in April 2016 and, following a survey carried out by the Municipality surveyor and Land Registry surveyor, a first/temporary plot title has been provided to ICRC by the Presidency of Municipality in November 2016 (refer to Annex 10).

D.1.3 Planning process

- Building permit
For all new buildings, a Building permit is required.
As a first step, once the plot will be officially allocated by the Erbil Governorate to the MoH/DoH in IKR for the construction of the new PRC, the following set of documents needs to be submitted to the Municipality 6:

- Official letter from the Presidency of Municipality-Erbil
- Property deed
- Title plan (showing the general boundaries of the property)

The land surveyor of the a/m Municipality will be responsible to check if the general boundaries of the property established in the title plan correspond to boundaries on site as defined by the corners marked by the Land Registry surveyor. If no evidence for non-compliance is found – according to them – the land survey and the authorization to proceed should last five (5) days.

If evidence for non-compliance is found, the Municipality informs accordingly the developer/owner that a new survey and revised title plan is needed from the Presidency of Municipality-Erbil: in this case the process might last from twenty (20) to thirty (30) days.

Next step will be only at the end of the Developed Design (DD). The client/owner will be responsible for submitting the DD set of documents, signed and stamped by the consultancy team and by the Kurdistan Engineers Union, to the Municipality together with the “professional services agreement (or contract)” signed by the two parties (consultancy licensed bureau and Client) and stamped and signed by the Kurdistan Engineers Union.

Major details about the type of documentation to be submitted (for instance scale of the drawings, related reports, etc.) have not been specified/disclosed neither by the Kurdistan Engineers Union nor by the employed of Municipality 6.

The project review by the Municipality to issue the authorization to move forward lasts 3 (three) days approximately and the “Building permit application form” is handed over (first page stamped and signed) to the client/owner (refer to Annex 11).

Upon receipt of this authorization, the client/owner will be responsible for submitting the DD set of documents and the “Building permit application form” to the following eight Directorates/Office (in brackets, estimated timing for review, stamp and signature):

1. Directorate of Property Tax (about two days)
2. Directorate of Sewerage (about five days)
3. Directorate of Water (about five days)
4. **Directorate of Electricity Distribution (about seven days)**
5. Post Office (about one day)
6. Directorate of Antiquities (about one day)
7. **Directorate of Civil Defence (about two days)**
8. **Directorate of Environment (about two days)**

All the a/m Directorates/Office will normally review the same DD set of documents and approve by stamping and signing the second page of the “Building permit application form”. Only the three Directorates “in bold type” (Electricity Distribution, Civil Defence and Environment) have to stamp and sign the DD set of documents too.

This phase will last theoretically 25 (twenty-five) working days, one month approximately if no difficulties will be encountered.

Next step will be only at the end of the Technical Design (TD). The client/owner will be responsible for submitting the TD set of documents, signed and stamped by the consultancy team and by the Kurdistan Engineers Union, to the Municipality together with the DD set of documents stamped and signed during the previous phase.

But if major changes will be made to the approved DD set of documents during the development of the Technical Design (for instance, use of materials, technologies, details), the new TD set of documents must be submitted again for approval to the Directorates of Electrical Distribution, Civil Defence and Environment.

The Municipality will establish then an internal committee and deliver finally the Building Permit.

**Directorate of Environment**

When applying for a Building Permit as a private owner/developer, the approval of the Directorate of Environment is one of the eight approvals needed before applying to the “Permit Department” of the “Presidency of Municipality - Erbil”. At the time of the DD set of documents submission, their Technical Department normally examines the measures adopted for the wastewater treatment and disposal.
According to them, there are few rules a hospital facility should comply with:

- The distance between the building and the nearest houses or commercial facilities should be not less than twenty-five (25) meters.
- The total covered area on all floors of all buildings cannot exceed the 75% of the area of the plot and a green belt should be foreseen around the boundary wall (inside).
- Provide wastewater treatment (such as treatment plant) before disposal to sewerage.
- Provide incinerator for medical waste (refer to section C.1.3 - Solid waste management)

**NOTA BENE:** It is worth reminding once again that because of the economic crisis (and the non-payment of salaries), the absenteeism in the public/government sector has grown in the last year and the presence of public/government employees is not always constant/assured. This situation, if not solved in the next future, could obviously have an impact on the planning progress.

