



PUNJAB INDUSTRIAL ESTATES

DEVELOPMENT AND MANAGEMENT COMPANY

A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)



PIE/SIE/NEPRA-2216
September 21, 2022

To,

The Registrar, NEPRA
NEPRA Tower,
Attaturk Avenue (East), Sector G-5/1, Islamabad.

Subject:

**APPLICATION FOR ELECTRIC POWER SUPPLY LICENSE FOR
PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT
COMPANY (PIEDMC) OWNED BY GOVT.OF PUNJAB AT SUNDAR
INDUSTRIAL ESTATE.**

Reference: NEPRA letter no. NEPRA/DG(Lic)/LAD-11/1580 Dated January 27, 2022, copy attached as annexure- A.

Dear Sir,

The Chief Executive Officer being duly authorized representative of Punjab Industrial Estates Development and Management Company (PIEDMC), by virtue of power of Attorney / Board Resolution as stipulated in its 134th BOD Meeting dated 4th May 2019, to apply to National Electric Power Regulatory Authority, Islamabad, for the grant of Electric Power Supply License to the Punjab Industrial Estates Development and Management Company (PIEDMC) Govt. of Punjab at its Sundar Industrial Estate.

In continuation to the aforementioned NEPRA letter. Please find the attached application as per NEPRA Licensing Procedures Regulations, 2021 (AMECPR-2021) as notified vide SRO No. 760(I)/2021, on December 21, 2021, for obtaining the Electric Power Supply License for the Punjab Industrial Estates Development and Management Company (PIEDMC), at its industrial estate located in Sundar Raiwind Road Lahore, Punjab.

A Pay Order in the sum of Rs.2,339,082/- being the 'Non-refundable License Applicant Fee calculated in accordance with schedule II and PART I as per NEPRA SRO No. 760(I)/2021 is also attached here with this application.

The application may please be processed at your end for the early issuance of Electric Power Supply License for PIEDMC at its Sundar Industrial Estate.

Thanking you and best regards.

DA/As above:


(ALI MUAZZAM SYED)
CHIEF EXECUTIVE OFFICER



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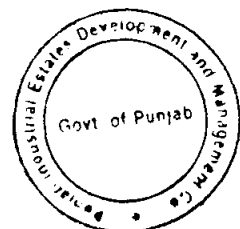
1. The Chairman, PIEDMC.
2. The Chairman, NEPRA.
3. The Director General Licensing, NEPRA.
4. The Director General CAD, NEPRA.
5. The General Manager Technical, PIEDMC.
6. The General Manager Coordination, PIEDMC.
7. The General Manager Business & Development, PIEDMC.
8. The Chief Financial Officer (Acting), PIEDMC.
9. The Chief Engineer Electrical, PIEDMC.
10. The Company Secretary (Acting), PIEDMC.
11. The Estate Manager, BOM-SIE.
12. The Project Director, SIE.

Punjab Industrial Estate Development & Management Company

Application of Electric Power Supply License for Sundar Industrial Estate (SIE)

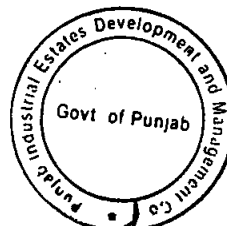
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21	A duly authorized statement stating whether the applicant has been refused grant of license under the Act	
22	Board Resolution authorizing the applicant	
23	Affidavit regarding the correctness, authenticity and accuracy of the application, documents and information submitted	
24	Undertaking regarding power of NEPRA to amend or grant dispensation	



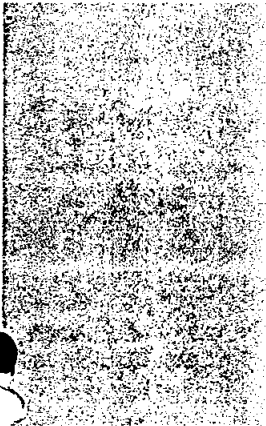
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PROSPECTUS





Sundar Industrial Estate



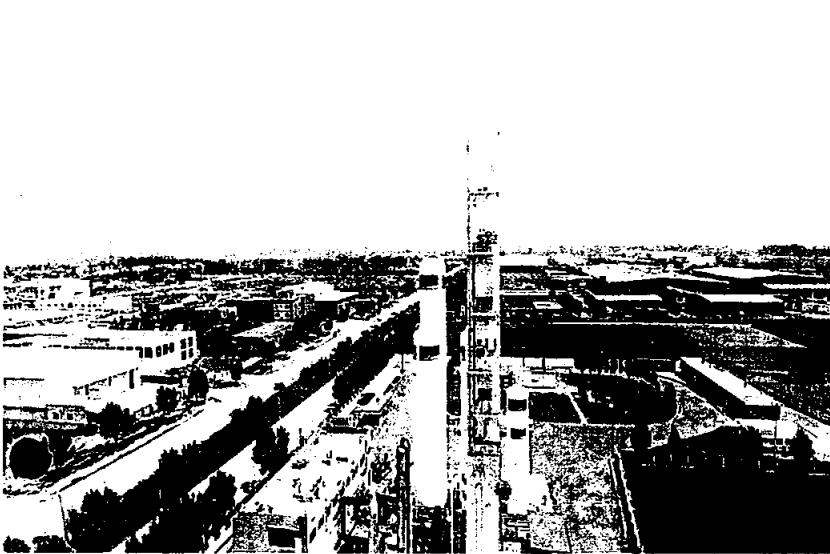
Sundar Industrial Estate comprising of 1763 acres of land was inaugurated in Feb, 2007 and is a vision turned into reality. It is the first project assigned to PIEDMC & was envisioned to be an 'island of facilitation' for prospective industrialists.

The objective was to develop an industrial estate where issues of industrialists are handled and problems solved through 'One Window' operation. There are over 500 factories in production in Sundar Industrial Estate and contributing to the economy by generating employment of 70 – 80 thousand persons.

Approximately 1262 acres is under industrial plots and remaining area has been dedicated for roads, infrastructure, amenities, utilities, commercial area, green belt, etc. Overall distribution/utilization is based on international standards and need assessment surveys.

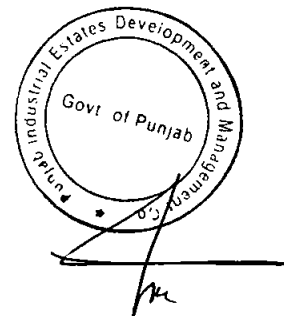
TOTAL AREA

1763



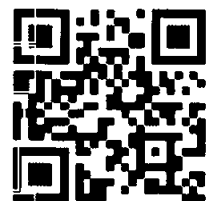
LOCATION

Sundar Industrial Estate is located at Sundar-Raiwind Road Lahore. It is 9 km away from the Railway Station, 54km from Lahore Airport, 7.5KM from N-5



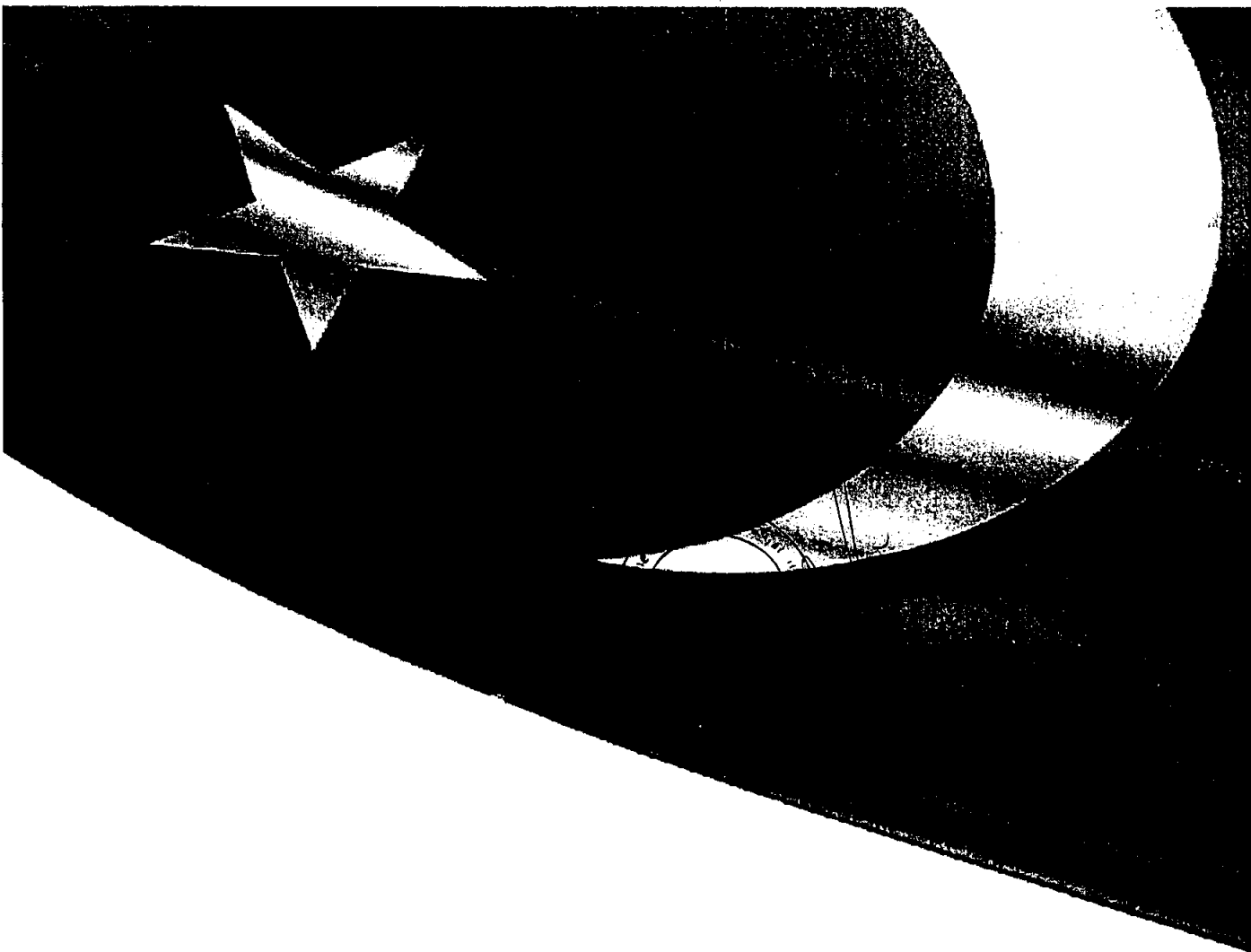
HIGH POTENTIAL SECTOR

- TEXTILE & GARMENTS
- ENGINEERING, CONSTRUCTION, STEEL
- FOOD & BEVERAGES
- PACKAGING, PAPER & PAPER BOARD
- PHARMACEUTICAL & NEUTRACEUTICAL
- PLASTIC
- WAREHOUSE & COLD STORAGE
- AUTO PARTS
- CHEMICALS



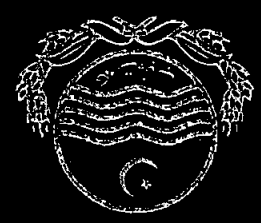
Scan the QR Code for more details.





**PUNJAB
INDUSTRIAL
ESTATES
DEVELOPMENT AND
MANAGEMENT COMPANY**

PIEDMC

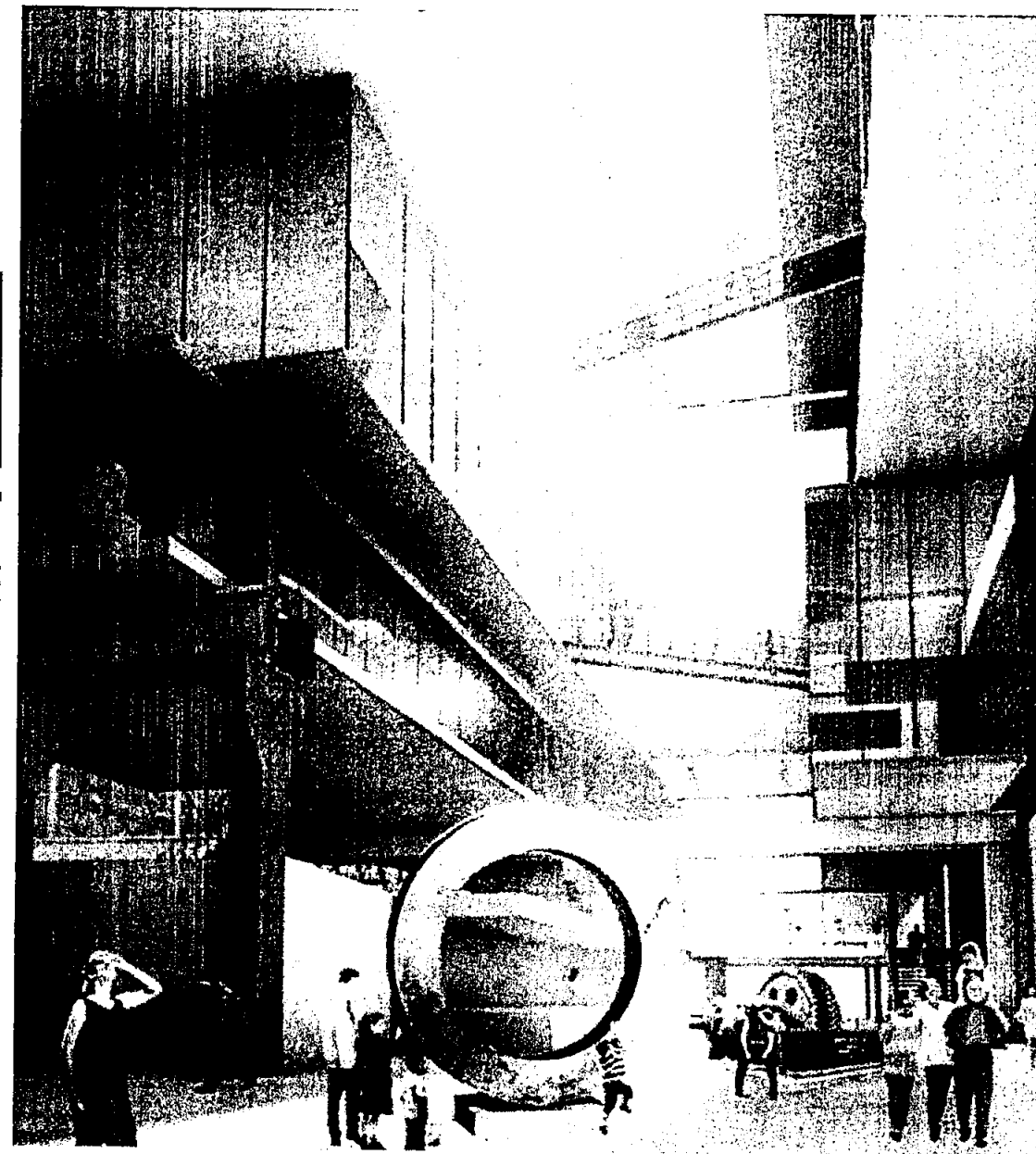




PIEDMC

AN ENGINE FOR INDUSTRIAL GROWTH

- Punjab Industrial Estates Development & Management Company (PIEDMC) was formed with the vision to promote industrialization in the province of Punjab.
- Autonomous, not for profit entity owned by Government of Punjab
- Successful example of Public - Private Partnership



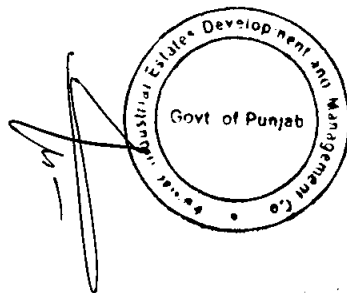


MISSION

To develop a chain of industrial estates in a dynamic and innovative manner by capitalizing on proposed & existing industrial and agricultural strengths of Punjab and Pakistan.

VISION

To follow public private partnership model and to bring less developed areas of Punjab into main stream, create jobs, alleviate poverty & contribute to sustainable GDP growth. Also to abide by environmental laws & comply with WTO regime.



ACHIEVEMENTS

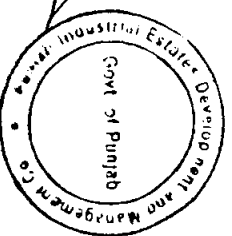


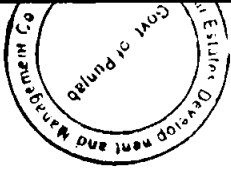
- 5 Estates Developed
- 3 Industrial Estates in development phase
- Up graded infrastructure of 2 Industrial Estates
- 950 Industries in Production Phase
- 353 Industries Under Construction
- More than 840,000 direct employment opportunities generated
- More than 1,680,000 indirect employment opportunities generated (projected)
- Attracted more than 50 billion PKR of Local Investment -1 billion USD of Foreign Investment
- Provided Infrastructural Development of 15,000 acres for Quaid-e-Azam Solar Power Plant (Bahawalpur)
- More then 3 Billion PKR tax contribution per annum



WHY PIEDMC

- Allotment of plot in 15 working days
- One Window Operation
- Provided Infrastructure
- Available Facilities





PROJECTS OF PIDMC

UPGRADED PROJECTS

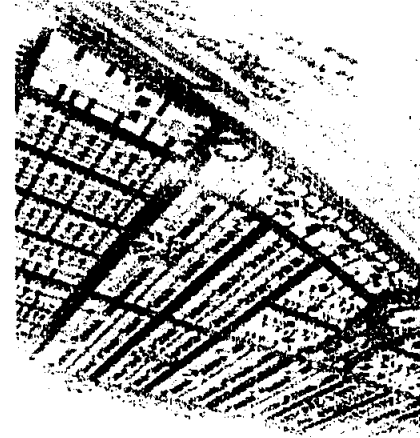
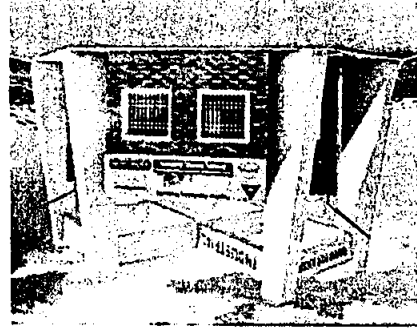
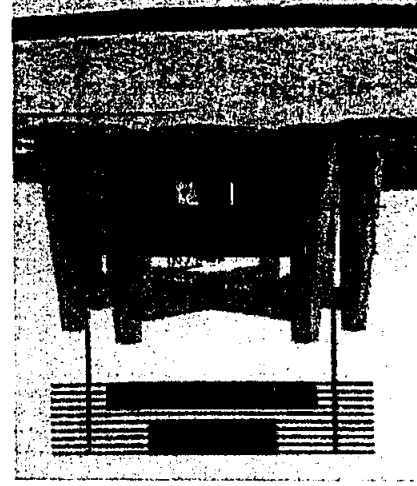
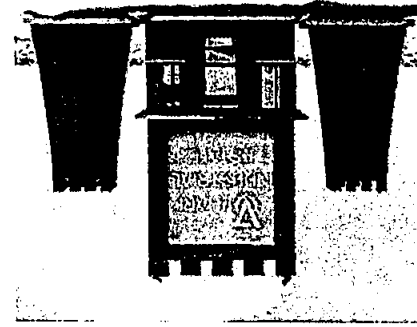
- Quid-e-Azam Industrial Estate Kotlakhpat Lahore (QIE)
- Multan Industrial Estate Phase -I, Multan (MIE-I)

COMPLETED PROJECTS

- Sundar Industrial Estate, Lahore (SIE)
- Multan Industrial Estate Phase -II, Multan (MIE-II)
- Rahim yar Khan Industrial Estate (RIE)
- Bhalwal Industrial Estate (BIE)
- Vehari Industrial Estate (VIE)

ONGOING / PLANNED PROJECTS

- Quid-e-Azam Business Park (QABP)
- Bahawalpur Industrial Estate (BWPIE)
- Chunian Industrial Estate (CIE)

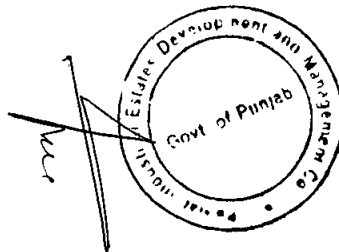


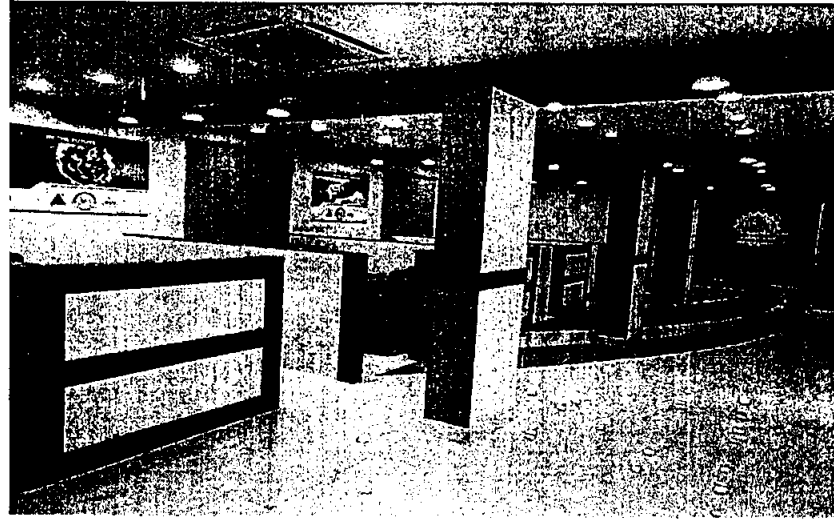
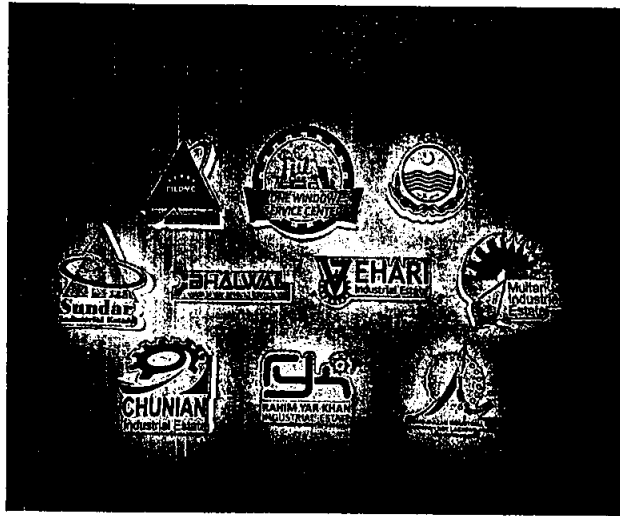
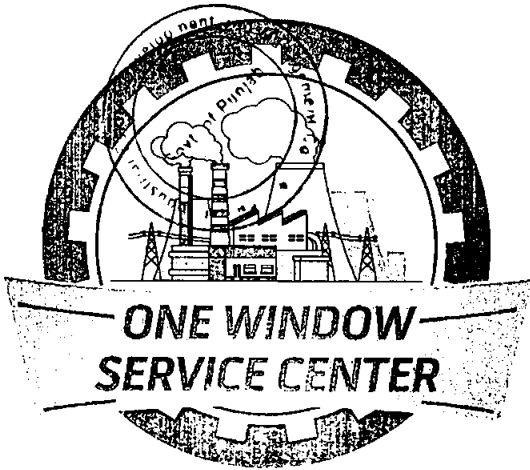
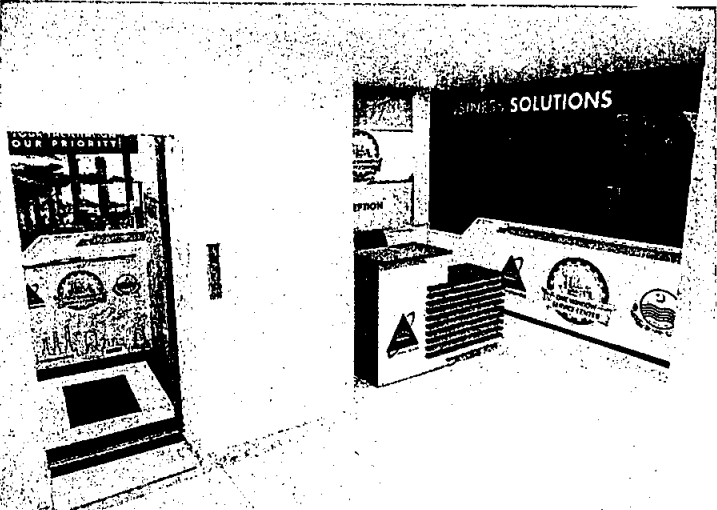
ONE WINDOW SERVICE CENTER (OWSC)

PIEDMC, for efficient and timely delivery of customer's requirements from land acquisition to start of production has established one of its kind One Window Facilitation Center at Quaid-E-Azam Industrial Estate .

The center provides following services under one roof:

- Allotment of Land
- Electricity Connection
- Water Connection
- Environmental Approval (Assistance)
- Construction Plan / Building Approval
- Change of Nature of Business
- Transfer of Plot
- EOBI & Social Security
- Complaint Registration
- Registration with SECP
- Services related to FBR



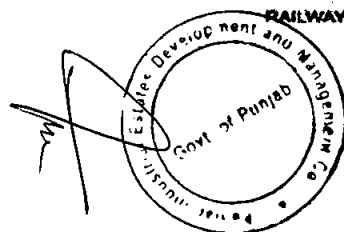
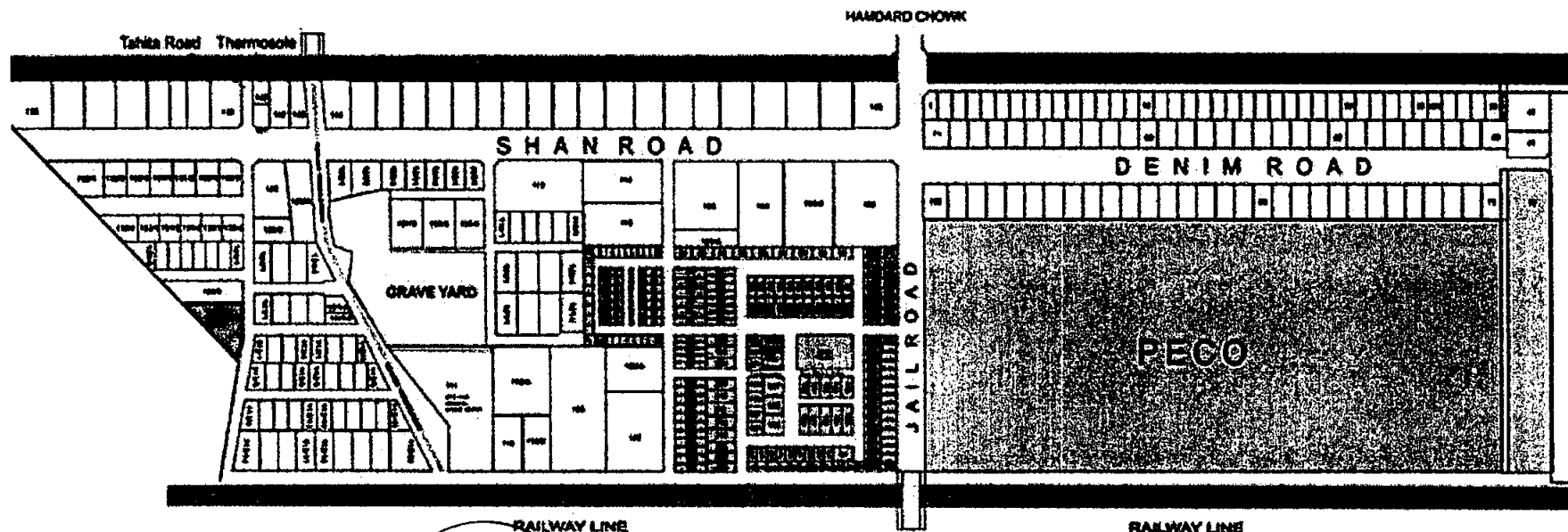


QUAID-E-AZAM INDUSTRIAL ESTATE

- QIE is one of the oldest planned industrial estates of Punjab, spread over an area of 565 acres. It has 477 industrial plots of various sizes varying from 1 kanal to 100 kanals. The Industries located in the estate comprise units of Textile, Dyeing & Printing, Auto Parts, Pharmaceuticals, Food, Household Appliances, Plastic ware, Chemicals, Rubber / Foam, Cosmetics etc. A total of 50,000

workers are employed which includes approximately 10,000 female workers.

- Quaid-e-Azam Industrial Estate is led by a Board of Management belonging to private sector representing various industrial segments of the estate and the rest representing the Government.
- A new one window cell is also being setup which will facilitate all customers.

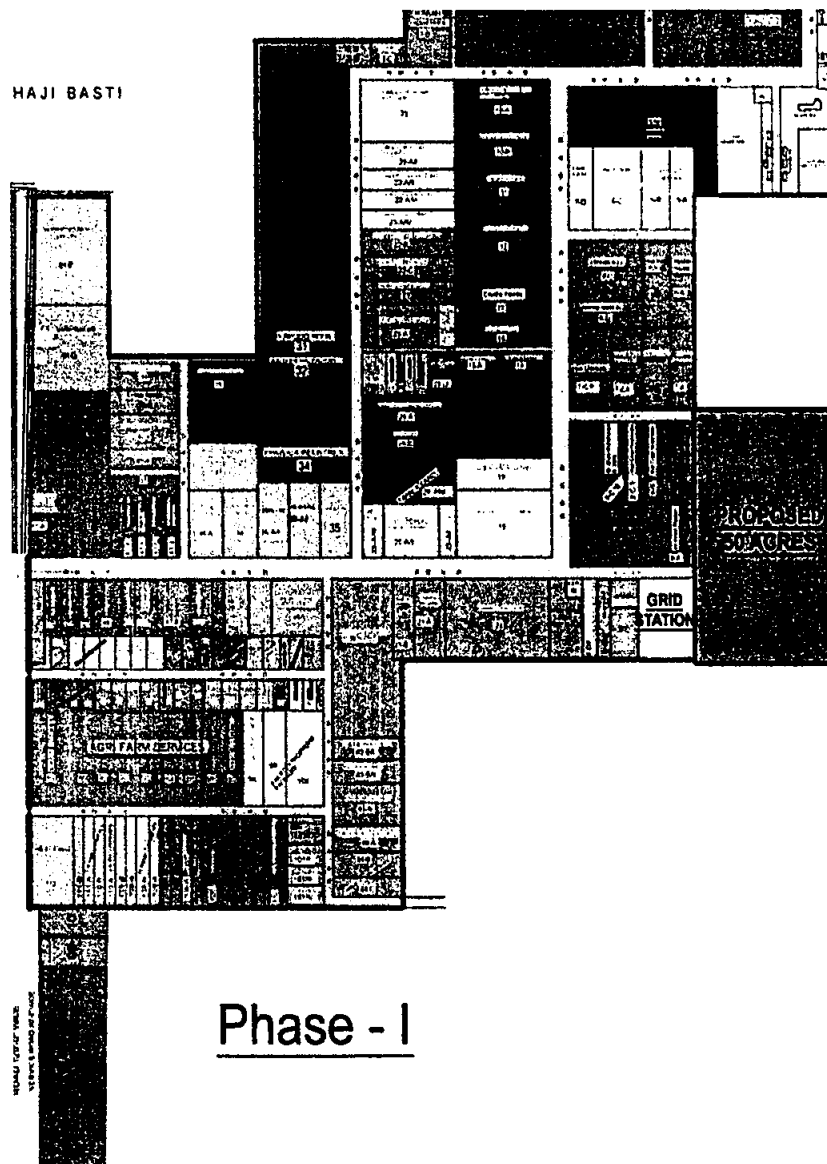


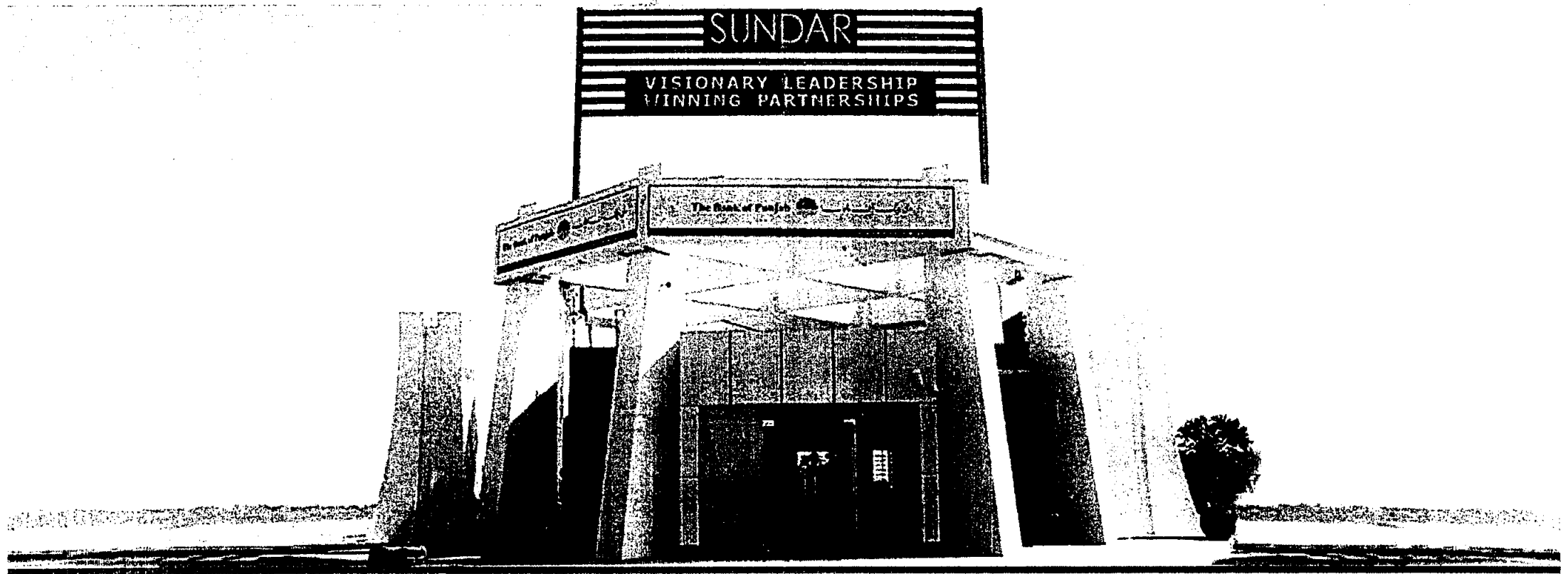
MULTAN INDUSTRIAL ESTATE (Phase 1)

- In 1960's approval was obtained by the Provincial Government to establish an Industrial Estate in the south of Punjab and 1410 acres of land was acquired for this purpose. However, Government of Punjab decided to develop it into two phases.

Phase-I comprising of 743 acres was developed & completed in 1980's whereas, 667 acres were planned to be developed subsequently as phase-II. All plots in phase-I were leased out for a period of 99 years to industrialists and some Govt. Institutions.

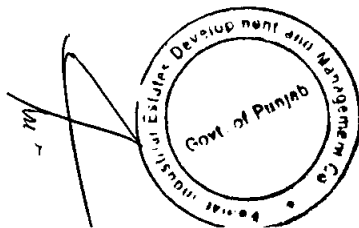
In 2004, the Government of Punjab (GoP) formally handed over MIE to Punjab Industrial Estates in order to revive industrial activity





A ROLE MODEL SUNDAR INDUSTRIAL ESTATE

State of the art, 1802 acres
Industrial estate

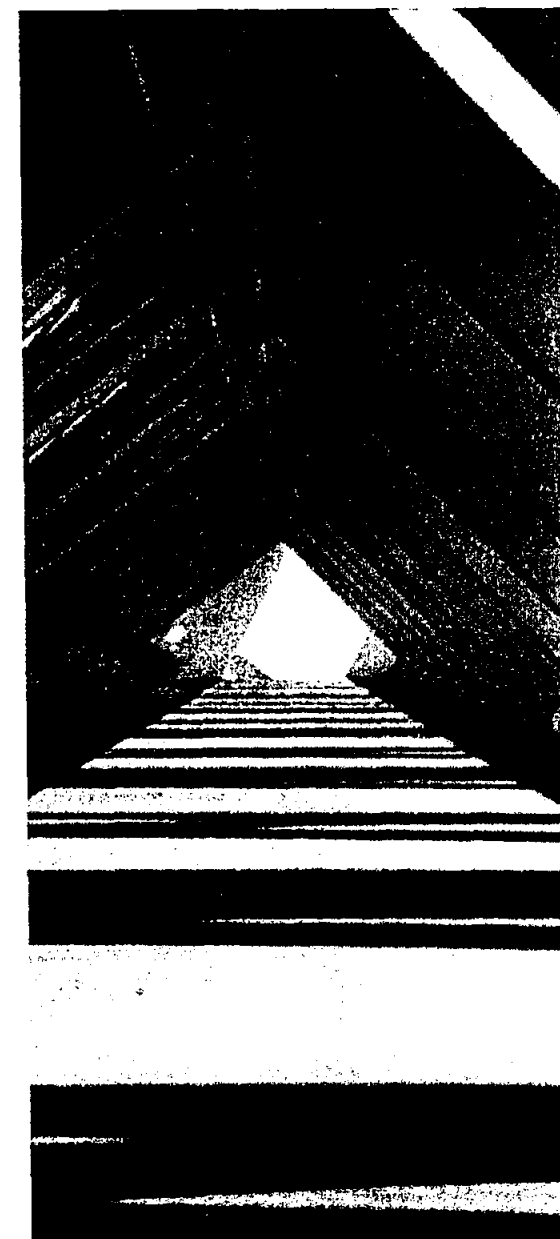
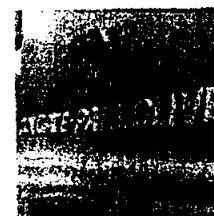


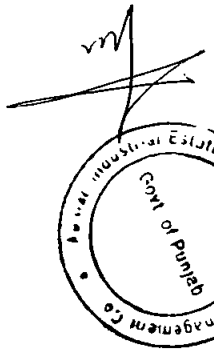
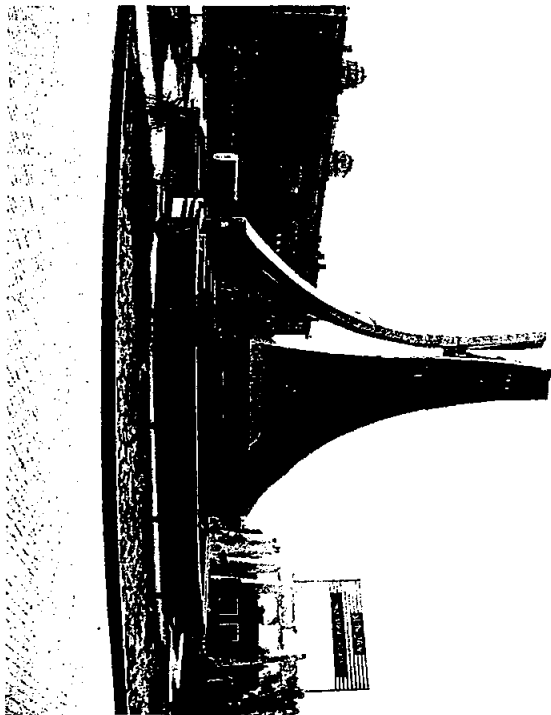
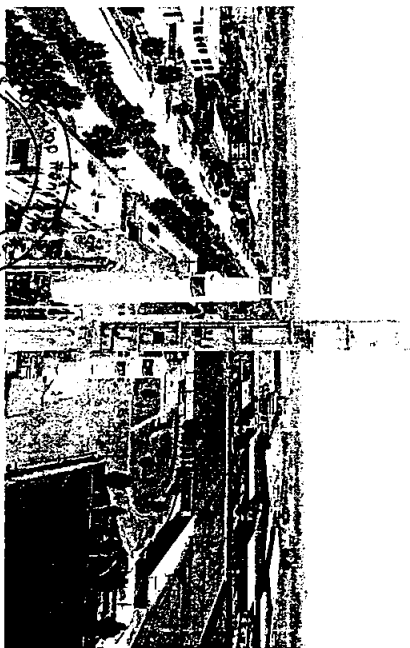
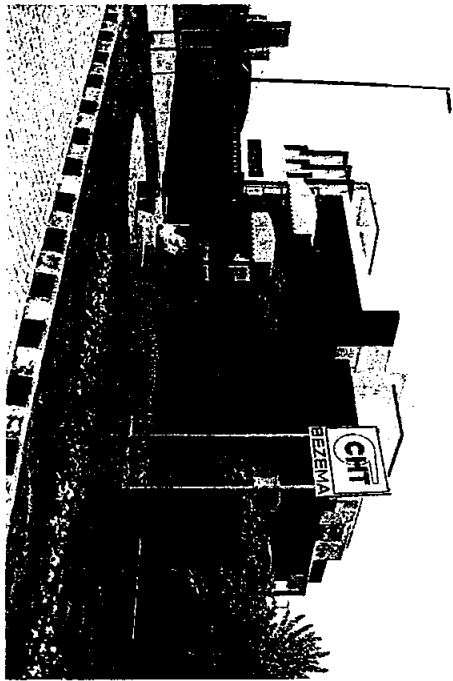
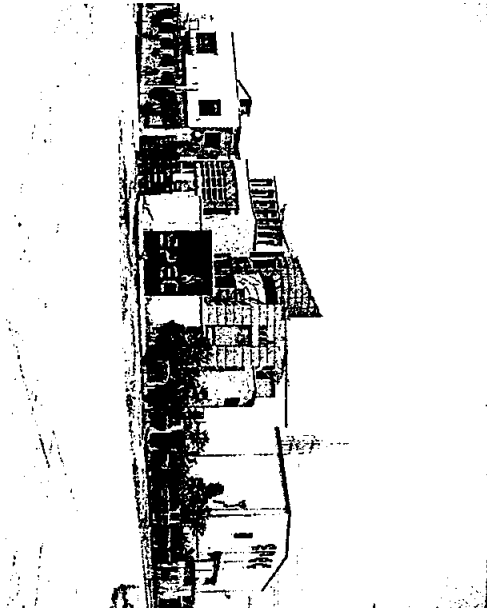
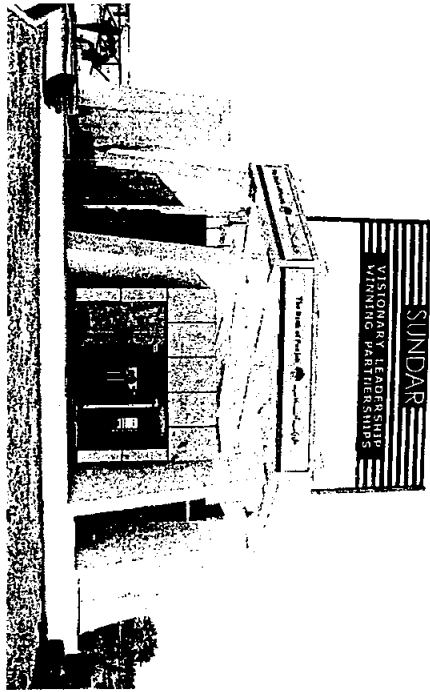


MULTINATIONAL COMPANIES

IN SUNDAR

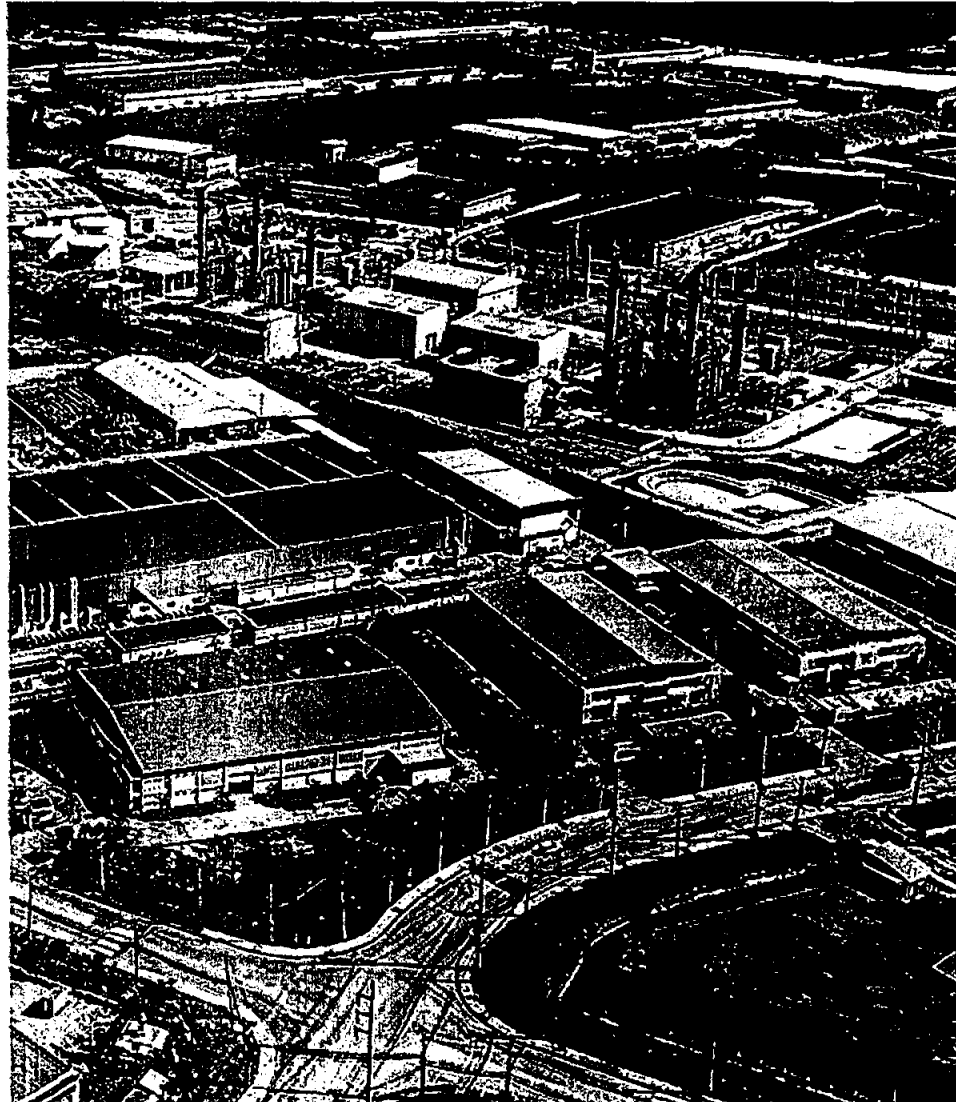
Sr.	Name Of Project	Nature of Business
1	Tetra Pak	Packaging
2	Pepsi Cola International	Snacks
3	CHT (Pvt.)	Chemical
4	Kansai Paints - Japan	Paints
5	New Allied Motors (LG)	Tri-wheelers
6	SVA - Ruba (Haier)	Injection Molding
7	Terraco - UAE	Chemicals
8	Stieffel Laboratories	Pharmaceutical
9	ICI	Paints - Chemicals
10	Gomila Intersole - Spain	Shoes
11	Colgate - Palmolive	Household
12	SPEC - UAE/USA	Engineering
13	Rudolf Pakistan (Pvt.) Ltd.	Chemical
14	Atlas Honda	Car Batteries
15	Eitmaad Engineering	Engineering
16	BOC	Gas
17	Commins International	Engines
18	SIKA (Swiss)	Construction Additives

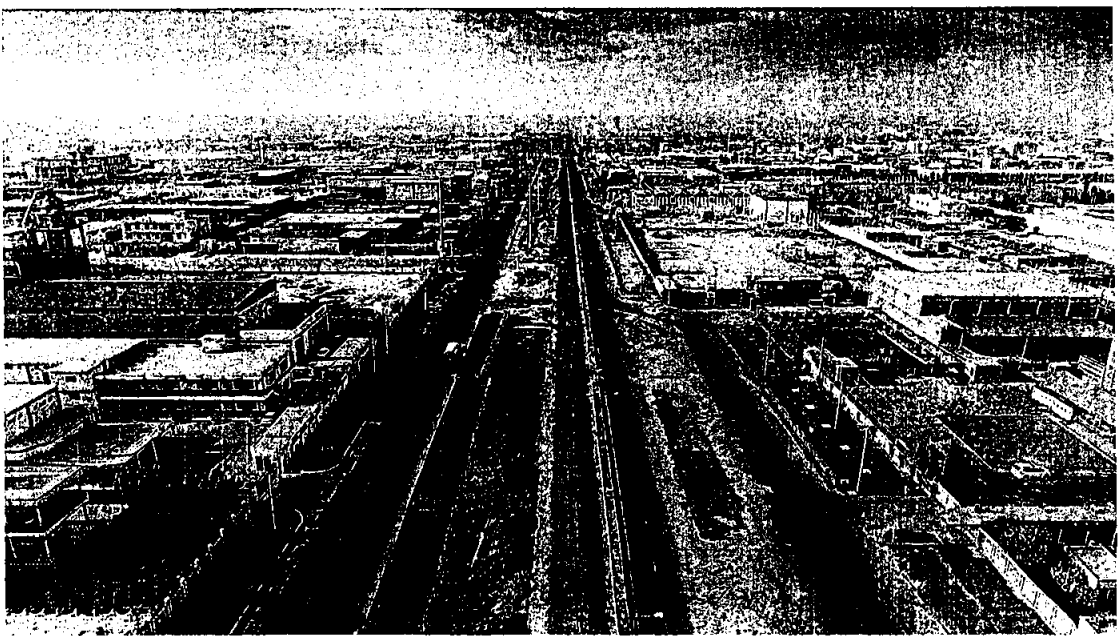
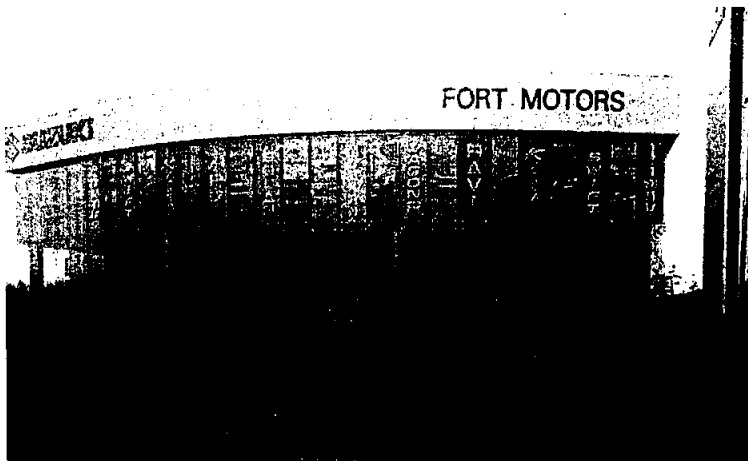
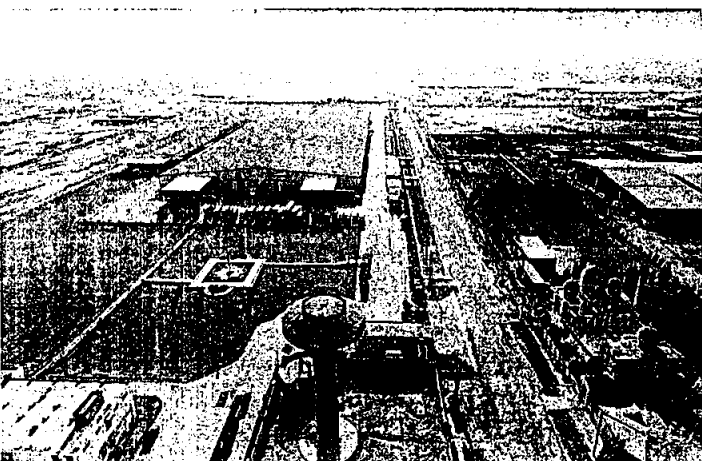




MULTAN INDUSTRIAL ESTATE PHASE 2 (MIE-II)

- 667 acres
- Located adjacent to Phase-I. 17 km from Multan City
- 10 km from Multan Airport, 9 km from Muzafarabad Railway station
- Renowned names like Coca Cola, Pepsi Co. Intl & Gourmet already established their units



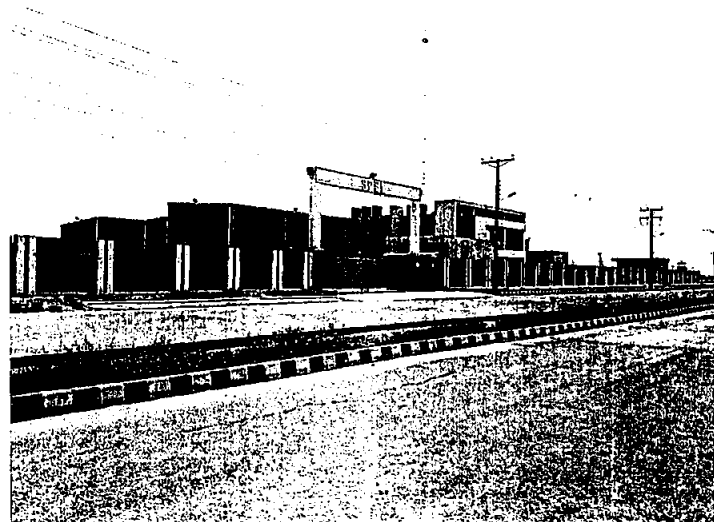
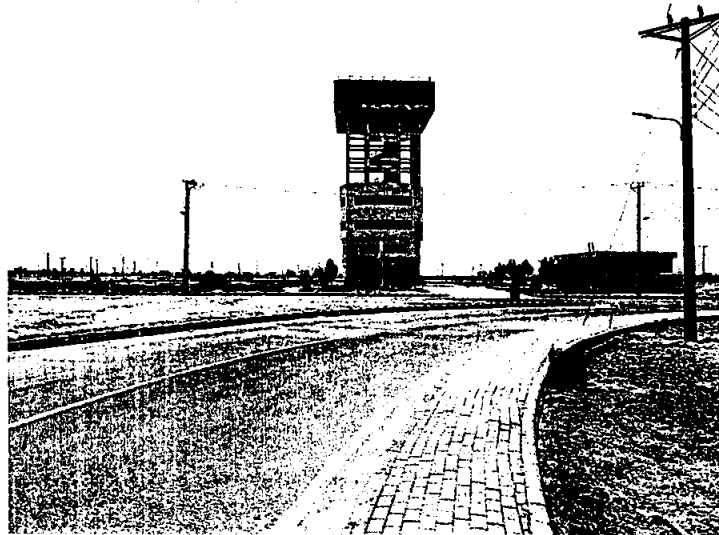
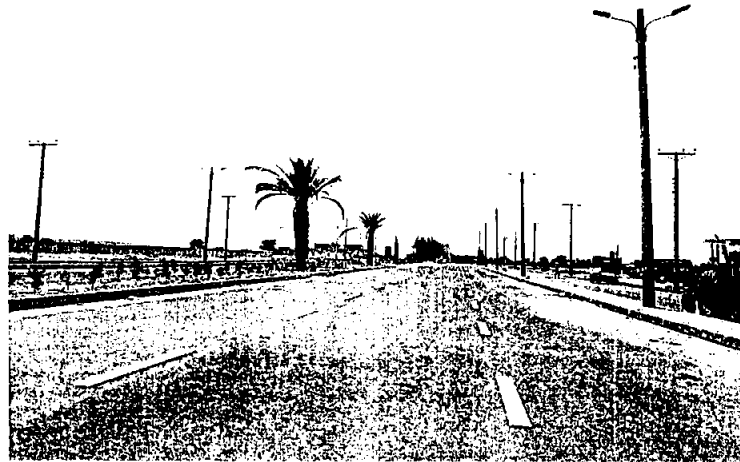


Coca-Cola

Gourmet 

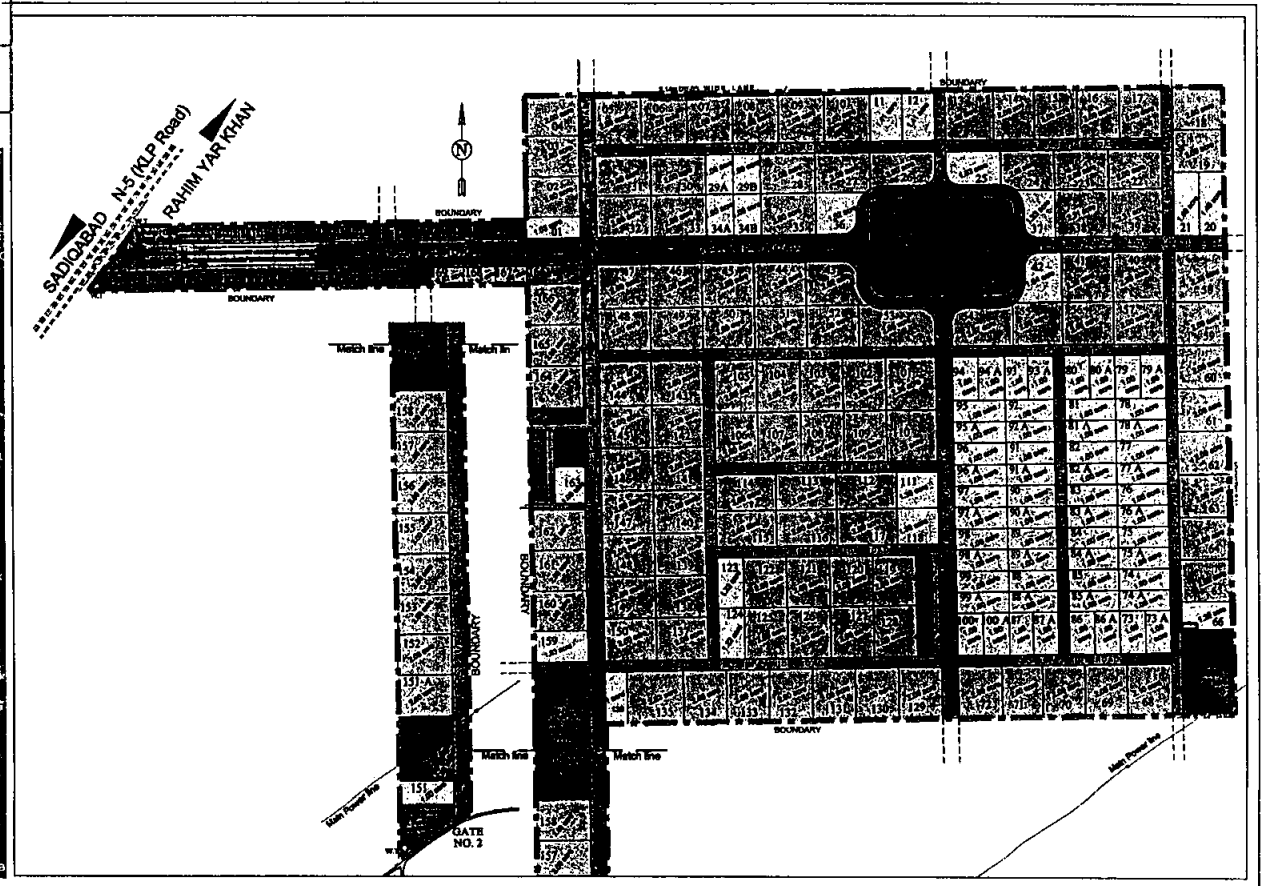
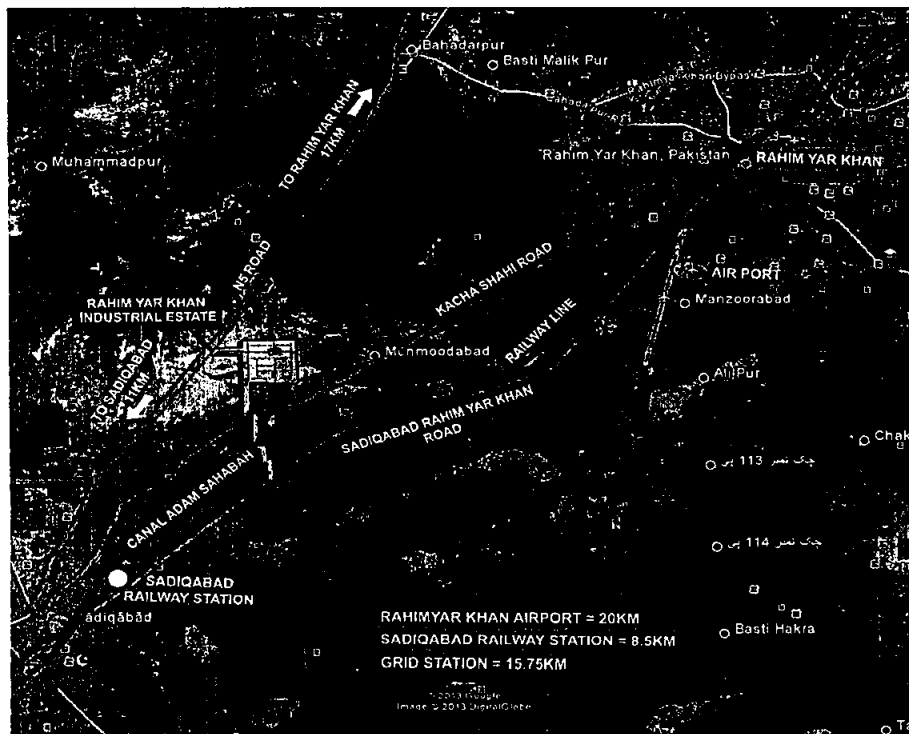
PEPSICO

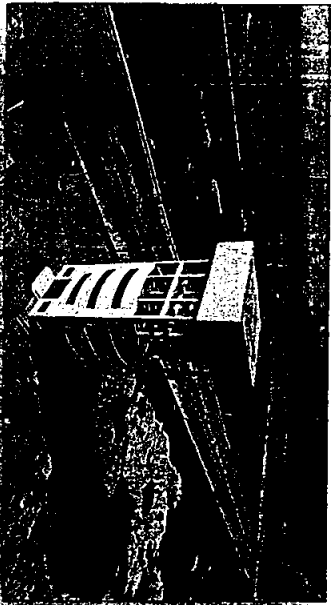
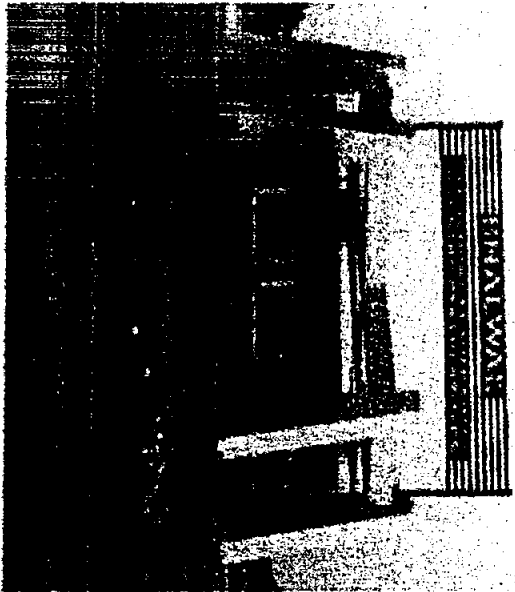




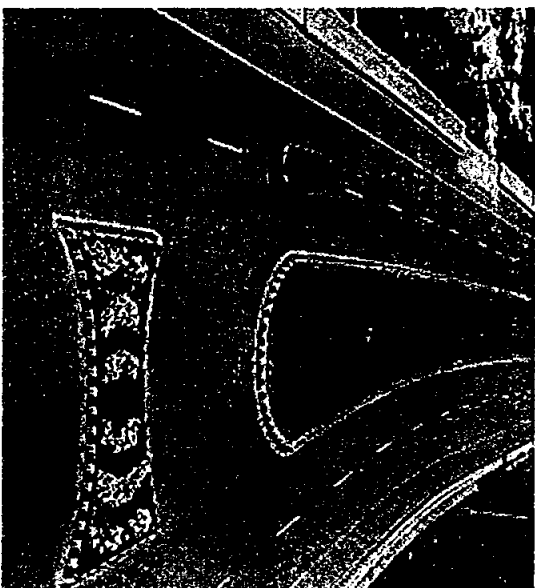
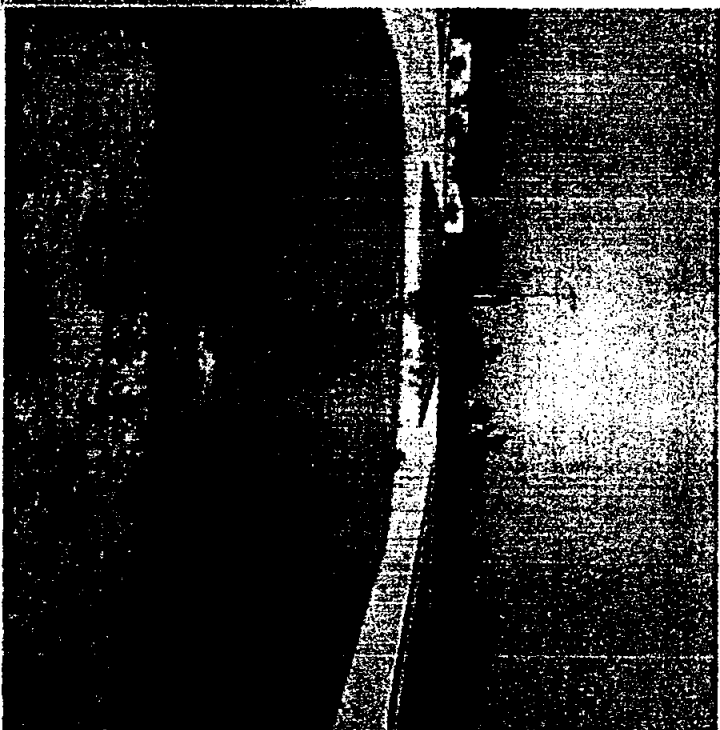
RAHIM YAR KHAN INDUSTRIAL ESTATE (SEZ)

SIZE	456
PLOT PRICE	18 Million
PAYMENT PLAN	30% Down, remaining in 6 installments
PLOT SIZES AVAILABLE	0.5, 1 & 2 Acres & Above



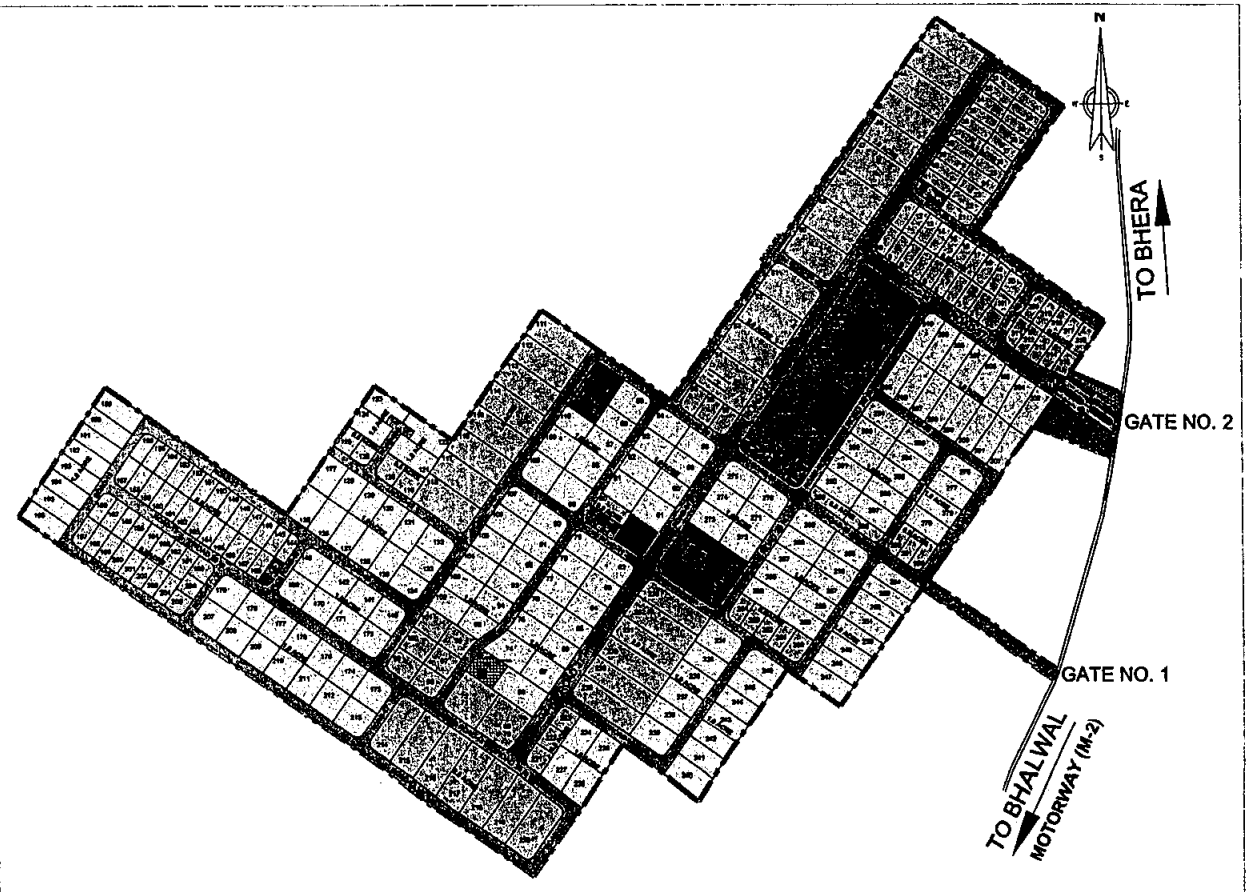
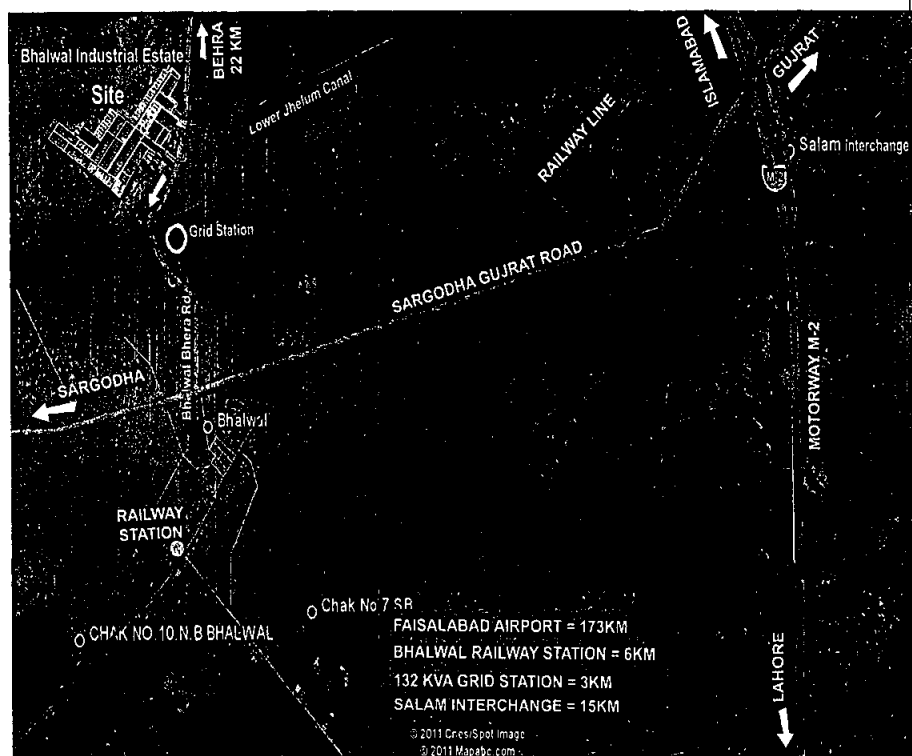


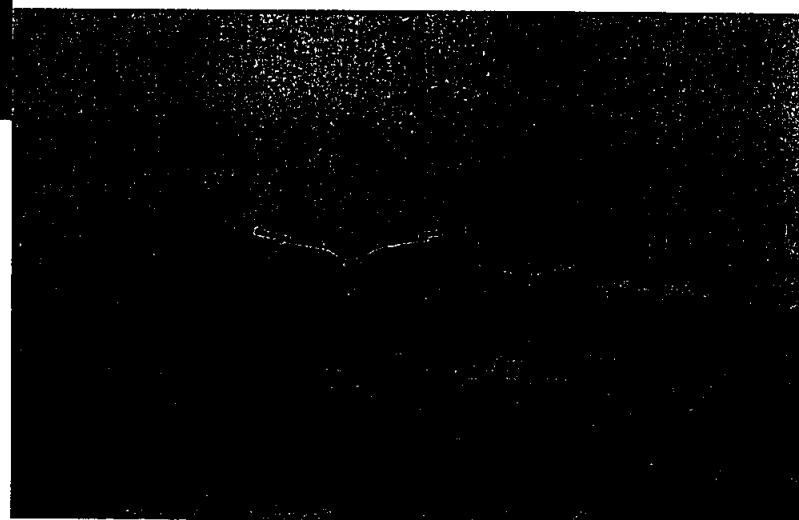
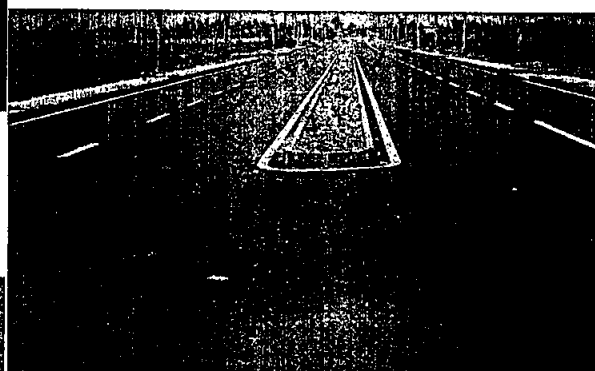
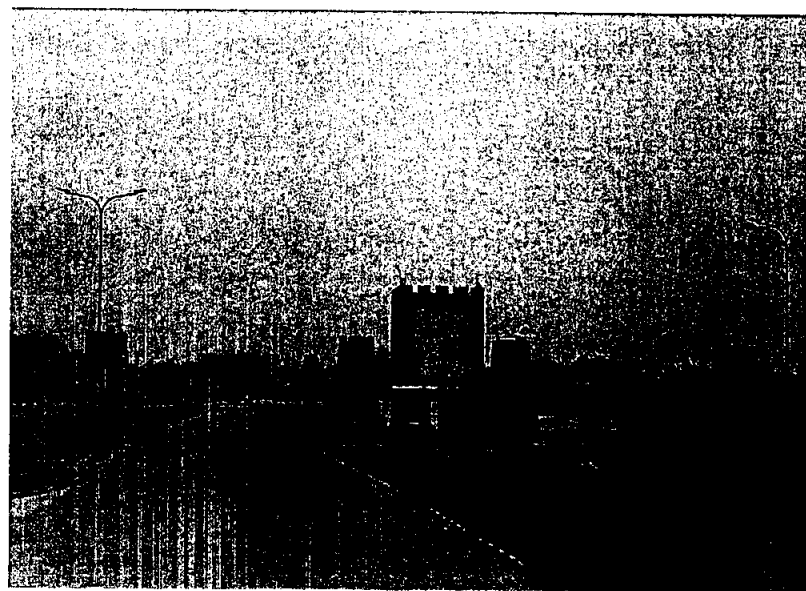
BHALWAL INDUSTRIAL ESTATE



BHALWAL INDUSTRIAL ESTATE (SEZ)

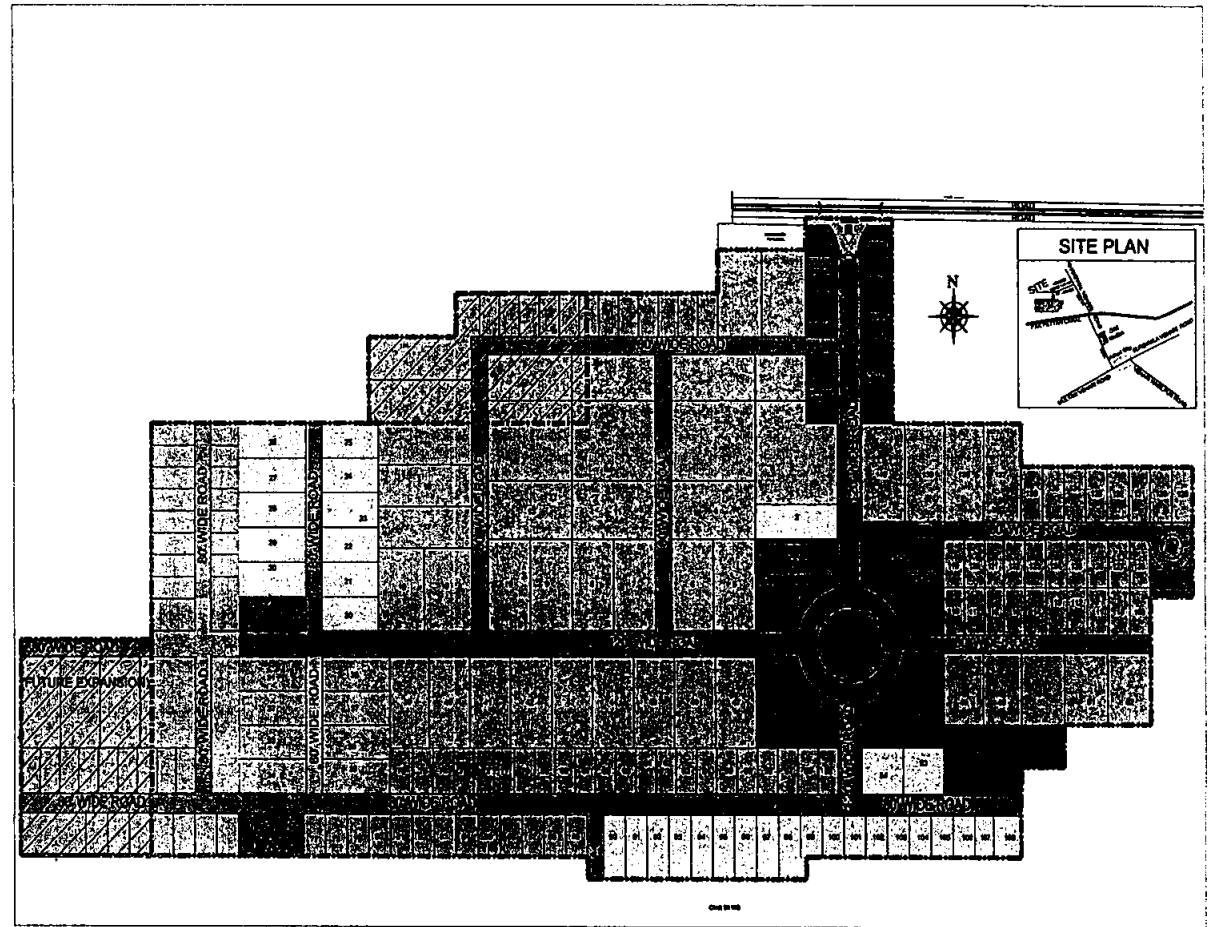
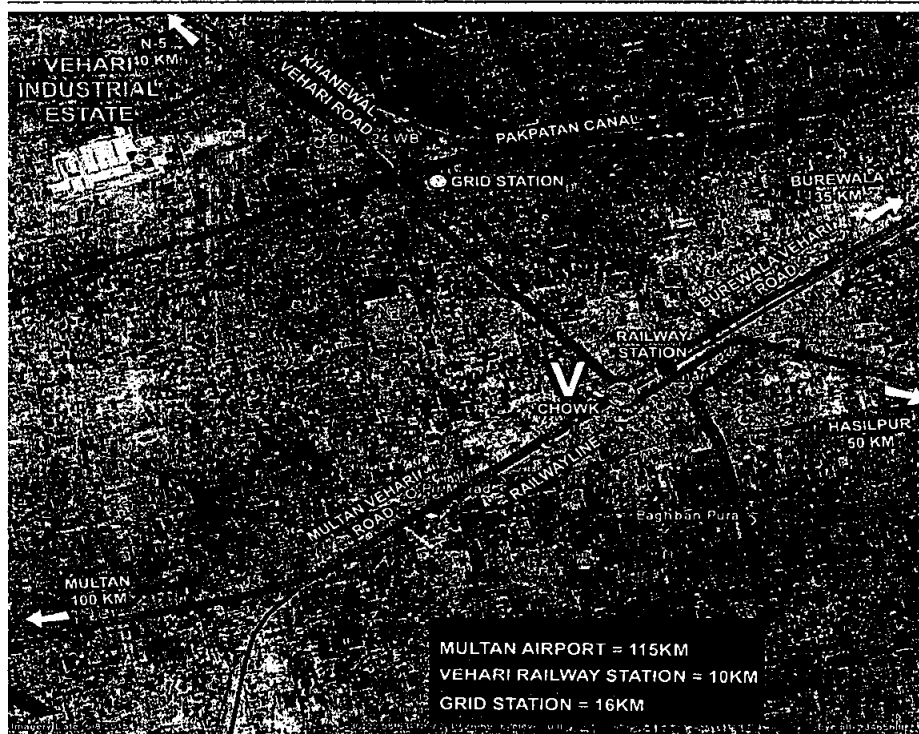
SIZE	427
PLOT PRICE	17 Million
PAYMENT PLAN	30% Down, remaining in 6 installments
PLOT SIZES AVAILABLE	0.5, 1 & 2 Acres & Above





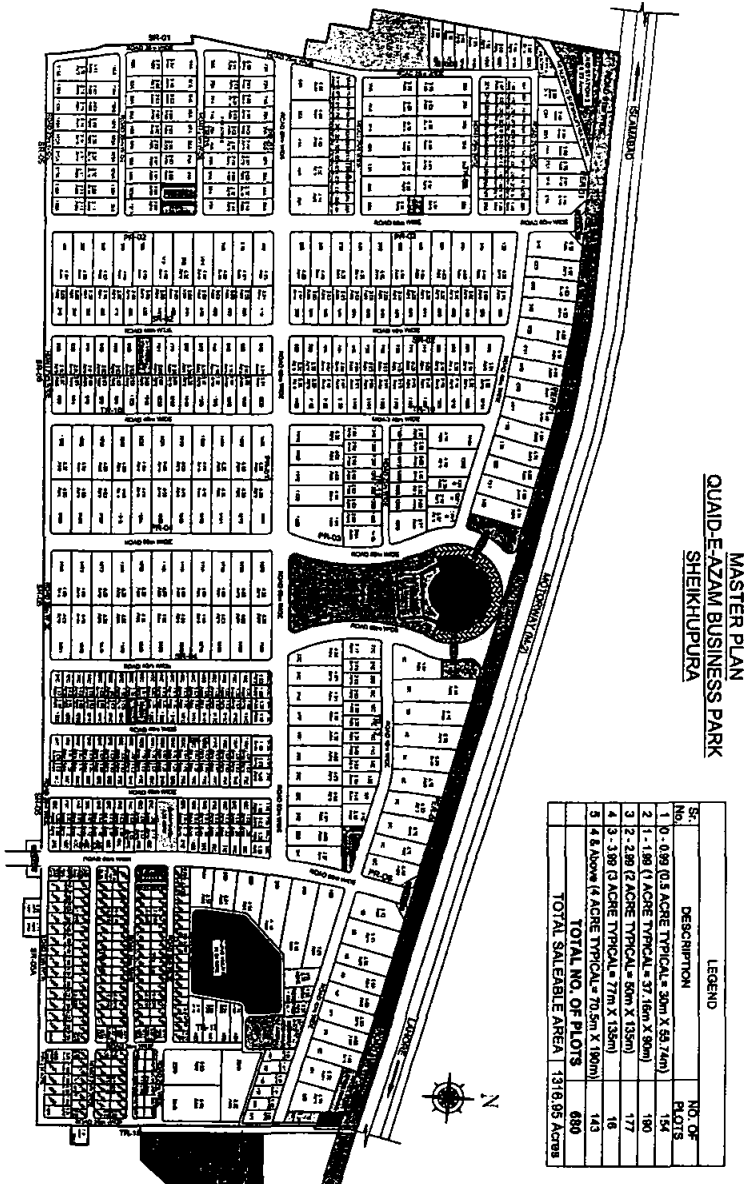
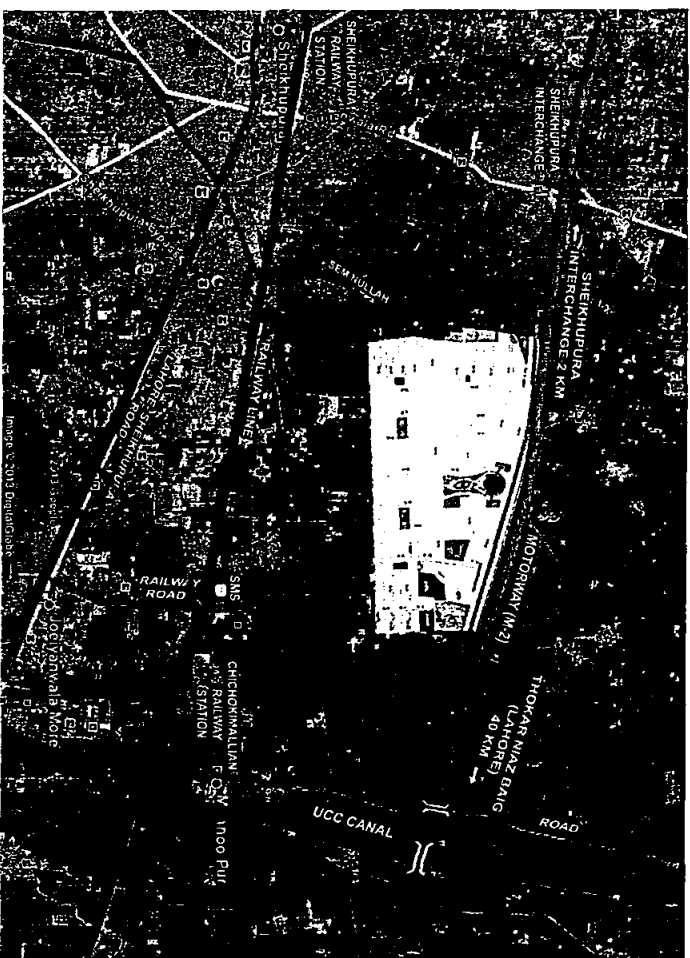
VEHARI INDUSTRIAL ESTATE (SEZ)

SIZE	251
PLOT PRICE	10 Million
PAYMENT PLAN	30% Down, remaining in 6 installments
PLOT SIZES AVAILABLE	0.5, 1 & 2 Acres & Above



QUAID-E-AZAM BUSINESS PARK (SEZ)

SIZE	1860
PLOT PRICE	36 Million
PAYMENT PLAN	30% Down, remaining in 6 installments
PLOT SIZES AVAILABLE	0.5, 1,2,3,4 & 5 Acres & Above



Value-added facilities – at QABP



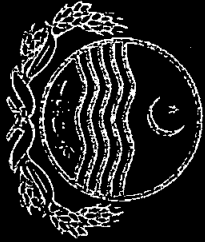
Factory	Trauma / Medical Centre (Self funded)	B&B Hotel	CETP	MOSQUE	Traffic control
Flexi Offices / Virtual Offices/ IT Incubation Center	Machinery / Spares / tools market	Rail track connection	Net Metering facility	Storm water monitoring	Labor residential Colony
Expo Centre	Digital Infrastructure control center	Bus Shuttle Service	GPS Electric metring	Effluent discharge check	

Standard Facilities

Electricity	Gas	Govt. Offices (one window)	RESCUE 1122
Construction Permits	Vocational Training Facility	Water	Fuel / service stations

BEST
FACILITIES
OFFERED
EVER

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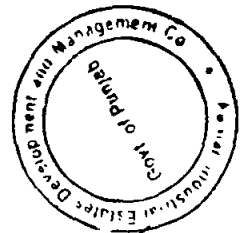


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THANK
YOU!



