

WAREHOUSE ASSESSMENT REPORT DISTRICT HEALTH OFFICE SWAT - MALAKAND



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ACRONYMS

- BMUs: Basic Medical Units
- DHQs: District Head Quarters
- THQs: Tehsil Head Quarters
- BHUs: Basic Health Units
- HC:Healthcare
- PPE's: Personal Protection Equipment
- SOPs:Standard Operating Procedures
- GWP: Good Warehouse Practices
- SKUs: Stock Keeping Units
- WMS: Warehouse Management System
- WH: Warehouse
- DHO:District Health Officer
- ABCActivity-Based Costing
- ISO International Organization for Standardization

Section I

Introduction of Assignment:

1) Introduction:

USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) is providing technical assistance to Department of Health in the Field of Supply Chain Management including the implementation of District Supply Chain MIS and Asset Management Information System at district Swat.

There is a need to carry out gap analysis and propose a model warehouse for medicines and supplies for district Swat. The proposed warehouse should fulfill all the standards of warehousing medicines and supplies like pallet and racking system, warehouse management system, designated dry and cold storage areas etc. as per the current and future requirements for district Swat.

In light of the above Health Department seeks USAID GHSC-PSM's technical support to conduct an assessment for the above said warehouse and provide layout requirements, equipment and funds for erection of warehouse meeting all the standards. This assessment is conducted to review the current throughput situation of the District Health Office-Swat's warehouse and propose a state of art warehouse design, budget, and human resource needs for next 20-25 years.

2) Statement of Problem:

The current warehouse is not purpose built. District Health Office rented few tiny spaces i.e. one small house consists of 5 rooms and 7 small shops. In these tiny spaces, it is impossible to apply good warehousing practices, keep track of INs and OUTs, proper staging, segregation of stocks, systematic record keeping, automation, avoiding and managing the risks etc.

3) Significance of the Assignment: Warehousing is a Role beyond Storage

Warehousing is an important and integral part of strategic decision making in supply chain and its importance becomes more vital when it is dealing with healthcare commodities, playing key functional role in achieving the overall objectives of the department in terms of treating ailing humanity. It includes handling with therapeutic drugs, test kits which are the basic elements of treatment of any disease, storing vaccines that need temperature control and handling (cold Chain) of highly sensitive products. The effectiveness of a supply chain in any healthcare program can considerably be enhanced through proper decision making on warehousing.

Roles of ideal warehouse in supply chain are;

- a. Maintain and assure the quality of Healthcare (HC) commodities (drugs, diagnostics, vaccines, and allied products and equipment) while receiving, handling, storages and distribution till the utilization by the patients
- b. Quick delivery of HC commodities to avoid stock outs
- c. Remarkable reduction in material handling cost
- d. Reducing operation costs
- e. Increase inventory turn-overs
- f. Maximum utilization of space
- g. Automations in receiving stacking, distribution and record keepings.
- h. Establishment of wide role information technology
- i. Avoiding overstocking and stock outs

4) Scope of the Assignment:

- a. Asses District Health Office – Swat current warehouse situation and conduct situational analysis of the warehouse premises, practices, space, shelving, HR, WMS, degree of automation and manual practices.
- b. Evaluate current system throughput and forecast future throughput.
- c. Examine current storage capabilities for both normal and cold chain products.
- d. Develop/Propose model for fulfilling warehousing needs keeping in view the international best practices and other state of the art warehouses i.e. ISO certified EPI warehouse Complex, Islamabad and CW&S, Karachi

5) Review of Related Documents, SOPs, guidelines and data:

To ascertain the current warehouse's situation, the related documents, SOPs, Guidelines, and data was required to review and draw a clear picture and road map to forecast the needs of warehouse for next 20-25 years. However, the available data was not sufficient to conclude the exact needs for next two decades. There were no reference SOPs or the guidelines available. They were managing day-to-day warehousing activities based on their knowledge and the prevailing practices. Most of the data was either not available or poorly organized making it difficult to reach to any conclusion.

6) Methods adopted of assessment:

Data for this assessment were collected by interviewing the warehouse staff, relevant doctors, DHO Swat and reviewing the available, documents and practices in placed. To forecast the future needs, previous trends, total demand, current consumption, consumption patterns, disease burdens, current and previous volume of procurement were studied. To design the state-of-the-art warehouse, the data were collected from the open market from several sources to ensure that the proposed budget and the warehouse design is practical and cost effective.

7) Limitations:

As the complete data was not available hence some part of this assessment is based on assumptions and may not be referred for any other assessment. Moreover, the available space is not sufficient as compared to total covered area required hence it may be lesser than the required needs.

The costing is being done considering the market trends; however, it may not be referred to any other assessment as the current market situation is very unstable and prices are increasing day by day. The inflation factor has been added in the budget considering the previous trends. However, it may affect the budget in case of significant increase in the inflation factor than the previous years.

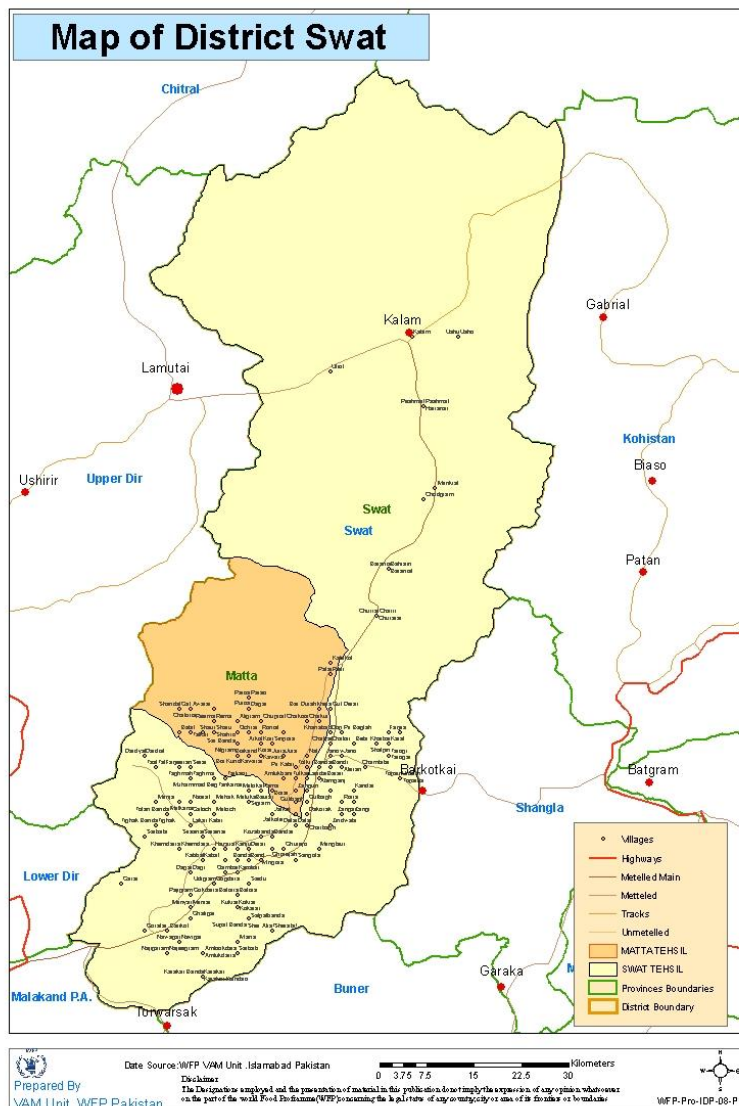
Section II

Introduction and Situation Analysis

I) Introduction:

1) General Demography

Swat is a district in the Malakand Division of Khyber Pakhtunkhwa, Pakistan surrounded by district Chitral, Dir, Timargira, Bunir and Shangla. With a population of 2,309,570 persons as per the 2017 national census with population density of 430/km² (1,100/sq mi), Swat is the 15th-largest district of Khyber Pakhtunkhwa province with the area of 5,337 sq.km (2,061 sq. mi) consisting of 7 tehsils named Babuzai, Matta, Khwaza Khela, Barikot, Kabal, Charbagh & Bahrain.



II) Health Coverage:

District Health Office Swat covers 74 BMU's consisting of one DHQ, 06 THQ's and 69 BHU's from the district warehouse located in centre of the city Swat, Mingora.