**D.1.4 Building codes and standards**

The Iraqi Kurdistan Region doesn’t have any Building Codes and Standards and the few codes and standards enacted by the Republic of Iraq are not applied. Theoretically, in absence of a regulatory framework, the International Building Codes and Standards normally apply but, along with foreign technical knowhow, foreign building codes and standards have been applied (for instance, Turkish ones in the Dohuk/Erbil Governorate and Iranian ones in Sulaymaniyah Governorate).

According to the request template for the Building permit (refer to Annex 11), there are few rules a new construction should comply with. The more relevant ones for the construction of the PRC follow:

- The total covered area on all floors of all buildings cannot exceed the 75% of the area of the plot.
- Window minimum area should not be less than 3.2 m² and each side not less than 1 m.
- It is not allowed to install outdoor units for Air-conditioning on the main façade

**D.1.4.1 Seismic provisions**

According to the Kurdistan Engineers Union, there is no specific regulation for seismic provision but the KRG Council of Ministers is working on the drafting of seismic design codes for Iraqi Kurdistan Region. Theoretically, any building must be designed and constructed in accord with seismic design codes, standards and practices defined by International Building Code (U.S. Standard or British Standards are used too).
Nevertheless, in 1997 the Republic of Iraq has published the “Code 2/1997 – Iraqi Seismic Code Requirements for Buildings” which provides design and construction for an earthquake resistant buildings, towers, chimneys and similar structure. The Seismic Zoning Mapping of Iraq divides Iraq into four (4) different seismic areas: 0, I, II and III (see Map below). The zone 0 is the least dangerous – the zone III is the most dangerous.

Since the Iraqi “Code 2/1997” has been patterned after the Uniform Building Code (UBC) of the U.S., the factor Z stands for “Seismic hazard and zoning coefficient” and it is one of the coefficients needed to calculate “Total un-factored horizontal seismic design force”. It doesn’t provide values for Peak Ground Acceleration (PGA).

Following the ICRC Geoportal the Erbil seismic hazard is considered HIGH risk (ICRC code n° 3A), with Peak Ground Acceleration (PGA) from 2.4 to 3.4 metres per second squared (sec/m²), equals to maximum 0.34 g with a 10% chance of exceedance in 50 years, corresponding to a return period of 475 years (see below Figure).

D.1.4.2 Fire safety provisions
The “Directorate of Civil Defence” of Erbil (under the “General Police Department”) is the AHJ for the official approval of the Fire Fighting System Installation.

47 http://www.slideshare.net/ProfessorDrNabeelAlB/iraqi-seismic-code-1997-arabicenglish
48 Based on: the Global Seismic Hazard Assessment Program (GHHAP) was launched in 1992 by the International Lithosphere Program (ILP) with the support of the International Council of Scientific Union (ICSU) and endorsed as a demonstration program in the framework of the United Nations International Decade for Natural Disaster Reduction (UN/IDNDR)
When applying for a Building Permit as a private owner/developer, the approval of the Directorate of the Civil Defence is one of the eight approvals needed before applying to the “Permit Department” of the “Presidency of Municipality - Erbil“. The Technical Department normally examines if the provided drawings comply with the “Requirements and Instructions” available for different typology of facilities, i.e. hospitals, schools, fuel stations, factory, multi-story buildings, etc. (refer to Annex 9 for the “Requirements and Instructions for Hospitals”). If no evidence for non-compliance is found – according to them – the drawings examination and approval should last two (2) days.

The above mentioned lists are not exhaustive and they cannot be used as a reference for the next design stages, DD and TD. In view of the fact that Iraq and Iraqi Kurdistan Region have no national codes, the design and installation of the Fire Fighting System Installation must comply either with standards and practices defined by the International Fire Code - IFC (U.S. Standard or British Standards are used too).

According to the “Civil Defence Directorate of Erbil” there are ten (10) Fire Stations and all of them have at least two (2) tracks.

The closest fire station to the plot is the one of Azadi that is located on the Qazi Muhammad road (also knew as 100 meters road), in the Peshangakan area. But because of its location (Municipality 6), the new PRC would be normally under the administrative responsibility of the Newroz fire station, located in the homonym road.

The Azadi fire station captain ensure they can be on the plot in three minutes (but, of course, depending on traffic conditions). There are normally twenty permanent fire-fighters but because of the economic crisis (and the non-payment of salaries), the current team consists of ten fire-fighters only. The fire-station is equipped with four permanents trucks (with a capacity either of 15’000 or 18’000 Litres each) but, since for every truck a group of five persons is needed, only two trucks can be deployed in case of fire.

The Azadi fire station doesn’t dispose of any water storage but they rely on a borehole with submersible pump for the filling of the trucks.