**MEMORANDUM & ARTICLE OF
ASSOCIATION
&
CERTIFICATE OF INCORPORATION**

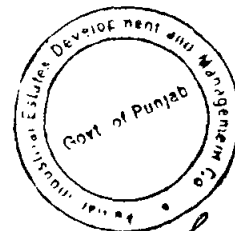


(THE COMPANIES ORDINANCE, 1984)

A COMPANY LIMITED BY GUARANTEE
HAVING A SHARE CAPITAL

Memorandum

and



Articles of Association 

of

PUNJAB INDUSTRIAL ESTATE DEVELOPMENT
AND MANAGEMENT COMPANY



CERTIFICATE OF INCORPORATION

No. RP/379 of 200 - 200

I hereby certify that " PUNJAB INDUSTRIAL ESTATE
DEVELOPMENT AND MANAGEMENT COMPANY, "13- FANE ROAD, LAHORE. "

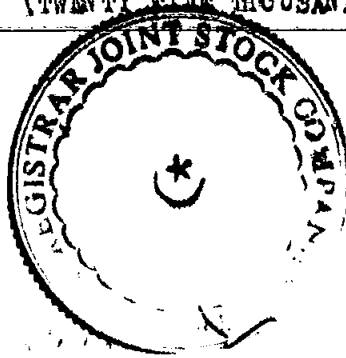
is this day incorporated under the Companies Ordinance of
1984, and that the company is limited by Guarantee without addition
of the word "Limited" to its name.

Given under my hand at LAHORE

this 18TH day of SEPTEMBER, 2003.

Two Thousand THREE

Fee : Rs. 25,000/- (TWENTY FIVE THOUSAND ONLY).



Atiq-ur-Rehman
(ATIQ-UR-REHMAN)

District Officer
For Registrar

Joint Stock Companies
CITY District Government.
Lahore.

No. RP/1251/L/S/2003/587

Dated. 18.09.2003

Certificate for Commencement of Business

(Pursuant to section 146 of the Companies Ordinance, 1984)

Certified that the PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND
MANAGEMENT COMPANY, 13- FANE ROAD, LAHORE.

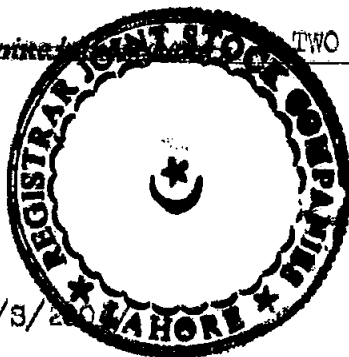
Which was incorporated under the Companies Ordinance, 1984, on the 18th
day of SEPTEMBER, 2003

and which has this day filed a duly verified declaration in the Prescribed form that the conditions of section 69 and 146 of the said Act, been complied with, is entitled to commence business.

Given under my hand at LAHORE

This 3rd day of JAN 2004

~~One thousand nine hundred and~~ TWO THOUSAND FOUR.



NO.RP/1251/L/S/2004

Dated:-3.1.2004.

(ATIQ-UR-REHMAN)

DISTRICT OFFICER

ENTERPRISE & INVESTMENT PROMOTION
LAHORE

FOR JOINT STOCK COMPANIES
LAHORE REGION.

THE COMPANIES ORDINANCE, 1984

(A COMPANY LIMITED BY GUARANTEE HAVING A SHARE CAPITAL)

**ESTABLISHED UNDER SECTION 42
OF THE COMPANIES ORDINANCE, 1984**

MEMORANDUM OF ASSOCIATION

OF

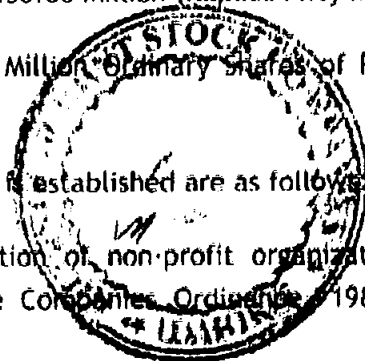
PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY

1. The name of "The Company" is Punjab Industrial Estate Development and Management Company, having a share capital, (hereinafter referred to as "The Company").
2. The registered office of "The Company" shall be situated in the Province of the Punjab, city of Lahore.
3. "The share capital of "The Company" will be as follows:-

- | | | |
|------|--------------------|---|
| (i) | Authorized Capital | Rs.150.00 Million (Rupees One Hundred and Fifty Million). |
| (ii) | Paid-up Capital | Rs.50.00 Million (Rupees Fifty Million). |

The Capital is divided into Five (05) Million Ordinary Shares of Rupees Ten (10) each.

4. The objects for which "The Company" is established are as follows:-
 - i. "The Company" is an association of non-profit organization, within the meaning of section 42 of the Companies Ordinance, 1984 and is being formed as a public company;
 - ii. organized and established for orderly, planned and rapid industrialization of Punjab, headed by a Chairman from private sector, a Board of Directors and a General Body as per Articles of Association, all to be nominated by Government of the Punjab, (hereinafter referred to as Government);
 - iii. to establish new Industrial Estate(s) as defined in Articles of Association of "The Company" and to upgrade those existing Industrial Estate(s) as may be assigned to "The Company" by Government, in financially sustainable



manner and to undertake such related functions as may be entrusted by Government to "The Company" from time to time;

- iv. to select/acquire/lease/purchase appropriate site(s) for the development of new Industrial Estate(s) and to make ancillary arrangements related thereto for establishing such Estate(s) including but not limited to creation of charge, lien, mortgages, encumbrances etc.;
- v. to develop infrastructure within the Industrial Estate(s). However, "The Company" shall not engage in real estate business;
- vi. to appoint Board of Management (BOM) for each of the Industrial Estate;
- vii. to identify support services required by each Industrial Estate(s) and to establish a linking mechanism with all the industries to increase productivity;
- viii. to form/incorporate/manage/administer/dispose of corporate entity(ies) as subsidiary(ies) with prior approval of the Government including but not limited to power generation/distribution/transmission/purchase/sale and/or any other purpose deemed expedient for the fulfillment of the objects of the Company, and/or to co-operate with any other company or association having similar objects;
- ix. to facilitate the provisions of utilities like electricity, gas, telephone and medical facilities and ancillary services for the units established or to be established within the industrial estate(s);
- x. To generate eclectic power through any means of generation developed or to be developed in future and to deal in transmission, transforming, conversion, switching, gridding, sale, purchase, distribution of electric power and other utilities in all its forms and perspectives and to undertake all such activities as are connected, linked or associated therewith and seek necessary approvals/registrations/licences from relevant authorities and to do all such acts, deeds or things as would be required for effective discharge of these objects;
- xi. to provide common facilities for the Industrial Estate(s) and to enter into financial transactions in furtherance thereof;
- xii. to identify the environment preservation requirements for the benefits of the Industrial Units;
- xiii. to create zoning restrictions within the Industrial Estate(s);

- xiv. to promote creation of jobs by capitalization on strengths of each region by prioritizing the type(s) of industry, already prevalent in that particular area;
- xv. to collect statistical data from within the Industrial Estate(s) for undertaking future improvements;
- xvi. to promote interaction between the industrialists and Government to create an over all conducive industrial environment in the Industrial Estate(s);
- xvii. to arrange workshops and meeting points for creating interaction with international investors, government regulators, non government organizations (NGOs) and various similar services organizations and bodies for creating a highly conducive local/international investment environment;
- xviii. to arrange interaction between academia and industry for creating platform to initiate research projects for the benefits of all concerned;
- xix. to provide the platform for the financial institutions to meet the stake holders and create specific products and services to solve the financial requirements of SMEs and the fiscal requirements of the financial institution(s) to create healthy loaning environment with a reduced risk of failure and to arrange systematic recovery/closure of such units;
- xx. to take necessary steps to attract industrialists to set up units in the Industrial Estate(s);
- xxi. to borrow or raise money by all legal means/instruments, with the specific permission of Government;
- xxii. to open and operate banking account(s) and to draw, make, accept, endorse, discount, execute and issue promissory notes, bills of exchange, bills of lading, warrants, drafts, cheques, bonds, debentures and other negotiable or transferable instruments subject to compliance of relevant prudential regulations;
- xxiii. to undertake and execute such agency agreement(s) which may promote directly the objects of "The Company";
- xxiv. to print and publish any periodicals, books or leaflets in furtherance of "The Company's" objectives;
- xxv. to invest the monies of "The Company" not immediately required in short term secured investment;
- xxvi. to enter, with permission of Government into any arrangements with any government(s) and authority(ies), municipal, local or otherwise or any

person or company that may seem conducive to all or any of the objects of "The Company" and to obtain from any such government(s), authority(ies), person or company any rights, privilege, contracts, license and concessions which "The Company" may think is desirable to obtain and to carry out exercise and comply therewith;

- xxvii. to accept from any government(s) or agencies or authorities, public/private/civic bodies, corporations, companies, persons or any other source in Pakistan and abroad for use in work and to raise funds, accept any grants or money, moveable or immoveable property, donations, gifts, subscriptions, devices, bequests and other assistance with a view to promoting the objects of "The Company" and in receiving any gift or property to take the same either conditionally or unconditionally or subject to any special conditions which may be prescribed by the donor in writing and accepted by the BOD subject to such procedure prescribed by Government from time to time;
 - xxviii. acquire, take-over, accept by way of gift, the assets of any other organization, body or society with similar objects or undertake and accept the management of any endowment or trust fund set up with similar objects as that of "The Company", subject to such procedure as may be prescribed by Government from time to time;
 - xxix. to take such steps by personal or written appeals or otherwise as may from time to time be deemed expedient for the purpose of procuring contributions to the funds of "The Company" in the shape of donations or annual subscriptions;
 - xxx. to cooperate with any company or association having objects similar to the objects of "The Company" and any company or association the objects of which are calculated either directly or indirectly to benefit "The Company" in attainment of any of its objects;
 - xxxi. to propose to Government amendments in statutes, rules, orders for enabling "The Company" to carry any of its objects into effect; and
 - xxxii. to do all such other lawful and charitable things as are incidental or conducive to the attainment of the above described objects;
5. The liability of the members is limited.
6. The income of "The Company" when-so-ever derived shall be applied solely towards the promotion of the objects of "The Company" as set forth in the Memorandum of Association and no portion thereof shall be paid or transferred directly or indirectly, by way of dividend, bonus, remuneration or grant in the

shape of other benefits, by way of profit, or otherwise howsoever, to the members of "The Company"; provided that nothing therein contained shall prevent the payment in good faith of remuneration to any officers or servants of "The Company" or any other person including Legal Advisor, except a Member in return for any services actually rendered to "The Company", nor prevent the payment of interest on money borrowed or rent out any property leased or hired from any person other than a Member of "The Company". No member of BOD of "The Company" shall be appointed to any salaried office of "The Company", or any office of "The Company" generating fee and that no remuneration shall be given by "The Company" to its members of BOD, but the Chairman/BOD shall be provided with the facilities for boarding, lodging and/or travel domestic or abroad undertaken for furtherance of the objects of "The Company".

7. No addition, alteration or amendment shall be made to or in the provisions or regulations contained in the Memorandum and/or Articles of Association, for the time being in force, except in accordance with the Companies Ordinance, 1984 and with the prior approval of the Government and thereafter the same shall be submitted to and approved by the Registrar of Companies, Lahore Region.
8. Patronage of any government or authority, express or implied, shall not be claimed unless such government or authority has signified its consent thereto in writing.
9. Each member of "The Company" undertakes to contribute to the assets of "The Company" in the event of its being wound up, while he is a member, or within one year afterwards for payment of the debts and liabilities of "The Company" contracted before he ceases to be member, and of the costs, charges and expenses of winding up. The sum to be contributed by the Members shall be as follows.

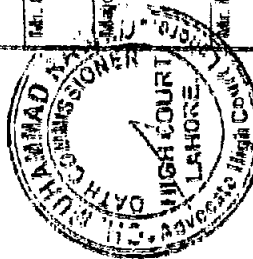
All Members of "The Company" shall individually contribute a sum not exceeding Rs. 1000.00 (Rupees one thousand only).

If the total sum required on winding up for payment of the debts and liabilities of "The Company" and of the said costs and expenses shall be less than Rs. 1000.00 then the Member shall contribute thereto in proportion to their maximum specified liability.

10. Notwithstanding what is stated herein, if upon the winding up or dissolution of "The Company" there remains, after the satisfaction of all its debts and liabilities, any property whatsoever, the same shall be given or transferred to Government.

We, the several persons, whose names and addresses are hereunder subscribed, are desirous of being formed into a Company in pursuance of the Memorandum of Articles of Association.

Name and surname (present and former in full and block letters)	Father's name in full	Nationality	Occupation	Residential address in full	Signature
Mr. Faysal Basir	Syed M. Musa	Pakistani	Engineer	71-S, Defence Phase-II, Lahore Cant.	
Mr. Faysal Basir	Basir Ahmed	Pakistani	Secretary Industries, Commerce & Investment	7-Ahmad Road, GOR, Lahore	
Mr. Qasim Muhammad Qasim	Khanwar Khuda Baksh	Pakistani	Industrialist	House No. 2, Nisar Colony, Kashim District, Lahore	
Mr. Saad Mustafa Khan	Basir A. Khan	Pakistani	Chairman TVTA	House No. 30-D, Sarsar Road, Lahore Cant., Lahore	
Mr. Saif P. Chohan	Dr. M. A. Chohan	Pakistani	Engineer	House No. 16, St. No. 62, Sector 77A, Islamabad	
Mr. Ahmad Nadeem	Dr. S. M. Naq	Pakistani	Businessman	House No. 1-41, Gulberg-II, Lahore	
Mr. Syed Azeed Hashmi	Syed Qasim Ali Shah	Pakistani	Chief Executive, Transmole	House No. 63A Block-3 Sector C, Township, Lahore	
Mr. M. I. Khan	Haji Bakht Ali	Pakistani	Incussite (Pvt.) Ltd. Chief Executive, Cantonment (Pvt.) Ltd.	45-CA, Gulberg-II, Lahore	
Major (R) Shahmawaz Bhatti	S. M. Bhatti	Pakistani	Secretary Labour and Human Resources	House No. 95 GOR-III, Shadman, Lahore	
Mr. Kamran Lashari	Sardar Abdul Majid Khan Lashari	Pakistani	Secretary, Environment Protection	House No. 224 F-10/3, Islamabad	
Mr. Zahoor Ahmad Khan	Nasir Ahmad Khan	Pakistani	Engineer	House No. 16 Fatah Sher Road, Mozang, Lahore	
Dr. Faisal Bari	Abdul Bari	Pakistani	Economist	122-R, Phase-II, Lahore	
				House No. 29 Ghazi Road, Karachi, Muhafat Sadr Bazar, Lahore	



ATTESTED

Dated the _____ day of _____
 WITNESS TO ABOVE SIGNATURES

Full Name: _____
 Father's Name: _____
 Full Address: _____
 Nationality: _____

Signature:
 Occupation: Advocate High Court Lahore

THE COMPANIES ORDINANCE, 1984

ARTICLES OF ASSOCIATION

OF

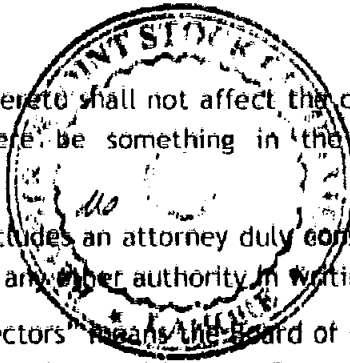
PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY
(A COMPANY LIMITED BY GUARANTEE HAVING A SHARE CAPITAL)

PRELIMINARY

1. WHEREAS IT HAS BEEN agreed by several persons whose names are hereunto subscribed to establish and incorporate a Company Limited by Guarantee having a Share Capital under the provisions of the Companies Ordinance, 1984 in the name of Punjab Industrial Estate Development and Management Company (hereinafter referred to as "The Company") in accordance with the provisions of the Memorandum of Association hereto annexed and subject to several regulations hereinafter contained which shall be the regulations for management of "The Company" and for the observance of Members thereof and their representatives and the same shall subject to exercise powers of "The Company", in reference to the repeal or alteration of or addition to, its regulations by Special Resolution as prescribed by the "Ordinance", be such as are contained in "These Presents".

INTERPRETATION

2. The marginal notes hereto shall not affect the construction hereof, and in "These Presents" unless there be something in the subject or context inconsistent therewith:
 - I. "Attorney" includes an attorney duly constituted or appointed under power of attorney or any other authority in writing.
 - II. "Board of Directors" means the Board of Directors (BOD) of "The Company" as constituted under provisions of "These Presents".
 - III. "Board of Management" mean representatives of occupiers of each Industrial Estate, nominated and appointed as such by BOD subject to Article 22 hereof. For the purposes of this clause an "occupier" means an owner in-possession of an industrial unit in industrial estate(s).
 - IV. "Chairman" means Chairman of "The Company" duly nominated from time to time by "Government" under the provisions of "These Presents".
 - IV-a "Chief Executive Officer" means the contractual employee, selected through an open competitive selection process by BOD to perform functions within the meaning of section 2(6) of the Companies Ordinance, 1984 and appointed as such in accordance with the terms and conditions to be determined by BOD.
 - V. "Federal Government" means Government of Pakistan.



- VI. "Fund" means initial amount to be provided by "Government" on loan basis on mutually agreed terms and conditions including mark-up rate with repayment period.
- VII. "General Body" means General Body of "The Company" as constituted under the provisions of "These Presents".
- VIII. "Government" means Government of the Punjab through Industries Department.
- IX. "Industrial Estate" means an Industrial Estate managed or to be established by "The Company" anywhere in the Province of Punjab.
- X. "Independent Director" means a director who is nominated by "Government" and shall have the same meanings as ascribed thereto respectively by the "Rules".
- XI. "Legal Advisor" means an Advocate entitled to appear before any of the High Court of Pakistan or Supreme Court of Pakistan and shall be appointed by the Chief Executive Officer and approved by BOD on retainer basis.
- XII. "Local Government" means a Local Government as defined in the Punjab Local Government Ordinance, 2001 (XIII of 2001).
- XIII. "Member" means Member of "The Company" whose name appears and/or is borne on the Register, as envisaged by Section 2(21) of the "Ordinance".
- XIV. "Month" means English calendar month.
- XV. "Office" means the registered office of "The Company".
- XVI. "Ordinance" means the Companies Ordinance, 1984 and every statutory modification thereof for the time being in force.
- XVII. "Prescribed" means as prescribed by BOD from time to time.
- XVIII. "Rules" means the Public Sector Companies (Corporate Governance) Rules, 2013 and every statutory modification thereof for the time being in force.
- XIX. "Register" means the Register of Members to be kept pursuant to the "Ordinance".
- XX. "Seal" means the common Seal of "The Company".
- XXI. "Secretary" means any individual appointed to perform the secretarial, administrative or other duties ordinarily performed by the secretary of a company.
- XXII. "Special Resolution" and "Ordinary Resolution" have the same meanings as assigned thereto respectively by the "Ordinance".
- XXIII. "These Presents" means and include Articles of Association and any modification or alteration thereof for the time being in force.
- XXIV. Words importing singular number only include the plural number.
- XXV. Words importing plural number only include the singular number.

- XXVI. Words importing masculine gender only include the feminine gender.
- XXVII. Words importing feminine gender only include the masculine gender.
- XXVIII. Words importing persons include bodies corporate and otherwise, firms, registered or un-registered associations, and non-government, semi-government and government organizations.
- XXIX. Words of expressions in "These Presents" shall, except where it is repugnant to the subject or context, bear the same meanings as in a Standard English Dictionary.
- XXX. "Written" and "In Writing" includes printing, lithography, type-writing, telex, tele-facsimile (fax) and other modes of representing or reproducing words in a visible form.

BUSINESS OF "THE COMPANY"

3. The business of "The Company", its affairs and/or functions shall comprise of achieving the objects given in the Memorandum and include undertaking of all or any of the several objects, and any act, deed or thing done in pursuance thereof, ancillary and/or incidental thereto as expressed in, and authorized by the Memorandum of Association hereto annexed, and can be commenced immediately after incorporation of "The Company" as BOD may think fit.

SHARE CAPITAL OF "THE COMPANY"

4. The Equity of "The Company" which shall be provided by the "Government" as follows:

- Authorized Capital Rs. 150.00 Million (Rupees One Hundred and Fifty Million)
- Paid up Capital Rs. 50.00 Million (Rupees Fifty Million)

The Capital shall be divided into 100 (100) Million Ordinary Shares of Rupees Ten (10) each. "The Company" may from time to time, by Special Resolution, increase, consolidate, subdivide, reduce or otherwise reorganize the Share Capital, subject to the "Ordinance" and with prior approval of the "Government".

TRANSFER AND TRANSMISSION OF SHARES

5. The "Government" shall have the exclusive right to transfer any share.
- No shares can be mortgaged, pledged, sold, hypothecated, transferred or disposed of by any Member without previous sanction of Government.
- In case of death of any Member, his share shall automatically stand transferred to Government, which shall have the exclusive right to allot the same to any other person/institution/entity.

MEMBERSHIP

6. The subscribers to "These Presents" and to the Memorandum of Association hereunto annexed shall be admitted to the Membership of "The Company" from time to time and shall be deemed to have agreed to become a "Member" of "The Company" in

accordance with and in pursuance to "These Presents" and whose names appear in the Register, shall be the "Member" of "The Company".

7. The total number of members of BOD of "The Company" shall be fifteen (15), who shall be nominated by "Government". Nine (09) members including the Chairman shall be the Independent Directors nominated by "Government". Six (06) members of the BOD shall be the Secretaries to the "Government" for Industries Department, Finance Department, Labor & Human Resource Department Chairman TEVTA., Chief Executive Officer of "The Company" and Chief Executive Officer of Punjab Board of Investment & Trade (PBIT) shall be appointed *ex-officio*.

Subsequent vacancies arising thereafter of members of BOD shall be filled in accordance with "These Presents". Due regard shall be given to skills and discipline in the composition of "General Body". Any person, who is a loan defaulter, or is a sponsor of a company which is in loan default, or otherwise ineligible to hold any such post under or by any law cannot be a member of BOD.

8. Any person/industrial estate/organization interested in the promotion of good governance and engaged in any voluntary activity with a proven record of Industrial experience is eligible to become a "Member" of "General Body" on invitation by BOD and approval of "Government", except a person/ industrial estate/organization who is a loan defaulter, or is a sponsor of company which is a loan defaulter, or otherwise ineligible to hold any such post under or by any law. Such person/industrial estate/organization may be associated with a voluntary organization or a private individual having record of community service but his/its Membership of "The Company" will be in his/its individual capacity.

9. "The Company" shall maintain a Roll of "Members", clearly indicating their full names, addresses and occupations and every "Member" shall sign the same. If a "Member" of "The Company" changes his address, he shall forthwith notify his new address to "Secretary" of "The Company", who shall thereupon cause the new address to be put on the Rolls of "Members". Where, however, a "Member" does not notify any change of address to the "Secretary", the address appearing on the Rolls of the "Members" shall be deemed to be correct address of the "Member". The said Roll of "Members" also called "Register" shall be maintained at the Office of "The Company".

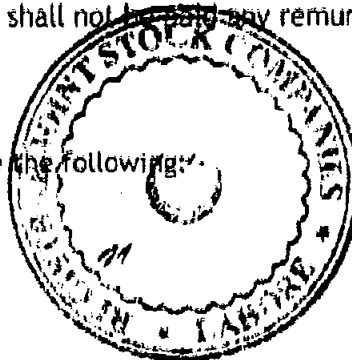
10. Membership of "The Company" may be terminated on the happening of any of the following events:

- I. On the "Member's" death, resignation, insolvency, lunacy or conviction for an offense involving moral turpitude.
- II. When a "Member" does not attend three consecutive General Meetings of "The Company" without prior leave of absence granted by BOD.
- III. When "The Company" in General Meeting, by a simple majority, decides to terminate the Membership of any person who acts in a manner prejudicial to the interests of "The Company", fails to fulfill any obligation required by "The Company" or acts in a manner as is not conducive to the objects of "The Company".

11. Subject to the foregoing and/or other provisions, Membership of "The Company" shall be open to all Pakistani citizens.
12. If a vacancy occurs, among the "Members", such vacancy shall be filled in as provided in Article (08) supra.
13. When a "Member" desires to resign from his Membership of "The Company", he shall forward his letter of resignation to the Chairman and such resignation shall take effect only from the date of its acceptance by BOD.
14. "The Company" shall function notwithstanding any vacancy in any of its bodies and no act, direction or proceeding of "The Company" shall be rendered invalid merely by reason of such vacancy or because of any defect in the appointment of any of the officers of "The Company".
15. The Chairman and the members of BOD will not be paid any remuneration but will be provided traveling, boarding, lodging traveling and transportation facilities on such terms as decided by BOD.
16. "Members" of "The Company" shall not be paid any remuneration or dividend.

OFFICERS OF "THE COMPANY"

17. "The Company" shall comprise the following:
 - I. General Body
 - II. BOD
 - III. Chairman
 - IV. Chief Executive Officer
 - V. Secretary
 - VI. Board of Management for specific Industrial Estates, exercising such powers as may be specifically "Prescribed" by BOD.



GENERAL BODY

18. There shall be a "General Body" of "The Company", which shall comprise of all the shareholders.
19. The Chairman shall preside over all meetings of "General Body".
20. The Chairman may invite any person other than a Member to attend a meeting of "General Body". Such invitee to be known as special invitee, shall not, however, be entitled to vote at the meeting.
21. "General Body" shall have the following powers and functions, namely:
 - a. to give overall policy guidance and direction for the efficient functioning of "The Company";
 - b. to approve the annual budget;
 - c. to consider the balance sheet and audited accounts for the previous year;

- d. to consider the annual report prepared by BOD;
- e. to amend "These Presents", if deemed necessary, by way of addition, alteration, modification or substitutions, in accordance with the "Ordinance" and with prior approval of the "Government" only after which the same shall be submitted to and approved by the Registrar Companies, Lahore Region.
- f. to appoint auditors except the First Auditors to be appointed by BOD.

POWER OF NOMINATION AND/OR TERMINATION

- 22. The power to nominate and/or terminate the Chairman, any Director or the "Member" of "General Body" shall vest with the "Government". The "Government" may also supersede BOM of industrial estates or appoint or remove member(s) thereof.

GENERAL MEETINGS

- 23. The First Annual General Meeting of "The Company" shall be held at such time not more than eighteen (18) months after the incorporation of "The Company", and at such time and place as BOD may determine.
- 24. Subsequent Annual General Meetings of "The Company" shall be held at least once every year at such time and place as may be determined by BOD, within fifteen calendar months after the holding of the last preceding General Meeting and within four months from the closing of the annual accounts.
- 25. The above named General Meetings shall be called Annual General Meetings. All other meetings of "The Company" shall be called Extraordinary General Meetings.
- 26. BOD may at any time call for an Extraordinary General Meeting and shall, on the requisition of the Members representing not less than one-third of the voting power on the date of deposit of requisition, proceed to call an Extraordinary General Meeting.
- 27. Any such requisition shall specify the objects of the Meeting and shall be signed by the makers, and shall be deposited at the Office. The meeting must be convened for purposes specified in the requisition only.
- 28. If BOD does not proceed to cause a meeting to be held within twenty one days from the date of requisition being deposited, the makers or a majority of them may themselves convene a meeting to be held not more than three months, from the date of deposit of the requisition.
- 29. Any meeting convened through requisition shall be convened in the same manner, as nearly as possible, as that in which meeting is convened by BOD.
- 30. Subject to the provisions of the "Ordinance", relating to Special Resolutions, twenty one days notice, at least (exclusive of the day on which the notice is served or deemed to be served, but inclusive of the day on which the notice is given), specifying the place, the day and the hour of the meeting, and in case of special business, the general nature of such business, shall be given of every General Meeting whether Annual or Extraordinary to the "Members" in the manner in which notices

are required to be served in accordance with the provisions contained herein below. Notwithstanding anything contained herein before, a meeting may be convened by such shorter notice and in such manner as those "Members" may think fit with the consent of all the "Members" entitled to receive notice thereof and the permission of the Registrar Companies, Lahore Region.

31. The accidental omission to give any such notice to or the non-receipt of notice by any of the "Member" shall not invalidate the proceedings of any such meeting.

PROCEEDING AT GENERAL MEETINGS

32. The business of an Annual General Meeting shall be to receive and consider the income and expenditure account and balance sheet, the Annual Report of BOD and of the Auditors, if required or found necessary, and the appointment of the Auditors and fixation of their remuneration and to transact any other business which may be transacted at an Annual General Meeting. All other business transacted at Annual General Meeting and all business transacted at an Extraordinary General Meeting shall be deemed special.
33. Two third (2/3) of the voting power of "Members" of "The Company" present personally, shall be a quorum for a General Meeting for all purposes. No business shall be transacted at any General Meeting unless the quorum is present at the commencement of business.
34. If within an hour of the time appointed for the meeting a quorum is not present, the meeting if called on the requisition of "Members", shall be dissolved. In any other case, it shall stand adjourned to the same day in the next week at the same time and place, and if at the adjourned meeting, a quorum is not present within half an hour from the time appointed for the meeting, "Members" being not less than one fourth (1/4) of the total voting power of "Members" of "The Company", shall be a quorum.
35. The Chairman shall be entitled to take the chair at every General Meeting of "The Company". If the Chairman is unable due to sickness or some other unavoidable reasons, BOD may elect one of the Director's to preside.
36. The Chairman may, with the consent of any meeting at which a quorum is present (and shall if so directed by the meeting), adjourn the meeting from time to time and from place to place, but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place. When a meeting is adjourned for ten days or more, notice of the adjourned meeting shall be given as in the case of an original meeting. Save as aforesaid, it shall not be necessary to give any notice of an adjournment or of the business to be transacted at an adjourned meeting.
37. At any General Meeting a resolution put to the vote of the meeting shall be decided on a show of hands, unless a poll (before or on the declaration of the result of the show of hands) demanded in accordance with the provisions of the "Ordinance" and unless a poll is so demanded, a declaration by the Chairman that a resolution has, on a show of hands, been carried or carried unanimously or by a particular majority

and an entry to that effect in the book of the proceedings of "The Company" shall be conclusive evidence of the fact, without proof of the number or proportion of the votes recorded in favor of, or against, that resolution.

38. If a poll is duly demanded, it shall be taken in such manner as the Chairman shall direct, and the result of the poll shall be deemed to be the resolution of the meeting at which the poll was demanded.
39. In the case of an equality of votes, whether on a show of hands or on a poll, the Chairman of the meeting at which the show of hands takes place, or at which the poll is demanded, as the case may be, shall be entitled to a casting vote.
40. The demand of a poll shall not prevent the continuance of a meeting for the transaction of any business other than the question on which a poll has been demanded.

VOTES OF MEMBERS

41. On a show of hands and on a poll, every Member present in person shall have vote(s) according to the shareholding. Voting by proxy is allowed as envisaged by the "Ordinance".
42. Any corporation or body corporate which is a Member of "The Company" may by resolution of its directors or other governing body, authorize such person as it thinks fit, to act as its representative at any meeting of "The Company". The persons so authorized shall be entitled to exercise the same powers on behalf of the corporation which he represents as that corporation could exercise if it were an individual Member of "The Company" present in person. A corporation or body corporate, as the case may be, attending a meeting through such representative shall be deemed to be present at the meeting in person.

BOARD OF DIRECTORS (BOD)

43. The BOD shall comprise of fifteen (15) members of which nine (09) members including the Chairman shall be the Independent Directors. The remaining six (06) members shall be the following

Secretary Industries
Secretary Finance
Secretary Labor and Human Resource Development
Chairman TEVTA
Chief Executive Officer of "The Company"
Chief Executive Officer PBIT

44. The affairs of "The Company" shall be managed by BOD, which shall have the responsibility to determine the direction and scope of the activities of "The Company" in accordance with the objectives specified in Memorandum of Association. It shall also have the responsibility to approve projects and assignments as well as providing technical assistance as may be mutually agreed upon, to the "Local Governments" and to approve and administer the annual and supplementary budgets.

45. The term of office of a member of BOD shall be three years, unless he resigns earlier or becomes disqualified from being a Director or otherwise ceases to hold office.
46. No member of BOD shall serve for more than three (03) consecutive terms of three (03) years each except *ex officio* members.
47. Members of BOD shall function in their individual capacity exercising individual judgment under the Chairman, and shall not be subjected to or be bound by instructions or orders of the office, organization or agencies with which they may be associated, except *ex officio* members.
48. No action or decision by BOD shall be rendered invalid or inoperative on account of any vacancy or vacancies in the composition of BOD.
49. The meetings of BOD shall be held in the following manner:
 - a. The BOD shall hold at least six regular meetings every year and shall be called by notice under the signature of "Secretary".
 - b. All meetings of BOD shall be presided over by the Chairman or in his absence, by a Director to be elected by BOD.
 - c. Minutes of the meetings of BOD shall be recorded by "Secretary" or in his absence by a member of BOD, appointed by the Chairman. The minutes shall be duly approved or corrected at the following regular meeting and filed in the permanent records of "The Company".
 - d. Members of BOD shall not receive any compensation for their services to "The Company" and/or any profit out of the business of "The Company".
50. Every notice calling for a meeting of BOD shall state "In Writing" the date, time and place of the meeting and shall be sent to every member of BOD ordinarily seven clear days before the day appointed for the meeting.
51. Any inadvertent omission to give notice or the non-receipt or late receipt of a notice by any member shall not invalidate the proceedings of the meetings.
52. At least 1/4th of the members of the BOD shall constitute a quorum provided at least one Director shall be the representative of the "Government".
53. Each member of BOD shall have one vote. All questions at meetings of BOD shall be determined by a vote of members present, provided that in case of equality of votes, the Chairman shall have a casting vote.
54. Subject to the "Ordinance" any business which BOD may consider necessary to perform, except such as may be required to be placed before "General Body" in general meeting, may be performed by a resolution In Writing circulated among all members of BOD, and any such resolution so circulated and approved by a majority of the members signing, shall be as effectual and binding as if a resolution had been passed at a meeting of BOD.
55. The proceedings of the meeting of BOD and resolution passed by the circulation shall be recorded in a book which shall be maintained by "The Company" for this purpose.

56. BOD shall exercise all executive and financial powers of "The Company", subject to such direction as may be issued by "General Body" from time to time.
57. The BOD shall be responsible for developing the policy guide lines for over-all management and administration of "The Company" and in particular and without prejudice to the generality of the foregoing provisions, BOD shall have the powers, subject to the provisions hereof, *inter alia*:
- I. establish byelaws and service rules of "The Company";
 - II. to constitute or to reconstitute Board of Management(s) for the industrial estates established, developed or managed by "The Company" and appoint members, fill casual vacancy(ies) and to remove any or all member(s) thereof;
 - III. to devise eligibility criteria and to establish operational policies including those relating to finance(s) for "BOM" of the Industrial Estate(s) established, developed or managed by "The Company";
 - IV. prepare and execute detailed plans and programs for the furtherance of the objects of "The Company";
 - V. consider the annual and supplementary budgets placed before it and pass them with such modifications as may be deemed necessary for being submitted to "General Body";
 - VI. prepare annual report and cause the preparation of accounts of "The Company" for consideration of "General Body";
 - VII. create posts and appoint such contractual staff as may be required for efficient management of affairs of the "The Company" and regulate the recruitment and terms and conditions of their services;
 - VIII. receive and to have custody of Funds and resources of "The Company", operate "The Company" and manage the properties of "The Company";
 - IX. incur expenditures subject to the provisions of the approved budget;
 - X. enter, for and on behalf of "The Company", into agreements including those containing arbitration clauses;
 - XI. establish, maintain, amalgamate and/or close down 'the company' offices etc. as may be deemed appropriate;
 - XII. to propose investment scenarios relating to Industrial Estate(s) development to Government;
 - XIII. to promote the establishment of common technical facility centers for up gradation of technologies used by the occupier(s) of Industrial Estate(s);
 - XIV. appoint boards, committees, sub-committees and panels, consisting of persons who may or may not be Members of "The Company" or employees of "The Company" to deal with any specific task as may be determined from time to time and to confirm the appointment of Legal Advisor appointed by the Chairman;

- XV. to impose and recover fees and charges for the services rendered by "The Company"; and
 - XVI. to contract out operational and management functions as and when required, to reputable firms or companies;
58. BOD may by resolution delegate such administrative, financial and other powers to the Chairman, Chief Executive, committees, sub-committees, panels and boards or any other officer of "The Company" as it may consider necessary and proper, subject to the condition that action taken by them under the powers so delegated, shall have to be confirmed and/or ratified in the next meeting of BOD.

CHAIRMAN

59. A. The Chairman shall be nominated by the "Government".
- B. The Chairman shall not be paid any remuneration for his services, but shall be provided all secretarial/material/ technical support in order to facilitate the efficient handling of "The Company". He will also be provided boarding, lodging, traveling and transportation facilities and shall be reimbursed for out of pocket expenses.
60. The Chairman shall be responsible *inter alia* for:
- I. coordinating and exercising general supervision over all activities of "The Company"; and
 - II. any other task as may be delegated by BOD.

CHIEF EXECUTIVE OFFICER (CEO):

- 60 A. a. The CEO shall be a contractual employee to be hired for a period of three years renewable term. He shall be duly selected through an open competitive selection process by the BOD from private sector having engineering/management qualification and experience of at least 10 years managing industrial projects, and appointed as such in accordance with terms and conditions of his appointment to be determined by BOD.
- b. The CEO shall work under the directions of the BOD through Chairman and he shall be responsible for day-to-day management and administration of "The Company". Without prejudice to the generality of the foregoing, he shall be responsible:
- I. to determine powers, duties and fix salaries or emoluments of the managers, secretaries, officers, clerks and employees, either permanent or temporary and to require security in such instances and to such amount as deemed appropriate;
 - II. to prescribe duties of all employees and staff of "The Company";
 - III. to make, draw, endorse, sign, accept, negotiate and give cheques, bills of lading, drafts, orders, bills of exchange, promissory notes and other negotiable instruments in the amount(s) and manner as allowed/approved by BOD;

- IV. to institute, conduct, defend or abandon any legal proceedings by or against "The Company" in consultation with Legal Advisor or otherwise concerning the affairs of "The Company" and also to compound and allow time for payment or satisfaction of any debt due and of any claim or demand by or against "The Company";
- V. proper administration of the affairs, "Funds" and resources of "The Company";
- VI. to secure fulfillment of any contract, agreement or engagement entered into by "The Company" by mortgage or charge of all or any of the properties of "The Company" from time to time or in such manner as he may think fit in the interest of "The Company";
- VII. to appoint and to remove or suspend managers, secretaries, officers, clerks and employees, either permanent or temporary, and to determine their powers, duties and fix their salaries or emoluments and to require security in such instances and to such amount as deemed appropriate;
- VIII. to refer any claims or demands by or against "The Company" to arbitration and observe and perform the awards, in consultation with Legal Advisor;
- IX. to exercise supervision and disciplinary control over the work and conduct of all employees of "The Company" in accordance with Human Resource and Administration Policy/Rules/Regulations approved by the BOD;
- X. to delegate any of his functions to any officer of "The Company" with permission of the BOD;
- XI. any other task assigned by BOD.

POWERS AND DUTIES OF BOD

61. The business of "The Company" shall be managed by BOD, who may exercise all such powers of "The Company" as are required by the "Ordinance".

RESOURCES OF "THE COMPANY"

62. The resources of "The Company" shall consist of the following;
 - I. grants made by "Government";
 - II. fee and charges imposed by "The Company" for services rendered by it; and
 - III. income and receipt from other sources;
63. "The Company" may in furtherance of its objectives;
 - I. invest and deal with "Funds" and monies of "The Company" according to "These Presents";
 - II. borrow and raise resources for "The Company" according to "These Presents";

- III. draw, accept, make, endorse, sign, negotiate, deposit, promissory notes, bills of exchange, cheques or any other negotiable instruments; and
 - IV. create, with the permission of "Government", a reserve company, sinking company, insurance company or any other special company whether for depreciation, repair, improvement, extension or maintenance of any of the properties or rights of "The Company" and/or for recouping wasting assets and for any other purposes for which "The Company" deems it expedient or proper to create or maintain any such company or companies.
64. All properties of "The Company", moveable or immovable, shall vest in "The Company" and shall be administered by Chief Executive Officer, on behalf of "The Company" within the parameters set by "The Company" in its General Meeting or otherwise as directed by BOD.
65. "The Company" may purchase, hire, lease, exchange or otherwise acquire property, moveable or immovable, tangible or intangible (including copyrights, patents and intellectual properties) which may be necessary or convenient for the purpose of "The Company" and construct, alter and/or maintain such buildings and works as may be necessary for carrying out the objects of "The Company", provided that for acquisition or disposal of immovable property through any mode, prior permission of "Government" shall be mandatory.
66. The income and the property of "The Company" however derived, shall be applied towards the promotion and furtherance of the objectives of "The Company" as set forth in the Memorandum of Association hereto annexed. Save as otherwise provided elsewhere, no portion of the income and property of "The Company" shall be paid or transferred directly or indirectly by way of dividend or by way of profit to persons who at any time are or have been "Members" of "The Company" or to any of them or to any person claiming through them provided that nothing herein shall prevent the payment in good faith any remuneration to any employee or other person in return for services rendered to "The Company" or for traveling allowance, and other similar out of pocket expenses.
67. A. All funds should be paid into "The Company's" account(s) with the bank(ers) of "The Company" and shall not be withdrawn except by cheque signed by authorized representatives in accordance with the procedure to be "Prescribed";
- B. Unless otherwise authorized by BOD, no new account in the name of "The Company" shall be opened.

THE SEAL

68. The "Seal" shall not be affixed to any instrument except by the authority of a resolution of the BOD and in the presence of at least two members of BOD or such other persons as BOD may appoint for the purpose and they shall sign every instrument to which the "Seal" is affixed in their presence.

ACCOUNTS

69. The BOD shall cause to be kept proper books of accounts as required under section 230 of the "Ordinance".
70. The books of account shall be kept at the "Office" or at such other place as BOD shall think fit and shall be open to inspection by the members of BOD during business hours.
71. BOD shall from time to time determine whether and to what extent and at what time and places and under what conditions or regulations, the accounts and books or papers of "The Company" or any of them shall be open to the inspection of Members not being members of BOD and no Member (not being a member of BOD) shall have any right of inspecting any account and book or papers of "The Company" except as conferred by law or authorized by BOD or by "The Company" in General Meeting.
72. BOD shall cause to be prepared and to be laid before "The Company" in General Meeting such profit and loss accounts or income and expenditure accounts and balance-sheets duly audited and reports as are required by sections 233 and 236 of the "Ordinance".
73. A balance-sheet, profit and loss account, income and expenditure account and other reports referred to in Article 69 supra shall be made out in every year and laid before "The Company" in the Annual General Meeting and made up to a date not more than four (04) months before such meeting. The balance-sheet and profit and loss account or income and expenditure account shall be accompanied by a report of the Auditors of "The Company" and the report of BOD.
74. A copy of the balance-sheet and profit and loss account or income and expenditure account and reports of BOD and Auditors shall, at least twenty one days preceding the meeting be sent to the persons entitled to receive notices of General Meetings in the manner in which notices are to be given hereunder.
75. BOD shall in all respects comply with the provisions of sections 230 to 236 of the "Ordinance".

AUDIT

76. The appointment and duties of the auditor(s) shall be regulated in accordance with the "Ordinance".
77. A. "The Company" at each Annual General Meeting shall appoint an auditor(s) being chartered accountant(s) to hold office until the next Annual General Meeting and the following provisions shall have effect, that is to say:

If an appointment of an auditor(s) is not made at an Annual General Meeting, the Securities and Exchange Commission may appoint an auditor(s) as per provisions of the "Ordinance".

- I. A member of BOD or an officer of "The Company", or a partner of or person in the employment of such member of BOD or officer or any person, indebted to "The Company" shall not be appointed auditor of "The Company".

- II. If any person after being appointed auditor becomes indebted to "The Company", his appointment shall thereupon be terminated.
 - III. The First Auditor(s) of "The Company" may be appointed by BOD within 60 days of the date of incorporation and auditor(s), if so appointed, shall hold office until the first Annual General Meeting, unless previously removed by a resolution of "The Company" in General Meeting in which "Member" of "The Company" may appoint auditor(s) at such a meeting.
 - IV. Retiring auditor(s) shall be eligible for re-appointment.
 - V. No person other than a retiring auditor(s) shall be capable of being appointed to the office of the auditor at the Annual General Meeting unless notice of an intention to nominate him be given to "The Company" not less than fourteen days before the day fixed for the holding of such Annual General Meeting and upon receipt of such notice, the provisions of the "Ordinance" shall be complied with.
- B. Any other audit of "The Company" shall be conducted as provided in the "Ordinance".
78. The remuneration of the auditor(s) shall be fixed by "The Company" in the General Meeting except that the remuneration of any auditor(s) appointed before the first Annual General Meeting or to fill any casual vacancy may be fixed by BOD.
79. Every auditor of "The Company" shall have a right of access at all times to the books, assets and accounts and vouchers of "The Company" and shall be entitled to require from the members of BOD and officers of "The Company" such information and explanation as may be necessary for the performance of duties of the auditor(s) and auditor(s) shall make a report to Members of "The Company" on the accounts examined by them, and on every balance-sheet, income and expenditure account laid before "The Company" in the General Meeting, during their tenure of office and the report shall state whether or not they have obtained all information and explanations they have required and whether or not in their opinion the balance-sheet, is in conformity with the law and whether or not such balance-sheet, and income and expenditure account, exhibit true and correct view of the state of "The Company's" affairs according to the best of their information and explanations given to them as shown by the books of "The Company" and whether or not in their opinion the books of accounts have been kept by "The Company" as required by the "Ordinance"; where any of the matters referred to herein above and answered in the negative or with a qualification, the report shall state the reasons for such answers and the report shall be attached to the balance-sheet, income and expenditure account and such report shall be read before "The Company" in a General Meeting and shall be open to inspection by any "Member".
80. The auditor(s) shall be entitled to receive notice of and to attend all General Meetings of "The Company".
81. Every account when audited and approved by the General Meeting shall be conclusive except as regards any error discovered therein within three months after the

approval thereof. Whenever any such error is discovered within that period, the account shall forthwith be corrected and henceforth shall be conclusive.

NOTICE

82. A notice may be given by "Secretary" to any "Member" either personally or by sending it by post to him to his registered address.
83. Where a notice is sent by post, service of the notice shall be effected by properly addressing, pre-paying and posting a letter containing the notice and unless the contrary is proved, notice shall be deemed to have been effected at the time at which the letter would be delivered in the ordinary course of post.
84. Notice of every General Meeting shall be given in a manner described supra to every "Member".

INDEMNITY


85. Every "Member" of "The Company" and BOD, the Chairman, Chief Executive Officer or any other officer or employee of "The Company" shall be indemnified by "The Company" against all costs, losses which they may incur or become liable to pay by reason of any contract entered into or act or deed done by them in discharge of their duties in good faith and any loss occasioned by any error of judgment, damage or misfortune which may happen in the execution of their duties in connection with affairs of "The Company".

POWER OF GOVERNMENT

86. Power to authorize the development, and up-gradation of existing or new "Industrial Estate(s)" shall vest in the "Government".

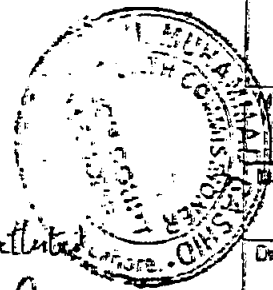
AMENDMENT

87. "These Presents" may, subject to clause 7 of the Memorandum of Association, be amended, modified, substituted, altered or repealed by a three fourth majority of the voting strength of the "Members" present and voting on a Special Resolution for the purpose in an Extraordinary General Meeting of the "Members", provided that a notice "In Writing" specifying the intention to propose the resolution as a Special Resolution shall have been served on "Members" of "The Company" at least twenty-one days prior to the meeting.


DISTRICT OFFICER (IPWM)
For Registrar Joint Stock Companies
Lahore

We, the several persons whose names and addresses are hereunder subscribed, are desirous of being formed into a Company in pursuance of these Articles of Association.

Name and surname (present and former in full and block letters)	Father's/Husband's name in full	Nationality/former Nationality	Occupation	Residential address in full	Signature
Monsir M. Syed	Syed M. Musa	Pakistani	Engineer	71-S, Defence Phase-II, Lahore Cantt	
Mr. Fayyaz Bashir	Bashir Ahmad	Pakistani	Secretary Industries, Commerce & Investment	7-Akman Road, GOR, Lahore.	
Mr. Khawaja Muhammad Owais	Khawaja Khuda Bakhs	Pakistani	Industrialist	House No. 2, Nisar Colony Kashina Dastar Lahore	
Mr. Sikander Mustafa Khan	Bashir A. Khan	Pakistani	Chairman MTA	House No. 30-D, Saowar Road, Lahore Cantt, Lahore.	
Mr. Sabir P. Chohan	Dr. M. A. Chohan	Pakistani	Engineer	House No. 1E, St. No. E3, Sector F7/3, Islamabad.	
Mr. Akmal Hyder	Dr. S. M. Naq	Pakistani	Businessman	House No. C-41, Gulberg-II, Lahore.	
Mr. Syed Nabeel Hashmi	Syed Nabeel Ali Shah	Pakistani	Chief Executive Thermosol Industries (Pvt.) Ltd.	House No. 698 Block-3 Sector C-I, Township, Lahore.	
Mr. M. I. Khurram	Haji Barkat Ali	Pakistani	Chief Executive Footwear Ltd.	45-E1 Gulberg-III, Lahore.	
Major (R) Shahrazad Bader	S. M. Bader	Pakistani	Secretary Labour and Human Resources	House No. 85 GOR III, Shadman, Lahore. House No. 224 F-10/3, Islamabad.	
Mr. Kamran Lashari	Sardar Abdul Majid Khan Lashari	Pakistani	Secretary Environment Protection	House No. 18 Faten Sher Road Mozang, Lahore.	
Dr. Zaheer Ahmad Khan	Naseer Ahmad Khan	Pakistani	Engineer	122-R, Phase-II, Lahore.	
Dr. Faisal Bar	Abdul Bari	Pakistani	Economist	House No. 29 Ghazi Road, Karachi, Minallah Sadder Bazar, Lahore.	



attested Lahore.

DISTRICT OFFICER

Enterprises & Investment Promotion
for Registration of Joint

Date the day of

WITNESS TO ABOVE SIGNATURES

Full Name Hafsa Afsar

Father's Name S. Nadeem Hussain

Full Address 109 BE, LDA, E-10/3

Signature

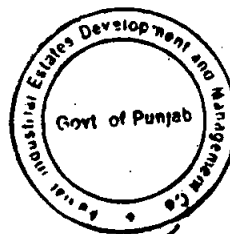
Occupation

ATTESTED

District Officer

Enterprises & Investment Promotion
for Registration Joint

ANNUAL REPORT



A handwritten signature in black ink, appearing to be "A. M.", written below the official stamp.

Independent Auditor's Report

To the members of Punjab Industrial Estate Development and Management Company

Report on the Audit of the Financial Statements

Opinion

We have audited the annexed financial statements of Punjab Industrial Estate Development and Management Company (the Company), which comprise the statement of financial position as at June 30, 2018, and the statement of income and expenditure and other comprehensive income, the statement of changes in equity, the statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies and other explanatory information, and we state that we have obtained all the information and explanations which, to the best of our knowledge and belief, were necessary for the purposes of the audit.

In our opinion and to the best of our information and according to the explanations given to us, the statement of financial position, statement of profit or loss and other comprehensive income, the statement of changes in equity and the statement of cash flows together with the notes forming part thereof conform with the accounting and reporting standards as applicable in Pakistan and give the information required by the Companies Act, 2017 (XIX of 2017), in the manner so required and respectively give a true and fair view of the state of the Company's affairs as at June 30, 2018 and of the surplus and other comprehensive income, the changes in equity and its cash flows for the year then ended.

Basis for Opinion

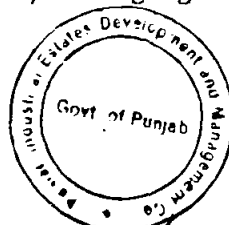
We conducted our audit in accordance with International Standards on Auditing (ISAs) as applicable in Pakistan. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Company in accordance with the International Ethics Standards Board for Accountants' Code of Ethics for Professional Accountants as adopted by the Institute of Chartered Accountants of Pakistan (the Code) and we have fulfilled our other ethical responsibilities in accordance with the Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Emphasis of Matter

As disclosed in note 13 to the financial statements, the Company has received various lands for estates development in the form of loan from Government of Punjab. These loans have been classified as current liabilities due to the fact that terms of these loans have not been formalized with the Finance Department of Government of Punjab through agreements.

GA/PA

Chartered Accountants
Member of Grant Thornton International Ltd
Offices in Karachi & Islamabad



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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB

Company Secretary

Information Other than the Financial Statements and Auditor's Report Thereon

Management is responsible for the other information. The other information comprises directors' report, but does not include the financial statements and our auditor's report thereon.

Our opinion on the financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of Management and Board of Directors for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with the accounting and reporting standards as applicable in Pakistan and the requirements of Companies Act, 2017(XIX of 2017) and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

Board of directors are responsible for overseeing the Company's financial reporting process.

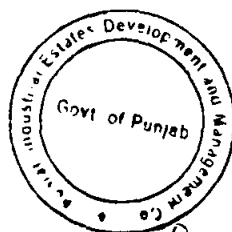
Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs as applicable in Pakistan will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with ISAs as applicable in Pakistan, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

6/11/22



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**PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMMISSION
OWNED BY: GOVT. OF PUNJAB**

Company Secretary

Review Report to the Members

On the Statement of Compliance with the Public Sector Companies (Corporate Governance) Rules, 2013

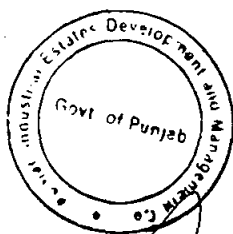
We have reviewed the enclosed Statement of Compliance with the best practices contained in the Public Sector Companies (Corporate Governance) Rules, 2013 (the Rules) prepared by the Board of Directors of *Punjab Industrial Estate Development and Management Company* (the Company) for the year ended June 30, 2018.

The responsibility for compliance with the Rules is that of the Board of Directors of the Company. Our responsibility is to review, to the extent where such compliance can be objectively verified, whether the Statement of Compliance reflects the status of the Company's compliance with the provisions of the Rules and report if it does not and to highlight any non-compliance with the requirements of the Rules. A review is limited primarily to inquiries of the Company's personnel and review of various documents prepared by the Company to comply with the Rules.

As a part of our audit of the financial statements we are required to obtain an understanding of the accounting and internal control systems sufficient to plan the audit and develop an effective audit approach. We are not required to consider whether the Board of Directors' statement on internal control covers all risks and controls or to form an opinion on the effectiveness of such internal controls, the Company's corporate governance procedures and risks.

The Rules requires the Company to place before the Audit Committee, and upon recommendation of the Audit Committee, place before the Board of Directors for their review and approval its related party transactions distinguishing between transactions carried out on terms equivalent to those that prevail in arm's length transactions and transactions which are not executed at arm's length price and recording proper justification for using such alternate pricing mechanism. We are only required and have ensured compliance of this requirement to the extent of the approval of the related party transactions by the Board of Directors upon recommendation of the Audit Committee. We have not carried out any procedures to determine whether the related party transactions were undertaken at arm's length price or not.

WPK



Chartered Accountants
Member of Grant Thornton International Ltd
Offices in Karachi & Islamabad

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB

Company Secretary

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Company to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the board of directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Report on Other Legal and Regulatory Requirements

Based on our audit, we further report that in our opinion:

- a) proper books of account have been kept by the Company as required by the Companies Act, 2017 (XIX of 2017);
- b) the statement of financial position, the statement of income and expenditure and other comprehensive income, the statement of changes in equity and the statement of cash flows together with the notes thereon have been drawn up in conformity with the Companies Act, 2017 (XIX of 2017) and are in agreement with the books of account and returns;
- c) investments made, expenditure incurred and guarantees extended during the year were for the purpose of the Company's business; and
- d) no zakat was deductible at source under the Zakat and Ushr Ordinance, 1980 (XVIII of 1980).

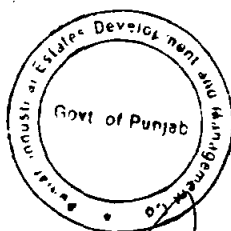
Other Matter:

The financial statements of the Company for the year ended June, 2017 were audited by another auditor who expressed an unmodified opinion on those statements on November 25, 2019.

The engagement partner on the audit resulting in this independent auditor's report is Imran Afzal.


CHARTERED ACCOUNTANTS
Lahore

Dated: July 5, 2021



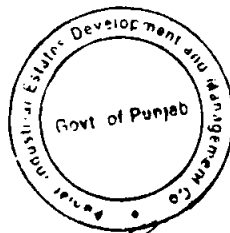
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**PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY GOVT. OF PUNJAB**

Company Secretary

Based on our review, nothing has come to our attention which causes us to believe that the Statement of Compliance does not appropriately reflect the Company's compliance, in all material respects, with the best practices contained in the Rules as applicable to the Company for the year ended June 30, 2018.

Grant Thornton Anjum Rahman
Grant Thornton Anjum Rahman
Chartered Accountants
City: Lahore
Dated: July 5, 2021

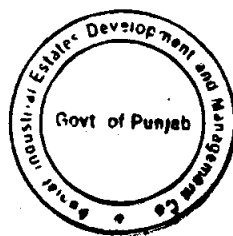


ATTESTED TO BE TRUE COPY

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB

Company Secretary

LAST ANNUAL RETURN



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THE COMPANIES ACT, 2017
THE COMPANIES (GENERAL PROVISIONS AND FORMS) REGULATIONS, 2018
[Section 130(1) and Regulations 4]

ANNUAL RETURN OF COMPANY HAVING SHARE CAPITAL

PART-I

(Please complete in typescript or in bold block capitals.)

1.1 CUIN (Registration Number)

R	P	-	3	7	9
---	---	---	---	---	---

1.2 Name of the Company

Punjab Industrial Estate Development & Management Company

1.3 Fee Payment Details 1.3.1 Challan No. 1.3.2

--

Amount

500/-

dd

mm

yyyy

1.4 Form A made up to

0	6
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0	8
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2.4 Date of AGM

0	6
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* The AGM was required to be held on or before 28-10-2018, however the same was held on 06-08-2021 under directions of the Registrar of Companies u/s 147 of the Companies Act, 2017.

PART-II

2. Section-A

2.1 Registered office address:

Commercial Area (North), Sundar Industrial Estate, Sundar Raiwind Road, Lahore.

2.2 Email Address:

corporate@pie.com.pk

2.3 Office Tel. No:

042-35297203-06

2.4 Office Fax No.:

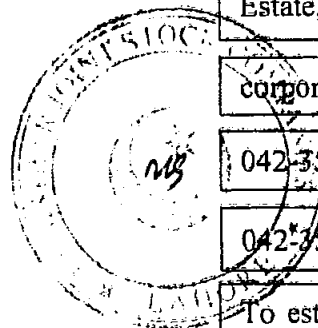
042-35297207

2.5 Principal line of business:

To establish new industrial estates and to upgrade those existing industrial estates as assigned by the Government.

2.6 Mobile No. of Authorized officer (Chief Executive/ Director/Company Secretary/ Chief Financial Officer)

0320-0840648



785

2.7

Authorized Share Capital			
Class and kinds of Shares	No. of Shares	Amount	Face Value
Ordinary Shares	15,000,000	Rs. 150,000,000/-	Rs. 10/-

2.8

Paid up Share Capital			
Class and kinds of Shares	No. of Shares	Amount	Face Value
Subject to payment wholly in cash	5,000,000	Rs. 50,000,000/-	Rs. 10/-

2.9

Particulars of the holding/subsidiary company, if any		
Name of company	Holding/Subsidiary	% of share held
NIL	NIL	NIL

2.10 Chief Executive Officer:

Name	Ali Muazzam Syed													
Address	North Commercial Area, Sundar Industrial Estate, Lahore.													
NIC #	3	5	2	0	2	8	2	7	9	6	8	6	-	3

2.11 Chief Financial Officer:

Name	Hamood -ur-Rahman													
Address	North Commercial Area, Sundar Industrial Estate, Lahore.													
NIC #	3	7	4	0	5	-	9	8	3	5	7	4	3	5

2.12 Secretary:

Name	M. Shafiq ur Rehman													
Address	North Commercial Area, Sundar Industrial Estate, Lahore.													
NIC #	3	5	2	0	2	-	9	7	2	7	1	4	5	1

2.13 Legal Advisor:

Name	M/s Ahmed and Pansota													
Address	20 - Ganga Ram Mansions, The Mall, Lahore, Pakistan.													

2.14 Particulars of Auditor(s)

Name	Grant Thornton Anjum Rahman (GTAR)													
Address	1-Inter Floor Eden Center 43 Jail Road Lahore.													
NIC #														

S

2.16 Particulars of Share Registrar (if applicable)

Name	N.A
Address	N.A
e-mail	N.A

Section-B:

2.16 List of Directors as on the date annual return is made:

Sr. #	Name	Residential Address	Nationality	NIC No. (Passport No. if foreigner)													Date of Appointment or election		
1	Syed Nabeel Hashmi	Thermosole Industries (Pvt.) Ltd. 140 Main Industrial Area, Kot-Lakhpat, Lahore.	Pakistani	3	5	2	0	2	-	2	6	9	8	5	7	4	-	5	Govt. of Punjab constituted Board of Directors vide Notification # AEA-I-15-22/2002(P-V) of ICI & SD Department dated 4-9-2019
2	Ahsan Mahmood Butt	M/s FAS Tube Mills & Engineering, Plot # 457-460, Sundar Industrial Estate, Lahore	Pakistani	3	5	2	0	1	-	1	6	0	6	2	5	8	-	9	-do-
3	Muhammad Anees Khawaja	Mehr Manzil, O/S Lohari Gate, Multan.	Pakistani	3	6	3	0	2	-	4	6	4	8	2	8	5	-	3	-do-
4	Syed Tariq Siraj Jafri	68-Block-B, Model Town, Lahore	Pakistani	3	5	2	0	2	-	2	5	9	5	1	7	4	-	1	-do-
5	Shahid Hussain Tarer	House # 12/13, A/2, WAPDA Town, Gujranwala.	Pakistani	3	4	1	0	1	-	9	5	3	4	6	8	9	-	9	-do-
6	Khawaja Arif Qasim	125-A, Quaid-e-Azam Industrial Estate, Kot-Lakhpat, Lahore.	Pakistani	3	5	2	0	2	-	4	6	0	1	9	2	8	-	1	-do-

7	Usman Aslam Malik	M/s Koretec Auto Industries 16-KM, Multan Road, Lahore.	Pakistani	3	5	2	0	1	-	1	5	5	5	4	0	9	-	1	-do-
8	Dr. Sumaira Rehman	Superior University, 17-KM Mian Raiwind Road, Lahore.	Pakistani	3	5	2	0	2	-	9	7	6	0	8	5	3	-	0	-do-
9	Dr. Erfa Iqbal Chief Executive Officer PBIT	Punjab Board of Investment & Trade, 23 Aikman road GOR-1, Lahore.	Pakistani	4	2	3	0	1	-	7	7	2	5	4	3	6	-	8	27-11-2020
10	Muhammad Abdullah Khan Sumbal, Secretary Finance Department	Finance Dept. Civil Secretariat Lahore.	Pakistani	3	5	2	0	2	-	2	9	9	4	9	2	3	-	9	30-04-2019
11	Wasif Khurshid, Secretary ICI&SD Department	ICI&SD Dept. Old P&D Building, 2 Bank Road, Lahore.	Pakistani	3	6	3	0	2	-	9	1	7	1	7	4	0	-	9	06-11-2020
12	Dr. Ahmed Javed Qazi, Secretary Labour & Human Resource	Labour & Human Resource Dept., 2 Bank Road, Lahore.	Pakistani	3	5	2	0	2	-	2	8	6	5	5	8	2	-	5	25-09-2020
13	Ali Salman Siddique Chairperson TEVTA	96-Gulberg Road, Lahore.	Pakistani	3	5	2	0	2	-	8	7	0	6	5	2	8	-	9	08-08-2019
14	Ali Muazzam Syed	Commercial Area, Sundar Industrial Estate, Lahore.	Pakistani	3	5	2	0	2	-	8	2	7	9	6	8	6	-	3	01-02-2021

2.17 List of members and Debenture holders on the date up to which this Form is made:

S#	Folio #	Name	Address	Nationality	No. of shares held	NIC No. (Passport No. if foreigner)											
Members		Government of the Punjab (through Industries, Commerce, Investment & Skill Development Department).	ICI&SD Dept. Old P&D Building, 2 Bank Road, Lahore.	NIL	5,000,000												
Debenture holders			NIL	NIL	NIL												

Use separate sheet, if necessary

2.18 Transfer of shares (debentures) since last Form A was made:

Sr. #	Name of Transferor	Name of Transferee	Number of shares transferred	Date of registration of transfer
	NIL	NIL	NIL	NIL

Use separate sheet, if necessary

PART-III

3.1

Declaration:

I do hereby solemnly; and sincerely declare that the information provided in the form is:

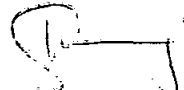
- true and correct to the best of my knowledge, in consonance with the record as maintained by the Company and nothing has been concealed; and
- hereby reported after complying with and fulfilling all requirements under the relevant provisions of law, rules, regulations, directives, circulars and notifications whichever is applicable.

3.2 Name of Authorized Officer with designation /Authorized Intermediary

M. Shafiq ur Rehman

Acting Company Secretary

3.3 Signatures



3.4 Registration No of Authorized Intermediary, if applicable

3.5

Date

Day

Month

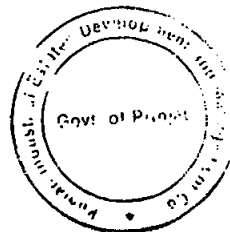
Year

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PATTERN OF SHAREHOLDING



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**PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY**
A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)

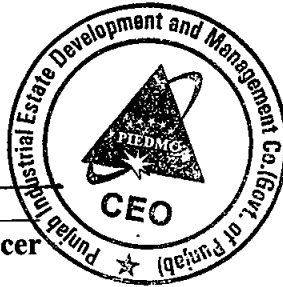


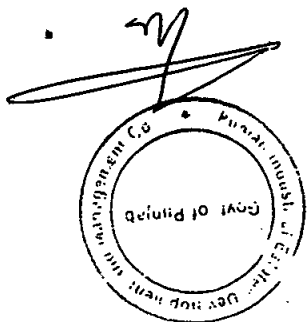
September 20, 2022

**Undertaking
Pattern of Shareholding**

We hereby undertake that Punjab Industrial Estate Development and Management Company (PIEDMC) is 100% owned by the Government of Punjab and that this information holds true to the best of our knowledge.

Chief Executive Officer



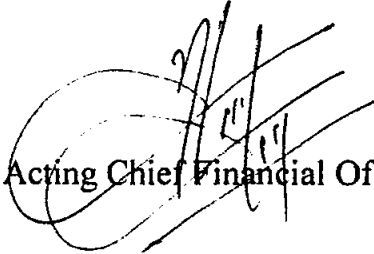


CASH & BANK BALANCE CERTIFICATES



TO WHOM IT MAY CONCERN

It is certified that Cash in Hand at Punjab Industrial Estates Development and Management Company – Head Office as at June 30, 2022 is Rs. 194,000 (One Hundred Ninety Four Thousand only).


Acting Chief Financial Officer

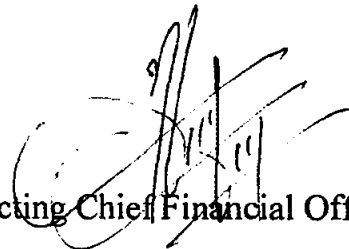


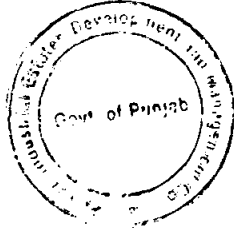
**PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY**
A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)



TO WHOM IT MAY CONCERN

It is certified that Cash in Hand at Punjab Industrial Estates Development and Management Company – Head Office as at June 30, 2018 is Rs. 170,000 (One Hundred Seventy Thousand only).


Acting Chief Financial Officer





Balance Confirmation Letter
002 Egerton Road Branch - Lahore

Date: 20-Jul-22

Name: PUNJAB INDUSTRIAL ESTATE DEVELOPMEN

Father/Husband:

Address: COMMERCIAL AREA (NORTH) SUNDAR INDUSTRIAL ESTATE RAIWIND RD LHR
COMMERCIAL AREA (NORTH) SUNDAR INDUSTRIAL ESTATERAIWIND RD LAHORE

Ph:

A/C Number: 6580003156000013

Currency: PKR

Dear Customer,

Your Corporate Premium Account No. 6580003156000013 with us shows a balance of PKR 2,492,643,721.59 (Rupees Two billion Four Hundred Ninety-Two million Six Hundred Forty-Three thousand Seven Hundred Twenty-One and fifty-nine paisas only) as on 30-JUN-2022.

Please confirm the correctness of the balance on the sub-joined confirmation slip and return the same to us duly signed by you at earliest on the mentioned address. It may please be noted that if your confirmation is not received back by us within seven days from the date of this intimation letter, the balance in your account shall be deemed correct and confirmed by you.

This is a system generated letter and does not require any signatures

-----CUT HERE

Confirmation of Balance

The Manager,
The Bank of Punjab,
002 Egerton Road Branch - Lahore.

Ref : Confirmation of Balance
A/c No.6580003156000013
Corporate Premium Account

Dear Sir,

I/We confirm, on examination, the correctness of balance of PKR 2,492,643,721.59 (Rupees Two billion Four Hundred Ninety-Two million Six Hundred Forty-Three thousand Seven Hundred Twenty-One and fifty-nine paisas only) in my/our above account with you as on 30-JUN-2022.

Authorized Signature
(of account holder)





Passion Reborn

**Main Branch,
7 Egerton Road, Lahore.
Tel: +92-42-36374811-14
Fax: +92-42-36374816
Email: bop0002@bop.com.pk**

July 20, 2022
MB/LHR/012/

TO WHOM IT MAY CONCERN

This is to certify that PUNJAB INDUSTRIAL ESTATE DEVELOPMEN is maintaining account # PK65BPUN6580003156000013 with us since 2004-08-23. The overall conduct of the Accounts is satisfactory.

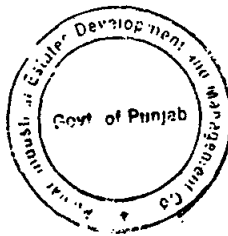
This certificate is being issued at the specific request of the customer without any risk and responsibility on part of the bank or any of its officer.

AIMON MAJEED BUTT
Customer Service Officer

MUHAMMAD USMAN GHANI
Branch Operations Manager
THE BANK OF PUNJAB
Main Branch Lahore-0002

MUHAMMAD USMAN GHANI
Manager Operations

DETAILS OF CHARGES & ENCUMBRANCES





PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)



September 20, 2022

Undertaking

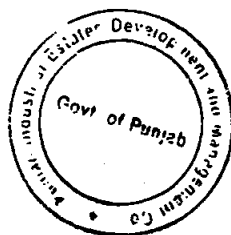
Details of Charges and Encumbrances

We hereby undertake that there are no charges and encumbrances on the assets of Punjab Industrial Estate Development & Management Company (PIEDMC).

Chief Executive Officer



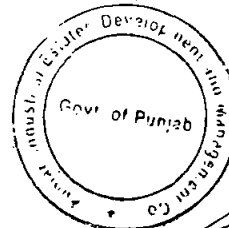
AUDITED FINANCIAL STATEMENTS



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Financial Statements 2017-18



ATTESTED TO BE TRUE COPY

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY GOVT. OF PUNJAB

Punjab Industrial Estates

Development & Management Company

Commercial Area (North) Sundar Industrial
Estate

Raiwind Road Lahore

UAN: 042-111-743-743

Tel: PABX 042-35297203-6 Fax: 042-

PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984, Now Companies Act, 2017)

Statement of Financial Position

As At June 30, 2018

	Note	2018 Rupees	2017 Rupees (Restated)	2016 Rupees (Restated)
Equity and liabilities				
Equity				
Share capital	7	50,000,000	50,000,000	50,000,000
Accumulated Surplus		3,001,805,426	2,954,319,643	2,341,548,119
Total equity		3,051,805,426	3,004,319,643	2,391,548,119
Liabilities				
Non-current liabilities				
Long term financing	8	2,293,671,350	3,788,021,849	3,876,117,563
Deferred income	9	201,832,629	168,275,489	101,097,884
Deferred credit	10	680,973,150	1,181,505,985	1,281,626,938
Deferred grants	11	210,306,546	218,052,828	228,341,382
Deferred liabilities	12	33,031,644	18,545,342	8,551,187
Total non-current liabilities		3,419,815,319	5,374,401,493	5,495,734,954
Current liabilities				
Current portion of long term financing	8	4,901,106,001	3,026,772,667	1,309,106,000
Loan from the Govt. of Punjab - <i>unsecured</i>	13	1,429,854,949	1,429,854,949	365,769,949
Accrued mark up on long term financing		66,631,743	45,326,685	29,984,736
Trade and other payables	14	1,543,371,850	902,552,240	1,140,828,330
Security deposits	15	408,311,907	372,254,472	315,594,624
Receipt against deposit works	16	371,364,881	541,402,791	934,132,834
Advances received for sale of plots	17	5,397,927,491	5,283,664,560	5,019,865,307
Total current liabilities		14,118,568,022	11,552,028,364	9,115,281,780
Total equity and liabilities		20,590,188,767	19,930,749,500	17,002,564,853
Contingencies and commitments	18			

The annexed notes from 1 to 45 form an integral part of these financial statements.

Signature

Signature
Chief Financial Officer

Signature
Chief Executive Officer

Signature
Chairman

ATTESTED TO BE TRUE COPY

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB

Company Secretary

PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

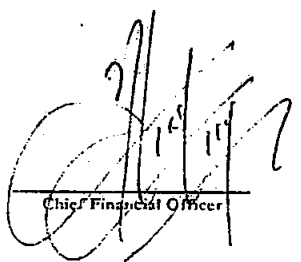
Statement of Financial Position

As At June 30, 2018

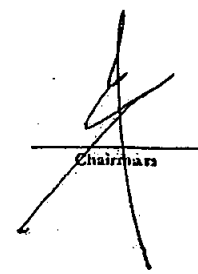
	Note	2018 Rupees	2017 Rupees (Restated)	2016 Rupees (Restated)
Assets				
Non-current assets				
Property, plant and equipment	19	576,014,142	505,367,952	405,649,588
Intangibles	20	304,675	321,862	482,770
Long term deposits		170,159,193	172,831,630	90,241,914
Total non-Current assets		746,478,010	678,521,444	496,374,272
Current assets				
Stores, spare parts and loose tools		41,430,936	23,091,809	20,130,870
Inventory, projects in progress	21	13,749,446,045	12,621,155,741	11,055,219,147
Trade debts, unsecured - considered good	22	1,191,230,739	950,641,399	571,853,901
Advances, deposits, prepayments and other receivables	23	1,114,308,619	258,417,338	236,308,756
Income tax refundable		661,485,568	634,644,503	605,384,869
Short term investments	24	2,210,000,000	2,410,000,800	2,610,000,000
Accrued interest		23,345,617	24,827,534	34,229,150
Cash and bank balances	25	851,863,233	2,320,449,932	1,372,563,888
Total current assets		19,843,710,757	19,252,228,056	16,506,190,581
Total assets		20,590,188,767	19,930,749,500	17,002,564,853

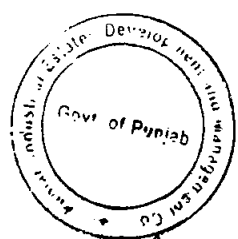
The annexed notes from 1 to 45 form an integral part of these financial statements.