2) Current throughput situation of District Health warehouse

District health Warehouse SWAT is located in thickly populated area within a narrow Street and difficult curves on the way, resulting in difficult approach and poor accessibility. The entire warehouse consists of one small rented house and 07 shops in a narrow street as shown below:



I) Human Resource:

There were only three staff appointed to manage the warehouse activities, who neither had been provided any training nor warehouse management courses. Two of them are full time while the 3rd one is on temporary basis. Considering the workload and bureaucratic management processes, it is recommended i) to provide DHO office an adequate number of warehouse staff and (ii) provide them warehouse management trainings and courses to update their knowledge and learn the warehouse management best practices. This will help them not only to improve their warehouse processes but also bring efficiency and accuracy in warehouse management function.

II) Capability:

Serious capacity issues were observed in relevant staff. The existing staff had very basic warehouse management knowledge i.e. name and location of the products etc. and are unfamiliar with good warehousing practices. Record keeping was being done manually following old school method, i.e., entries in stock register. The entire warehouse staff needs capacity enhancement and professional trainings on good warehousing practices and advanced inventory modelling techniques.

III) Space:

District Health Office has make shift arrangement to store the health supplies. They have rented small house consisting 5 small rooms and 7 small shops which neither meet the basic warehousing needs nor fit for purpose. Apart from this, the team has noted several other serious issues as well, some of them are as under;

- a. Severe shortage of space
- b. No marking and distinction of area
- c. No receiving bays
- d. No quarantine spaces
- e. No segregation areas
- f. No isolation of stocks
- g. No area for returns and recalls
- h. No Batch printing and recording area

- i. No isolation of groups of commodities.



IV) Safety and Security

There were no proper security and safety measures placed at any space rented by the District Health Office. Some of examples are as under;

- a. No Security guards were placed at any of the property rented by the DHO office
- b. Fire extinguishers were available but training to staff how to use them was not given by the department. Moreover, the staff was not aware of date of expiry of the equipment as well as how to re-fill them
- c. Supplies were not stored in a systematic manner while it was spread everywhere making it difficult to count and keep record of them
- d. No lock and key system
- e. No space for expired drugs
- f. No security and safety gears were available
- g. No temperature and humidity control were being implemented hence all healthcare commodities were at high risk of losing their efficacy
- h. PPEs for the staff were not available
- i. Neither the warehouse stock nor the staff was insured

- j. Electric wires were exposed from several points which increasing the risk of short circuit as well occurrence of fire
- k. High risk of theft and pilferage as the supplies were laying openly and there was no lock and key
- l. Fumigation has never been done ever which has increased the risk of termite, mites and other insects attack which may affect the health supplies and their efficacy



V) Cold Chain:

There was no space available for cold chain. They were storing the temperature control health commodities in a refrigerator. Two available refrigerators are neither sufficient nor well maintained. Moreover, monitoring of temperature and humidity was not in practice.



VI) Hazardous Goods:

There was no safe space allocated for hazardous material. All hazardous goods were stored with the regular supplies and medicines including acid and phenols which has increased the risk of explosion and fire hazards.



VII) Stationery storage:

It was observed that the stationery was stored in warehouse. Managing the stationery is not in warehouse domain, it should be managed by the administration department. If it is required to manage by the warehouse team, then there should be a separate place. Currently, stationery is stored in an almira but open stationery was also present everywhere.

VIII) Healthcare- Equipment

Cross-docking method was being adopted for the delivery of health equipment across the district. The equipment was directly being delivered from the supplier to the site. Technical team is involved for verification, inspection and confirmation of deliveries. After satisfactory confirmation, the district was advised to release the payments of suppliers.

IX) Returns/ Recalls

No space was available for the returns and recalls of the drugs and equipment's for the whole district.

X) Warehouse Management Practices

a. Guidelines and SOP's

There was no reference guidelines or SOPs available. There are also no signs of good warehousing practices (GWP). They were managing day to day activities based on their own experience and exposure.

b. Stock Keeping Units (SKU's)

Total 95 stock keeping units are being managed at district health warehouse excluding stationery, fire extinguishers and fixed assets.

c. Automation/WMS

There was neither any Warehouse Management System (WMS) placed nor any systematic automation was adopted in receiving, batch printing, stacking, dispatch and inventory control. Only stocks and distribution data were maintained through the support from USAID GHSC PSM Project.

d. Area Allocation:

All the health supplies, drugs, chemicals were stored together without any marking to segregate them. Stock receiving, stock sorting and stock picking, packing and shipping bays were neither available nor in practice.

e. Receiving's:

Guidelines and SOPs were neither in place nor in practice. No sequential flow charts or road maps were available.

I. Stacking

No area segregation in stacking and allocated placement sites were defined

II. Bin Cards:

Bin cards were neither available nor in practice

f. Inventory Management Practices:

No principal parameters like ABC analysis, Cycle Counting or average monthly consumption were being implemented.

g. Segregation:

No area was allocated/marked for receiving's, quarantines, return, recalls, picking, packing and distribution.

h. Quality Circle:

In the light of ISO requirement, no quality circle meeting recorded, no risk register and no quality enhancement and advancement in procedural planning was in practice.

3) Total District Warehouse Inventory Load:

Total District WH stock load (yearly) =	2,000 cartons
Inventory replenishment/ re-filling rate =	twice in a year (6 monthly)
Maximum stocks level =	8,000 to 10,000 Cartons
Minimum Stocks Level=	4,000 to 5,000 Cartons
Average size of carton Width =	14" Length = 20" height = 11"
Average covered area per carton=	3,080/ 1,728 = 1.75 sq. ft.
App. total (maximum) covered area =	10,000 Sq. ft. * 1.78 = 17,800 sq. ft

- l) Available Space:
Available space is 70 ft. * 90 ft.



Section III

Need Assessment, Design, budget and recommendation

I) Need Assessment

I) Human Resource

The current available staff is not sufficient to meet the needs of future warehousing. Based on revised requirements, following HR structure for warehouse staff is proposed;

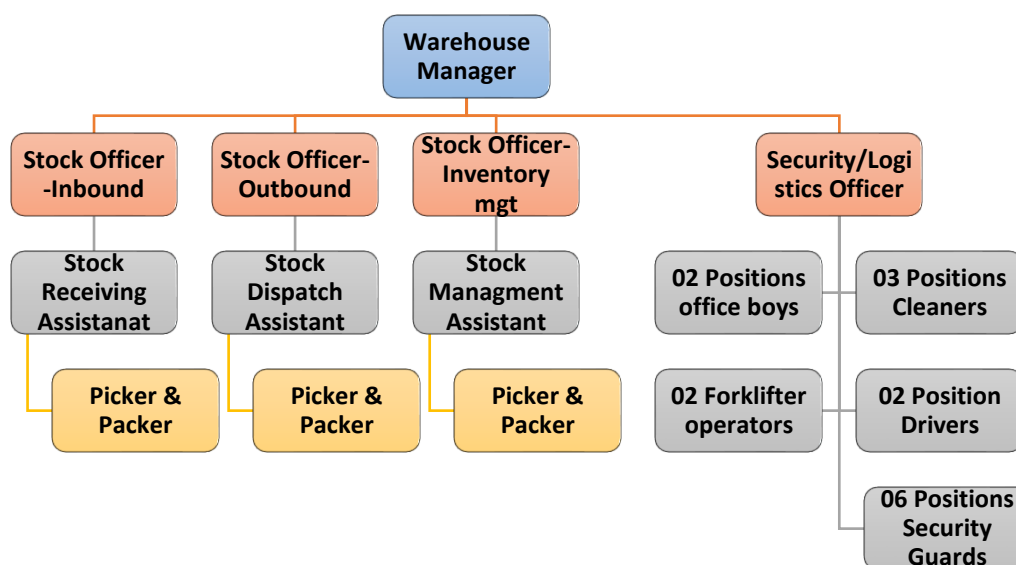


Figure 1

a) Staff needs for District Health Officer Swat's Warehouse

Table 1

Statement showing the title of position, basic scale, requisition, qualifications, experience and job description (JDs)

Sr. #	Title of Position	No. of Posts	Qualification/Experience /Place of Duty/Age for Post	Job Description (JDs)
01	Manager Warehouse (BPS-17)	01	<ul style="list-style-type: none"> Pharm D/B. Pharm, Masters in Public Health and MBA. 10 Years' working experience in public health programs will be preferred, especially dealing with health, non-health and Diagnostic product Computer skills. 	<p>Reports To: District Health Officer Swat</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> Responsible for overall operational performance of the warehouse. Liaison with the procurement supply chain and logistic sections of District Swat.