The Newroz fire station captain ensure they can be on the plot in five/six minutes (but, of course, depending on traffic conditions). There are normally forty permanent fire-fighters but because of the economic crisis (and the non-payment of salaries), the current team consists of fifteen fire-fighters only. The fire-station is equipped with four permanents trucks (two trucks with a capacity of 15’000 litres water and other two trucks with a capacity of 10000 litres, of which 8000 litres water and 2000 litres foam) but, since for every truck a group of five persons is needed, only three trucks can be deployed in case of fire.

The Newroz fire station doesn’t dispose of any water storage but they rely on a borehole with submersible pump for the filling of the trucks.

D.1.4.3 Accessibility provisions

The Iraqi Government ratified the “UN Convention on the Rights of Persons with Disabilities” (UN CRPD) in March 2013 and, during the following year, the Law No. 38 of 2013 on the “Care of Persons with Disabilities and Special Needs” and the “Social Protection Law” were enacted. Both laws protect the eligibility of persons with disabilities to receive cash transfer benefits and specified services from the Ministry of Labour and Social Affairs (MOLSA) as well as basic health care and rehabilitative services from the Ministry of Health (MoH).

According to a presentation done in 2010 during a World Standards Cooperation workshop on “Accessibility Standards in the Middle East and North Africa (MENA) Region” 49, in Iraq “there are laws and regulations to ensure accessibility of the build environment requiring that public places, the outdoor environment and housing are made accessible” but none of the professionals met, including the Kurdistan Engineers Union, did mention them. That probably because as stated in the above mentioned presentation, “There is no disability awareness component incorporated in the training of planners, architects and construction engineers.”

In absence of clear (most likely they are in Arabic only) and complete building codes and standards for accessibility, the use of the International Standard “ISO_DIS – 21542:2011 Building Construction – Accessibility and usability of the built environment” seems to be the most suitable choice.

Although, the ISO recommendations are very comprehensive and include provisions for: (1) people with hearing impairments, (2) people with vision impairments, (3) people with mobility impairments, (4) people with cognitive impairments, (5) people with hidden impairments (such as Specific Language Impairments and dyslexia) and (6) people with diversities in age and stature (including frail older people, children etc.).

49 http://www.iso.org/sites/WSC_Accessibility_2010/presentations/3_Group_2_08_Bachar%20presentation.pdf
The PT/ERB-BAG proposes to focus on the provisions for groups 3, 4, 5 and 6 due to the nature of the centre and its patients. It is worth reminding that the centre will provide services for cerebral palsy patients already during Phase 1 (Yr1 and Yr2) and to patient with clubfoot, spinal cord injuries and language impairments during the following Phase2.

**NOTA BENE:** The equivalent standard in the U.S. is the ICC /ANSI A117.1 (2009) – Standard for Accessible and Usable Buildings and Facilities

### D.2 Building project delivery strategy

#### D.2.1 Project delivery method

The new Erbil PRC project has been developed according to the ICRC planning system called "Protocol for the management of ICRC Construction Projects" and it is one of eight projects presented under the "Humanitarian Impact Bond" system.

Before moving into the next design stages, two main steps are required (i) forth this Feasibility Notice must institutionally approved by the Head of Delegation of Bagdad and then by OP_NAME and the financing method of the project confirmed (ii) an agreement will be reached with the ICRC partners in KRG.

The project delivery method recommended is the “Design-Bid-Build” (also known as “Design-Tender”). It is a project delivery method in which there are three main sequential phases:

- The design phase
- The bidding (or tender) phase
- The construction phase

But it is worth highlighting that most of the medium/large buildings constructed in Erbil over the past ten year, the "Design-Build" have been used as project delivery method, mainly by appealing to foreigner (Turkish) companies.

- **Design procurement strategy**

As stipulated by "Kurdistan Engineers Union rule No.3 of 2011", a registered/licensed consultancy team in IKR must be hired (including architect, structural engineer, mechanical engineer and electrical engineer) for the design.

Since the FEA only come up with a basic concept design, it is advisable to split the design process in two stages: (i) Developed Design (DD) and (ii) Technical Design (TD) which are mainly defined by the Client (PRP/Iraq) intervention.