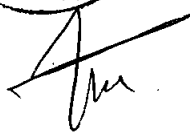
GPR


Chief Financial Officer


Chief Executive Officer

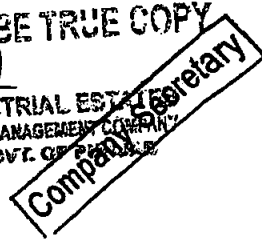

Chairman





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PUNJAB INDUSTRIAL ESTATE
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB


Company Secretary

PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

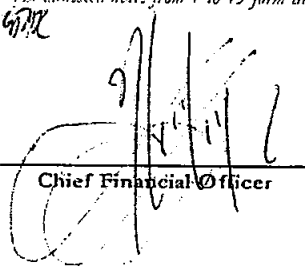
Statement of Income and Expenditure and Other Comprehensive Income

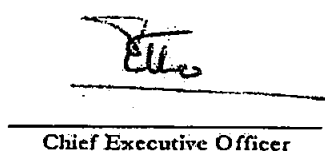
For the Year Ended June 30, 2018

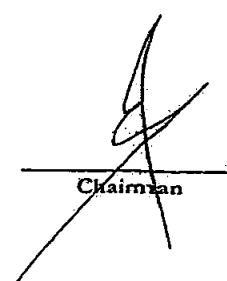
	Note	2018 Rupees	2017 Rupees (Restated)
Revenue			
Amortization of grants	11	7,746,282	10,288,554
Sale of plots	26	473,594,589	399,780,700
Electricity billing	27	4,050,593,950	3,471,221,534
Fees	28	391,983,243	618,791,393
Operation, maintenance and allied service billing	29	209,344,025	195,009,062
Sales of electrical material		167,400	7,654,028
Other income	30	864,510,552	816,380,665
Total income		5,997,940,041	5,519,125,936
Expenditure			
Cost of plots sold	31	451,456,595	276,833,867
Development expenditures	32	29,564,450	55,488,011
Operations and maintenance expenses	33	293,401,582	215,988,985
Cost of electricity	34	4,123,623,170	3,482,596,666
Administrative expenses	35	480,201,678	303,289,696
Selling expenses	36	45,682,198	9,769,471
Finance cost	37	505,540,559	544,544,873
Total expenditure		5,929,470,232	4,888,511,569
Net surplus for the year		68,469,809	630,614,367
Taxation	38		
Net surplus after tax		68,469,809	630,614,367
Other comprehensive income			
Items that will not be reclassified to income & expenditure			
Items that may be reclassified subsequently to income & expenditure:			
Remeasurement of post employment benefit obligation - actuarial loss		(20,984,026)	(17,842,843)
Other comprehensive loss for the year		(20,984,026)	(17,842,843)
Total comprehensive income for the year		47,485,783	612,771,524

The annexed notes from 1 to 45 form an integral part of these financial statements.

6/12


Chief Financial Officer


Chief Executive Officer


Chairman

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB

Company Secretary

PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

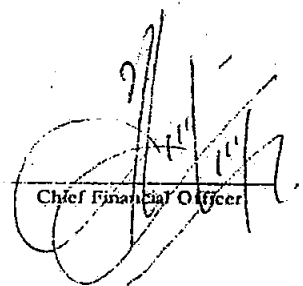
Statement of Changes in Equity


For the Year Ended June 30, 2018

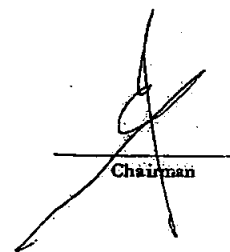
Note	Share Capital Rupees	Excess of income over expenditures Rupees	Equity portion of shareholder loan and other benefits Rupees	Total Rupees
Balance as at June 30, 2016 - as previously reported	50,000,000	1,789,019,559	2,062,496,880	3,901,516,439
Effect of Restatement 6.2.1	-	552,528,560	(2,062,496,880)	(1,509,968,320)
Balance as at July 01, 2016 - Restated	50,000,000	2,341,548,119	-	2,391,548,119
Net surplus for the year - restated	-	630,614,367	-	630,614,367
Other comprehensive loss for the year	-	(17,842,843)	-	(17,842,843)
Balance as at June 30, 2017 - Restated	50,000,000	2,954,319,643	-	3,004,319,643
Net surplus for the year	-	68,469,809	-	68,469,809
Other comprehensive loss for the year	-	(20,984,026)	-	(20,984,026)
Balance as at June 30, 2018	50,000,000	3,001,805,426	-	3,051,805,426

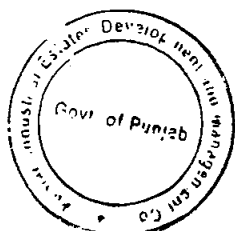
The annexed notes from 1 to 45 form an integral part of these financial statements.

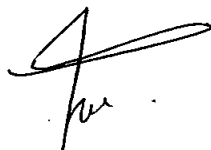
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Chief Financial Officer


Chief Executive Officer

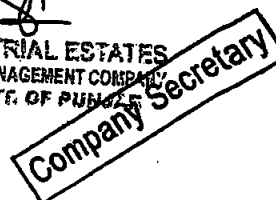

Chairman





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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY GOVT. OF PUNJAB


Company Secretary

PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Statement of Cashflows

For the Year Ended June 30, 2018

	Note	2018 Rupees	2017 Rupees (Restated)
Cash used in for operations	39	(1,588,116,127)	(860,562,201)
Interest paid		(1,808,251)	(2,109,632)
Return on bank deposits		230,298,362	213,917,855
Long term deposits		2,672,437	(59,843,789)
Gratuity contributions paid		(37,336,629)	(29,116,904)
Net cash used in operating activities		(1,394,290,208)	(737,714,671)

Cash flows from investing activities

Capital expenditure	(137,975,523)	(118,347,723)
Capital work in process	(29,798,652)	(47,522,740)
Proceeds from sale of assets	5,027,684	3,849,211
Short term investments	-	200,000,000
Net cash generated from / (used in) investing activities	(162,746,491)	37,978,748

Cash flows from financing activities

Net loan received from Government	-	1,650,000,000
Repayment of long term loan	(120,550,000)	(120,550,000)
Net cash (used in)/from financing activities	(120,550,000)	1,529,450,000
Net (decrease)/increase in cash and cash equivalents	(1,677,586,699)	829,714,077
Cash and cash equivalents at the beginning of the year	4,449,449,932	3,619,735,855
Cash and cash equivalents at the end of the year	2,771,863,233	4,449,449,932

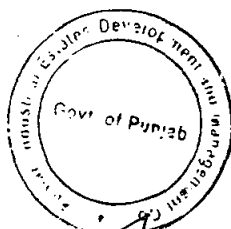
Cash and cash equivalents			
Cash and bank balances	25	851,863,233	2,329,449,932
Short term investments	24	1,920,000,000	2,120,000,000
Cash and cash equivalents at the end of the year		2,771,863,233	4,449,449,932

The annexed notes from 1 to 45 form an integral part of these financial statements.

Signature
Chief Financial Officer

Signature
Chief Executive Officer

Signature
Chairman



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PUNJAB INDUSTRIAL ESTATE
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB
Company Secretary

PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

1 Legal status and nature of business

Punjab Industrial Estates Development and Management Company ("the Company") was incorporated in Pakistan on 18 September 2003 as a public company limited by guarantee, licensed as a non-profit organization under section 42 of the Repealed Companies Ordinance, 1984 (now Companies Act, 2017). The Company is wholly owned by the Government of Punjab. The principal activity of the Company is to develop new industrial estates together with updating the existing industrial estates as may be assigned by the Government of Punjab. The registered office of the Company is situated at Commercial Area (North) Sundar Industrial Estate, Raiwind road, Lahore.

The Company is managing Quaid e Azam Industrial Estate ("QIE") and Sundar Industrial Estate ("SIE") in Lahore and Multan Industrial Estate - Phase I ("MIE I") in Multan while it is currently developing:

- Multan Industrial Estate - Phase II ("MIE II") in Multan;
- Rahim Yar Khan Industrial Estate in Rahim Yar Khan;
- Bhawal Industrial Estate in Bhawal;
- Vehari Industrial Estate in Vehari;
- Quaid-e-Azam Business Park in Sheikhupura;
- Chunian Industrial Estate in Chunian; and
- Bahawalpur Industrial Estate in Bahawalpur

2 Basis of preparation

2.1 Statement of compliance

These financial statements have been prepared in accordance with approved accounting standards as applicable in Pakistan. Approved accounting standards comprise such International Financial Reporting Standards (IFRSs) issued by the International Accounting Standards Board Accounting Standard for Not for Profit Organization issued by ICAP as are notified under the Companies Act, 2017 and provisions of and directives issued under the Companies Act, 2017. In cases where requirements differ, the provisions of and directives issued under the Companies Act, 2017 shall prevail.

2.2 Standards, amendments or interpretations that became effective during the year

The fifth schedule to the Companies Act, 2017 became applicable to the Company for the preparation of these financial statements. The Companies Act, 2017 (including its fifth schedule) forms an integral part of the statutory financial reporting framework applicable to the Company and among others, prescribes the nature and content of disclosures in relation to various elements of the financial statements.

The Company has also adopted following amendments of standards which became effective for the current year:

Standard or Interpretation

- IAS-7 Statement of Cash Flows
- IAS-12 Income Taxes

The adoption of the above standards and amendments did not have any significant effect on the financial statements of the Company.

2.3 Standards, amendments and interpretations to the approved accounting standards that are relevant but not yet effective

The following standards, amendments or interpretations with respect to the approved accounting standards and interpretations as applicable in Pakistan would be effective from the dates mentioned below against the respective standards:

Standard or Interpretation	Effective Date
IFRS 9 Financial Instruments	1-Jul-18
IFRS 15 Revenue from Customers	1-Jul-18
IFRS 16 Leases	1-Jul-19
IFRS 2 Share-based Payment - Classification and Measurement of Share based Payment Transactions	1-Jan-18
IFRS 4 Insurance Contracts - Applying IFRS 9 Financial Instruments with IFRS 4 Insurance Contracts	1-Jan-18
IAS 40 Investment Property - Transfers of Investment Property	1-Jan-18

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
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Company Secretary

PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984, Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

IFRS 1 Annual Improvements to IFRS Standards 2014-2016 Cycle	1-Jan-18
IFRS 11 Joint Agreements - Accounting for Acquisition of Interests in Joint Operations (Amendments)	1-Jan-18
IAS 28 Presentation of Financial Statements - Annual Improvements to IFRS Standards 2014-2016 Cycle	1-Jan-18
IAS 16 Property, Plant and Equipment and IAS 38 Intangible Assets - Clarification of Acceptable Methods of Depreciation and Amortization (Amendments)	1-Jul-16
IFRIC 22 Foreign Currency Transactions and Advance Consideration	1-Jan-18
IFRIC 23 Uncertainty Over Income Tax Treatment	1-Jan-18
IFRS 1 and IAS 28 - Annual Improvements to IFRSs 2014-2016	1-Jan-18

The Company is in process of assessing impact of these new and amended published standards and interpretations on the financial statements of the Company.

2.4 Standards, amendments and interpretations to the published standards that are not yet notified by the Securities and Exchange Commission of Pakistan (SECP)

In addition to the above, following standards have been issued by IASB which are yet to be notified by the SECP for the purpose of applicability in Pakistan;

Standards or Interpretations

IFRS-14 Regulatory Deferral Accounts

IFRS 17 Insurance Contracts

The Company is in process of assessing impact of these standards, amendments and interpretations on the financial statements of the Company.

3 Basis of measurement

These financial statements have been prepared under the historical cost convention except for certain balances which are stated in accounting policies below.

4 Functional and presentational currency

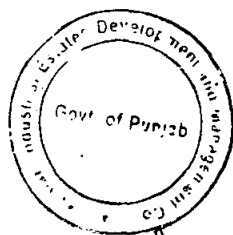
These financial statements have been prepared in Pak Rupees which is also the Company's functional currency. All financial information presented in Rupees has been rounded off to the nearest rupee, unless otherwise stated.

5 Use of estimates and judgments

The preparation of financial statements in conformity with approved accounting standards requires management to make judgments, estimates and assumptions that affect the application of policies and reported amount of assets and liabilities and income and expenses. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under circumstances, and the results of which form the basis for making judgment about carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revision to accounting estimates are recognized in the period in which the estimate is revised if the revision affects only that period, or in the period of revision and future periods if the revision affects both current and future periods. The areas where assumptions and estimates are significant to the Company's financial statements or where judgment was exercised in application of accounting policies are as follows:

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY GOVT OF PUNJAB
Company Secretary

PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

5.1 Depreciation method, rates and useful lives of property, plant and equipment

The management of the Company reassesses useful lives, depreciation method and rates for each item of property, plant and equipment annually by considering expected pattern of economic benefits that the Company expects to derive from that item and the maximum period up to which such benefits are expected to be available. Any change in estimate may affect the depreciation charge or impairment. The rates of depreciation are specified in note 19.

5.2 Employee Benefits

The Company operates approved funded gratuity scheme covering all its full time permanent workers who have completed the minimum qualifying period of service as defined under the respective scheme. The gratuity scheme is managed by trustees. The calculation of the benefit requires assumptions to be made of future outcomes, the principal ones being in respect of increase in remuneration and the discount rate used to convert future cash flows to current values. The assumptions used for the plan are determined by independent actuary on annual basis.

5.3 Leave Encashment

Balanced/un-availed Annual Leave is encashed at the rate of current gross salary of the employee at the end of fiscal year. Days to be reimbursed of new employees are counted on pro-rata basis.

5.4 Taxation

Current

Provision for current taxation is based on taxable income at the current rates of taxation after considering rebates and tax credits available, if any. The charge for the current tax also includes adjustments where necessary, relating to prior periods which arise from assessment framed / finalized during the period, if any.

Deferred

Deferred tax is provided using the balance sheet method for all temporary differences at the balance sheet date between tax bases of assets and liabilities and their carrying amounts for financial reporting purposes.

Deferred income tax asset is recognized for all deductible temporary differences and carry forward of unused tax losses and tax credits, if any, to the extent that it is probable that taxable profits will be available against which such temporary differences and tax losses/credits can be utilized. Deferred tax liabilities are recognized for all major taxable temporary differences.

Deferred income tax assets and liabilities are measured at the tax rates that are expected to apply to the period when the asset is realized or the liability is settled, based on tax rates that have been enacted or substantively enacted at the date of statement of financial position. Deferred tax is charged or credited to statement of profit or loss, except in the case of items credited or charged to equity in which case it is included in equity.

5.5 Provisions

Provisions are based on best estimate of the expenditure required to settle the present obligation at the reporting date, that is, the amount that the Company would rationally pay to settle the obligation at the reporting date or to transfer it to a third party.

5.6 Impairment

The management of the Company reviews carrying amounts of its assets including receivables and advances and cash generating units for possible impairment and makes formal estimates of recoverable amount if there is any such indication.

5.7 Provision for doubtful debts, advances and other receivables

The Company reviews the recoverability of its trade debts, advances and other receivables to assess amount of bad debts and provision required there against on annual basis.

5.8 Contingencies

Where it is not probable that an outflow of resources embodying economic benefits will be required to settle the obligations or the amount of the obligation can not be measured with sufficient reliability, it is disclosed as contingent liability.

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PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

5.9 Stores, spare parts and loose tools

The Company reviews the stores, spare parts and loose tools for possible impairment on an annual basis. Any change in estimates in future years might affect the carrying amounts of the respective items of stores and spare parts and loose tools with a corresponding effect on the provision.

5.10 Inventory

The Company reviews the carrying amount of inventory on a regular basis. Carrying amount of inventory is adjusted where the net realizable value is below the cost. Net realizable value is the estimated selling price in the ordinary course of business, less the estimated costs of completion and estimated costs necessary to make the sale.

6 Summary of significant accounting policies

These accounting policies stated below have been consistently applied to all periods presented in these financial statements.

6.1 Long term financing

These are classified as 'financial liabilities at amortized cost'. On initial recognition, these are measured at fair values less a attributable transaction costs. Subsequent to initial recognition, these are measured at amortized cost with any difference between cost and value at maturity recognized in the statement of income and expenditure account over the period of the borrowings on an effective interest rate basis.

Loan at a below-market rate of interest from Government are recognized and measured at amortized cost (i.e. the present value of the future cash flows discounted at a market rate of interest). The benefit, that is the difference between the fair value of the loan on initial recognition and the amount received, is accounted for as additional government grant. The benefit is accounted for as deferred credit and is amortized over the period of borrowings.

6.2 Government grants

Government grants are recognized when there is reasonable assurance that the Company will comply with all conditions attaching to them and these will be received.

When the grant relates to expense item, it is recognized as income over the period necessary to match the grant on systematic basis to the cost that is intended to compensate. When the grant relates to an asset, it is recognized as deferred income and changes to the income in equal amounts over the expected useful life of related assets.

Non monetary grants are recognised at fair value of the assets.

6.3 Post retirement benefit

The Company operates approved funded gratuity scheme covering all its full time permanent workers who have completed the minimum qualifying period of service as defined under the respective scheme. The gratuity scheme is managed by trustees. The calculation of the benefit requires assumptions to be made of future outcomes, the principal ones being in respect of increase in remuneration and the discount rate used to convert future cash flows to current values. The assumptions used for the plan are determined by independent actuary on annual basis.

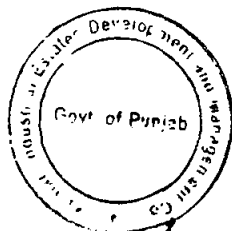
6.4 Trade and other payables

Liabilities relating to trade and other payables are carried at fair value of consideration to be paid in the future for goods and services received, whether or not billed to the Company.

6.5 Borrowing costs

Borrowing costs directly attributable to the acquisition, construction or production of qualifying assets, which are assets that necessarily take a substantial period of time to get ready for their intended use or sale, are added to the cost of those assets, until such time as the assets are substantially ready for their intended use or sale. Investment income earned on the temporary investment of specific borrowings pending their expenditure on qualifying asset is deducted from the borrowing costs eligible for capitalization. All other borrowing costs are recognized in the statement of income and expenditure as incurred.

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**PUNJAB INDUSTRIAL ESTATES
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Company Secretary

PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

6.6 Provisions

Provisions are recognized when the Company has a legal or constructive obligation as a result of past event, it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate of the amount can be made. Provisions are reviewed at each statement of financial position and adjusted to reflect the current best estimate.

6.7 Property, plant and equipment

Property and equipment are stated at cost less accumulated depreciation and impairment in value, if any. Cost of property plant and equipment consist of historical costs and directly attributable costs in bringing the assets to their working condition.

Depreciation is calculated by applying the rates mentioned in the Note 19 on reducing balance method. Depreciation is charged on additions from the month the asset is available for use and on disposals up to the month preceding the month of disposal. The assets' residual values and useful lives are reviewed and adjusted, if appropriate, at each reporting date.

Normal repair and maintenance is charged to income as and when incurred whereas major renewals and improvements are capitalized. Gain or loss on disposal of assets is charged to the statement of income and expenditure.

6.8 Capital work-in-progress

Capital work in progress represents expenditure on property, plant and equipment in the course of construction and installation including material, labour and overheads directly relating to the project. Capital work-in-progress is stated at cost less any identified impairment loss. All expenditure connected with specific assets incurred during installation and construction period are carried under capital work-in progress. These are transferred to specific assets as and when these are available for use.

6.9 Intangibles

Expenditure incurred to acquire intangibles is capitalized as intangible and stated at cost less accumulated amortization and any identified impairment loss. The estimated useful life and amortization method is reviewed at the end of each annual reporting period, with effect of any changes in estimate being accounted for on a prospective basis.

Intangibles are amortized using straight-line method over a period of three years. Amortization on additions to intangible assets is charged from the month the asset is available for use and on disposals up to the month preceding the month of disposal.

6.10 Stores, spare parts and loose tools

These are stated at lower of cost and net realizable value. Cost is determined using the weighted average method. Items in transit are valued at cost comprising invoice value plus other charges paid thereon.

6.11 Inventory

This represents saleable land received from government and land purchased for various projects, expenditure incurred on its development, and is intended to be sold in the ordinary course of business.

Expenditure incurred on development of infrastructure forms part of the cost of over all project and is included in the cost of inventory as and when incurred.

Inventory is valued at lower of the cost and net realizable value. Net realizable value is the estimated selling price of plots in the ordinary course of business less the estimated costs of completion of projects in progress. Cost is determined on worked performed basis.

6.12 Impairment

Financial assets

A financial asset is assessed at each reporting date to determine whether there is any objective evidence that it is impaired. Individually significant financial assets are tested for impairment on an individual basis. The remaining financial assets are assessed collectively in groups that share similar credit risk characteristics. A financial asset is considered to be impaired if objective evidence indicates that one or more events have had a negative effect on the estimated future cash flows of the asset.

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Notes to the Financial Statements

For the year ended June 30, 2018

An impairment loss in respect of a financial asset measured at amortized cost is calculated as the difference between its carrying amount, and the present value of the estimated future cash flows discounted at the original effective interest rate. Impairment loss in respect of a financial asset measured at fair value is determined by reference to that fair value. All impairment losses are recognized in statement of income and expenditure. An impairment loss is reversed if the reversal can be related objectively to an event occurring after the impairment loss was recognized. An impairment loss is reversed only to the extent that the financial asset's carrying amount after the reversal does not exceed the carrying amount that would have been determined, net of amortization, if no impairment loss had been recognized. Reversal of impairment loss is recognised in statement of income and expenditure except in the case of available for sale instruments where the reversal is included in other comprehensive income.

Non-financial assets

The carrying amount of the Company's non-financial assets, other than inventories and deferred tax assets are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated. The recoverable amount of an asset or cash generating unit is the greater of its value in use and its fair value less cost to sell. In assessing value in use, the estimated future cash flows are discounted to their present values using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset or cash generating unit.

An impairment loss is recognized if the carrying amount of the assets or its cash generating unit exceeds its estimated recoverable amount. Impairment losses are recognized in statement of income and expenditure. Impairment losses recognized in respect of cash generating units are allocated to reduce the carrying amounts of the assets in a unit on a pro rata basis. Impairment losses recognized in prior periods are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to that extent that the asset's carrying amount after the reversal does not exceed the carrying amount that would have been determined, net of depreciation and amortization, if no impairment loss had been recognized.

6.13 Trade debts

Trade debts are carried at original invoice amount less an estimate made for doubtful debts based on review of outstanding amounts at the year end. Bad debts are written off when identified.

6.14 Cash and cash equivalents

Cash and cash equivalents comprise of cash in hand and at bank and short term investments with maturities of three months or less. These are readily convertible to known amount of cash therefore they are subject to insignificant risk of changes in value and are used by the Company in the management of its short-term commitments.

6.15 Loans and receivables

Loans and receivables are recognized initially at fair value, plus attributable transaction costs. Subsequent to initial recognition, loans and receivables are stated at amortized cost with any difference between cost and redemption value being recognized in the statement of income and expenditure over the period of the investments on an effective yield method.

6.16 Financial instruments

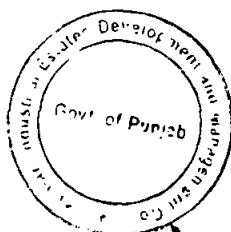
Financial assets comprise of deposits, trade debts, other receivable, short term investments and balance with banks and financial liabilities comprise of long term financing, trade and other payables, accrued mark up, deposits and loan from the Government of Punjab. Financial assets and liabilities are recognized when the Company becomes party to the contractual provisions of the instruments. Financial assets are de-recognized when the Company loses control of the contractual rights that comprise the financial assets. Financial liabilities are de-recognized when they are extinguished, that is, when the obligation specified in the contract is extinguished, cancelled, or expired. Any gain or loss on de-recognition of the financial assets and financial liabilities is taken to statement of income and expenditure.

Non-derivative financial liabilities are initially recognized at fair value less any directly attributable transaction costs. Subsequent to initial recognition, these liabilities are measured at amortized cost using effective interest method. The carrying values of liabilities approximates to their amortized cost.

Offsetting of financial assets and financial liabilities

Financial assets and liabilities are off-set and the net amount reported in the statement of financial position when there is a legally enforceable right to offset the recognized amounts and there is an intention to settle on a net basis, or realize the asset and settle the liability simultaneously.

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY GOVT. OF PUNJAB

Company Secretary

PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

6.17 Revenue

Revenue is recognized to the extent that it is probable that the economic benefits will flow to the Company and the revenue can be measured reliably. Revenue is measured at fair value of consideration received or receivable on the following basis:

- Revenue from sale of industrial plots is recognized at the completion of the project for its intended use by the owner of the plot and the chances of cancellation of the allotment of the plot is remote at which stage the Company determines that the risks and rewards associated to sale of plot is transferred to the buyer.
- Revenue from electricity bills is recognized on the basis of electricity supplied to customers at rates determined by NEPRA for LESCO. Electricity sale is recorded on accrual basis i.e. when the consumers have consumed the electricity supplied.
- Fee and other charges are charged to customers at prescribed rates and they are recognized as income on accrual basis.
- Operations and maintenance charges billed to customers are recorded on accrual basis.
- Non-utilization fee is recognized if the project is not completed in accordance with terms of allotment of the plot and the recovery of the fee is certain.
- Return on bank deposits is recognized as and when accrued on effective interest method.
- Miscellaneous income represents fee for providing temporary connections and repair/replacement of cables and temporary meters. The fee for installation/replacement of temporary connections is recognized on installation of meters at allottees' sites. The income related to repair of meters and cables is recognised on performance of repair and maintenance services.

6.18 Advances received for sale of plots

Advances received from customers against sale of plots are stated at cost. They are recognized as revenue when the chances of cancellation of the allotted plot are remote and the customer has completed the project.

6.19 Deferred income

Amount received from customers for electric transformers are recognised as deferred income and recognized as income over the useful life of the transformers from the date of installation.

6.20 Summary of significant events and transactions

- Due to the first time application of financial reporting requirements under the Companies Act, 2017 and NPO standards, including disclosure and presentation requirements of the fifth schedule of the Companies Act, 2017, the Company has presented additional disclosures in these financial statements and represented certain comparative figures;
- During the year, the Company has purchased property plant and equipment amounting to Rs. 173 million; and
- During the year, the Company had disposed off investment amounting to Rs. 200 million.

6/12/18

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PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

6.21 Effect of restatement:

- (a) During the year, due to application of the Companies Act, 2017 and NPO standards, the Company has changed its accounting policies w.r.t. amortization of subsidise loans obtained from sponsors. The Company has recognised the present value effect of low interest-bearing loan from Government of Punjab in statement of financial position as government grant. Loans or similar assistances provided by Governments or similar institutions with an interest free loan or interest rate below the current applicable market rate is recorded as government grant. The effect has been incorporated by restating the comparative figures.
- The Company had originally recognised the present value effect of low interest-bearing loan from Government of Punjab in statement of changes in equity being loan provided by the Government of Punjab in the capacity of shareholder. (TR-32 issued by ICAP).
- (b) The Company has restated grants received from sponsors for setting up a pharmaceutical laboratory at Sundar Industrial Estate and acquisition of land and development of new industrial estate in Gujrat and which had been included in equity in accordance with TR-32 of ICAP previously.

Effect of restatements are as follows:

	Original	Effect of Restatement	Restated
	-----Rupees-----		
Balance as at 30/06/2016		Increase/(Decrease)	Balance as at 30/06/2016
Statement of changes in equity			
Accumulated surplus	1,789,019,559	552,528,560	2,341,548,119
Equity portion of shareholder loan	2,062,496,880	(2,062,496,880)	-
Net Decrease in Statement of changes in equity		(1,509,968,320)	

Statement of financial position			
Deferred credit	-	1,281,626,938	1,281,626,938
Deferred Grants	-	228,341,382	228,341,382
Net Increase in Statement of financial position		1,509,968,320	

	Original	Effect of Restatement	Restated
	-----Rupees-----		
Balance as at 30/06/2017		Increase/(Decrease)	Balance as at 30/06/2017
Statement of changes in equity			
Accumulated surplus	1,859,770,286	1,094,549,357	2,954,319,643
Equity portion of shareholder loan	2,494,108,170	(2,494,108,170)	-
Net Decrease in Statement of changes in equity		(1,399,558,813)	

Statement of financial position			
Deferred credit	-	1,181,505,985	1,181,505,985
Deferred Grants	-	218,052,828	218,052,828
Net Increase in Statement of financial position		1,399,558,813	

	Original	Effect of Restatement	Restated
	-----Rupees-----		
For the year ended 30/06/2017		Increase/(Decrease)	For the year ended 30/06/2017

Statement of Income and Expenditure and Other Comprehensive Income			
Income			
Amortization of grants	-	10,288,554	10,288,554
Effect of discounting of interest free loan	-	542,020,800	542,020,800
Net Increase in Income and Expenditure		552,309,354	

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DEVELOPMENT AND MANAGEMENT COMPANY
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Company Secretary

PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

	Note	2018 Rupees	2017 Rupees
7 Share capital			
Authorized share capital			
15,000,000 (2017:15,000,000) ordinary shares of rupees 10 each		150,000,000	150,000,000
Issued, subscribed and paid up capital			
5,000,000 (2017:5,000,000) ordinary shares of rupees 10 each fully paid in cash		50,000,000	50,000,000
		<u>50,000,000</u>	<u>50,000,000</u>
	Note	2018 Rupees	2017 Rupees (Restated)
8 Long term financing			
Loan from Government of Punjab I	8.1	935,000,500	935,000,500
Loan from Government of Punjab II	8.2	151,000,000	151,000,000
Loan from Government of Punjab III	8.3	100,000,000	100,000,000
Loan from Government of Punjab IV	8.4	19,500,000	19,500,000
Sub total	8.5	1,205,500,500	1,205,500,500
Loan from Government of Punjab V- VI	8.6	250,000,000	250,000,000
Loan from Government of Punjab VII - 1st Tranche	8.7	3,315,668,001	3,315,668,001
Loan from Government of Punjab VII - 2nd Tranche	8.8	1,587,332,000	1,587,332,000
Loan from Government of Punjab VIII - A	8.9	470,000,000	470,000,000
Loan from Government of Punjab IX - A	8.10	1,650,000,000	1,650,000,000
Sub total		8,478,500,501	8,478,500,501
Less: Repayment of loan		(602,750,000)	(482,200,000)
Less: Deferred credit	10	(2,254,954,917)	(2,254,954,917)
		5,620,795,584	5,741,345,584
Opening balance of amortization		1,073,448,932	531,428,132
Add: Amortization of deferred income during the year		500,532,835	542,020,800
	8.11 & 8.12	1,573,981,767	1,073,448,932
Total Financing		7,194,777,351	6,814,794,516
Less: Current portion of long term financing	8.13	(4,901,106,001)	(3,026,772,667)
		<u>2,293,671,350</u>	<u>3,788,021,849</u>
8.1 This represents loan from the Government of Punjab for development of infrastructure and ancillary facilities at Sundar Industrial Estate. For terms refer to Note 8.5.			
8.2 This represents loan from the Government of Punjab for the establishment of Vchari Industrial Estate. For terms refer to Note 8.5.			
8.3 This represents loan from the Government of Punjab for shifting of Hazardous Industries from city to Sundar Industrial Estate. For terms refer to Note 8.5.			
8.4 This represents loan from Government of Punjab on behalf of Punjab Environmental Effluent Treatment Company ("PEETCO"), a related party, for combined effluent treatment plant at Sundar Industrial Estate. (For terms refer to Note 8.5).			
8.5 Aggregate amount of loan of Rs.1,205.50 million is repayable in ten equal annual instalments commencing from 31 December 2013 and carries mark-up at the rate at 0.25% per annum. Penalty on overdue payments is chargeable at the rate of 4% per annum.			
8.6 This represents loan received from the Government of Punjab of Rs. 150 million for establishment of Vchari Industrial Estate and Rs. 100 million for shifting of Hazardous Industries from City to Sundar Industrial Estate. The loan is repayable in three equal annual instalments commencing from 30 June 2017 and carries mark-up at the rate at 0.25% per annum. Penalty on overdue payments is chargeable at the rate of 4% per annum.			
8.7 This represents loan received from the Government of Punjab for the establishment of Quaid-e-Azam Business Park Sheikhupura. The loan was received in the form of land having award value of Rs. 3,316 million with area measuring 1,562 acres during the year ended 30 June 2014. The loan is repayable in three equal annual instalments commencing from 30 June 2017 and carries mark-up at the rate at 0.25% per annum. Penalty on overdue payments is chargeable at the rate of 4% per annum.			
8.8 This represents loan received during 30 June 2015 from the Government of Punjab for the establishment of Quaid-e-Azam Business Park Sheikhupura. The loan is repayable in three equal annual instalments commencing from 30 June 2018 and carries mark-up at the rate at 0.25% per annum. Penalty on overdue payments is chargeable at the rate of 4% per annum.			

6/12

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OPENED BY GOVT OF PUNJAB
Company Secretary

PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984, Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

- 8.9 This represent loan received last year from the Government of Punjab for the establishment of Chunian Industrial Estate. The loan is repayable in three equal annual instalments commencing from 30 June 2019 and carries mark-up at the rate at 0.25% per annum. Penalty on overdue payments is chargeable at the rate of 4% per annum.
- 8.10 This represents loan received during 30 June 2017 from the Government of Punjab for the establishment of Quaid-e-Azam Apparel Park Sheikhupura. The loan is repayable in three equal annual instalments commencing from 30 June 2020 and carries mark-up at the rate at 0.25% per annum. Penalty on overdue payments is chargeable at the rate of 4% per annum.
- 8.11 This represents difference between amortized cost and face value of loan. Amortized cost has been determined using effective mark-up at 9.83% per annum.
- 8.12 The Company has recognised the present value effect of low interest bearing loan from the Government of Punjab in statement of financial position as deferred credit.
- 8.13 This includes an overdue amount of Rs. 4,298 million (2017: Rs. 1,188.56 million) at year end.

	Note	2018 Rupees	2017 Rupees
9	Deferred income		
	Opening balance	168,275,489	101,097,885
	Receipt from customers during the year	52,562,969	85,874,870
	Amortization during the year	(19,005,829)	(18,697,266)
	Closing balance as at 30 June	201,832,629	168,275,489
	Note	2018 Rupees	2017 Rupees (Restated)
10	Deferred credit		
	Opening balance	2,254,954,917	2,254,954,917
	Less: accumulated amortization	(1,573,981,767)	(1,073,448,932)
	Closing balance as at 30 June	680,973,150	1,181,505,985
11	Deferred grants		
	Opening balance	218,052,828	228,341,382
	Grants received during the year	-	-
		218,052,828	228,341,382
	Grants amortized related to income	-	-
	Grants amortized related to assets	(7,746,282)	(10,288,554)
	Closing balance as at 30 June	210,306,546	218,052,828
11.1	This includes grant of Rs. 80 million from the Government of Punjab for setting up a pharmaceutical laboratory at Sundar Industrial Estate and Rs. 180 million received in cash for acquisition of land and development of new industrial estate in Gujrat. No development work has been started till 30 June 2018 in Gujrat Industrial Estate.		
12	Deferred liabilities		
	The latest actuarial valuation of the Company's defined benefit gratuity scheme was conducted on 30 June 2018 using projected unit credit method. Details of obligation for defined benefit gratuity scheme is as follows:		
	Note	2018 Rupees	2017 Rupees
12.1	Present value of defined benefit obligation	134,058,736	93,239,370
	Fair value of plan assets	(101,027,092)	(74,694,028)
	Liability as at 30 June	33,031,644	18,545,342

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PUNJAB INDUSTRIAL ESTATE
DEVELOPMENT AND MANAGEMENT COMPANY
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Company Secretary

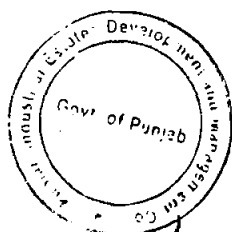
PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

(a company set up under section 42 of the repealed Companies Ordinance, 1984. Now Companies Act, 2017)

Notes to the Financial Statements

For the year ended June 30, 2018

	Note	2018 Rupees	2017 Rupees
12.2 Movement in liability for defined benefit obligation			
Present value of defined benefit obligation at beginning of the year		93,239,370	76,264,035
Current service cost for the year		30,929,630	20,623,025
Interest cost for the year		7,911,270	4,680,335
Benefits due but not paid		-	(5,505,646)
Benefits paid		(13,708,582)	(17,909,727)
Advance benefits paid		(1,715,668)	-
Experience adjustments actuarial loss		17,402,716	15,087,348
Present value of defined benefit obligation at end of year		<u>134,058,736</u>	<u>93,239,370</u>
12.3 Comparative amounts of five years			
			Rupees
30 June 2016			<u>76,264,035</u>
30 June 2015			<u>64,329,173</u>
30 June 2014			<u>48,338,703</u>
30 June 2013			<u>36,614,004</u>
30 June 2012			<u>21,258,445</u>
12.4 Changes in fair value of plan assets			
		2018 Rupees	2017 Rupees
Fair value of plan assets		74,694,028	67,712,848
Contributions		37,336,629	29,116,904
Interest income on plan assets		8,001,995	5,315,442
Benefits paid		(13,708,582)	(24,695,671)
Advance benefits paid		(1,715,668)	-
Experience adjustments on return on plan assets		(3,581,310)	(2,755,495)
Fair value of plan assets		<u>101,027,092</u>	<u>74,694,028</u>
12.5 Expenses to be charged to statement of income and expenditure			
Current service cost		30,929,630	20,623,025
Interest cost on defined benefit obligation		7,911,270	4,680,335
Interest income on plan assets		(8,001,995)	(5,315,442)
Expenses chargeable to statement of income and expenditure		<u>30,838,905</u>	<u>19,987,918</u>
12.6 Remeasurement chargeable in other comprehensive income			
Experience adjustments on plan obligations		17,402,716	15,087,348
Experience adjustments on return on plan assets		3,581,310	2,755,495
		<u>20,984,026</u>	<u>17,842,843</u>
12.7 Significant actuarial assumptions		2018	2017
Discount rate used for interest cost in statement of income and expenditure		8%	7%
Discount rate used for year-end obligation		7%	9%
Salary increase used for year-end obligations:			
Salary increase FY 2017		N/A	N/A
Salary increase FY 2018		7%	8%
Salary increase FY 2019		7%	8%
Salary increase FY 2020		7%	8%
Salary increase FY 2021		7%	8%
Salary increase FY 2022		7%	8%
Salary increase FY 2023 onward		7%	8%
Next salary is increased at		1/9/2018	01/09/2017
Mortality rates		SLIC 2001-05	SLIC 2001-05
		Setback 1 Year	Setback 1 Year
Withdrawals rates		Age-based	Age-based
		(per appendix)	(per appendix)
Retirement assumption		Age 60	Age 60



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PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

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Notes to the Financial Statements

For the year ended June 30, 2018

	Note	2018 Rupees	2017 Rupees
12.8 Expected expense for the next year			
Current service cost		32,561,620	25,443,635
Interest cost on defined benefit obligation		14,209,348	7,835,267
Interest income on plan assets		(10,456,333)	(7,466,480)
Amount chargeable to statement of income and expenditure		36,314,635	25,812,422
12.9 Year end sensitivity analysis on defined benefit obligation			
Discount rate increase by 100 bps		121,593,765	84,467,265
Discount rate decrease by 100 bps		148,948,255	103,705,825
Salary increase by 100 bps		148,091,432	104,482,457
Salary decrease by 100 bps		121,378,746	83,629,724
13 Loan from the Government of Punjab - unsecured			
Loan VIII - B	13.1.1	103,203,387	103,203,387
Loan IX - B	13.1.2	132,000,000	132,000,000
Loan X	13.1.3	130,566,562	130,566,562
Loan XI	13.1.4	1,064,085,000	1,064,085,000
		1,429,854,949	1,429,854,949
13.1.1 The represents land sold by the Government of Punjab (GoPb) to the Company for the establishment of Chunian Industrial Estate having award value of Rs. 103.20 million with area measuring 130.11 acres during the year ended 30 June 2014. In accordance with letter received from the GoPb sale price of such land will be converted into loan after finalization of specified terms and condition with the Finance Department. Since the terms and conditions are not finalized, accordingly this loan has been classified as short term loan.			
13.1.2 The represents land sold by the Government of Punjab (GoPb) to the Company for the establishment of Vehari Industrial Estate having award value of Rs. 132 million with area measuring 200 acres during the year ended 30 June 2012. In accordance with letter received from the GoPb sale price of such land will be converted into loan after finalization of specified terms and condition with the Finance Department. Since the terms and conditions are not finalized, accordingly this loan has been classified as short term loan.			
13.1.3 The represents land sold by the Government of Punjab (GoPb) to the Company for the establishment of Bahawal Industrial Estate having award value of Rs. 127.33 million and Rs. 3.24 million with area measuring 385.84 acres and 4.91 acres during the year ended 30 June 2011 and 2012, respectively. In accordance with letter received from the GoPb sale price of such land will be converted into loan after finalization of specified terms and condition with the Finance Department. Since the terms and conditions are not finalized, accordingly this loan has been classified as short term loan.			
13.1.4 The represents land sold by the Government of Punjab (GoPb) to the Company for the establishment of Bahawalpur Industrial Estate having award value of Rs. 1,064.09 million with area measuring 483.18 acres during the year ended 30 June 2017. In accordance with letter received from the GoPb sale price of such land will be converted into loan after finalization of specified terms and condition with the Finance Department. Since the terms and conditions are not finalized, accordingly this loan has been classified as short term loan.			
14 Trade and other payables			
Creditors		538,333,525	175,726,143
Advances from customers		166,550,778	120,959,145
Accrued liabilities		33,127,819	25,805,742
Bills payable		258,188,366	86,029,182
Retention money payable		331,624,164	324,779,841
With holding tax payable		108,611,346	151,129,353
Payable to tannery zone allottees		2,923,403	2,923,403
Gratuity due but not paid			6,635,444
Other payables	14.1	104,011,650	8,563,988
		1,543,371,050	902,552,240

14.1 This includes donation payable of Rs. 3,041,525 (2017: 3,041,525).

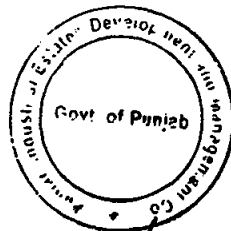
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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
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Company Secretary

EXPRESSION OF INTEREST





PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)



EXPRESSION OF INTEREST

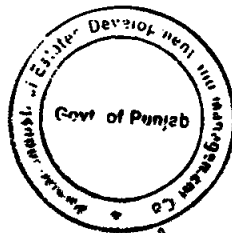
In the light of resolution passed by the Board of Directors in 104th BOD meeting held on July 21, 2016. The Company expresses its interest to provide credit from the resources owned by the company.



Chief Executive Officer



NET WORTH / DEBT & EQUITY RATIO





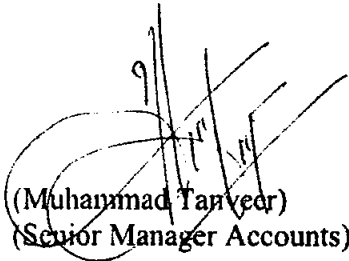
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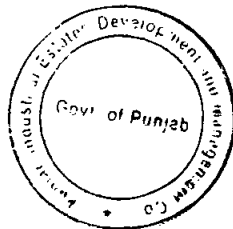
NET WORTH CERTIFICATE

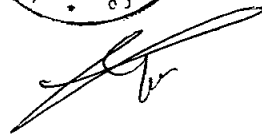
This is to certify that the Net worth of M/s. Punjab Industrial Estate Development & Management Company as on June 30, 2018, was Rupees 3,051.50 million only, as per the computation attached annexure "A". It is further certified that the computation of Net worth is based on Audited Accounts for the Financial Year 2017-18 audited by independent auditors.

For and on behalf of PIEDMC


(Muhammad Tanveer)
(Senior Manager Accounts)

Date:





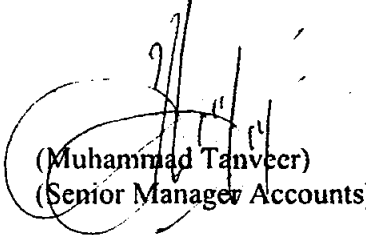


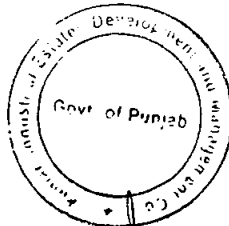
NET DEBIT EQUITY RATIO CERTIFICATE

This is to certify that the **Debit Equity Ratio** of **M/s. Punjab Industrial Estate Development & Management Company** as on June 30, 2018, was **2.82** as per the computation given below. It is further certified that the computation of Debit Equity Ratio is based on Audited Accounts for the Financial Year 2017-18 audited by independent auditors.

Particulars	Financial Statement Note No.	Rupees In Million
Long term financing	8	2,293.67
Current portion of long term financing	8	4,901.11
Loan from the Govt. of Punjab - unsecured	13	1,429.86
Total Debit (A)		8,624.64
Paid up Capital	7	50.00
Excess of income over expenditure as per statement of change in equity		3,001.81
Total Equity (B)		3,051.81
Debit Equity Ratio (A/B*100)		2.82

For and on behalf of PIEDMC


(Muhammad Tanveer)
(Senior Manager Accounts)



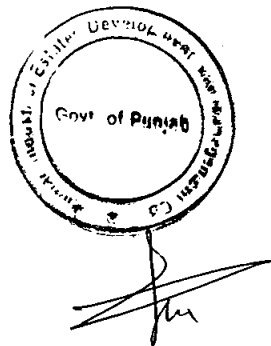
Date:



COMPUTATION OF NET WORTH

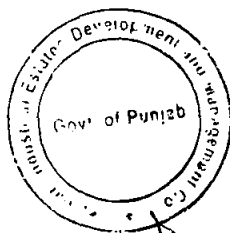
The net worth has been computed as per the format given below for the Financial Year Ending June 30, 2018.

Particulars	Rupees In Million
Paid up Capital (A)	50.00
Add: Equity Share Premium (B)	-
Add: Reserve & Surplus (excluding revaluation reserves) (C)	3,001.81
Less : Statutory Reserves (D)	-
Less: Revaluation Reserves (E)	-
Less: Accumulated losses if any – (F)	-
Less: Intangible Assets included in the balance sheet (G)	0.31
Less: Miscellaneous Expenditure to the extent not written off– (H)	-
Total Net worth ((A+B+C)-(D+E+F+G+H))	3,051.50



**PROFILE OF THE APPLICANT AND THE
APPLICANT'S SENIOR MANAGEMENT
AND PROFESSIONAL STAFF**

**EMPLOYEMENT RECORDS OF
ENGINEERING AND TECHNICAL STAFF
OF THE APPLICANT PROPOSED TO BE
EMPLOYED**





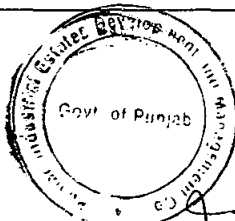
PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
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List of the Board of Directors

Punjab Industrial Estates Development & Management Company

Sr. #	Name	Designation
1	Mr. Muhammad Anees Khawaja	Chairman / Independent Director
2	Mr. Yasir Asghar Bucha	Independent Director
3	Mr. Shahid Hussain Tarer	Independent Director
4	Mr. Shahzad Azam Khan	Independent Director
5	Mr. Sajid Saleem Minhas	Independent Director
6	Dr. Sumaira Rehman	Independent Director
7	Mr. Mian Abuzar Shad	Independent Director
8	Mr. Sohail Azhar	Independent Director
9	Mr. Obaid Ullah	Independent Director
10	Mr. Ali Mouazzam Syed Chief Executive Officer-PIEDMC	Ex-officio Director
11	Chief Executive Officer-PBIT	Ex-officio Director
12	Secretary, Industries, Commerce, Investment & Skill Development Department.	Ex-officio Director
13	Secretary, Finance Department	Ex-officio Director
14	Secretary, Labour & HR Department	Ex-officio Director
15	Chairperson TEVTA	Ex-officio Director



ATTESTED TO BE TRUE COPY

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB



THE COMPANIES ACT, 2017
THE COMPANIES (GENERAL PROVISIONS AND FORMS) REGULATIONS, 2018
[Section 197 and Regulations 4 & 20]

PARTICULARS OF DIRECTORS AND OFFICERS, INCLUDING THE CHIEF EXECUTIVE, SECRETARY, CHIEF FINANCIAL OFFICER, AUDITORS AND LEGAL ADVISER OR OF ANY CHANGE THEREIN

PART-I

(Please complete in typescript or in bold block capitals.)

1.1 CUIN (Registration Number)

R P - 3 7 9

1.2 Name of the Company

Punjab Industrial Estates Development & Management Company

1.3 Fee Payment Details

1.3.1 Challan No.

1.3.2 Amount

500/-

2. Particulars*

PART-II

Present Name in Full	NT No. or passport No. in case of Foreign National	Father's/ Husband's Name	Usual residential address	Designation	Nationality **	Business Occupation *** (if any)	Date of present appointment or change	Mode of appointment/ change / any other Remarks ****	Nature of directorship (nominee /independent/ additional/ other *****
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2.1 New appointment/election:									
Muhammad Ancees Khawaja	36302-4648285-3	Khawaja Muhammad Younus	Mehr Manzil, O/S Lohari Gate, Multan.	Chairman / Independent Director	Pakistani	Business	01-04-2022	Re-appointed by the Govt. of the Punjab vide Notification # AEA-I-15-22/2002(P-V)	Independent

								of ICI&SD Department dated 01-04-2022	
Shahid Hussain Tarer	34101-9534689-9	Sadiq Hussain Tarer	House # 12/13, A/2, WAPDA Town, Gujranwala.	Independent Director	Pakistani	Business	01-04-2022	-do-	Independent
Dr. Sumaira Rehman	35202-9760853-0	Dr. Ch. Abdul Rehman	Superior University, 17-KM Mian Raiwind Road, Lahore.	Independent Director	Pakistani	Educationist	01-04-2022	-do-	Independent
Shahzad Azam Khan	35202-9862024-7	Muhammad Azam Khan	House # 7/1, Block B, Model Town, Lahore.	Independent Director	Pakistani	Business	01-04-2022	-do-	Independent
Yasir Asghar Bucha	35201-2545128-1	Noor Asghar Bucha	77 Peer Khursid Colony, Muhana	Independent Director	Pakistani	Business	01-04-2022	Appointed by the Govt. of the Punjab vide Notification # AEA-I-15- 22/2002(P-V) of ICI&SD Department dated 01-04-2022	Independent
Mian Abuzar Shad	35202-2532223-9	Mian Muhammad Shafi	170-H, Model Town, Lahore	Independent Director	Pakistani	Business	01-04-2022	-do-	Independent
Obaid Ullah	35202-9589038-1	Asad Ullah	Muhammad Umer Riaz Law Associates, 6-Begum Road, Lahore.	Independent Director	Pakistani	Legal Consultant	01-04-2022	-do-	Independent

Sajid Saleem Minhas	35202-0669048-7	Muhammad Saleem Minhas	House # 79-C, DHA, Phase-V, Lahore.	Independent Director	Pakistani	Business	01-04-2022	-do-	Independent
Sohail Azhar	35201-1348146-1	Azhar Ameen Sheikh	H # 83, St. 16, Cavalry Ground Extension, Lahore Cantt	Independent Director	Pakistani	Business	01-04-2022	-do-	Independent
Mr. Ahmer ud Din Mallick Chief Executive Officer PBIT	35201-1308058-9	Saif ud Din Mallick	Punjab Board of Investment & Trade 23, Aikman road GOR-1, Lahore.	Ex-Officio Director	Pakistani	PBIT Employee	01-04-2022	-do-	Ex-Officio Director
Ali Muazzam Syed	35202-8279686-3	Aslam Bahar Syed	H# 504, DHA Phase 3, Lahore.	Ex-Officio Director	Pakistani	PIEDMC Employee	01-04-2022	Given additional charge of CEO	Ex-Officio Director
Wasif Khurshid Secretary, Industries Commerce & Investment	36302-9171740-9	Khurshid Ahmad Anwer	Old P&D Building, 2-Bank Road, Lahore.	Ex-Officio Director	Pakistani	Govt. Employee	03-11-2021	Appointed in place of Cap. (Retd) Muhammad Zafar Iqbal	Ex-Officio Director
Iftikhar Amjad Secretary, Finance Department	35202-2994923-9	Muhammad Amjad	Civil Secretariat, Lahore.	Ex-Officio Director	Pakistani	Govt. Employee	01-12-2021	Appointed in place of Muhammad Abdullah Khan Sumbal	Ex-Officio Director
Dr. Muhammad Suhail Secretary, Labour & Human Resource Department	33100-0640328-3	Ghulam Haider Chatha	Old P&D Building, 2-Bank Road, Lahore.	Ex-Officio Director	Pakistani	Govt. Employee	10-12-2021	Appointed in place of Liaqat Ali Chatha	Ex-Officio Director

Ali Salman Siddique Chairperson TEVTA	35202-8706528-5	Salman Siddique	96-Gulberg Road, Lahore.	Ex-Officio Director	Pakistani	Private Sector	01-04-2022	Appointed in place of Hafiz Farhat Abbas	Ex-Officio Director
2.2 Ceasing of office/Retirement/Resignation:									
Syed Nabeel Hashmi	35202-5698574-5	Syed Quwat Ali Shah	Thermosole Industries (Pvt.) Ltd. 140 main industrial area, Kot Lakhat, Lahore.	Chairman	Pakistani	Business	12-12-2021	Ceased of office	Independent
Ahsan Mahmood Butt	35201-1606258-9	Asim Hussain Butt	M/s FAS Tube Mills & Engineering, Plot # 457- 460, Sundar Industrial Estate, Lahore.	Independent Director	Pakistani	Business	12-12-2021	-do-	Independent
Khawaja Arif Qasim	35202-4601928-1	Sheikh Muhammad Qasim	125-A, Quaid-e- Azam Industrial Estate, Kot Lakhat, Lahore.	Independent Director	Pakistani	Business	12-12-2021	-do-	Independent
Syed Tariq Siraj Jafri	35202-2595174-1	Syed Siraj ul Hassan Jafri	68-Block-B, Model Town, Lahore.	Independent Director	Pakistani	Business	12-12-2021	-do-	Independent
Usman Aslam Malik	35201-1555409-1	Malik Muhammad Aslam Khan	M/s Koretec Auto Industries, 16 KM, Multan Road, Lahore.	Independent Director	Pakistani	Business	12-12-2021	-do-	Independent

8+

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Muhammad Anees Khawaja	36302-4648285-3	Khawaja Muhammad Younus	Mehr Manzil, O/S Lohari Gate, Multan.	Independent Director	Pakistani	Business	12-12-2021	Re-appointed	Independent
Shahid Hussain Tarer	34101-9534689-9	Sadiq Hussain Tarer	House # 12/13, A/2, WAPDA Town, Gujranwala.	Independent Director	Pakistani	Business	12-12-2021	-do-	Independent
Dr. Sumaira Rehman	35202-9760853-0	Dr. Ch. Abdul Rehman	Superior University, 17-KM Mian Raiwind Road, Lahore.	Independent Director	Pakistani	Educationist	12-12-2021	-do-	Independent
Shahzad Azam Khan	35202-9862024-7	Muhammad Azam Khan	House # 7/1, Block B, Model Town, Lahore.	Independent Director	Pakistani	Business	12-12-2021	-do-	Independent

- * In the case of a firm, the full name, address and above-mentioned particulars of each partner, and the date on which each became a partner.
- ** In case the nationality is not the nationality of origin, provide the nationality of origin as well.
- *** Also provide particulars of other directorships or offices held, if any."
- **** In case of resignation of a director, the resignation letter and in case of removal of a director, member's resolution be attached.
- ***** In case of a director nominated by a member or creditor the name of such nominating or appointing body shall also be mentioned in column (j), and a copy of resolution from the nominating or appointing body be attached.
- J.

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PART-III

3.1

Declaration:

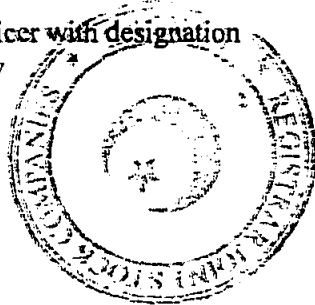
I do hereby solemnly; and sincerely declare that the information provided in the form is:

- i. true and correct to the best of my knowledge, in consonance with the record as maintained by the Company and nothing has been concealed; and
- ii. hereby reported after complying with and fulfilling all requirements under the relevant provisions of law, rules, regulations, directives, circulars and notifications whichever is applicable.

3.2 Name of Authorized Officer with designation
/Authorized Intermediary

M. Shafiqur-Rehman	Acting Company Secretary
--------------------	--------------------------

3.3 Signatures



[Handwritten Signature]

3.4 Registration No of Authorized Intermediary, if applicable

[Empty box for registration number]

3.5 Date

Day
1 2

Month
0 4

Year
2 0 2 2

[Handwritten Signature]
22/4/22
DISTRICT OFFICER BPWMA
For Registrar Joint Stock Companies
Lahore

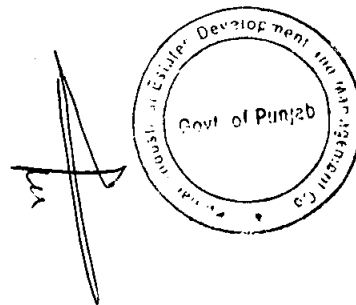
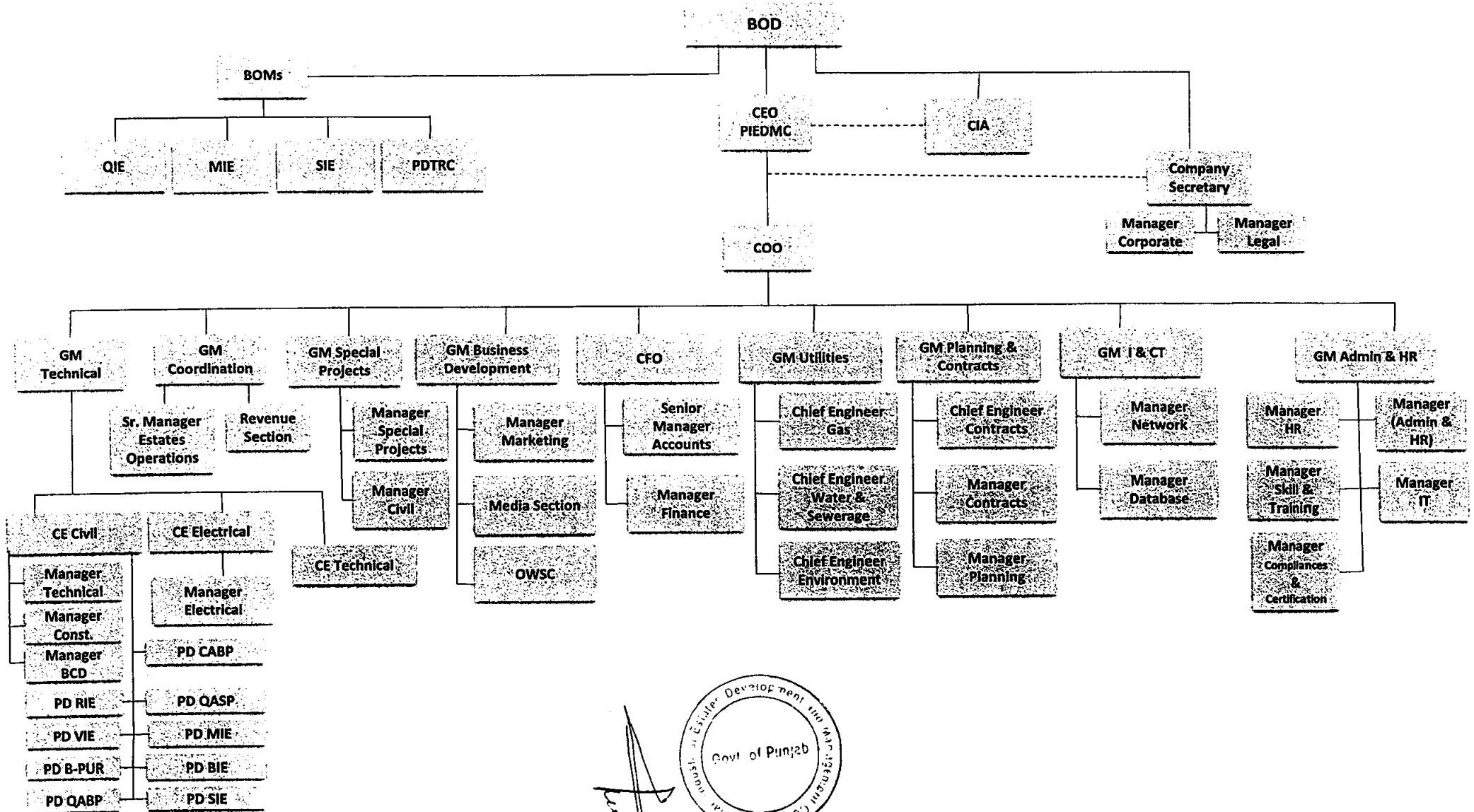
[Handwritten Signature]
DISTRICT OFFICER BPWMA
For Registrar Joint Stock Companies
Lahore

Punjab Industrial Estates Deployment and Management Company (PIED MC)

Employees Data Head Office

Official Data

S. No.	Emp. No.	Employee Name	Designation	Department	Deployed	Grade	Date of Joining	Qualification
1	1319	Ali Muazzam Syed	CEO-PIEDMC	CEO Office	Head Office	12	8-Jul-20	Msc (Transportation Engg), MBA (Finance)
2	432	Umar Saeed	GM Coordination	Coordination	Head Office	11	14-Mar-14	BSc. (Civil) & EMBA & M.Phil
3	1318	Farukh Elahi Johri	GM (Technical)	Engineering	Head Office	11	13-Apr-20	BSc Civil Engineering ME (Hon) Civil Engineering
4	1316	Amina Faisal	GM (Business Development)	Marketing	Head Office	11	27-Feb-20	MSc (Finance & Economics)
5	207	Muhammad Tanveer	Acting CFO	Accounts	Head Office	10	20-Aug-07	MBA (Finance)
6	1333	Tajdar Javed	Sr. Manager Estates Operations	Coordination	Head Office	10	29-Apr-22	MA & LLB
7	1315	Muneeb Ahmad Dar	Chief Engineer Electrical	Electrical	Head Office	10	10-Feb-20	BSc Electrical Engineering
8	936	Khizar Hayat	Project Director-CABP/QASP	Engineering	CABP Office	10	14-Jun-10	BSc. (Electrical)
9	404	Nouman Rafique	Chief Engineer Technical	Engineering	Head Office	10	9-Mar-11	Msc (Hydro Power Engg)
10	1177	Ahmad Ali	Acting GM (Planning & Contracts)	Planning & Contracts	Head Office	10	24-May-16	BSc (Civil)
11	910	Muhammad Aamir	Manager Electrical	Electrical	Head Office	9	4-Aug-08	MBA (HRM) & B-Tech (Hons) Electrical
12	1322	Sohail Anwar	Deputy Manager Electrical	Electrical	Head Office	8	20-Apr-21	BSc Electrical Engineering
13	907	Zia-ur-Rehman	Asst. Manager O & M	Electrical	VIE Office	7	10-Mar-08	DAE (Electrical)
14	1098	Haris Rashid	Electrical Engineer	Electrical	Head Office	6	15-Jan-14	BSc (Electrical)
15	1229	Muhammad Hashim Amin	Electrical Engineer	Electrical	Head Office	6	1-Dec-16	MS (Electrical Engineering)
16	1182	Sarfraz Ali	Junior Engineer Electrical	Electrical	QABP Office	5	20-Jul-16	BSc (Electrical) & MS Engg. Management
17	1012	Umar Sohail	Senior Technician (Electrical)	Electrical	RIE Office	5	26-Jul-11	Matric
18	1089	Muhammad Khan	Sub Engineer (Electrical)	Electrical	RIE Office	5	4-Mar-13	DAE (Electronics)
19	982	Syed Sana Haider	Sub Engineer (Electrical)	Electrical	BIE Office	5	1-Apr-11	Matric & DAE Electrical
20	984	Habib-ur-Rehman	Sub Engineer (Electrical)	Electrical	QABP Office	5	19-Aug-14	Matric & DAE Electrical
21	1249	Syed Ghazanfar Ali Naqvi	Electrical Supervisor	Electrical	MIE Office	4	11-Apr-17	DAE (Electrical)
22	1103	Ihtisham Ali	Electrical Helper	Electrical	Head Office	2	1-Sep-14	DAE (electronics)





PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY

A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)



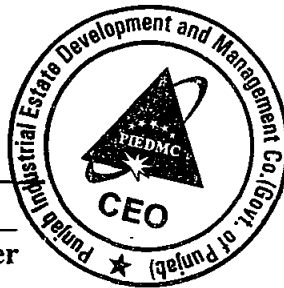
September 20, 2022

Undertaking

Use of Sub-Contractors

We hereby undertake that Punjab Industrial Estate Development and Management Company (PIEDMC) does not use the services of any sub-contractors and that this information holds true to the best of our knowledge.

Chief Executive Officer



**TECHNICAL AND FINANCIAL PROPOSAL IN
REASONABLE DETAIL FOR THE OPERATION,
MAINTENANCE, PLANNING & DEVELOPMENT
OF THE FACILITY AT SIE.**

Technical & Financial Proposal in Reasonable details for Operation, Maintenance, Planning and Development of Facility at SIE

Project Objectives:-

Sundar Industrial Estate comprising of 1763 acres of land was inaugurated in Feb, 2007 and is a vision turned into reality. It is the first project assigned to PIEDMC & was envisioned to be an 'island of facilitation' for prospective industrialists.

The main objective of power sector program in industrial estate was to create adequate electric supply to meet load requirement of industrial sector playing vital role in national economy.

Technical Aspects:-

Punjab Industrial Estates Development & Management Company (PIEDMC) has established 132/11.5kV Air Insulated Switchgear (AIS) Grid Station being fed by T-off arrangement from one of the circuits of 132kV KEL-Chak 65 Grid Station transmission line at the premises of Sundar Industrial Estate.

The design has been prepared for whole of the system as underground. The HV system consisted on HT Main feeders, Standby / Express feeders and LT Ring Main System to cater the ultimate load demand of Sundar Industrial Estate. The HT feeders are laid down to form open-end loop system to ensure continuity of supply in case of segment faults. The network is laid to achieve the safe operation, technical feasibility and stability of supply to the consumers of Industrial Estate.

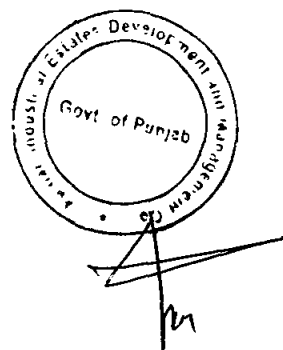
Salient Features of 132KV AIS Grid Station:-

1st Transformer Bay

Rating	;	31.5/40 MVA
Designed By	;	PowerCom
Constructed By	;	Siemens Pakistan
Transformer Make	;	Siemens
Commissioned / Energized On	;	10 th April, 2010

2nd Transformer Bay

Rating	;	31.5/40 MVA
Designed By	;	Pakistan Engineering Services (PES)
Constructed By	;	Siemens Pakistan
Transformer Make	;	Siemens
Commissioned / Energized On	;	11 th December, 2014



- 120mm² , 3-C AL/XLPE/PVC/AWA, 15kV
- 70mm², 4-C AL/PVC/PVC, 1kV
- 25mm², 4-C AL/PVC/PVC, 1kV

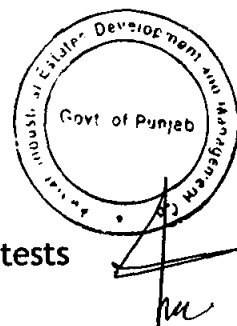
O&M of 132kV Grid Station:-

PIEDMC has established 31.5/40MVA, 132/11.5kV AIS Grid Station at its own cost and being operated and maintained by LESCO in light of agreement dated 8th April, 2010 signed between Punjab Industrial Estates Development & Management Company (PIEDMC) and Lahore Electric Supply Company. All preventive maintenance including equipment testing, relay settings, attending to the failure of equipment to diagnose problem are being carried out by concerned technical team of LESCO. The electricity within Industrial Estate is being regulated by LESCO staff deputed at 132kV Grid Station Sundar Industrial Estate in coordination with PIEDMC/BOMSIE in case load shedding / restricting the supply in any manner that may be deemed necessary due to system conditions.

Annual & General Maintenance:-

Annual and General Maintenance of 132kV Grid Station is being carried out on cost deposit basis through LESCO SS&T and P&I team. Following major activities are performed during maintenance:-

- ✓ Power Transformers
 - Megger, TTR, C&DF tests
 - Oil Testing and Earth Resistance tests
- ✓ 132kV Circuit Breakers
 - Timing tests
 - Contact Resistance and HiPoT
 - SF-6 purity tests
- ✓ 132kV CT's & PT's
 - C&DF, Megger Contact & Earth Resistance tests
 - Circuit verification test
- ✓ Contact & Earth Resistance test of 132kV Isolators
- ✓ HiPot of Lightning Arrestor
- ✓ Tightening of Jumpers & Droppers
- ✓ Protection & Instrumentation testing of Control and Relay Panels
- ✓ Earth mast of Grid Station
- ✓ 11kV Incoming Panel
 - Complete Panel / VCB testing
 - O/C, E/F relay test, DC Supervision, AMP/KV/PF meters
 - Cleaning & Greasing
- ✓ 11kV Outgoing Panel

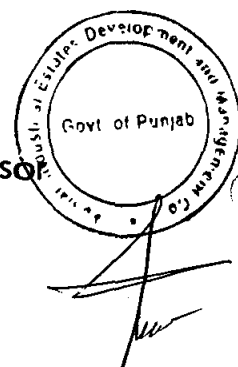


Ring Main Switches:-

- Inspection of Termination Kits
- Checking of SF6 gas pressure
- Checking of switching mechanism
- General cleaning
- Vermin Proofing

Street Light Control Panels:-

- Detail inspection of Street light control panels and light fixtures
- Checking of manual switching ON/OFF
- Cleaning of contacts
- Mechanical / Electrical operation of breakers
- Tightening of Power and Control cables
- Checking of instruments operation / photovoltaic sensor



Testing Equipment:-

Following major testing equipment is available with O&M team:-

Sr. No.	Description	Unit	Quantity
1	Cable Fault Location System Model Syscompact 2000 (32 KV) S/No. 1810600157001 along with Burn Down / Fault condition Option UL-30 & BM-30 along with all allied accessories.	Nos.	1
2	Route Locator (Seba KMT Easy)LOC RX	Nos.	1
3	Test Fault Locating System Unit SPG 15-1150	Set.	1
4	Oil Test Set 80KV Model : BA 80 (SB0007) Make : B2 Electronic GMBH Austria Origin : Austria (Along with GUI & Accessories mentioned in Evaluation criteria)	Set	1
5	3-Phase Power Quality Analyzer Model : WS 2320A Make : Applied Precision Origin : Slovakia 3-Phase working standard (120a, Class 0.05) Along GUI & CT Arrangement as mentioned in Evaluation Criteria	No.	1
6	Megger Insulation Tester Model SI 1068	Set.	1
7	High Voltage Detector 3kv ~ 24kvModel SEW 276 HD	Nos.	4

Availability, Sources, Rates and Evidence of Commitments with the Applications from the Sources of Electric Power

1. AVAILABILITY

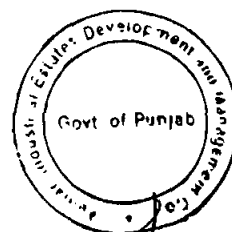
PIEDMC has established 132kV AIS Grid Station at Sundar Industrial Estate with sanctioned load of 104MW.

2. SOURCE

132kV single circuit overhead transmission line through Solid Tee-off arrangement from one of the circuits of 132kV KEL-Chak 65 Grid Station transmission line.

3. RATES

- a. The security deposits for all type of industrial connections are same as applicable in LESCO.
- b. All Tariff rates are the same as applicable in LESCO.
- c. The minimum charges required for connection are same as of LESCO.
- d. The equipment costs, however, vary because the two systems are entirely different in nature and design. The LESCO distribution system is overhead whereas, Underground distribution network is laid down in Sundar Industrial Estate to eliminate electricity outages/tripping and hence increase system stability. All 11kV feeders are configured in Ring Main System, controlled by RMUs. Each distribution transformer at Sundar Industrial Estate is connected with two (02) sources for supply of electricity.
- e. All B3 category consumers are required to provide independent transformer/s according to load as followed in LESCO.



Type, Technology, Model Technical Details and Design of Facilities
Proposed to be Acquired, Constructed, Developed or Installed
Equipment

The Electrical Design features are briefly stated as under:-

- **Design**

The design has been prepared for whole of the system as underground as the major fixtures/equipment such as Pad Mounted Transformers, HV Ring Main Switches and Street Light Poles etc.

- **Distribution System**

The HV system consists of HT Main feeders, standby / express feeders and LT Ring Main System to cater for ultimate load demand of Sundar Industrial Estate. The HT 'Distribution system consist on 40 no's of 11kV feeders including 4 express feeders. HT feeders have been constructed to form open-end loop system to ensure continuity of supply in case of segment faults. The network has been laid down to achieve the safe operation, technical feasibility and stability of supply to the consumers of Industrial Estate.

1. Power Requirement Calculations

For calculation of load, criteria and factors specified by WAPDA have been adopted. Punjab Industrial Estates Development & Management Company has assessed basic load requirement as 170kW per acre of industrial plot, and 5kW per marla (floor-wise connection) for commercial / community facilities, based on the requirements of individuals as per respective applications.

The sanctioned and proposed load details are as under:-

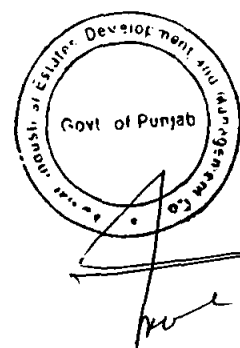
Sanctioned Load = 227.64 MW

Proposed Load for Under Construction Plots = 19.25 MW

Proposed Load for Vacant Plots = 21.98 MW

Proposed Load for Commercial / Community Facilities = 11 MW

Total Load Demand = 280 MW



b) COMMERCIAL & COMMUNITY FACILITIES / PUBLIC BUILDINGS

COMMERCIAL / COMMUNITY FACILITIES & PUBLIC BUILDINGS		
Sr. No.	Size (Marla)	No. of Plots
1	5	68
2	7.5	26
3	10	13
4	15	13
TOTAL PLOTS		120

2. Equipment Ratings

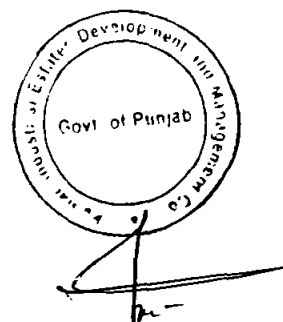
The material and equipment for system had been developed with standard available sizes and ratings. WAPDA Specifications have been adopted for the procured equipment and material. Major electrical material and other components with rating/sizes have been provided keeping in view the ultimate load requirements and are given as below:-

HT Distribution System

- i. 500mm², 1-C AL/XLPE/PVC/AWA, 15kV
- ii. 120mm², 3-C AL/XLPE/PVC/AWA, 15kV

LT Distribution System

- i. 70mm², 4-C AL/PVC/PVC, 1kV
- ii. 25mm², 4-C AL/PVC/PVC, 1kV

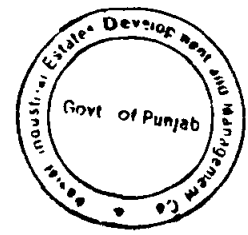


Power Supply Sources

132kV single circuit overhead transmission line through Solid Tee-off arrangement from one of the circuits of 132kV KEL-Chak 65 Grid Station transmission line. Presently 4 x 40MVA Power Transformers are installed. PIEDMC/BOMSIE has planned for 2nd 132kV Grid Station to cope with increasing load requirements.

SUNDAR INDUSTRIAL ESTATE

Sundar Industrial Estate comprising of 1763 acres of land was inaugurated in Feb, 2007 and is a vision turned into reality. It is the first project assigned to PIEDMC & was envisioned to be an 'island of facilitation in the sea of harassment' for prospective industrialists.



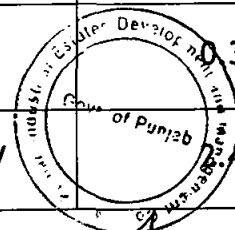
SCHEDULE-III

1. Relevant Feeder Maps, Number of Consumers and Expected Load

Description / Tariff	No. of Consumers	Load (MW)
B3	93	122.19
B2	482	101.42
A3	17	0.21
A2	39	1.06
G	36	0.36
E-ii	96	2.40
Under Construction Plots	-	19.25
Vacant Plots	-	21.98
Commercial / Community Facilities	-	11
TOTAL	763	280

2. Consumer Class/Category, Sub-Category on basis of Sanctioned Load and Voltage Level

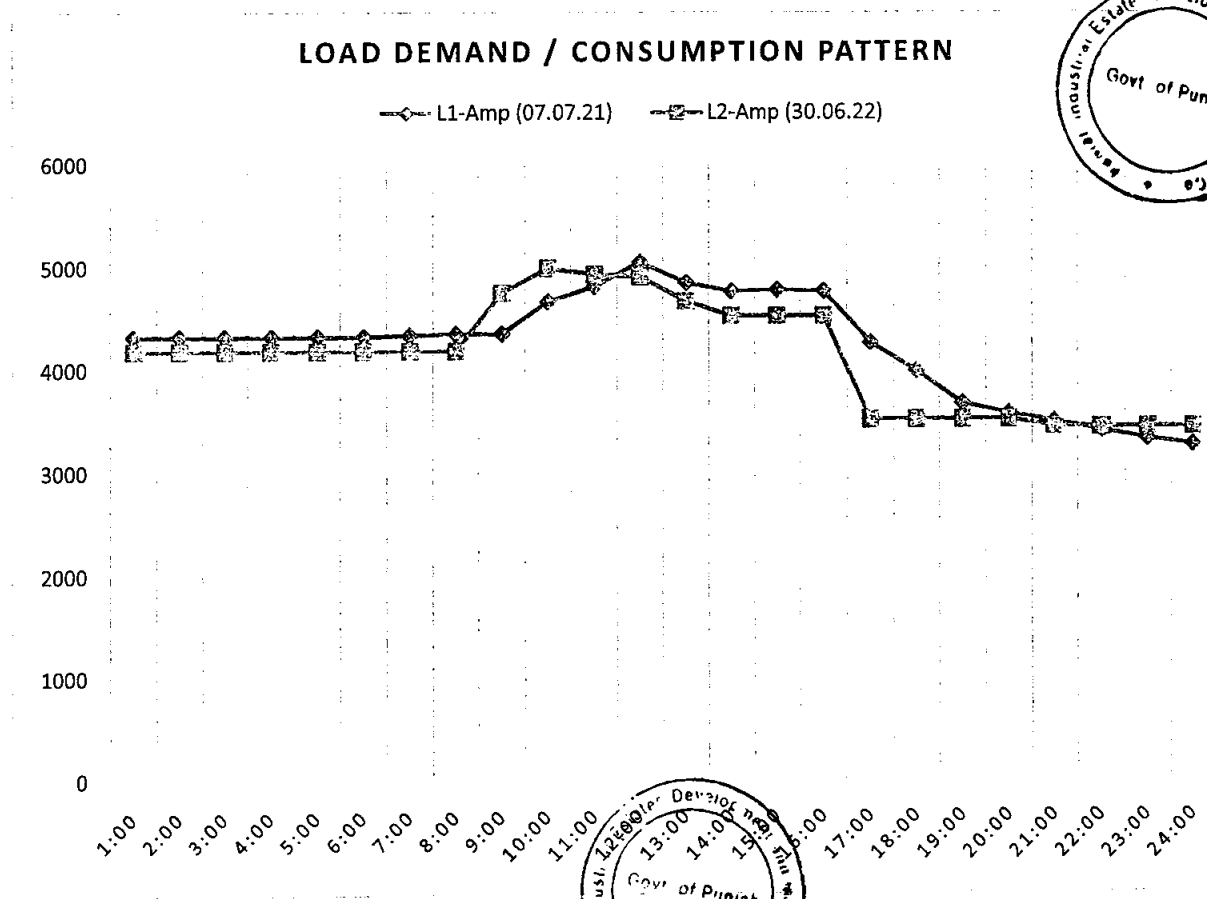
Type of Connection	No. of Consumers	Voltage Level	Sanctioned Load (MW)
Permanent	93	11kV	122.19
Permanent	482	400V	101.42
Permanent	17	400V	0.21
Permanent	39	400V	1.06
Permanent	36	400V	0.36
Temporary	96	230/400V	2.40



3. Tariff Categories of Consumer Classes to be served

Tariff	No. of Consumers	Type of Connection
B3	93	Permanent
B2	482	Permanent
A3	17	Permanent
A2	39	Permanent
G	36	Permanent
E-ii	96	Temporary

4. Demand and Consumption Pattern on different time periods



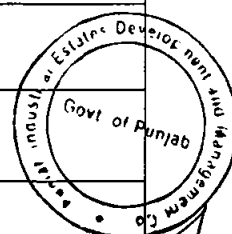
5. Procurement Plan for meeting Expected Loads (including own Generation and / or Long term and short PPAs)

Pakistan is currently passing from one of its worst energy crisis. It is very difficult to supply continuous electricity to Industrial Estates. There is need to procure more power for PIEDMC Estates especially Sundar Industrial Estate which is 80% colonized and is rapidly growing.

PIEDMC is aggressively pursuing for adding source of power for Sundar Industrial Estate wherein load demand has reached at 227.64MW and facing load shortfall. The Competent Authority has allocated funds for construction of 2nd 132kV Grid Station in premise of Sundar Industrial Estate to cope with increasing load demand. The Management has decided to procure electricity under CTBCM model, developed by NEPRA. Besides, Solar Green Energy is being promoted to lessening Grid load in national interest.

6. 12-Months Projections on Expected Load, Number of Consumers and Expected Sale of Units for each Consumer Category

12-Month Projected Data (Jul-22 to Jun-23)	
No. of Consumers	47
Expected Load (MW)	10.74
Expected Units Sale (KWH)	
Category / Tariff	Units (KWH) in Million
B3	350
B2	172.67
A2	1.05
A3	0.53
E2	0.53



G	0.79
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7. 5-Years Investment Plan indicating scheme/models/framework for undertaking supply of electric power (including frameworks for providing non-discriminatory services and acquisition/sale of assets in relevant service territories)

8. Training and Development Procedures and Manuals

9. Consumer Service Manual

INTRODUCTION:-

Sundar Industrial Estate comprising of 1763 acres of land was inaugurated in Feb, 2007 and is a vision turned into reality. It is the first project assigned to PIEDMC& was envisioned to be an 'island of facilitation in the sea of harassment' for prospective industrialists.

The objective was to develop an industrial estate where issues of industrialists are handled and problems solved through 'One Window' operation. There are more than 500 factories in production.

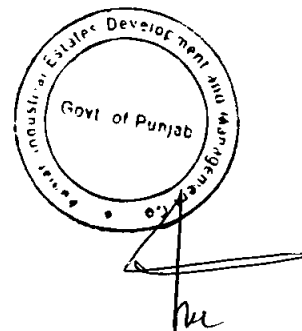
LOCATION:-

45-KM from center of Lahore.