Sr. #	Title of Position	No. of Posts	Qualification/Experience /Place of Duty/Age for Post	Job Description (JDs)
			<ul style="list-style-type: none"> • Age:45 Years • Duty Station: • Swat 	<ul style="list-style-type: none"> • To supervise and ensure workplace health and safety requirements are met and ensure security of the building and stock; • Responsible for managing and directing all activities related to the warehouse, including receiving (inbound outbound), planning and scheduling all distribution services. • To ensure use of automated and computerized system (LMIS); • Review of load and equipment clearance requirements. • Check temperature recording sheet at least once a week for special storage equipment's. • Sharing of disease wise and product wise existing inventory status with DHO. • Responsible to share the average inventory of one year with higher authorities for inventory level definition purposes. • Assist in defining inventory levels in meeting with DHO. • Ensuring incorporation of all stock entries into system/manual register on daily basis. • Ensuring availability of safety stock exist at all time. • Review of inventory levels on monthly basis through scheduled reports. • Ensuring existence of adequate controls over the inventory at the warehouse. • Allocation of warehouse space for inventory to be received. • Communication to procurement department for receipt of goods received in deviation from PO. • Verification of DC. • Verification of Service Entry Sheet. • Approval of GRN. • Review of inventory periodic reconciliation and necessary actions. • Reporting of out of inventory to competent authority. • Evaluation and recommendation of optimum course of inventory dispatch. • Responsible to sign the delivery of returned stock to the district warehouse. • Responsible for verification of Inventory Return Adjustment Note. • Responsible for conducting physical count of inventory on periodic basis.

Sr. #	Title of Position	No. of Posts	Qualification/Experience /Place of Duty/Age for Post	Job Description (JDs)
				<ul style="list-style-type: none"> • Responsible of placement of inventory in line with FEFO/FIFO approach. • Responsible for sharing an annual listing of obsolete inventory with the DHO. • Responsible for sharing expired inventory status report on monthly basis. • Initiation of movement of expired inventory file for incineration. • Intimation of damage inventory to the concerned unit. • Review of adjustment in the inventory. • Ensuring handing over/taking over of responsibilities. • Maintain and update the Warehouse Information sheet. • Checking of temperature recording sheet at least once a week. • Analysis of staff strength and existing warehouse workload. • Ensuring proper procedures related to equipment safety and inventory handling are in place. • Ensuring that warehouse personnel have been trained about health safety.
02	Stock Control Officer (BPS-16)	03	<ul style="list-style-type: none"> • PharmD/B. Pharm, MBA /M. Com or equivalent • Five years' experience of handling stores and procurement services of the health institution or equivalent experience • Computer skills preferable. • Age:45 Years <p>Duty Station:</p> <ul style="list-style-type: none"> • Swat 	<p>Reporting To: Manager Warehouse</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> • Maintenance of inventory levels and inventory records. • Responsible for coordination for physical inventory counts. • Examination of inventory items requiring special storage. • To ensure use of automated and computerized system (LMIS). • Ensure nonexistence of hazardous material near such storages. • Sharing of hard copy of delivery documents having vehicle details and driver details with the gate staff at the office opening hours on the day of delivery upon receipt of inventory. • Matching PO with DC for local supplies upon receipt of inventory. • To Prepare GRN (Good Receipt Note) and ensure the availability of necessary documents for stock entries and for record at CMU Warehouse.

Sr. #	Title of Position	No. of Posts	Qualification/Experience /Place of Duty/Age for Post	Job Description (JDs)
				<ul style="list-style-type: none"> • Intimation to technical unit for inspection of inventory. • Signing and verification of DC. • Reporting of damage supplies received in DC note upon receipt of inventory. • Ensuring completion of all necessary documents prior to recording of inventory into warehouse. • Incorporation of entry into stock register. • Preparation of GRN. • Performance of periodic inventory reconciliations. • Inspection of stock at vendor site. • Provision of allocated space to returned inventory. • Acknowledgement on return delivery for the returning inventory. • Recording of inventory entries and adjustments into system. • Receipt of inventory and preparation of necessary documentation. • Allocation of space in warehouse for inventory to be received. • Perform aging of slow-moving inventory items. • SCO is responsible to report the slow-moving inventory to concerned units on semi-annual basis. • Any other task assigned by Warehouse Manager.
03	Security/Logistic Officer (BPS-16)	01	<ul style="list-style-type: none"> • Master in Supply Chain, MBA or relevant areas with 5 years working experience of security and logistics • Computer Skills • Age:45 Years <p>Duty Station:</p> <ul style="list-style-type: none"> • Swat 	<p>Reporting to: Manager Warehouse</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> • Ensure the warehouse security and supervise security guards • Ensure all security gears and install and functional including fire alarm and firefighting system, CCTV cameras and other security equipment. • Manage and monitor all third-party contracts i.e., Freight forwarders, security companies, janitorial services etc. • Ensure the availability of all warehouse gears and operating equipment
04	Warehouse Assistant (BPS-12)	03	<ul style="list-style-type: none"> • Bachelor Degree. • Minimum Five year past experience of 	<p>Report to: Stock Officer</p> <p>KEY JOB RESPONSIBILITIES</p>

Sr. #	Title of Position	No. of Posts	Qualification/Experience /Place of Duty/Age for Post	Job Description (JDs)
			<p>warehouse/store support activities.</p> <ul style="list-style-type: none"> • Demonstrated flexibility and clarity in responding to changing work priorities and environment. • Age:45 Years <p>DUTY STATION:</p> <ul style="list-style-type: none"> • Swat 	<ul style="list-style-type: none"> • To assist the Stock Officer in stock receiving, stock management and dispatch on daily basis. • Organize the systematic storage of material according to their specified storage requirement. • Responsible for stacking of Medical Supplies as per FEFO and other related commodities as FIFO method. • Movement of inventory in warehouse across the building of warehouse. • Report damaged or missing inventory to manager warehouse on daily basis. • Responsible to sort organize, pack and label, store inventory in proper locations. • Assist Stock Officer in counting inventory on rotating basis to ensure accurate inventory record. • Follow the instruction of Manager Warehouse regarding protocols for warehouse cleanness and racks arrangement. • Re-assembling of warehouse racks according to commodities need. • Responsible to allocate/assign Support staff according to daily operations need. • Responsible to report if shelf-life of any item is shorter. • Ensure wear safety gear all the time, for staff working in warehouse operational area. • Ensure workplace is free of debris and remove safety hazards from aisle. • Ensure the temperature recording in the entire warehouse building. • Responsible to keep warehouse related equipment updated and functional • Responsible to maintain list of category wise obsolete inventory. • Take on any other task assigned by Manager Warehouse and Distribution, necessary to ensure proper and timely management of warehouse functions.
05	Forklift (Stacker) Operator (BPS-07)	01	<ul style="list-style-type: none"> • Secondary School Examination Certificate (SSEC) or equivalent • Valid fork-lifting certificate. 	<p>Report to; Security/Logistics Officer</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> • Transporting materials to different locations within the facility.