The Developed Design (DD) will be primarily focussed on the drafting of Architectural Design with inputs from the engineering team through technical discussions and with major reverse feedback/revisions from the Client (PRP/Iraq). The DD result should be an agreed architectural layout scale 1/100. The technical inputs will streamline the main technical strategy for each section (structure, water supply, sewage, power, firefighting system etc.). **This phase will last approximately from two to three months.**

The Technical Design (TD) will be driven by the agreed DD architectural layout, and it will complete the design at scale 1/50 with all technical layouts and specifications. The consulting team and WatHab CPM will take the main workload with minor consultation with the Client (PRP/Iraq). **This phase will last approximately from two to three months.**

The different design steps will be shared with OP_ASSIST_EH and TF/GVA in order to reduce the approval process for the next steps.

- **Quality Control Mechanism**

Due to the absence of National Building Codes and, therefore, the required knowledge of International (and/or American) Codes and Standards and the a/m strategy adopted by the KRG for the development of the housing and infrastructure sector in the Iraqi Kurdistan Region, it is strongly recommended to have a quality control mechanism above national consultants. Already in other projects, ICRC hired an international firm to overlook the DD and TD outputs and cross check that International Codes and Standards were properly applied.
• **Tender procurement strategy**

At the completion of the technical design and of the related set of documents (conditions of contract, specification, bill of quantities etc.), a call for bids (or call for tenders) will be launched.

This phase must be carried out in accordance with the usual ICRC procedures, and the result of the invitation to tender must be signed by LOG_PURCH/GVA.

A "Restricted Tendering" is recommended as procurement method since it will limit the request for tenders to a select number of Contractors both because only a few firms are qualified to fulfil the specific type of requirement and in order to reduce the time and cost of the selection process. To have a more complete comparison and taking into account the scale of the construction project for the new Erbil PRC, at least five (up to ten) shortlisted Contractors should be invited. **This phase will last approximately four months.**

In contrast to many other countries where ICRC has been carrying out construction projects, in the Iraqi Kurdistan Region and in the city Erbil in particular many companies – both National and mainly International (Turkish) – will be able to undertake the construction works and, actually, a problematic almost opposite can be predicted: identifying a construction company whose "size" is adequate and proportionate to the new PRC construction project.

Following a meeting with the "Kurdistan Engineers Union – Council of Union" held on 08.11.2016, an official letter (refer to Annex 12) has been sent to this Authority requesting a short list of suitable Construction Companies registered and active in IKR. According to the information received, the short-list was supposed to be prepared upon consultation with the "Kurdistan Contractors Union" but finally the short list wasn’t included in their official answer - received on 29.11.2016 - since the “construction companies aren’t registered in their Union” (refer to Annex 12). Therefore, following the unexpected KEU answer, an official letter has been sent on 01.12.2016 to the Kurdistan Contractors Union – High Board requesting a short list of suitable Construction Companies registered and active in IKR. Their official answer has been received on 13.12.2016 (refer to Annex 13): **all the eleven contractors mentioned in the list are Kurdish, Turkish contractors haven’t been included**.

On another front, an official letter has been sent by the Assistant Head of Sub-Delegation to the Governor office requesting a list of Construction Companies normally working with the Erbil Governorate and the UN Agencies.


• **Construction procurement strategy**

As stipulated by “Kurdistan Engineers Union rule No.3 of 2011”, a registered/licensed consultancy team in IKR must be hired (including architect, structural engineer, mechanical engineer and electrical engineer) even for the quality control and site supervision. But it was also felt, that a lot of the costs / negotiations around the centre construction and concept could be managed once it is clearly put into context for the Government / Governorate.

That said, two different scenarios will be possible.

**First scenario:** according to a/m KEU rule, a consultancy team registered/licensed in IKR will be hired for the quality control and site supervision. In this case, stakeholders’ roles and responsibilities during construction phase will be as follows:

- The Contractor will be responsible for material procurement, labour force and erecting the structure.
- ICRC Logistic and Administration departments will ensure that ICRC regulations are properly in place.
- Consultancy team will be in charge of quality control and site supervision.
- ICRC Water and Habitat department will be mainly in charge of minor quality control works and general project management (interface with the Client – PRP/Iraq, with the Management etc.).
- ICRC PRP and LOG departments will responsible for the request, transport and installation of all equipment not included in the contract.

**Second scenario:** in agreement with the Government / Governorate, and at variance with the KEU rule, no consultancy team registered/licensed in IKR will be hired for the construction phase. And in this other case, stakeholders’ roles and responsibilities during construction phase will be as follows:

- The Contractor will be responsible for material procurement, labour force and erecting the structure.
- ICRC Logistic and Administration departments will ensure that ICRC regulations are properly in place.
- ICRC Water and Habitat department will be in charge of quality control, site supervision and general project management (interface with the Client – PRP/Iraq, with the Management etc.).