DEFENITIONS:-

The definitions of the following terms are accordingly as per the tariff determinations of NEPRA as amended from time to time:-

1. Energy Charges
2. Fixed Charges
3. General Service
4. General Supply
5. Maximum Demand
6. Industrial Supply
7. Maximum Demand Indicator (MDI)
8. Power Factor



OTHER DEFINITIONS:-

Applicant: means any person who applies for provision of electric power service or for similar other purpose.

Application: means a request to the authorized office of PIEDMC/BOMSIE for an electric

service connection on the prescribed form. (Annex I);

Company: means Punjab Industrial Estates Development & Management Company (PIEDMC) a company set up under section 42 of the Companies Ordinance 1984 (Now Companies Act, 2017).

Conductor: means a wire, cable or other form having suitable capacity for carrying electric current and used for movement or delivery of electricity;

Connected Load: means total load in kilowatts (kW) that is connected to an electric supply system or installed at premises;

Consumer: means a person or his successor-in –interest who purchases or receives electric power for consumption and not for delivery or re-sale to others, including a person who owns or occupies a premises where electric power is supplied;

Consumption: means the amount of electricity used and measured over a given period of time;

Distribution Facilities: means electrical facilities operating at distribution voltage and used for movement or delivery of electric power;

Earthing or Grounding: means electrical connection to general mass of earth in such a manner as to ensure, at all times, an immediate discharge of energy;

Energy Meter: means a device that registers the quantity of electrical energy over a period of time;

Force majeure: means an act of God that is reasonably not foreseeable or a force or cause beyond the reasonable control of company;

Interconnection Point: means the point where the metering installation and protection apparatus of the consumer is connected to the dedicated distribution system;

Interruption: means loss of electric power to one or more consumers;

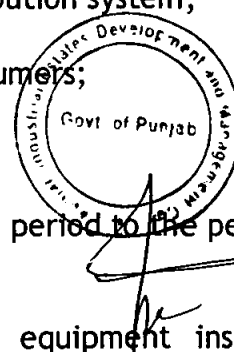
LESCO: means Lahore Electric Supply Company;

Load Factor: means the ratio of average load over a designated period to the peak load in that period;

Metering Installation: means the metering and associated equipment installed for recording consumption/usage of electric power of a consumer;

NEPRA: means National Electric Power Regulatory Authority;

Power Factor: means the ratio of kWh to kVAh recorded during the month or the ratio of



kWh to the square root of sum of square of kWh and kVARh.

Premises: means the building/site /location where Electric Power is required/ consumed;

Primary Service Connection: means any connection which is provided at 11 kV or above;

Running Load: means quantum of demand in kilowatts (kW), recorded by electricity measuring instrument at the consumer's premises at any given time interval.

Sanctioned Load: means the load in kilowatts (kW) sanctioned by PIEDMC/BOMSIE;

Tariff Schedules: means the rates, charges, terms and conditions for generation of electric power, transmission, distribution services and sale of electric power to consumers by PIEDMC/BOMSIE as approved by NEPRA and notified by the Government of Pakistan.

Underground Distribution System: means an electric distribution system with all wires installed underground except those wires within surface-mounted equipment enclosures

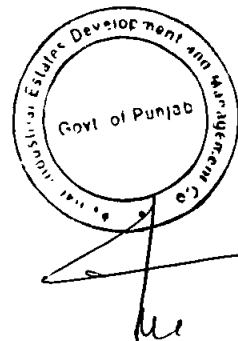
Voltage: means difference of potential or "electric pressure" in an electrical circuit measured in volts;

Voltage Drop: means the reduction in the voltage between two reference points.

Voltage Fluctuation: means a series of voltage changes or a cyclic variation of voltage.

ACRONYMS / ABBREVIATIONS

AIS	-	Air Insulated Sub Station
AMR	-	Automated Meter Reading
BOD	-	Board of Directors
BOMSIE	-	Board of Management Sundar Industrial Estate
CNIC	-	Computerize National Identity Card
DCO	-	Disconnection Order
DN	-	Demand Notice
kWh	-	Kilo Watt Hour
LPS	-	Late Payment Surcharge
MCO	-	Meter Change Order
MDC	-	Meter Data Collection
MDI	-	Maximum Demand Indicator
MDM	-	Meter Data Management



NOC	-	No Objection Certificate
RCO	-	Reconnection Order
SIE	-	Sundar Industrial Estate
ToU	-	Time of Use

NEW CONNECTION / EXTENSION OF LOAD / REDUCTION OF LOAD

GENERAL INFORMATION:-

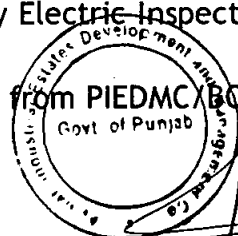
PIEDMC/BOMSIE has established One Window Operation facility in industrial estate, to provide all necessary information required regarding application for new connections and all other matters relating to consumer services and provision of electric power services.

APPLICATION FOR NEW CONNECTION:-

Application Form and Power Supply Contract Form (Annex-I) are available free of charge at One Window Operations and on website of BOMSIE.

An applicant shall be required to fill in the forms and attach the required supporting documents as detailed therein. Any assistance or information required in filling the Application Form shall be provided to the applicant by staff in the office where form is to be submitted. Pre-requisite for provision of electric connection at BOMSIE are as under:-

- Applications for new connection along with supporting documents will be submitted in person at One Window Operations. After the receipt of the application, BOMSIE officer shall issue acknowledgement receipt and allot a serial number/tracking ID to the applicant and enter in the Service Connection register with date. In case, any documents are required; the applicant will be informed accordingly through letter/email/telephone.
- Demand Notice issued to consumer after preparation of feasibility studies.
- The applicant may pay the Demand Notice(s) in designated banks. Upon receipt/acknowledgement of payment; the connection shall be energized within the stipulated time period.
- Consumer shall also submit Wiring test report duly issued by Electric Inspector or his authorized wiring contractor.
- Consumer shall get the Building Plan of his factory approved from PIEDMC/BOMSIE Building.



SERVICE CONNECTION PARAMETERS:-

1. The load will be charged at Rs. 4000 per KVA as Transformation Capacity for B-1 & B-2 Industrial Customers.
2. PIEDMC/BOMSIE shall provide connection to all consumers having load demand

upto maximum 500kW from common distribution transformers.

3. All B-3 connections (above 500kW) shall purchase their own dedicated transformer.

CAHRGES FOR SUPPLY ON B-1 & B-2 CUSTOMERS:-

- Rs.4000 x KVA demand - (A).
- Metering equipment cost including LT Cables & accessories - (B).
- Installation cost (Contractor Charges) - (C).
- Services & handling charges @ 10% of [(B) + (C)].

CHARGES FOR SUPPLY ON B-3 CUSTOMERS:-

- Rs. 1500 / KVA underground system charges.
- Price of 3-Way Switch.
- Customer will provide 3-Way RMU, 11 kV Metering and Protection panel and dedicated transformer. All HT Material shall comply to WAPDA/NTDC/PEPCO and IEC Standards and Specifications.
- 10% Services & handling charges on sum of above amount.

EXTENSION OF LOAD / REDUCTION OF LOAD:-

Documents to be attached for extension of load/reduction of load along with Application Form (Annex I):

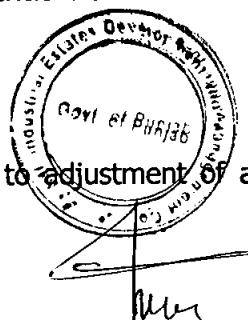
- (i) Test report issued by the Electric Inspector or authorized wiring contractor
- (ii) Copy of last paid bill subject to the condition that no arrears / deferred amount/installments are pending.
- (iii) Attested copy of CNIC
- (iv) Power Supply Contract
- (v) Payment of Capital Cost (if applicable)
- (vi) Updating of Security Deposit in case of extension/reduction of load at prevailing rates subject to adjustment of already paid security deposit.

CHANGE OF TARIFF:-

Documents to be attached for change of tariff along with Application Form (Annex I):

- (i) Test report issued by the Electric Inspector or authorized wiring contractor
- (ii) Copy of last paid bill subject to the condition that no arrears / deferred amount/installments are pending.
- (iii) Attested copy of CNIC
- (iv) Power Supply Contract
- (v) Payment of Capital Cost (if applicable)
- (vi) Payment of Security Deposit at prevailing rates subject to adjustment of already paid Security Deposit.

TEMPORARY CONNECTION:-



Application Form and Power Supply Contract Form (Annex-II) are available free of charge at One Window Operations and on website of BOMSIE.

An applicant may apply for a temporary connection for the following purposes:-

- Construction of building
- Projects execution
- Illumination / lighting, functions, exhibitionsetc
- Testing of industrial equipment
- Any other emergent requirement of temporary nature

PIEDMC / BOMSIE SAFETY POLICY:-

The purpose of this policy is to ensure that the network is planned, developed, operated and maintained in an efficient & safe way without compromising on safety of any kind related to the systems, personnel & others. BOMSIE has dedicated HSE department to implement latest standards of quality and safety.

“No operating condition or urgency of service can ever justify endangering the life of anyone”

SAFETY OBJECTIVES:-

The Safety Policy of PIEDMC/BOMSIE is designed to achieve the following objectives:

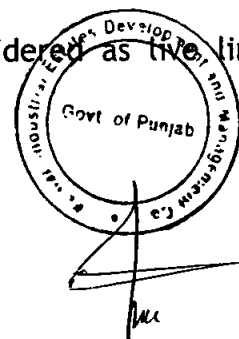
- a. To completely integrate safety with production, construction, maintenance & operation.
- b. To provide safe working conditions, proper & adequate tools, equipment and protective devices.
- c. To train employees in practices for the safe conduct of their work.
- d. To enforce safety measures.

STEPS FOR SAFETY:-

- For Safety awareness of technical staff, the eye-catching posters are properly displayed with plastic coating at SIE Grid Station and complaint offices.
- Barricade being erected to limit the distance of public approach to protected area.
- Before deputing the line staff to any assignment job planning/job briefing should be given.
- Temporary Earthing on both sides of 11KV line MUST be provided before starting the work.
- Street light phase and neutral wire must be considered as live line for safe conduct of work on the line.

10. Information Related to:-

- Proposed Service Territory



Service territory is Sundar Industrial Estate for which land has been acquired and right of way has been procured. PIEDMC intends to obtain distribution license for Sundar Industrial Estate for power distribution within its territory.

▪ **Billing and Collection Procedures (including provision for remote metering)**

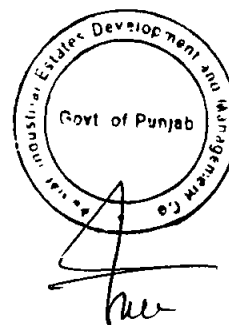
Bills are being generated through Integrated Billing System developed by PITC in-line with NEPRA regulations/ notifications time to time. All bills are properly distributed on customer mailing address as well as online available at BOMSIE official website and collection is being ensured through designated banks before due date of LESCO billed to SIE. Following is detailed procedure for billing and collection:-

➤ **Electricity Billing Procedure:-**

1. Signed reading sheets received from Electrical Department by 05th of every month.
2. Preparation of Electricity (B-2, B-3, A-2 & Temporary) tariff-wise sheets for uploading on software.
3. Update the electricity billing sheet (new Connection / Extension of load) data given by Electrical Department.
4. Preparation & calculation of LPS of Electricity Billing.
5. Calculate the any new adjustment / relief passed by LESCO.
6. Billing to Customers as per NEPRA / Govt. notified tariffs and rates.
7. Compiling, printing and dispatching of Electricity Bills after receiving of SIE LESCO bill.
8. Billing is being proceed at-par with NEPRA / Govt. notified tariffs and rates through Power Information Technology Company (PITC) on Integrated Billing System (IBS).

➤ **Collection Procedure:-**

1. Mode of Payment:
 - i. Cheques
 - ii. Pay order
 - iii. IBFT
 - iv. RTGS
 - v. Online Transfer
 - vi. Cash (No cash payment received at BOM Customer deposits cash directly into the Bank)
2. Customer approached One-Window for deposit of bill.
3. SIE representative enter bill number in software.



4. Confirm the title, enter instrument number / date.
5. System generated receiving provided to customers.
6. It is mandatory for customer who deposits bill through IBFT, RTGS to get system generated receiving.

▪ **Ability to access consumer metering systems and other services/equipment**

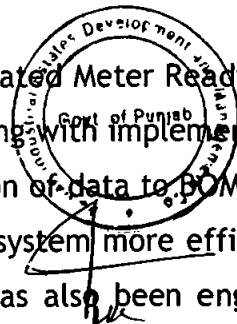
Meter readings of all consumers of Sundar Industrial Estate are being taken through Mobile Meter Reading System on monthly basis to record consumption during particular billing cycle. The meter readings are generally taken / recorded with pictures by concerned staff of Sundar Industrial Estate. The meter reading program is being prepared in such a way that consumer meters are normally read on the same date each month.

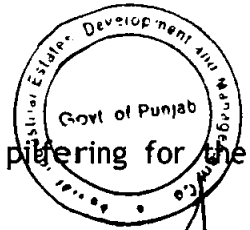
To ensure proper billing to consumers of Sundar Industrial Estate, all energy meters are being purchased as per WAPDA/NTDC Standards and Specifications from the approved meter manufacturers of WAPDA/NTDC/LESCO who will ensure the accuracy of these meters. However, doubtful meters will be tested on site with standard testing equipment.

Meter Readers shall also check the irregularities / discrepancies in the metering system at time of reading meters and report the same for an appropriate action. Metering and Testing (M&T) teams have also been formulated for periodic checking / testing of energy meters and proactive measures for corrective monitoring of energy consumption.

Backup energy meters are installed on all permanent electric consumers of Sundar Industrial Estate. The same is considered as billing meter in case of meter display washed / meter burnt or any other issue observed.

In light of directions from the Competent BOD PIEDMC, Automated Meter Reading (AMR) Energy Meters are installed within Sundar Industrial Estate along with implementation of Advanced Metering Infrastructure (AMI) for directly transmission of data to BOMSIE / end users. The system shall reduce labor cost and assist to make system more efficient and accurate and timely reporting of anomalies. Besides, PITC has also been engaged for generation of electricity bills through Integrated Billing System.





Follow up duties are also scheduled for coming and to reduce the piling for the effective curtailment of losses.

Any detection bill is charged as per SOP's in-line with NEPRA consumer service manual.

Dispute resolution committee is also formulated for the amicable settlement of billing conflict before the matter to be taken on any third forum.

Emergency provisions and protocols

Besides availability of sufficient line materials, skilled staff is available for emergency services. Alternate feeding from 11KV express feeders and alternate transformers make it easy to handle any abnormal/emergency situation.

BASIS OF COMMON SERVICES FOR ELECTRIC CONSUMERS AND THEIR ALLOCATION THEREOF:-

1. ELECTRICAL CONNECTIONS:-

PIEDMC / SIE is providing temporary and permanent electrical connections to Resident Industrialists for construction and operation purpose. A temporary electric connection or any other emergent requirement of temporary nature will be given to consumer on first stage. Temporary electric power supply connection for construction shall be provided by BOMSIE initially for period of six months which is further extendable on the three months basis upto connection of the specific job / project for which temporary connection was obtained. The sanctioning officer ensured that the temporary connection is utilizing for temporary / construction purpose only. After the completion of construction works, the permanent connection will be given to resident industrialist basis upon their load requirement.

One Window Operations has been established wherein all types of application for connection are received from consumers.

2. PROVIDING RING MAIN SYSTEM TO ENSURE THE SUSTAINABILITY AND RELIABILITY OF POWER SUPPLY TO CONSUMERS:-

The design has been prepared for whole of the system as underground. The HT feeders are laid down to form open-end loop system to ensure continuity of supply

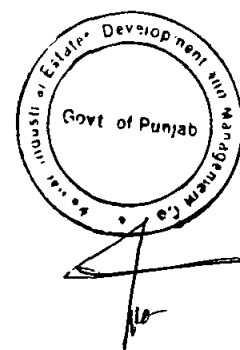
in case of segment faults. In Ring Main System, one ring network for load point is fed by more than one feeder and also connected with express feeders (Backup feeders). In this case, if one feeder is under fault / maintenance, the ring distribution is still intact by other feeders / Express feeders connected to it. In this way, the supply to consumers is not affected even when any feeder becomes out of service.

3. PREVENTIVE / SCHEDULE MAINTENANCE:-

Maintenance plans are prepared by Electrical department in advance on monthly/quarterly basis. Procedures have been developed by the qualified engineers of consultant and executions are carried out under qualified, trained and experienced supervisory staff by the help of line staff. Proper T&P (tools and plants) including cable fault locator, surge generator, safety belt, safety hat, bots, earthing sets, safety gloves, protective gloves, torches insulated pliers; screw drivers etc are provided to field staff and are checked regularly. Trouble shooting procedure is also made available to the field staff.

All Preventive / Annual and General Maintenance of 132kV Grid Station is being carried out on cost deposit basis through LESCO SS&T and P&I team. Following major activities are performed during maintenance:-

- ✓ Power Transformers
 - Megger, TTR, C&DF tests
 - Oil Testing and Earth Resistance tests
- ✓ 132kV Circuit Breakers
 - Timing tests
 - Contact Resistance and HiPoT
 - SF-6 purity tests
- ✓ 132kV CT's & PT's
 - C&DF, Megger Contact & Earth Resistance tests
 - Circuit verification test
- ✓ Contact & Earth Resistance test of 132kV Isolators
- ✓ HiPot of Lightning Arrestor
- ✓ Tightening of Jumpers & Droppers
- ✓ Protection & Instrumentation testing of Control and Relay Panels
- ✓ Earth mast of Grid Station
- ✓ 11kV Incoming Panel
 - Complete Panel / VCB testing



- O/C, E/F relay test, DC Supervision, AMP/KV/PF meters
- Cleaning & Greasing
- ✓ 11kV Outgoing Panel
 - Complete Panel / VCB testing
 - O/C, E/F relay test, DC Supervision, AMP/KV/PF meters
 - Cleaning & Greasing

The BOMSIE maintenance team have also planned Bi-Annual and Quarterly preventive maintenance in coordination with LESCO. Following activities are performed during maintenance:-

- Checking and Calibration of protection relays
- Parameterization of relays according to sanctioned load
- Testing of Trip circuit
- Checking & Tightening of primary and secondary connections of CT's and PT's
- Cleaning and tightening of Main 11kV Busbar
- Cable tightening
- Cleaning & Greasing of 11kV Panels

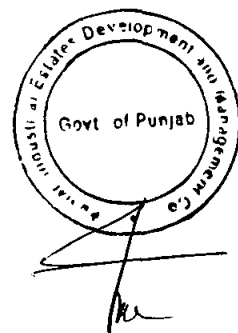
The BOMSIE maintenance team have also planned following activities on weekly / daily basis:-

- Maintaining Log Reports
- Visual inspection of Panel Boards
- Visual inspection of Power Transformers upto safety point
- Checking of battery gravity
- Patrolling of Switchyard yard upto safety point

The BOMSIE maintenance team have planned routine and preventive maintenance to keep reliable operation of distribution system. Following activities are performed on regularly, weekly / monthly basis:-

Distribution Transformers:-

- Inspection of oil leakage
- Detail physical inspection of transformer's bushing
- Dehydration of transformer
- Checking of temperature mechanist working
- General cleaning of transformer parts
- Tightening of Cables and Busbar connection
- Checking of end termination kits
- Ground continuity
- Neutral Earthing Connection
- Vermin Proofing



- Painting of rusty steel parts of transformer

Ring Main Switches:-

- Inspection of Termination Kits
- Checking of SF6 gas pressure
- Checking of switching mechanism
- General cleaning
- Vermin Proofing

Street Light Control Panels:-

- Detail inspection of Street light control panels and light fixtures
- Checking of manual switching ON/OFF
- Cleaning of contacts
- Mechanical / Electrical operation of breakers
- Tightening of Power and Control cables
- Checking of instruments operation / photovoltaic sensor

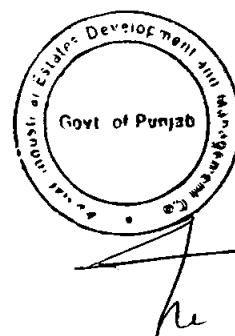
4. TROUBLESHOOTING / NON-SCHEDULED MAINTENANCE:-

Non-Scheduled / emergency or corrective maintenance is often not in accordance with planned and usually occurred in result of malfunction or unexpected defect. Non-scheduled maintenance covers all measures aimed at restoring the designed state of technical equipment. To identify fault in case of power failure, the troubleshooting is done through test instruments and corrective measurements which can be used to root cause the fault. Upon repairing / fault rectification, supply gets restored.

5. COMPLAINT HANDLING:-

The complaint in respect of electric supply failure, meter reading and other related issues are being handled through dedicated team (usually every complaint regarding restoration of power supply is attended within 20 minutes). One Window Operations is established by BOMSIE wherein, all procedural complaints / matters are received from customers and redressed within prescribed timeline. The complaint office remains functional 24/7hrs duly supervised by engineer. The customer feedback is also monitored and their grievances are readdressed as well.

6. ENSURE THE QUALITY POWER SUPPLY AS PER NTDC/NEPRA:-



In Sundar Industrial Estate, 132KV AIS Grid Station comprising 4 x 40MVA Transformer Bays are designed, constructed and commissioned by WAPDA/LESCO approved Consultant firms and Contractors which ensure the quality power. Besides, all the installed equipment is placed in "Insets" along the boundary wall of the Industrial Units and underground power supply lines to ensure good quality control on the delivered power.

Power quality shall be maintained as per the latest NEPRA/NTDC Standards as under:-

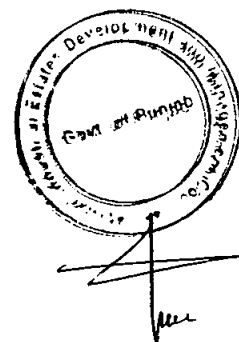
- Voltage level at utilization end will be 415V/11kV with +/-5% permissible regulations limit of variation.
- Frequency 50Hz with +/-1% limit of variation.
- Power factor shall be maintained above 0.9 through decentralize / centralize PFI's plants.

7. CONSTRUCTION OF OWN GRID STATION FOR ENSURING QUALITY POWER SUPPLY:-

PIEDMC has established 31.5/40MVA, 132/11.5kV AIS Grid Station at Sundar Industrial Estate at its own cost and being operated and maintained by LESCO in light of agreement dated 8th April, 2010 signed between Punjab Industrial Estates Development & Management Company (PIEDMC) and Lahore Electric Supply Company. All preventive maintenance including equipment testing, relay settings, attending to the failure of equipment to diagnose problem are being carried out by concerned technical team of LESCO which ensure quality power supply to Industrial Consumers.

8. ESTABLISHING THE ALTERNATE SOURCE OF POWER:-

PIEDMC is aggressively pursuing for adding source of power for Sundar Industrial Estate wherein load demand has reached at 227.64MW and facing load shortfall. The Management has decided to procure electricity under CTBCM model, developed by NEPRA. Besides, Solar Green Energy is being promoted to lessening Grid load in national interest.



PROPOSED SERVICE TERRITORY

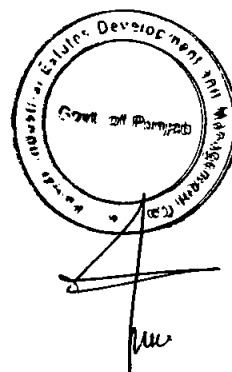
Service territory is Sundar Industrial Estate for which 1763 Acres land has been acquired and right of way has been procured. NEPRA has been approached by PIEDMC for issuance of distribution license/NOC in favor of Sundar Industrial Estate.

The area consists of the saleable plots of ½ Acre, 1 Acre, 2 Acre, 3 Acre, 5 Acre and above plots for industrialists units and 5, 7.5, 10 & 15 Marla plots for commercial purpose. Moreover, proper road network, amenities and other utilities are available in the Sundar Industrial Estate for ease of business for the industrialists. Moreover, PIEDMC has constructed its own 132KV Grid Station having load of 104MW for the smooth and reliable power supply to the land owners inside the estate.

EMERGENCY PROVISIONS AND PROTOCOL

To cater for any emergency situation, express/ back up feeders have been provided. Sufficient line material and spares parts have been procured by PIEDMC and are readily available at site store Sundar Industrial Estate to meet with any emergency situation which arrive at any time of the day.

A well trained, competent and educated distribution/O&M staff has been hired by PIEDMC, who are working under well-qualified supervisors in three (3) shifts. The staff is available on 24/7 basis to attend any emergency situation and for preventive maintenance of the system as well.



Billing and Collection Procedure (Include Provision for Remote Metering)

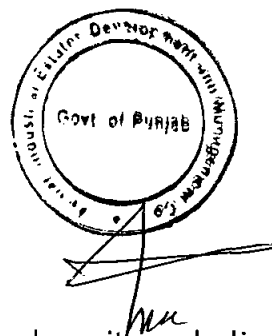
Bills are being generated through Integrated Billing System developed by PITC in-line with NEPRA regulations/ notifications time to time. All bills are properly distributed on customer mailing address as well as online available at BOMSIE official website and collection is being ensured through designated banks before due date of LESCO billed to SIE. Following is detailed procedure for billing and collection:-

➤ Electricity Billing Procedure:-

1. Signed reading sheets received from Electrical Department by 05th of every month.
2. Preparation of Electricity (B-2, B-3, A-2 & Temporary) tariff-wise sheets for uploading on software.
3. Update the electricity billing sheet (new Connection / Extension of load) data given by Electrical Department.
4. Preparation & calculation of LPS of Electricity Billing.
5. Calculate the any new adjustment / relief passed by LESCO.
6. Billing to Customers as per NEPRA / Govt. notified tariffs and rates.
7. Compiling, printing and dispatching of Electricity Bills after receiving of SIE LESCO bill.
8. Billing is being proceed at-par with NEPRA / Govt. notified tariffs and rates through Power Information Technology Company (PITC) on Integrated Billing System (IBS).

➤ Collection Procedure:-

1. Mode of Payment:
 - i. Cheques
 - ii. Pay order
 - iii. IBFT
 - iv. RTGS
 - v. Online Transfer
 - vi. Cash (No cash payment received at BOM Customer deposits cash directly into the Bank)
2. Customer approached One-Window for deposit of bill.
3. SIE representative enter bill number in software.
4. Confirm the title, enter instrument number / date.
5. System generated receiving provided to customers.
6. It is mandatory for customer who deposits bill through IBFT, RTGS to get system generated receiving.



**PROCUREMENT PLAN FOR MEETING EXPECTED LOADS (INCLUDING OWN GENERATION
AND / OR LONG TERM AND SHORT PPAs)**

Pakistan is currently passing from one of its worst energy crisis. It is very difficult to supply continuous electricity to Industrial Estates. There is need to procure more power for PIEDMC Estates especially Sundar Industrial Estate which is 80% colonized and is rapidly growing.

PIEDMC is aggressively pursuing for adding source of power for Sundar Industrial Estate wherein load demand has reached at 227.64MW and facing load shortfall. The Competent Authority has allocated funds for construction of 2nd 132kV Grid Station in premise of Sundar Industrial Estate to cope with increasing load demand. The Management has decided to procure electricity under CTBCM model, developed by NEPRA. Besides, Solar Green Energy is being promoted to lessening Grid load in national interest.

ABILITY TO ACCESS CONSUMER METERING SYSTEMS AND OTHER SERVICES / EQUIPMENT

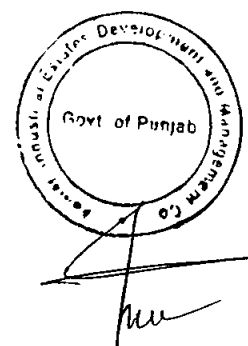
Meter readings of all consumers of Sundar Industrial Estate are being taken through Mobile Meter Reading System on monthly basis to record consumption during particular billing cycle. The meter readings are generally taken / recorded with pictures by concerned staff of Sundar Industrial Estate. The meter reading program is being prepared in such a way that consumer meters are normally read on the same date each month.

To ensure proper billing to consumers of Sundar Industrial Estate, all energy meters are being purchased as per WAPDA/NTDC Standards and Specifications from the approved meter manufacturers of WAPDA/NTDC/LESCO who will ensure the accuracy of these meters. However, doubtful meters will be tested on site with standard testing equipment.

Meter Readers shall also check the irregularities / discrepancies in the metering system at time of reading meters and report the same for an appropriate action. Metering and Testing (M&T) teams have also been formulated for periodic checking / testing of energy meters and proactive measures for corrective monitoring of energy consumption.

Backup energy meters are installed on all permanent electric consumers of Sundar Industrial Estate. The same is considered as billing meter in case of meter display washed / meter burnt or any other issue observed.

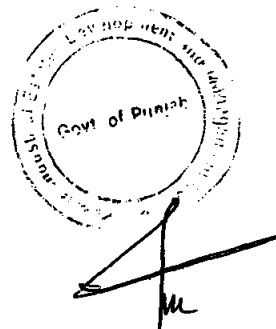
In light of directions from the Competent BOD PIEDMC, Automated Meter Reading (AMR) Energy Meters are installed within Sundar Industrial Estate along with implementation of Advanced Metering Infrastructure (AMI) for directly transmission of data to BOMSIE / end users. The system shall reduce labor cost and assist to make system more efficient and accurate and timely reporting of anomalies. Besides, PITC has also been engaged for generation of electricity bills through Integrated Billing System.



Follow up duties are also scheduled for coming and to reduce the pilfering for the effective curtailment of losses.

Any detection bill is charged as per SOP's in-line with NEPRA consumer service manual.

Dispute resolution committee is also formulated for the amicable settlement of billing conflict before the matter to be taken on any third forum.



The image shows a circular official stamp from the Government of Punjab, Pakistan. The text within the stamp includes "Govt of Punjab" and "Pakistan". Below the stamp, there is a handwritten signature in black ink.

BASIS OF COMMON SERVICES FOR ELECTRIC CONSUMERS AND THEIR ALLOCATION THEREOF:-

1. ELECTRICAL CONNECTIONS:-

PIEDMC / SIE is providing temporary and permanent electrical connections to Resident Industrialists for construction and operation purpose. A temporary electric connection or any other emergent requirement of temporary nature will be given to consumer on first stage. Temporary electric power supply connection for construction shall be provided by BOMSIE initially for period of six months which is further extendable on the three months basis upto connection of the specific job / project for which temporary connection was obtained. The sanctioning officer ensured that the temporary connection is utilizing for temporary / construction purpose only. After the completion of construction works, the permanent connection will be given to resident industrialist basis upon their load requirement.

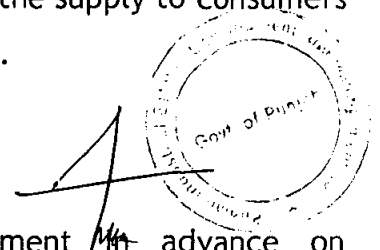
One Window Operations has been established wherein all types of application for connection are received from consumers.

2. PROVIDING RING MAIN SYSTEM TO ENSURE THE SUSTAINABILITY AND RELIABILITY OF POWER SUPPLY TO CONSUMERS:-

The design has been prepared for whole of the system as underground. The HT feeders are laid down to form open-end loop system to ensure continuity of supply in case of segment faults. In Ring Main System, one ring network for load point is fed by more than one feeder and also connected with express feeders (Backup feeders). In this case, if one feeder is under fault / maintenance, the ring distribution is still intact by other feeders / Express feeders connected to it. In this way, the supply to consumers is not affected even when any feeder becomes out of service.

3. PREVENTIVE / SCHEDULE MAINTENANCE:-

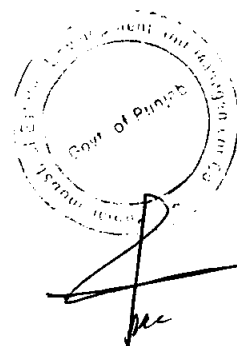
Maintenance plans are prepared by Electrical department in advance on monthly/quarterly basis. Procedures have been developed by the qualified engineers of consultant and executions are carried out under qualified, trained and experienced supervisory staff by the help of line staff. Proper T&P (tools and plants) including



cable fault locator, surge generator, safety belt, safety hat, boots, earthing sets, safety gloves, protective gloves, torches insulated pliers; screw drivers etc are provided to field staff and are checked regularly. Trouble shooting procedure is also made available to the field staff.

All Preventive / Annual and General Maintenance of 132kV Grid Station is being carried out on cost deposit basis through LESCO SS&T and P&I team. Following major activities are performed during maintenance:-

- ✓ Power Transformers
 - Megger, TTR, C&DF tests
 - Oil Testing and Earth Resistance tests
- ✓ 132kV Circuit Breakers
 - Timing tests
 - Contact Resistance and HiPoT
 - SF-6 purity tests
- ✓ 132kV CT's & PT's
 - C&DF, Megger Contact & Earth Resistance tests
 - Circuit verification test
- ✓ Contact & Earth Resistance test of 132kV Isolators
- ✓ HiPot of Lightning Arrestor
- ✓ Tightening of Jumpers & Droppers
- ✓ Protection & Instrumentation testing of Control and Relay Panels
- ✓ Earth mast of Grid Station
- ✓ 11kV Incoming Panel
 - Complete Panel / VCB testing
 - O/C, E/F relay test, DC Supervision, AMP/KV/PF meters
 - Cleaning & Greasing
- ✓ 11kV Outgoing Panel
 - Complete Panel / VCB testing
 - O/C, E/F relay test, DC Supervision, AMP/KV/PF meters
 - Cleaning & Greasing



The BOMSIE maintenance team have also planned Bi-Annual and Quarterly preventive maintenance in coordination with LESCO. Following activities are performed during maintenance:-

- Checking and Calibration of protection relays
- Parameterization of relays according to sanctioned load
- Testing of Trip circuit
- Checking & Tightening of primary and secondary connections of CT's and PT's
- Cleaning and tightening of Main 11kV Busbar

- Cable tightening
- Cleaning & Greasing of 11kV Panels

The BOMSIE maintenance team have also planned following activities on weekly / daily basis:-

- Maintaining Log Reports
- Visual inspection of Panel Boards
- Visual inspection of Power Transformers upto safety point
- Checking of battery gravity
- Patrolling of Switchyard yard upto safety point

The BOMSIE maintenance team have planned routine and preventive maintenance to keep reliable operation of distribution system. Following activities are performed on regularly, weekly / monthly basis:-

Distribution Transformers:-

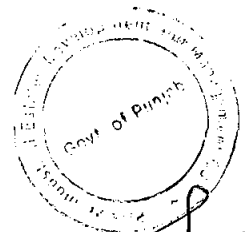
- Inspection of oil leakage
- Detail physical inspection of transformer's bushing
- Dehydration of transformer
- Checking of temperature mechanist working
- General cleaning of transformer parts
- Tightening of Cables and Busbar connection
- Checking of end termination kits
- Ground continuity
- Neutral Earthing Connection
- Vermin Proofing
- Painting of rusty steel parts of transformer

Ring Main Switches:-

- Inspection of Termination Kits
- Checking of SF6 gas pressure
- Checking of switching mechanism
- General cleaning
- Vermin Proofing

Street Light Control Panels:-

- Detail inspection of Street light control panels and light fixtures
- Checking of manual switching ON/OFF
- Cleaning of contacts
- Mechanical / Electrical operation of breakers
- Tightening of Power and Control cables
- Checking of instruments operation / photovoltaic sensor



4. TROUBLESHOOTING / NON-SCHEDULED MAINTENANCE:-

Non-Scheduled / emergency or corrective maintenance is often not in accordance with planned and usually occurred in result of malfunction or unexpected defect. Non-scheduled maintenance covers all measures aimed at restoring the designed state of technical equipment. To identify fault in case of power failure, the troubleshooting is done through test instruments and corrective measurements which can be used to root cause the fault. Upon repairing / fault rectification, supply gets restored.

5. COMPLAINT HANDLING:-

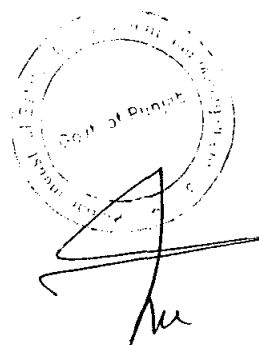
The complaint in respect of electric supply failure, meter reading and other related issues are being handled through dedicated team (usually every complaint regarding restoration of power supply is attended within 20 minutes). One Window Operations is established by BOMSIE wherein, all procedural complaints / matters are received from customers and redressed within prescribed timeline. The complaint office remains functional 24/7hrs duly supervised by engineer. The customer feedback is also monitored and their grievances are readdressed as well.

6. ENSURE THE QUALITY POWER SUPPLY AS PER NTDC/NEPRA:-

In Sundar Industrial Estate, 132KV AIS Grid Station comprising 4 x 40MVA Transformer Bays are designed, constructed and commissioned by WAPDA/LESCO approved Consultant firms and Contractors which ensure the quality power. Besides, all the installed equipment is placed in "Insets" along the boundary wall of the Industrial Units and underground power supply lines to ensure good quality control on the delivered power.

Power quality shall be maintained as per the latest NEPRA/NTDC Standards as under:-

- Voltage level at utilization end will be 415V/11kV with +/-5% permissible regulations limit of variation.
- Frequency 50Hz with +/-1% limit of variation.
- Power factor shall be maintained above 0.9 through decentralize / centralize PFI's plants.

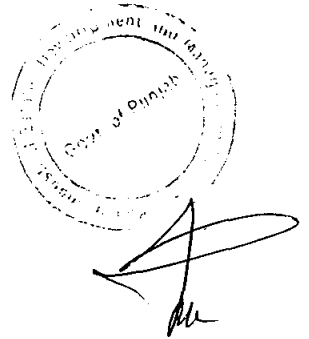


7. CONSTRUCTION OF OWN GRID STATION FOR ENSURING QUALITY POWER SUPPLY:-

PIEDMC has established 31.5/40MVA, 132/11.5kV AIS Grid Station at Sundar Industrial Estate at its own cost and being operated and maintained by LESCO in light of agreement dated 8th April, 2010 signed between Punjab Industrial Estates Development & Management Company (PIEDMC) and Lahore Electric Supply Company. All preventive maintenance including equipment testing, relay settings, attending to the failure of equipment to diagnose problem are being carried out by concerned technical team of LESCO which ensure quality power supply to Industrial Consumers.

8. ESTABLISHING THE ALTERNATE SOURCE OF POWER:-

PIEDMC is aggressively pursuing for adding source of power for Sundar Industrial Estate wherein load demand has reached at 227.64MW and facing load shortfall. The Management has decided to procure electricity under CTBCM model, developed by NEPRA. Besides, Solar Green Energy is being promoted to lessening Grid load in national interest.



Training and Development Procedures

Introduction

In order to keep PIEDMC Electrical Staff fully updated with the electrification in Industrial Estates, PIEDMC has established a Training and Development Manual.

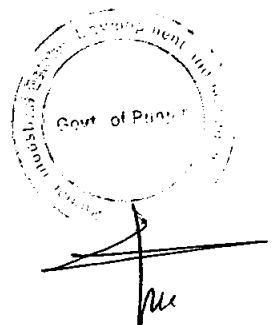
Training is provided to employees of Customer Services and the Electrical department.

Training at regular interval is arranged by Chief Engineer for the Technical Staff where new and efficient maintenance and fault locating methods are being explained for implementation.

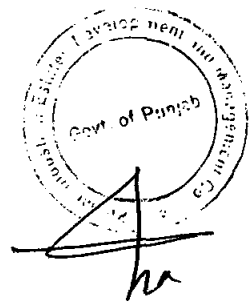
The Employees from customer relations are also updated at regular intervals of any change in customer policy and change of Tariff etc.

All the operations and maintenance (O&M) staff of Sundar Industrial Estate (SIE) are trained as per the training manuals of Lahore Electric Supply Company (LESCO). The staff is trained to provide high quality services and are trained in the following areas:

- Introduction to Training Programmed Organization and System
- Overview of role and Duties of Line Superintendent.
- Material of use in construction line
- Use and care of T&P.
- Service Installation(LT & HT)
- Patrolling of lines
- First aid skills and practices
- Basic electricity concept, testing/measure instruments and their uses
- Distribution system standards and specifications
- Distribution system planning



- Installation of Earth system
- Distribution system operation
- Distribution system maintenance
- Location of faults and consumer complaints
- Safety and Safety equipment
- Fire prevention and control
- Distribution system mapping
- Energy meters-Installation, checking and maintenance.



Sundar Industrial Estate

Environmental Impact Assessment

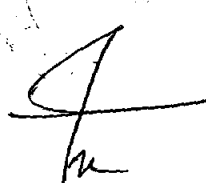
Proposed Sundar Industrial Estate, Lahore

Submitted By:

**PUNJAB INDUSTRIAL ESTATES DEVELOPMENT
AND MANAGEMENT COMPANY**

1st Floor, Saudi Pak House,
14-Egerton Road,
Lahore, Pakistan.
Phone: 042-9203662-7
Fax: 042-9203660
Web: www.piedmc.com

March 2006

13.1.01 P. 13.1.01


List of Abbreviations and Acronyms

ASP	Activated Sludge Process
BOD	Biochemical Oxygen Demand
CBO	Community Based Organization
CETP	Combined Effluent Treatment Plant
cm	centimeter
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
dBA	Decibel
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
GOP	Government of Pakistan
H ₂ S	Hydrogen Sulfide
HSP	Health and Safety Plan
IEE	Initial Environmental Examination
IPP	Independent Power Producer
kg/d	kilogram per day
km/h	kilometer per hour
m ³ /d	cubic meter per day
m ³ /h	cubic meter per hour
mg/l	milligram per liter
mm	millimeter
MW	Mega Watt
NEC	National Environmental Consulting
NEQS	National Environmental Quality Standards
NGO	Non-government Organization
NLC	National Logistic Cell
NOC	No Objection Certificate
NO _x	Oxides of Nitrogen
O & M	Operation and Maintenance
OHS	Occupational Health and Safety
PEPA-97	Pakistan Environmental Protection Act 1997
PEPO	Pakistan Environmental Protection Ordinance
pH	Power of Hydrogen Ion Concentration
PIE	Punjab Industrial Estates Development and Management Company
PM	Particulate Matter
PPE	Personal Protection Equipment
SIE	Sundar Industrial Estate
SO _x	Oxides of Sulfur
SS	Suspended Solids
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
UASB	Up-flow Anaerobic Sludge Blanket Reactor
UNESCO	United Nations Educational, Scientific and Cultural Organization
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WAPDA	Water and Power Development Authority
WHO	World Health Organization
WTO	World Trade Organization

Executive Summary

After taking the management control and upgrading of the Multan Industrial Estate (MIE) and the Quaid-e-Azam Industrial Estate (QIE), the PIE has now introduced the Sundar Industrial Estate (SIE) on the Raiwind-Sundar Road, 25 km south of Lahore. The purpose of this estate is to create new jobs, reduce poverty, encourage industrialization in Punjab and resultantly increase the GDP of the country.

Under the Pakistan Environmental Protection Act 1997 (PEPA-97), clause 12, it is required that the proponent of any development project will have to submit an IEE or EIA report to the concerned Environmental Protection Agency/Department to obtain approval prior to start of construction or operation of the project. The objective of the Environmental Impact Assessment (EIA) study is primarily to document the existing baseline environmental conditions of the project area, establish the potential impacts of the project construction and operation on the physical, ecological and human environments, and propose the mitigation measures for the adverse impacts.

The policy framework for EIA is principally derived from the Pakistan National Conservation Strategy (1992). The principal applicable laws and regulations, in respect of EIA, are the PEPA-97, the Pakistan Environmental Assessment Procedures (2000), and the NEQS (Self Monitoring and Reporting) Rule, 2001. The institution involved in the administrative action pertaining to the environmental aspect of the project is the Environmental Protection Department, Punjab.

According to the Pakistan Environmental Assessment Procedures (2000) by the PEPA for environmental approval, the SIE plant falls under Category B (Manufacturing and Processing) of Schedule II, which requires EIA for environmental approval prior to any construction. According to the Guidelines for Self Monitoring and Reporting by Industry (2001) prepared by the Environmental Standards Committee for the implementation of the NEQS, the SIE falls under Category A of Schedule I and Schedule II for monitoring and monthly reporting of environmental parameters of effluent and gaseous emissions respectively to the EPD.

The SIE will comprise a number of industrial sectors such as textile, pharmaceuticals, pesticides, equipment, light engineering, mechanical, electrical, electronics, plastics, food, and beverages. The estimated capital cost of this project is 4 billion rupees.

The methodology adopted for conducting EIA study includes orientation session, development of the data acquisition plan, review of the existing data, sources and tools of data collection, primary data collection surveys (reconnaissance survey, socioeconomic survey), sources of secondary information and impact assessment matrices.

The area around the project site is flat. The project area is predominantly an uncultivated area. The agricultural land is found only in the southwest of the project site. The seismic factor for the project area falls between minor to negligible. The climate of the area is subtropical experiencing 300 mm to 500 mm rainfall annually. The quality of drinking water at shallow depth is unpalatable. The quality of wastewater of the Rohi Nullah is better than the Nullah Drain. The ambient air quality data show that the atmosphere of the area is contaminated with particulate matter only. The ambient noise levels vary at different locations at different timings.

No forests are found in the project area but there are few scattered perennial trees namely Eucalyptus. Terrestrial fauna are found in the project area but there are no endangered/rare species and protected areas.

There are 6 settlements in the project area namely Nahela, Haveli Bangroo, Sangatpura, and Haveli Munimanwali, Bhai Kot, and Mull. Most of the people in these settlements live under

nuclear family system. The male to female ratio is 52:48. There are altogether 10 government and private schools for boys and girls. The principle earning occupations include agriculture and skilled labor work. The land owners of the area tend to grow wheat, fodder crops, vegetable, and fruit plants. Livestock is mainly raised for transportation, food and farming purposes. The income levels of most of the people in the area are low. Most of the houses are constructed in bricks and permanent roofing structures. No community water supply schemes are laid out in these settlements. The quality of ground water is unpalatable. Electricity is provided to all the settlements except the village Haveli Munimanwali. There is no natural gas supply in the area and the people mostly use cow dung and wood as fuel for cooking and heating. There are few people who are making use of the telecommunication facility. The main mode of transport for local villagers is public bus and wagons. The sanitary conditions are unsatisfactory with most of the people discharging their wastewater and solid waste into open drains and open land. Health of the people is badly affected due to contaminated drinking water. There are 2 government dispensaries, 1 private clinic and 1 unauthorized hakeem catering unsatisfactory services to the local people. The project site is accessible by a number of roads such as Raiwind-Sundar road, Raiwind-Manga road, and road along the Rohi nullah (officially named as Raiwind drain). There is no postal facility in the area. There are 15 mosques, 3 madrassa, 1 church, and 2 graveyards. None of the monuments/sites, of archaeological or historical importance, exist in the area. No recreational site of regional or national importance is found in the area. The local people opine that industrial development should take place with the aim to promote job opportunities and improve existing infrastructure.

The major environmental impacts of the proposed project will be due to the constructional and the operational activities. The constructional phase impacts are: generation of dust due to transportation of construction materials in uncovered form, open storage of construction materials, earthwork operations, preparation of concrete at batching plants, movement of construction machinery and construction materials transport vehicles, exhausts of the construction machinery, and construction materials transport vehicles mostly using diesel as fuel; noise and vibration due to movement of construction materials transport vehicles and construction and erection of electrical and mechanical equipment; generation of domestic wastewater and solid waste; job opportunities; public health and safety of local population; and impacts on local social order. The operational phase impacts are wastewater generation, solid and liquid wastes generation, air pollution, noise and vibration, and the OHS issues.

During the operational phase, the wastewater will be generated from the municipal and industrial sources. The solid wastes will mainly comprise empty containers of used lube oil, and chemicals, metal scrap, discarded mechanical parts, and domestic solid waste from all the industries in the SIE. Solid waste will also be produced from commercial and institutional activities in the SIE. The liquid waste stream includes used lube oil. Improper disposal of liquid waste can cause soil, water and air pollution. The air pollution sources will be mainly generators, boilers, and vehicles. The plant noise and the vehicular noise are the two major sources. The plant noise is normally generated from the moving and rotating parts of the machinery (such as conveyor belts), boilers and generators. Generally, well maintained vehicles have noise within the NEQS level of 85 dBA. The OHS issues mainly concern with the use of the OHS equipment by the plant workers.

The mitigation measures for the construction phase issues include disposal of domestic wastewater, domestic solid waste management, dust suppression, noise and vibration control. To mitigate impacts during the operational phase, the management of the PIE should stick to the proposed measures to run the SIE in an environment-friendly manner. For solid waste management, monitoring of the solid waste with respect to its source, type and generation rate is essential. The municipal and industrial wastewater will be treated at the CETP site and the sludge will be disposed of at the designated landfill site in the SIE. For liquid wastes, there can be a mutual agreement with the major suppliers of lube oil to take them back after use.

The noise control measures should be implemented both for the plant noise and the vehicles. For the plant noise, the management should take different measures such as noise measurement, audiometric testing, record keeping of medical tests and follow up, engineering controls, administrative controls, and training of employees. For vehicular noise mitigation, the vehicles maintenance program will be implemented for carrying out their regular maintenance.

The management shall develop environmental management plan to implement the mitigation measures proposed for the environmental impacts during the construction and the operation phases. The plan will include institutional measures, disaster/hazard management plan (comprising hazards identification, engineering and administrative controls, and occupational health and safety planning), and establishment of environmental monitoring department to carry out water quality monitoring of the CETP, solid waste monitoring (SIE in general and land fill site in particular), air quality monitoring (SIE in general and the land fill site in particular), and noise monitoring.

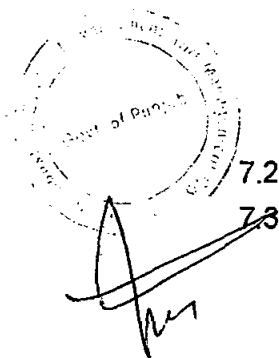
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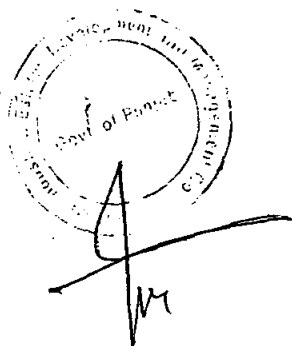
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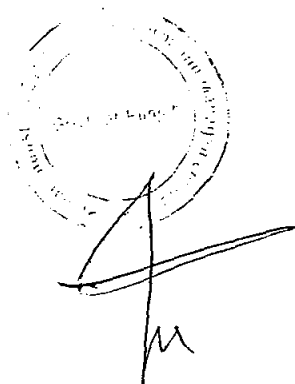
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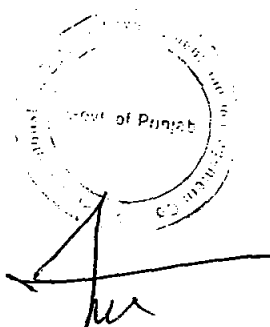
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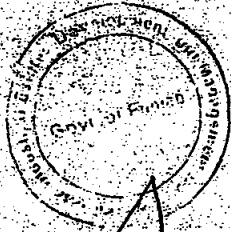
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Chapter 1

Introduction

Introduction

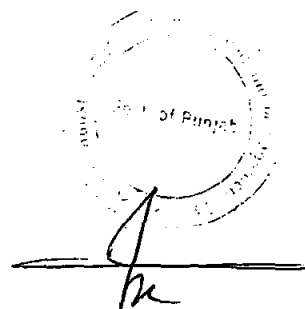
1.1 Proponent History and the Proposed Project

The Punjab Industrial Estates Development and Management Company (PIEDMC hereinafter referred to as PIE) is owned by the Government of Punjab and was established in September 2003. The objectives of the PIE include planned and rapid industrialization and develop a chain of new industrial estates. The objective also involves upgrading existing industrial estates in a dynamic and innovative manner by providing solutions and involving local stakeholders in the decision making process. The seed money has been provided by the Government of Punjab, which will be utilized for the development of new industrial estates.

After taking the management control and upgrading of Multan Industrial Estate and Quaid-e-Azam Industrial Estate, the PIE has now introduced the Sundar Industrial Estate (SIE) on the Sundar-Raiwind Road, 25 km south of Lahore. The area, comprising 541.4 ha, has been reserved for a number of industrial sectors such as textile (knitting, stitching, dyeing, finishing, weaving), pharmaceutical, pesticides, equipment, light engineering, mechanical, electrical, electronics, plastics, food and beverages like frozen food, juices, bakery and edible oil. The planned infrastructure facilities at the SIE include roads, telecommunication, sewerage, electricity, water supply, gas, petrol-pumps, health safety and environment support etc. There will be no large residential settlements within the SIE. Only a small residential colony will be established for the factory workers.

Name and Contact Address of the Proponent

Mr. Mohsin M. Syed
Chairman, PIE
1st Floor, Saudi Pak House,
14-Egerton Road, Lahore.
Phone: 042-9203662-7
Fax: 042-9203660
Web: www.piedmc.com



1.2 Need of the Environmental Impact Assessment (EIA) Study

Under the Pakistan Environmental Protection Act 1997 (PEPA-97), clause 12, it is required that the proponent of any development project will have to submit an IEE or EIA report to the concerned Environmental Protection Agency (EPA) to obtain approval prior to start of construction or operation of the project.

The Industries and Mineral Development Department, the Government of Punjab under Control on Establishment and Enlargement Act, 1963, Notification No. AEA-III-4-1/85 dated 26th October 1986, section 6, states that the government reserves the right

to refuse establishment/enlargement of any industrial undertaking, which is in contravention to the public interest or ecology.

This study also serves the purpose of documentation and incorporation of the environmental concerns and the requirements at the conceptual and feasibility stages of the project. The industrial processes are scrutinized for all the possible environmental issues and their respective impacts. The mitigation measures are proposed to comply with all the National Environmental Quality Standards (NEQS) and to eliminate the possibilities of any impact on ecology. The EIA also proposes an Environmental Management Plan for ensuring that the project should remain environment-friendly throughout its operational life.

1.3 Objectives and Scope

The objectives and scope of the EIA study are:

- ✧ Documentation of the applicable policy, legislative and administrative framework
- ✧ Determination and description of the baseline physical, biological and human environmental conditions of the project area. The aim of the baseline conditions is to record pre-project state of the environments so as to provide basis of comparison during the construction and the operation stages.
- ✧ Identification and assessment of the potential environmental impacts of the project in qualitative and quantitative terms
- ✧ Recommendations on the measures to mitigate the negative impacts of the project
- ✧ Recommendations on Environmental Management Plan

1.4 Organization of the Report

Chapter-1 "Introduction" presents scope and objectives of the EIA study.

Chapter-2 "Policy, Statutory and Administrative Framework" provides a broad outline of the policy, statutory and administrative framework, in local perspective, applicable to the environmental impact process.

Chapter-3 "Project Description" furnishes an overall description of the project, including its background and production process.

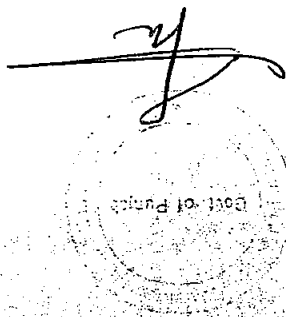
Chapter-4 "Methodology" lays down methodologies adopted for collection of primary as well as secondary data and information, required for carrying out the EIA study.

Chapter-5 "Baseline Environmental Profile of the Project Area" comprises a detailed documentation of the existing (baseline) conditions of the project area, in respect of its physical, biological and human environments.

Chapter-6 "Environmental and Socio-Economic Issues and Impacts" documents the likely impacts of the project on the physical, biological and human environments during the construction and the operation phases.

Chapter-7 "Environmental Impacts Mitigation Measures" lays down the proposed measures to mitigate the adverse impacts of the project.

Chapter-8 "Environmental Management Plan" provides the proposals on mechanism to be adopted for the implementation and monitoring of the environmental measures.



Policy, Statutory and Administrative Framework

Chapter 2

Policy, Statutory and Administrative Frameworks

2.1 General

This chapter presents the environmental policy, legislative and administrative frameworks for the protection of environment, adopted and enforced in Pakistan. The requirements of these policies, legislations and guidelines have been duly considered in the preparation of this study.

2.2 Policy Framework

The Ministry of Environment is responsible for policy making and planning on the subject of environmental protection in Pakistan. The Pakistan Environmental Protection Council, headed by the Chief Executive of Pakistan, is the apex inter-ministerial and multi-stakeholders decision making body.

2.2.1 Pakistan National Conservation Strategy

The Pakistan National Conservation Strategy is one of the principal policy documents for environmental issues in the country, which was developed and approved by the Government of Pakistan on March 1, 1992. Following are the industry-specific policies:

- ✧ Develop and enforce effective pollution controls
- ✧ Promote clean industrial processes and recycling
- ✧ Establish incentives for environmentally beneficial or benign industries
- ✧ Develop a policy to site industry in areas of lower environmental sensitivity
- ✧ Build awareness within industry

2.3 Statutory Framework

The Pakistan Environmental Protection Agency (PEPA) is the primary government institution dealing with the environmental issues with delegated broad-based enforcement powers to the provincial environmental protection agencies/departments. The publication of the Pakistan Environmental Protection Agency "Review of IEE and EIA Regulations 2000" provides necessary details on the preparation, submission, and review of IEE and EIA.

Pakistan's statute books contain a number of other laws, which have clauses governing the regulation and protection of the environment in addition to the Pakistan Environmental Protection Act, 1997.

2.3.1 Pakistan Environmental Protection Act, 1997 (PEPA-97)

Pakistan Environmental Protection Act, 1997 (PEPA-97) was enacted by repealing PEPO 1983. The PEPA-97 provides the framework for implementation of the National Conservation Strategy, protection and conservation of species, wildlife habitats and

biodiversity, conservation of renewable resources, establishment of standards for the quality of the ambient air, water and land, establishment of Environmental Tribunals, appointment of Environmental Magistrates, IEE, EIA, promotion of public education and awareness of environmental issues through mass media. The Act is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The act is applicable to a broad range of issues and extends to air, water, soil, marine, and noise pollution, as well as to the handling of hazardous wastes. Penalties have been prescribed for those contravening the provisions of the Act.

Following are the key features of the law, which have a direct bearing on the Project:

Section 12 (1) requires that "no proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an IEE or, where the project is likely to cause an adverse environmental effect, an EIA, and has obtained from the Federal Agency approval in respect thereof."

Section 12 (2) (b) states that the Federal Agency shall review the EIA report and accord its approval subject to such conditions as it may deem fit to impose, or require that the EIA be resubmitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.

The details of the Act are given in **Annexure 2.1**.

2.3.2 PEPA Environmental Assessment Procedures

The PEPA has published a set of environmental guidelines for conducting environmental assessments and environmental management of different types of development projects. The guidelines, which are applicable to the proposed project, are listed below followed by comments on their relevance:

- ※ ***Policy and Procedures for Filing, Review and Approval of Environmental Assessments, PEPA, 2000:*** These guidelines define the policy context and the administrative procedures, which govern the environmental assessment process, from the project pre-feasibility stage to the approval of the environmental report.
- ※ ***Guidelines for the Preparation and Review of Environmental Reports, PEPA, 1997:*** The guidelines on the preparation and review of environmental reports specify the following for the project proponent:
 - Nature of the information to be included in environmental reports
 - Minimum qualifications of the EIA conductors appointed
 - Need to incorporate suitable mitigation measures at every stage of the project implementation
 - Need to specify monitoring procedures

2.3.3 Other Relevant Laws

Other laws applicable to the project are outlined hereunder:

a) Wildlife Act 1974

Punjab Wildlife Protection, Conservation and Management Act 1974, requires protecting the wildlife species declared as *endangered/threatened* and *rare*. The Act gives protection to these species by declaring their natural living environment as

protected and reserved such as national parks, wildlife sanctuaries, and game reserves.

b) Antiquities Act 1975

The Act provides protection and preservation of historically and archaeologically important sites. The project development activities must take into account the location and other activity patterns around historically important sites and should take all the measures to protect and preserve the original character of such areas of historical and/or archeological importance.

c) Factories Act 1934

The clauses relevant to the project are those, which concern the health, safety and welfare of workers, disposal of solid waste and effluent, and damage to private and public properties. The Act also provides regulations for handling and disposing of toxic and hazardous materials.

d) Canal and Drainage Act 1873

The Act prohibits fouling of channels, watercourses, reservoirs and tubewells by industrial and/or domestic waste.

The proposed SIE will not be a source of pollution for natural water bodies; rather, it will discharge treated effluent from all the industries with parameters having concentration within the NEQS limits.

e) Pakistan Penal Code 1960

The Pakistan Penal Code deals with the offences where public or private properties and/or human lives are affected due to intentional or accidental misconduct of an individual or body of people. In the context of environment, the Penal Code, however, can provide a basis for the SIE to coordinate its activities with the local authorities to ensure that its construction activities do not become a cause of public nuisance or inconvenience.

2.4 Administrative Framework

The administrative framework operating in Pakistan relevant to environmental issues of the project, right from execution to monitoring, is briefly presented below:

2.4.1 Pakistan Environmental Protection Agency

The Federal EPA has overall jurisdictions over IEE/EIA issues. Federal jurisdiction is applicable to the projects as under:

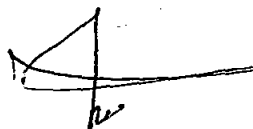
- ✱ On federal land
- ✱ Military projects
- ✱ Involving trans-country impacts
- ✱ Bearing trans-province impacts

For all other cases, the concerned provincial Responsible Authority shall have jurisdiction. The PEPA reserves the rights to review any environmental report at any time and to suspend the powers it has delegated to any responsible authority if it believes those powers have not been properly used.

The PEPA is headed by Director General and has administrative, technical and legal staff. It is also allowed to establish advisory committees for various subjects and appoint as members thereof eminent representatives of the relevant sector, educational institutions, research institutes and non-government organization. It can undertake inquiries or investigation into environmental issues either of its own accord or upon complaint from any person or organization and institute legal actions against persons found in violation of the PEPA-97.

2.4.2 Environmental Protection Department of Punjab

The components of the project lie geographically in the province of Punjab; therefore, the EPD Punjab will have jurisdiction over the proposed project. The EPD is headed by the Director General and supported by administrative, technical and legal staff. The major functions of the EPD are to issue, after reviewing, the approval of EIA for the projects; carry out environmental monitoring of the operations in the province; enforce environmental legislation; and monitor the projects as per the recommendations of the EIA. The EPD can involve district and local administration for the enforcement of environmental legislation.



Chapter 3

Project Description

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PROJECT DESCRIPTION

3.1 Type and Category of the Project as per the PEPA Guidelines

According to the Pakistan Environmental Assessment Procedures (2000) by the PEPA for environmental approval, the SIE falls under Category B (Manufacturing and Processing) of Schedule II, which require EIA for environmental approval prior to any construction.

According to the Guidelines for Self Monitoring and Reporting by Industry (2001) prepared by the Environmental Standards Committee for the implementation of the NEQS, the SIE falls under Category A of Schedule I for monitoring and monthly reporting of environmental parameters of effluents to the responsible authority.

For new SIEs, the EIA guidelines may specifically set a prior requirement of approval of its operation. Once after the establishment of the SIE, a comprehensive monitoring report for all the NEQS parameters for normal CETP operation and other plants operations in the SIE may be required to establish that the plants do meet the environmental commitments made in respective EIAs submitted. The subsequent monitoring will then be limited to the priority parameters only as proposed for respective categories.

The above reference documents are attached as **Annexure 3.1** and **Annexure 3.2**.

3.2 Cost and Size of the Project

The estimated total project cost is **4** billion rupees. It is in the category of very large size project. Total electricity demand of the SIE will be 150 MW. The proposed project covers total land area of 541.4 hectares. Detailed distribution of plot sizes in the SIE is given in **Table 3.1**. The human resources required during the construction phase will be about 1,100 personnel (labor). During the operation phase, the total staff will be about 40 to 50.

Table 3.1
Land Use Distribution of the SIE

Category	No of Plots with Sizes (acres)								Area (ha)
	0.4-0.5	0.6-1	1.1-2	2.1-3	3.1-4.6	5-5.8	20-30	Total	
Industrial Plots	136	370	157	76	21	19	2	781	365.3
Commercial & Institutional Plots									27.1
Open Areas									13.7
Roads									135.3
Total									541.4

3.3 Project Layout

The layout plan of the proposed project is attached as **Annexure 3.3**.

3.4 Government Approvals and Lease Required by the Project

The SIE is a government supported project. For industrial installation at the project site, NOC is required from the City District Government Lahore, which has already been obtained. There is no lease required by the project. The project is self-funded. The seed money has been provided by the Government of Punjab. NOC from the drainage department (Punjab Irrigation and Drainage Authority) for discharging treated excess wastewater into drainage canal will be obtained after completion of construction and before operation of the Combined Effluent Treatment Plant (CETP). The department will issue NOC if the treated wastewater has concentration of pollutants within the NEQS.

3.5 Rehabilitation Plan

At present, the PIE has not made any rehabilitation plan at the end of the project life.

3.6 Implementation Schedule

The project implementation schedule is illustrated under **Table 3.2**:

Table 3.2
Project Implementation Schedule

No	Activities	Completion Time
1.	Start of construction	January 2005
2.	Installation of main equipment	December 2006
3.	Completion	February 2007
4.	Commissioning	April 2007
5.	Start of commercial operations	June 2007

3.7 Project Background and Overview

The Government of Punjab (GOP) showed deep concern towards the difficulties faced by the industrialists and announced a proactive policy to promote industrial growth and remove unnecessary delays and hindrances. The GOP chalked out growth strategies and resultantly established the PIE in September 2003 to ensure an overall enhancement of industrial growth in Pakistan and particularly to achieve orderly, planned and rapid industrialization of the Punjab province. It will develop a chain of industrial estates in a dynamic and innovative manner by capitalizing on existing industrial and agricultural strengths of each region.

The purpose of this modular industrial estate is to create new jobs, reduce poverty, encourage industrialization in Punjab and resultantly increase the GDP of the country. It is being built on a similar concept of international industrial estates of Singapore, China and Thailand where developed industrial plots are sold or leased. The funds generated will be utilized for the establishment of new industrial sites.

The land for the SIE was selected on the basis of easy accessibility to main highways with its approach to Multan road and Raiwind road. The site is connected to the major

landmarks and is within half an hour drive from Motorway, Allama Iqbal International Airport, New Railway Dry Port and NLC container terminal. With four entry exit points, easy movement in all directions is ensured.

The SIE is being built as a state of the art infrastructure project with services based on need assessment survey from the existing industrialists. More than 300 industrialists have provided relevant data and information regarding their respective proposed ventures, including capital cost, number of skilled and unskilled laborers to be employed, electricity, water, gas consumption and the source of availability of raw material etc.

3.8 Project Site Alternatives

During the process of site selection for the proposed industrial estate, two sites were taken into consideration including Sundar and Gia Bagga. The latter site was discarded by the industrialists owing to unknown reasons and Sundar was selected as the preferred location for the estate.

3.9 Basic Amenities of the Project

Keeping the needs of modern entrepreneurs, the PIE has ensured the availability of the following basic and special amenities at the SIE:

- ✧ Roads
- ✧ Underground sewerage system
- ✧ Underground electricity distribution system
- ✧ Gas
- ✧ Water
- ✧ Telecommunications
- ✧ Estate owned electrical distribution system
- ✧ Civic center (post office, sports facilities, banks etc.)
- ✧ Appropriately designed food areas for workers at major intersections
- ✧ Fire station (including fire trucks) and fire hydrants
- ✧ Computerized weigh station
- ✧ Information sign boards
- ✧ Technical training facilities
- ✧ Private security arrangements
- ✧ Hospital/emergency medical services (by Social Security)
- ✧ Public transport
- ✧ Police station
- ✧ Mosque
- ✧ Motel and restaurant
- ✧ Pre-built warehouses and offices for rent
- ✧ Petrol pumps
- ✧ WTO environmental compliances (drinking quality water, ~~health, safety and~~ environmental support, CETP and solid waste management)

Following is a brief description about the nature of industries in the SIE, industrial wastewater flows, pollution loads and concentrations, water balance, sewage treatment and sludge treatment technologies:

3.9.1 Design Wastewater Flows and Characteristics

The process design of the treatment facilities shall be carried out at maximum day flows and pollution loads, whereas the hydraulic design of all the wastewater

conveyance and transfer components shall be carried out at peak hour flows. This chapter presents the determination of the design values of all these parameters.

It is proposed that the CETP-SIE shall not be designed for the removal of any toxic metals or compounds present in the wastewater and these pollutants, where originating from any individual industry and exceeding the NEQS values, shall be removed by that industry, by providing specific in-house treatment system, prior to discharge of the wastewater into the sewerage system of the SIE. The CETP-SIE shall be designed primarily to bring the BOD, COD, and TSS values of the wastewater within the NEQS limits. The analysis, therefore, in this section is limited to these quality parameters.

In general, the design concentrations, for each pertinent quality parameter, shall be determined by dividing the respective design pollution load values with the respective design wastewater flows.

The specific nature of individual industries which have been allotted plots in the SIE, and information on their production is not known at this stage. The only available pertinent data, which can be used for establishing design wastewater flows and characteristics for the CETP-SIE at this stage, is the plot-area based composition of the SIE with respect to different broad categories of industries. Keeping this in view, the design wastewater flows and pollution loads for the CETP-SIE are established on the basis of the following criteria:

- a) Using plot area based unit wastewater flows and pollution loads for different categories of industries on the basis of international literature and local data
- b) An analysis based on comparison with the measured values of the Quaid-e-Azam Industrial Estate (QIE)
- c) Wastewater flow values used in the design of sewerage system

a) Plot Area Based Unit Wastewater Flows and Pollution Loads

The plot area based unit wastewater flows and pollution loads for different categories of industries are determined by employing the following general relationship:

$$[\text{Wastewater Flow or Pollution Load per Production}] \times [\text{Production per Plot Area}]$$

Representative unit wastewater flows and pollution loads per production, for different categories of industries, are taken from the following international and local sources. The data on typical daily production rate per plot area is derived from the local sources and data available inside the NEC.

- ✧ World Bank Group (1998) *Pollution Prevention and Abatement Handbook*
- ✧ World Health Organization (1982) *Rapid Assessment of Sources of Air, Water and Land Pollution*, Geneva
- ✧ European Commission (2003) *Integrated Pollution Prevention and Control (IPPC): Reference Document on Best Available Techniques for the Textile Industry*, Spain
- ✧ United Nations Environment Program (1996) *Cleaner Production in Textile Wet Processing: A Workbook for Trainers*, France
- ✧ Implementation of Cleaner Production Technologies (ICPT): Textile Sector of Pakistan (2002) *Report: Techno-economic Study of Environmental Solutions*
- ✧ Cleaner Production Program (CPP): A multi-sectoral industrial environmental project, funded by the Royal Netherlands Embassy (RNE)

Table 3.3 presents the representative plot-area based unit wastewater flows and pollution loads, for BOD, COD and SS, for different types of industries, derived by corroborative analysis of data obtained from the afore-mentioned sources.

Table 3.3

Plot-Area Based Unit Wastewater Flows, Unit Pollution Loads and Concentrations for Different Types of Industrial Wastewater and Domestic Wastewater

Industry	Unit WW Flows (liters/d-m ²)	Unit Pollution Loads			Concentrations		
		BOD (g/d-m ²)	COD (g/d-m ²)	SS (g/d-m ²)	BOD (mg/l)	COD (mg/l)	SS (mg/l)
Textile Processing	140	63	140	56	450	1,000	400
Pharmaceutical	5	1.5	3	1	300	600	200
Pulp & Paper	300	375	900	150	1,250	3,000	500
Dairy	30	18	31.5	9	600	1,050	300
Fruit Juices & Jams	30	18	31.5	9	600	1,050	300
Automotive	8	0.8	2.8	0.8	100	350	100
Steel Melting (EAF)	15	0.75	1.50	4.50	50	100	300
Domestic Wastewater	5	1	2	1	200	400	200

Table 3.4 presents the representative concentrations of BOD, COD and SS and plot-area based unit wastewater flows, for industries in accordance with their categorization for the SIE. For same or similar categories, values are directly taken from **Table 3.3**, whereas for categories different than those given in **Table 3.3**, the values are estimated, on the basis of comparison in terms of nature of industrial processes involved and their wastewater flows and pollution loads generation potential.

Table 3.4

Plot-Area Based Unit Wastewater Flows and Concentrations for Different Categories of Industries in the SIE

Industry	Unit WW Flow (liters/d-m ²)	BOD (mg/l)	COD (mg/l)	SS (mg/l)
Textile & Knitwear Processing	140	450	1,000	400
Textile (Non-processing)	30	150	300	150
Garments & Embroidery	20	100	200	200
Carpets Processing	140	450	1,000	400
Carpets (Non-processing)	30	100	200	200
Paper	300	1,250	3000	500
Food Processing	30	500	900	300
Pharmaceutical	5	300	600	200
Chemicals, Paints and Cosmetics	30	300	900	200

Industry	Unit WW Flow (liters/d-m ²)	BOD (mg/l)	COD (mg/l)	SS (mg/l)
Leather Products	5	200	400	200
Rubber & Plastic Items	20	200	400	200
Construction Items	20	50	100	300
Engineering	15	100	350	150
Steel	15	50	100	300
Miscellaneous: LW-LP	5	200	400	200
CETP & IPP	5	100	200	100
Commercial & Institutional	5	200	400	200

b) Determination of Wastewater Flows

Validation of Plot-Area Based Unit Wastewater Flows on the QIE Data

In order to validate and check the representative plot-area based unit wastewater flows, for different categories of industries, as laid down in Table 3.4, these values are used to compute the daily wastewater flows, for the monitored area of the QIE. The computed flows are then compared with the measured flows. Table 3.5 presents the results of this analysis.

Table 3.5

Wastewater Flows Computed on the Basis of Plot-Area Based Unit Wastewaters for the Monitored Area of the QIE in Comparison with the Measured Flows

Industry	Plot Area (m ²)	Unit Flow (liters/d-m ²)	Flow (m ³ /d)
Textile/Knitwear Processing	186,990	140	26,180
Textile (Non-processing)	5,520	30	165
Garments & Embroidery	22,080	20	440
Carpets Processing	13,110	140	1,835
Carpets (Non-processing)	0	30	0
Paper	4,830	300	1,450
Food Processing	63,480	30	1,905
Pharmaceutical	89,010	5	445
Chemicals, Paints	18,630	30	560
Leather Products	44,850	5	225
Rubber & Plastic Items	50,370	20	1,010

Industry	Plot Area (m ²)	Unit Flow (liters/d-m ²)	Flow (m ³ /d)
Construction Items	4,830	20	100
Engineering	74,520	15	1,120
Steel	24,840	15	370
Miscellaneous: LW-LP	78,660	5	395
CETP & IPP	0	5	0
Commercial & Warehouses	8,280	5	40

Total by Analysis	690,000		36,240
Measured Values			31,940
Measured-to-Analyzed Ratio			0.88

Wastewater Flows for the SIE on the basis of Plot-Area Based Unit Wastewater Flows

Table 3.6 presents the ultimate daily wastewater flows of the SIE, computed on the basis of representative plot-area based unit wastewater flows for different categories of industries as laid down in Table 3.4.

Table 3.6

Ultimate Daily Wastewater Flows computed on the Basis of Plot-Area Based Unit Wastewaters for the SIE

Industry	Plot Area (m ²)	Unit Flow (liters/d-m ²)	Flow (m ³ /d)
Industrial Plots	3,653,000		119320
Textile/Knitwear Processing	310,505	140	43,470
Textile (Non-processing)	157,079	30	4,710
Garments & Embroidery	365,300	20	7,310
Carpets Processing	138,814	140	19,435
Carpets (Non-processing)	135,161	30	4,055
Paper	18,265	300	5,480
Food Processing	263,016	30	7,890
Pharmaceutical	639,275	5	3,200
Chemicals, Paints	146,120	30	4,385
Leather Products	7,306	5	40
Rubber & Plastic Items	186,303	20	3,730
Construction Items	113,243	20	2,265

Industry	Plot Area (m ²)	Unit Flow (liters/d-m ²)	Flow (m ³ /d)
Engineering	683,111	15	10,245
Steel	65,754	15	990
Miscellaneous: LW-LP	91,325	5	455
CETP & IPP	189,956	5	950
Commercial & Warehouses	142,467	5	710
Commercial & Institutional Plots	271,000	5	1,355
Total	3,924,000		120,675

Wastewater Flows for the SIE on the basis of Comparative Analysis with the QIE

The analysis done in Table 3.5 for the QIE shows that ratio of measured wastewater flows to those computed on the basis of representative plot-area based unit flows 0.88. The same factor is applied to the computed SIE flow to obtain the QIE-based flow, which works out to be **106,200 m³/d**.

Daily Design Wastewater Flow

Table 3.7 presents a summary of daily wastewater flows computed on different basis.

Table 3.7

Sundar Industrial Estate

Comparison of Alternate Daily Wastewater Flows at Full Development

Basis	Daily Design Flows
Using Category-wise Plot-Area Based Unit Wastewater Flows	120,675 (m ³ /d)
Based on Comparative Analysis with the QIE	106,200 (m ³ /d)
Value Used in the Design of Sewerage System	140,600 (m ³ /d)

It needs to be appreciated that in order to reach at the design values, a factor of safety needs to be applied to the values determined by analysis, in order to account for uncertainties of data, various assumptions made for the analysis and the possible change in the actual future composition of the SIE. Keeping in view these factors and also the value, employed for the design of sewerage system, the ultimate daily design wastewater flow for the CETP-SIE is adopted as **150,000 m³/d**.

Design Peak Hour Flow

The peak hour factor, which is ratio of peak hour flow to average daily flow, ranges from 1.06 to 1.12 for the monitored area of the QIE. According to our assessments, the peak hour factor for the SIE, at maximum day flows would not exceed a value of 1.25. Accordingly, the peak hour flow works out to be about 7,800 m³/h, for a daily design flow of 150,000 m³/d.

The Infrastructure Services Design Report employs a peak factor of 1.5 and computes peak hour wastewater as 8,700 m³/h, for a daily design flow of 140,600 m³/d.

According to the sewerage system drawings, the capacity of last trunk sewer (6' dia) is 8,640 m³/h.

The peak hour wastewater flow for the CETP-SIE is taken as 8,640 m³/h, which is equal to the maximum capacity of the last sewer.

c) Determination of Wastewater Pollution Loads and Concentrations

Validation of Plot-Area Based Unit Pollution Loads on the QIE Data

In order to validate and check the representative plot-area based unit pollution loads, for different categories of industries, based on the unit flows and concentrations laid down in Table 3.4, these values are employed to compute the daily pollution loads of BOD, COD and SS, for the monitored area of the QIE. The computed pollution loads are then compared with the measured loads. Table 3.8 presents the results of this analysis. The flows, for different categories of industries, are taken from Table 3.5.

Table 3.8

Pollution Loads on the Basis of Plot-Area Based Unit Wastewater Flows and Concentrations for the Monitored Area of the QIE in Comparison with the Measured Loads

Industry	Flow (m ³ /d)	Concentration (mg/l)			Loads (kg/d)		
		BOD	COD	SS	BOD	COD	SS
Textile/Knitwear Processing	26,180	450	1000	400	11,781	26,180	10,472
Textile (Non-processing)	165	150	300	150	25	50	25
Garments & Embroidery	440	100	200	200	44	88	88
Carpets Processing	1,835	450	1000	400	826	1,835	734
Carpets (Non-processing)	0	100	200	200	0	0	0
Paper	1,450	1250	3000	500	1,813	4,350	725
Food Processing	1,905	500	900	300	952	1,714	572
Pharmaceutical	445	300	600	200	134	267	89
Chemicals, Paints	560	300	900	200	168	504	112
Leather Products	225	200	400	200	45	90	45
Rubber & Plastic Items	1,010	200	400	200	202	404	202
Construction Items	100	50	100	300	5	10	30
Engineering	1,120	100	350	150	112	392	168
Steel	370	50	100	300	18	37	111
Miscellaneous: LW-LP	395	200	400	200	79	158	79
CETP & IPP	0	100	200	100	0	0	0
Commercial & Warehouses	40	200	400	200	8	16	8
Total by Analysis	36,240	447	996	371	16,212	36,095	13,460

Industry	Flow (m ³ /d)	Concentration (mg/l)			Loads (kg/d)		
		BOD	COD	SS	BOD	COD	SS
Measured Values	31,940	308	612	327	9,838	19,548	10,444
Measured-to-Analyzed Ratio	0.88				0.60	0.54	0.78

Wastewater Pollution Loads for the SIE on the Basis of Plot-Area Based Unit Pollution Loads

Table 3.9 presents the ultimate daily wastewater pollution loads of BOD, COD and SS for the SIE, computed on the basis of representative plot-area based unit pollution loads, for different categories of industries, based on the unit flows and concentrations laid down in Table 3.4. The flows, for different categories of industries, are taken from Table 3.6.

Table 3.9

Ultimate Daily Pollution Loads for the SIE computed on the Basis of Plot-Area Based Unit Pollution Loads

Industry	Flow (m ³ /d)	Concentration (mg/l)			Loads (kg/d)		
		BOD	COD	SS	BOD	COD	SS
Industrial Plots	119320				45,490	102073	38,361
Textile/Knitwear Processing	43,470	450	1000	400	19,561	43,470	17,388
Textile (Non-processing)	4,710	150	300	150	707	1,413	706
Garments & Embroidery	7,310	100	200	200	731	1,462	1,462
Carpets Processing	19,435	450	1000	400	8,746	19,435	7,774
Carpets (Non-processing)	4,055	100	200	200	405	811	811
Paper	5,480	1250	3000	500	6,850	16,440	2,740
Food Processing	7,890	500	900	300	3,945	7,101	2,367
Pharmaceutical	3,200	300	600	200	960	1,920	640
Chemicals, Paints	4,385	300	900	200	1,315	3,946	877
Leather Products	40	200	400	200	8	16	8
Rubber & Plastic Items	3,730	200	400	200	746	1,492	746
Construction Items	2,265	50	100	300	113	226	680
Engineering	10,245	100	350	150	1,025	3,586	1,537
Steel	990	50	100	300	50	99	297
Miscellaneous: LW-LP	455	200	400	200	91	182	91
CETP & IPP	950	100	200	100	95	190	95
Commercial & Warehouses	710	200	400	200	142	284	142
Commercial & Institutional	1,355	200	400	200	271	542	271
Total	120,675				45,761	102615	38,632

Wastewater Pollution Loads for the SIE on the basis of Comparative Analysis with the QIE

The analysis shown in Table 3.8, for the QIE, depicts that measured pollution loads, for all the parameters, are less than those computed on the basis of representative plot-area based unit pollution loads, by certain factors. Table 3.10 presents the "QIE-Based" pollution loads for the SIE, whereby the pollution loads computed in Table 3.9, for BOD, COD and SS are multiplied by the respective Measured-to-Analyzed Ratios, established for the QIE in Table 3.8.