Sr. #	Title of Position	No. of Posts	Qualification/Experience /Place of Duty/Age for Post	Job Description (JDs)
			<ul style="list-style-type: none"> One-year experience of operating electric forklift in the warehouse with racking system Excellent hand-eye coordination. Proficiency in operating technical machinery Good physical health Mathematical aptitude. Good organizational skills. Good written and verbal communication. Age:45 Years <p>Duty Station:</p> <ul style="list-style-type: none"> Swat 	<ul style="list-style-type: none"> Locating and moving stock of products to pallets or crates for storage or shipment Optimizing loads to ensure operational efficiency. Locate and place the pallets at right location Securing loads to machine before transportation. Inspecting the damages to vehicles. Scheduling vehicles for maintenance and repairs. Operating and managing technical equipment. Picking and wrapping orders for shipment. Identifying workplace safety hazards. Comply with company policies and guidelines Adhering to safety management standards. Any other task assigned by line Manager
06	Picker and Packers/Loaders (BPS-02)	5	<ul style="list-style-type: none"> Primary Three years' working experience in relevant field. Age:40 Years <p>Duty Station:</p> <ul style="list-style-type: none"> Swat 	<p>Report to: Stock Assistant</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> Packing, un-packing of stocks when needed Loading and off-loading of shipments Assist stock assistant in stock placement Any other task assigned by the line Manager
07	Office boys (BPS-02)	02	<ul style="list-style-type: none"> Primary Three years' working experience in relevant field. Age:40 Years <p>Duty Station:</p> <ul style="list-style-type: none"> Swat 	<p>Report to: Security/Logistics Officer</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> Movement of files, signature by the authorities and placement of files to relevant desk/racks Serve tea and coffee to the staff Any other task assigned by the line Manager
08	Cleaner (BPS-02)	03	<ul style="list-style-type: none"> Primary Three years' working experience in relevant field. Age:40 Years <p>Duty Station:</p>	<p>Report to: Security/Logistics Officer</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> Ensure the warehouse cleaning in and outside Clean office desk, equipment and washrooms

Sr. #	Title of Position	No. of Posts	Qualification/Experience /Place of Duty/Age for Post	Job Description (JDs)
			<ul style="list-style-type: none"> Swat 	<ul style="list-style-type: none"> Any other task assigned by the line Manager
09	Security Guards (BPS-02)	06	<ul style="list-style-type: none"> Primary Ex-army official or have security training and experience Age:60 Years <p>Duty Station:</p> <ul style="list-style-type: none"> Swat 	<p>Report to: Security/Logistics Officer</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> Ensure the warehouse security day and night Scan all the visitors and supplies coming in warehouse Ensure nothing goes out without gate pass Record and maintain visit register Any other task assigned by the line Manager
10	Drivers (BPS-04)	02	<ul style="list-style-type: none"> Primary 10 years' driving experience with a company Valid driving license of LTV & HTV Age:40 Years <p>Duty Station:</p> <ul style="list-style-type: none"> Swat 	<p>Report to: Security/Logistics Officer</p> <p>KEY JOB RESPONSIBILITIES</p> <ul style="list-style-type: none"> Drive office vehicle Ensure vehicle's timely maintenance and service Maintain vehicle logs on daily basis Distribution of medicines and supplies to the Tehsil level Any other task assigned by the line Manager

b) Proposed Salary structure of warehouse staff

Sr. No	Title	Grade	Positions
1	Manager Warehouse	(BPS-17)	01
2	Stock Control Officer	(BPS-16)	03
3	Security/Logistic Officer	(BPS-16)	01
4	Warehouse Assistant (BPS-12)	(BPS-12)	03
5	Forklift Operator & Driver	(BPS-07)	02
6	Picker and Packers/Loaders	(BPS-02)	03
7	Office boys	(BPS-02)	02
8	Cleaner	(BPS-02)	03
9	Security Guards	(BPS-02)	06
10	Drivers	(BPS-04)	02

2) Structure of Warehouse:

After detail research and discussion with District Health Officer (DHO)-Swat it is recommended to adopt "Prefabricated Steel Warehouse Structure". A prefabricated steel building for warehouse comprises of steel beams, columns, truss and other elements that are made of steel. The parts are assembled to each other by bolts, joints, rivets, etc. The primary purpose of steel warehouse is to provide ample space required for

storage. The steel structure usually has large span for this purpose. But what are the advantages of steel warehousing solution over conventional ones?

Time factor is the biggest advantage of pre-engineered steel warehouse buildings. The construction period is significantly shorter due to modular construction. The other advantage is that being lightweight, it is convenient to relocate a steel warehouse than a conventional one.

l) PEB Steel warehouse vs traditional concrete warehouse

Warehouses are primarily storage facilities, so they are classified based on the commodity distribution systems or nature of the goods. To cope with the increasing demand of warehouses in recent years, people are adopting more to steel warehouse buildings which are quick to be constructed. So this is a clear indication that with passage of time steel warehouses are taking precedence over traditional ones due to added convenience.

The construction of the pre-engineered steel warehouses happens about 30 to 60 percent faster. Also, they are easy to expand, which means you can add more storage space as you need without much hassle. Pre-engineered construction happens offsite. Unlike concrete, this is dry construction and therefore more environment friendly.

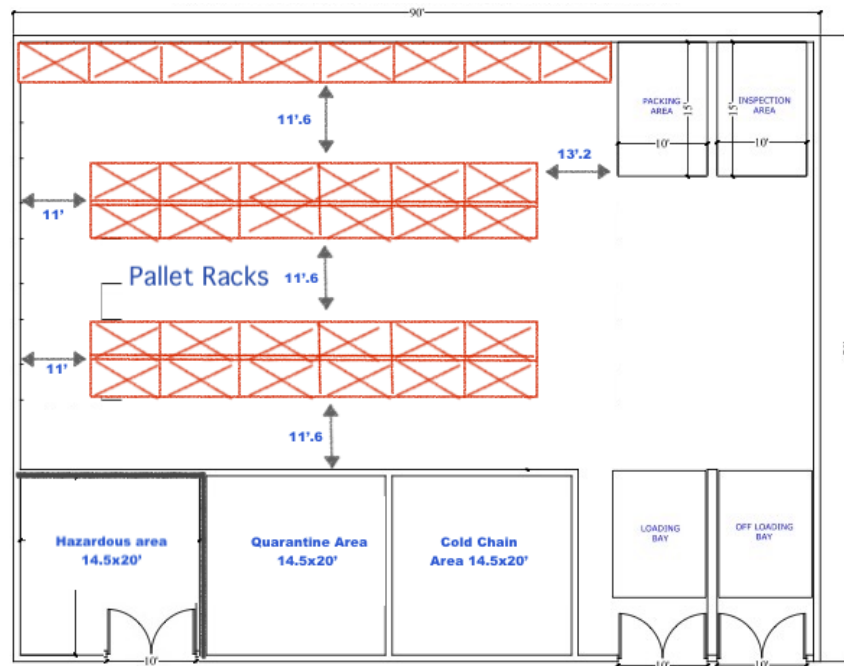
Warehouses made of steel typically save construction workers' costs, as compared to concrete warehouses. This saves lot of production and other costs that are commonly associated while building a warehouse. The steel used in PEBs is lightweight and so are the panels used on wall and roofing. The overall weight of PEB warehouses are therefore much lighter than traditional brick and mortar warehouse. Consequently, steel warehouses do not need a foundation as heavy as those made in the traditional way. This becomes another area of cost saving.

The lesser the columns or structural objects in your building, the more becomes your space inside the warehouse. With steel construction, it is possible to design large clear span spaces for your warehouse. It is possible to have a single stretch of over 60 meters in a warehouse, without requiring any load bearing support. This makes it easy to set up large-scale heavy machinery and equipment as per your need.

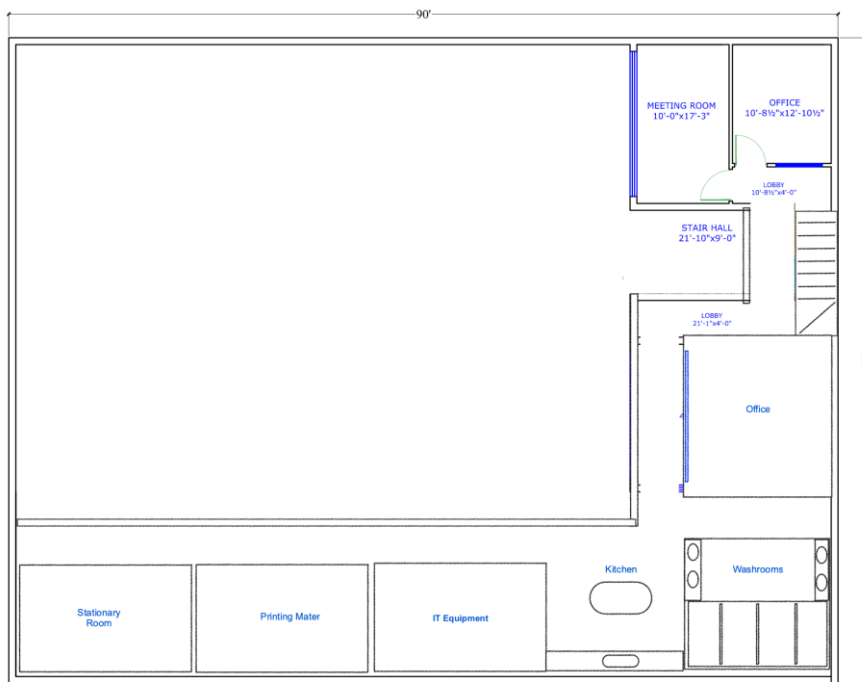
Another factor that favors steel warehouses over traditional ones are common wear and tear resulting from decay, mildew, termite attacks, pest and fire damage. Besides, steel warehouses that are professionally designed can resist severe weather conditions like excessive snowfall or incessant rain and thunderstorms. This is the reason that is garnering worldwide acceptance of pre-engineered buildings.

II) Structure Design

a) Layout



GROUND FLOOR



MAZZANINE FLOOR

Figure 2

b) Pre-Engineered Steel Structure

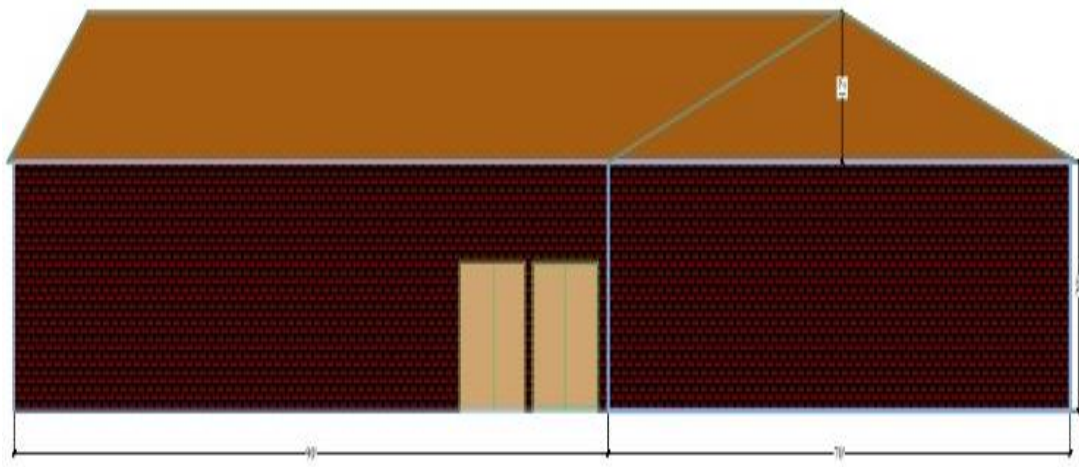
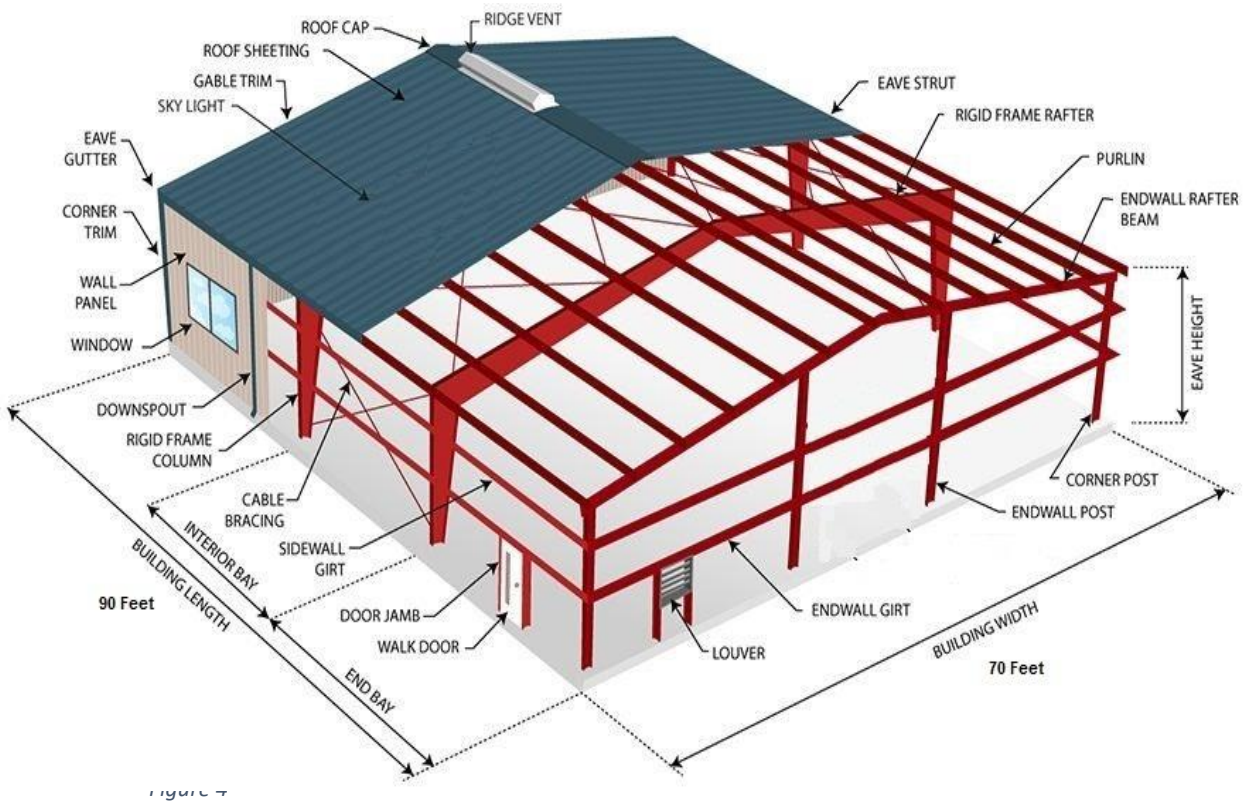


Figure 3



c) Material Specification

SELF TAPPING SCREWS



Figure 5

3-INCH-THICK EPS ROOF SANDWICH PANEL



Figure 6

3-INCH-THICK EPS WALL SANDWICH PANEL



Figure 7

DIFFERENT PARTS OF AN I-BEAM

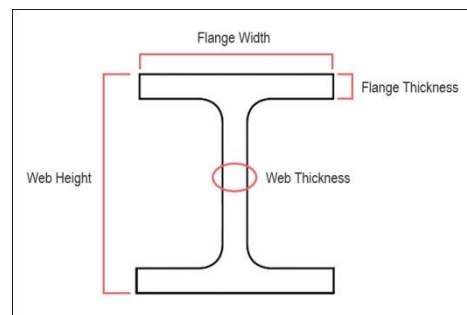


Figure 8

I-BEAM FIXED IN THE STRUCTURE



Figure 9

DIFFERENT PARTS OF A Z-SECTION (USED AS GIRTS & PURLINS)

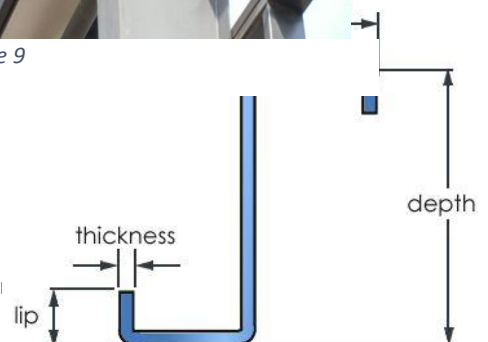


Figure 10

Z- STEEL SECTION (USED AS GIRTS & PURLIN IN A SHED)