Table 3.10

Ultimate Daily Pollution Loads for the SIE based on Comparative Analysis with the QIE

Parameter	Pollution Loads (Plot-Area Basis) (kg/d)	Measured-to-Analyzed Ratios for QIE	Pollution Loads (QIE-Based) (kg/d)
BOD	45,761	0.60	27,457
COD	102,615	0.54	55,412
SS	38,632	0.78	30,133

Daily Design Wastewater Pollution Loads and Concentrations

Table 3.11 presents a summary of daily pollution loads, for BOD, COD and SS, computed on two different basis and the corresponding concentrations, computed by dividing the daily pollution loads with the daily design wastewater flow of 150,000 m³/d.

Table 3.11

Sundar Industrial Estate

Comparison of Alternate Pollution Loads and Concentrations at Full Development

Parameter	BOD	COD	SS
Computed Daily Pollution Loads (kg/d)			
Using Category-wise Plot-Area Based Unit Pollution Loads	45,761	102,615	38,632
Based on Comparative Analysis with QIE	27,457	55,412	30,133
Computed Concentrations (mg/l)			
Using Category-wise Plot-Area Based Unit Pollution Loads	305	684	257
Based on Comparative Analysis with QIE	183	370	201

Table 3.12 presents the finalized design daily pollution loads and concentrations, for BOD, COD and SS. The pollution loads are increased by an order of 15% over and above the higher of the values computed by analysis, in order to further enhance the factor of safety.

Table 3.12

Design Pollution Loads and Concentrations for the SIE

Parameter	BOD	COD	SS
Design Daily Pollution Loads (kg/d)	52,500	105,000	45,000
Design Concentrations (mg/l)	350	700	300

d) Summary of Design Wastewater Flows and Characteristics

Table 3.13

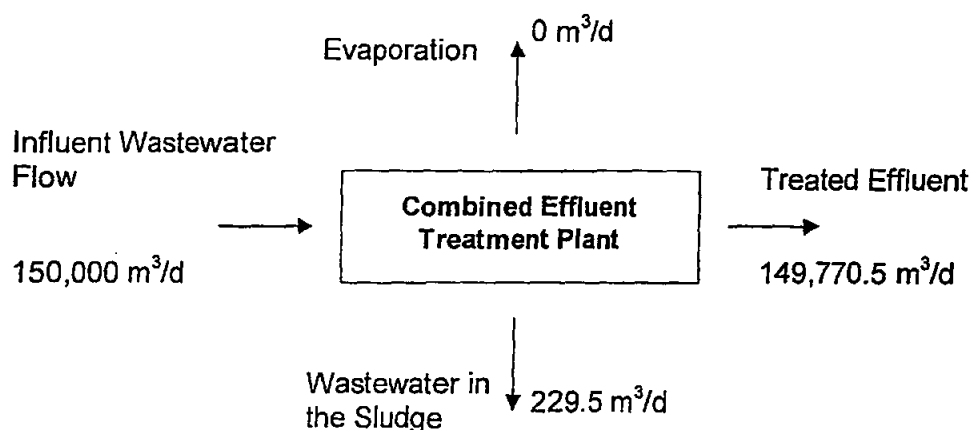
Design Wastewater Flows and Characteristics for the CETP-SIE

Daily Design Flows	150,000 (m ³ /d)
Peak Hour Flow	8,640 (m ³ /h)
BOD	350 (mg/l)
COD	700 (mg/l)
SS	300 (mg/l)

3.9.2 Water Balance

The water balance of the CETP-SIE is portrayed in **Figure 3.1**. The total influent wastewater flow will be 150,000 m³/d, which after passing through the treatment process will reduce to 149,770.5 m³/d as effluent. The remaining 229.5 m³/d wastewater will be retained in the sludge produced.

Figure 3.1

Water Balance of the CETP-SIE

3.9.2

Wastewater Treatment Technology Alternatives

Before selecting the final wastewater treatment technology for the CETP-SIE, different alternatives were studied in detail to reach at a most suitable system for the compliance of the NEQS. Following is the list of the most robust wastewater treatment systems, which were selected as alternatives for the project:

- ✧ Up-flow anaerobic sludge blanket reactor followed by activated sludge process;

- ✧ Oxidation pond;
- ✧ Trickling Filter Process;
- ✧ Aerated Lagoons; and
- ✧ Activated sludge process.

The detailed description of each technology is given below:

a) Up-flow Anaerobic Sludge Blanket Reactor followed by the Activated Sludge Process

Anaerobic processes are used primarily for the treatment of waste sludge and wastewaters with high concentration of organic matter. Of all the anaerobic processes, the Up-Flow Anaerobic Sludge Blanket Reactor (UASB) is the most commonly used process. It differs from the other processes by the simplicity of its design. The process is a combination of the physical and biological processes. Moreover, it only reduces high strength wastewater to lower concentration and the Activated Sludge Process (ASP) is necessary for further polishing for the compliance of the NEQS.

The main features of the physical and biological processes are; separation of solids and gases from the liquid and degradation of decomposable organic matter under anaerobic conditions, respectively. The influent wastewater is distributed at the bottom of the reactor and travels in an up-flow mode through the sludge blanket. The key feature of this process, which allows the use of high volumetric COD loadings compared to other anaerobic processes, is the development of a dense granulated sludge. The development of the sludge is affected by the wastewater characteristics.

The anaerobic degradation of complex, particulate organic matter has been described as a multi-step process of series and parallel reactions. It involves the decomposition of organic and inorganic matter in the absence of molecular oxygen. Complex polymeric materials such as polysaccharides, proteins, and lipids (fat and grease) are first hydrolyzed to soluble products by extracellular enzymes, secreted by microorganisms, so as to facilitate their transport or diffusion across the cell membrane. These relatively simple, soluble compounds are fermented or anaerobically oxidized, further to short-chain fatty acids, alcohols, carbon dioxide, hydrogen, and ammonia. The short-chain fatty acids (other than acetate) are converted to acetate, hydrogen gas, and carbon dioxide. Methanogenesis finally occurs from the reduction of carbon dioxide and acetate by hydrogen. The initial stage of anaerobic degradation, i.e. acid fermentation is essentially a constant BOD stage because the organic molecules are only rearranged.

Among notable disadvantages, it has low synthesis/reaction rate and nuisance due to generation of odorous Hydrogen Sulfide (H_2S) gas, including long start up periods and difficulty in recovery from upset conditions. So, in case of the low strength wastewater like in the SIE, there will be very slow rate of sludge production. Consequently, the system may fail due to high wash out in the effluent. Hence, this system is not recommended for wastewater treatment at the CETP-SIE.

b) Oxidation Pond

An oxidation pond is simply a shallow body of water contained in an earthen basin open to sun and air. The ponds are classified as aerobic, facultative, anaerobic and tertiary according to the nature of the biological activity, which takes place within the pond. The specific biological activity is achieved by maintaining only depth of the pond in a certain range. The detail of each type is given below:

Aerobic Ponds

Shallow ponds, less than 1 m in depth, where dissolved oxygen is maintained throughout the entire depth, mainly by the action of photosynthesis and aeration from the surface. Stabilization of the organic material entering an aerobic pond is accomplished mainly through the action of the aerobic bacteria.

Facultative Ponds

Ponds, 1 to 2.5 m deep, have an anaerobic lower zone, a facultative middle zone, and an aerobic upper zone maintained by photosynthesis and surface re-aeration.

Anaerobic Ponds

Deep ponds, which receive high organic loads, cause anaerobic conditions throughout the entire pond depth. The depth of anaerobic ponds is in the range of 4 to 6 m.

Maturation or Tertiary Ponds

Ponds used for polishing effluent from other biological processes are called *maturity or tertiary ponds*. Dissolved oxygen is furnished through photosynthesis and surface re-aeration. This type of pond is also known as a *polishing pond*. The depth used for the maturation ponds are quite shallow normally about 1m.

Oxidation ponds are quite suitable for the sanitary and low strength wastewater. The other main benefit of using oxidation ponds system is its very low operation and maintenance cost. But, limitation of this system is high land requirement and its nuisance due to odor, flies and mosquitoes breeding. Another limitation of the ponds is that the operation is largely controlled by the weather.

As the available land area for the CETP-SIE is limited, so the pond system is not suitable for the wastewater treatment.

c) Trickling Filter Process

In this process, the settled wastewater is allowed to trickle down over a circular deep bed of coarse aggregates filter. The microbial film developed on the surface of aggregates over time treat the wastewater. A part of this film, washed away by the hydraulic action of trickling wastewater, is separated in the secondary clarifier, in the form of humus sludge, disposed of after sludge treatment.

d) Aerated Lagoons

Aerated lagoons are completely mixed basins, with detention periods, ranging from 2 to 6 days, in which wastewater is generally treated on flow through basis (without solids recycling), with forced aeration. The aerobic suspended biological flocs, responsible for the waste conversion, closely resemble to that of activated sludge process. The area requirements are in between those of the oxidation ponds and activated sludge process.

e) Activated Sludge Process

It is a biological wastewater treatment technique in which a mixture of wastewater and biological sludge (microorganisms) is agitated and aerated. The biological solids are

subsequently separated from the treated wastewater and returned to the aeration process as needed.

The process derives its name from the biological mass formed when air is continuously injected into wastewater. In this process, microorganisms are recycled to the aeration tank from the secondary settling tank and are mixed thoroughly with organic matter under conditions that stimulate their growth by using organics as food. As the microorganisms grow and are mixed by agitation of the air, the individual organisms clump together to form an active mass of microbes called 'activated sludge'.

It is widely famous and being used all over the world due to its less area requirement and capacity to handle shock loadings. This system is highly recommended for the CETP-SIE due to high flow rate (150,000 m³/d) and limited area available. Moreover, the land cost is also quite high in its periphery and the availability of land is also a big question mark.

3.9.4 Selection of Wastewater Treatment Technology

All the above cited wastewater treatment technologies were evaluated on the basis of area requirement, capital investment, energy requirement for aeration, mechanical complexity, frequency of repair and maintenance, reactor resilience, skilled persons requirement, and on site environmental impacts. Table 3.14 exhibits the evaluation of these technologies for the CETP-SIE against a number of technical parameters. The detailed description of the criteria for these parameters is attached as Annexure 3.4.

Table 3.14
Selection of Wastewater Treatment Technology

Parameters	Technologies				
	UASB + ASP	Oxidation Pond	Trickling Filter	Aerated Lagoons	ASP
Land Requirement	5	1	5	3	5
Capital Investment	1	5	3	5	1
Energy Requirement for Aeration	3	5	3	1	1
Mechanical Complexity	3	5	3	3	3
Frequency of Repair & Maintenance	3	5	3	3	3
Reactor Resilience	1	5	3	1	5
Skilled Persons Requirement	1	5	1	1	1
On Site Environmental Impacts	3	1	1	5	5
Total	20	32	22	22	24

UASB – Up-flow Anaerobic Sludge Blanket Reactor ASP – Activated Sludge Process

1 – Least Favorable

5 – Most Favorable

It is evident from the above analysis that the Oxidation Pond is more suitable than others because of a number of factors like small investment, less energy for aeration, less repair and maintenance and high organic and hydraulic loads bearing capacity.

But taking into consideration the limited space available for the CETP at the SIE, the ASP has been finally selected for effluent treatment.

3.9.5 Sludge Treatment Technologies

There are a number of sludge treatment technologies. Keeping in view the nature of industries in the SIE, we have considered the following technologies for comparative analysis to find out the best one.

- a. Solid bowl centrifuge;
- b. Belt press filter;
- c. Recessed plate filter press; and
- d. Sludge drying beds.

The brief description of these technologies along with their pros and cons is given hereunder:

a) Solid Bowl Centrifuge

It is designed for separating solids from liquids with the help of rapidly rotating machines. It contains different units such as rotating bowl, screw feeder, hopper or conveyor belt. The sludge is fed at a constant flow rate into the rotating bowl, which separates thick cake containing the solids and the dilute stream called *centrate*. Typically, the cake solid content in primary sludge is between 25 to 35 per cent.

It is most efficient method but very complex because it entails a large number of components, which require frequent maintenance by highly skilled staff. It needs frequent attention of operators. The energy demand is very high. The land required for the construction of this plant is small. The environmental impacts of this technology are also low.

b) Belt Press Filter

It allows for continuous sludge dewatering with the help of chemical conditioning, gravity drainage, and mechanically applied pressure. It is composed of sludge pumps, polymer feed equipment, a sludge-conditioning tank (flocculator), a belt press filter, a sludge cake conveyor, and support systems (sludge feed pumps, wash water pumps and compressed air).

The characteristics of this method are almost the same as the Solid Bowl Centrifuge but there are few exceptions such as moderate efficiency, complex mechanical operations, frequent attention of operators, and moderate energy requirement.

c) Recessed Plate Press Filter

This device functions under high hydraulic pressure to force water out of the sludge. The components of this device include a series of rectangular plates recessed on both sides and supported face to face in a vertical position on a frame with fixed and movable head. In order to hold these plates, the hydraulic rams or powered screws are used. A filter cloth is hung or fitted over each plate.

It has also the same characteristics as the Belt Press Filter method.

d) Sludge Drying Beds

These beds are constructed to filter digested water from the sludge. The thick cakes are eventually disposed of in a landfill or used as land conditioner.

It is least efficient method. Its operation is simplest. It requires occasional attention (by operators) and maintenance. It does not need energy for its operations. The negative impacts of this technology include large land requirement, a number of skilled persons required, and high environmental impacts.

3.9.6 Selected Technology for Sludge Treatment

Table 3.15 presents comparative analysis of different sludge dewatering technologies against a number of technical parameters. The detailed description of the criteria set under these parameters is given in Annexure 2.4.

Table 3.15
Selection of Sludge Treatment Technology

Parameters	Technologies			
	SBC	BPF	RPPF	SDB
Efficiency	5	3	3	1
Mechanical Complexity	1	3	1	5
Attention of Operator	1	3	1	5
Maintenance Requirement	1	1	1	3
Energy Requirement	1	3	3	5
Land Requirement	5	5	5	1
Skilled Persons Requirement	5	5	5	1
On-site Environmental Impacts	5	5	5	1
Total	24	23	24	22

SBC – Solid Bowl Centrifuge

BPF – Belt Press Filter

RPPF – Recessed Plate Press Filter

SDB – Sludge Drying Beds

1 – Least Favorable

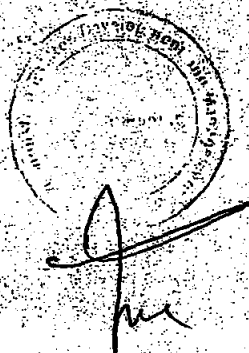
5 – Most Favorable

The above analysis implies that the first three technologies demand moderate to very high energy consumption and frequent maintenance subsequently increasing operation and maintenance costs. On contrary to this, the Sludge Drying Bed technology is relatively economical in terms of operation and maintenance costs. But it has also demerits such as large land requirement, large number of skilled persons required for its operations and very high on-site environmental impacts.

Above all, the Belt Press Filter technology has been considered as the most appropriate for sludge treatment at the CETP-SIE. The major factors, which qualify this technology, are less land requirement, few skilled persons required for the operations and low on-site environmental impacts.

Chapter 4

Methodology



4

Methodology

This chapter presents methodology, which has been adopted for the collection of the requisite data, for the SIE, for the purpose of the EIA study.

4.1 Orientation Session

Meetings and discussions were held with the key officials of the project team. This activity was aimed at achieving a common ground of understanding of the various issues of the study.

4.2 Development of the Data Acquisition Plan

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the consulting team. The plan identified specific requirements of the primary and secondary data and their sources, determined time schedules and responsibilities for their collection, and indicated the logistics and facilitation needs for the execution of the data acquisition plan.

4.3 Review of the Existing Data

The relevant secondary data on the physical, technical and institutional aspects of the project available with the PIE were reviewed.

4.4 Sources and Tools of Data Collection for EIA

Both primary and secondary data were acquired to accomplish the said study. In general, the following sources and tools were employed for the collection of the requisite data for the proposed project.

Primary Data Collection Tools	Household Questionnaires
	Focused Group Discussion
	Field Test (ambient noise levels)
Primary Data Collection Surveys	Reconnaissance Survey
	Socio-economic Survey through Household Questionnaires
Sources of Secondary Data	PIE
	Public Departments and Agencies
	Literature and Previous Reports

All the collected data were reviewed, compared (where available from multiple resources), and verified to arrive at the final authentic numbers.

4.5 Primary Data Collection Surveys

4.5.1 Reconnaissance Survey

This survey was carried out to have an overview of the project area and prepare location and land use maps.

4.5.2 Socio-economic Survey by Household Questionnaires

The prime objective of the socio-economic survey through household questionnaires was to collect baseline socio-economic information about the affected population and their feedback on the project. This survey was carried out on sample basis, through Performa "Households, Housing and Socio-economic Questionnaire" as given in **Annexure 4.1**. The sample size was planned to be kept as 5 percent of the households, on an average, in each of the affected villages. The data were collected through random sampling. The respondents were to be an adult member of the households with preference for the head of the household. The questionnaire covered the following socio-economic aspects:

- a) Demography
- b) Education
- c) Employment and economic conditions
- d) Housing and social amenities
- e) Affected population feedback

A total of 29 households were surveyed out of the total 381 households. Hence, the actual sample size comes out to be 7.6 percent.

4.6 Sources of Secondary Information

The secondary data about the physical, technical, and environmental parameters available with the PIE were reviewed. The additional data were collected from the following concerned departments in Lahore and Queta:

Information Area	Source
Physical Environment	
Climate	Meteorological Department
Seismology	Geophysical Center, Queta
Drainage	Drainage Department
Biological Environment	
Terrestrial Flora	Forest Department
Terrestrial Fauna	Forest Department, Wildlife Department
Aquatic Fauna	Fisheries Department
Human Environment	
Demography	Sample Socioeconomic Survey
Occupation and Employment	
Economic Conditions	

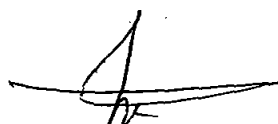
Information Area	Source
Local Government and Administration	District Government
Agriculture	Agriculture Department
Livestock	Livestock Department

In addition, the data for the following parameters were collected from the secondary sources:

- a) Groundwater quality
- b) Surface water quality
- c) Ambient air quality

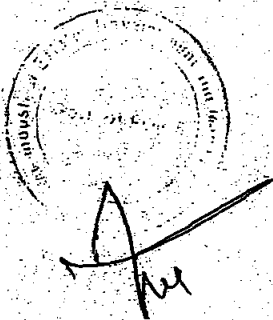
4.7 Impact Assessment Matrices

Generally environmental impact matrices are prepared to present, at a glance, the overall profile of the environmental impacts of the project. A typical matrix screens all the components of the project against environmental parameters such as physical (surface water quality, ground water quality, air quality, noise), biological (terrestrial flora, terrestrial fauna, aquatic fauna) and human (social, economic and cultural) at both the construction and the operation stages. In these matrices, the environmental parameters are shown on horizontal axis and the project components on vertical axis. Each impact is represented by a qualitative indicator, denoting its intensity and significance.



Chapter 5

Baseline Environmental Profile of the Project Area



Baseline Environmental Profile of the Project Area

5.1 Delineation of the Study Area

An environmental assessment study should encompass all the project aspects and expected impacts during different stages of the project execution in a delineated area, which is expected to be impacted by the project interventions. The SIE is located at a distance of 25 km south of Lahore on the Sundar–Raiwind road. It encompasses an area of 541.4 hectares. The location and land use maps are shown in **Annexure 5.1** and **Annexure 5.2** respectively.

5.2 Purpose of the Baseline Study

An environmental baseline study is intended to identify and establish all the physical, biological and human environmental conditions, prevailing before the execution of the project, in order to use this information as a reference datum to compare future changes and judge them if the condition has changed for better or worse. As such, it must include all resources, which can reasonably be expected to be affected by a project. The baseline description is intended to accomplish the following two objectives:

- ✧ To provide proponent of the project and stakeholders with sufficient knowledge about the socio-economic set-up, agriculture, ecological features, built-up buildings and infrastructure of the project area
- ✧ To allow the planners to evaluate the potential efficacy of actions to mitigate adverse impacts and enhance benefits.

5.3 Physical Environment of the Project Area

5.3.1 Climate

There are four distinct climatic seasons:

- ✧ Cold and moderate widespread rainfall – December through March
- ✧ Extremely hot and dry – April through June
- ✧ Hot and intense scattered rainfall – July through September
- ✧ Cool and dry – October through November

a) Rainfall

The city of Lahore lies in a relatively arid zone experiencing 300 mm - 500 mm of rain annually. Heaviest rainfall takes place during July, August and early September

(cumulatively 65 per cent of the total) due to Monsoon. October and November are dry months. April and May receive rainfall through the western disturbances or locally generated thunderstorms. During the year 2004, the maximum rainfall was in the month of July (144 mm), but the total rainfall during the peak months of June till August was 360.4 mm (72.8 per cent), out of yearly total 495.2 mm. The heaviest rainfall in Lahore occurred in the year 1882 when 95.07 cm of rainfall was recorded. The driest year was 1899 with only 15.77 cm of rainfall.

b) Temperature

The climate of the city of Lahore is sub-tropical. It is generally hot in summer and moderate in winter. Generally days are sunny in the summer months. The coldest month is January and the hottest is June. After June, the heat is somewhat temperate due to monsoon rains but humidity increases and the combination causes great discomfort to the inhabitants. Temperature below freezing point (32 °F) and over (115 °F) are rarely experienced. The seasonal mean monthly minimum and maximum temperatures during the year 2004 are shown in Table 5.1.

Table 5.1.
Temperature

Season	Months	Temperature (°C)	
		Minimum	Maximum
Summer	May – Aug	27	37
Autumn	Sep – Nov	20	31
Winter	Dec – Feb	11	21
Spring	Mar – Apr	21	34

Source: Meteorological Department Lahore, 2004

c) Wind

The wind blows throughout the year with highest velocities occurring during the summer months, June till July (2.9 to 3.6 knots at 0800 am and 2.7 to 2.9 at 0500 pm). Whereas the minimum wind speed is during the month of November (0.1 knots at 0800 am and 0.3 knots at 0500 pm). The direction is primarily towards northwest during winter and southeast during summer months. Average wind speed never exceeds 2.9 knots (1 knot = 1.6 km/h) at 0800 am. June and July are the months when windstorms occur.

d) Humidity

Generally, the periods of humidity are December to February and July to September. April and May are dry months. The seasonal mean monthly relative humidities are given in Table 5.2.

Table 5.2
Humidity

Season	Months	Humidity (%)	
		8 am	5 pm
Summer	Apr – Sep	60	40.7
Winter	Oct – Mar	75.8	49.7

Source: Meteorological Department Lahore, 2004

5.3.2 Topography and Drainage

The area around the project site is flat. The surface is 215 meters above the mean sea level. The gradient range is 20 - 40 cm per km. Slope of the land is towards east of the project site, allowing storm and sewerage water of the area to flow in that direction. There are number of drains (mainly Raiwind main drain, Bucher Khana distributary and Nullah drain) in the project area carrying storm-water and industrial wastewater to the Ballōki-Sulemanki Canal. The profiles of these water bodies are given in Table 5.3.

Table 5.3
Surface Drainage Patterns

Name of Drain	Length (feet)	Catchment Area (sq. miles)	Discharge at Outfall (cusecs)
Raiwind Main Drain	167,000	215 – 60	862
Bucher Khana Distributary	74,000	38.8	155
Nullah Drain	28,000	9.62	39

5.3.3 Soils

Topsoil of the project area is generally not suitable for agriculture. The area is of chung formation, which is loess clay with silty and sandy deposits. It comprises earthy brown to brown silt, clay and sand. The silt beds are largely hard, laminated and sandy.



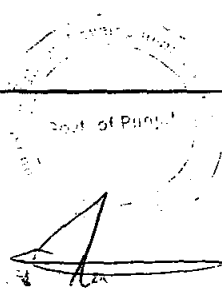
5.3.4 Seismology

Pakistan lies on an active seismic belt of the earth. Seismic observations indicate that hundreds of shocks originate every year. Mostly, these seismic waves are of low intensity and do not have any significant effect. According to seismic zones of Pakistan developed by the Geophysical Center Queta, the project area falls under the damage category, minor to negligible, and seismic factor is $g/15$ - $g/20$ or less. The details of seismic factors prevailing in different zones of Pakistan are found in Annexure 5.3.

5.3.5 Ground Water Conditions

The ground water conditions in the project area were determined on the basis of ground water quality tests carried out for two different projects named 'Project A'¹ and

¹ Project A – EIA of the New Snack Manufacturing Facility, Lahore



'Project B'² respectively. Tables 5.4 and 5.5 present laboratory test results in comparison with the WHO guidelines. In these tables, sample 1 was taken from hand pumps (70 - 100 feet depth) and samples 2 and 3 were taken from motor pumps (100 - 140 feet depth) from different locations within the project area. The sampling points are shown in the sampling map attached as Annexure 5.4. The laboratory test reports are attached as Annexure 5.5.

Table 5.4
Groundwater Conditions (Project A)

#	Test Method	Parameter	Test Results			WHO Values (2004)
			Sample 1	Sample 2	Sample 3	
A. Physico-Chemical Testing						
1.	4500-H ⁺ -B	pH	7.74	7.74	7.56	NGV
2.	HACH-1670	Color - Direct (Pt-Co)	3	BDL	BDL	NGV
		Color - at pH 7.6 (Pt-Co)	4	BDL	BDL	
3.	Turbidity Meter	Turbidity - (NTU)	2.2	0.5	BDL	NGV
4.	2540 – C	Total Dissolved Solids (TDS) mg/l	2,542	1,129	3,121	NGV
5.	2340 – C	Hardness – Total (as CaCO ₃) mg/l	136	82.6	205	NGV
6.	3500-Ca-D	Calcium - mg/l	12	8.8	15.2	NGV
7.	3500-Mg-E	Magnesium - mg/l	25.8	14.7	40.7	NGV
8.	4500-Cl-B	Chloride - mg/l	357	107	355	NGV
9.	HACH-3450	Sulfate – mg/l	750	188	1,033	NGV
10.	HACH-1900	Fluoride - mg/l	1.92	0.97	3.35	1.5
11.	HACH-2520	Nitrate - mg/l	3.09	5.30	2.21	50*
12.	HACH-2165	Iron (Total) - mg/l	0.233	0.159	0.183	NGV
B. Bacteriological Testing						
1.	9221-C	Faecal Coliform (MPN/100 ml)	1.1	<1.1	9.2	NIL
2.	9221-B	Total Coliform (MPN/100 ml)	1.1	<1.1	9.2	NIL

NIL - must not be detectable in any 100 ml sample

NGV - No Guideline Value

* - short term exposure

Pt-Co - Platinum-Cobalt Standard

NTU - Nephelometric Turbidity Unit

BDL - Below Detection Limit

MPN - Most Probable Number

² Project B - EIA of the CETP, Sundar Industrial Estate, Lahore

Table 5.5
Groundwater Conditions (Project B)

#	Test Method	Parameter	Test Results		WHO Values (2004)
			Sample 1	Sample 2	
A. Physico-Chemical Testing					
1.	4500-H ⁺ -B	pH	7.65	7.92	NGV
2.	2320-B	Alkalinity - Total (as CaCO ₃) - mg/L	1,177	445	-
		Alkalinity - Hydroxide (as CaCO ₃) - mg/L	BDL	BDL	-
		Alkalinity - Carbonate (as CaCO ₃) - mg/L	BDL	BDL	-
		Alkalinity - Bicarbonate (as CaCO ₃) - mg/L	1,177	445	-
3.	HACH-1670	Color - Direct - (TCU)	6	14.9	NGV
		Color - at pH 7.6 - (TCU)	6	15	NGV
4.	Turbidity	Turbidity - (NTU)	BDL	1.1	NGV
5.	2540 - C	Total Dissolved Solids (TDS) - mg/L	2,766	1,065	NGV
6.	2340 - C	Hardness - Total (as CaCO ₃) - mg/L	141	147	NGV
7.	3500-Ca-D	Calcium - mg/L	15.9	22.2	NGV
8.	3500-Mg-E	Magnesium - mg/L	24.5	22.1	NGV
9.	4500-Cl-B	Chloride - mg/L	420	221	NGV
10.	HACH-3450	Sulfate - mg/L	636	164	NGV
11.	HACH-1900	Fluoride - mg/L	1.17	0.76	1.5
12.	HACH-2520	Nitrate - mg/L	3.4	0.7	50*
13.	HACH-2165	Iron (Total) - mg/L	0.829	0.232	NGV
B. Bacteriological Testing					
1.	9221-C	Fecal Coliform (MPN/100 mL)	5.1	12.0	Nil
2.	9221-B	Total Coliform (MPN/100 mL)	5.1	12.0	Nil

BDL – Below Detection Limit

* short term exposure

TCU – True Color Unit

NTU – Nephelometric Turbidity Unit

MPN – Most Probable Number

Nil – must not be detectable in any 100 ml sample

It is evident from the above tables that all the samples are within the permissible limits, set by the WHO Guidelines 2004, except samples 1 and 3 in Table 5.4 and sample 1 and 2 in Table 5.5, which are high in fluoride and faecal coliforms. The presence of these contaminants in high concentration renders drinking water quality unpalatable posing serious health concerns to the local people. The potential effects of these contaminants in water include mottling of teeth and in severe cases, crippling skeleton fluorosis as well as mild gastroenteritis to severe and sometimes fatal diarrhea, dysentery, hepatitis and typhoid fever.

5.3.6 Wastewater Conditions

The wastewater conditions in the project area were assessed on the basis of wastewater quality tests carried out for a project entitled 'EIA of the New Snack Manufacturing Facility, Lahore'. Table 5.6 presents laboratory test results in comparison with the NEQS. In this table, samples 1 and 2 were taken from the Nullah

drain and the Rohi Nullah respectively. The laboratory test report is attached as **Annexure 5.5**.

Table 5.6
Wastewater Conditions of the Project Area

#	Test Method	Parameter (mg/l)	Test Results		NEQS Values
			Sample1	Sample2	
1.	4500-H ⁺ -B	pH	8.44	8.62	6-9
2.	5210-B	Biochemical Oxygen Demand (BOD ₅)	134	*NR	80
3.	5220-D	Chemical Oxygen Demand (COD)	208	79	150
4.	2540-D	Total Suspended Solids (TSS)	7	93	200
5.	2540-C	Total Dissolved Solids (TDS)	1,728	1,347	3,500
6.	5520-B	Oil and Grease	13	3.66	10
7.	4500-Cl ⁻ -B	Chloride (Cl ⁻)	319	252	1,000
8.	HACH-3450	Sulfate (SO ₄ ²⁻)	420	250	600
9.	HACH-3500	Sulfide (S ²⁻)	0.041	0.004	1
10.	SLT-6	Chromium (Total)	2.15	2.58	1

Source: EIA Report of the New snack manufacturing facility, Lahore

The laboratory test results, when compared with the NEQS (*refer Annexure 5.6*), imply that the Nullah drain is more polluted in terms of BOD, COD, oil & grease, and chromium than the Rohi Nullah, which has high concentration of chromium only. High concentration of these pollutants renders depletion of oxygen required for the survival of the aquatic life, reduces re-aeration in the natural surface bodies and consequent depletion in dissolved oxygen levels, reduces light penetration in natural waters and consequent reduction in photosynthesis, causes aesthetic nuisance, and causes carcinogen and ulceration.



5.3.7 Ambient Air Quality

Secondary data were used for determining ambient air quality of the project area. Samples were taken from two different locations in the project area (location points shown in **Annexure 5.4**). Concentration levels of different parameters are given in **Table 5.7** and the laboratory test results reports are attached as **Annexure 5.5**.

Chapter-5

Table 5.7
Ambient Air Quality

Time		CO (ppm)		SO ₂ (µg/m ³)		NO ₂ (µg/m ³)		PM ₁₀ (µg/m ³)	
S-1	S-2	S-1	S-2	S-1	S-2	S-1	S-2	S-1	S-2
9:00	9:00	0	0	BDL	BDL	3.8	3.1	89.2	45.1
10:00	10:00	1	1	2.8	BDL	4.6	3.2	81.7	47.2
11:00	11:00	1	0	3.2	BDL	5.4	3.4	68.4	54.2
12:00	12:00	2	1	BDL	BDL	3.4	3.6	59.2	53.2
13:00	13:00	3	1	BDL	BDL	3.2	3.2	72.5	48.3
14:00	14:00	2	0	3.1	BDL	3.1	BDL	68.8	47.2
15:00	15:00	2	1	3.4	BDL	3.6	3.3	70.3	45.7
16:00	16:00	1	0	2.7	BDL	3.3	BDL	74.6	43.5

S-1 = Sample 1

S-2 = Sample 2

Source: EIA Report of the New Snack Manufacturing Facility, Lahore

Ambient air quality data (when compared with WHO guidelines) show that atmosphere of the area is contaminated with particulate matter only. High concentration of this pollutant in the atmosphere leaves adverse impacts on both environment and human health such as: choking of plant leaves restricting photosynthesis process; global cooling of earth by reflecting back the solar radiations; impairment of atmospheric visibility affecting the transportation safety; deterioration of aesthetic quality of atmosphere, land and water; and respiratory diseases.

This baseline condition can be used in future to note the differential increase of the air pollutants due to development of the SIE.

5.3.8 Existing Noise Levels

Noise levels were taken from different locations of the project site (location points shown in **Annexure 5.4**). These levels vary at different locations in different timings as shown in **Table 5.8**.

Table 5.8
Ambient Noise Levels

Sampling Point	Time	Sound Level (dBA)
Point 1	1200 – 1203	72 – 92
Point 2	1210 – 1213	70 – 91
Point 3	1220 – 1223	62 – 91
Point 4	1225 – 1228	69 – 96
Point 5	1235 – 1238	65 – 87
Point 6	1245 – 1248	62 – 90

Source: Monitoring at the Project Site

The results imply that the project area is bit noisy due to presence of industrial activities.

5.4 Ecological Environment of the Project Area

The ecological environment includes terrestrial flora and fauna, aquatic flora and fauna, rare/endangered species and protected areas.

5.4.1 Terrestrial Flora

The project site itself is a barren land but the natural vegetation around the site is comprised of few scattered perennial trees namely Eucalyptus and Kiker (*Acacia arabica*).



5.4.2 Terrestrial Fauna

Terrestrial fauna of the area includes cats, jackals and dogs. Domestic animals like cow, buffalo, goats, sheep, donkey and horses are also found. The bird community, found in the area, includes variety of residential birds such as sparrows, crows, parrots etc. Small squirrels, rats and snakes are also found in the area.

5.4.3 Aquatic Flora

There are three water bodies in the project area namely Rohi nullah (officially named as Raiwind drain), Bucher Khana distributary and Nullah drain. Due to high concentration of organic pollutants such as BOD₅ and COD, the aquatic plant life is hard to survive in these water bodies.

5.4.4 Aquatic Fauna

Fish is the major aquatic fauna found in the project area. There are 8 private fish ponds owned by the local residents. The drains were also used to be the main sources of fish community around 20 years back, but after the industrial activities in the area, the aquatic life in these mediums has changed its habitat.

5.4.5 Rare/Endangered Species and Protected areas

There exist no rare/endangered species and protected areas in the project area.

5.5 Socio-economic Environment of the Project Area

This section covers the socio-economic conditions of the population that will be indirectly affected by the project. The socio-economic profile focuses on the sources of livelihood, income levels, and accessibility to social services like health, education etc.

The socio-economic data collection process is explained in Section 4.5.2. This section covers the socio-economic profiles of the villages located in the immediate surroundings of the project site.

5.5.1 Political and Administration Unit

The project area falls under the Allama Iqbal Town Municipal Administration, City District Government, Lahore. The PIE is an administrative body of the Sundar Industrial Estate.

5.5.2 Social, Political and Cultural Features

The power structure in the project area, as revealed through the community profiles, is quite egalitarian and there are no major power monopolies by certain groups or families.

The existing communities reflect rural culture. The rural community has its own norms and values. Females are not exposed to males and exercise veil on their faces while going out of their houses. The women do all household work by themselves and their daughters help them.

5.5.3 Settlement Pattern

The project area is predominantly a barren area interspersed with settlements inhabited by the local population. The population of the area resides in the villages of varying sizes. In order to have an idea of the size of the affected settlements, Table 5.9 presents distribution of the villages vis-à-vis their population.

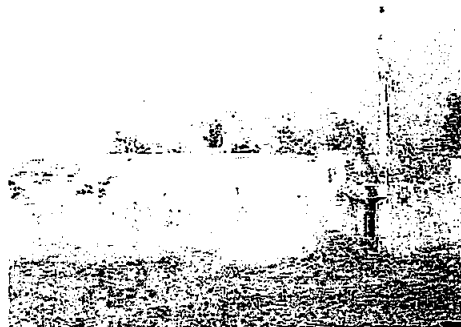


Table 5.9
Distribution of the Project Affected Population

Villages	Total Population	
	Number	Percentage
Nahela	1,000	10
Haveli Bangroo	1,000	10
Sangatpura	150	2
Haveli Munimanwali	75	1
Bhai Kot	3,500	35
Mull	4,200	42
Total	9,925	100

The above table indicates that out of 6 settlements, only 2 (77 per cent) are larger in size. The smaller settlements having population less than and equal to 1,000 are, in the decreasing order, Nahela, Haveli Bangroo, Sangatpura, and Haveli Munimanwali.

5.5.4 Demography

According to the sample based socio-economic survey, about 64 per cent of the households live in nuclear family structures and the remaining about 36 per cent live in joint families. Based on the socio-economic survey, male to female ratio comes out to be 52:48, which is almost the same as the national ratio. The percentage of the younger population is found to be higher than those above 40 years.

5.5.5 Education

There are 10 government and private schools in the project area – 6 government primary schools (3 for boys and 3 for girls) and 4 private primary, middle and Matric co-education schools. The school buildings are in good condition. According to the

sample based socio-economic survey, the literacy level is low with most of the households either illiterate or having primary level education.

5.5.6 Occupation, Employment and Workforce

Based on the sample-based socio-economic survey of the project area, Table 5.10 presents distribution of household members by occupation.

Table 5.10
Distribution of Household Members by Occupation

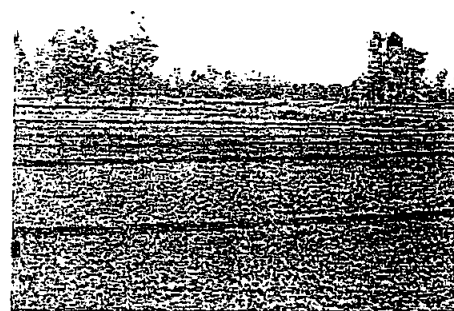
Occupation	Percentage
Agriculture	38.58
Shopkeeper	1.57
Student	19.69
Labour	11.81
Teacher	0.00
Tailor	0.79
Factory Worker	0.79
Driver	0.79
Unemployed	0.00
Housework	25.98
Total	100.00

Source: EIA New Snack Manufacturing Facility SIE Lahore

Leaving the categories of housework and education, which mainly pertain to house wives and children, the principal earning occupations include agriculture and skilled labour work.

5.5.7 Agriculture and Livestock

Agriculture plays a major role in the economy of Pakistan. This sector earns about 42.2 per cent of the foreign exchange for the country. According to the Economic Survey of Pakistan (2003-2004), the contribution of agriculture to Gross Domestic Product is 23 per cent. About 57 per cent of the total population is directly or indirectly engaged in the agriculture sector.



Agricultural land use in the project area is determined largely by physiography, soils and water availability. The project area is predominantly a barren area. The agricultural land is only found in the southwest of the project site. The land is categorized as irrigated land. The land owners of the area tend to grow wheat, fodder crops, vegetable and fruit plants (guava).

Livestock is normally raised for transportation, food and farming purposes. The livestock have market potential and are frequently sold at the time of need. Major livestock animals of the area are cows, buffalos, goats, sheep and donkeys.

Loss of Agricultural Land and Compensation Package

Since residential land was not acquired for the said purpose; therefore, no resettlement plan was prepared. However, the compensation is being made to those whose agricultural lands have been expropriated. Table 5.11 depicts affected villages, locations of lost agricultural land, total land area, and compensation package.

Table 5.11
Agricultural Land and Compensation Package

Village	Nature of Land	Total Land			Price	Rs.
		Acre	Kanal	Marla	Rs/Acre	(Million)
Bhai Kot	Off Road Side Agricultural A (I)	132	5	13	160,000	21.23
	Off Road Side Banjar A (II)	188	7	13	120,000	22.67
	Off Road Side B	5	1	1	310,000	1.59
	Road Side Rear C (I)	0	7	10	235,000	0.22
	Off Road Side Rear Banjar C (II)	4	5	10	175,000	0.82
	Link Road Agriculture D (I)	23	3	4	235,000	5.50
	Link Road Banjar D (II)	8	0	0	175,000	1.40
Nahela	Link Road Side	3	2	14	385,000	1.28
	Off Road Side	124	2	10	260,000	32.32
Mull	Road Side Agricultural B (I)	25	3	15	385,000	9.81
	Road Side Banjar B (II)	20	7	18	235,000	4.93
	Off Road Agriculture A (I)	448	0	14	260,000	116.50
	Road Side Banjar A (II)	601	7	3	160,000	96.30
Total		1581	49	125		314.57

The above table illustrates that the Mull village is affected most strongly in terms of dispossession of agricultural land followed by the Bhai Kot village. The compensation rate varies with the types and locations of affected lands.

5.5.8 Industry

There are number of industries along the Raiwind-Sundar road, Raiwind-Manga road, Raiwind-Manga link road, Rohi nullah, and road along the Nullah drain. Most of these industries are textile and pharmaceutical. Other industries are related to food (cooking oil and dairy).

5.5.9 Trading Activities

Agricultural and livestock mainly suffice to the needs of the people living in the project area. Very few people sell their harvest and livestock (including its products such as milk, ghee, butter) in the market for monetary gains. Besides this, there are number of small fish farms in the project area, which are meant for commercial fishing.

5.5.10 Economic Conditions

a) Sources of livelihood

The socio-economic survey of the area reveals that agriculture is a major income generating occupation of the residents.

b) Income Levels

Based on the sample-based socio-economic survey of the project area, **Table 5.12** presents distribution of households, with respect to their reported average monthly household income.

Table 5.12
Distribution of Households by Average Monthly Household Income

Monthly Household Income (Rs)	Percentage
Up-to 3,000	48
3,000-5,000	17
5,000-7,000	14
7,000 & above	21
Total	100

It is evident from the above table that income level of most of the people living in the project is low. Given this poor economic status, it is hard to make their ends meet. The reason behind low income earning of the families is due to the fact that they are neither qualified nor skilled enough to get better job opportunities and generally employed as farmers and laborers.

c) Housing

Housing condition is an important indicator of the economic conditions of the people. On the basis of the sample-based socio-economic survey, **Table 5.13** presents distribution of houses by house structure in the project area.

Table 5.13
Distribution of Houses by House Structure

Building Type	Percentage
Pacca	31
Semi Pacca	62
Kacha	7
Total	100

In the project area, most of the houses (about 93 per cent) are built using bricks and permanent roofing structures with only about 7 per cent constructed in clay. Majority of the residents interviewed during the survey claimed to have lived in their respective areas since 1947.

According to the sample-based socio-economic survey, most of the surveyed houses (about 59 per cent) have at least 2 rooms followed by 31 per cent having 3-4 rooms. The number of rooms depends upon the needs of the family. In larger families with marital extensions of sons, additional rooms are built to fulfill the additional space requirements.

d) Household Utilities and Appliances

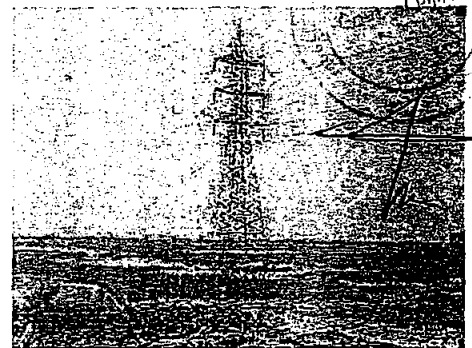
Potable Water Supply

Invariably, groundwater is used for all domestic purposes, in the project area. No community water supply schemes are laid in these settlements. Population relies upon their private sources, with majority using hand pumps for tapping groundwater. Most of the houses have their own hand pumps, generally, located in the courtyards of their houses.

The groundwater is not palatable owing to its quality. It is brackish in taste. The people are not adopting safe drinking water practices such as boiling, filtering etc. because they are unaware about the consequences of unsafe drinking water.

Electricity Supply

All the settlements except Haveli Munimanwali in the project area have been provided with power supply network, by the WAPDA (LESCO). There is seldom breakdown of electricity but sometimes it happens due to strong wind. High-tension voltage lines (132 KV) are passing through the project site. No construction activity is planned under these lines.



Natural Gas Supply

There is no natural gas supply in the area. Majority of the people use cow dung and wood as fuel for cooking and heating.

Telecommunication Network

Majority (about 82 per cent) of the population are not making use of telephonic facilities because of financial constraints. Only about 18 per cent are availing this facility.

e) Transport and Travel Mode

According to the sample-based socio-economic survey of the project area, the main mode of transport among the local villagers is public bus and wagons. Motorcycles and cycles are also in use of some of the villagers.

5.5.11 Sanitation

The sewerage/drainage system in the area is not satisfactory. Most of the people discharge their wastewater into open drains and few have got pit latrine and septic tank systems inside



their houses. It is also a common practice to dispose of solid waste into nearby open land.

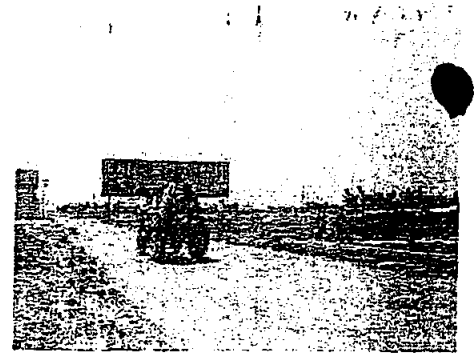
5.5.12 Public Health

The health conditions of the people in the area are badly affected due to contaminated drinking water and poor sanitary conditions. Most of the people in the area are vulnerable to malaria, chest infection and skin infection. Other commonly found diseases include eye infection, asthma, diarrhea and few cases of arthritis.

There are 2 government dispensaries, 1 private clinic and 1 unauthorized hakeem in the area, which do not provide better medical health facilities; therefore, the people resort to Raiwind for better treatment. No maternity health facilities are available and no government doctor is available at night. A well-equipped maternity clinic is the basic need of the people of this area.

5.5.13 Transport and Communication

The project site is accessible by a number of roads – Raiwind-Sundar road, Raiwind-Manga road, road along the Rohi nullah. Public transport is not available on these routes because it is mainly an industrial area. The locals have to hire motor rickshaws or use their own transport (tonga, cycle, car, etc.) to reach their abodes. The internal street pattern of the area is satisfactory. Most of the streets are brick paved or gravel mixed.

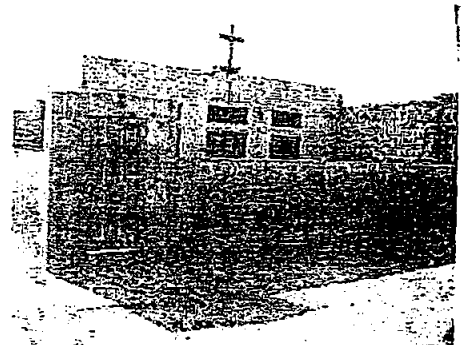


5.5.14 Postal Services

There is no post office facility provided in the project area. People have to go to Raiwind for dispatching and receiving their letters and other mails.

5.5.15 Cultural and Religious Resources

According to the sample based socio-economic survey, there are 15 mosques, 3 madrassa, 1 church and 2 graveyards in the project area. All of the mosques are built in the recent past and do not have any historical or architectural value.



5.5.16 Archeological and Historical Resources

None of the monuments or sites, of archaeological or historical importance, declared so by the following institutions, exists in the project area:

- ✕ World Heritage Sites in Pakistan per UNESCO
- ✕ Notified Archaeological Sites and Monuments (Protected by Federal Government)
- ✕ Monuments Declared as Special Premises by the Government of Punjab

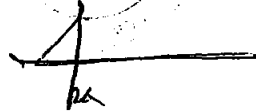
5.5.17 Recreational Areas and Resources

No recreational site of regional or national importance is found in the area. There is hardly any tourism activity observed in the area.

5.5.18 Perceptions of the Community

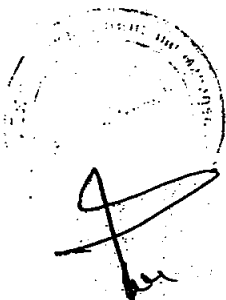
Concerning their views about the existing industries and the proposed SIE, they opined: "the existing industries have provided job opportunities to the local people to some extent and we also expect from the proposed project to cater job opportunities to the locals." In addition, steps should be taken to improve their existing infrastructure such as drainage/sewerage system as well as provision of gas supply.

The locals, residents of the affected villages, expressed grudges over compulsory and injudicious land acquisition and compensation process of the SIE. They argued that the lands were compulsorily acquired at a cheaper price and allotted to the industrialists at a higher price, which was sheer injustice to them. There are many affectees, who are still entangled in the cumbersome process of getting compensation. People, who are not satisfied, have filed references under Section 18 of land acquisition with civil courts.



Chapter 6

Environmental and Socio-economic Issues and Impacts



Environmental and Socioeconomic Issues and Impacts

6.1 Assessment Procedures

The environmental assessment of the project is conducted, principally, within the framework of the Pakistan Environmental Protection Act (1997) and the Pakistan Environmental Assessment Procedures (2000). The environmental impacts matrices for the project are presented in Tables 6.1 and 6.2, which cover impacts during the construction and the operation phases of the project, respectively. For rating impact significance, the following criterion is developed by considering severity of risk on environment and human health, probability of occurrence, legal requirements and views of the affected parties:

- ✧ NA – Not Applicable
- ✧ O – Insignificant (no or minimal impact)
- ✧ LA – Low Adverse (short term reversible or less damage to the environment)
- ✧ MA – Medium Adverse (long term reversible damage to the environment)
- ✧ HA – High Adverse (severe irreversible damage to the environment)
- ✧ LB – Low Beneficial (short term benefits or less beneficial to the environment)
- ✧ MB – Medium Beneficial (long term benefits to the environment)
- ✧ HB – High Beneficial (perpetual benefits to the environment)

6.2 Environmental Impacts During the Operation Phase

The proposed project, right from the decision for its implementation to the operation phase, will cause environmental impacts on three environmental settings such as physical, biological and human.

6.2.1 Wastewater Impacts

The project has potential to impact on the existing water bodies such as Nullah drain, Rohi nullah (officially named as Raiwind drain), Bucher Khana drain, and eventually the Balloki-Sulemanki Canal. Consequent to this, the aquatic life and the people reliant on these water bodies for drinking purpose will be affected most strongly.

a) Sources of Wastewater Generation

Following are the sources of wastewater generation:

- ✧ Sanitary wastewater
- ✧ Industrial wastewater

Table 6.1

ENVIRONMENTAL IMPACTS MATRIX FOR THE CONSTRUCTION PHASE

(EIA of the Sundar Industrial Estate)

PROJECT ACTIVITIES	ENVIRONMENTAL COMPONENTS	Physical Environment					Biological Environment					Human Environment						
		Soil Contamination	Surface Water Quality	Groundwater Quality	Air Quality	Noise & Vibration	Terrestrial Flora	Terrestrial Fauna	Aquatic Flora	Aquatic Fauna	Protected Areas	Public Health	Occupational Health & Safety	Employment	Population Disturbance	Social Disorder	Cultural & Religious Values	Aesthetic & Landscape Values
1	Transport of Construction Materials	O	O	O	MA	O	O	O	O	O	N/A	MA	MA	MB	MA	O	O	O
2	Open Storage of Construction Materials	O	O	O	MA	O	O	O	O	O	N/A	MA	MA	O	MA	O	O	LA
3	Earthwork Operations (land clearing, excavation, dumping etc.)	O	O	O	MA	O	O	O	O	O	N/A	MA	MA	MB	MA	O	O	LA
4	Preparation of Concrete at Batching Plants	LA	O	O	MA	LA	O	O	O	O	N/A	MA	MA	MB	MA	O	O	LA
5	Exhausts of Construction Machinery and Materials Transport Vehicles	O	O	O	MA	O	O	O	O	O	N/A	MA	MA	MB	MA	O	O	LA
6	Movement of Construction Materials Transport Vehicles	O	O	O	O	MA	O	O	O	O	N/A	MA	MA	MB	MA	O	O	O
7	Construction and Erection of Electrical and Mechanical Equipment	O	O	O	O	LA	O	O	O	O	N/A	LA	LA	LB	LA	O	O	O
8	Solid Waste (domestic, construction debris, used oil, construction chemicals) Disposal	MA	MA	LA	MA	O	O	O	O	MA	N/A	MA	MA	O	MA	O	O	MA
9	Wastewater Disposal	MA	MA	MA	O	O	O	O	O	MA	N/A	MA	MA	O	O	O	O	MA

LA - Low Adverse
LB - Low Beneficial

MA - Medium Adverse
MB - Medium Beneficial

HA - High Adverse
HB - High Beneficial

O - Insignificant
NA - Not Applicable

Table 6.2

ENVIRONMENTAL IMPACTS MATRIX FOR THE OPERATION PHASE

(EIA of the Sundar Industrial Estate)

<div>ENVIRONMENTAL COMPONENTS</div> <div>PROJECT ACTIVITIES</div>		Physical Environment					Biological Environment					Human Environment						
		Soil Contamination	Surface Water Quality	Groundwater Quality	Air Quality	Noise & Vibration	Terrestrial Flora	Terrestrial Fauna	Aquatic Flora	Aquatic Fauna	Protected Areas	Public Health	Occupational Health & Safety	Employment	Population Disturbance	Social Disorder	Cultural & Religious Values	Aesthetic & Landscape Values
1	Wastewater Generation	LA	MA	LA	LA	O	O	O	O	MA	N/A	MA	LA	O	O	O	O	LA
2	Solid and Liquid Waste Generation	MA	MA	MA	MA	O	O	O	O	LA	N/A	MA	MA	O	MA	O	O	MA
3	Air Pollution (from factories premises)	O	O	O	MA	O	O	O	O	O	N/A	MA	LA	O	MA	O	O	LA
4	Noise Pollution	O	O	O	O	MA	O	O	O	O	N/A	MA	LA	O	MA	O	O	O
5	Increase in Traffic	O	O	O	MA	MA	O	O	O	O	N/A	MA	O	MB	MA	O	O	LA

LA - Low Adverse
LB - Low Beneficial

MA - Medium Adverse
MB - Medium Beneficial

HA - High Adverse
HB - High Beneficial

O - Insignificant
NA - Not Applicable

A handwritten signature is written over a circular official stamp. The signature appears to be 'A. S. S. S.' or similar. The stamp contains text that is mostly illegible but seems to include 'Sundar Industrial Estate' and 'EIA'.

Sanitary Wastewater

The sanitary wastewater sources are administration office, commercial area and the other facilities provided in the SIE. But all this will be mixed up with the industrial wastewater in the collection system leading to the CETP-SIE site. Only the sanitary wastewater generated from the toilets installed in the CETP-SIE facility buildings, such as laboratory, management building and guard room toilet will be discharged directly to the wastewater treatment plant. The total estimated quantity of sanitary and laboratory wastewater generated will be about 4.5 to 6.5 m³/d, which is negligible when compared with the industrial effluent coming to the CETP-SIE (150,000 m³/d, full phase flow) and it will not affect the concentration of the flow coming from the whole SIE. Table 6.3 presents the typical characteristics of untreated sanitary wastewater.

Table 6.3
Typical Characteristics of Untreated Sanitary Wastewater

No	Description	Values
1.	Total Suspended Solids (TSS) – mg/l	210
2.	Biochemical Oxygen Demand (BOD ₅) – mg/l	200
3.	Chemical Oxygen Demand (COD) – mg/l	450
4.	Total Kjeldahl Nitrogen (TKN) – mg/l	40
5.	Phosphate – mg/l	7

Note: TKN values are taken from the International Literature (Characterization and Development of Treatment Alternatives for Potato Processing Wastewater – Department of Civil Engineering – North Dakota – USA)

Industrial Wastewater

It is estimated that about 150,000 m³/d flow will be generated from the proposed SIE when fully developed. Table 6.4 presents wastewater characteristics, expected from the SIE, reaching at the CETP.

Table 6.4
Wastewater Characteristics

Pollution Parameter	Flow Rate (m ³ /d)	Concentration (mg/L)	Pollution Load (kg/d)
BOD	150,000	350	52,500
COD		700	105,000
TSS		300	45,000

b) Impacts of Wastewater

Table 6.5 presents impacts of wastewater on environment and human health.

Table 6.5
Impacts of Wastewater on Environment and Human Health

Parameter	Impacts
pH	Growth inhibition of bacterial species (responsible for removing organic pollution) under highly acidic or alkaline conditions
	Corrosion of water carrying system and structures with acidic wastewaters having low Ph
	Malfunctioning and impairment of certain physico-chemical treatment processes under highly acidic or alkaline conditions
Organic Pollutants	Depletion of dissolved oxygen (DO) levels, of the receiving water body, below limits necessary to maintain aquatic life (4-5 mg/l)
Suspended Solids	Sedimentation in the bottom of water bodies leaving adverse impact on flora and fauna
	Localized depletion of dissolved oxygen in the bottom layers of water bodies
	Reduced light penetration in natural waters and consequent reduction in photosynthesis
	Aesthetic nuisance
Oil and grease	Reduced re-aeration in natural surface bodies, because of floating oil and grease film and consequent depletion in dissolved oxygen levels
	Reduced light penetration in natural waters and consequent reduction in photosynthesis
	Aesthetic nuisance

The impacts of untreated wastewater on physical, biological and human environments would range from low adverse to medium adverse.

6.2.2 Solid and Liquid Waste Impacts

The solid waste will generally comprise empty containers of lube oil and chemicals, metal scrap, discarded mechanical parts and domestic solid waste from all the industries in the SIE. Other major solid waste streams will depend upon the varying nature of industries in the SIE. Solid waste will also be produced from commercial and institutional activities in the SIE.

The liquid waste is generally the used lube oil from different machines, especially from the gears and from the vehicles. The quantity of this waste stream is not possible to estimate at this stage. The improper disposal of liquid waste can cause air, water and soil pollution. The solid and liquid waste impacts on different environmental conditions would be medium adverse.

6.2.3 Air Pollution

a) Sources of Air Pollution

There will essentially be the following major sources of air pollution in the SIE:

- ✱ Generators/Power Plant
- ✱ Boilers

* Vehicles

Generators/Power Plant

Diesel oil is used as fuel normally in generators used for standby electricity generation, but now gas fired generators are also being used. Gas fired generators are preferred for because their emissions are quite clean. Diesel based generators generally emit pollutants like CO, NO_x, SO₂ and particulate matter.

The PIE is also planning to have its own power generation plant at the SIE to ensure uninterrupted supply of electricity. Hence, the provision of generators will be eliminated. For installation of the power plant, an independent EIA study is recommended to identify and mitigate the concerned environmental issues.

Boilers

The boiler flue gases are the major air emissions in the industry. The major pollutants in the gas fired boiler are CO, NO_x, CO₂, and PM. This is a visual nuisance as well as health concern.

Vehicles

With the commencement of the SIE, the traffic in the area will increase. Such increase in traffic would cause fugitive dust emission in the area. The traffic will mainly comprise trucks, vans and office cars. These vehicles will also increase air emission due to fuel combustion. The major pollutants present in air emission will be oxides of nitrogen and carbon, particulate matter and un-burnt hydrocarbons. For well maintained vehicles, the air emissions will remain within the NEQS.

The SIE is a blend of different industrial clusters (textile, pharmaceutical, pesticides, equipment, light engineering, mechanical, electrical, electronics, plastics, food and beverages), which will produce air emissions (of varying intensities) relative to their respective processes. The CETP and the land fill site will also be the sources of air pollution. All these industries will be required to have their own EIAs prior to construction in the SIE.

b) Impacts of Air Pollution

Table 6.6 presents impacts of air emission on environment (E) and human health and life (HL).

Table 6.6
Impacts of Air Emission on Environment (E) and Human Health and Life (HL)

Parameter		Impact
Particulate Matter	E	Damage to plants by choking the leaf pores and restricting photosynthesis
		Global cooling of earth by reflecting back the solar radiation
		Impairment of the atmospheric visibility affecting transportation safety
		Deterioration of aesthetic quality of atmosphere, land and water
		Soiling of materials, physical properties and infrastructure
	HL	Increase in the frequency of respiratory infections such as bronchitis

Parameter		Impact
Carbon Monoxide	HL	Heart attack by reducing the oxygen carrying capacity of blood
		Birth defects including mental retardation and impairment of fetus growth
		Dizziness, headache, and nausea
		Increase in reaction time of the drivers, a threat to the road safety
Oxides of Sulfur	E	Chlorosis and Plasmolysis in plants
		Damage to materials and property, by acid rains, resulting from oxidation of sulfur oxides to sulfuric acid, after reacting with water vapors
	HL	Serious lung damage, particularly in sulphate form
		Respiratory diseases like chronic bronchitis
Oxides of Nitrogen	E	Formation of photochemical oxidants
		Damage to materials and property, by acid rains, resulting from oxidation of oxides of nitrogen to nitric acid, after reacting with water vapors
		Retardation of growth in plants
	HL	Reduction in oxygen carrying capacity of blood
		Impairment of olfactory sense and night vision
		Dryness and roughness of throat
VOC		Formation of photochemical oxidants
Photo Chemical Oxidants	E	Leaf discoloration and cell collapse in plants
		Damage to rubber, textiles, paints and other materials
	HL	Severe eye, nose and throat irritations
		Severe coughing and shortness of breath

However, the impacts of air pollution are assessed as low adverse to medium adverse.

6.2.4 Noise Pollution and Vibration

There are two types of noise sources i.e., plant noise and vehicular noise.

a) Sources of Noise

Plant Noise

The possible sources of noise after the establishment of the SIE would be different process equipments (depending upon the types of industries), boilers and generators.

Vehicular Noise

The industrial activities in the SIE will increase traffic in the area. The vehicular noise will be one of the added nuisances for the nearby community. An area of about 2 km radius will be directly affected by vehicular noise. The ambient noise levels of the area lie in the range of 62-96 dBA. The office vehicles will also contribute to this noise level, which will further increase after start up of the mill operations. Generally, the well maintained vehicles have noise levels within the NEQS level of 85 dBA.

b) Impacts of Noise

The high noise levels result into various health impacts such as hearing loss and number of physiological and other effects.

Hearing Loss

Exposure to sufficiently intense noise for long enough duration results in damage to the inner ear and thus decreases one's ability to hear. It is specifically the organ of corti that is most commonly affected. In addition to a general decrease in the ability to detect sounds, the quality and clarity of auditory perception can be affected as well.

Acoustic Trauma

Acoustic trauma, which results from a single or relatively few exposures, is defined as "immediate organic damage to the ear from excessive sound energy." If the noise is intense enough, other structure outside the inner ear may also be affected, such as the eardrum, which may become ruptured. However, such damage is rare, and occurs only in instances involving extremely intense noise and blasts. Additionally, acoustic trauma often causes some degree of permanent damage to the auditory system.

Temporary and Permanent Threshold Shift

In temporary and permanent threshold shift, the person's auditory sensitivity decreases. The difference between these two effects is that, in temporary threshold shift, the auditory level returns to its original level, whereas in permanent, problems remain permanent. Thus a person with permanent threshold shift, no further recovery is possible. Sometimes, the permanent threshold shift results from acoustic trauma but it often results from long period of repeated exposure of noise.

Physiological Effects

In addition to effects on hearing, noise also causes some physiological effects. These include cardiovascular and gastric effects. The studies have shown that anti-hypertensive medication consumption is generally higher in the noisy areas. Loud noise is related with the vasoconstriction with the consequent increase in blood pressure. One laboratory study showed that plasma cortisol and blood cholesterol levels were increased with the increase of noise level above 85 dBA.

Exposure to noise can also lead to gastric changes. A study showed noise level above 80 dBA resulted in a reduction in stomach contraction strength and helped in ulcer development.

Other Effects

Some of the other effects of noise are cognitive performance, occupational performance, psychological functioning, effects on social behavior and effects on aggression.

Various studies related with cognitive performance reveal that recall is detrimentally affected by background noise. Vigilance and attention are also impaired by noise exposure.

Occupational performance exerts its influence either directly or indirectly on the person through annoyance or job dissatisfaction. It has been seen that in the situation

involving noise levels over 90 dBA, there are often increased number of errors in tasks requiring continuous attention. Also the occupational tasks involving sensory input can be hindered by noise. Poor concentration, irritation, nervousness, frustration, headaches, accidents, aggressive social behavior, fatigue and anxiety are some of the common other effects. There would be low adverse to medium adverse impacts on public health and OHS.

6.2.5 Socio-economic Impacts

After start up of the industrial operations, there will be increase in traffic in the project area, which may result in traffic jams, road accidents and unnecessary delays. There may also be the job opportunities available to the local residents.

6.2.6 Impacts on Occupational Health and Safety

There could be a number of safety issues in the industrial operations. General impression in the industrial operations is that the workers hesitate to use the occupational health and safety equipments.

6.3 Temporary Impacts During the Construction Phase

6.3.1 Water Quality Deterioration

During the construction phase, the surface water like drains/nullahs/canals/river and ground water may get polluted by the wastewater disposal from contractors housing facilities for staff. The extent of surface and ground water pollution would very much depend upon the implementation of pollution control measures. The increase in pollution of surface and ground water may impair health of the workers and local population, using this water.

6.3.2 Disposal of Solid Waste in the Project Area

Following would be the major sources of solid waste, associated with the construction of the project:

- ✧ Domestic solid waste from contractors housing facilities
- ✧ Construction debris and waste
- ✧ Waste mechanical equipment and parts
- ✧ Used oil
- ✧ Waste construction chemicals

The extent of environmental impacts of the solid waste would depend upon their disposal practices. Indiscriminate disposal of solid waste would lead to surface as well as ground water pollution.

6.3.3 Air Pollution

In case of the project, the following would be the major potential sources of the fugitive PM emissions to the atmosphere:

- ✧ Transport of construction materials like earthen materials, sand, in uncovered form, blown by wind and vibration
- ✧ Open storage of construction materials like earthen materials and sand, blown by wind
- ✧ Earthwork operations including land clearing, excavation, dumping, spreading, grading and compaction
- ✧ Other construction activities like preparation of concrete at batching plants
- ✧ Movement of construction machinery and construction materials transport vehicles over unpaved areas
- ✧ Exhausts of the construction machinery, and construction materials transport vehicles, mostly using diesel as fuel

The dust emissions from the above sources and operations would cause public health hazards and nuisance, to the nearby communities particularly since these emissions get released at the ground level, with less chances of diffusion. Much of the fugitive dust generated by construction activities consists of relatively large size particles, which are expected to settle within a short distance from their source. A continuous flux of PM generation, however, during the active construction period, would keep the atmosphere polluted for longer periods.

Major sources of other principal pollutants including CO, SO_x, NO_x and VOC would be construction machinery, equipment and construction materials transport vehicles, mostly diesel based, employed for the project. Generators, to be operated as standby in case of shut of electricity supplies from the WAPDA, shall also contribute to air pollution. The extent of pollution would depend on the rate of usage of these equipments. Dispersion of these pollutants in the atmosphere would be primarily governed by the prevalent climatic conditions of the area.

6.3.4 Noise Pollution and Vibration

Major sources of noise and vibration from the project during its construction phase would be:

- ✧ Movement of construction materials transport vehicles
- ✧ Construction and erection of electrical and mechanical equipment

Noise and vibration levels, at a given location, depend on types and numbers of the construction equipment being operated in the vicinity, their noise generation characteristics, and their distance from that location. For reference and comparison, the NEQS noise level limit (for vehicles) is 85 dBA, at a distance of 7.5 meters from the source.

The most vulnerable areas, subjected to construction noise, would be the settlements in the close vicinity of the project site.

Noise is considered as an interference to and imposition upon comfort, health and the quality of life. Noise may have both physiological as well as psychological effects on human beings.

Physiological effects include dizziness, nausea, unusual blood pressure variation, physical fatigue, hearing impairment and, in acute cases, permanent hearing loss. A single or relatively few exposures to noise of excessive sound energy (like blasts) may also cause acoustic trauma, causing rupture of the eardrum. The psychological effects may comprise reduced mental capability and irritations. Chronic exposure of people to higher noise levels also impairs their efficiencies and skills.

6.3.5 Impacts on Local Employment

During the construction phase, there will be significant positive impact on the local employment. It is assessed that the local people will get opportunities to get direct construction-related jobs.

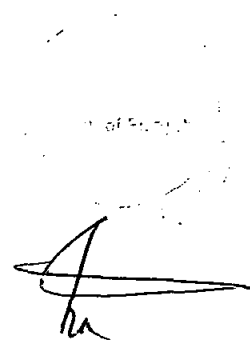
6.3.6 Impacts on Public Health and Safety of the Local Population

Following are the key public health and safety concerns associated with the construction activities of the project:

- ⊗ Increased incidences of diseases in the local population may result from the rise in populations of disease vectors including flies and mosquitoes, from increased levels of wastewater and solid waste pollution, generated by the construction workers in the area.
- ⊗ Increased air pollution levels in the atmosphere are the source of greatest concern from public health point of view.
- ⊗ Most of the public and workers safety hazards would be associated with the operation of construction machinery and equipment, transportation. The causes of safety hazards generally involve human errors, operational faults of machinery and unforeseen incidences. Majority of the causes can be controlled with efficient management, staff training, equipment maintenance and other preventive measures. Accident prevention is essentially an engineering and administrative problem and rests mainly on strict compliance with the established safety rules and regulations.

6.3.7 Impacts on Local Social Order

The influx of large work force in the project area, during the construction period, may disturb the local communities and create social and cultural problems. Enhanced levels of adverse interactions, tensions and conflicts, may lead to some serious law and order problems. The control of such situations shall, in anticipation, be exercised by including appropriate clauses in the construction contract, which shall comprise the regulations on the workforce necessary to avoid any law and order situation.



Chapter 7

Environmental Impacts Mitigation Measures



Environmental Impacts Mitigation Measures

This chapter presents the proposed measures for mitigating the potential environmental impacts of the project. Each impact is described briefly along with types of environmental effects associated with different project activities. The ways and means are also proposed for reducing/mitigating the impacts for both the construction and the operational phases.

7.1 Mitigation Measures during the Operation Phase

7.1.1 Wastewater

The wastewater impacts are in the category of low adverse to medium adverse. Such impacts can be managed by incorporating the pollution control technology. Some of these impacts can be eliminated through the administrative controls but not all. The control technology is the CETP (at the SIE level) and pre-treatment plants (at the industrial level) whereas the administrative controls include training of workers, implementation of operational and process control, preventive maintenance, and environmental monitoring and reporting. The management has incorporated wastewater pollution control measures in the planning stage.

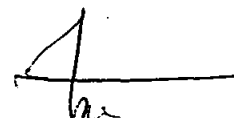
The management of the SIE is recommended to implement the following measures to manage the process wastewater.

a) Water Consumption Monitoring

Water consumption both for the process and sanitary purposes should be monitored and its quantities recorded by each industry in the SIE. All the main water inlets shall be provided with flow meters to record daily water intake. Unit water consumption with respect to production and water consumption per capita per day for domestic use can be established by this measured water quantity.

b) Sanitary Wastewater Disposal

The management should encourage the use of the septic tank for pre-treatment of sanitary wastewater in each industrial unit. This system is the partial treatment of wastewater. The BOD and suspended solids are decreased 40 per cent and 70 per cent respectively from this system. In this process, the suspended solids are settled down by the provision of retention time of about 18-24 hours. The BOD is reduced by anaerobic treatment, in which organic matters are converted into methane, H_2S and CO_2 . The overflow water from the septic tank will be conveyed to the CETP prior to disposal into the Nullah drain.



c) Process Wastewater

The concentration of the wastewater pollutants (BOD, COD, TSS) originating from the process areas is above the NEQS level. To comply with the NEQS, the management will treat wastewater of all industries by adopting Activated Sludge Process technique.

d) Wastewater Monitoring and Reporting

Wastewater discharged from all the industries including the CETP will be monitored with respect to its quantity and quality. As per the NEQS (Self Monitoring and Reporting) Rules, 2001, the priority parameters for wastewater from different industries will vary accordingly. After monitoring water consumption and wastewater discharges, water balance can be established. On the basis of monitoring, the departments consuming huge water quantities can be controlled through water audit.

The frequency of reporting of the priority parameters to the concerned authority will vary according to the nature of industries in the SIE. The services of some reliable private laboratory can be hired or an in-house laboratory can be established and training can be imparted to its own professionals for this exercise.

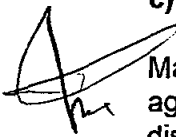
7.1.2 Solid Waste**a) Plant Solid Waste Disposal**

For safe disposal of industrial wastes, the management can encourage the use of three R's concept (reduce, reuse and recycle the solid waste). The plant operators should be trained to do their best to produce less solid waste from the process by employing different cleaner production techniques. The solid waste management team should explore ways to reuse waste in house as such. If it is possible to reuse any waste after making some change on it (called *recycling*); it should be practiced.

Monitoring of the solid waste with respect to its source, type, and generation rate is essential. For such monitoring, there will be solid waste management system in the organizations in which, waste segregation, collection and storage will be integrated with the plants operations. The management will ensure that these wastes are used under no objection circumstances. A sanitary landfill site will be constructed by the management of the SIE to dispose of industrial solid waste.

b) Domestic Solid Waste Disposal

The domestic waste generated from the administration buildings in the SIE will be collected and dumped at appropriate bins inside the plants. From waste collection bins, it will be transported to the SIE designated solid waste dumping site daily.

c) Liquid Waste Disposal

Major liquid waste streams include used lubricants. There should be a mutual agreement with the major suppliers of lube oil to take them back after use. Their safe disposal or reclamation will be the responsibility of the suppliers.

7.1.3 Air Pollution Control**a) Air Emission Control Program**

The following measures are recommended for air emissions control:

- ✧ Process control of combustion chambers
- ✧ Air emissions monitoring and reporting

Process Control of Combustion Chambers

The combustion process can be controlled to make air pollutants within the NEQS level. The parameters to control are the uniform supply of fuel, control on air supply and fine tuning of the combustion equipment and burners.

There should be regular monitoring of boiler flue gases for NO_x, CO, excess air supply, the PM, and generator emissions for CO, NO_x, SO_x and the PM by the industries. In case, these parameters are above the desired level, the appropriate measures can be taken.

Air Emissions Monitoring and Reporting

As mentioned in Section 3.1 that the SIE falls under the Category A for effluent and air emissions. For the EPA monitoring and reporting requirement, the Category A industry has to monitor its air emissions and report to the EPD monthly.

The priority parameters for air emissions monitoring and reporting for different industries in the SIE will vary accordingly.

7.1.4 Noise Pollution and Vibration

The management should encourage the use of the following sequence to control noise at various plants locations within the SIE:

- ✧ Noise measurement of the noisy areas (if required)
- ✧ Audiometric testing of workers exposed to high noise levels
- ✧ Record keeping of medical tests and follow up
- ✧ Engineering control for noise reduction
- ✧ Administrative control for noise reduction
- ✧ Training of employees
- ✧ Vehicular noise

a) Plant Noise Measurement

Table 7.1 provides threshold limit values (TLV) of the noise according to the American Conference of Government Industrial Hygienists (ACGIH).

Table 7.1
Noise Threshold Limit Values

Duration per Day (Hours)	Sound Level (dBA)
16	80
8	85
4	90
2	95
1	100
1/2	105

1/4	110
1/8	115

When the sound levels listed above exceed, the feasible administrative or engineering controls should be instituted. If these controls fail to reduce the sound levels to within those listed above, the hearing protection devices should be provided and used to reduce sound levels to an acceptable level.

b) Audiometric Testing

The management should implement audiometric testing of the workers exposed to high noise levels.

Audiometer is used to measure the hearing threshold of employees. These tests can detect changes in hearing threshold of employees. A negative change represents hearing loss within a given frequency range. The initial audiogram establishes a baseline-hearing threshold. After that, audiometric testing should occur at least annually.

c) Follow Up

It is very important to follow up monitoring of those employees having early stage of noise induced hearing loss. Hearing loss can occur without producing any evidence of physiological damage. Therefore, it is important to follow up on even the slightest evidence of a change in an employee's hearing threshold.

d) Engineering Control

There are three components of noise hazards i.e. noise source, noise path and noise receiver. The most desirable noise controls are those that reduce noise at the source. The second priority is to reduce the noise along its path. The last resort is noise reduction at the receiver using personal protective devices. The latter approach should never be substituted for the two former approaches.

- ✕ Noise can be reduced at its source by enclosing the source, altering the acoustical design at the source, substituting equipment that produces less noise, making alternations to the existing equipment, or changing the process so that less noisy equipment can be used;
- ✕ Noise can be reduced along its path by moving the source farther away from receivers and improving the acoustical design of the path so that more sound is absorbed as it travels toward receivers; and
- ✕ Noise can be reduced at the receiver by enclosing the worker, using personal protective devices.

e) Administrative Control

Administrative controls are the controls that reduce the exposure of employees to noise rather than reducing the noise. There could be many operations in the SIE in which the exposure of employees to noise could be controlled administratively, that is, production schedules can simply be changed or jobs can be rotated so that exposure times are reduced. This includes such measures as transferring employees from a job

location with a high noise level to a job location with a lower one if this procedure would make the employee's daily noise exposure acceptable.

Administrative controls should be considered a second level approach with engineering controls given top priority.

f) Training

The workers' training and education will be helpful for the management of each industry in the SIE to convince workers for the implementation of noise control strategies. The training and education program will provide information about the adverse effects of noise and how to prevent noise induced hearing loss. At a minimum, all trainings will cover the following topics:

- ✧ Noise induced hearing loss
- ✧ Recognizing hazardous noise
- ✧ Symptoms of overexposure to hazardous noise
- ✧ Hearing protection devices (HPD)- advantages and limitations
- ✧ Selection, fitting, use, and maintenance of the HPD

g) Vehicular Noise

The vehicles maintenance program should be implemented for carrying out regular maintenance of the office vehicles. Maintenance should focus on noise monitoring, engine tuning, oil change and general up keep. Generally, well maintained vehicles, in all respects, cause less noise pollution in the area.

7.1.5 Mitigation Measures for Socioeconomic Impacts

The traffic management measures are required as a means of reducing road accidents, improving the residential living environment and reducing the chance of collisions between vehicles, pedestrians and cyclists.

After the SIE is in operation, there will be traffic load on the major external roads (Raiwind-Sundar road, Raiwind-Manga Road) as well as internal roads. Proper traffic management measures should be adopted such as traffic soothing and channelization. As a measure to streamline heavy traffic in the area, proper road marking and signboard posting should also be done. Proper pedestrian precincts should be provided where development has encroached the human passages.

The vehicle drivers should be apprised of the local customs and values, and be advised to remain courteous to the local population.

The raw material transport activities scheduling should be such that most of the tasks are executed in a manner so as not to cause traffic jams and congestion in the area. Preference for job opportunities should be given to the local affected communities for their social and economic uplift.

7.1.6 Improvements in Occupational Health and Safety

a) Training of Workers

Workers of the industries in the SIE need training on the OHS issues such as the use of the OHS equipment, fire fighting, first aid, emergency response etc. Frequency of these trainings can be established according to the need. The consultants, trainers

and people from different agencies working on these issues can provide in house trainings.

Each new entrant will undergo such trainings at the time of joining. Afterward he/she will also attend the scheduled trainings. To evaluate the effectiveness of these trainings, people of the facility should be tested time to time through different drills.

b) Comfortable Working Environment

The management of the SIE should ensure the following sequence to be adopted to control heat stresses on workers and to improve the working conditions in industries:

- ✕ Measurement of heat stresses at high temperature working areas
- ✕ Establishing rest break schedules for workers of heat stress areas
- ✕ Improving working conditions by improving ventilation
- ✕ First aid training to workers to fight heat stresses

c) Enforcement and Use of the OHS Equipment

Workers should be enforced to use the OHS equipments in the plants. The management should also adopt such practices to motivate workers. Workers should be trained on these issues and provide knowledge of all the occupational hazards and associated diseases. After getting knowledge, they will definitely follow safety protocols. All such measures can eliminate the chances of accidents in the working areas. The management has the responsibility to supply these equipments to the workers uninterruptedly.

7.2 Rehabilitation Plan

The management of the PIE should formulate rehabilitation plan for the SIE. At the end of the SIE life, there should be a planning for it. This plan should focus on the following areas:

- ✕ Removal of machines and their safe disposal
- ✕ Filling of all the excavation and restore land to its original form
- ✕ Clearing of soil from soil pollutants like lubricants and chemicals
- ✕ Plantation of plants (if required)

7.3 Mitigation Measures for the Construction Phase

7.3.1 Water Quality

- ✕ During the construction phase, domestic sewage shall be generated at residential facilities for staff. This can result in pollution of surface and ground water if not treated. In order to allay concentration of pollution caused by sewage water, treatment of the waste is recommended before final discharge. According to the PEPA-97, BOD of all the surface discharges from domestic or industrial wastes should not exceed 80 mg/l. Therefore, sewage should be treated by septic tank. The sewage should not be let exposed in open areas, which may cause health hazards.

7.3.2 Land Pollution

- ✕ Construction camps will be the main sources for the generation of municipal solid waste. Unsafe disposal of this waste will lead to generation of obnoxious smells

and badly disturb the aesthetic condition of the land besides land pollution. A complete waste management plan is recommended to deal with the collected wastes and to dump that at proper location. Sanitary landfill is one of the most popular methods for the safe disposal of solid waste.

- ✧ During the wrapping up of the construction phase, machinery and equipment will be packed up and transported back. For the sake of site clearing, discarded pieces of machineries, construction material should be disposed of at the dumping sites.
- ✧ Different kinds of lubricants for oiling, greasing and fueling of machineries and equipment will be used during the construction phase. The conventional disposal method for the used lubricants and waste chemicals is to throw it in a ditch/water pit. This practice is environmentally unfriendly, and may cause negative impacts on the soil quality. A better way of dealing with depleted lubricants is to send it back to the suppliers for recycling or otherwise environmentally safe disposal. Moreover, leakage from fuel storages on construction sites also pollutes the land. These materials ought to be stored, carried and handled properly. Careful handling of fuel should be monitored to avoid surface contamination.

7.3.3 Air Quality

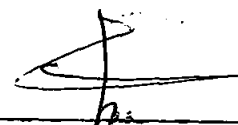
Presently, the air quality of the project area is good but the construction activities will invariably result into pollution of the ambient air. Fugitive particulate matter (PM) emissions to the atmosphere can be caused by earthen materials, transport and storage of construction materials in uncovered form, blown by wind and vibration, exhausts of the construction machinery and construction materials transport vehicles, mostly using diesel as fuel. Gases emitting from generators are also a source of air pollution.

The dust emissions from the above sources and operations would cause public health hazard and nuisance to the nearby communities particularly when these emissions get released at the ground level, with less chances of diffusion. Most of the dust generated by construction activities consists of relatively large size particles, which are expected to settle within a short distance from their source. A continuous flux of particulate matter generation, however, during active construction period, would keep the atmosphere polluted for longer periods.

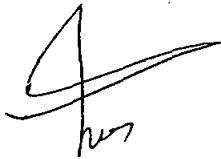
- ✧ Likely pollutants are CO, SO_x, NO_x and VOC etc.
- ✧ Sprinkling of water should be performed during the construction stage.
- ✧ Chimneys and particulate scrubber should be provided to the plants generating particulate matter.
- ✧ The project construction vehicles having an age of more than 5 years should not be allowed to use.
- ✧ Masks should be provided to drivers and operators of vehicles and construction machinery.

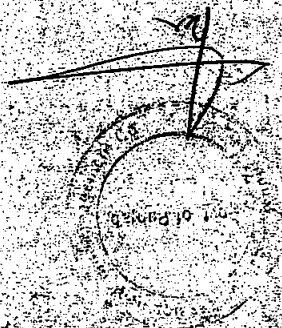
7.3.4 Noise and Vibration

Operation of construction machinery, movement of construction materials transport vehicles etc. can cause noise at the project site.



- ✧ The NEQS noise level limit (for vehicles) is 85 dBA, at a distance of 7.5 meters from source. The noise levels should be kept under this permissible limit, otherwise these may cause unusual blood pressure variation, physical fatigue, hearing impairment and, in acute cases, permanent hearing loss, rupture of ear drum etc. Chronic exposure of people to higher noise levels also impairs their efficiency and skill.
- ✧ Construction contractors should maintain heavy-duty machinery in good operating condition. In this regard, restricting noisy activities to normal working hours, when ambient noise levels are higher, make incremental impacts less obtrusive.
- ✧ Mufflers should be provided to the drivers, workers in the vicinity of the machinery producing noise more than permissible level.





Environmental Management Plan

Chapter 8

8

Environmental Management Plan

The Environmental Management Plan (EMP) is developed to implement mitigation measures proposed for the environmental impacts during the construction and the operation phases. It comprises institutional arrangements, risk/hazard management, occupational health and safety and monitoring plan.

8.1 Objectives of the EMP

The overall objective of the EMP is to provide framework for addressing and managing environmental issues. Following are the main objectives of the EMP:

- ✧ Provide an institutional framework accompanied with roles and responsibilities of different role players such as environmentalist, estate engineer, design engineer, resident engineer, contractor, plant manager (O & M team), plant operators (O & M team) and stakeholders.
- ✧ Develop monitoring mechanism and identify monitoring parameters to ensure effective implementation of all the mitigation measures
- ✧ Identify training requirements and develop plans for implementation
- ✧ Identify resources required to implement the EMP and ensure availability of these resources

8.2 Key Environmental Issues

The environmental issues associated with the proposed SIE are discussed in detail in Chapter 6. However, the key issues are:

- ✧ Contamination of air, water and soil during the construction and the operation phases
- ✧ Impacts of noise generated by vehicles, plant, and equipment during the construction and the operation phases;
- ✧ Disposal of sludge generated from the treatment of wastewater;
- ✧ Occupational health and safety issues during the construction and the operation phases.

8.3 Cost of the Mitigation Plan

The direct costs of implementing the mitigation plan will be very modest, as nearly all the recommendations depend on good and proper management of the construction activities and high standards of operations of the plant itself. These costs are already included in the cost of the project. However, the following are suggestions for the

activities, which could help minimize environmental impacts and enhance beneficial/positive impacts of the project, and do have cost implications:

- ✧ The site at the CETP-SIE will be surrounded by a 15 m buffer zone. The whole site could benefit from a tree-planting scheme in the buffer zone to screen the plant completely. It will not only act as a buffer against dispersion of odor and noise in the surroundings but also enhance the visual impact;
- ✧ Construction of the CETP-SIE and disposal of treated effluent to Nullah Drain and Rohi Nullah and finally to the River Ravi, will provide an extremely valuable opportunity for monitoring the impact of discharge to a much polluted drain.
- ✧ Local research institutions should be encouraged to develop a monitoring program, which expands on the statutory requirements of monitoring water quality. The provision for environmental monitoring should also be made in the operational budget of the wastewater treatment plant, because this could provide invaluable information for designing and managing the new plants efficiently, and their impacts on the receiving bodies. No such information is available at present, as so far, no such treatment plant is operational in the industrial estates with the expected industry mix like in the SIE.

8.4 Salient Features of the EMP

Following are the salient features of the EMP at different phases of the project:

8.4.1 Construction Phase

a) Water Related Measures

The action required for mitigating impacts on water resources is to treat the domestic wastewater before discharging it to streams.

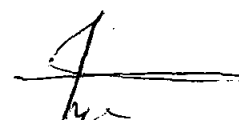
b) Land Related Measures

The following actions will be performed by the contractors to mitigate the impacts on land:

- ✧ Limit the excavation of earth fill to an approximate depth of 50 cm, and stripping and stockpiling the top plough layer to redress the land after the required borrow material has been removed.
- ✧ Train the contractors' workforce in storing and handling materials and chemicals, which can potentially cause soil contamination.
- ✧ Ensure that solid waste generated during construction and at camp sites is properly treated and safely disposed of only in demarcated waste disposal site.

c) Air Quality Related Measures

- ✧ Sprinkle water for dust suppression
- ✧ Ensure plants and vehicles properly equipped with pollution control devices
- ✧ Ensure compliance of the NEQS for gaseous emissions from the construction vehicles



d) Measures for Socioeconomic Environment

- ⊗ Minimize safety and health hazards among its workers as well as the local population by adopting good engineering practices
- ⊗ Maintain congenial relationship between the construction staff and the local communities

8.4.2 Operation Phase**a) Water Quality Related Measures**

- ⊗ Ensure sanitary and process wastewater treatment before discharge to the streams
- ⊗ Recruit highly motivated and well trained staff to run the CETP plant
- ⊗ Ensure all equipments regularly maintained and repaired
- ⊗ Encourage the use of 3 R's (reduce, reuse and recycle) concept

b) Land Related Measures

- ⊗ Ensure safe disposal of the domestic and the plants solid waste
- ⊗ Ensure timely removal of sludge to the officially designated landfill site

c) Air Quality Related Measures

- ⊗ Monitor air quality vis-à-vis the national and international air quality standards
- ⊗ Devise odor control system if problems occur and persist
- ⊗ Monitor vehicular emissions in accordance with the NEQS

d) Measures for Socioeconomic Environment

- ⊗ Provide job opportunities to the locals
- ⊗ Ensure public and occupational health and safety by adopting engineering and administrative measures

8.5 Institutional Needs for Implementing the Environmental Measures

The potential impacts of the SIE on air, water and soil necessitate institutional support for efficient conduct and supervision of materials handling, pollution control, and waste reduction. This section of the EIA report aims at assessing the institutional capabilities that exist within the PIE set-up, identifying their future plans for implementing environmental measures, and then providing an outline of recommended institutional measures, which need to be developed by the PIE in order to make them an environmentally-sensitive and abiding entity.

8.5.1 Existing Institutional Capabilities and Environmental Awareness

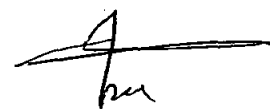
The top management of the PIE is well-versed with the environmental concerns. Optimum recycling option having been built-in and incorporated in the design is a positive step in this direction, and is clearly symptomatic of the fact that the technical department of the PIE is environmental concerned, and has taken maximum precautions to keep emissions and discharges to a minimum. The proposals show that the policy of waste minimization is being strictly followed.

8.5.2 Recommended Institutional Measures

The PIE is responsible for overall implementation of the SIE project. Figure 8.1 represents its organizational structure and Figure 8.2 indicates the key roles and responsibilities assigned within the PIE as well as its interrelationship with the other monitoring agencies.

The main individual, groups, government agencies, NGOs etc. identified with their respective responsibilities for implementing the mitigation plan include:

- ✱ Environmentalist (PIE)
- ✱ Estate Engineer (PIE);
- ✱ Design Engineer;
- ✱ Resident Engineer;
- ✱ Contractor;
- ✱ Plant Manager;
- ✱ Plant Operators; and
- ✱ Stakeholders



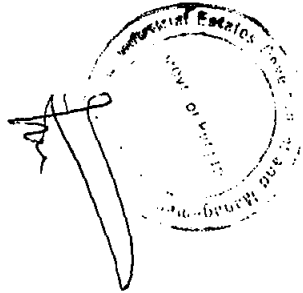


Figure 8.1
Organizational Structure of the PIE

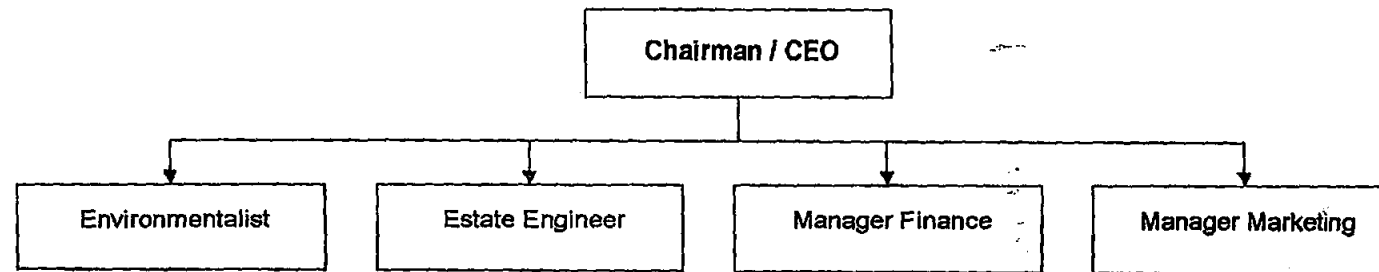
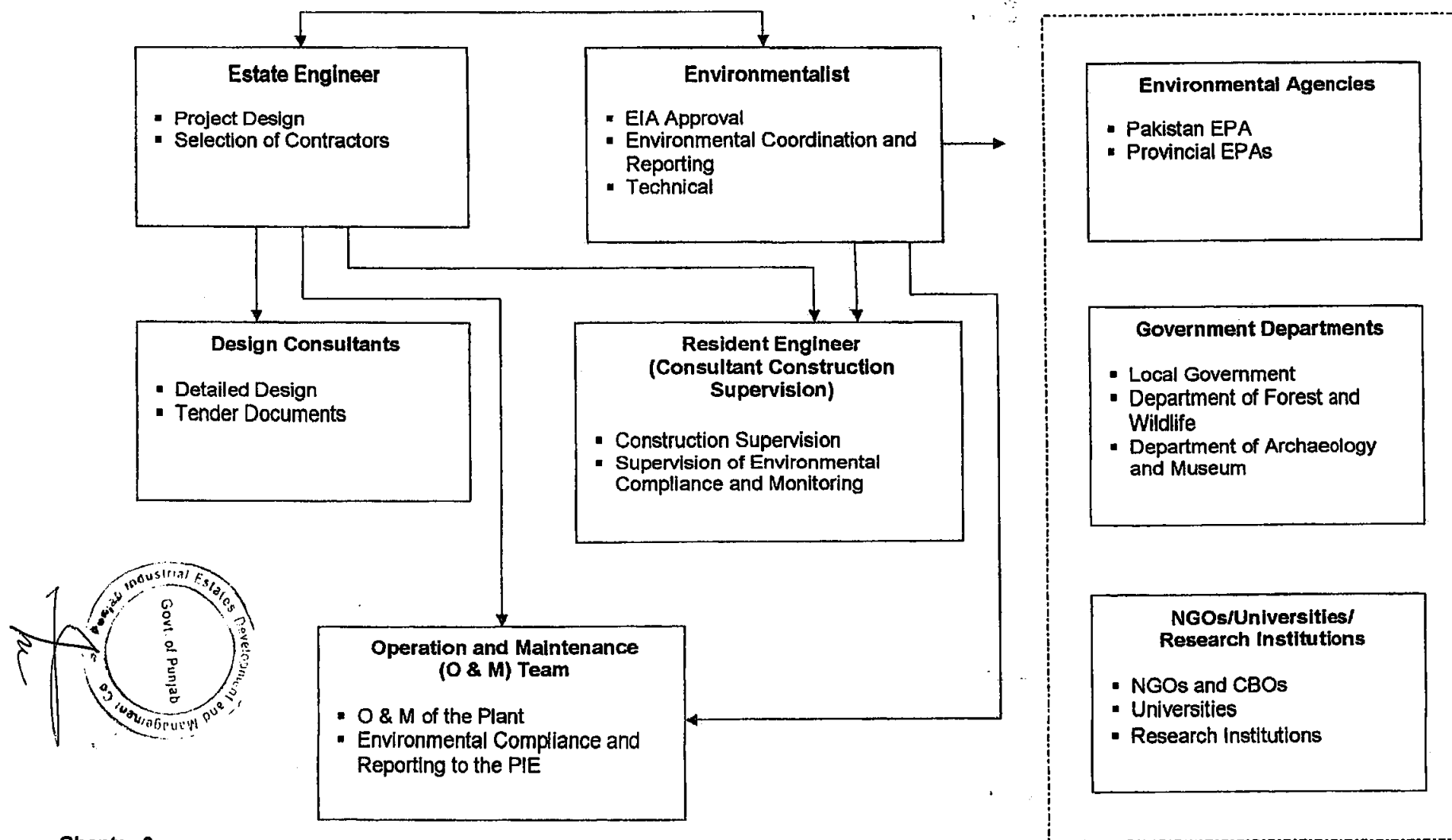


Figure 8.2
Environmental Management Organization



a) Environmentalist (PIE)

The Environmentalist, PIE will have overall responsibility for ensuring compliance of the EMP. The scope of responsibilities will include:

- ✧ Setting up system for environmental management and supervising environmental and social impact assessment;
- ✧ Providing information and support to the Estate Engineer to ensure that the environmental considerations have been incorporated in the design of the CETP-SIE;
- ✧ Liaising with the Resident Engineer (consultant construction supervision) and the Estate Engineer to ensure monitoring of environmental compliance during construction and provide technical support where required;
- ✧ Coordinating with the regulatory agencies including EPA, District Local Government, Local NGOs, CBOs that could assist the PIE in independent review of environmental compliance;
- ✧ Reporting environmental monitoring and evaluation of compliance to the EPA;
- ✧ Devising system of tariffs for treatment of waste depending upon the quality of effluent received from the industries
- ✧ Providing incentives for industries to progressively implement their own pre-treatment systems;
- ✧ Setting up forum for industrialists to discuss waste management;
- ✧ Acting as a facilitator by assisting with solutions to the wastewater treatment management problems; and
- ✧ Informing the O & M team of the CETP-SIE about the new environmental legislation and guide for up-gradation of the plant and inform the PIE for detailed planning to start new phase.

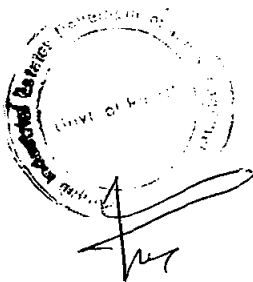
b) Estate Engineer (PIE)

The Estate Engineer and his staff are responsible for:

- ✧ Supervising the design consultant when preparing an outline design and tender documents for project contracts;
- ✧ Hiring contractors for construction of the CETP-SIE, using a competitive bid process; and
- ✧ Ensuring that all the recommendations of the EIA have been incorporated in the design.

c) Design Engineer

The CETP-SIE Design Engineer must ensure:



- ✧ Mitigation requirements are appended to the tender documents so that the mitigation costs are also incorporated by the contractors while preparing bids;
- ✧ Mitigation requirements included in tender documents are enforceable;
- ✧ Features are provided for public and operator's safety;
- ✧ Design facilities, which can be readily operated and maintained properly;
- ✧ Features are incorporated to minimize production of odors;
- ✧ Areas with higher potential of odor production are enclosed;
- ✧ Features are provided for security;
- ✧ Appropriate landscaping is provided for visual effect and noise suppression;
- ✧ Modular type of design for the CETP-SIE is provided;
- ✧ Noisy equipments are enclosed;
- ✧ Emergency generators are provided so that the facilities can operate during power failures, or ensure continuous supply of electricity from the power plant installed within the SIE; and
- ✧ Contractor to plan and implement traffic control system for safety of public and workers, and reconstruction of disturbed and damaged facilities during construction to restore them.

d) Resident Engineer (Consultant Construction Supervision)

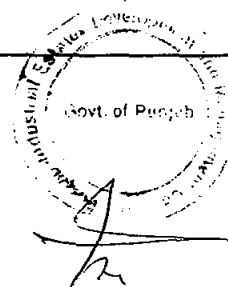
The Resident Engineer has the following responsibilities:

- ✧ Ensure contractors to understand mitigation requirements and their responsibilities for implementing the mitigation plan;
- ✧ Monitor contractor's actions and enforce contractual obligations;
- ✧ Plan construction schedule with contractors to ensure that the construction process is as quick and efficient as possible;
- ✧ Ensure efficient traffic management during the construction process; and
- ✧ Ensure provisions for health and safety of construction workers are in place, including swift supply of medical facilities in the event of accidents, PPEs etc.

e) Contractor

The responsibilities envisaged for the contractor working for the CETP-SIE are as follows:

- ✧ Ensure efficient site management for the storage of equipment, stockpiling materials etc.;
- ✧ Ensure construction plan devised and agreed with the Resident Engineer;

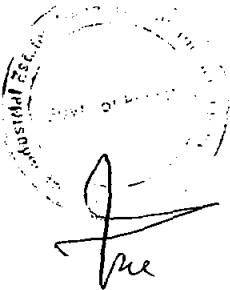


- ✕ Recruit labor from locally affected communities first;
- ✕ For the construction camp on the site, ensure appropriate sanitary arrangements, accommodation and drinking water availability;
- ✕ Liaise with the local communities regarding services and goods supply at the site;
- ✕ Liaise with the local communities regarding construction activity, time span, likely nuisances such as noise, dust and disturbance;
- ✕ Ensure provision of appropriate night lights; and
- ✕ Plan working hours to provide minimum disturbance to the community.

f) Plant Manager (O & M Team)

The Plant Manager during operation of the CETP-SIE is responsible for the tasks:

- ✕ Manage plant efficiently at all times;
- ✕ Maintain cleanliness of the site and the facilities;
- ✕ Recruit highly motivated and well trained staff to run the plant;
- ✕ Ensure staff is aware of the contents of the operational manuals (on the wastewater treatment in particular) comprising safety procedures, emergency, shut-down or accidental injury on the site;
- ✕ Ensure all equipment regularly maintained and repaired;
- ✕ Keep stocks of spares in case of equipment failure;
- ✕ Ensure daily effluent quality monitoring and problems remedied as soon as possible;
- ✕ If problems of receiving un-authorized wastewater at works crop up, coordinate with the PIE to identify source of problem and take remedial action;
- ✕ Ensure timely removal of sludge from the site to the landfill;
- ✕ Ensure instant diagnosis and repair of leaks, spills and blockages – alert communities of imminent health hazards in discharge area;
- ✕ Liaise with community organizations regarding nature, functions and relationship with operation of the plant;
- ✕ Ensure timely redress of complaints about the plant;
- ✕ Maintain record of complaints received and actions taken;
- ✕ Ensure positive response to requests for site visits etc. with the view to enhance relations with the locals and other institutions;



- ✧ If monitoring shows that the effluent treatment is not adequate to meet the water application of technology and the quality standards, then take action to install treatment which is adequate;
- ✧ If necessary, seek advice on how to improve the situation, especially if equipment not performing to the specifications;
- ✧ Ensure sludge dewatering and removal in an efficient and environment-friendly manner; and
- ✧ Devise odor control system if problems occur and persist.

g) Plant Operators (O & M Team)

The following responsibilities are identified for the Plant Operators:

- ✧ Read and digest operational manuals;
- ✧ Ensure safety and fire fighting equipment are in place and accessible;
- ✧ Ensure regular maintenance of the equipments;
- ✧ Report malfunctioning of the equipment and equipment failure to the Plant Manager; and
- ✧ Ensure responsible and conscientious attitude towards execution of their duties at all times.

h) Stakeholders

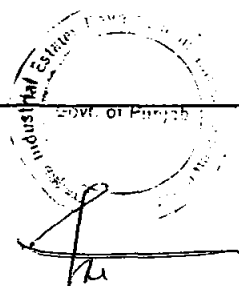
The following responsibilities are identified for the community as *Stakeholders* during the construction and operation phases of the CETP-SIE:

- ✧ Liaise with the Resident Engineer regarding schedule of construction activities;
- ✧ Avoid construction routes for personal and work routines;
- ✧ If plant creates nuisance, odors or excessive noise, contact the Plant Manager, with the information on time, place and wind direction, etc.;
- ✧ In case of inefficient sludge removal, lodge complaints with the Plant Manager; and
- ✧ If the CETP-SIE or activities associated with it, in any way, jeopardize health of the nearby community, ensure the Plant Manager and the EPD are alerted.

8.5.3 Disaster/Hazard Management

The existence of hazards, associated with industrial facilities, calls for disaster/risk management plan, which will comprise:

- ✧ Conditions potentially leading to major release accidents including releases from pipes, flexible connections, filters, valves, vessels, pumps, compressors, tanks, stacks etc.



- * Explosion in boiler and storage areas
- * Occupational health and well being conditions
- * Occupational safety conditions

The last two points will be discussed under "Occupational Health and Safety Planning". The discussion under disaster management mainly pertains to the hazards associated with the SIE and the controls to be exercised, as part of the disaster management, to overcome the danger of being exposed to these hazards.

Hazards assessment for the proposed facilities in the SIE will take into account the potential hazards likely to occur during the construction and the operation stages of the project. The construction phase hazards may involve danger to the safety of workers as a result of unforeseen accidents. Exposure to toxic materials and explosives can pose serious threats to the health of the workers. The hazards associated with the operation phase may be of the following categories:

a) Electrical

Electrocution from live conductors and misuse of power tools, overhead power lines, downward electrical wires, buried cables, and work during electric storms

b) Mechanical

Collision accidents with moving equipment, especially when operating in reverse, failed pulleys, snapped cables and clothes catching in gears or drills

c) Structural

Potential for falling or strain when working conditions include slippery surfaces, steep grades, narrow stairs, open holes, trip hazards and unstable flooring, potential puncture from objects, and potential burial from trench cave-ins or from unstable slopes on material stock-piles

d) Temperature

Heat stress in hot environments or when working in clothing, which limits the dissipation of body heat and moisture

e) Noise

Stress and physical damage to the ear when subjected to noise levels exceeding recommended guidelines (e.g. an 8-hour, time-weighted average sound level of 90 dBA, as per the US guidelines; NEQS recommended 85 dBA as the limiting value for motor vehicle noise – there is no NEQS limitation imposed on noise generated from industrial processes)

f) Radiation

Burns and/or internal damage when subjected to excessive levels of ionizing radiation

g) Oxygen Deficiency

Health effects due to displacement of oxygen due to another gas or consumption of oxygen by a chemical reaction, particularly in confined spaces, may occur when levels drop below 19.5 per cent oxygen. In addition, it is possible that if the work areas are not designed properly, they can cause workers discomfort and mental stress, which



can result in loss of efficiency, and thus lessen the worker's ability to respond promptly to any hazard. Also, creation of such conditions can cause monotony and fatigue thereby increasing the potential for hazards and accidents to occur.

The recommended control measures to minimize and manage potential hazards include engineering controls and administrative controls, which are elucidated below:

i) Engineering Controls

Layout Design

Unit operations being laid out in such a manner that incompatible substances and incompatible operations are not located within close proximity to each other. Specific examples of incompatible substances, not being located in close proximity, include:

- ✧ Particulate matter and liquid droplets from boilers will not fall within the battery limits of the complex, and will be sufficiently diluted before reaching the ground.
- ✧ It is planned that the wastewater treatment plant will be designed so as not to allow the mixing of incompatible streams - each stream will be given specific treatment before mixing with other wastewater streams on entering the wastewater treatment plant.
- ✧ It is planned that solid waste and sludges will be dumped at the designated landfill area in the SIE.

Resource Minimization

Recycling and reuse of wastewater generated in the plant

Access Control

Limitations of personnel to those specifically trained in the work conditions present within a potentially hazardous area including use of personnel identification, double lock, security services and barriers.

Labeling

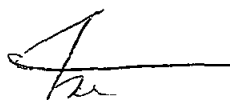
Complete hazard labeling of all switches, valves, containers, and unit operations; complete identification of specific hazardous substances by name and type (e.g. toxic, reactive, ignitable, and explosive).

Monitoring

Monitoring of the environment in the immediate vicinity of potential hazards as well as at the fence-line of the installation, provides an early warning of a hazard occurring. For example, air quality monitoring for oxygen levels, combustible gas levels, and/or specific air constituents could be conducted on a regular basis using portable equipment or on a continuous basis with stationary equipment. Smoke detectors, heat monitors, and radiation detectors can be used to signal a hazard occurring.

Secondary Containment

Provision of appropriate systems to contain releases including water curtains to restrict gas releases, dikes to contain spills; emergency response equipment to collect spilled material, fire-proofing to limit the spread of fire; absorbents to absorb or adsorb hazardous substance; and buffer zones.



ii) Administrative Controls

These controls need to be exercised in situations where it is not possible to reduce hazards through engineering controls. It is recommended that administrative controls should be implemented in the form of rearrangement of work schedules so as to minimize the duration of exposure to hazards and transfer or rotation of personnel who have, over a period of time, reached a maximum allowable exposure limit.

The controls should also be exercised to ensure easy access to and availability of PPE for use within the vicinity of potential hazards. Such equipment could include chemical resistant gloves, safety shoes, ear protection plugs, safety glasses etc. Special clothing should be provided as well as basic items for use in emergencies such as portable light, safety belt, two-way radio etc. should be easily accessible at all times for 24 hours a day.

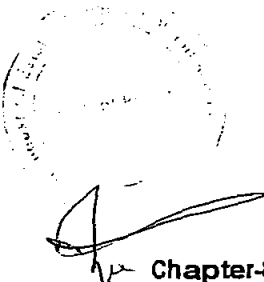
During training, the following areas of knowledge and experience are considered essential:

- ✧ Appreciation of the properties (e.g. flammability, corrosiveness, toxicity, reactivity) of hazardous substances, as well as the levels at which they pose a significant danger requiring protective measures.
- ✧ Awareness of early-warning indicators, hazards/risk identification, and ability to recognize potentially hazardous situations.
- ✧ Familiarity with engineering controls to avoid occurrence of hazardous situations
- ✧ Familiarity with capabilities and limitations of the facility to respond to hazardous emergencies: ventilation systems, plumbing systems, shut-off systems, containment devices, and emergency response procedures.
- ✧ Knowledge of the use and maintenance of emergency response equipment as well as routine equipment for health and safety monitoring and protection
- ✧ Knowledge of methods and procedures for decontaminating personnel, equipment, and facility, following potential chemical contamination.

8.5.4 Occupational Health and Safety Planning

It is recommended to the management of the PIE to carry out a complete assessment and identification of all potential hazards anticipated during the construction, operation, and desertation phases of the SIE, and to prepare a Health and Safety Plan (HSP) along with the Plant Health and Safety Rules developed. The HSP, aimed at identifying, evaluating, monitoring and controlling health hazards, should provide the following basic information:

- ✧ Definition of all potential hazards
- ✧ Health and safety implications of each hazard
- ✧ Description of routine health and safety management techniques, including health and safety inspections, maintenance/repair follow-up on inspection citations, recordkeeping, personnel protective gear, and medical monitoring.
- ✧ Outline of the emergency response procedures following occurrence of a major hazard including organizational structure of key trained personnel to act as



emergency responders, action steps for entering and working within zone of hazard, evacuation procedures, protective gear requirements, decontamination procedures, lines of communication, emergency telephone numbers, map of route to nearest medical centre etc.

✱ Follow-up procedures after the emergency is over.

The management needs to ensure that the HSP along with the associated Health and Safety Rules is established and enforced. The Plant Health and Safety Rules should include provisions for prevention of and response to toxic chemicals and gases.

An Occupational Health and Safety Programme (OHSP) needs to be developed, which is both appropriate and affordable. Major components of such a programme should include control of injury hazards, procedures for emergency care of injured personnel, routine medical examinations of the plant workers and surveillance programme, provision for compensation of injured workers, maintenance of in-plant sanitation including proper management of hazardous wastes and provision of safe drinking water supply and adequate bathing/washing facilities including emergency showers and eye douches. Occupational Health and Safety Training in plant health and safety should be imparted on a regular basis, with emphasis being given on good environmental house-keeping practices.

8.6 Environmental Monitoring Program

It is the process of repeated observation and measurement of one or more environmental quality parameters to enable changes to be observed over a period of time. These changes relate to the physico-chemical and biological parameters of various components of the environment such as air, water, and soil.

The main objective of this programme is the conservation of the quality of the various components of the environment. Monitoring is carried out to obtain quantitative information on current levels of harmful or potentially harmful parameters of water quality, air quality and soil quality. The information, so obtained, enables an assessment to be made of the extent of the polluting damages of these parameters, the rising and falling levels of specific polluting parameters, and the control measures that need to be implemented.

This programme needs to be developed by the PIE with the following functional parameters:

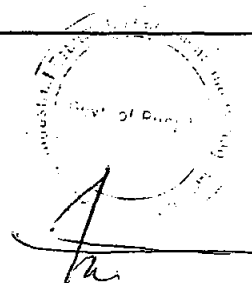
Planning: This is to include economic projections and engineering-economics analysis of what structural and non structural measures need to be put into use when, where and how?

Implementation: This shall comprise design and construction of facilities, setting effluent and emissions standards and establishing inspection procedures.

Operation: This is based on the opening/closing of facilities, making inspections, and repairs and maintenance.

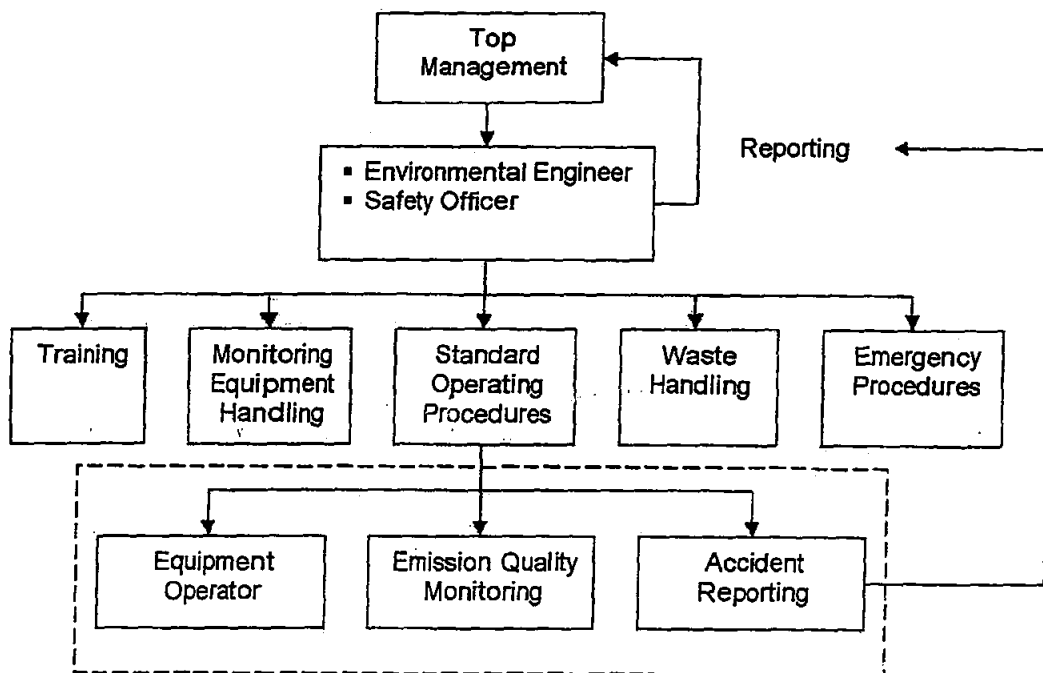
It is, therefore, recommended to the PIE to develop a monitoring programme based on the above functional parameters, to include a whole range of activities from selection of sampling station sites of monitoring network, effluent and emissions quality parameters, instrumentation, sampling and analyses, data processing and documentation, research and development, including training of personnel.

Figure 8.3 depicts schematic presentation of the proposed Environmental Monitoring Programme for the SIE. All industries in the SIE will have their own environmental



monitoring programs.

Figure 8.3
Organizational Structure of the Environmental Monitoring Department and its Functions



The instrumentation requirement of the environmental monitoring programme falls under the categories of:

- ✗ Physical analysis instruments
- ✗ Chemical analysis instruments
- ✗ Biological analysis instruments
- ✗ Data processing instruments

In case of the SIE, the monitoring of the following parameters is recommended on the basis of detailed assessment of the discharges and emissions anticipated:

8.6.1 Water Quality Monitoring

Water quality monitoring is essential for analyzing the quality of drinking water and discharges from point sources during the construction and the operation stages. The monitoring is carried out for the purpose of obtaining quantitative information about the current levels of harmful or potentially harmful water quality parameters. These parameters include physical, chemical and biological parameters. Through a proper and effective monitoring network, water and wastewater samples can be collected, tested and analyzed against regulatory standards. The WHO drinking water quality guidelines and the NEQS will, therefore, be the yardsticks by which the performance of the SIE (including the CETP and the landfill sites) will be evaluated in terms of compliance/non-compliance.

Specific drinking water and effluent quality monitoring requirements identified for the construction stage are specified below:

- ✗ Quantities of pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride,

sulfate, fluoride, nitrate, iron, faecal coliforms, total coliforms in groundwater or the SIE water supply should be monitored quarterly on the construction site to ensure compliance with the WHO drinking water guidelines.

- ✱ Quantities of pH, BOD₅, COD, TSS present in the effluent generated from the construction site offices should be monitored quarterly so that they don't exceed the limits prescribed in the NEQS. The sampling points will be taken from each office.

Specific drinking water and effluent quality monitoring requirements identified during the operation stage are given below:

- ✱ Quantities of pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, and total coliforms in groundwater at the SIE in general and the sanitary landfill site in particular should be monitored quarterly to ensure compliance with the WHO drinking water guidelines.
- ✱ Quantities of pH, BOD₅, COD, and TSS in the effluent (from the CETP) should be monitored monthly so that they don't exceed the limits prescribed in the NEQS.

8.6.2 Air Quality Monitoring

The first step in air quality monitoring is to prepare an inventory of all the emissions for the purpose of establishing benchmarks. The inventory will include location of the air pollution source, type and magnitude of pollution, projected emissions of pollutants, frequency and duration. The frequency and intensity of air quality monitoring supplements to housekeeping practices.

The monitoring will be carried out at both the construction and the operation stages. The parameters to be monitored during these stages include CO, NO_x, SO_x, and PM₁₀. During the construction stage, the monitoring will be carried out near main entrances of the SIE in the downwind direction. During the operation phase, the samples will be taken near main entrances, the CETP site, and the landfill site in the downwind direction. The monitoring will be carried out on quarterly basis for continuous 8 hours period. The compliance of the monitoring results with the USEPA standards and the WHO air quality guidelines will be ensured. The laboratory should be set up and adequately equipped for this purpose.

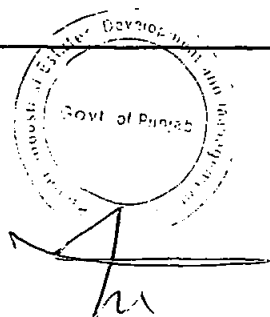
8.6.3 Noise Level Monitoring

The noise levels will be measured for different noise producing entities (vehicles, construction equipment and machinery) during the construction and the operation stages. During the construction stage, the noise of each vehicle will be measured at a distance of 7.5 m for 15 minutes time each on quarterly basis. In addition, the sampling points will also be taken at the construction site (to gauge noise produced from different construction machinery and equipment) as well as near the main entrances. During the operation stage, the noise levels will be measured for each vehicle, near the main entrances, at the CETP site, near generator room for 15 minutes each on quarterly basis. All these noise levels will be compared with the NEQS, OSHA and the WHO noise guidelines for compliance.

8.6.4 Solid Waste Monitoring

The anticipated solid wastes generation from the construction site offices, administrative buildings, and the CETP site will need to be monitored so as to ensure that no immediate and long-term environmental and health problems are caused.

The parameters to be monitored daily during the construction stage include domestic



solid waste (source, type and generation), used oil, discarded mechanical parts, and construction chemicals. During the operation stage, the monitoring of domestic solid waste (source, type and generation) and the sludge produced at the CETP site will be carried out on daily basis.

Unfortunately in Pakistan, there are no national regulations for monitoring of the toxic chemicals and solid wastes to ensure that these are not improperly used and that all precautions are taken to prevent and minimize the likelihood of accidents involving such chemicals and solid wastes.

Table 8.1 presents summary of the environmental monitoring plan comprising environmental quality parameters, applied standards, sampling locations, frequency and duration.

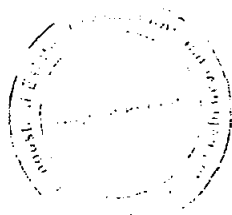
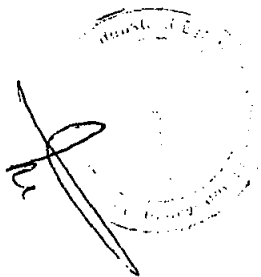


Table 8.1
Environmental Monitoring Plan

Project Stage	Parameters	Details	Applied Standards	Location	Frequency	Duration
Water Quality						
1) Construction						
a) Drinking water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, total coliforms	Groundwater or SIE water supply	WHO drinking water quality guidelines	Construction site	Quarterly	-
b. Wastewater	pH, BOD ₅ , COD, TSS	Wastewater from the site offices	NEQS	One point from each office	Quarterly	-
2) Operation						
a) Drinking water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, total coliforms	Groundwater	WHO drinking water quality guidelines	SIE site in general and sanitary landfill site in particular	Quarterly	-
b) Wastewater ¹	Effluent flow, temperature, pH, BOD ₅ , COD, TDS, oil and grease, chromium, copper, zinc, TSS, chloride	Effluent from the CETP and leachate from the landfill site	NEQS	CETP and landfill sites	Monthly	-

¹ There is dearth of information about priority parameters for effluent monitoring from the CETP. However, the selection of these parameters is tentative contingent upon the data received from each industry about its effluent characteristics.



Project Stage	Parameters	Details	Applied Standards	Location	Frequency	Duration
Air Quality						
Construction	CO, NO _x , SO _x , PM ₁₀	Boundary wall	USEPA, WHO air quality guidelines	At 3 points (near the main entrances) in the downwind direction	Quarterly	8 hours
Operation	CO, NO _x , SO _x , PM ₁₀	Boundary wall	USEPA, WHO air quality guidelines	At 5 points (near the main entrances, the CETP site, landfill site) in the downwind direction	Quarterly	8 hours
Noise Levels						
Construction	Noise levels on dBA scale	7.5 m from the vehicles	NEQS, OSHA, WHO noise guidelines	For each vehicle 6 points at the construction site	Quarterly	15 minutes at each point
Operation	Noise levels on dB (A) scale	7.5 m from the vehicles	NEQS, OSHA, WHO noise guidelines	For each vehicle Main entrances CETP site Generator room	Quarterly	15 minutes at each point
Solid Waste						
Construction	Domestic solid waste (source, type, generation), used oil, discarded mechanical parts, construction chemicals		-	Construction site	Daily	-
Operation	Domestic solid waste (source, type,		-	Administrative buildings	Daily	-

Project Stage	Parameters	Details	Applied Standards	Location	Frequency	Duration
	generation), CETP sludge					
				CETP site		

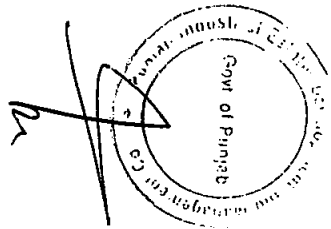


Table 8.2

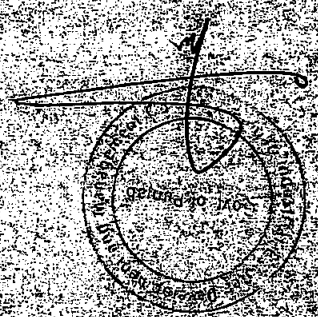
Annual Budget Estimates for Environmental Monitoring (Construction Phase)

Monitoring Component	Parameters	Amount (Rs)
Water Quality		
Drinking Water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, total coliforms	23,000
Wastewater	pH, BOD ₅ , COD, TSS	34,400
Air Quality	CO, NO _x , SO _x , PM ₁₀	96,000
Noise Levels	10 vehicles, 6 points at the construction site	19,200
Total		172,600

Table 8.3

Annual Budget Estimates for Environmental Monitoring (Operation Phase)

Monitoring Component	Parameters	Amount (Rs)
Water Quality		
Drinking Water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, total coliforms	46,000
Wastewater	Effluent flow, temperature, pH, BOD ₅ , COD, TDS, TSS, oil and grease, chromium, copper, zinc	192,000
Air Quality	CO, NO _x , SO _x , PM ₁₀	160,000
Noise Levels	10 vehicles, main entrances, CETP site, generator room	18,000
Total		416,000

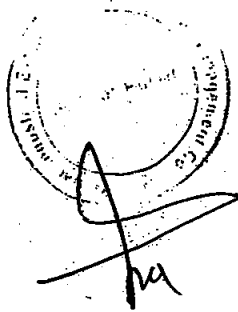


Annexure 2.1 - 5.6

Annexures

Annexure 2.1

**Pakistan Environmental Protection Act
(1997)**



Pakistan Environmental Protection Act

(PEPA), 1997

The Pakistan Environmental Protection Act 1997 was passed by the National Assembly of Pakistan on September 3, 1997, and by the Senate of Pakistan on November 7, 1997. The Act received the assent of the President of Pakistan on December 3, 1997.

The text of the Environmental Protection Act 1997 is as follows:

Act No. XXXIV of 1997

An Act to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development.

Whereas it is expedient to provide for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development and for matters connected therewith and incidental thereto;

It is hereby enacted as follows:

1) Short Title, Extent and Commencement

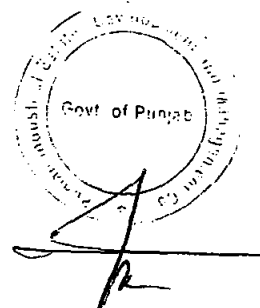
- (1) This Act may be called the Environmental Protection Act 1997.
- (2) It extends to the whole of Pakistan.
- (3) It shall come into force at once.

2) Definitions

In this Act, unless there is anything repugnant in the subject or context:

(i) "adverse environmental effect" means impairment of, or damage to, the environment and includes:

- (a) impairment of, or damage to, human health and safety or to biodiversity or property;



(b) pollution; and

(c) any adverse environmental effect as may be specified in the regulation.

(ii) **"agricultural waste"** means waste from farm and agricultural activities including poultry, cattle farming, animal husbandry, residues from the use of fertilizers, pesticides and other farm chemicals;

(iii) **"air pollutant"** means any substance that causes pollution of air and includes soot, smoke, dust particles, odor, light, electro-magnetic, radiation, heat, fumes, combustion exhaust, exhaust gases, noxious gases, hazardous substances and radioactive substances;

(iv) **"biodiversity" or "biological diversity"** means the variability among living organizations from all sources, including inter alia terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems;

(v) **"council"** means the Pakistan Environmental Protection Council established under section 3;

(vi) **"discharge"** means spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping;

(vii) **"ecosystem"** means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit;

(viii) **"effluent"** means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour;

A circular official stamp, likely from the Ministry of Environment, Government of Pakistan, is visible in the bottom left corner. Overlaid on the stamp is a handwritten signature in black ink.

(ix) "emission standards" means the permissible standards established by the Federal Agency or a Provincial Agency for emission of air pollutants and noise and for discharge of effluent and waste;

(x) "environment" means-

- (a) air, water and land;
- (b) all layers of the atmosphere;
- (c) all organic and inorganic matter and living organisms;
- (d) the ecosystem and ecological relationships;
- (e) buildings, structures, roads, facilities and works;
- (f) all social and economic conditions affecting community life; and
- (g) the inter-relationships between any of the factors in sub-clauses (a) to (f)

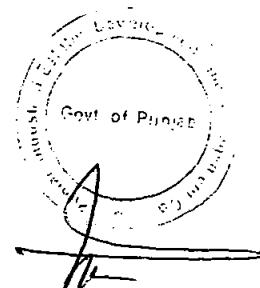
(xi) "environmental impact assessment" means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed;

(xii) "Environmental Magistrate" means the Magistrate of the First Class appointed under section 24;

(xiii) "Environmental Tribunal" means the Environmental Tribunal constituted under section 20;

(xiv) "Exclusive Economic Zone" shall have the same meaning as defined in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(xv) "factory" means any premises in which industrial activity is being undertaken;



(xvi) **"Federal Agency"** means the Pakistan Environmental Protection Agency established under section 5, or any Government Agency, local council or local authority exercising the powers and functions of the Federal Agency;

(xvii) **"Government Agency"** includes-

- (a) a division, department, attached department, bureau, section, commission, board, office or unit of the Federal Government or a Provincial Government;
- (b) a development or a local authority, company or corporation established or controlled by the Federal Government or Provincial Government;
- (c) a Provincial Environmental Protection Agency; and
- (d) any other body defined and listed in the Rules of Business of the Federal Government or a Provincial Government;

(xviii) **"hazardous substance"** means-

- (a) a substance or mixture of substance, other than a pesticide as defined in the Agricultural Pesticide Ordinance, 1971 (II of 1971), which, by reason of its chemical activity is toxic, explosive, flammable, corrosive, radioactive or other characteristics causes, or is likely to cause, directly or in combination with other matters, an adverse environmental effect; and
- (b) any substance which may be prescribed as a hazardous substance;

(xix) **"hazardous waste"** means waste which is or which contains a hazardous substance or which may be prescribed as hazardous waste, and includes hospital waste and nuclear waste;

(xx) **"historic waters"** means such limits of the waters adjacent to the land territory of Pakistan as may be specified by notification under section 7 of the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(xxi) **"hospital waste"** includes waste medical supplies and materials of all kinds, and waste blood, tissue, organs and other parts of the human and animal bodies, from hospitals, clinics and laboratories;



(xxii) **"industrial activity"** means any operation or process for manufacturing, making, formulating, synthesizing, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal, or for mining, for oil and gas exploration and development, or for pumping water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purpose;

(xxiii) **"industrial waste"** means waste resulting from an industrial activity;

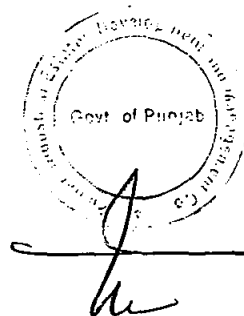
(xxiv) **"initial environmental examination"** means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an environmental effect for requiring preparation of an environmental impact assessment;

(xxv) **"local authority"** means any agency set-up or designated by the Federal Government or a Provincial Government by notification in the official Gazette to be a local authority for the purposes of this Act;

(xxvi) **"local council"** means a local council constituted or established under a law relating to local government;

(xxvii) **"motor vehicle"** means any mechanically propelled vehicle adapted for use upon land whether its power of propulsion is transmitted thereto from an external or internal source, and includes a chassis to which a body has not been attached, and a trailer, but does not include a vehicle running upon fixed rails;

(xxviii) **"municipal waste"** includes sewage, refuse, garbage, waste from abattoirs, sludge and human excreta and the like;



Official stamp of the Government of Punjab, Punjab, India. The stamp is circular with the text "GOVT. OF PUNJAB" in the center and "PUNJAB, INDIA" around the perimeter. A handwritten signature is written over the stamp.

(xxix) "**National Environmental Quality Standards**" means standards established by the Federal Agency under clause (e) of sub-section (1) of section 6 and approved by the Council under clause (c) of sub-section (1) of section 4;

(xxx) "**noise**" means the intensity, duration and character from all sources, and includes vibrations;

(xxxi) "**nuclear waste**" means waste from any nuclear reactor or nuclear or other nuclear energy system, whether or not such waste is radioactive;

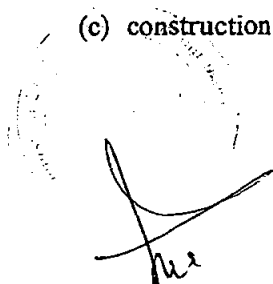
(xxxii) "**person**" means any natural person or legal entity and includes an individual, firm, association, partnership, society, group, company, corporation, co-operative society, Government Agency, non-governmental organization, community-based organization, village organization, local council or local authority and, in the case of a vessel, the master or other person having for the time being the charge or control of the vessel;

(xxxiii) "**pollution**" means the contamination of air, land or water by the discharge or emission or effluents or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or substances alters unfavourably the chemical, physical, biological, radiational, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious, disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to biodiversity;

(xxxiv) "**prescribed**" means prescribed by rules made under this Act;

(xxxv) "**project**" means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes;

- (a) construction or use of buildings or other works;
- (b) construction or use of roads or other transport systems;
- (c) construction or operation of factories or other installations;

A handwritten signature, possibly 'mu', is written over a faint circular stamp or seal.

- (d) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like;
- (e) any change of land use or water use; and
- (f) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems; factories or other installations;

(xxxvi) "**proponent**" means the person who proposes or intends to undertake a project;

(xxxvii) "**Provincial Agency**" means a Provincial Environmental Protection Agency established under section 8;

(xxxviii) "**regulations**" means regulations made under this Act;

(xxxix) "**rules**" means rules made under this Act;

(xl) "**sewage**" means liquid or semi-solid wastes and sludge from sanitary conveniences, kitchens, laundries, washing and similar activities and from any sewerage system or sewage disposal works;

(xli) "**standards**" means qualitative and quantitative standards for discharge of effluents and wastes and for emission of air pollutants and noise either for general applicability or for a particular area, or from a particular production process, or for a particular product, and includes the National Environmental Quality Standards, emission standards and other standards established under this Act and the rules and regulations made thereunder;

(xlii) "**sustainable development**" means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs;

(xliii) "**territorial waters**" shall have the same meaning as defined in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);



(xiv) "vessel" includes anything made for the conveyance by water of human beings or of goods; and

(xiv) "waste" means any substance or object which has been, is being or is intended to be, discarded or disposed of, and includes liquid waste, solid waste, waste gases, suspended waste, industrial waste, agricultural waste, nuclear waste, municipal waste, hospital waste, used polyethylene bags and residues from the incineration of all types of waste.

3) Establishment of the Pakistan Environmental Protection Council-

(1) The Federal Government shall, by notification in the official Gazette, establish a Council to be known as the Pakistan Environmental Protection Council consisting of;

(i) Prime Minister or such other person as the Prime Minister may nominate in this behalf. **Chairperson**

(ii) Minister Incharge of the Ministry or Division dealing with the subject of environment. **Vice Chairperson**

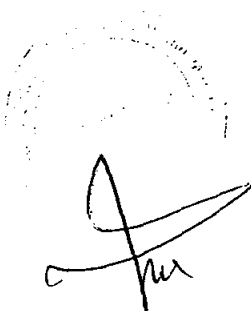
(iii) Chief Ministers of the Provinces. **Members**

(iv) Ministers Incharge of the subject of environment in the provinces. **Members**

(v) Such other persons not exceeding thirty-five as the Federal Government may appoint, of which at least twenty shall be non-official including five representatives of the Chambers of Commerce and Industry and Industrial Associations and one or more representatives of the Chambers of Agriculture, the medical and legal professions, trade unions, and non-governmental organizations concerned with the environment and development, and scientists, technical experts and educationists. **Members**

vi) Secretary to the Government of Pakistan, in-charge of the Ministry or Division dealing with the subject of environment **Member/Secretary**

(2) The Members of the Council, other than ex-officio members, shall be appointed in accordance with the prescribed procedure and shall hold office for a term of three years.

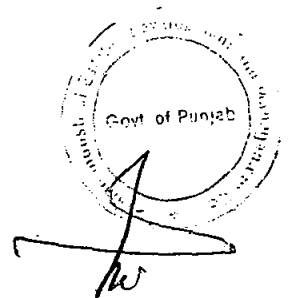


- (3) The Council shall frame its own rules of procedure.
- (4) The Council shall hold meetings as and when necessary, but not less than two meetings shall be held in a year.
- (5) The Council may constitute committees of its members and entrust them with such functions as it may deem fit, and the recommendations of the committees shall be submitted to the Council for approval.
- (6) The Council or any of its committees may invite any technical expert or representative of any Government Agency or non-governmental organization or other person possessing specialized knowledge of any subject for assistance in performance of its functions.

4) Function and Powers of the Council

- (1) The Council shall-
- (a) co-ordinate and supervise enforcement of the provisions of this Act;
 - (b) approve comprehensive national environmental policies and ensure their implementation within the framework of a national conservation strategy as may be approved by the Federal Government from time to time;
 - (c) approve the National Environmental Quality Standards;
 - (d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources;
 - (e) coordinate integration of the principles and concerns of sustainable development into national development plans and policies; and
 - (f) consider the National Environment Report and give appropriate directions thereon.
- (2) The Council may, either itself or on the request of any person or organization, direct the Federal Agency or any Government Agency to prepare, submit, promote or implement projects for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, and the sustainable development of resources, or to undertake research in any specified aspect of environment.

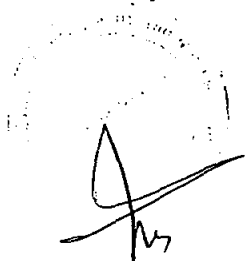
5) Establishment of the Pakistan Environmental Protection Agency



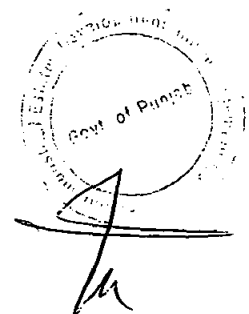
- (1) The Federal Government shall, by notification in the official Gazette, establish the Pakistan Environmental Protection Agency, to exercise the powers and perform the functions assigned to it under the provisions of this Act and the rules and regulations made thereunder.
- (2) The Federal Agency shall be headed by a Director General, who shall be appointed by the Federal Government on such terms and conditions as it may determine.
- (3) The Federal Agency shall have such administrative, technical and legal staff as the Federal Government may specify, to be appointed in accordance with such procedure as may be prescribed.
- (4) The powers and function of the Federal Agency shall be exercised and performed by the Director General.
- (5) The Director General may, by general or special order, delegate any of these powers and functions to staff appointed under sub-section (3)
- (6) For assisting the Federal Agency in the discharge of its functions, the Federal Government shall establish Advisory Committees for various sectors, and appoint as members thereof eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

6) Functions of the Federal Agency

- (1) The Federal Agency shall-
- (a) administer and implement the provisions of this Act and the rules and regulations made thereunder;
 - (b) prepare, in coordination with the appropriate Government Agency and in consultation with the concerned sectoral Advisory Committees, national environmental policies for approval by the Council;
 - (c) take all necessary measures for the implementation of the national environmental policies approved by the Council;
 - (d) prepare and publish an annual National Environment Report on the state of the environment;

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- (e) prepare or revise, and establish the National Environment Quality Standards with approval of the Council; Provided that before seeking approval of the Council, the Federal Agency shall publish the proposed National Environmental Quality Standards for public opinion in accordance with the prescribed procedure;
- (f) ensure enforcement of the National Environmental Quality Standards;
- (g) establish standards for the quality of the ambient air, water and land, by notification in the official Gazette, in consultation with the Provincial Agency concerned;
- Provided that
- (i) different standards for discharge or emission from different sources and for different areas and conditions may be specified;
 - (ii) where standards are less stringent than the National Environmental Quality Standards, prior approval of the Council shall be obtained;
 - (iii) certain areas, with the approval of the Council, may exclude from carrying out specific activities, projects from the application of such standards;
- (h) co-ordinate environmental policies and programmes nationally and internationally;
- (i) establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors;
- (j) take measures to promote research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and sustainable development;
- (k) certify one or more laboratories as approved laboratories for conducting tests and analysis and one or more research institutes as environmental research institutes for conducting research and investigation, for the purposes of this Act;
- (l) identify the needs for, and initiate legislation in various sectors of the environment;
- (m) render advice and assistance in environmental matters, including such information and data available with it as may be required for carrying out the purposes of this Act;



Provided that the disclosure of such information shall be subject to the restrictions contained in the proviso to sub-section (3) of section 12;

(n) assist the local councils, local authorities, Government Agencies and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the standards established by it;

(o) provide information and guidance to the public on environmental matters;

(p) recommend environmental courses, topics, literature and books for incorporation in the curricula and syllabi of educational institutions;

(q) promote public education and awareness of environmental issues through mass media and other means, including seminars and workshops;

(r) specify safeguards for the prevention of accidents and disasters which may cause pollution, collaborate with the concerned person in the preparation of contingency plans for control of such accidents and disasters, and co-ordinate implementation of such plans;

(s) encourage the formation and working of non-governmental organizations, community organizations and village organizations to prevent and control pollution and promote sustainable development;

(t) take or cause to be taken all necessary measures for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development; and

(u) perform any function which the Council may assign to it.

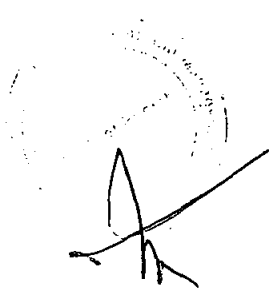
(2) The Federal Agency may-

(a) undertake inquiries or investigation into environmental issues, either of its own accord or upon complaint from any person or organization;

(b) request any person to furnish any information or data relevant to its functions;

(c) initiate with the approval of the Federal Government, requests for foreign assistance in support of the purposes of this Act and enter into arrangements with foreign agencies or organizations for the exchange of material or information and participate in international seminars or meetings;

(d) recommend to the Federal Government the adoption of financial and fiscal programmes,

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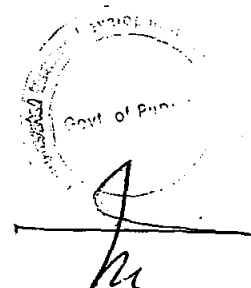
schemes or measures for achieving environmental objectives and goals and the purposes of this Act, including:

- (i) incentives, prizes, awards, subsidies, tax exemptions, rebates and depreciation allowances; and
- (ii) taxes, duties, cesses and other levies;
- (e) establish and maintain laboratories to help in the performance of its functions under this Act and to conduct research in various aspects of the environment and provide or arrange necessary assistance for establishment of similar laboratories in the private sector; and
- (f) provide or arrange, in accordance with such procedures as may be prescribed, financial assistance for projects designed to facilitate the discharge of its functions.

7) Powers of the Federal Agency

Subject to the provisions of this Act, the Federal Agency may-

- (a) lease, purchase, acquire, own, hold, improve, use or otherwise deal in and with any property both movable and immovable;
- (b) sell, convey, mortgage, pledge, exchange or otherwise dispose of its property and assets;
- (c) fix and realize fees, rates and charges for rendering any service or providing any facility, information or data under this Act or the rules and regulations made thereunder;
- (d) enter into contracts, execute instruments, incur liabilities and do all acts or things necessary for proper management and conduct of its business;
- (e) appoint with the approval of the Federal Government and in accordance with such procedures as may be prescribed, such advisers, experts and consultants as it considers necessary for the efficient performance of its functions on such terms and conditions as it may deem fit;
- (f) summon and enforce the attendance of any person and require him to supply any information or document needed for the conduct of any enquiry or investigation into any environmental issue;
- (g) enter and inspect and under the authority of a search warrant issued by the Environmental Tribunal or Environmental Magistrate, search at any reasonable time, any land, building, premises, vehicle or vessel or other place where or in which, there are reasonable grounds to believe that an offence under this Act has been or is being committed;



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(h) take samples of any materials, products, articles or substances or of the effluents, wastes or air pollutants being discharged or emitted or of air, water or land in the vicinity of the discharge or emission;

(i) arrange for test and analysis of the samples at a certified laboratory;

(j) confiscate any article used in the commission of the offence where the offender is not known or cannot be found within a reasonable time:

Provided that the power under clauses (f), (h), (i) and (j) shall be exercised in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898), or the rules made under this Act and under the direction of the Environmental Tribunal or Environmental Magistrate; and

(k) establish a National Environmental Coordination Committee comprising the Director-General as its chairman and the Director-Generals of the Provincial Environmental Protection Agencies and such other persons as the Federal Government may appoint as its members to exercise such powers and perform such functions as may be delegated or assigned to it by the Federal Government for carrying out the purposes of this Act and for ensuring inter-provincial co-ordination in environmental policies;

8) Establishment, Powers and Functions of the Provincial Environmental Protection Agencies

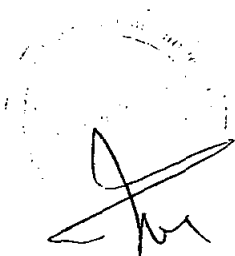
(1) Every Provincial Government shall, by notification in the official Gazette, establish an Environmental Protection Agency, to exercise such powers and perform such functions as may be delegated to it by the Provincial Government under sub-section (2) of section 26.

(2) The Provincial Agency shall be headed by a Director-General who shall be appointed by the Provincial Government on such terms and conditions as it may determine.

(3) The Provincial Agency shall have such administrative, technical and legal staff as the Provincial Government may specify, to be appointed in accordance with such procedure as may be prescribed.

(4) The powers and functions of the Provincial Agency shall be exercised and performed by the Director-General.

(5) The Director-General may, by general or special order, delegate any of these powers and functions to staff appointed under sub-section (3).

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(6) For assistance of the Provincial Agency in the discharge of its functions, the Provincial Government shall establish sectoral Advisory Committees for various sectors and appoint members from amongst eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

9) Establishment of the Provincial Sustainable Development Funds

(1) There shall be established in each Province a Sustainable Development Fund.

(2) The Provincial Sustainable Development Fund shall be derived from the following sources, namely;

(a) grants made or loans advanced by the Federal Government or the Provincial Governments;

(b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, national or international agencies, and non-governmental organizations; and

(c) contributions from private organizations, and other persons.

(3) The Provincial Sustainable Development Fund shall be utilized in accordance with such procedure as may be prescribed for:

(a) providing financial assistance to the projects designed for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, the sustainable development of resources and for research in any specified aspect of environment; and

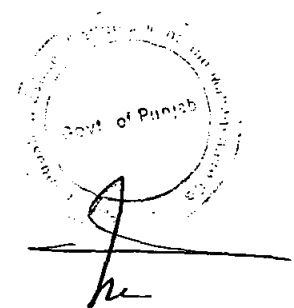
(b) any other purpose which in the opinion of the Board will help achieve environmental objectives and the purpose of this Act.

10) Management of the Provincial Sustainable Development Fund

(1) The Provincial Sustainable Development Fund shall be managed by a Board known as the Provincial Sustainable Development Fund Board consisting of:

i) Chairman, Planning and Development Board/Additional
Chief Secretary Planning and Development Department.

Chairperson



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(ii) such officers of the Provincial Governments not exceeding **Members**
six as the Provincial Government may appoint, including
Secretaries in charge of the Finance, Industries and
Environment Departments.

(iii) such non-official persons not exceeding ten as the Provincial **Members**
Government may appoint including representatives of the Provincial
Chamber of Commerce and Industry, non-governmental organizations,
and major donors.

(iv) Director-General of the Provincial Agency. **Member/Secretary**

(2) In accordance with such procedure and such criteria as may be prescribed, the Board shall have the power to:

- (a) sanction financial assistance for eligible projects;
- (b) invest moneys held in the Provincial Sustainable Development Fund in such profit-bearing Government bonds, savings schemes and securities as it may deem suitable; and
- (c) take such measures and exercise such powers as may be necessary for utilization of the Provincial Sustainable Development Fund for the purposes specified in sub-section (3) of section 9.

(3) The Board shall constitute committees of its members to undertake regular monitoring of project financed from the Provincial Sustainable Development Fund and to submit progress reports to the Board which shall publish an Annual Report incorporating its annual audited accounts, and performance evaluation based on the progress reports.

11) Prohibition of Certain Discharges or Emissions

(1) Subject to the provisions of this Act and the rules and regulations made thereunder no person shall discharge or emit or allow the discharge or emission of any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess of the National Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6.

(2) The Federal Government levy a pollution charge on any person who contravenes or fails to comply with the provisions



of sub-section (1), to be calculated at such rate, and collected in accordance with such procedure as may be prescribed.

(3) Any person who pays the pollution charge levied under sub-section (2) shall not be charged with an offence with respect to that contravention or failure.

(4) The provisions of sub-section (3) shall not apply to projects which commenced industrial activity on or after the thirtieth day of June, 1994.

12) Initial Environmental Examination and Environmental Impact Assessment

(1) No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Federal Agency approval in respect thereof.

(2) The Federal Agency shall;

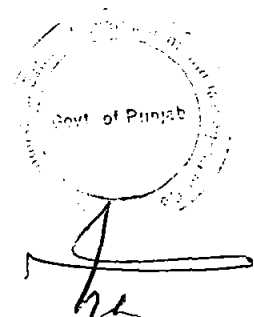
(a) review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or

(b) review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.

(3) Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to:

(i) trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial, scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director-General of the Federal Agency is of the opinion that the request for confidentiality is not well-founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or

(ii) international relations, national security or maintenance of law and order, except with the



consent of the Federal Government; or

(iii) matters covered by legal professional privilege.

(4) The Federal Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations made thereunder.

(5) Subject to sub-section (4) the Federal Government may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

(6) The provisions of sub-section (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.

(7) The Federal Agency shall maintain separate Registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such Registers shall be subject to the restrictions specified in sub-section (3).

13) Prohibition of Import of Hazardous Waste

No person shall import hazardous waste into Pakistan and its territorial waters, Exclusive Economic Zone and historic waters.

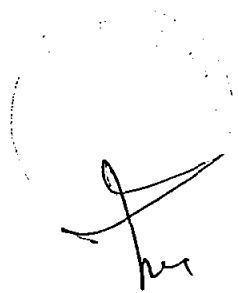
14) Handling of Hazardous Substances

Subject to the provisions of this Act, no person shall generate, collect, consign, transport, treat, dispose of, store, handle or import any hazardous substance except;

(a) under a licence issued by the Federal Agency and in such manner as may be prescribed;

or

(b) in accordance with the provisions of any other law for the time being in force, or of any



international treaty, convention, protocol, code, standard, agreement or other instrument to which Pakistan is a party.

15) Regulation of Motor Vehicles

(1) Subject to the provisions of this Act and the rules and regulations made thereunder, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the National Environmental Quality Standards, or where applicable the standards established under clause (g) of sub-section (1) of section 6.

(2) For ensuring compliance with the standards mentioned in sub-section (1), the Federal Agency may direct that any motor vehicle or class of vehicles shall install such pollution control devices or other equipment or use such fuels or undergo such maintenance or testing as may be prescribed.

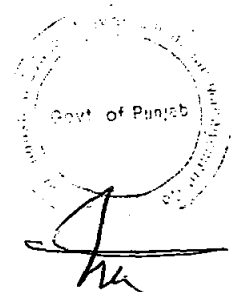
(3) Where a direction has been issued by the Federal Agency under sub-section (2) in respect of any motor vehicles or class of motor vehicles, no person shall operate any such vehicle till such direction has been complied with.

16) Environmental Protection Order

(1) Where the Federal Agency or a Provincial Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring or has occurred in violation of the provisions of this Act, rules or regulations or of the conditions of a licence, and is likely to cause, or is causing or has caused an adverse environmental effect, the Federal Agency or, as the case may be, the Provincial Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order direct such person to take such measures that the Federal Agency or Provincial Agency may consider necessary within such period as may be specified in the order.

(2) In particular and without prejudice to the generality of the foregoing power, such measures may include:

(a) immediate stoppage, preventing, lessening or controlling the discharge, emission, disposal, handling, act or omission, or to minimize or remedy the adverse environmental



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effect;

(b) installation, replacement or alteration of any equipment or thing to eliminate or control or abate on a permanent or temporary basis, such discharge, emission, disposal, handling, act or omission;

(c) action to remove or otherwise dispose of the effluent, waste, air pollutant, noise, or hazardous substances; and

(d) action to restore the environment to the condition existing prior to such discharge, disposal, handling, act or omission, or as close to such condition as may be reasonable in the circumstances, to the satisfaction of the Federal Agency or Provincial Agency.

(3) Where the person, to whom directions under sub-section (1) are given, does not comply therewith, the Federal Agency or Provincial Agency may, in addition to the proceeding initiated against him under this Act or the rules and regulations, itself take or cause to be taken such measures specified in the order as it may deem necessary, and may recover the costs of taking such measures from such person as arrears of land revenue.

17) Penalties

(1) Whoever contravenes or fails to comply with the provisions of section 11, 12, 13, or section 16 or any order issued thereunder shall be punishable with fine which may extend to one million rupees, and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues and where such contravention or failure continues: Provided that if contravention of the provisions of section 11 also constitutes contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2) only.

(2) Whoever contravenes or fails to comply with the provisions of section 14 or 15 or any rule or regulation or conditions of any licence, any order or direction issued by the Council or by the Federal Agency or Provincial Agency shall be punishable with fine which may extend to one hundred thousand rupees, and in case of continuing contravention, or failure with an additional fine which extend to one thousand rupees for every day during which such contravention continues.

(3) Where an accused has been convicted of an offence under sub-section (1) and (2), the Environmental Tribunal and Environmental Magistrate shall, in passing sentence, take into



account the extent and duration of the contravention or failure constituting the offence, and the attendant circumstances.

(4) Where an accused has been convicted of an offence under sub-section (1) and the Environmental Tribunal is satisfied that as a result of the commission of the offence monetary benefits have accrued to the offender, the Environmental Tribunal may order the offender to pay, in addition to the fines under sub-section (1), further additional fine commensurate with the amount of the monetary benefits.

(5) Where a person convicted under sub-section (1) or sub-section (2), and had been previously convicted for any contravention under this act, the Environmental Tribunal or, as the case may be, Environmental Magistrate may, in addition to the punishment awarded thereunder:

(a) endorse a copy of the order of conviction to the concerned trade or industrial association, if any, or the concerned Provincial Chamber of Commerce and Industry or the Federation of Pakistan Chambers of Commerce and Industry;

(b) sentence him to imprisonment for a term which may extend upto two years;

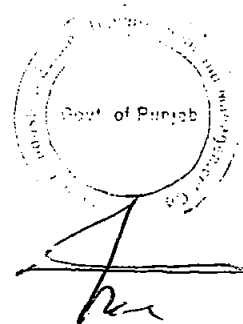
(c) order the closure of the factory;

(d) order confiscation of the factory, machinery, and equipment, vehicle, material or substance, record or document or other object used or involved in contravention of the provisions of the Act; Provided that for a period of three years from the date of commencement of this Act the sentence of imprisonment shall be passed only in respect of persons who have been previously convicted for more than once for any contravention of sections 11, 13, 14 or 16 involving hazardous waste.

(e) order, such person to restore the environment at his own cost, to the conditions existing prior to such contravention or as close to such conditions as may be reasonable in the circumstances to the satisfaction of the Federal Agency or, as the case may be, Provincial Agency; and

(f) order that such sum be paid to any person as compensation for any loss, bodily injury, damage to his health or property suffered by such contravention.

(6) The Director-General of the Federal Agency or of a Provincial Agency or an officer generally or specially authorized by him in this behalf may, on the application of the accused compound an offence under this Act with the permission of the Environmental Tribunal or Environmental Magistrate in accordance with such procedure as may be prescribed.



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(7) Where the Director-General of the Federal Agency or of a Provincial Agency is of the opinion that a person has contravened any provision of this Act, he may, subject to the rules, by notice in writing to that person require him to pay to the Federal Agency or, as the case may be, Provincial Agency an administrative penalty in the amount set out in the notice for each day the contravention continues; and a person who pays an administrative penalty for a contravention shall not be charged under this Act with an offence in respect of such contravention.

(8) The provisions of sub-sections (6) and (7) shall not apply to a person who has been previously convicted of offence or who has compounded an offence under this Act or who has paid an administrative penalty for a contravention of any provision of the is Act.

18) Offences by Bodies Corporate

Where any contravention of this Act has been committed by a body corporate, and it is proved that such offence has been committed with the consent or connivance or, is attributed to any negligence on the part of, any director, partner, manager, secretary or other officer of the body corporate, such director, partner, manager, secretary or other officer of the body corporate, shall be deemed guilty of such contravention along with the body corporate and shall be punished accordingly:

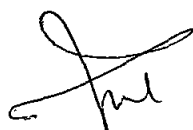
Provided that in the case of a company as defined under the Companies Ordinance, 1984 (XLVII of 1984), only the Chief Executive as defined in the said Ordinance shall be liable under this section.

Explanation:

For the purpose of this section, "body corporate" includes a firm, association of persons and a society registered under the Societies Registration Act, 1860 (XXI of 1860), or under the Co-operative Societies Act, 1925 (VII of 1925).

19) Offences by Government Agencies, Local Authorities or Local Councils

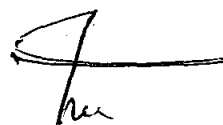
Where any contravention of this Act has been committed by any Government Agency, local authority or local council, and it is proved that such contravention has been committed with the consent or connivance of, or is attributable to any negligence on the part of the Head or any other



officer of the Government Agency, local authority or local council, such Head or other officer shall also be deemed guilty of such contravention alongwith the Government Agency, local authority or local council and shall be liable to be proceeded against and punished accordingly.

20) Environmental Tribunals

- (1) The Federal Government may, by notification in the official Gazette, establish as many Environmental Tribunals as it considers necessary and, where it establishes more than one Environmental Tribunal, it shall specify territorial limits within which, or the class of cases in respect of which, each one of them shall exercise jurisdiction under this Act.
- (2) An Environmental Tribunal shall consist of a Chairperson who is, or has been, or is qualified for appointment as, a Judge of the High Court to be appointed after consultation with the Chief Justice of the High Court and two members to be appointed by the Federal Government of which at least one shall be a technical member with suitable professional qualifications and experience in the environmental field as may be prescribed.
- (3) For every sitting of the Environmental Tribunal, the presence of the Chairperson and not less than one Member shall be necessary.
- (4) A decision of an Environmental Tribunal shall be expressed in terms of the opinion of the majority of its members, including the Chairperson, or if the case has been decided by the Chairperson and only one of the members and there is a difference of opinion between them, the decision of the Environmental Tribunal shall be expressed in terms of the opinion of the chairperson.
- (5) An Environmental Tribunal shall not, merely by reason of a change in its composition, or the absence of any member from any sitting, be bound to recall and rehear any witness who has given evidence, and may act on the evidence already recorded by, or produced, before it.
- (6) An Environmental Tribunal may hold its sittings at such places within its territorial jurisdiction as the Chairperson may decide.
- (7) No act or proceeding of an Environmental Tribunal shall be invalid by reason only of the existence of a vacancy in, or defect in the constitution of, the Environmental Tribunal.
- (8) The terms and conditions of service of the Chairperson and members of the Environmental Tribunal shall be such as may be prescribed.



21) Jurisdiction and Powers of Environmental Tribunals

(1) An Environmental Tribunal shall exercise such powers and perform such functions as are, or may be, conferred upon or assigned to it by or under this Act, or the rules and regulations made thereunder.

(2) All contravention punishable under sub-section (1) of section 17 shall exclusively be triable by an Environmental Tribunal.

(3) An Environmental Tribunal shall not take cognizance of any offence triable under sub-section (2) except on a complaint in writing by:

(a) the Federal Agency or any Government Agency or local council; and

(b) any aggrieved person, who has given notice of not less than thirty days to the Federal Agency or the Provincial Agency concerned of the alleged contravention and of his intention to make a complaint to the Environmental Tribunal.

(4) In exercise of its criminal jurisdiction, the Environmental Tribunal shall have the same powers as are vested in the Court of Session under the Code of Criminal Procedure, 1898 (Act V of 1898).

(5) In exercise of the appellate jurisdiction under section 22 the Environmental Tribunal shall have the same powers and shall follow the same procedure as an appellate court in the Code of Civil Procedure, 1908 (Act V of 1908).

(6) In all matters with respect to which no procedure has been provided for in this Act, the Environmental Tribunal shall follow the procedure laid down in the Code of Civil Procedure, 1908 (Act V of 1908).

(7) An Environmental Tribunal may, on application filed by any officer duly authorized in this behalf by the Director-General of the Federal Agency or Provincial Agency, issue bailable warrant for the arrest of any person against whom reasonable suspicion exists of his having been involved in contravention punishable under sub-section (1) of section 17:

Provided that such warrant shall be applied for, issued, and executed in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898):

Provided further that if the person arrested executes a bond with sufficient sureties in accordance with the endorsement on the warrant, he shall be released from custody, failing which he shall be taken or sent without delay to the officer-in-charge of the nearest police station.



(8) All proceedings before the Environmental Tribunal shall be deemed to be judicial proceedings within the meaning of sections 193 and 228 of the Pakistan Penal Code (Act XLV of 1860), and the Environmental Tribunal shall be deemed to be a court for the purposes of sections 480 and 482 of the Code of Criminal Procedure, 1898 (Act V of 1898).

(9) No court other than an Environmental Tribunal shall have or exercise any jurisdiction with respect to any matter to which the jurisdiction of an Environmental Tribunal extends under this Act or the rules and regulations made thereunder.

(10) Where the Environmental Tribunal is satisfied that a complaint made to it under sub-section (3) is false and vexatious to the knowledge of the complainant, it may, by an order, direct the complainant to pay to the person complained against such compensatory costs which may extend to one hundred thousand rupees.

22) Appeals to the Environmental Tribunal

(1) Any person aggrieved by any order or direction of the Federal Agency or any Provincial Agency under any provision of this Act and rules or regulations made thereunder may prefer an appeal with the Environmental Tribunal within thirty days of the date of communication of the impugned order or direction to such person.

(2) An appeal to the Environmental Tribunal shall be in such form, contain such particulars and be accompanied by such fees as may be prescribed.

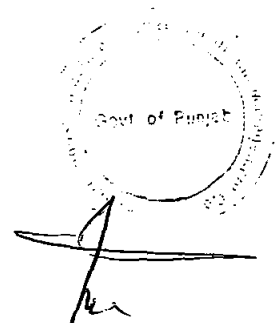
23) Appeals from Orders of the Environmental Tribunal

(1) Any person aggrieved by any final order or by any sentence of the Environmental Tribunal passed under this Act may, within thirty days of communication of such order or sentence, prefer an appeal to the High Court.

(2) An appeal under sub-section (1) shall be heard by a Bench of not less than two Judges.

24) Jurisdiction of Environmental Magistrates

(1) Notwithstanding anything contained in the Code of Criminal Procedure, 1898 (Act V of 1898), or any other law for the time being in force, but subject to the provisions of this Act, all



The image shows an official circular stamp of the Government of Punjab. The text 'Govt. of Punjab' is visible in the center. Below the stamp, there is a handwritten signature in black ink.

(b) a Provincial Agency shall be bound by the directions give to it in writing by the Provincial Government.

28) Indemnity

No suit, prosecution or other legal proceedings shall lie against the Federal or Provincial Governments, the Councils, the Federal Agency or Provincial Agencies, the Director-Generals of the Federal Agency and the Provincial Agency, members, officers, employees, experts, advisors, committees or consultants of the Federal or Provincial Agencies or the Environmental Tribunal or Environmental Magistrates or any other person for anything which is in good faith done or intended to be done under this Act or the rules or regulations made thereunder.

29) Dues Recoverable as Arrears of Land Revenues

Any dues recoverable by the Federal Agency or Provincial Agency under this Act, or the rules or regulations made thereunder shall be recoverable as arrears of land revenue.

30) Act to Override Other Laws

The provisions of the Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force.

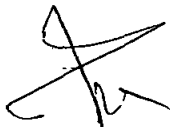
31) Power to Make Rules

The Federal Government may, by notification in the official Gazette, make rules for carrying out the purposes of this Act including rules for implementing the provisions of the international environmental agreements, specified in the Schedule to this Act.

32) Power to Amend the Schedule

The Federal Government may, by notification in the official Gazette, amend the Schedule so as to add any entry thereto or modify or omit any entry therein.

33) Power to Make Regulations



contraventions punishable under sub-section (2) of section 17 shall exclusively be triable by a judicial Magistrate of the first class as Environmental Magistrate especially empowered in this behalf by the High Court.

(2) An environmental Magistrate shall be competent to impose any punishment specified in sub-section (2) and (4) of section 17.

(3) An Environmental Magistrate shall not take cognizance of an offence triable under sub-section (1) except on a complaint in writing by:

- (a) the Federal Agency, Provincial Agency, or Government Agency or local council; and
- (b) any aggrieved person.

25) Appeals from Orders of Environmental Magistrates

Any person convicted of any contravention of this Act or the rules or regulations by an Environmental Magistrate may, within thirty days from the date of his conviction, appeal to the Court of Sessions, whose decision thereon shall be final.

26) Power to Delegate

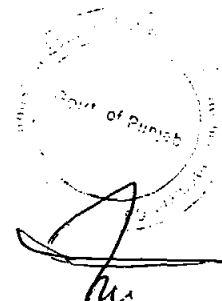
(1) The Federal Government may, by notification in the official Gazette, delegate any of its or of the Federal Agency's powers and functions under this Act and the rules and regulations made thereunder to any Provincial Government, any Government Agency, local council or local authority.