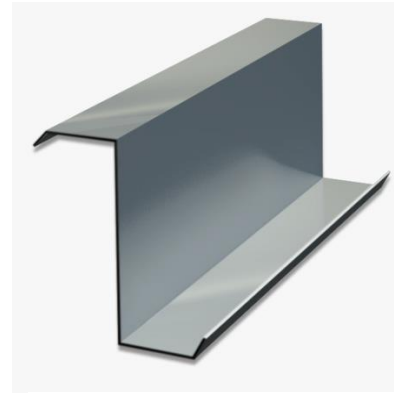


Figure 11

d) Pallet Racks

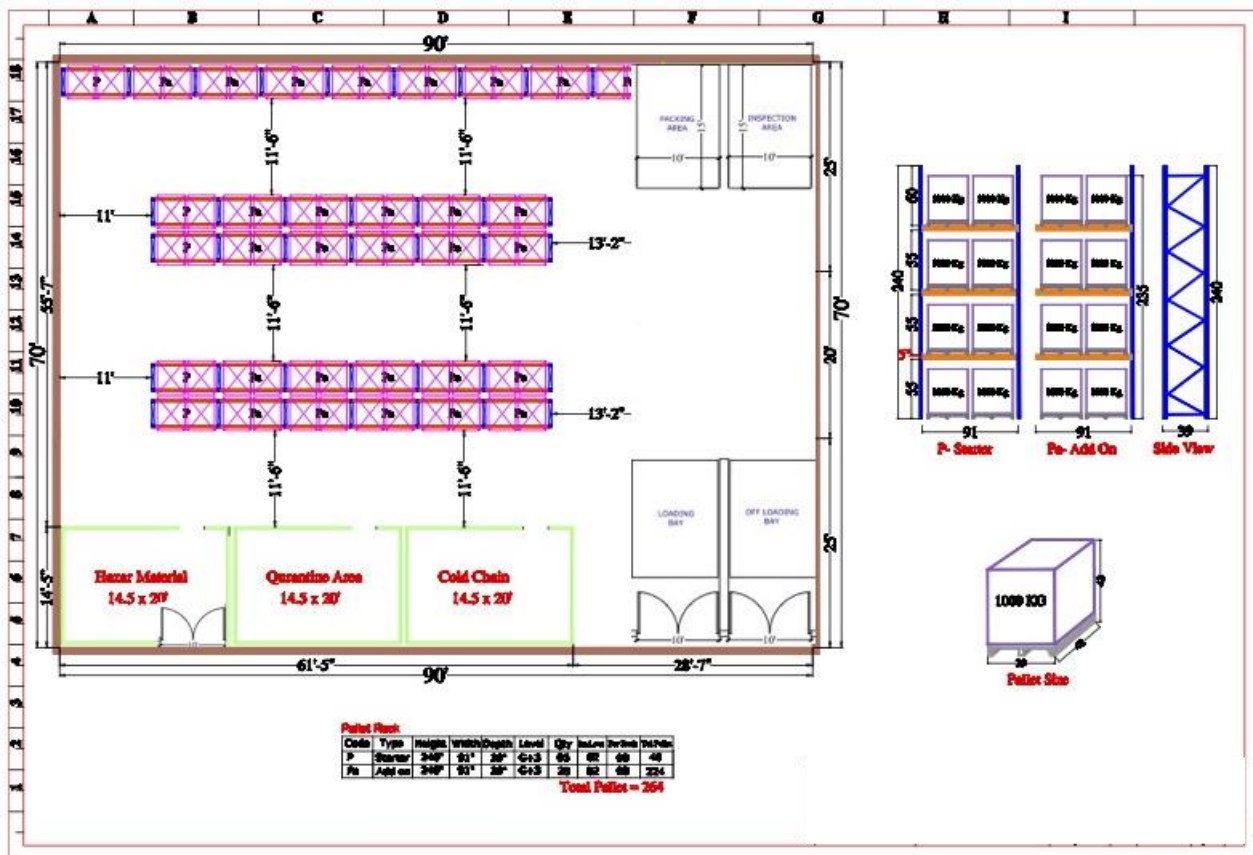


Figure 12

e) Pallet Racks Specification

Table 2

Pallet Rack											
Qty	Code	Rack Name	Type	H	W	D	Level	Capacity Per Level	Pallet Per Level	Pallet Per Rack	Total Pallet
05	P	Pallet Rack	Starter	240"	91"	39"	G+3	2000kg	02	08	40
28	Pa	Pallet Rack	Add-on	240"	91"	39"	G+3	2000kg	02	08	224
								Total Pallets			264
P, Starter:											
Qty	Item		Size	Rate	Amount						
02	Upright > 4"		39 x 240"	35,585	71,170						
06	Beam > 5"		91"	6,210	37,260						
01	Bolt Set			1,435	1,435						
01	Anchor Bolt Set			900	900						
Pa, Add On :											
Qty	Item		Size	Rate	Amount						
01	Upright > 4"		39 x 240"	35,585	35,585						
06	Beam > 5"		91"	6,210	37,260						
01	Bolt Set			1,435	1,435						
01	Anchor Bolt Set			900	900						

Quality : **Pallet Rack**

Upright Pillar > 4" : > 14g

Box Beam > 5" : > 14g

Base Plate : > 10g

Beam Joinder : > 10g

Cross Brass : > 18g

Figure 13

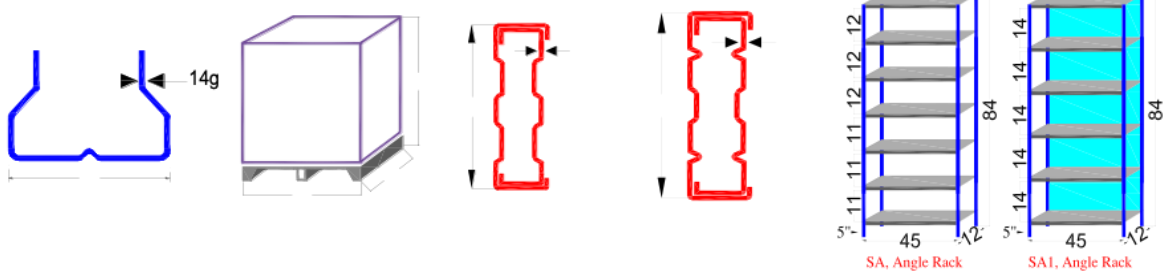


Figure 14

3) Budget

I) Budget Summary

Table 3

Budget Summary for Warehouse District Swat		
Sr. No	Category	Cost
1	Civil Work	4,095,000
2	Frame Structure	5,985,000
3	Wall & Roof Paneling	5,638,500
4	Pallet Racking	3,165,372
5	Generator	4,890,600
6	Electric, Plumbing, Fire fighting	8,820,000
7	Warehouse Equipment	20,335,000
8	Office Equipment & Supplies	14,017,500
9	Utilities	33,720,000
10	Other cost	23,813,394
	Total	124,480,366

II) Budget for Civil Work

Table 4

Sr. No	DESCRIPTION	QTY	UNIT	UNIT RATE	TOTAL RATE
CIVIL WORK PROCESS					
1	Dismantling / Removal of existing material. Removal of trees and other wild plants & bushes. Disposed of useless materials/debris outside the municipal limits, stack useable materials as decided by higher authorities.				
2	Land Survey				
	Layout				
	Demarcation				
	Key Plan Preparation				
	Collection of information regarding the existing structures, deeds and other property legal information such as ownership, lease agreement conditions etc.				
	Preparation of a base boundary plan.				
	Carrying out field survey.				
	Preparation of the existing conditions plan				
	Resolution of boundary issues (if any)				
	Obtaining of other required survey information.				
	Preparation of the construction stack-out survey.				
	Preparation of the As-Built Survey.				