(2) The Provincial Government may, by notification in the official Gazette, delegate any of its or of the Provincial Agency's powers or functions under this Act and the rules and regulations made thereunder to any Government Agency of such Provincial Government or any local council or local authority in the Province.

27) Power to give Directions

In the performance of their function under this Act:

- (a) the Federal Agency and Provincial Agencies shall be bound by the directions give to them in writing by the Federal Government; and



- (1) For carrying out the purposes of this Act, the Federal Agency may, by notification in the official Gazette and with the approval of the Federal Government, make regulations not inconsistent with the provisions of this Act or the rules made thereunder.
- (2) In particular and without prejudice to the generality of the foregoing power, such regulations may provide for:
- (a) submission of periodical reports, data or information by any Government agency, local authority or local council in respect of environmental matters;
 - (b) preparation of emergency contingency plans for coping with environmental hazards and pollution caused by accidents, natural disasters and calamities;
 - (c) appointment of officers, advisors, experts, consultants and employees;
 - (d) levy of fees, rates and charged in respect of services rendered, actions taken and schemes implemented;
 - (e) monitoring and measurement of discharges and emissions;
 - (f) categorization of projects to which, and the manner in which, section 12 applies;
 - (g) laying down of guidelines for preparation of initial environmental examination and environmental impact assessment and Development of procedures for their filing, review and approval;
 - (h) providing procedures for handling hazardous substances; and
 - (i) installation of devices in, use of fuels by, and maintenance and testing of motor vehicles for control of air and noise pollution.

34) Repeal, Savings and Succession

- (1) The Pakistan Environmental Protection Ordinance, 1983 (XXXVII of 1983) is hereby repealed.
- (2) Notwithstanding the repeal of the Pakistan Environmental Protection Ordinance, 1983 (XXVII of 1983), any rules or regulations or appointments made, order passed, notifications issued, powers delegated, contracts entered into, proceedings commenced, rights acquired, liabilities incurred, penalties, rates, fees or charges levied, things done or action taken under any provisions of that Ordinance shall, so far as they are not inconsistent with the provisions of this Act, be deemed to have been made, passed, issued, delegated, entered into, commenced, acquired, incurred, levied, done or taken under this Act.

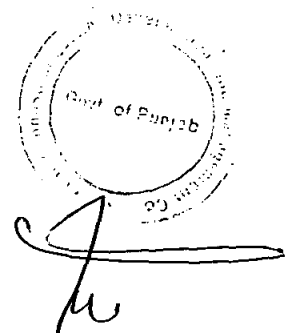


- (2) On the establishment of the Federal Agency and Provincial Agencies under this Act, all properties, assets and liabilities pertaining to the Federal Agency and Provincial Agencies established under that Ordinance shall vest in and be the properties, assets and liabilities, as the case may be, of the Federal Agency and Provincial Agency established under this Act.

SCHEDULE

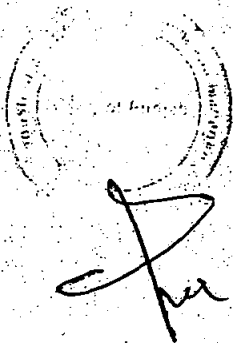
(See Section 31)

1. International Plant Protection Convention, Rome, 1951.
2. Plant Protection Agreement for the South-East Asia and Pacific Region (as amended), Rome 1956.
3. Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia (as amended), Rome, 1963.
4. Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971 and its amending Protocol, Paris, 1982.
5. Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention), Paris, 1972.
6. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973.
7. Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979.
8. Convention on the Law of the Sea, Montego Bay, 1982.
9. Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985.
10. Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987 and amendments thereto.
11. Agreement on the Network of Aquaculture Centres in Asia and the Pacific, Bangkok, 1988.
12. Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, Basel, 1989.
13. Convention on Biological Diversity, Rio De Janiero, 1992.
14. United Nations Framework Convention on Climate Change, Rio De Janiero, 1992



Annexure 3.1

**PEPA (Review of IEE & EIA) Regulations
(2000)**



**PAKISTAN ENVIRONMENTAL PROTECTION AGENCY (REVIEW OF IEE
AND EIA) REGULATIONS, 2000**

S.R.O. 339 (1)/2001. - In exercise of the powers referred by section 33 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), Pakistan Environmental Protection Agency, with the approval of the Federal Government is pleased to make the following Rules, namely : -

1. Short title and commencement

(1) These regulations may be called the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.

(2) They shall come into force at once.

2. Definitions

(1) In these regulations, unless there is anything repugnant in the subject or context -

(a) "Act" means the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997);

(b) "Director-General" means the Director-General of the Federal Agency;

(c) "EIA" means an environmental impact assessment as defined in section 2(xi);

(d) "IEE" means an initial environmental examination as defined in section 2(xxiv); and

(e) "section" means a section of the Act.

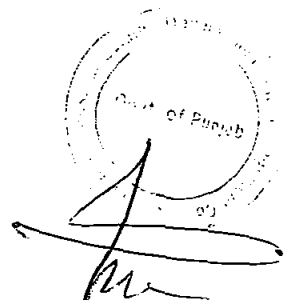
(2) All other words and expressions used in these regulations but not defined shall have the same meanings as are assigned to them in the Act.

3. Projects requiring an IEE

A proponent of a project falling in any category listed in Schedule I shall file an IEE with the Federal Agency, and the provisions of section 12 shall apply to such project.

4. Projects requiring an EIA

A proponent of a project falling in any category listed in Schedule II shall file an EIA with the Federal Agency, and the provisions of section 12 shall apply to such project.



5. Projects not requiring an IEE or EIA

- (1) A proponent of a project not falling in any category listed in Schedules I and II shall not be required to file an IEE or EIA:

Provided that the proponent shall file –

- (a) an EIA, if the project is likely to cause an adverse environmental effect;
- (b) for projects not listed in Schedules I and II in respect of which the Federal Agency has issued guidelines for construction and operation, an application for approval accompanied by an undertaking and an affidavit that the aforesaid guidelines shall be fully complied with.
- (2) Notwithstanding anything contained in sub-regulation (1), the Federal Agency may direct the proponent of a project, whether or not listed in Schedule I or II, to file an IEE or EIA, for reasons to be recorded in such direction:
- Provided that no such direction shall be issued without the recommendation in writing of the Environmental Assessment Advisory Committee constituted under Regulation 23.
- (3) The provisions of section 12 shall apply to a project in respect of which an IEE or EIA is filed under sub-regulation (1) or (2).

6. Preparation of IEE and EIA

- (1) The Federal Agency may issue guidelines for preparation of an IEE or an EIA, including guidelines of general applicability, and sectoral guidelines indicating specific assessment requirements for planning, construction and operation of projects relating to particular sector.
- (2) Where guidelines have been issued under sub-regulation (1), an IEE or EIA shall be prepared, to the extent practicable, in accordance therewith and the proponent shall justify in the IEE or EIA any departure therefrom.

7. Review Fees

The proponent shall pay, at the time of submission of an IEE or EIA, a non-refundable Review Fee to the Federal Agency, as per rates shown in Schedule III.

8. Filing of IEE and EIA

- (1) Ten paper copies and two electronic copies of an IEE or EIA shall be filed with the Federal Agency.

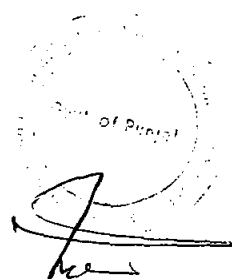
- (2) Every IEE and EIA shall be accompanied by –
 - (a) an application, in the form prescribed in Schedule IV; and
 - (b) copy of receipt showing payment of the Review Fee.

9. Preliminary scrutiny

- (1) Within 10 working days of filing of the IEE or EIA, the Federal Agency shall –
 - (a) confirm that the IEE or EIA is complete for purposes of initiation of the review process; or
 - (b) require the proponent to submit such additional information as may be specified; or
 - (c) return the IEE or EIA to the proponent for revision, clearly listing the points requiring further study and discussion.
- (2) Nothing in sub-regulation (1) shall prohibit the Federal Agency from requiring the proponent to submit additional information at any stage during the review process.

10. Public participation

- (1) In the case of an EIA, the Federal Agency shall, simultaneously with issue of confirmation of completeness under clause (a) of sub-regulation (1) of Regulation 9, cause to be published in any English or Urdu national newspaper and in a local newspaper of general circulation in the area affected by the project, a public notice mentioning the type of project, its exact location, the name and address of the proponent and the places at which the EIA of the project can, subject to the restrictions in sub-section (3) of section 12, be accessed.
- (2) The notice issued under sub-regulation (1) shall fix a date, time and place for public hearing of any comments on the project or its EIA.
- (3) The date fixed under sub-regulation (2) shall not be earlier than 30 days from the date of publication of the notice.
- (4) The Federal Agency shall also ensure the circulation of the EIA to the concerned Government Agencies and solicit their comments thereon.
- (5) All comments received by the Federal Agency from the public or any Government Agency shall be collated, tabulated and duly considered by it before decision on the EIA.



- (b) before commencing operation of the project, obtain from the Federal Agency written confirmation that the conditions of approval, and the requirements in the IEE/EIA relating to design and construction, adoption of mitigatory and other measures and other relevant matters, have been duly complied with.

14. Confirmation of compliance

(1) The request for confirmation of compliance under clause (b) of sub-regulation (2) of Regulation 13 shall be accompanied by an Environmental Management Plan indicating the measures and procedures proposed to be taken to manage or mitigate the environmental impacts for the life of the project, including provisions for monitoring, reporting and auditing.

(2) Where a request for confirmation of compliance is received from a proponent, the Federal Agency may carry out such inspection of the site and plant and machinery and seek such additional information from the proponent as it may deem fit:

Provided that every effort shall be made by the Federal Agency to provide the requisite confirmation or otherwise within 15 days of receipt of the request, with complete information, from the proponent.

(3) The Federal Agency may, while issuing the requisite confirmation of compliance, impose such other conditions as the Environmental Management Plan, and the operation, maintenance and monitoring of the project as it may deem fit, and such conditions shall be deemed to be included in the conditions to which approval of the project is subject.

15. Deemed approval

The four-month period for communication of decision stipulated in sub-section (4) of section 12 shall commence from the date of filing of an IEE or EIA in respect of which confirmation of completeness is issued by the Federal Agency under clause (a) of sub-regulation (1) of Regulation 9.

16. Extension in review period

Where the Federal Government in a particular case extends the four-month period for communication of approval prescribed in sub-section (5) of section 12, it shall, in consultation with the Federal Agency, indicate the various steps of the review process to be taken during the extended period, and the estimated time required for each step.

17. Validity period of approval

(1) The approval accorded by a Federal Agency under section 12 read with Regulation 12 shall be valid, for commencement of construction, for a period of three years from the date of issue.

(2) If construction is commenced during the initial three year validity period, the validity of the approval shall stand extended for a further period of three years from the date of issue.

(3) After issue of confirmation of compliance, the approval shall be valid for a period of three years from the date thereof.

(4) The proponent may apply to the Federal Agency for extension in the validity periods mentioned in sub-regulations (1), (2) and (3), which may be granted by the Federal Agency in its discretion for such period not exceeding three years at a time, if the conditions of the approval do not require significant change:

Provided that the Federal Agency may require the proponent to submit a fresh IEE or EIA, if in its opinion changes in location, design, construction and operation of the project so warrant.

18. Entry and inspection

(1) For purposes of verification of any matter relating to the review or to the conditions of approval of an IEE or EIA prior to, during or after commencement of construction or operation of a project, duly authorized staff of the Federal Agency shall be entitled to enter and inspect the project site, factory building and plant and equipment installed therein.

(2) The proponent shall ensure full cooperation of the project staff at site to facilitate the inspection, and shall provide such information as may be required by the Federal Agency for this purpose and pursuant thereto.

19. Monitoring

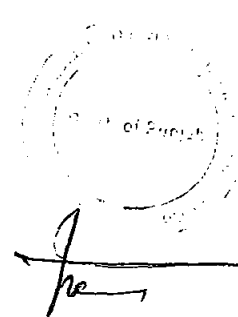
(1) After issue of approval, the proponent shall submit a report to the Federal Agency on completion of construction of the project.

(2) After issue of confirmation of compliance, the proponent shall submit an annual report summarizing operational performance of the project, with reference to the conditions of approval and maintenance and mitigatory measures adopted by the project.

(3) To enable the Federal Agency to effectively monitor compliance with the conditions of approval, the proponent shall furnish such additional information as the Federal Agency may require.

20. Cancellation of approval

(1) Notwithstanding anything contained in these Regulations, if, at any time, on the basis of information or report received or inspection carried out, the Federal Agency is of the opinion that the conditions of an approval have not been complied with, or that the information supplied by a proponent in the approved IEE or EIA is incorrect, it



shall issue notice to the proponent to show cause, within two weeks of receipt thereof, why the approval should not be cancelled.

(2) If no reply is received or if the reply is considered unsatisfactory, the Federal Agency may, after giving the proponent an opportunity of being heard:

(i) require the proponent to take such measures and to comply with such conditions within such period as it may specify, failing which the approval shall stand cancelled; or

(ii) cancel the approval.

(3) On cancellation of the approval, the proponent shall cease construction or operation of the project forthwith.

(4) Action taken under this Regulation shall be without prejudice to any other action that may be taken against the proponent under the Act or rules or regulations or any other law for the time being in force.

21. Registers of IEE and EIA projects

Separate Registers to be maintained by the Federal Agency for IEE and EIA projects under sub-section (7) of section 12 shall be in the form prescribed in Schedule VIII.

22. Environmentally sensitive areas

(1) The Federal Agency may, by notification in the official Gazette, designate an area to be an environmentally sensitive area.

(2) Notwithstanding anything contained in Regulations 3, 4 and 5, the proponent of a project situated in an environmentally sensitive area shall be required to file an EIA with the Federal Agency.

(3) The Federal Agency may from time to time issue guidelines to assist proponents and other persons involved in the environmental assessment process to plan and prepare projects located in environmentally sensitive areas.

(4) Where guidelines have been issued under sub-regulation (3), the projects shall be planned and prepared, to the extent practicable, in accordance therewith and any departure therefrom justified in the EIA pertaining to the project.

23. Environmental Assessment Advisory Committee

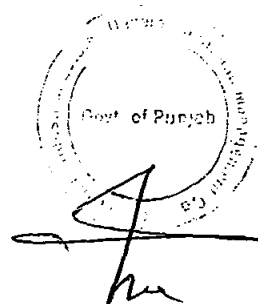
For purposes of rendering advice on all aspects of environmental assessment, including guidelines, procedures and categorization of projects, the Director-General shall constitute an Environmental Assessment Advisory Committee comprising –

(a) Director EIA, Federal Agency ... Chairman

- | | | | |
|-----|--|-----|---------|
| (b) | One representative each of the Provincial Agencies | ... | Members |
| (c) | One representative each of the Federal Planning Commission and the Provincial Planning and Development Departments | ... | Members |
| (d) | Representatives of industry and non-Governmental organizations, and legal and other experts | ... | Members |

24. Other approvals

Issue of an approval under section 12 read with Regulation 12 shall not absolve the proponent of the duty to obtain any other approval or consent that may be required under any law for the time being in force.



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SCHEDULE I
(See Regulation 3)

List of projects requiring an IEE

A. Agriculture, Livestock and Fisheries

1. Poultry, livestock, stud and fish farms with total cost more than Rs.10 million
2. Projects involving repacking, formulation or warehousing of agricultural products

B. Energy

1. Hydroelectric power generation less than 50 MW
2. Thermal power generation less than 200 KW
3. Transmission lines less than 11 KV, and large distribution projects
4. Oil and gas transmission systems
5. Oil and gas extraction projects including exploration, production, gathering systems, separation and storage
6. Waste-to-energy generation projects

C. Manufacturing and processing

1. Ceramics and glass units with total cost more than Rs.50 million
2. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost less than Rs.100 million
3. Man-made fibers and resin projects with total cost less than Rs.100 million
4. Manufacturing of apparel, including dyeing and printing, with total cost more than Rs.25 million
5. Wood products with total cost more than Rs.25 million

D. Mining and mineral processing

1. Commercial extraction of sand, gravel, limestone, clay, sulphur and other minerals not included in Schedule II with total cost less than Rs.100 million
2. Crushing, grinding and separation processes

3. Smelting plants with total cost less than Rs.50 million

E. Transport

1. Federal or Provincial highways (except maintenance, rebuilding or reconstruction of existing metalled roads) with total cost less than Rs.50 million
2. Ports and harbor development for ships less than 500 gross tons

F. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume less than 50 million cubic meters of surface area less than 8 square kilometers
2. Irrigation and drainage projects serving less than 15,000 hectares
3. Small-scale irrigation systems with total cost less than Rs.50 million

G. Water supply and treatment

Water supply schemes and treatment plants with total cost less than Rs.25 million

H. Waste disposal

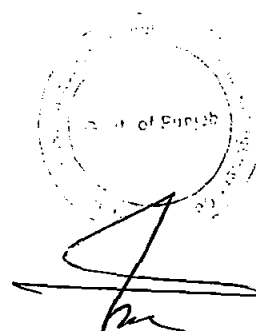
Waste disposal facility for domestic or industrial wastes, with annual capacity less than 10,000 cubic meters

I. Urban development and tourism

1. Housing schemes
2. Public facilities with significant off-site impacts (e.g. hospital wastes)
3. Urban development projects

J. Other projects

Any other project for which filing of an IEE is required by the Federal Agency under sub-regulation (2) of Regulation 5



SCHEDULE II
(See Regulation 4)

List of projects requiring an EIA

A. Energy

1. Hydroelectric power generation over 50 MW
2. Thermal power generation over 200 MW
3. Transmission lines (11 KV and above) and grid stations
4. Nuclear power plans
5. Petroleum refineries

B. Manufacturing and processing

1. Cement plants
2. Chemicals projects
3. Fertilizer plants
4. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above
5. Industrial estates (including export processing zones)
6. Man-made fibers and resin projects with total cost of Rs.100 M and above
7. Pesticides (manufacture or formulation)
8. Petrochemicals complex
9. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel), printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million
10. Tanning and leather finishing projects

C. Mining and mineral processing

1. Mining and processing of coal, gold, copper, sulphur and precious stones
2. Mining and processing of major non-ferrous metals, iron and steel rolling
3. Smelting plants with total cost of Rs.50 million and above

D. Transport

1. Airports
2. Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads) with total cost of Rs.50 million and above
3. Ports and harbor development for ships of 500 gross tons and above
4. Railway works

E. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of 50 million cubic meters and above or surface area of 8 square kilometers and above
2. Irrigation and drainage projects serving 15,000 hectares and above

F. Water supply and treatment

Water supply schemes and treatment plants with total cost of Rs.25 million and above

G. Waste Disposal

1. Waste disposal and/or storage of hazardous or toxic wastes (including landfill sites, incineration of hospital toxic waste)
2. Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10,000 cubic meters

H. Urban development and tourism

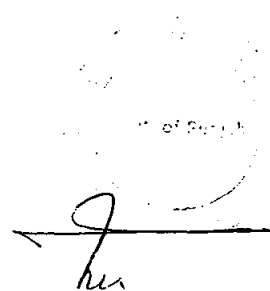
1. Land use studies and urban plans (large cities)
2. Large-scale tourism development projects with total cost more than Rs.50 million

I. Environmentally Sensitive Areas

All projects situated in environmentally sensitive areas

J. Other projects

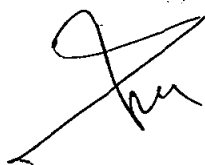
1. Any other project for which filing of an EIA is required by the Federal Agency under sub-regulation (2) of Regulation 5.
2. Any other project likely to cause an adverse environmental effect



SCHEDULE III
(See Regulation 7)

IEE/EIA Review Fees

Total Project Cost	IEE	EIA
Upto Rs.5,000,000	NIL	NIL
Rs.5,000,001 to 10,000,000	Rs.10,000	Rs.15,000
Greater than Rs.10,000,000	Rs.15,000	Rs.30,000



SCHEDULE V
[See Regulation 12]

Decision on IEE

1. Name and address of proponent _____

2. Description of project _____
3. Location of project _____
4. Date of filing of IEE _____

5. After careful review of the IEE, the Federation Agency has decided –

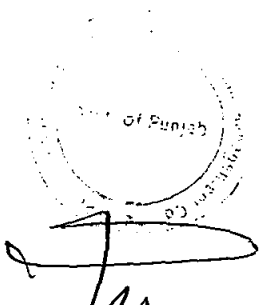
(a) to accord its approval, subject to the following conditions:

or (b) that the proponent should submit an EIA of the project, for the following reasons –

[Delete (a) or (b), whichever is inapplicable]

Dated _____

Tracking no. _____


Director-General
Federal Agency
(with official stamp/seal)

SCHEDULE IV
[See Regulation 8(2)(a)]

Application Form

1.	Name and address of proponent		Phone: Fax: Telex:	
2.	Description of project			
3.	Location of project			
4.	Objectives of project			
5.	IEE/EIA attached?	IEE/EIA : Yes/No		
6.	Have alternative sites been considered and reported in IEE/EIA?	Yes/No		
7.	Existing land use		Land requirement	
8.	Is basic site data available, or has it been measured?	(only tick yes if the data is reported in the IEE/EIA) Meterology (including rainfall) Ambient air quality Ambient water quality Ground water quality	<u>Available</u> Yes/No Yes/No Yes/No Yes/No	<u>Measured</u> Yes/No Yes/No Yes/No Yes/No
9.	Have estimates of the following been reported?	Water balance Solid waste disposal Liquid waste treatment	<u>Estimated</u> Yes/No Yes/No Yes/No	<u>Reported</u> Yes/No Yes/No Yes/No
10.	Source of power		Power requirement	
11.	Labour force (number)	Construction: Operation:		

Verification. I do solemnly affirm and declare that the information given above and contained in the attached IEE/EIA is true and correct to the best of my knowledge and belief.

Date _____

Signature, name and _____
designation of proponent
(with official stamp/seal)

SCHEDULE VI
[See Regulation 12]

Decision on EIA

1. Name and address of proponent _____

2. Description of project _____
3. Location of project _____
4. Date of filing of EIA _____
5. After careful review of the EIA, and all comments thereon, the Federation Agency has decided –

(a) to accord its approval, subject to the following conditions:

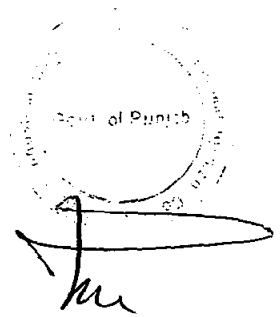
or (b) that the proponent should submit an EIA with the following modifications-

or (c) to reject the project, being contrary to environmental objectives, for the following reasons:

[Delete (a)/(b)/(c), whichever is inapplicable]

Dated _____

Tracking no. _____

The block contains an official circular stamp of the Federal Agency, with the text "Federal Agency" and "Ministry of Environment" visible. Overlaid on the stamp is a handwritten signature in dark ink.

Director-General
Federal Agency
(with official stamp/seal)

SCHEDULE VII
[See Regulation 13(2)]

Undertaking

I, (full name and address) as proponent for (name, description and location of project) do hereby solemnly affirm and declare that I fully understand and accept the conditions contained in the approval accorded by the Federal Agency bearing tracking no. _____ dated _____, and undertake to design, construct and operate the project strictly in accordance with the said conditions and the IEE/EIA.

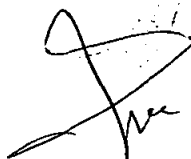
Date _____

Signature, name and _____
designation of proponent
(with official stamp/seal)

Witnesses
(full names and addresses)

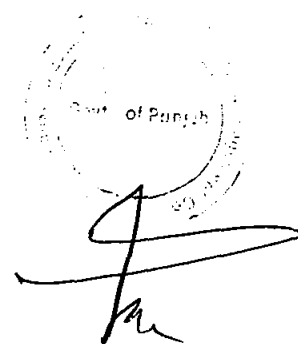
(1) _____

(2) _____

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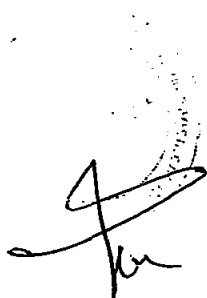
SCHEDULE VIII
(See Regulation 21)
Form of Registers for IEE and EIA projects

S. No.	Description	Relevant Provisions
1	2	3
1.	Tracking number	
2.	Category type (as per Schedules I and II)	
3.	Name of proponent	
4.	Name and designation of contact person	
5.	Name of consultant	
6.	Description of project	
7.	Location of project	
8.	Project capital cost	
9.	Date of receipt of IEE/EIA	
10.	Date of confirmation of completeness	
11.	Approval granted (Yes/No)	
12.	Date of approval granted or refused	
13.	Conditions of approval/reasons for refusal	
14.	Date of Undertaking	
15.	Date of extension of approval validity	
16.	Period of extension	
17.	Date of commencement of construction	
18.	Date of issue of confirmation of compliance	
19.	Date of commencement of operations	
20.	Dates of filing of monitoring reports	
21.	Date of cancellation, if applicable	



Annexure 3.2

**Guidelines for Self-Monitoring and
Reporting by Industry (2001)**

A handwritten signature in black ink, appearing to be 'J. K.', is located in the lower-left quadrant of the page. The signature is written over a faint, circular, dotted watermark or stamp.

S.R.O. 528 (1)/2001. - In exercise of the powers conferred by section 31 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Federal Government is pleased to make the following rules, namely: -

1. **Short title and commencement.** - (1) These rules may be called the National Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rule, 2001.

(2) They shall come into force at once.

2. **Definitions.** - (1) In these rules, unless there is anything repugnant in the subject or context, -

- (a) **Act** means the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997);
- (b) **Associated Company** and associated undertaking, shall have the same meaning as defined in the Companies Ordinance, 1984 (XLVII of 1984);
- (c) **Certified environmental laboratory** means an environmental laboratory which has been granted certification under the Pakistan Environmental Protection Agency (Certification of Environmental Laboratories) Regulations, 2000;
- (d) **Director-General** means the Director-General of the Federal Agency;
- (e) **Environmental monitoring report** means the report submitted by an industrial unit to the Federal Agency in respect of priority parameters;
- (f) **industrial unit** means any legal entity carrying on industrial activity;
- (g) **pollution level** means number of units per unit of production determined under the Pollution Charge for Industry (Calculation and Collection) Rules, 2001;
- (h) **priority parameters** means those parameters of the National Environmental Quality Standards which have been selected for purposes of submission of Environmental Monitoring Reports to the Federal Agency by an industrial unit; and
- (i) **Schedule** means the Schedule to these rules.

(2) All other words and expressions used in these rules but not defined herein shall have the same meanings as are assigned to them in the Act.

3. **Responsibility for reporting.** - All industrial units shall be responsible for correct and timely submission of Environmental Monitoring Reports to the Federal Agency.

4. **Classification of industrial units.** - On the basis of the pollution level of an industrial unit, the Director-General shall classify the unit into category "A", "B" or "C" for liquid effluents, and category "A" or "B" for gaseous emissions:

Provided that, till such time as the pollution level of an industrial unit is determined, it shall be classified according to the type of industry to which it belongs, as shown in Schedule I for liquid effluents and in Schedule II for gaseous emissions.

5. **Category "A" industrial units.** - (1) An industrial unit in category "A" shall submit Environmental Monitoring Reports on monthly basis-

(a) in respect of liquid effluents, for priority parameters listed in column 3 of Table A of Schedule III:

Provided that during start-up or upset conditions, priority parameters mentioned in column 4 of Table A of Schedule III shall be recorded on hourly basis;

(b) in respect of gaseous emissions, for priority parameters listed in Table B of Schedule III.

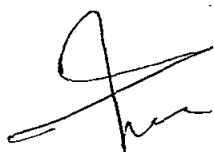
(2) An industrial unit in category "A" shall maintain a record of the times during which start-up and upset conditions occur, and shall mention the total time elapsed in such conditions in its monthly Environmental Monitoring Report.

6. **Category "B" industrial units.** - An industrial unit in category "B" shall submit Environmental Monitoring Reports on quarterly basis-

(a) in respect of liquid effluents, for priority parameters listed in Table A of Schedule IV;

(b) in respect of gaseous emissions, for priority parameters listed in Table B of Schedule IV.

7. **Category "C" industrial units.** - An industrial unit in category "C" shall submit Environmental Monitoring Reports on biannual basis for priority parameters in respect of liquid effluents listed in Schedule V.



8. **Special Industries.** - (1) Without prejudice to the provisions of rule 4, the Director-General may classify a large industrial unit with very high pollution levels as "Special Industry".

(2) In addition to complying with the requirements of rule 5, a Special Industry shall submit Environmental Monitoring Reports for such parameters and at such frequency as the Director-General may require.

9. **Environmental Monitoring Report.** - (1) An Environmental Monitoring Report shall comprise a Liquid Effluents Monitoring Report, a Gaseous Emissions Monitoring Report and a Cover Sheet which shall be in the form as set out in Forms A, B and C, respectively, of Schedule VI.

(2) All measurements of priority parameters contained in the Environmental Monitoring Report submitted by an industrial unit shall be based on test reports of a certified environmental laboratory, and attested copies of such results shall be attached with the Environmental Monitoring Report:

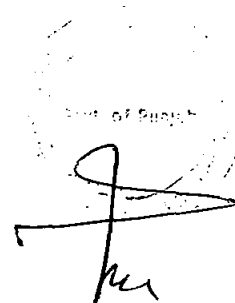
Provided that such certified environmental laboratories shall not be part of, or an associated company or associated undertaking of, the said industrial unit.

(3) The Gaseous Emissions Report shall cover the priority parameters listed in Schedule VII, and shall include, every two years, metal analysis of all gaseous emissions from the industrial unit.

10. **Sampling, testing and analysis.** - Sampling testing and analysis of effluents, gaseous emissions and waste shall be carried out in accordance with the Environmental Samples Rules, 2001.


11. **Monitoring conditions of EIA approval.** - The provisions of these rules shall be in addition to, and not in derogation of, the monitoring conditions laid down in an EIA approval.

12. **Compilation, analysis and management of data.** - The Federal Agency shall compile, analyze and manage the data contained in the Environmental Monitoring Reports with the objective, *inter alia*, of enforcing the National Environmental Quality Standards and developing an environmental database.

A handwritten signature in dark ink is written over a faint circular stamp. The signature appears to be 'J. K. Singh' or similar. The stamp is mostly illegible but seems to contain the text 'Ministry of Environment'.

Schedule I
(See rule 4)
Classification of Industrial Units for Liquid Effluents

1. Category "A"

- 
- (1) Chlor-Alkali (Mercury Cell).
 - (2) Chlor-Alkali (Diaphragm Cell).
 - (3) Metal finishing and electroplating.
 - (4) Nitrogenous fertilizer.
 - (5) Phosphate fertilizer.
 - (6) Pulp and paper.
 - (7) Pesticides formulation.
 - (8) Petroleum refining.
 - (9) Steel industry.
 - (10) Synthetic fiber.
 - (11) Tanning and leather finishing.
 - (12) Textile processing.
 - (13) Pigments and dyes.
 - (14) Thermal Power Plants (Oil Fired and Coal Fired).
 - (15) Rubber products.
 - (16) Paints, Varnishes and Lacquers.
 - (17) Pesticides.
 - (18) Printing.
 - (19) Industrial chemicals.
 - (20) Oil and Gas production.
 - (21) Petrochemicals.
 - (22) Combined effluent treatment.
 - (23) Any other industry to be specified by Federal or Provincial Agency.

2. Category "B"

- (1) Dairy industry.
- (2) Fruit and vegetable processing.
- (3) Glass manufacturing.
- (4) Sugar.
- (5) Detergent.
- (6) Photographic.
- (7) Glue manufacture.
- (8) Oil and Gas exploration.
- (9) Thermal Power Plants (Gas Fired)
- (10) Vegetable oil and ghee mills.
- (11) Woolen mills.
- (12) Plastic materials and products.
- (13) Wood and cork products.

(14) Any other industry to be specified by federal or Provincial Agency.

3. **Category "C"**

- (1) Pharmaceutical (Formulation) Industry.
 - (2) Marble Crushing.
 - (3) Cement.
 - (4) Any other industry to be specified by Federal or Provincial Agency
-

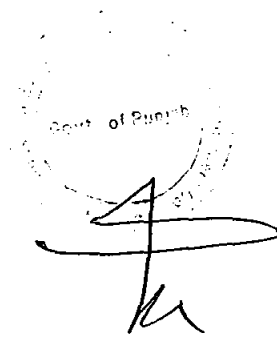
Schedule II

(See rule 4)

Classification of Industrial Units for Gaseous Emissions

1. Category "A"

- (1) Cement.
- (2) Glass manufacturing
- (3) Iron and steel.
- (4) Nitrogenous fertilizer.
- (5) Phosphate fertilizer.
- (6) Oil and Gas production.
- (7) Petroleum refining.
- (8) Pulp and paper.
- (9) Thermal Power Plants (coal and oil based)
- (10) Boilers, ovens, furnaces and kilns (coal and oil fired)
- (11) Brick-Kilns (firewood and bagasse based)
- (12) Any other industry to be specified by Federal or Provincial Agency.



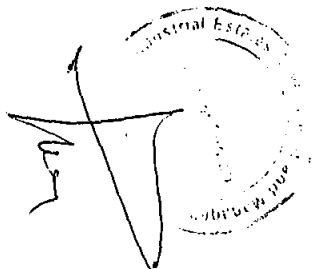
2. Category "B"

- (1) Sugar.
 - (2) Textile.
 - (3) Chloralkali plants.
 - (4) Dairy industry.
 - (5) Fruits and vegetables.
 - (6) Metal finishing and electroplating.
 - (7) Boilers, ovens, furnaces and kilns (gas-fired)
 - (8) Any other industry to be specified by Federal or Provincial Agency.
-

Schedule III
[See rule 5(1)(a) and (b)]
Table A
Category "A"
Priority Parameters for Monitoring of Liquid Effluents

S.No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Monthly Basis ¹	Priority Parameters for Start-up and Upset Conditions to be Recorded on an Hourly Basis
1.	Chlor-Alkali (Mercury Cell)	Effluent flow, Temperature, pH, TSS, Chlorine, Mercury, Chlorides	Effluent Flow, Temperature, pH, TSS, Mercury, Chlorides
2.	Chlor-Alkali (Diaphragm Cell)	Effluent Flow, Temperature, pH, TSS, Chlorine, Chlorides	Effluent Flow, Temperature, pH, TSS, Chlorides
3.	Metal Finishing and Electroplating ¹	Effluent Flow, Temperature, pH, TSS, Oil and Grease, Arsenic, Cadmium, Chromium (trivalent), Chromium (hexavalent), Lead, Nickel, Mercury, Silver Zinc, Fluorides, Cyanides	Effluent Flow, Temperature, pH, TSS,
4.	Nitrogenous Fertilizer	Effluent Flow Temperature, pH, TSS, Ammonia, COD	Effluent Flow, Temperature, pH, TSS,
5.	Phosphate Fertilizer	Effluent Flow, Temperature pH, TSS, Cadmium, Fluorides, COD	Effluent Flow, Temperature, pH, TSS,
6.	Pulp and paper	Effluent Flow, Temperature, pH, COD, TSS, TDS Sulfides, BOD5	Effluent Flow, Temperature, pH, TDS, TSS,
7.	Pesticides Formulation	Effluent Flow, Pesticides	Effluent Flow,
8.	Petroleum Refining	Effluent flow, Temperature, pH, COD, TSS, BOD5 Oil and Grease, phenolic compounds	Effluent Flow, Temperature, pH, TSS,
9.	Steel Industry ²	Effluent flow, Temperature, pH, COD, TSS, TDS, Chromium (trivalent), Iron, Oil and Grease, Cadmium Copper	Effluent Flow, Temperature, pH, TSS,
10.	Synthetic Fiber	Effluent Flow, Temperature pH, COD TSS, BOD5, Oil and Grease, Sulfides	Effluent Flow, Temperature, pH, TSS,
11.	Tanning and Leather Finishing	Effluent Flow, Temperature, pH, COD, TSS, BOD5, Sulfide, Oil and Grease, Chromium (trivalent), Chromium (hexavalent), TDS, phenolic compounds	Effluent Flow, Temperature, pH, TSS,
12.	Textile Processing	Effluent Flow, Temperature, pH, COD, TSS, TDS, BOD5, Copper, Chromium	Effluent Flow Temperature, pH, TSS,

S.No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Monthly Basis	Priority Parameters for Start-up and Upset Conditions to be Recorded on an Hourly Basis
13.	Pigments and Dyes	Effluent Flow, pH, Temperature, COD, lead, Copper, Zinc.	Effluent Flow, Temperature, pH,
14.	Thermal Power Plants (Oil fired and coal fired)	Effluent Flow, Temperature, pH, TSS, Oil and Grease	Effluent Flow, Temperature, pH, TSS
15.	Rubber Products	COD, Cadmium TSS	TSS.
16.	Paints, Varnishes & Lacquers	pH, TSS, COD, Lead, Chromium, Cadmium, Zinc, Barium.	pH, TSS
17.	Pesticides	COD, Mercury, Pesticides	COD,
18.	Printing	COD, Lead	COD,
19.	Industrial Chemicals	pH, COD, TDS, Phenolic Compounds, Cyanide, Ammonia, Cadmium*, Chromium*, Mercury*, Nickel*, Zinc*, Arsenic*,	pH, COD, TDS.
20.	Oil and Gas Production	Effluent Flow, Temperature, pH, COD, TSS, TDS, Oil and Grease, Chloride, BOD ₅ , Phenolic Compounds	Effluent Flow, Temperature, pH, TSS, TDS,
21.	Petrochemicals	Effluent Flow, Temperature pH, COD TSS, TDS, Oil and Grease, BOD ₅ , Phenolic Compounds	Effluent Flow, Temperature, pH, TSS, TDS.
1.	Industry using chromium in its cooling water system will also report chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.		
2.	Steel Industry includes steel-re-rolling mills; electric furnaces, and foundries.		
*	Priority parameters will be limited to those occurring in chemicals and raw-materials used.		



Schedule IV
[See rule 6(a) and (b)]

Table A
Category "B"
Priority Parameters for Monitoring of Liquid Effluents

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a quarterly Basis ¹
1.	Dairy Industry	Effluent Flow, Temperature, pH, BOD ₅ , TSS, TDS, Oil and Grease
2.	Fruit and Vegetable Processing	Effluent Flow, Temperature, pH, BOD ₅ , TSS, COD
3.	Glass Manufacturing	Effluent Flow, Temperature, pH, TSS, COD, Oil and Grease
4.	Sugar	Effluent Flow, Temperature, pH, BOD ₅ , TSS, COD, Oil and Grease
5.	Detergent	pH, COD, Oil and Grease, An-ionic Detergent
6.	Photographic	pH, COD, Silver, Cyanide, Fluoride
7.	Glue Manufacture	BOD, COD, pH.
8.	Oil and Gas Exploration	Effluent Flow, Temperature, pH, COD, TSS, TDS, Oil and Grease, Chloride, BOD ₅ , Phenolic compounds

1. Industry using chromium in its cooling water system will also report Chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector

Table B
Category "A"
Priority Parameters for Monitoring of Gaseous Emissions

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be reported on a Monthly basis	
		<u>Process Emission</u>	<u>Emission from fired Equipment</u>
1.	Cement	Particulates	CO, *SO _x , NO _x , Particulates
2.	Glass Manufacturing	Particulates	CO, *SO _x , NO _x , Particulates
3.	Iron and Steel	Particulates, Fluorides CO, NO _x , SO _x	
4.	Nitrogenous Fertilizers	Ammonia, Particulates	CO, *SO _x , NO _x , Particulates
5.	Phosphate Fertilizers	Ammonia, Flouride, Particulate	
6.	Oil and Gas Production	CO, *SO _x , NO _x , H ₂ S and Particulates.	
7.	Petroleum Refining	H ₂ S, NO _x , SO _x , Particulates	CO, *SO _x , NO _x , Particulates
8.	Pulp and Paper	Chlorine, SO _x	CO, *SO _x , NO _x , Particulates
9.	Thermal Power Plants (Coal and Oil based)		*SO _x , NO _x , CO, Heavy Metals and Particulates
10.	Boilers, Ovens, Furnaces and Kilns (Coal and Oil fired)		CO, NO _x , *SO _x , Particulates.
11.	Brick Kilns (Firewood and Bagasse)		CO, Particulates

1. Metal analyses of all gaseous emission would be carried out once in two years.

*Only where fuel contains hydrogen sulphide (H₂S) more than 20ppm

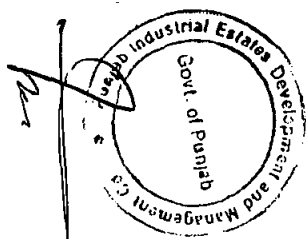


Table B
Category "B"
Priority Parameters for Monitoring of Gaseous Emission
Category "B"

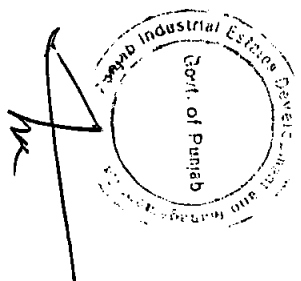
S. No.	Industry	Priority Parameters for Normal Plant Conditions to be reported on a Quarterly Basis ¹	
		Process Emission	Emission from fired Equipment
1.	Sugar	Particulates	CO, *SO _x , NO _x , Particulates
2.	Textile		CO, *SO _x , NO _x , Particulates
3.	Chloralkali Plants	Chlorine	
4.	Dairy Industry		CO, NO _x , *SO _x , Particulates
5.	Fruits and Vegetables		CO, NO _x , *SO _x , Particulates
6.	Metal Finishing and Electroplating	Particulates	
7.	Boilers, Ovens, furnaces and Kilns (Gas-fired)		CO, NO _x

1. Metal analyses of all gaseous emission would be carried out once in two years.
 *Only where fuel contains hydrogen sulphide (H₂S) more than 20ppm

Schedule V
(See rule 7)
Category "C"
Priority Parameters for Monitoring of Liquid Effluents

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a quarterly Basis ¹
1.	Pharmaceutical (formulation industry, marble crushing, Cement, and any other industry as notified by EPAs	Effluent Flow, Temperature, pH, COD, TSS, TDS,

1. Industry using chromium in its cooling water system will also report chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.



Schedule VI

FORM A

Liquid Effluents Monitoring Report

SMART Plant Database

Monitored Effluents

Normal Conditions

SMART

- Sampling Information

Date Sampling Date Sampling Time
 Location Temp. (C) Flow (m³/hr)

Reported Data

Period
 Reported Days Hrs per Day

- Laboratory

Name Address

- Sample Analysis

Ammonia <input type="text"/> mg/l	Chloride <input type="text"/> mg/l	Cod <input type="text"/> mg/l	Silver <input type="text"/> mg/l
Asiatic Detergent <input type="text"/> mg/l	Chromium Hexavalent <input type="text"/> mg/l	Manganese <input type="text"/> mg/l	Sulfide <input type="text"/> mg/l
Acetone <input type="text"/> mg/l	Chromium Trivalent <input type="text"/> mg/l	Mercaptan <input type="text"/> mg/l	TDS <input type="text"/> mg/l
Barium <input type="text"/> mg/l	COO <input type="text"/> mg/l	Nickel <input type="text"/> mg/l	Total Chromium <input type="text"/> mg/l
BOD5 <input type="text"/> mg/l	Copper <input type="text"/> mg/l	Oil and Grease <input type="text"/> mg/l	TSS <input type="text"/> mg/l
Benzene <input type="text"/> mg/l	Cyanide <input type="text"/> mg/l	Pesticides <input type="text"/> mg/l	Zinc <input type="text"/> mg/l
Cadmium <input type="text"/> mg/l	Fluoride <input type="text"/> mg/l	pH <input type="text"/>	
Cyanides <input type="text"/> mg/l	Iron <input type="text"/> mg/l	Micro-Organisms <input type="text"/>	

- Province/Plant ID

PUNJAB 1AAY

Edit

Save

Cancel

Main

Schedule VI

FORM B

Gaseous Effluents Monitoring Report

SMART Plant Database

X

Monitored Emissions

Normal Conditions

SMART

Sampling Information

Process Emission Stack ☐ Sampling Date ☐ Time ☐
 Location Flow (m³/hr)

Reported Data

Period
 Reported Days Hrs Per Day

Laboratory

Name Address

Sample Analysis

Ammonia <input type="text"/> mg/m ³	Copper <input type="text"/> mg/m ³	NO _x <input type="text"/> mg/m ³
Antimony <input type="text"/> mg/m ³	Hydrogen Fluoride <input type="text"/> mg/m ³	Particulates <input type="text"/> mg/m ³
Arsenic <input type="text"/> mg/m ³	Hydrogen Sulphide <input type="text"/> mg/m ³	Smoke <input type="text"/> Ringelman Scale
Cadmium <input type="text"/> mg/m ³	Hydrogen Chloride <input type="text"/> mg/m ³	SO _x <input type="text"/> mg/m ³
Chlorine <input type="text"/> mg/m ³	Lead <input type="text"/> mg/m ³	Zinc <input type="text"/> mg/m ³
CO <input type="text"/> mg/m ³	Mercury <input type="text"/> mg/m ³	

Province/Plant ID

PUNJAB 1AAV

Edit

Save

Cancel

Main

FORM C

Environmental Monitoring Report Cover Sheet

SMART Plant Database Registration Information

SMART

Company	
Company Name	Chief Executive
Address 1	Designation
Address 2	City Code
City	E-mail
Post Code	Phone
	Fax

Plant	
Plant Name	Contact Person
Address 1	Designation
Address 2	City Code
City	E-mail
District	Phone
	Fax

Type		
Plant Type	Total Number of Combustion Stacks	Total Number of Process Stacks
Total Number of Streams		
Plant Uses Chromium Based Chemicals for Water Treatment ? <input type="radio"/> Yes <input type="radio"/> No		

Province/Plant ID	<input type="button" value="Edit"/> <input type="button" value="Save"/> <input type="button" value="Cancel"/> <input type="button" value="Main"/>
PUNJAB 1AAV	

Schedule VII

[See rule 9(3)]

Priority Parameters for Monitoring of Gaseous Emissions

S. No.	Emission source	Priority Parameters 2 for Reporting
1.	Boiler, Ovens Furnaces and Kilns	
	Gas Fired	CO, NOx
	Oil Fired	CO, NOx, SOx, Particulates
	Coal	CO, NOx, SOx, Particulates
	Bagasse and Firewood	CO, Particulates
2.	Brick Kilns	CO, NOx, SOx, Particulates
3.	Thermal Power Plants	Sox, NOx, Particulates
4.	Process Emission ¹	Particulates Ammonia, Chlorine, H ₂ S, fluoride, SOx, NOx, Co, Mercury*, Lead*, Zinc*, Cadmium*, Arsenic*, Antimony*

1. Process emissions involving fuel combustion will also include parameters as for Boilers, Ovens, furnaces and Kilns.

2. Metal analyses of all gaseous emissions would be carried out once in two years.

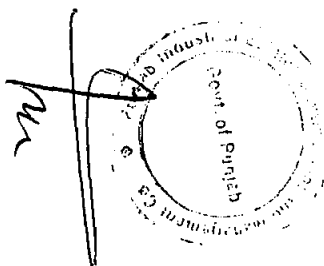
* Priority parameters will be limited to those occurring in chemicals and raw-materials used.

F. No. 14 (3)/98-TO-PEPC

(SAEED ATHAR)

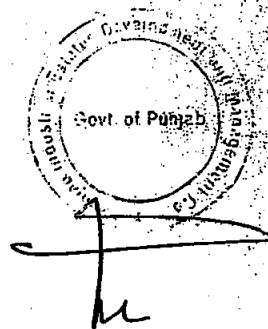
Section Officer

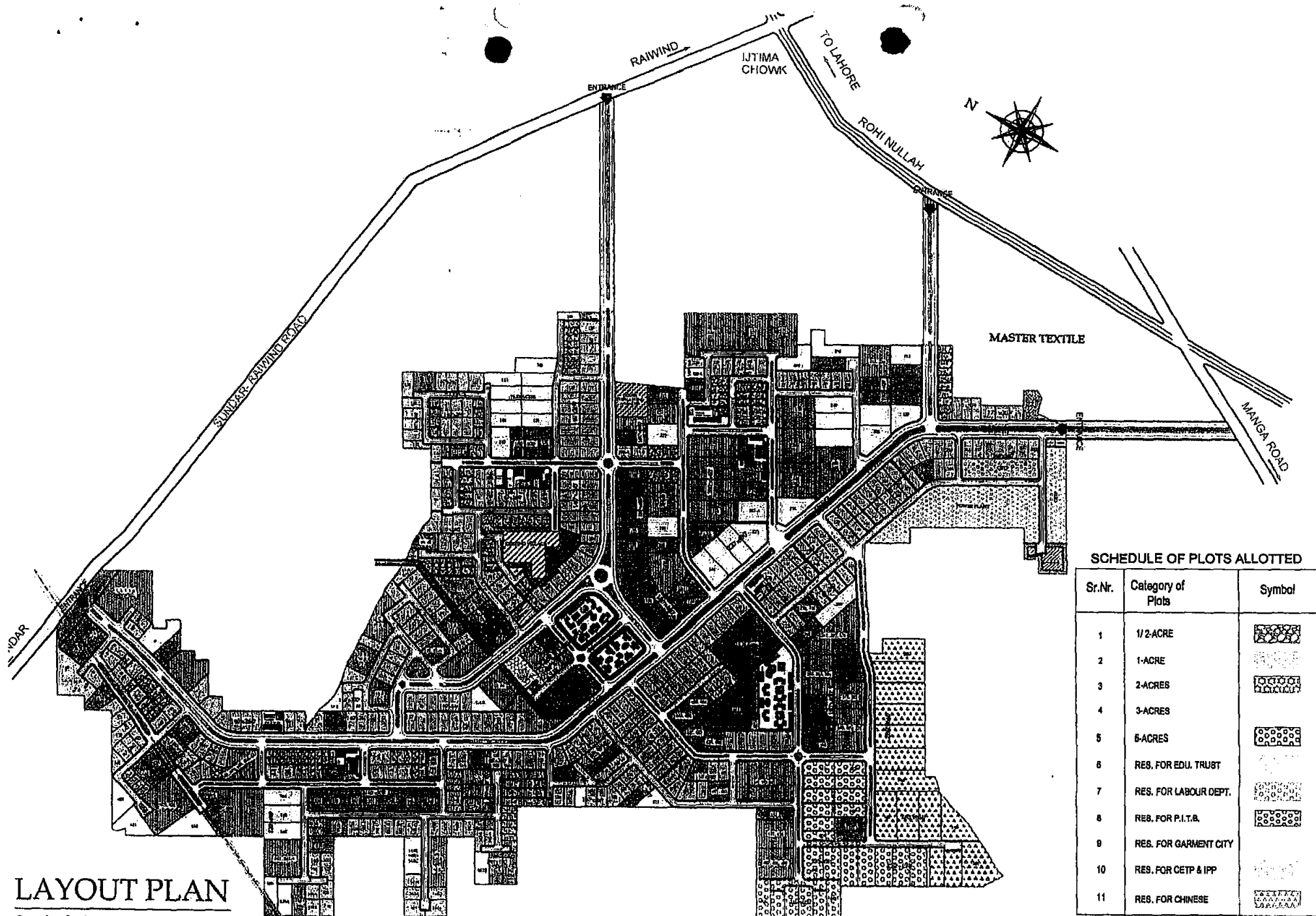
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PUBLISHED BY THE MANAGER OF PUBLICATIONS, KARACHI



Annexure 3.3

Layout Plan of the SIE





LAYOUT PLAN

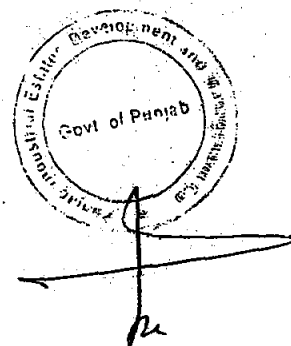
Sundar Industrial Estate (SIE)
 25-Km Railw Sundar Road, Lahore

SCHEDULE OF PLOTS ALLOTTED

Sr.Nr.	Category of Plots	Symbol
1	1/2-ACRE	
2	1-ACRE	
3	2-ACRES	
4	3-ACRES	
5	6-ACRES	
6	RES. FOR EDU. TRUST	
7	RES. FOR LABOUR DEPT.	
8	RES. FOR P.I.T.B.	
9	RES. FOR GARMENT CITY	
10	RES. FOR CETP & IPP	
11	RES. FOR CHINESE	

Annexure 3.4

Technology Selection Criteria for Effluent and Sludge Treatment



TECHNOLOGY SELECTION CRITERIA

The technology selection criteria for treatment of both effluent and sludge have been developed on the basis of findings of the physical surveys, the field visits of the operational CETPs in other countries, and the literature review. These criteria have been established against a number of technical parameters for comparative analysis of the different technologies.

A. TECHNOLOGY SELECTION CRITERIA FOR EFFLUENT TREATMENT

According to the literature, the following technologies are most commonly being used for industrial effluent treatment:

- Up-flow anaerobic sludge blanket reactor followed by the ASP
- Oxidation pond
- Trickling filter process
- Aerated lagoons
- ASP

For the CETP-SIE, we have also taken into consideration the above technologies for comparative analysis. The technical parameters along with the selection criteria are discussed in detail hereunder:

1) Land Requirement

Land requirements vary for different technologies. It is a very important factor and can be a limiting factor in many areas due to its constraints. The technologies are compared on the basis of:

Small Land Requirement	Below 20 acres (weighted score 5)
Moderate Land Requirement	21-50 acres (weighted score 3)
Large Land Requirement	More than 50 acres (weighted score 1)

2) Capital Investment

Capital investment requirements vary for different technologies. It is a very important factor as the funds available for the project can be a very big limiting factor to choose certain technology. The technologies are compared on the basis of:

Small Investment Requirement	Below Rs. 300 millions (weighted score 5)
Moderate Investment Requirement	Rs. 300-600 millions (weighted score 3)
Large Investment Requirement	More than Rs. 600 millions (weighted score 1)

3) Energy Requirement for Aeration

The energy requirement in terms of aeration intensity is defined as "the amount of energy required by technology for biodegrading the organic matter". The higher the air demand, the more will be the electric power consumption, thereby affecting the comparative efficiency of the system. Following are the categories for measuring the efficiency:

Most Efficient	No requirement of mechanical supply of air (weighted score 5)
Moderate Efficient	Below 500 watt of electricity to supply air per kg of BOD treated per hour (weighted score 3)
Least Efficient	Above 500 watt of electricity to supply air per kg of BOD treated per hour (weighted score 1)

4) Mechanical Complexity

It is defined on the basis of the technology sophistication and its operations. The more complex the plant, the higher will be the operational and maintenance cost. Following is the basis for judgment of this parameter:

Simple	Few mechanical components (weighted score 5)
Complex	A number of mechanical components (weighted score 3)
Very Complex	A large number of mechanical components (weighted score 1)

5) Frequency of Repair and Maintenance

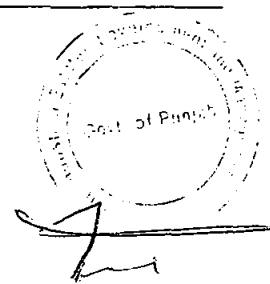
The structural and equipment depreciation vary for different technologies. The equipments requiring higher frequency of repair and maintenance incur higher costs to the project. This parameter is assessed on the following criteria:

Incidentally	Whenever required (weighted score 5)
Occasionally	2-3 years (weighted score 3)
Frequently	Yearly (weighted score 1)

5) Reactor Resilience

It is defined as "the resilience of the reactor against abnormal conditions such as power failures, organic and hydraulic shock loads." The technologies are compared on the basis of the following criteria:

Shock Loads	
Higher Resilience	Unexpected shocks bearing capacity (weighted score 5)
Medium Resilience	Expected shocks bearing capacity (weighted score 3)
Low Resilience	No shocks bearing capacity (weighted score 1)



6) Skilled Persons Requirement

The requirements for manpower skills vary depending upon the size and complexity of operations and their maintenance. The technologies are assessed according to the following criteria:

Skilled Persons Requirement	Small team of professionals is required (weighted score 5)
Highly Skilled Persons Requirement	Large team of professionals is required (weighted score 1)

7) On-site Environmental Impacts (EI) of the Plant

The impacts could be aerosol dispersion, soil infiltration, noise pollution, odor, flies and insects breeding. They are categorized on the basis of the following criteria:

Low EI	Few of the above-mentioned environmental problems prevail (weighted score 5)
High EI	Some of the above-mentioned environmental problems prevail (weighted score 3)
Very High EI	All the above-mentioned environmental problems prevail (weighted score 1)

B. TECHNOLOGY SELECTION CRITERIA FOR SLUDGE TREATMENT

Keeping in view the anticipated sludge characteristics and the physico-chemical climatic conditions at the CETP-SIE, the following technologies are taken into account for comparative analysis:

- Solid bowl centrifuge
- Belt press filter
- Recessed plate filter press
- Sludge drying beds

The technical parameters and their criteria set for carrying out comparative analysis of the above technologies are illustrated as under:

1) Efficiency

It is determined in terms of yields of solids on a dry weight basis expressed as pounds per square foot per hour (kilogram per square meter per hour). The quality of the filtered cake is measured by its solid content on a wet-weight basis expressed in percentage.

Most Efficient	More than 25 % cake solids (weighted score 5),
Moderate Efficient	15 – 25 % cake solids (weighted score 3)
Least Efficient	Less than 15 % cake solids (weighted score 1)

2) Mechanical Complexity

It is defined on the basis of the technology sophistication and its operations. The more complex the technology, the higher will be its operation and maintenance cost. The assessment is based on the following criteria:

Simplest	Negligible mechanical components (weighted score 5)
Complex	A number of mechanical components (weighted score 3)
Very Complex	A large number of mechanical components (weighted score 1)

3) Attention of Operator

Each technology has got its own design, structure and operations. Needs for attention vary for each technology. This parameter is assessed on the following criteria:

Occasionally	Twice a week (weighted score 5)
Frequently	Daily (weighted score 3)
Continuous	Full time (weighted score 1)

4) Maintenance Requirements

The structural and equipment depreciation vary for different technologies. The equipments requiring higher frequency of repair and maintenance incur higher costs to the project. This parameter is assessed on the following criteria:

Incidentally	Whenever required (weighted score 5)
Occasionally	Yearly (weighted score 3)
Frequently	On regular basis (weighted score 1)

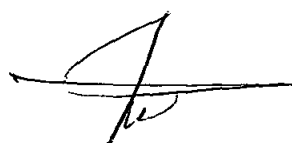
5) Energy Requirements

Energy is required to eliminate or reduce the moisture content present in the sludge and compact the sludge in the form of cakes. Higher the energy requirement for processing the sludge, higher will be the electric power consumption thereby increasing cost of the project. The criteria are given below for assessment of this parameter:

Most Efficient	No power requirement for supply of energy (weighted score 5)
Moderate Efficient	Moderate power requirement (weighted score 3)
Least Efficient	Very high power requirement (weighted score 1)

6) Land Requirement

Land requirements vary for different technologies. It is a very important factor as far as the capital cost of the whole project is concerned. The technologies are compared on the basis of the following criteria:



Small Land Requirement	Below one acre (weighted score 5)
Moderate Land Requirement	1-2 acres (weighted score 3)
Large Land Requirement	More than 10 acres (weighted score 1)

7) Skilled Persons Requirement

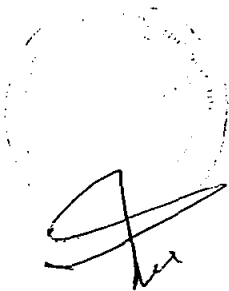
The requirements for manpower skills vary depending upon the size and complexity of operations and their maintenance. The technologies are assessed according to the following criteria:

Skilled Person Requirement	A few skilled persons required (weighted score 5)
Highly Skilled Person Requirement	A number of skilled persons required (weighted score 1)

8) On-site Environmental Impacts (EI) of Sludge Treatment Technology

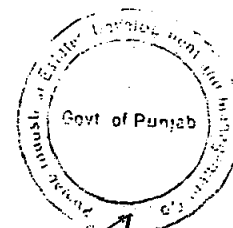
The impacts could be noise pollution, odor, flies and insects breeding. They are categorized on the basis of the following criteria:

Low EI	One of the above mentioned EI prevails, such as odor (weighted score 5)
High EI	Severe EI as insects breeding and odor (weighted score 1)



Annexure 4.1

Village Profile and Households, Housing and Socioeconomic Questionnaires



HOUSEHOLDS, HOUSING & SOCIO-ECONOMIC QUESTIONNAIRE

EIA of the Sundar Industrial Estate, Lahore

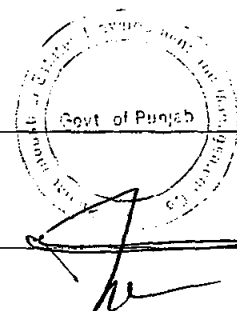
Questionnaire #		Village Name	
Interview Date		Union Council	
Interviewer		Tehsil	
Interviewee		District	

A. Households Profile

List down details of all the household members and their relationships to the head of the household						
No.	Relationship to the HH	Gender	Age	Education	Occupation	Work Place
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
26.						

* HH – Head of the Household

Q #	Data Required	Response
B. Family Composition		
1.	Type of Family	a. Nuclear b. Joint
C. Ethnic Groups		
1.	Types	a. Punjabi b. Pathan c. Sindhi d. Balochi e. Others (specify)
D. Income		
1.	Monthly Income of the Households	a. < 3000 b. 3000-5000 c. 5000-7000 d. 7000 & above
E. Health Conditions		
1.	Type/Location of Public Health Facility	a. Clinic b. Dispensary c. B.H.U. d. Hospital
2.	Common Diseases	a. Chest Infection b. Skin Infection c. Eye Infection d. Asthma e. Diarrhea f. Malaria g. Others (specify)
F. Housing & Social Amenities		
1.	Structure of the House	a. Pacca (Bricks+Cement) b. Semi Pacca (Clay+Bricks) c. Kacha (Clay) d. Others (Specify)
2.	Total Area of the House (marlas/kanals)	
3.	Total Number of Rooms	
4.	Tenure of the House	a. Owned b. Tenant c. Others (specify)
5.	Period of Stay in this Village	a. 0-5 years b. 6-10 years c. 11-15 years d. 16-20 years e. 21-25 years f. 26 & above
6.	Source of Fuel for Cooking/Heating	a. Natural Gas b. Cylinder Gas c. Kerosene Oil



Q #	Data Required	Response
		d. Cow Dung e. Coal f. Wood g. Others (specify)
7.	Source of Domestic Water Supply	a. Piped Water/Community Water Supply b. Community Tap c. Open Well d. Hand Pump e. Others (specify)
8.	Quality of Water	a. Clean b. Salty & Smelly c. Oily d. Others (specify)
9.	Pretreatment of Water	a. None b. Boiling c. Filtering d. Others (specify)
10.	Drainage System & Condition	a. Pit Latrine b. Septic Tank c. Open Drain d. Covered Drain e. Sewer f. Others (specify)
11.	Outlet Discharge of Drainage/Sewerage	a. Drain/Nullah b. Pond c. Others (specify)
12.	Street Condition	a. Kacha b. Brick Paved c. Gravel/Concrete/Bituminous d. Others (specify)
13.	Solid Waste Disposal	a. Burn b. Dump (where _____) c. Others (specify)
14.	Telephone	a. Yes b. No
15.	Electricity	a. Yes/No, If yes then answer the followings: <ul style="list-style-type: none"> ▪ Source of Electricity ▪ Breakdown of Electricity (Yes/No) ▪ If yes, why?
16.	Transport Facility	Public Transport (Yes/No)
G. Educational Institutions		
1.	Names/Types/Locations of Institutions	a. b. c.

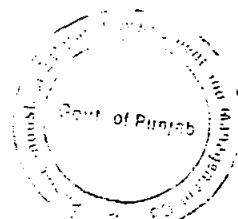
Q #	Data Required	Response
6.	Remarks of the Interviewer	

A handwritten signature, possibly 'Jm', is written over a faint circular stamp. The stamp contains some illegible text, likely an official seal or logo.

VILLAGE PROFILE
EIA of the Sundar Industrial Estate, Lahore

Questionnaire #		Village Name	
Interview Date		Union Council	
Interviewer		Tehsil	
Interviewee		District	

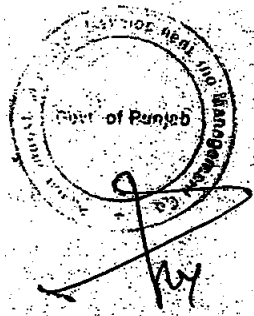
Q #	Data Required	Response
1.	Total Population of the Village	
2.	Total Area of the Village	
3.	Total Number of Houses	
4.	Utility Services	a. Water Supply (Type _____) b. Drainage/Sewerage (Type _____) c. Electricity d. Gas (Type _____) e. Others (specify)
5.	Street Condition	a. Kacha b. Brick Paved c. Gravel/Concrete/Bituminous d. Others (specify)
6.	Public Amenities (Number)	a. Madrassa () b. Basic Health Unit (BHU) () c. Private Clinics () d. Post Offices () e. Police Stations () f. Mosques () g. Shrines () h. Others (specify)
7.	Educational Institutions (types & locations)	a. b. c. d. e. f.
8.	Common Diseases	a. Chest Infection b. Skin Infection c. Eye Infection d. Asthma e. Diarrhea f. Malaria g. Others (specify)
9.	Nearest Railway Station/Bus Stop	

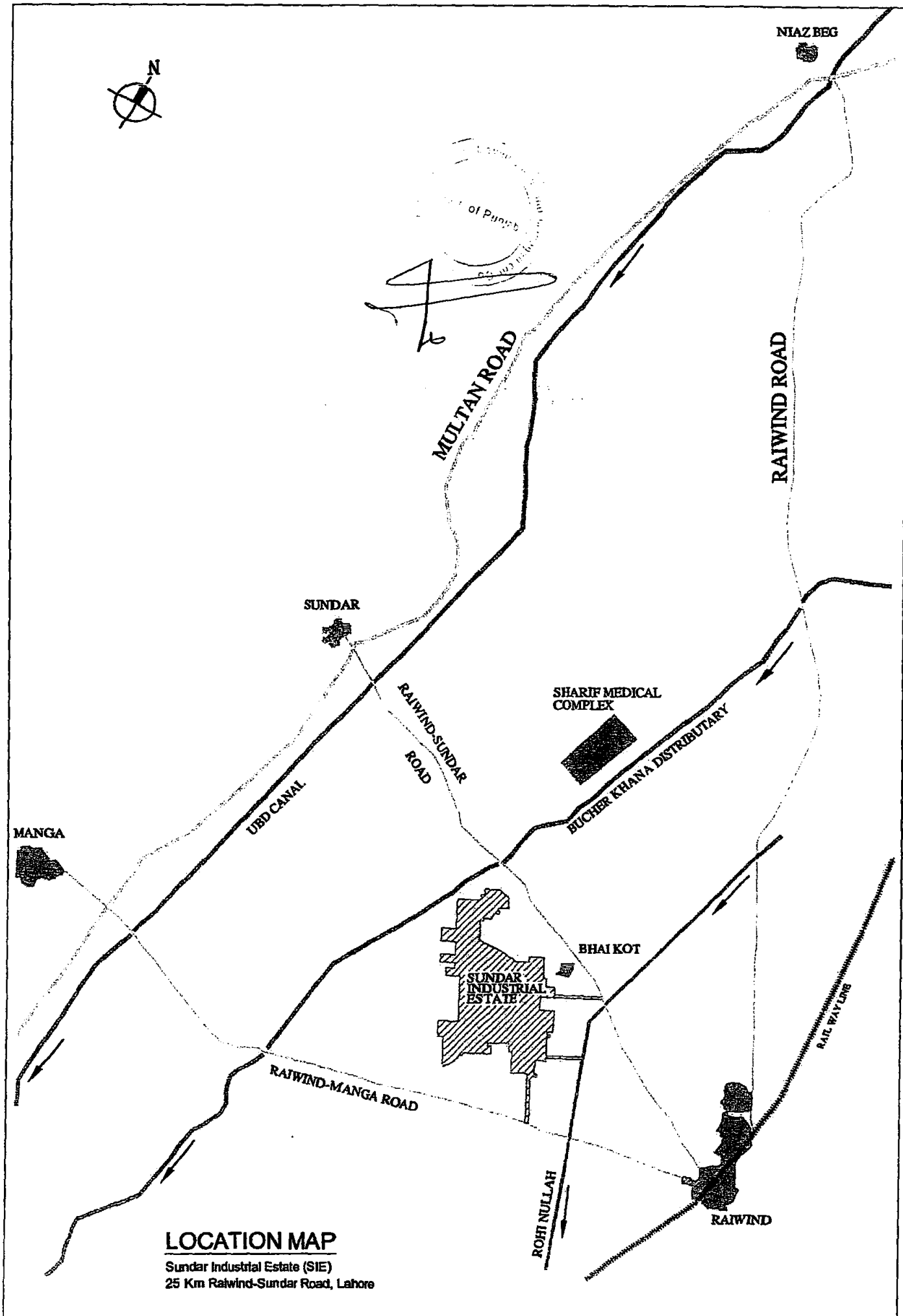


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Annexure 5.1

Location Map

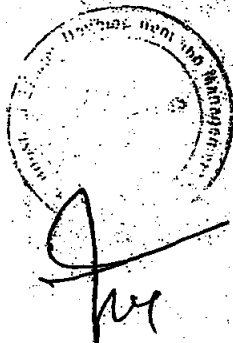




Annexure 5.2

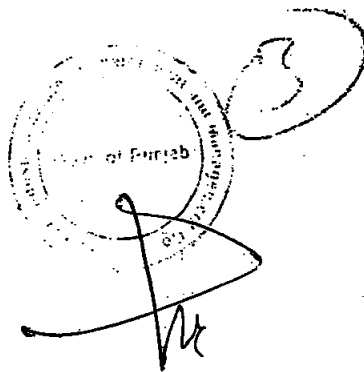
Land Use Map

(4)



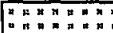
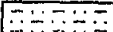


Annexure 5.3

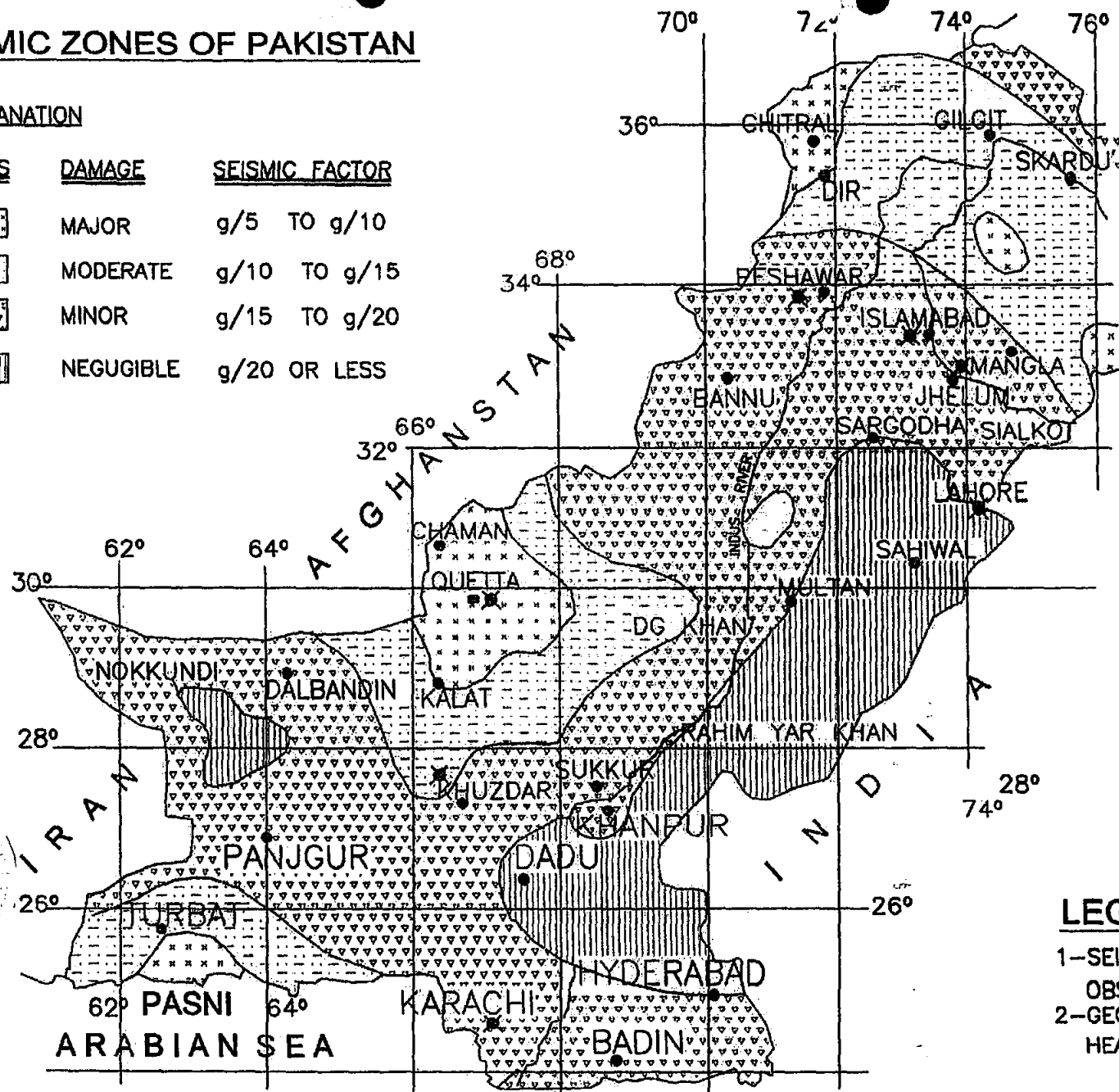
Seismology Map



SEISMIC ZONES OF PAKISTAN

EXPLANATION

SYMBOLS	DAMAGE	SEISMIC FACTOR
	MAJOR	g/5 TO g/10
	MODERATE	g/10 TO g/15
	MINOR	g/15 TO g/20
	NEGUGIBLE	g/20 OR LESS

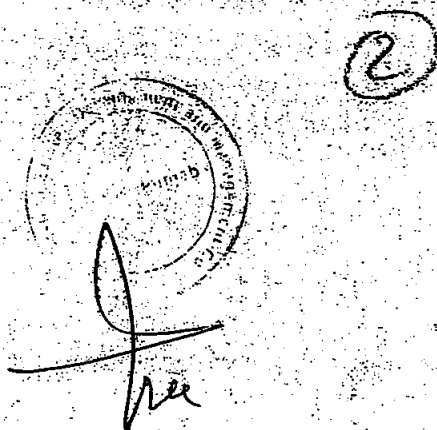


LEGEND

- 1-SEISMOLOGICAL OBSERVATORY
- 2-GEOPHYSICAL HEADQUARTER



Annexure 5.4
Sampling Map



Annexure 5.5

Laboratory Test Reports

1



Laboratory of Environmental Sciences

(A PTA-NZ Environmental Society Project)

TEST REPORT

A. BASIC INFORMATION

Report Reference No:	LES/PCM/06/620	Date:	January 16, 2006
Client	Pepsi-Cola International (Private) Limited 43-T, Gulberg-II, Lahore Ph: 042-111-724-725		
Sample Dates	Date of Sampling: December 23, 2005 (As reported by NEC team) Date of Sample Received: December 23, 2005		
Sampling carried out by	NEC Team (Ifkhar Ahmed & Rashid Maqbool)		
Sampling Location (As reported by NEC team)	Sample-1: Village Haveli Bangroo Sample-2: Village Haveli Bangroo Sample-3: New Snack Manufacturing Facility (NSMF)		
Sample Description (As reported by NEC team)	Description	Sample-1	Sample-2
	Type of sample	Ground water	Ground water
	Source of sample	Hand Pump	Motor Pump
	Depth = 70 feet	Depth = 100 feet	Depth = 140 feet
	Type of sampling	Grab	Grab
	Sampling point	Outlet of Hand Pump	Outlet of Motor Pump

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results			WHO Guideline Value (2004)
					Sample 1	Sample 2	Sample 3	
A	Physico-Chemical Testing							
1	4500-H ⁺ -B	23/12/2005	pH	-	7.74 at 21 °C	7.74 at 24 °C	7.56 at 22 °C	NGV
2	HACH-1670	28/12/2005	Color – Direct	Pt-Co	3	BDL	BDL	NGV
			Color – at pH 7.6		4	BDL	BDL	
3	Turbidity Meter	27/12/2005	Turbidity	NTU	2.2	0.5	BDL	NGV
4	2540-C	29/12/2005	Total Dissolved Solids (TDS)	mg/L	2,542	1,129	3,121	NGV
5	2340-C	26/12/2005	Hardness – Total (as CaCO ₃)	mg/L	136	82.6	205	NGV
6	3500-Ca-D	28/12/2005	Calcium	mg/L	12	8.8	15.2	NGV
7	3500-Mg-E	28/12/2005	Magnesium	mg/L	25.8	14.7	40.7	NGV
8	4500-Cl-B	7/1/2006	Chloride	mg/L	357	107	355	NGV
9	HACH-3450	29/12/2005	Sulfate	mg/L	750	188	1,033	NGV
10	HACH-1900	29/12/2005	Fluoride	mg/L	1.92	0.97	3.35	1.5
11	HACH-2520	27/12/2005	Nitrate	mg/L	3.09	5.30	2.21	50*
12	HACH-2165	30/12/2005	Iron (Total)	mg/L	0.233	0.159	0.183	NGV
B	Bacteriological Testing							
13	9221-C	27/12/2005	Fecal Coliform	MPN/100 mL	1.1	<1.1	9.2	NIL
14	9221-B	27/12/2005	Total Coliform	MPN/100 mL	1.1	<1.1	9.2	NIL

Pt-Co= Platinum-Cobalt Standard
- No Unit
Short-term exposure

NTU= Nephelometric Turbidity Unit
NEC= National Environmental Consulting (Pvt.) Ltd.
NIL = Must not be detectible in any 100 mL sample

BDL= Below Detection Limit
NGV= No Guideline Value
MPN= Most Probable Number

Note:

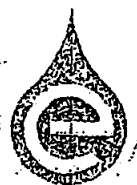
- Results relate only to the sample tested;
- Integrity of sample lies with NEC Team.

Z. Huma
Zill-e-Huma
Chemist

Sajad Amin
Sajad Amin
Dy. Manager

Wasim Iqbal Rabbani
Wasim Iqbal Rabbani
Technical Advisor

(End of the Report)



Laboratory of Environmental Sciences

(A PTA-NZ Environmental Society Project)

Report Reference No: LES/NEC/05/460

Date: May 30, 2005

Client	National Environmental Consulting (Private) Limited 21 km, Off Ferozepur Road, Near Masjid-e-Ibrahim, Lahore Ph: 042-5274527-30
Sample Dates	Date of Sampling: May 18, 2005 Date of Sample Received: May 18, 2005
Sampling Carried out by	LES Team
Sampling Location	Sunder Industrial Estate (SITE for Combined Effluent Treatment Plant) Sample-1: Nahla (Hand pump discharge from 70-100 feet depth) Sample-2: Ravi Spinning Mills - Water tank (sample taken from lap) -
Type of Sample	Drinking water samples

TEST REPORT

*This is 4+5 sample
Pg 55.*

#	Test Method	Parameter	Unit	Test Results		WHO Guideline Values (1998)
				Sample 1	Sample 2	
A. Physico-chemical Testing						
1	4500-H ⁺ -B	pH	-	7.65	7.92	-
2	2320-B	Alkalinity – Total (as CaCO ₃)	mg/L	1,177	445	-
		Alkalinity – Hydroxide (as CaCO ₃)	mg/L	BDL	BDL	-
		Alkalinity – Carbonate (as CaCO ₃)	mg/L	BDL	BDL	-
		Alkalinity – Bicarbonate (as CaCO ₃)	mg/L	1,177	445	-
3	HACH-1670	Color – Direct	TCU	6	14.9	15
		Color – at pH 7.6		6	15	
4	Turbidity Meter	Turbidity	NTU	BDL	1.1	5
5	2540-C	Total Dissolved Solids (TDS)	mg/L	2,766	1,065	1,000
6	2340-C	Hardness – Total (as CaCO ₃)	mg/L	141	147	-
7	3500-Ca-D	Calcium	mg/L	15.9	22.2	-
8	3500-Mg-E	Magnesium	mg/L	24.5	22.1	-
9	4500-Cl-B	Chloride	mg/L	420	221	250
10	HACH-3450	Sulfate	mg/L	636	164	250
11	HACH-1900	Fluoride	mg/L	1.17	0.76	1.5
12	HACH-2520	Nitrate	mg/L	3.4	0.7	50 (Acute)
13	HACH-2165	Iron (Total)	mg/L	0.829	0.232	0.3
B. Bacteriological Testing						
14	9221-C	Fecal Coliform	MPN/100 mL	5.1	12.0	NIL*
15	9221-B	Total Coliform	MPN/100 mL	5.1	12.0	NIL*

BDL= Below Detection Limit

NTU= Nephelometric Turbidity Unit

* Must not be detectable in any 100 mL of sample

- No Guideline Value

MPN= Most Probable Number

TCU= True Color Unit

Note:

i) Results relate only to the sample tested.

Nadeem-Uz-Zaman Mirza
Lab. Chemist

Sajad Amin
Dy. Manager

Wasim Iqbal Rabbani
Technical Advisor

Perfect S.I.T.E. 21-KM Ferozepur Road, Near Masjid-e-Ibrahim, Lahore.