Sr. No	DESCRIPTION	QTY	UNIT	UNIT RATE	TOTAL RATE
3	Excavation Process/Breaking Earth Work				
	Leveling the ground.				
	Setting corner benchmarks.				
	Identification of the ground and top levels.				
	Excavation for column & plinth to the approved depth or width complete in all respects or directed by Architect/Engineer.				
	Removal of any roots of the tree or rocks in the column and plinth foundation.				
	Dressing of the loose soil.				
	Marking of the cut off level.				
	Digging of dewatering wells and interconnecting trenches.				
	Construction of protection drains.				
4	The Foundation.				
	Foundation is the part of the structure below the plinth level. A foundation is needed for making any structure. The foundation is essential to the value and safety of the structure. Foundation has a direct contact with the soil. There are several benefits of using a foundation i.e., first it is used to transfer a load from structure to soil. Second it transfers a load from short to a larger area. Third, it prevents unequal settlement of any structure. Fourth, it increases the stability of any structure. Fifth, it Prevents a lateral movement of the structure.				
5	Depth of the Foundation.				
	The depth of the foundation depends upon several factors including the availability of the soil bearing capacity, depth of shrinkage and swelling in clayed soil due to seasonal changes which may cause considerable movements. Depth of the frost penetration in case of fine sand. Possibility of the other excavation work nearby. Depth of the Ground water table. The minimum Depth of the foundation is not less than 50 cm.				
6	Marking the Footings.				
	Marking the boundaries of the shed walls.				
	The Points for Footings are marked as an F1,F2,F3 etc. and Column Points are marked as C1,C2,C3 etc.				
	The layout of the footing and column is drawn one by one.				
	A line is drawn from one footing to other consequent footing with the help of a Thread and Lime, Or Straight Aluminum, wooden strips with a permanent marker.				
7	Digging Trenches For Footings.				
8	Soil bearing Capacity Test				
	The soil will be excavated a pit of the required depth.				
	With the help of a square cube of known dimensions, the square is dropped from a known height.				
	The impression made on the pit is measured with a scale.				
9	Installation of the Plumbing Pipes.				

Sr. No	DESCRIPTION	QTY	UNIT	UNIT RATE	TOTAL RATE
10	Length and Width of the Footings.				
	The Length and Width of the Footings depend upon the structural design. Which shall be provided by us in case of the approval.				
11	Installation of Reinforcement in the Footings.				
	Providing & making of 1:2:4 concrete having compressive strength of 3000 Psi, using best quality ordinary Portland cement and local approved quality sand and crushed stone, curing as per requirement, including Reinforcement of 1/2" dia deformed steel bars @ 6" C/C both ways double mesh with minimum 40,000 psi yield strength including form work and its removal, complete in all respects.				
12	PCC ratio in column footing & under the plinth.				
-	For Column Footings the recommended ratio is 1:2:4 and for Plinth the recommended ratio is 1:4:8				
	Providing & laying Block / Brick masonry walls including racking of joints with 1:4 cement sand mortar, complete in all respect as per drawing, specifications, to the satisfaction of the customer.				
13	Plain Cement Concrete				
	Provide and laying 3" thick 1:4:8 cement concrete including curing hacking/chipping of existing surface for bonding where necessary etc. complete in all respects as per approval of Engineer/Architect.				
14	Plaster Works.				
	Providing & laying 1/2" to 3/4" thick cement sand plaster best quality locally available with 1:4 cement sand mortar on exposed concrete base, using best quality, smooth trowel finish completes in all respect, as per satisfaction of employer's Engineer/Architect.				
15	Flooring & Special Finishes.				
	Providing and Laying 24"X24" at floor over 2" thick 1:4 cement mortar including grouting with matching grout material, including wastage of materials leveling of floor before laying of tiles, complete in all respect as per satisfaction of employer's Engineer/Architect.				
12	Paint				
	Providing and applying, 3 coats Matt/Enamel finish at all steel items, complete in all respects as specified and as approved by the valued client.				
TOTAL CIVIL WORKS AMOUNT		6,300	Sq.Ft.	650	4,095,000

III) Budget for Frame Structure

Sr. NO	DESCRIPTION	QTY	UNIT	UNIT RATE	TOTAL RATE
FRAME WORK					
	After the successful completion of Civil Work & Foundation, the third step of the project will be the erection of the steel structure.				

Sr. NO	DESCRIPTION	QTY	UNIT	UNIT RATE	TOTAL RATE
1	Column:				
	Number of Column:				
	Total number of columns for the base shall be 16 i.e., 4 Corner Posts, 4 End wall posts and 6 Right Frame Columns.				
	I Beam Specification				
	Pre-fabricated MS Steel Beams, Fixed to the Base Pillars with Bolts shall be used for columns of the shed. Based on the pre calculated live & dead load on the shed, it has been decided by the Architect that the web of the I beam shall be 12" at the base and 24" at the head. The flange of each beam shall be 6 inches and the thickness of the I beam shall be 10mm standard. the distance between two consecutive i beams shall be 18 feet. All Steel Columns & beams shall be Painted with Weather shield Enamel to increase the life the beams and Columns i.e., protection from rust and giving them a good look.				
	Base Plates & Head Plates				
	The Base Plate for the desired Shed shall be 15" x 15" and the thickness of each Plate shall be 20mm thick white the head plates shall be 20 mm thick and of the specified size.				
2	Girts				
	Z Purlins, made from Galvanized Steel Sheets, with 16-gauge thickness, shall be used as girts in the shed. The distance between two consecutive girts shall be 48 Inches.40 z purlins, each of size 18 feet shall be installed in the side frame. and 16 z purlins each of size 25 feet shall be installed in the end walls.				
3	Z Purlins Specification				
	The Z Purlin shall be made from galvanized steel. The thickness shall be 16 gauge, the width of the web shall be 8 inches & the width of the flange shall be 3 inch each.				
4	Rafters				
	The same Z Purlins Used for the Girts shall be used for rafters in the frame. A total of 90 z Purlins of the same specification and 18 feet long each shall be installed in the roofing frame.				
	Total Cost	6300	Sq.Ft.	950	5,985,000

IV) Budget for Wall & Roof Paneling

SERIAL	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
1	Roof Panels				
	3-inch-thick EPS Sandwich panels of the branded quality shall be installed for the roof of the shed. Width of each roofing sheet shall be about 39 inches and 18 feet long. Each sheet is made from 3-inch thick thermocol (Polystyrene) with strong adhesives to bind with the steel sheet 26 gauge. the Roofing sheet is corrugated from the upward side painted blue or red and flat from down side Painted white. The Density of the thermocol is 20 Kg/m ³ which decreases the temperature of the internal environment to 34 Percent. A Total of 7,020 Sq. Ft. of the Roof Panels shall be used in Sheds.	6,300	Sq.Ft	445	2,803,500
2	Wall Panels				
	EPS Sandwich Panels White in color, Thickness 3 Inch, Made from Steel Sheet, gauge 26 Shall be used in walls. The Wall Panels have Scrambled Shape. Wall Panels and Roof Panels have Male/Female Sections used for joining two panels together. Each Wall Panel is 46 Inch Wide and 10 Feet Long. We Will need 6400 Sq. Ft to cover the walls of the shed.	6,300	Sq.Ft.	415	2,614,500
3	Prism Specifications:				
	Above the 20 feet High walls the shed shall be made in a prismic shape. The angle of elevation of the prism shall be 14 feet on each side i.e. from each corner post. The height of the prism shall be 8 feet. Hence the total height of the shed if calculated from the base shall be 28 feet. Wall Panels shall be required to cover the bases of the prism on both sides.	560	Sq. Ft	415	232,400
	Total Cost				5,638,500

V) Budget for Pallet Racks

Technical and Financial Specification

Pallet Rack											
Qty	Code	Rack Name	Type	H	W	D	Level	Capacity Par Level	Pallet Par Level	Pallet Par Rack	Total Pallet
05	P	Pallet Rack	Starter	240"	91"	39"	G+3	2000kg	02	08	40
28	Pa	Pallet Rack	Add-on	240"	91"	39"	G+3	2000kg	02	08	224
								Total Pallets			264
P, Starter:											
Qty	Item		Size	Rate	Amount						
02	Upright > 4"		39 x 240"	35,585	71,170						
06	Beam > 5"		91"	6,210	37,260						
01	Bolt Set			1,435	1,435						
01	Anchor Bolt Set			900	900						
			Total		110,765	x	05	=	553,825		
Pa, Add On :											
Qty	Item		Size	Rate	Amount						
01	Upright > 4"		39 x 240"	35,585	35,585						
06	Beam > 5"		91"	6,210	37,260						
01	Bolt Set			1,435	1,435						
01	Anchor Bolt Set			900	900						
			Total		75,180	x	28	=	2,105,040		
	Total Of Pallets Racks										2,658,865
	GST 17%										452,007
	Total After GST										3,110,872
	Fitting Charges										54,500
	Total after Fitting										3,165,372

Table 5

VI) Budget for Generator

Table 6

Sr.#	Items	QTY	Unit	Unit Rate	Total Rate
1	100 KVA with imported Canopy, complete with Foundation Pad and Installation,	1	Each	4,180,000.00	4,180,000.00
2	GST 17%				710,600
	Grant Total				4,890,600.00

VII) Budget for Electrical, Plumbing and Fire Fighting

Table 7

Electrical, Plumbing & Fire fighting					
Sr.#	Description	Qty	Unit	Unit Rate	Total Rate
Electrical Works					
(A). Internal Works					
1	Wiring/ Cables	6300	Sft	150.00	945,000.00
2	Lights	6300	Sft	70.00	441,000.00
3	Fans	6300		70.00	441,000.00
4	Distribution Boards	6300	Sft	50.00	315,000.00
Total					2,142,000.00
(B). External Works					
1	CCTV system	6300	Sft	70.00	441,000.00
2	Earthing System	6300	Sft	15.00	94,500.00
3	Networking/telephone (depends on requirement)	6300	Sft	25.00	157,500.00
4	External lights/ cables (depends on requirements)	6300	Sft	200.00	1,260,000.00
Total					1,953,000.00
Total (A) +(B)					4,095,000.00
Plumbing Works					
(C). Internal Works					
1	Water supply/sewerage, etc.	6300	Sft	100.00	630,000.00
2	Firefighting Works	6300	Sft	100.00	630,000.00
Total					1,260,000.00
(D). External Works					
1	Sewerage	6300	Sft	100.00	630,000.00
2	Water supply	6300	Sft	100.00	630,000.00
3	Firefighting Pipes	6300	Sft	100.00	630,000.00
4	Fire & water supply pumps	6300	Sft	100.00	630,000.00
5	U/G Tank	6300	Sft	75.00	472,500.00
6	Overhead water Tank	6300	Sft	75.00	472,500.00
Total					3,465,000.00
Total (C) +(D)					4,725,000.00
Total (A)+(B)+(C)+(D)					8,820,000.00

VIII) Budget for Warehouse Equipment

Table 8

Warehouse Equipment Detail

Sr#	Name of Item / activity	Specification	Qty	Unit	Unit Rate	Total Rate
1	lifting trolley	Hydraulic(heavy duty)	4	Each	40,000	160,000
2	Moving trolley	3.5' x 2.5' (heavy duty)	5	Each	30,000	150,000
3	Waste Bin	organic, plastic, glass and metal (1600 ltr plastic)	4	Each	5,000	20,000
4	Dehumidifier	Steel or Plastic body with timing function, 1000L with washable air filter and external drain.	5	Each	50,000	250,000
5	Strapping and Banding Machine	Heavy Duty Tabletop Banding Machine, Automatic, for cartons strapping	2	Each	125,000	250,000
6	Forklift	Diesel fuel, load capacity 8000 –11000 LBS, Complete Specification attached	2	Each	5,500,000	11,000,000
7	Weight scale	industrial heavy duty with 1500 to 2000 capacity	2	Each	75,000	150,000
8	Yard Ramps	Yard Ramp, Mobile Hydraulic, Unloading Yard Ramp for Truck	3	Each	450,000	1,350,000
9	Refrigerator	600 liter, inverter technology	2	Each	80,000	160,000
10	Emergency Light	good quality (imported)	10	Each	5,000	50,000
11	Umbrella	Umbrella	10	Each	1,500	15,000
12	Varioline chiller	Double door, 880 L, for optimization of 2-8 Degrees Celsius Controlled-Temperature	4	Each	200,000	800,000
13	Deep Freezer	important for optimization of -2 to -20 degree celsius controlled temperature	2	Each	90,000	180,000
14	Truck Restraints	The STR- 4200 Dok-Lock or equal system with Hydraulic Cylinders stabilise air-ride suspension trailers to help address horizontal and vertical movement during loading/ un-loading. (Vehicle Restraints helps preventvertical and horizontal trailer movement)	3	Each	150,000	450,000
15	Temperature Control System	Heavy Duty Centrally Temperature Control System	1	Set	5,000,000	5,000,000
16	Digital Temperature Thermometer Hygrometer	Digital Temperature Thermometer Hygrometer	10	Unit	10,000	100,000
17	Smoke detector system	Smoke detector system	1	Set	250,000	250,000
Total Estimated Cost						20,335,000

IX) Budget for Office Equipment & Supplies

Table 9

Office Equipment & Supplies					
Sr. no	Item Description	QTY	Unit	Unit rate	Total Rate
1	Office Furniture	8	Set	50,000	400,000
2	Laptops	8	No	150,000	1,200,000
3	Printers	3	No	100,000	300,000
4	Photocopier Machine	1	No	450,000	450,000
5	Water Dispenser	3	No	20,000	60,000
6	Office Chairs	24	No	25,000	600,000
7	Visitor Chairs	12	No	15,000	180,000
8	Meeting Table	1	No	75,000	75,000
9	Meeting Chairs	12	No	15,000	180,000
10	Internet Devices	1	No	50,000	50,000
11	Internet Routers	3	No	7,500	22,500
12	Vehicle/Car	1	No	7,500,000	7,500,000
13	Master truck/Shehzore	1	No	3,000,000	3,000,000
	Total				14,017,500

X) Budget for Warehouse Utilities & Associated Cost

Table 10

Warehouse Utilities & Other costs

Sr. no	Item Description	QTY	Unit	Unit rate	Total Rate
1	Electricity month cost	60	Months	50,000	3,000,000
2	Gas Monthly Cost	60	Months	15,000	900,000
3	Internet Month Cost	60	Months	10,000	600,000
4	Water Supply Monthly Cost	60	Months	2,000	120,000
5	Stock Insurance	5	years	1,500,000	7,500,000
6	Vechile Insurance	5	years	200,000	1,000,000
7	Fuel for Generators, Forklift,	60	Months	200,000	12,000,000
8	Lubricants including for Generators, Forklift,	60	Months	100,000	6,000,000
9	Electricity connection cost	1	Unit	2,000,000	2,000,000
10	Gas connection cost	1	Unit	100,000	100,000
11	Mics	1	Unit	500,000	500,000
	Total				33,720,000

XI) Other Cost

Table 11

Other Cost

Sr. No	Description	QTY	Unit	Total Project Cost	Factor
1	Inflation factor 10%	1	Each	100,666,972	10,066,697
2	Contingency Cost 5%	1	Each	100,666,972	5,033,349
3	Design & Supervision 5%	1	Each	100,666,972	5,033,349
	Total				20,133,394
Sr. No	Description	QTY	Unit	Unit Rate	Total Rate
4	Supervision staff for WH construction	3	months	150,000	450,000
5	Warehouse operational expenses	60	months	50,000	3,000,000
7	Warehouse Staff Training & Capacity building	1	Lumpsum	200,000	200,000
	Total				3,650,000
	Grant Total				23,813,394

4) Recommendation

This assessment is conducted based on the scope in TOR and discussion with DHO-Swat. All their requirement has been considered for and have been added into design and budget. This is now an appropriate document for writing PCI and getting approval from the provincial Govt. for fund allocation. However, following tasks were out of scope and required technical inputs hence recommended to be completed before initiating the tender process for this project;

- I) Complete Engineering designed with BOQ, layouts, structure design, electrical, plumbing, firefighting, etc. The cost of design has been added in the budget.
- II) Selection of Engineering Consultant for Design and Monitoring of the construction of the project. Cost of monitoring has been added in the budget.
- III) Development of detail SOPs/guidelines for warehouse if already not done by M/s Chemonics
- IV) Development of LMIS
- V) Training of District warehouse Swat team for warehouse best practices, procedure and use of LMIS
- VI) Assessment of District -Swat procurement function whether they have capacity to conduct this procurement independently or not? In case of lack of capacity, it is recommended to hire a consultant to develop bidding document, evaluate the bids, preparation of evaluation report etc.
- VII) Hiring of supervision staff, in case there is no in house capacity to monitor the progress of consultant and the contractor, it is recommended to hire a staff or consultant. The cost of supervision staff has been added in the budget.

5) Annexures;

- i) Budget
- ii) List of Interviewers

----- End -----