Phone: (92-42) 5274524, 5274527-30, Fax: (92-42) 5274526, E-mail: les@nexlinx.net.pk, URL: http://www.les.com.pk



Laboratory of Environmental Sciences

(A PTA-NZ Environmental Society Project)

TEST REPORT

A. BASIC INFORMATION

Report Reference No:	LES/PCI/06/621	Date:	January 16, 2006
Client	Pepsi-Cola International (Private) Limited 43-T, Gulberg-II, Lahore Ph: 042-111-724-725		
Sample Dates	Date of Sampling:	December 23, 2005 (As reported by NEC team)	
	Date of Sample Received:	December 23, 2005	
Sampling Carried out by	NEC Team (Ifikhar Ahmed & Rashid Maqbool)		
Sampling Location (As reported by NEC team)	1. Nullah Drain (In the vicinity of New Snack Manufacturing Facility) 2. Rohi Nullah (Near Raiwind-Manga Road Bridge)		
Sample Description (As reported by NEC team)	Description	Sample 1	Sample 2
	Type of sample	Wastewater	Wastewater
	Source of sample	Nullah Drain	Rohi Nullah
	Sampling type	Grab	Grab
	Sampling point	In the close vicinity of NSMF	Near Raiwind-Manga Road Bridge

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	
					Sample 1	Sample 2
1	4500-H ⁺ -B	23/12/2005	pH	-	8.44	8.62
2	5210-B	28/12/2005	Biochemical Oxygen Demand (BOD ₅)	mg/L	134	NR
3	5220-D	29/12/2005	Chemical Oxygen Demand (COD)	mg/L	208	79
4	2540-D	5/1/2006	Total Suspended Solids (TSS)	mg/L	7	93
5	2540-C	3/1/2006	Total Dissolved Solids (TDS)	mg/L	1,728	1,347
6	5520-B	4/1/2006	Oil & Grease (O & G)	mg/L	13	3.66
7	4500-Cl ⁻ -B	2/1/2006	Chloride (Cl ⁻)	mg/L	319	252
8	HACH-3450	30/12/2005	Sulfate (SO ₄ ²⁻)	mg/L	420	250
9	HACH-3500	26/12/2005	Sulfide (S ²⁻)	mg/L	0.041	0.004
10	SLT-6	3/1/2006	Chromium (Total)	mg/L	2.15	2.58

NR= Not reported because test results do not qualify the criteria for reporting
NSMF= New Snack Manufacturing Facility
NEC= National Environmental Consulting (Private) Limited
No Unit

Note:

- i) Results relate only to the sample tested;
ii) Integrity of samples left with NEC Team.

Ch. Javed Hameed
Associate Chemist

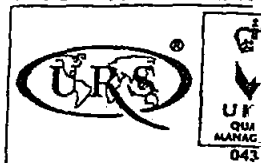
Sajad Amin
Dy. Manager
(End of the Report)

Wasim Iqbal Rabbani
Technical Advisor



GLOBAL ENVIRONMENTAL LAB

ISO 9001:2000 CERTI



Certificate Number: 2038/3

GEL/LAB/013

ISSUE: 3

ISSUE DATE: 29.04.2004

PAGE 1 OF 1

AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: A/3344 Date: 01-02-06
Name of client: Pepsi Cola International (Pvt) Limited.
Address: 43-T, Gulberg - II, Lahore.
Location: Main Gate Entrance (Sunder Estate)
Sample Collected by: GEL
Date of Sample Collection: 19-01-06
No. of monitoring: 8 hours

Time	Carbon Monoxide (ppm)	Sulphur Dioxide ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	Remarks
9:00	0	BDL	3.8	89.2	
10:00	1	2.8	4.6	81.7	
11:00	1	3.2	5.4	68.4	
12:00	2	BDL	3.4	59.2	
13:00	3	BDL	3.2	72.5	
14:00	2	3.1	3.1	68.8	
15:00	2	3.4	3.6	70.3	
16:00	1	2.7	3.3	74.6	

Deviation from standard method if any:

BDL: Below Detection Limit

This report is not valid for any negotiations.

1 Sample Analyzed by:

M. Sadiq Hashmi
Analyst

2 Name of Chief Analyst with seal:

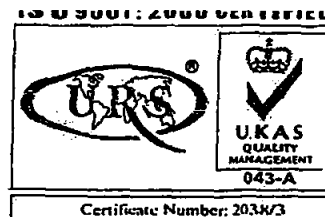
Gulzar A. Adil
Chief Analyst

3 Singnature of incharge of the environmental laboratory:

Name: Asim MahmoodDesignation: General ManagerDate: 01-02-06



GLOBAL ENVIRONMENTAL LAB



GEL/LAB/4/013

ISSUE: 3

ISSUE DATE: 29.04.2004

PAGE 1 OF 1

Date of Submission of report: 01-02-2006

AMBIENT AIR QUALITY MONITORING REPORT

Report reference No: A/3345
Name of client: Pepsi Cola International (Pvt) Limited,
Address: 43-T, Gulbeg - II, Lahore.
Location: New Snack Manufacturing Facility
Sample Collected by: GEL
Date of Sample Collection: 20-01-06
Duration of monitoring: 8 hours

Time	Carbon Monoxide (ppm)	Sulphur Dioxide (ug/m ³)	Nitrogen Dioxide (ug/m ³)	PM ₁₀ (ug/m ³)	Remarks
9:00	0	BDL	3.1	45.1	
10:00	1	BDL	3.2	47.2	
11:00	0	BDL	3.4	54.2	
12:00	1	BDL	3.6	53.2	
13:00	1	BDL	3.2	48.3	
14:00	0	BDL	BDL	47.2	
15:00	1	BDL	3.3	45.7	
16:00	0	BDL	BDL	43.5	

Deviation from standard method if any:

BDL: Below Detection Limit

report is not valid for any negotiations.

1 Sample Analyzed by:

M. Sadiq Hashmi
Analyst

2 Name of Chief Analyst with seal:

Gulzar A. Aziz
Chief Analyst

3 Signature of incharge of the environmental laboratory:

Name: Asim Mahmood
Designation: General Manager
Date: 01-02-06

Annexure 5.6

**National Environmental Quality Standards
(NEQS) 2000**

A faint circular stamp, likely an official seal, is visible above a handwritten signature. The signature is written in a cursive style and appears to be the name 'Me'.

REGISTERED No. M-302
L. 7646

The Gazette



of Pakistan

EXTRAORDINARY
PUBLISHED BY AUTHORITY

ISLAMABD, THURSDAY, AUGUST 10, 2000

PART-II

Statutory Notification (S.R.O)

GOVERNMENT OF PAKISTAN

MINISTRY OF ENVIRONMENT, LOCAL GOVERNMENT AND
RURAL DEVELOPMENT

NOTIFICATION

Islamabad, the 8th August 2000

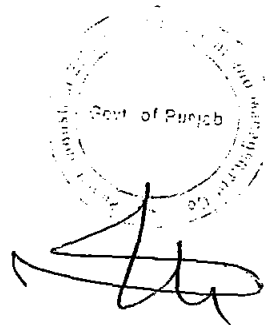
S.R.O. 549 (I)/2000. In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to direct that the following further amendments shall be made in its Notification No. S.R.O. 742(I)/93, dated the 24th August, 1993, namely: _____

In the aforesaid Notification, in paragraph 2. _____

(1289)

[4138(2000)/Ex.GAZ]

Price : Rs. 5.00



(1) for Annex, I the following shall be substituted, namely:_____

Annex-I**“NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR MUNICIPAL AND
LIQUID INDUSTRIAL EFFLUENTS (mg/l,
UNLESS OTHERWISE DEFINED)**

S. No.	Parameter	Revised Standards			
		Existing Standards	Into Inland Waters	Into Sewage Treatment ⁽⁵⁾	Into Sea ⁽¹⁾
1	2	3	4	5	6
1.	Temperature or Temperature Increase *	40°C	≤3°C	≤3°C	≤3°C
2.	pH value (H ⁺) .	6-10	6-9	6-9	6-9
3.	Biochemical Oxygen Demand (BOD) ₅ at 20°C ⁽¹⁾	80	80	250	80**
4.	Chemical Oxygen Demand (COD) ⁽¹⁾	150	150	400	400
5.	Total Suspended Solids (TSS)	150	200	400	200
6.	Total Dissolved Solids (TDS)	3500	3500	3500	3500
7.	Oil and Grease	10	10	10	10
8.	Phenolic compounds (as phenol)	0.1	0.1	0.3	0.3
9.	Chloride (as Cl ⁻)	1000	1000	1000	SC***
10.	Fluoride (as F ⁻)	20	10	10	10
11.	Cyanide (as CN ⁻) total ..	2	1.0	1.0	1.0
12.	An-ionic detergents (as MBAS) ⁽²⁾	20	20	20	20
13.	Sulphate (SO ₄ ²⁻)	600	600	1000	SC***
14.	Sulphide (S ²⁻)	1.0	1.0	1.0	1.0
15.	Ammonia (NH ₃)	40	40	40	40
16.	Pesticides ⁽³⁾	0.15	0.15	0.15	0.15



6. Provided discharge is not at shore and not within 10 miles of mangrove or other important estuaries.

* The effluent should not result in temperature increase of more than 3°C at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 meters from the point of discharge.

** The value for industry is 200 mg/l

*** Discharge concentration at or below sea concentration (SC).

Note: 1. Dilution of liquid effluents to bring them to the NEQS limiting values is not permissible through fresh water mixing with the effluent before discharging into the environment.

2. The concentration of pollutants in water being used will be subtracted from the effluent for calculating the NEQS limits" and

(2) for Annex-II the following shall be substituted, namely: _____

Annex-II

"NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR INDUSTRIAL GASEOUS EMISSION (mg/Nm³, UNLESS OTHERWISE DEFINED)."

S. No.	Parameter	Source of Emission	Existing Standards	Revised Standards
1	2	3	4	5
1.	Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale	40% or 2 Ringlemann Scale or equivalent smoke number
2.	Particulate matter	(a) Boilers and Furnaces		
	(1)	(i) Oil fired	300	300
		(ii) Coal fired	500	500
		(iii) Cement Kilns	200	300
		(b) Grinding, crushing, Clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas.	500	500
3.	Hydrogen Chloride	Any	400	400

1	2	3	4	5	6
17.	Cadmium ⁽⁴⁾	0.1	0.1	0.1	0.1
18.	Chromium (trivalent and hexavalent ⁽⁴⁾	1.0	1.0	1.0	1.0
19.	Cooper ⁽⁴⁾	1.0	1.0	1.0	1.0
20.	Lead ⁽⁴⁾	0.5	0.5	0.5	0.5
21.	Mercury ⁽⁴⁾	0.01	0.01	0.01	0.01
22.	Selenium ⁽⁴⁾	0.5	0.5	0.5	0.5
23.	Nickel ⁽⁴⁾	1.0	1.0	1.0	1.0
24.	Silver ⁽⁴⁾	1.0	1.0	1.0	1.0
25.	Total toxic metals	2.0	2.0	2.0	2.0
26.	Zinc	5.0	5.0	5.0	5.0
27.	Arsenic ⁽⁴⁾	1.0	1.0	1.0	1.0
28.	Barium ⁽⁴⁾	1.5	1.5	1.5	1.5
29.	Iron	2.0	8.0	8.0	8.0
30.	Manganese	1.5	1.5	1.5	1.5
31.	Boron ⁽⁴⁾	6.0	6.0	6.0	6.0
32.	Chlorine	1.0	1.0	1.0	1.0

Explanations:

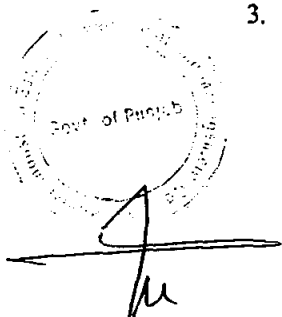
1. Assuming minimum dilution 1:10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Federal Environmental Protection Agency. By 1:10 dilution means, for example that for each one cubic meter of treated effluent, the recipient water body should have 10 cubic meter of water for dilution of this effluent.
2. Methylene Blue Active Substances; assuming surfactant as biodegradable.
3. Pesticides include herbicides, fungicides, and insecticides.
4. Subject to total toxic metals discharge should not exceed level given at S. N. 25.
5. Applicable only when and where sewage treatment is operational and BOD₅=80mg/l is achieved by the sewage treatment system.



1	2	3	4	5
4.	Chlorine	Any	150	150
5.	Hydrogen Fluoride	Any	150	150
6.	Hydrogen Sulphide	Any	10	10
7.	Sulphur Oxides ^{(2) (3)}	Sulfuric acid/Sulphonic acid plants		
		Other Plants except power Plants operating on oil and coal	400	1700
8.	Carbon Monoxide	Any	800	800
9.	Lead	Any	50	50
10.	Mercury	Any	10	10
11.	Cadmium	Any	20	20
12.	Arsenic	Any	20	20
13.	Copper	Any	50	50
14.	Antimony	Any	20	20
15.	Zinc	Any	200	200
16.	Oxides of Nitrogen	Nitric acid manufacturing unit.	400	3000
	(3)	Other plants except power plants operating on oil or coal:		
		Gas fired	400	400
		Oil fired	-	600
		Coal fired	-	1200

Explanations:-

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1 percent Sulphur content in fuel oil. Higher content of Sulphur will case standards to be pro-rated.
3. In respect of emissions of Sulphur dioxide and Nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards:-



A. Sulphur Dioxide

Sulphur Dioxide Background levels Micro-gram per cubic meter ($\mu\text{g}/\text{m}^3$) Standards.

Background Air Quality (SO_2 Basis)	Annual Average	Max. 24-hours Interval	Criterion I Max. SO_2 Emission (Tons per Day Per Plant)	Criterion II Max. Allowable ground level increment-to ambient ($\mu\text{g}/\text{m}^3$)
				(One year Average)
Unpolluted	<50	<200	500	50
Moderately Polluted*				
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	>100	>400	100	10

* For intermediate values between 50 and 100 $\mu\text{g}/\text{m}^3$ linear interpolations should be used.

** No projects with Sulphur dioxide emissions will be recommended.

B. Nitrogen Oxide

Ambient air concentrations of Nitrogen oxides, expressed as NO_x should not be exceed the following:-

Annual Arithmetic Mean	100 $\mu\text{g}/\text{m}^3$ (0.05 ppm)
------------------------	--

Emission level for stationary source discharge before missing with the atmosphere, should be maintained as follows:-

For fuel fired steam generators as Nanogram (10^0 -gram) per joule of heat input:

Liquid fossil fuel	..	..	..	130
Solid fossil fuel ..	..	..	..	300
Lignite fossil fuel	..	..	..	260

Note:-

Dilution of gaseous emissions to bring them to the NEQS limiting value is not permissible through excess air mixing blowing before emitting into the environment.

[File No. 14(3)/98-TO-PEPC.]

HAFIZ ABDULAH AWAN
DEPUTY SECRETARY (ADMN)

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ISLAMABAD. PUBLISHED BY THE MANAGER OF PUBLICATIONS,
KARACHI.

**Punjab Industrial Estate Development and
Management Company (G) Limited**

**PROPOSED INDUSTRIAL ESTATE AT
RAIWIND-SUNDER ROAD**

**REPORT ON
EVALUATION OF SITE FOR
SUITABILITY OF CONSTRUCTION**

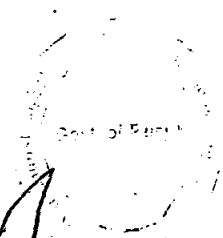
OCTOBER 2003

*1st Set
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for Record.*



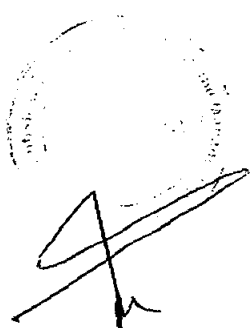
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
Geotechnical & Geoenvironmental Engineering Division
Nespak House, 1-C, Block N, Model Town Extension, Lahore
Email: gtnesp@wvl.net.pk

156-02/024/M/30/(2003)



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**Punjab Industrial Estate Development and
Management Company (G) Limited**

A circular stamp is located at the top left of the page. Below it, there is a handwritten signature in black ink.

**PROPOSED INDUSTRIAL ESTATE AT
RAIWIND-SUNDER ROAD**

**REPORT ON
EVALUATION OF SITE FOR
SUITABILITY OF CONSTRUCTION**

OCTOBER 2003



NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
Geotechnical & Geoenvironmental Engineering Division
NESPAC House, 1-C, Block N, Model Town Extension, Lahore
Email: gtnesp@waf.net.pk

156-02/024/M/30/(2003)

PROPOSED INDUSTRIAL ESTATE AT RAIWIND - SUNDER ROAD

REPORT ON EVALUATION OF SITE FOR SUITABILITY OF CONSTRUCTION

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5. CONCLUSIONS AND RECOMMENDATIONS	9
APPENDICES	
Appendix-A	Site Location Plan, Geotechnical Investigation Plan, Subsurface Soil Logs and Columnar Section
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Fig. A-2	Geotechnical Investigation Plan
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	Detailed Test Result Sheets
Appendix-E	Plates

EXECUTIVE SUMMARY

The Government of the Punjab aims to achieve an orderly, planned and rapid industrialization of the Province by developing a chain of industrial estates in different cities which will provide turnkey solutions to the problems faced by prospective entrepreneurs. The industrial estates will be developed through a new institution, namely the Punjab Industrial Estate Development and Management Company (G) Limited, (PIEDMC).

One of the sites earmarked for this purpose by PIEDMC is located on Raiwind-Sunder Road and is spread over an area of 1000 acres. National Engineering Services Pakistan (Pvt.) Limited (NESPAK) has been engaged for evaluation of the site for suitability of construction.

Limited geotechnical and geophysical studies were considered necessary as a part of the evaluation of the site for this specific purpose. These investigations included field investigations, electrical resistivity survey and laboratory testing. Besides, groundwater potential and drainage of the site were also considered.

The field investigations were planned by NESPAK for generating necessary parameters required for the evaluation of the site for construction purposes. These were carried out by hiring a specialist drilling contractor viz. M/s Berkeley Associates Lahore, under full-time supervision of experienced geotechnical engineers of NESPAK. The field work comprised drilling of seven boreholes of upto 5m depth, excavation of two testpits of 2m depth each and electrical resistivity survey. Specific field tests and soil sampling were also carried out in the boreholes and testpits.

The representative soil samples were tested in SOILCON Geotechnical Testing Laboratories, Lahore, for classification and limited chemical testing.

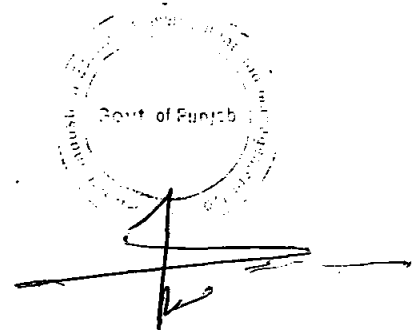
The lithological distribution of soils consists of slightly cohesive, generally firm to stiff silty clay/ lean clay from 1.0 to 3.5m depth, followed by firm to stiff sandy silt/silt of 1.0 to 3.0m thickness in turn followed by medium dense silty fine sand. Groundwater is present at a depth of 4.5 to 5.0m below top of ground.

The subsurface generally appears suitable for supporting light to medium loads through spread foundations placed at 1.0 to 2.0m depth. Besides, some isolated weak spots are also expected, which will require special measures to be adopted.

Tests on soil/water samples for determination of amount of aggressive chemicals like sulphates and chlorides in the soil have revealed that salt concentration is high enough to trigger an attack on concrete and steel work below ground. Hence special protection measures would be required to protect the substructures against any chemical attack.

No surface drainage problems are foreseen as water can be disposed in the Rohi nullah flowing in the eastern part of the site. Adequate quantity of good quality groundwater is available below a depth of 50m.-

No cognizable problem is foreseen for the construction of the industrial estate at the Raiwind-Sunder Road site, however, detailed geotechnical investigations will have to be carried out at the detailed design stage, specifically at the locations where large and important structures are planned to be located.



PROPOSED INDUSTRIAL ESTATE AT RAIWIND - SUNDER ROAD

REPORT ON EVALUATION OF SITE FOR SUITABILITY OF CONSTRUCTION

1. INTRODUCTION

1.1 General

Punjab Industrial Estate Development and Management Company (G) Limited (PIEDMC) is planning to develop an Industrial Estate at Raiwind - Sunder Road. The site proposed for this purpose consists of a 1000 acres piece of land located at a distance of about 6 km, off Multan road on Raiwind - Sunder road (Appendix A, Fig.A-1). Physiographically, the site generally consists of barren land with cultivated pockets in the north-west area of the site.

National Engineering Services Pakistan (Pvt) Limited (NESPAK) are providing the necessary engineering consultancy services for the evaluation of site for suitability of construction.

It was planned to evaluate the site by limited geotechnical and geophysical studies, along with visual observations regarding its condition, possible drainage and the conditions of roads and buildings present in the vicinity.

M/s Berkeley Associates Lahore were engaged as the contractor for carrying out geotechnical investigations at the site after competitive bidding. Laboratory testing was carried out at SOILCON Geotechnical Testing Laboratories, Lahore. The entire field work was done under the guidance and full-time supervision of NESPAK geotechnical engineers.

This report presents a summary of the preliminary investigations carried out at the site along with our evaluations and recommendations.

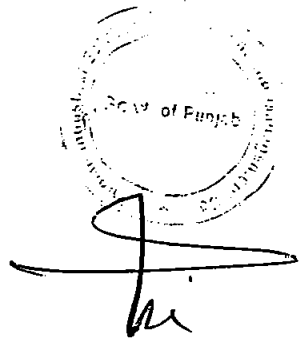
1.2 Objectives of Study

The study was aimed at developing a fair estimate about the suitability of the site for construction and identification of any potential problematic areas. Experts in the fields of geotechnical, groundwater, environment and public health engineering carried out observational studies and limited physical testing to meet the objectives.

1.3 Scope of Work

The scope of work included geotechnical investigations for assessment of foundation conditions, electrical resistivity survey to establish the availability/suitability of groundwater for construction/general use and drainage conditions at the site.

Geotechnical investigations comprised drilling of boreholes, excavation of testpits along with field and laboratory testing.



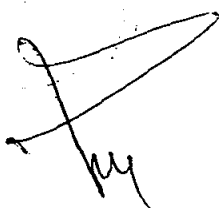
2. RECONNAISSANCE OF THE SITE

A detailed reconnaissance of the project area was carried out by experts of NESPAK prior to planning the investigation programme, which would best suit the intended objectives. The reconnaissance revealed that the proposed site consists of barren land in general and contains some cultivated pockets in its north-west direction. The site is located on the Raiwind-Sunder road and is also accessible by metalled tracks off-shooting from Raiwind-Sunder road.

The site is fairly level and lies below the adjacent roads by 1.0 to 1.25m. Some of the cultivated fields were watered at the time of the study. Some dry patches show mild alligator cracking of the ground. Rohi nullah crosses the site, in its east direction.

The roadways as well as the structures present in the vicinity of the site did not show any damage/distress, which could be associated to the weak ground condition.

On the basis of the above information, an appropriate study plan was developed and later implemented in the light of the knowledge gained through reconnaissance.

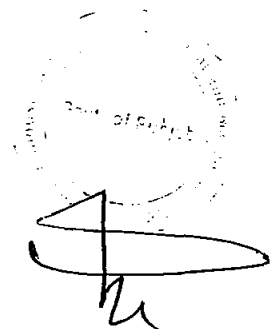


3. ENGINEERING STUDIES

3.1 Planning

The engineering studies at the proposed site were aimed at obtaining information regarding geo-engineering characteristics of the subsoils, groundwater and drainage potential of the site. Following studies were planned to be carried out at the site:

- Execution of boreholes upto a maximum depth of 5.0m using hand auger/light percussion method of boring.
- Performance of standard penetration tests (SPTs) in the boreholes at a depth interval of 1 m together with collection of SPT samples.
- Excavation of testpits upto a maximum depth of 2.0m each below ground level.
- Collection of undisturbed block samples and disturbed soil samples at selected horizons from the testpits.
- Logging of boreholes/testpits.
- Electrical resistivity survey of the site.
- Physical observations for the drainage of the site.



The location of the respective boreholes/testpits executed at the site and the electrical resistivity survey probe points are indicated on the Geotechnical Investigation Plan (Appendix A, Fig. A-2).

3.2 Studies at Site

3.2.1 Preliminary Foundation Investigation

3.2.1.1 Drilling of Boreholes

Seven boreholes were drilled at the site by hand auger/light percussion method. Depth of boreholes ranged from 1.5m to 5.0m. Cylindrical augers were used to advance the boreholes of 150 mm diameter upto the groundwater table. Light percussion method of drilling was used with casing for drilling below the ground water table. Borehole logs are appended to this report as Appendix B.

3.2.1.2 Standard Penetration Tests

Standard penetration tests were conducted in the borehole at a depth interval of 1.0 m. The SPT samples collected were preserved for laboratory testing. The SPT blow count and penetration of the split spoon sampler along the depth of borehole are recorded in the respective borehole logs. A Field SPT Profile is appended in Appendix C, Fig. C-1.

3.2.1.3 Excavation of Testpits

Two testpits were excavated to a maximum depth of 2.0 m below surface level. These pits served the following purpose:

- Visual inspection of the subsurface
- Recovery of an undisturbed block sample for classification and evaluation of foundation conditions
- Collection of disturbed samples for classification and determination of natural moisture content

3.2.1.4 Logging of Boreholes/Testpits

Careful logging of all the boreholes and testpits was done by NESP geotechnical engineers to describe the lithology and stratigraphy of soil materials. Other relevant information like SPT data, sampling water level, groundwater level etc. was also noted on these logs. The field logs were finalized on the basis of laboratory test results. The subsurface soil logs developed on the basis of the corrected borehole logs are appended to this report as Appendix A, Fig.A-3, while the detailed borehole/testpit logs are appended to this report as Appendix-B.

3.2.1.5 Sampling

The soil samples collected in the split spoon sampler (SPT) during SPT in boreholes were preserved as disturbed samples. Besides some disturbed samples (DS) from the boreholes were collected for determination of moisture content and chemical aggressivity. An undisturbed block sample (BS) was also collected from one testpit. Four water samples (WS) were also collected from the boreholes and the tubewell/hand pump located in the vicinity of the site.

3.2.2 Ground Water Potential

Electrical resistivity survey was carried out at three locations within the study area to ascertain the subsurface hydrogeological conditions. The results of this survey (Appendix A, Fig. A-4) has shown that relatively better quality water is expected below a depth of about 50m in the south-eastern side of the site area, near Rohi nullah. The water quality in the upper 50 meters zone of subsoil is generally brackish.

Many of the tubewells in the Raiwind-Sunder Road area are yielding good quality water. The study of the area shows that good quality groundwater is available in the area in adequate quantity. It is proposed to extract the same from below 50m depth through vertical turbine pumps of requisite capacity and required head.

3.2.3 Drainage Observations

The area has no major drainage problem. Properly designed surface drain network along the roadway may be designed to discharge into Rohi nullah flowing in the east of the site.

3.3 Laboratory Evaluations

3.3.1 General

Selected disturbed as well as undisturbed soil samples and water samples collected during subsurface investigations were tested in the laboratory for determination of physical and chemical characteristics.

All the testing was done as per ASTM or the equivalent BS standards. The following laboratory tests were performed on the soil samples:

- Grain size Analysis
- Atterberg Limits
- Chemical Analysis

Water samples were subjected to chemical tests.

Laboratory testing was carried out at SOILCON Geotechnical Testing Laboratory, Lahore. Appendix-D of this report presents results of individual tests carried out on disturbed as well as undisturbed soil samples in the laboratory.

Appendix D, Table D-1 presents a summary of the laboratory test results.

3.3.2 Test Results

In-situ dry density was determined on one undisturbed soil sample. The result of test carried out show that dry density is 1.61 g/cm^3 .

The natural moisture content determined on six soil samples indicate that values generally range from 15 to 28%.

For determination of particle size distribution of different substrata, eleven (11) grain size analyses were conducted on the representative samples. The tests have revealed presence of 13% to 98% of material finer than #200 sieve.

Ten (10) Atterberg limit tests carried out on the cohesive soils show that the liquid limit (LL) ranges from 20 to 34 while the plasticity index (PI) ranges between 5 and 13. On the basis of the classification tests, the soils are predominantly classified as lean clays, silty clays/clayey silts and silty fine sands.

Chemical tests were carried out on five (5) soil samples, collected at 0 to 3.45m depth from selected boreholes/testpits and from the natural surface. The tests indicate that the sulphate content at these locations ranges from 0.006 % to 0.437%, the chloride content varies from 0.004% to 0.392%, while the total dissolved salts varies from 0.12 % to 3.98%. The higher salt concentration corresponds to the surface sample showing visible efflorescence.

The chemical analysis of groundwater indicates that soluble sulphate content range from 274 to 487ppm, the chloride content range from 50 to 213ppm and total dissolved salts ranging from 740 to 1560ppm. The pH values range from 7.50 to 7.75.

In order to prevent both sulphate and chloride attacks, the standard specifications require the use of slag cement (BS 146) or use of a blend of ordinary Portland cement (OPC) with slag cement for the concrete works in contact with ground. These cements are commercially available in the Punjab.

4. SUBSURFACE GEOTECHNICS

In general, subsurface stratigraphy at the site consists of three basic lithological units as given below:

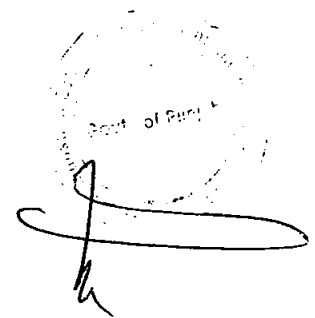
- i) Lean Clay/Silty Clay
- ii) Sandy Silt/Silt
- iii) Silty fine Sand/fine Sand

These soils are the alluvial deposits of the recent geologic times. The subsurface stratigraphy is as discussed below:

The first soil unit of brown silty clay/lean clay forms the topsoil cover at the site at all the locations and generally continues to a depth of 1.0m-3.5m below top of ground (except one location where it continues to the bottom of the borehole). This stratum contains trace fine sand and trace to little concretions at places. It is present in a soft to a stiff state of consistency and has low to medium plasticity.

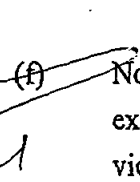
The second soil unit of brownish grey sandy silt/silt underlies the upper silty clay/lean clay stratum. This layer has a thickness of 1.0 to 3.0m and is present in a firm state.

The third soil unit of brownish grey non-plastic fine silty sand underlies the silt/silty sand stratum. It is present in a loose to medium-dense state.

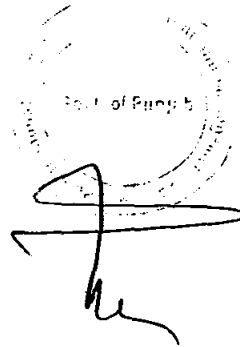


5. CONCLUSIONS AND RECOMMENDATIONS

The results of the above studies and the test results indicate general suitability of the site for construction. The pertinent conclusions and recommendations are as follows:

- (a) Physiographically, the site generally consists of barren land with cultivated pockets in the northwest area of the site.
- (b) The lithologic distribution of soil strata consists of slightly cohesive, soft to stiff clayey silt/silty clay or lean clay from 1.0 to 3.5 m depth (topsoil), followed by firm silts of 1.0 to 3.0 m thickness in turn followed by loose to medium-dense silty fine sand.
- (c) The groundwater table is present at a depth of 4.5 to 5.0 m below the top of ground.
14' to 16'
- (d) Some isolated pockets contain slightly swelling soils in the upper 1.0 to 2.0 m zone, which is manifested by the presence of alligator cracks in the ground.
- (e) The subsurface generally appears suitable for supporting light to medium loads through spread foundation placed at 1.0 to 2.0 m depth. Besides, some isolated weak spots are also indicated which will require either placement of spread foundations at deeper depths or replacement of weak soil with select granular material after proper compaction in layers.
-  (f) No cognizable problem is foreseen for the construction of roadways, except that good quality borrow sources will have to be explored in the vicinity of the site.
- (g) Tests on soil/water samples for determination of aggressive chemicals like sulphate and chlorides have revealed that the salt concentration is high enough to trigger an attack on concrete and steel work below ground. Therefore some proper measures, to counter the attack of these aggressive chemicals on the structures below ground, are foreseen. These may include, use of slag cement or blending ordinary Portland cement with slag cement as well as using low permeability concrete by addition of admixtures, for all construction below ground.

- (h) The area has no major drainage problem. Properly designed surface drain network along the roadways may be designed to discharge into Rohi nullah flowing in the eastern part of the site.
- (i) The results of electrical resistivity survey show presence of acceptable quality of water below 50m depth. The aquifer at that depth appears to be capable of supplying sufficient quantity of good quality water for the requirement of the users. The potential of groundwater may be harnessed by sinking tubewells into the deeper aquifer.



The stamp is circular and contains the text "Joint of Punjab" in the center. A handwritten signature is written across the stamp.

APPENDICES

- APPENDIX-A

***SITE LOCATION PLAN,
GEOTECHNICAL INVESTIGATION PLAN,
SUBSURFACE SOIL LOGS & COLUMNAR
SECTION***

- APPENDIX-B

BOREHOLE & TESTPIT LOGS

- APPENDIX-C

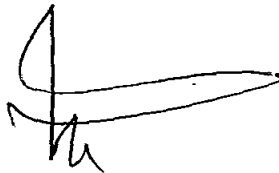
SUBSURFACE CHARACTERISTICS

- APPENDIX-D

LABORATORY TEST RESULTS

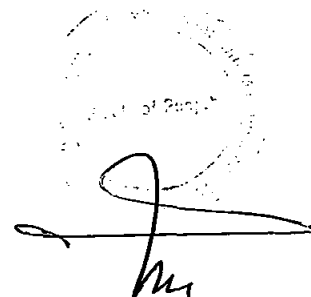
- APPENDIX-E

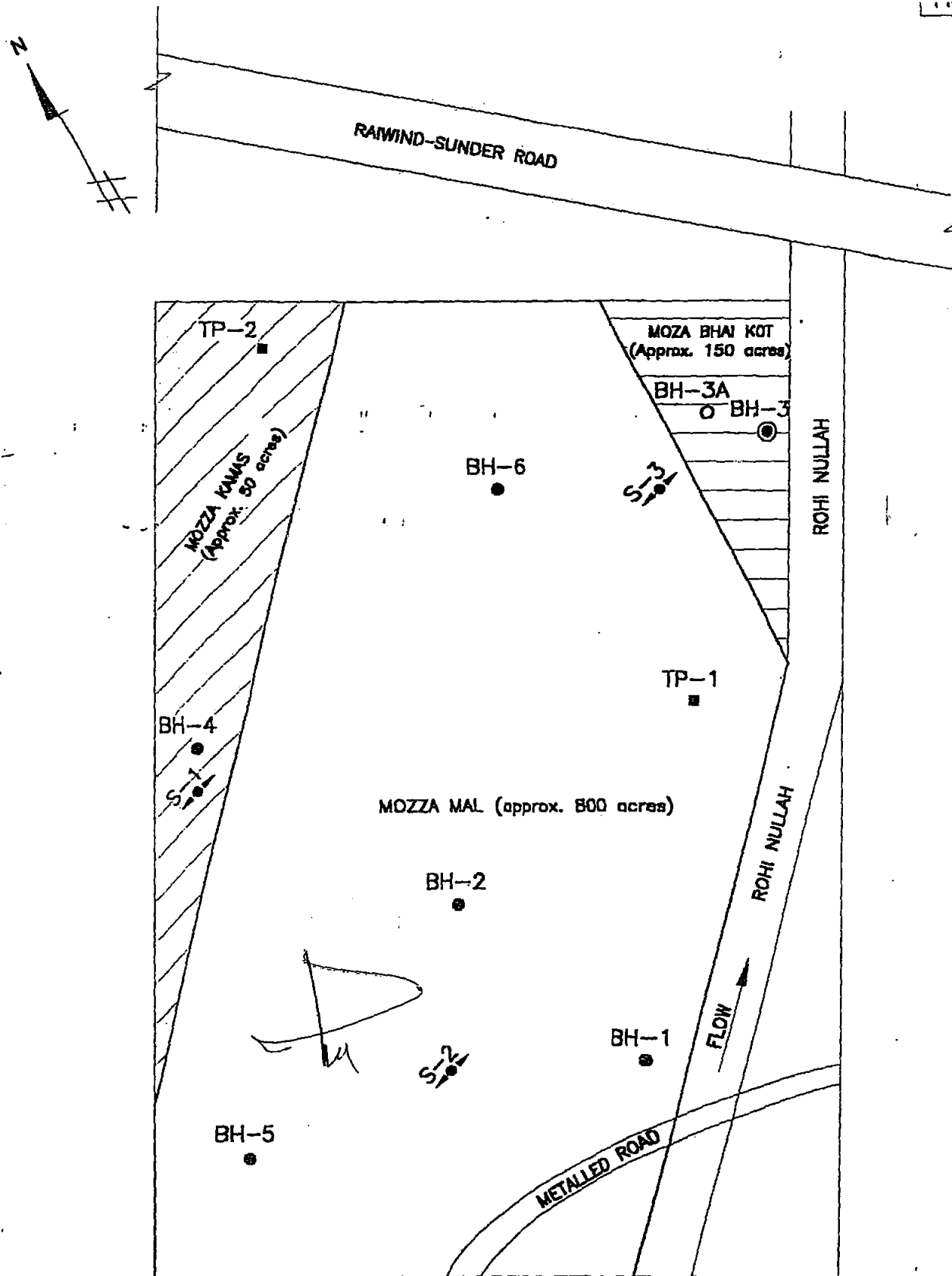
PLATES

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**SITE LOCATION PLAN, GEOTECHNICAL
INVESTIGATION PLAN, SUBSURFACE SOIL
LOGS & COLUMNAR SECTION**

- *Fig. A-1* *Site Location Plan*
- *Fig. A-2* *Geotechnical Investigation Plan*
- *Fig. A-3* *Subsurface Soil Logs*
- *Fig. A-4* *Columnar Section showing
Interpreted Subsurface Lithology*





LEGEND

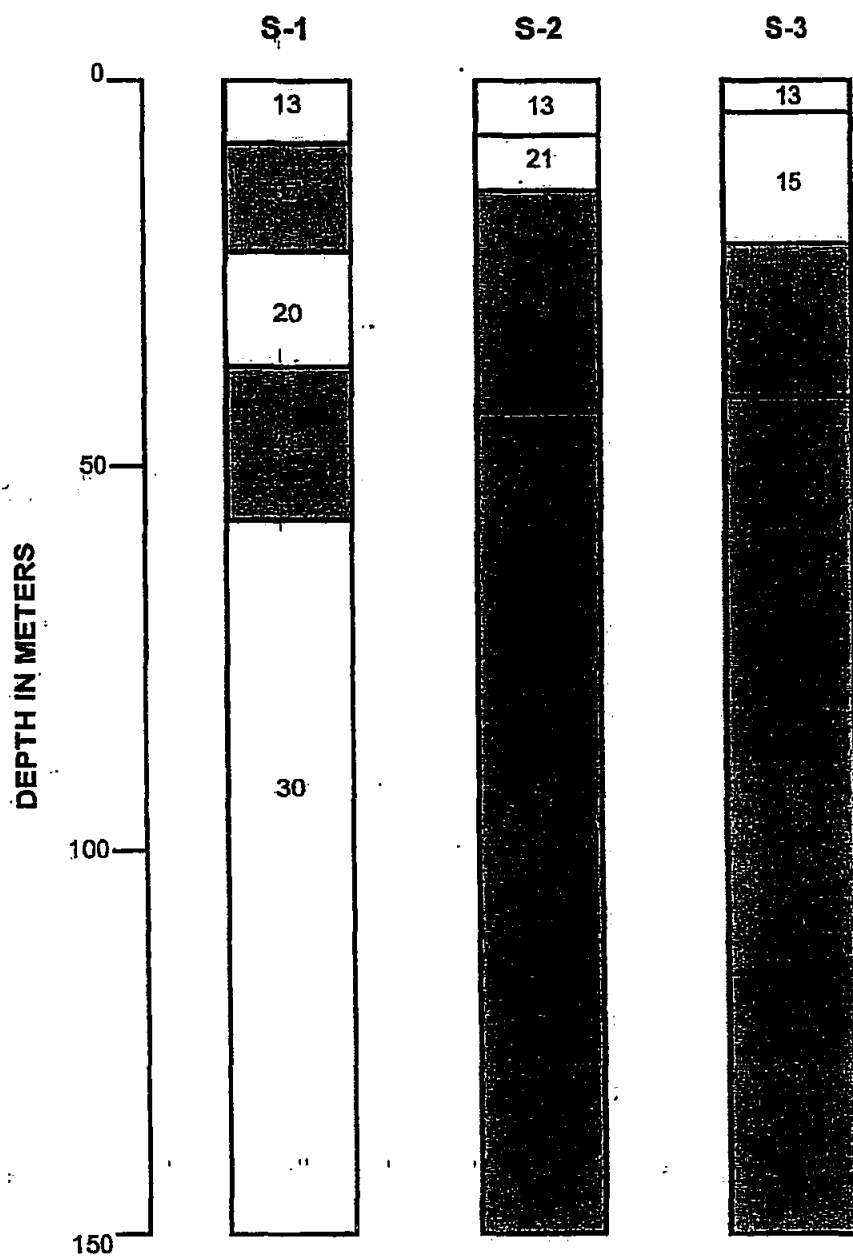
- TESTPIT 2m DEEP
- BOREHOLE 5m DEEP
- ⊙ BOREHOLE 4.5m DEEP
- BOREHOLE 1.5m DEEP
- ⚡ LOCATION OF ELECTRICAL RESISTIVITY SURVEY PROBE POINT

SCALE: NOT TO SCALE

PROPOSED INDUSTRIAL ESTATE AT
RAIWIND-SUNDER ROAD

GEOTECHNICAL INVESTIGATION PLAN

COLUMNAR SECTION SHOWING INTERPRETED SUBSURFACE LITHOLOGY



LEGEND



Resistivity 0-10 ohm-meter
Mainly clay, brackish water



Resistivity 11-30 ohm-meter
Mainly silty clay with some sand layers, brackish water



Resistivity 31-60 ohm-meter
Mainly sand with minor clay layers, fresh water

PROPOSED INDUSTRIAL ESTATE
AT RAINWIND-SUNDER ROAD

APPENDIX-B

BOREHOLE & TESTPIT LOGS

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INDUSTRIAL ESTATE AT
RAIWIND— SUNDER ROAD

Job No. 156-Q2 Project RAIWIND- SUNDER ROAD Location MOZZA MAL (BARREN LAND)
Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/s BERKELEY ASSOCIATES
Type of boring HAND AUGERING Drilling Fluid - Ground Water Depth -
Coordinates - Ground Elevation 28.92 m* Date 21-9-2003 To 21-9-2003

Depth (m)	Sample No.	Legend	Classification Symbol	Description of Material	Dia of Casing/ Hole	P.L. ▽	N.M.C. x	L.L. ○	Remarks								
						SPT Blows/30cm											
0.0						10	20	30	40	50	60	70	80	90	100		
0.0	DS-1		CL-ML	Greyish brown, firm, SILTY CLAY with sand, trace mica.	DIA OF BH=150 mm											* Measured w.r.t. an assumed BM=100ft (30.48m). A few roots at 4.25 m GWT	
1.0	SPT-1		CL	Dark brown, soft, LEAN CLAY, medium plasticity, medium dry strength.													
2.0	DS-2		ML	Brown, soft to firm, CLAYEY SILT, low plasticity, trace fine sand, moist.													
2.0	SPT-2																
3.0	SPT-3																
4.0	SPT-4		SM	Brown, soft, SILT with sand, trace mica, moist.													
5.0	SPT-5				Brown, loose to medium-dense, silty fine SAND, trace mica, moist to wet.												
						BOTTOM OF BOREHOLE											





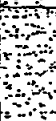
NATIONAL ENGINEERING SERVICES
PAKISTAN (Pvt.) LIMITED, LAHORE

BOREHOLE NO. BH-3

SHEET 1 OF 1

BOREHOLE LOG

Job No. 156-02 Project INDUSTRIAL ESTATE AT RAIWIND- SUNDER ROAD Location MOZZA BHAI KOT
Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/s BERKELEY ASSOCIATES
Type of boring HAND AUGERING Drilling Fluid — Ground Water Depth 4.30 m
Coordinates — Ground Elevation 29.27 m* Date 21-9-2003 To 21-9-2003

Depth (m)	Sample No.	Legend	Classification Symbol	Description of Material	Dia of Casing/ Hole	P.L.	N.M.C.		LL	Remarks							
						▽	10	20	30		40	50	60	70	80	90	100
0.0							SPT Blows/30cm										
						10	20	30	40	50	60	70	80	90	100		
1.0	SPT-1		CL	Brown, firm, LEAN CLAY, medium plasticity, medium dry strength trace fine sand, trace roots and concretions.	DIA OF BH=150 mm											* Measured w.r.t. an assumed BM=100ft (30.48m).	
2.0	SPT-2																
3.0	SPT-3		SM	Brown, loose, silty fine SAND, trace mica, moist.													
4.0	SPT-4						SP	Brown, medium dense, fine SAND with SILT, trace mica, trace concretions, wet.									
4.5				BOTTOM OF BOREHOLE													

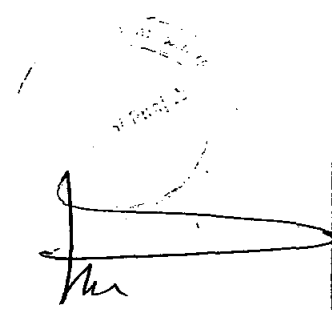
INDUSTRIAL ESTATE AT
RAIWIND-SUNDER ROAD

Job No. 156-02 Project RAIWIND-- SUNDER ROAD Location MOZZA MAL (BARREN LAND)
Site Incharge: AH/OHQ/MAK Client PIEDMC Contractor M/s BERKELEY ASSOCIATES
Type of boring HAND AUGERING Drilling Fluid - Ground Water Depth NOT ENCOUNTERED
Coordinates - Ground Elevation 29.27 m Date 21-9-2003 To 21-9-2003

[illegible]

INDUSTRIAL ESTATE AT
RAIWIND- SUNDER ROAD

Job No.	156-02	Project	RAJWIND- SUNDER ROAD	Location	MOZZA KAMAS
Site Incharge	AH/OHQ/MAK	Client	PIEDMC	Contractor	M/s BERKELEY ASSOCIATES
Type of boring	HAND AUGERING	Drilling Fluid	-	Ground Water Depth	NOT ENCOUNTERED
Coordinates	-	Ground Elevation	31.78 m*	Date	21-9-2003 To 21-9-2003

Depth (m)	Sample No.	Legend	Classification Symbol	Description of Material	Dia of Casing/ Hole	P.L. ▽	N.M.C. x			LL ○	Remarks						
						SPT Blows/30cm											
0.0						10	20	30	40	50	60	70	80	90	100		
0.0			CL-ML	Brown, firm, SILTY CLAY, low plasticity, low to medium dry strength.	DIA OF BH=150 mm												
1.0	SPT-1		ML	Brown, firm, SILT, slight plasticity, low dry strength, trace concretions.			5										
2.0	SPT-2							7									
3.0	SPT-3					Brown, firm, SILT with sand, non plastic, trace mica.		6									
4.0	SPT-4		SM	Brown, loose, SILTY fine SAND, trace mica, moist.			8										
5.0	SPT-5						8										
5.45			ML	Brown, soft, SANDY SILT, trace mica.	BOTTOM OF BOREHOLE												
																	




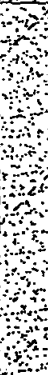
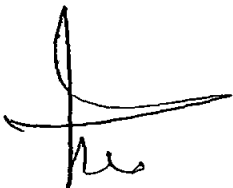
NATIONAL ENGINEERING SERVICES
PAKISTAN (Pvt.) LIMITED, LAHORE

BOREHOLE NO. BH-5

SHEET 1 OF 1

BOREHOLE LOG

Job No. 156-02 Project INDUSTRIAL ESTATE AT RAIWIND- SUNDER ROAD Location MOZZA MAL
Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/s BERKELEY ASSOCIATES
Type of boring HAND AUGERING Drilling Fluid - Ground Water Depth NOT ENCOUNTERED
Coordinates - Ground Elevation 30.67 m* Date 21-9-2003 To 21-9-2003

Depth (m)	Sample No.	Legend	Classification Symbol	Description of Material	Dia of Casing/ Hole	P.L. ▽	N.M.C. x	LL o	Remarks								
						SPT Blows/30cm											
0.0						10	20	30	40	50	60	70	80	90	100		
1.0	SPT-1		CL	Brown, firm, LEAN CLAY, low to medium plasticity, low dry strength, trace fine sand, little concretions, dry.	DIA OF BH=150 mm	5											
2.0	SPT-2					6											
3.0	SPT-3					8											
4.0	SPT-4		SM	Brown, loose, silty fine SAND, trace mica, dry, moist to wet from 5.0 m.		7											
5.0	SPT-5					8											
5.4	DS-1					BOTTOM OF BOREHOLE											
																	

* Measured
w.r.t. on
assumed
BM=100ft.
(30.48m).

Signature

INDUSTRIAL ESTATE AT
RAIWIND— SUNDER ROAD

Job No.	156-02	Project	RAINWIND- SUNDER ROAD	Location	MOZZA KAMAS
Site Incharge	AH/OHQ/MAK	Client	PIEDMC	Contractor	M/s BERKELEY ASSOCIATES
Type of boring	HAND AUGERING	Drilling Fluid	-	Ground Water Depth	5.0 m
Coordinates	-	Ground Elevation	29.80 m*	Date	21-9-2003 To 21-9-2003

[illegible]



NATIONAL ENGINEERING SERVICES
PAKISTAN (Pvt.) LIMITED, LAHORE

Test Pit No. TP-1

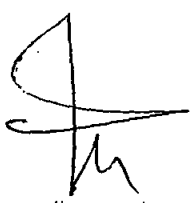
Sheet 1 OF 1

TESTPIT LOG

Job No. 156-02 Project INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD Location MOZZA MALL

Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/S BERKELEY ASSOCIATES

Coordinates N = E = Ground Elevation 29.20 m* Date 21-9-2003

Depth in meter	Elevation in meter	Legend	Unified Classification Symbol	DESCRIPTION OF MATERIAL	Sample Type/No.	Field Density Test		Lab. Density Test		Inplace % Compaction	REMARKS
						Wet Density g/cm ³	Moisture Content %	Max. Dry Density g/cm ³	Optimum m.c. %		
0.0				Brown, firm to stiff, clayey SILT with concretions, trace sand, moist.							* Measured w.r.t. on assumed BM=100ft (30.48m).
0.5				Brown, firm, SILT with sand, slightly moist.							
1.0			ML		DS-1						
1.5											
2.0					DS-2						
				BOTTOM OF TESTPIT							
											



TESTPIT LOG

Job No. 156-02 Project INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD Location MOZZA KAMAS
Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/S BERKELEY ASSOCIATES
Coordinates N = Ground Elevation 31.45 m* Date 21-9-2003
E =

Depth in meter	Elevation in meter	Legend	Unified Classification Symbol	DESCRIPTION OF MATERIAL	Sample Type/No.	Field Density Test		Lab. Density Test		Inplace % Compaction	REMARKS
						Wet Density g/cm ³	Moisture Content %	Max. Dry Density g/cm ³	Optimum m.c. %		
0.0				Brown, stiff, LEAN CLAY, medium plasticity, non dilatant, trace concretions, trace fine sand.							
0.5											
1.0			CL	Brown, stiff, LEAN CLAY, slightly moist, high plasticity, non dilatant.	BS-1						
1.5					DS-1						
2.0			CL-ML	Brown, firm, SILTY CLAY/CLAYEY SILT, low plasticity.	DS-2						
				BOTTOM OF TESTPIT							

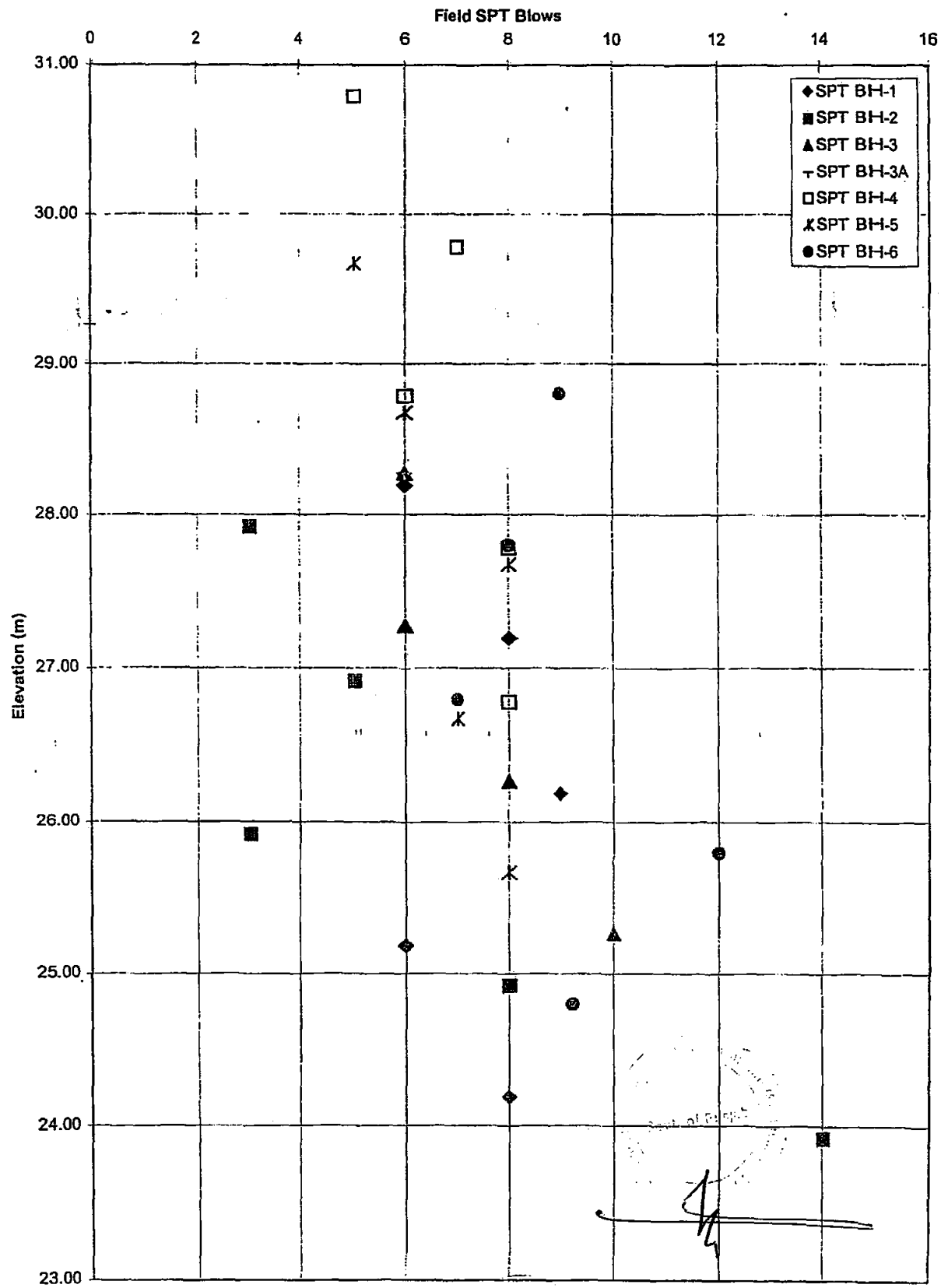
SUBSURFACE CHARACTERISTICS

- *Fig. C-1 Field SPT Profile*
- *Fig. C-2 Variation of Moisture Content with Elevation*

Jh

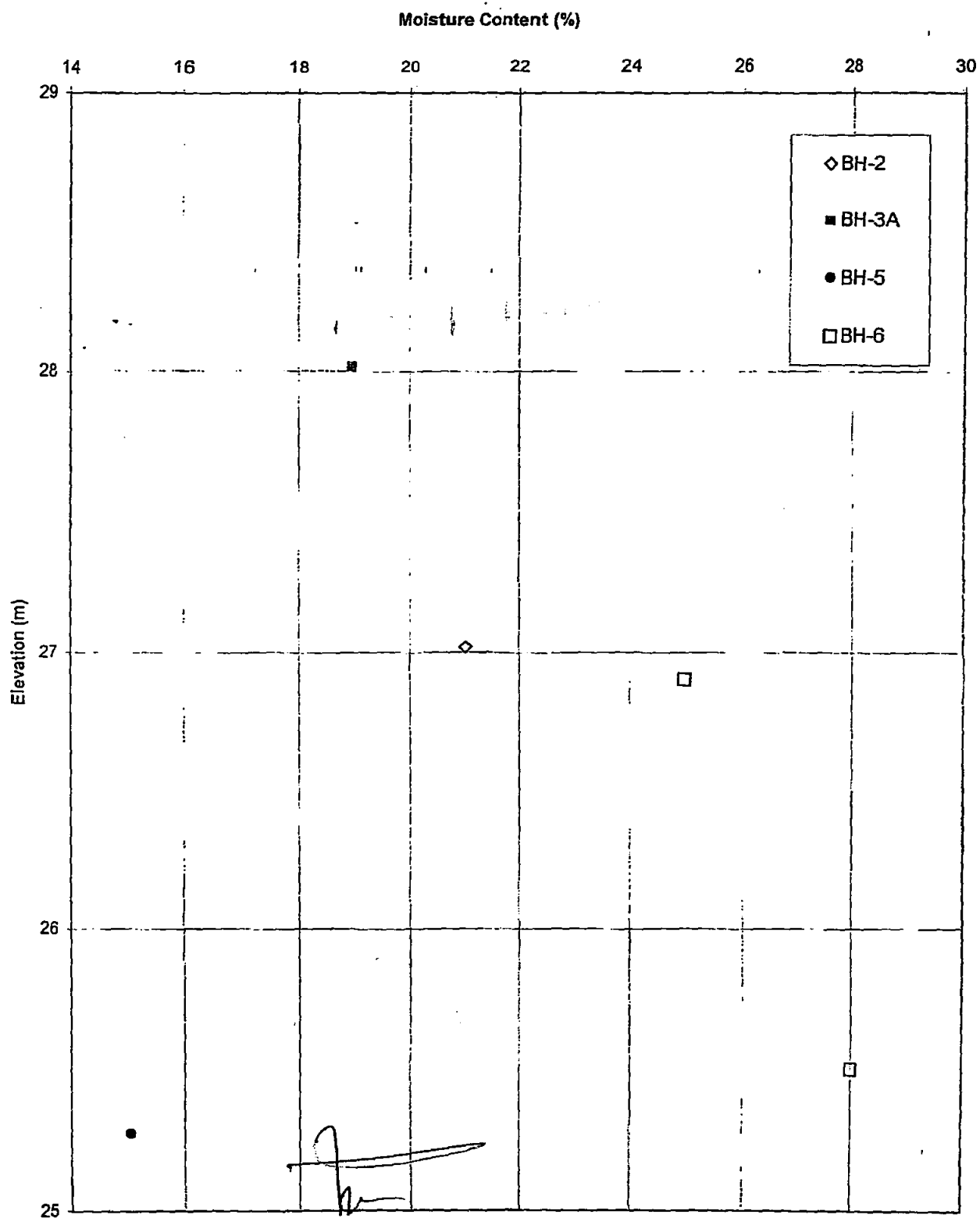
PROPOSED INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD

Field SPT Profile



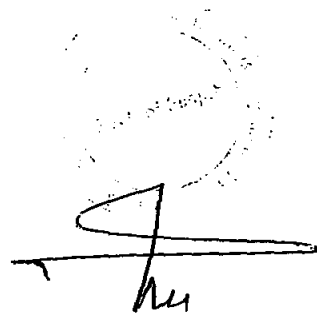
PROPOSED INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD

Variation of Natural Moisture Content with Elevation



LABORATORY TEST RESULTS

- *Table D-1 Summary of Laboratory Test Results*
- *Detailed Test Result Sheets*



PROPOSED INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD

SUMMARY OF LABORATORY TEST RESULTS

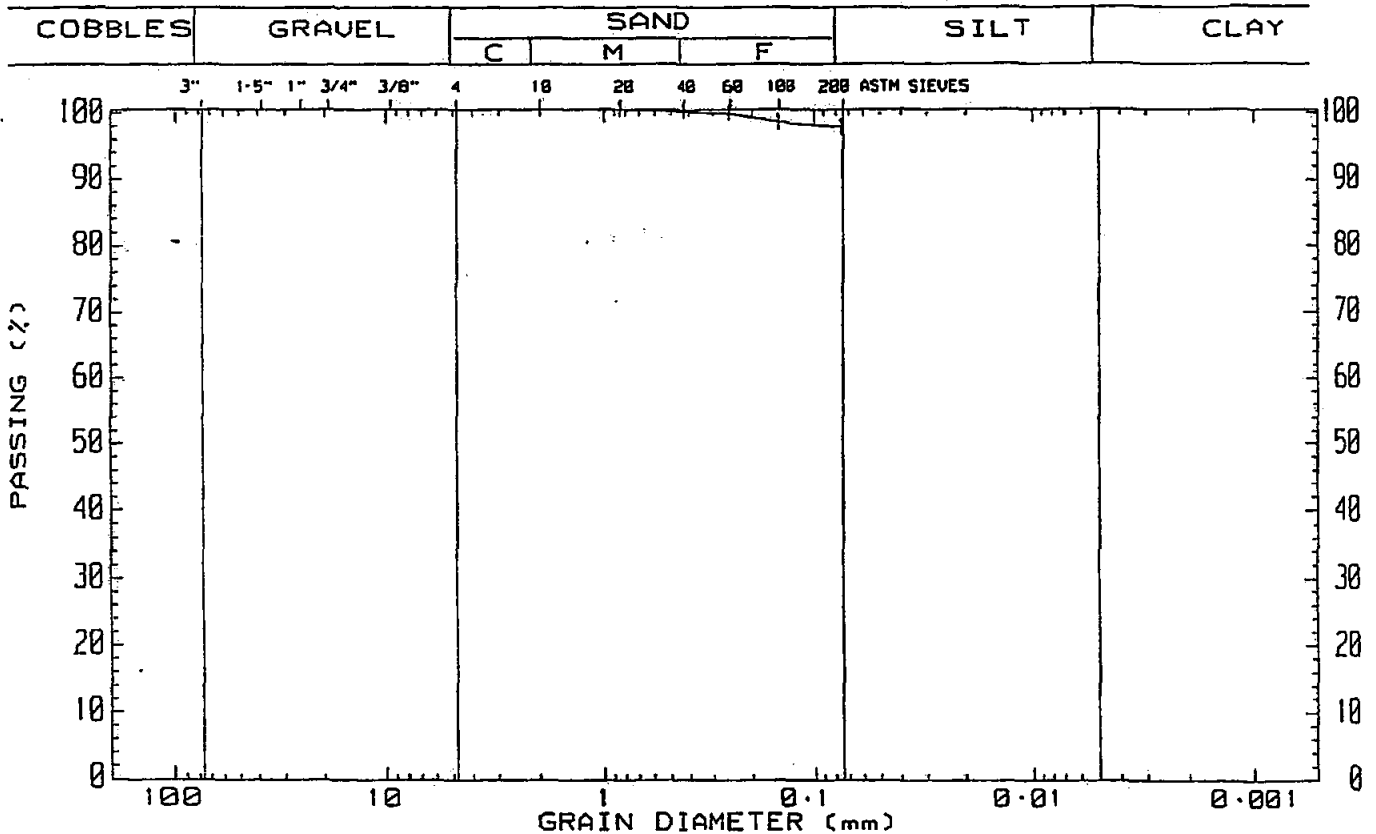
Sr. No.	Borehole/ Testpit No.	Sample No.	Depth	In-situ Dry Density	Natural Moisture Content NMC	Grain Size Distribution					Atterberg Limits			Classification	Total Dissolved Salts	Sulphate Content	Chloride Content	pH
											LL	PL	PI					
			(m)	(g/cm ³)	(%)	# 4	# 10	# 40	# 100	# 200	(%)	(%)		Unified Soil Classifica- tion System	(%)	(%)	(%)	
1	BH-1	SPT-1	1.00-1.46	-	-	100	100	100	99	97	30	20	10	CL	-	-	-	-
2	BH-1	SPT-5	5.00-5.45	-	-	100	100	99	98	97	30	20	10	CL	-	-	-	-
3	BH-2	DS-1	0.00-0.10	-	-	100	100	99	91	85	24	18	8	CL-ML	3.98	0.437	0.392	10.4
3	BH-2	DS-2	-	-	21	-	-	-	-	-	-	-	-	-	-	-	-	-
4	BH-2	SPT-3	3.00-3.45	-	-	100	100	100	84	72	-	-	-	ML	0.21	0.012	0.072	7.85
5	BH-2	WS-1	6.00-5.00	-	-	-	-	-	-	-	-	-	-	-	1560 ppm	487 ppm	213 ppm	7.76
6	BH-3	SPT-2	2.00-2.45	-	-	100	100	100	99	97	29	21	8	CL	0.21	0.013	0.056	7.76
7	BH-3	SPT-4	4.00-4.45	-	-	100	98	94	21	13	-	-	-	SM	-	-	-	-
8	BH-3A	SPT-1	0.00-0.45	-	-	100	100	100	87	80	20	15	5	CL-ML	0.125	0.006	0.013	8.14
9	BH-3A	DS-1	1.25-1.25	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-
10	BH-5	SPT-1	1.00-1.45	-	-	81	80	80	76	73	25	17	8	CL	0.12	0.014	0.0044	7.52
11	BH-5	DS-1	5.40-5.40	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-
12	BH-6	SPT-2	2.00-2.45	-	-	100	100	100	99	98	34	21	13	CL	-	-	-	-
13	BH-6	DS-1	2.80-2.90	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-
14	BH-6	DS-2	4.30-4.30	-	28	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TP-1	DS-2	2.00-2.00	-	-	100	100	99	97	93	27	20	7	CL	-	-	-	-
16	TP-2	BS-1	1.00-1.30	1.61	24	99	98	98	98	95	31	20	11	CL	-	-	-	-
17	TUBEWELL (NEAR BH-4)	WS-1	-	-	-	-	-	-	-	-	-	-	-	-	740 ppm	274 ppm	50 ppm	7.50

SOILCON

SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWINI
 SITE SUNDER ROAD
 BOREHOLE BH-1 SAMPLE SPT-1
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 1.00 - 1.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G-1	11	1.00	1.45	-	-	3	97			1.0E-17*	5.9E-22*	2.0E-30*	6.7E-039*	1.5E+21	5.8E-05

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003

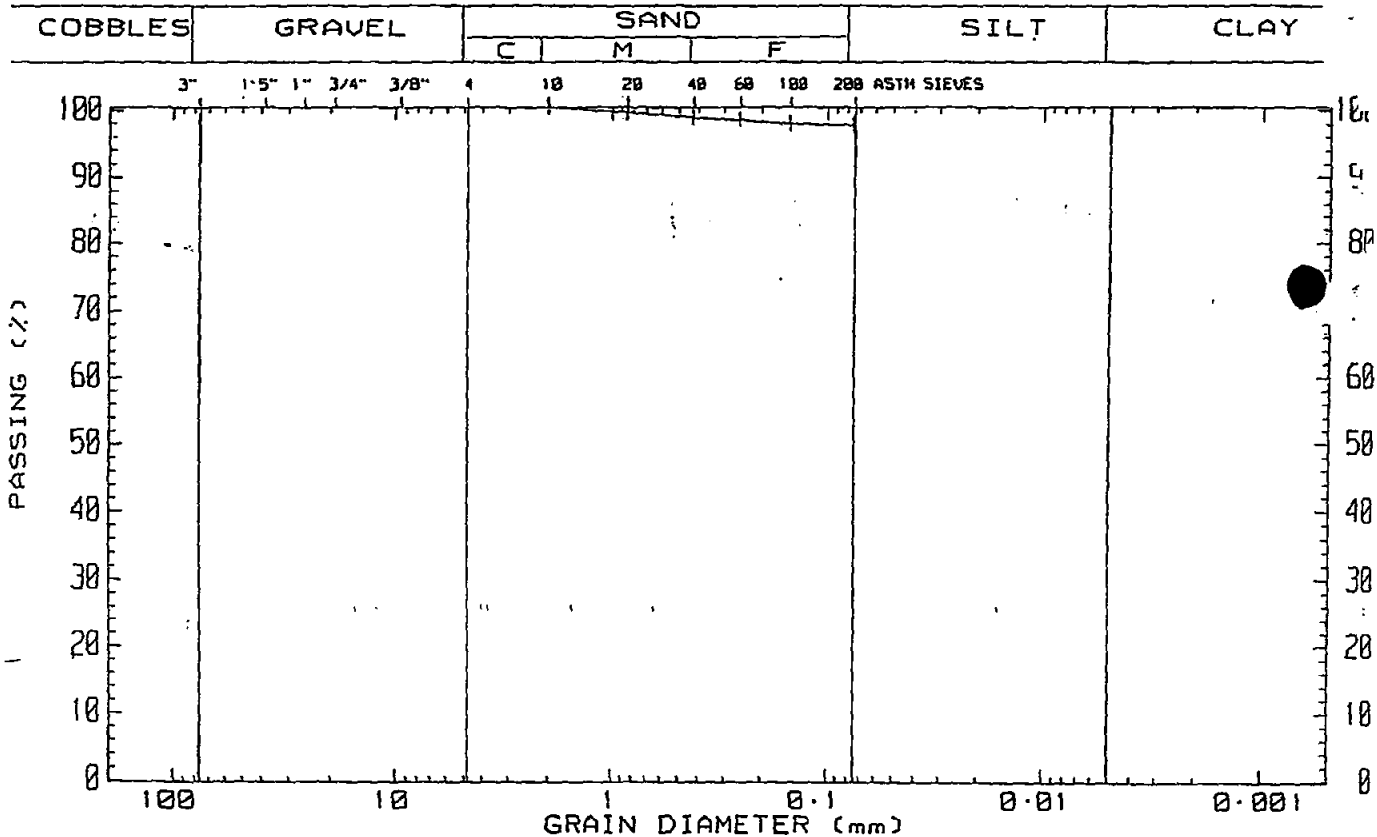
[Handwritten Signature]

SOILCO

SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M.

CLIENT NESPAK
PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT
SITE SUNDER ROAD
BOREHOLE BH-1 SAMPLE SPT-5
SPECIMEN 1 TYPE DISTURB
DEPTH [m] 5.00 - 5.45
TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G-1	11	5.00	5.45	-	-	3	97			2.1E-49	3.9E-62	1.3E-87	4.7E-113	4.4E+63	1.9E-13

NOTES

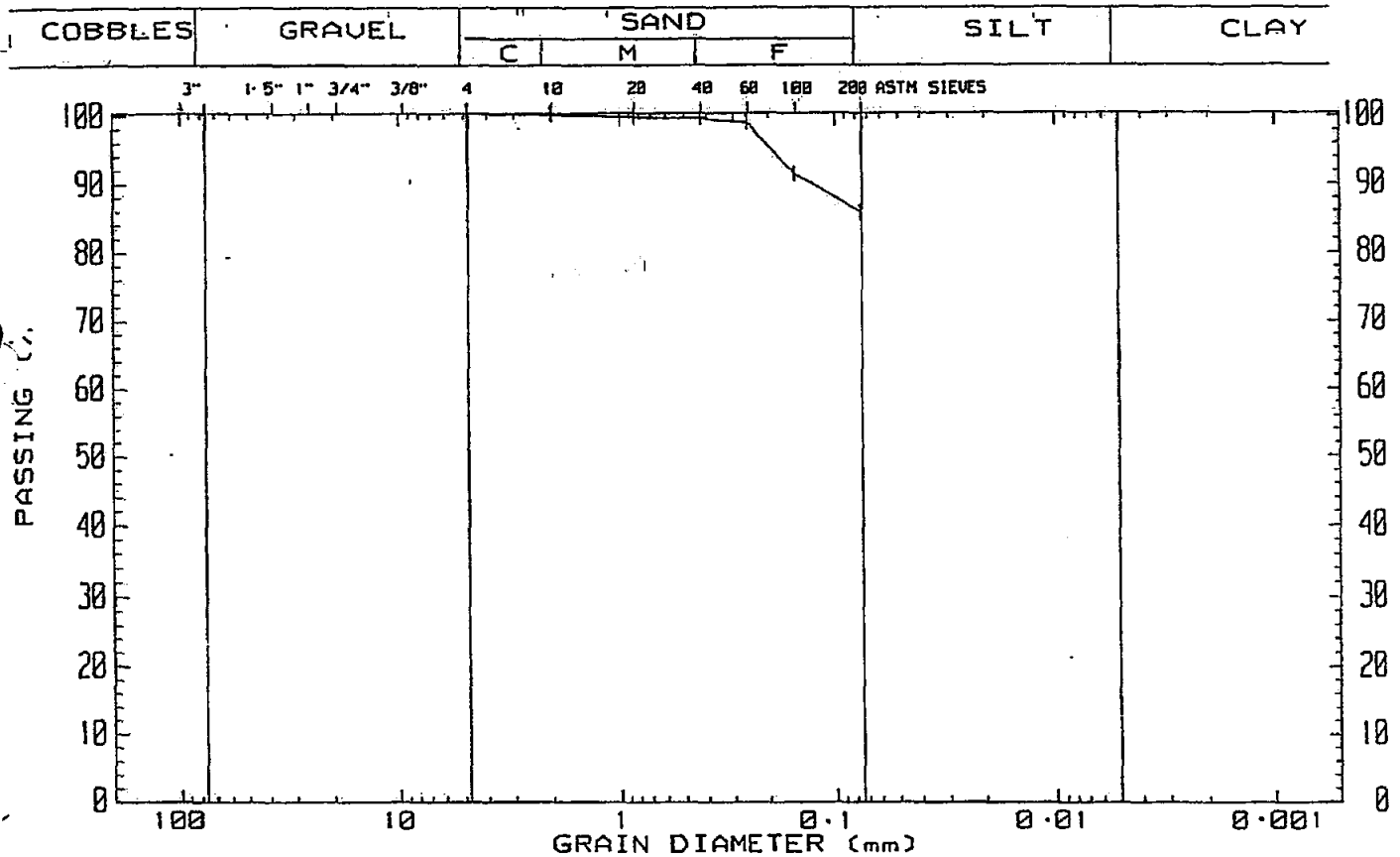
* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
Gr1 LAB REF 74/2003

SOILCON

SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE BH-2 SAMPLE SURFACE
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 0.00 - 0.10
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G-1	1	0.00	0.10	-	-	15	85			2.9E-03*	8.3E-04*	6.6E-05*	5.2E-006*	5.6E+02	2.8E-01

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr1 LAB REF 74/2003

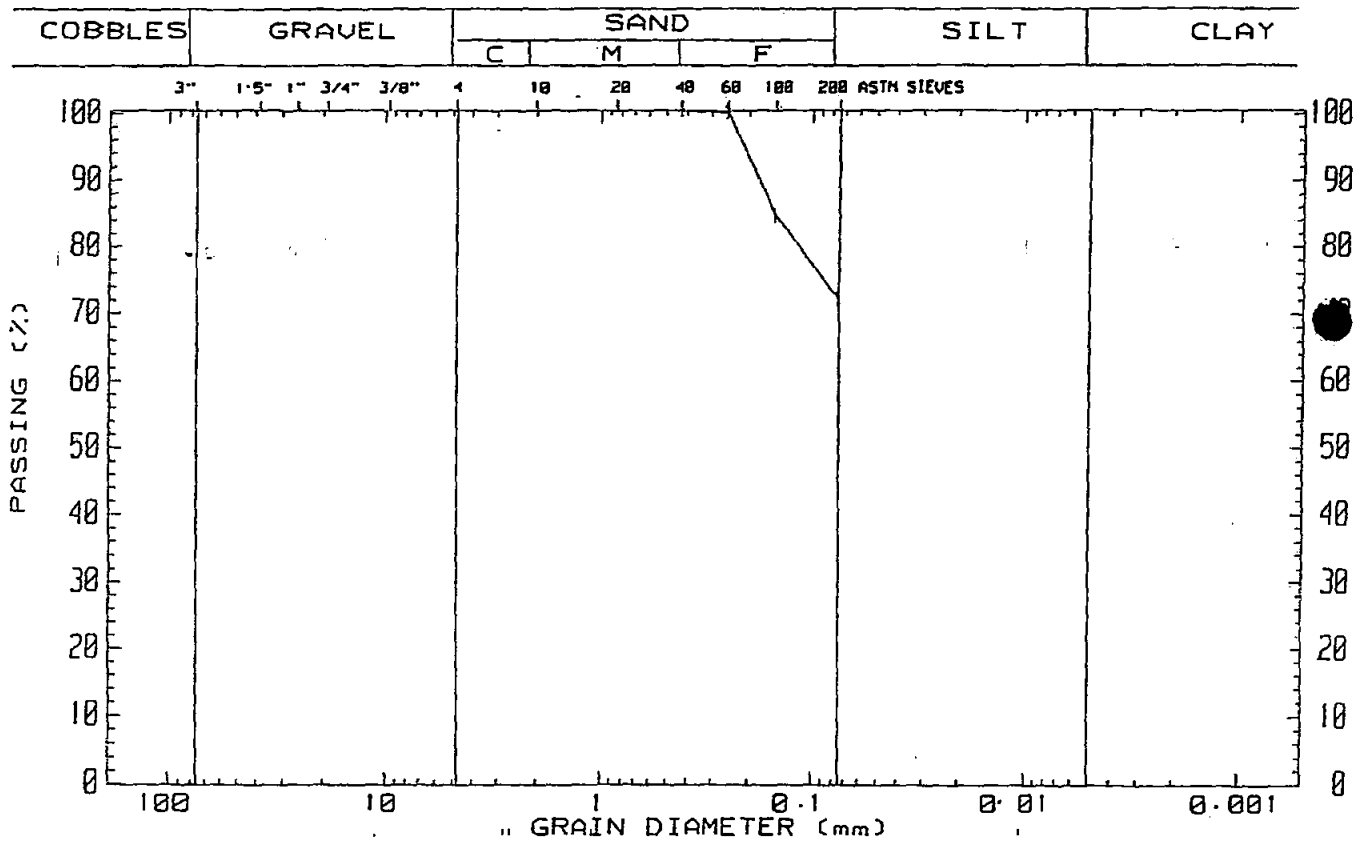
24.09.2003

SOILCON

SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR-Z.M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAM
 SITE SUNDER ROAD
 BOREHOLE BH-2 SAMPLE SPT-3
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 3.00 - 3.45
 TEST DATE 24-09-03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
Gr 1	1	3.00	3.45	-	-	20	72			3.8E-02*	2.2E-02*	7.0E-03*	2.3E-003*	1.7E+01	5.7E-01

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr1 LAB REF 74/2003

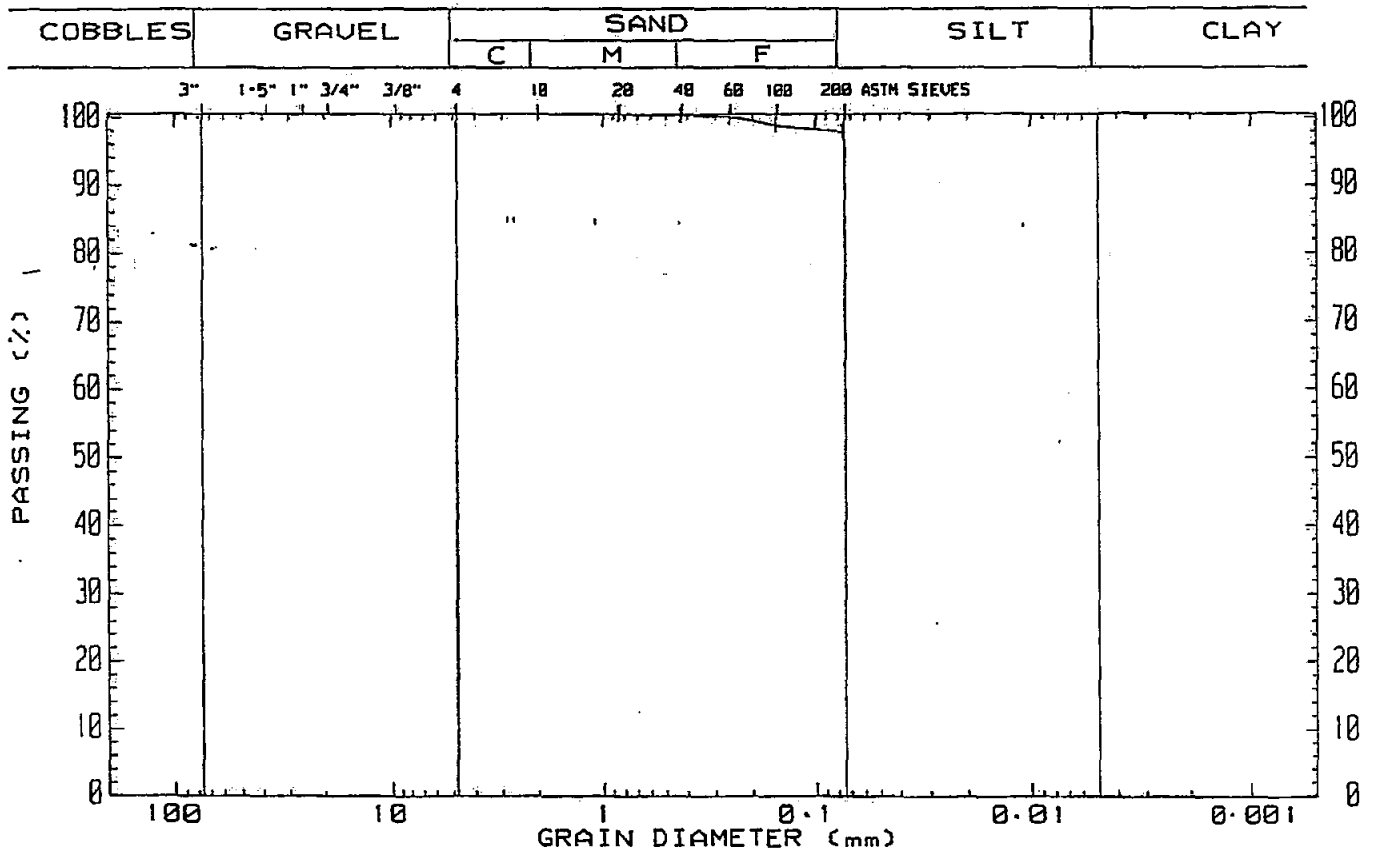
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SOILCON

SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE BH-3 SAMPLE SPT-2
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 2.00 - 2.45
 TEST DATE 24-09-03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING %200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	Cu	Cc
		from	to												
G-1	1	2.00	2.45	-	-	3	97			1.1E-13*	7.2E-17*	3.4E-23*	1.6E-029*	6.6E+15	6.9E-04

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003

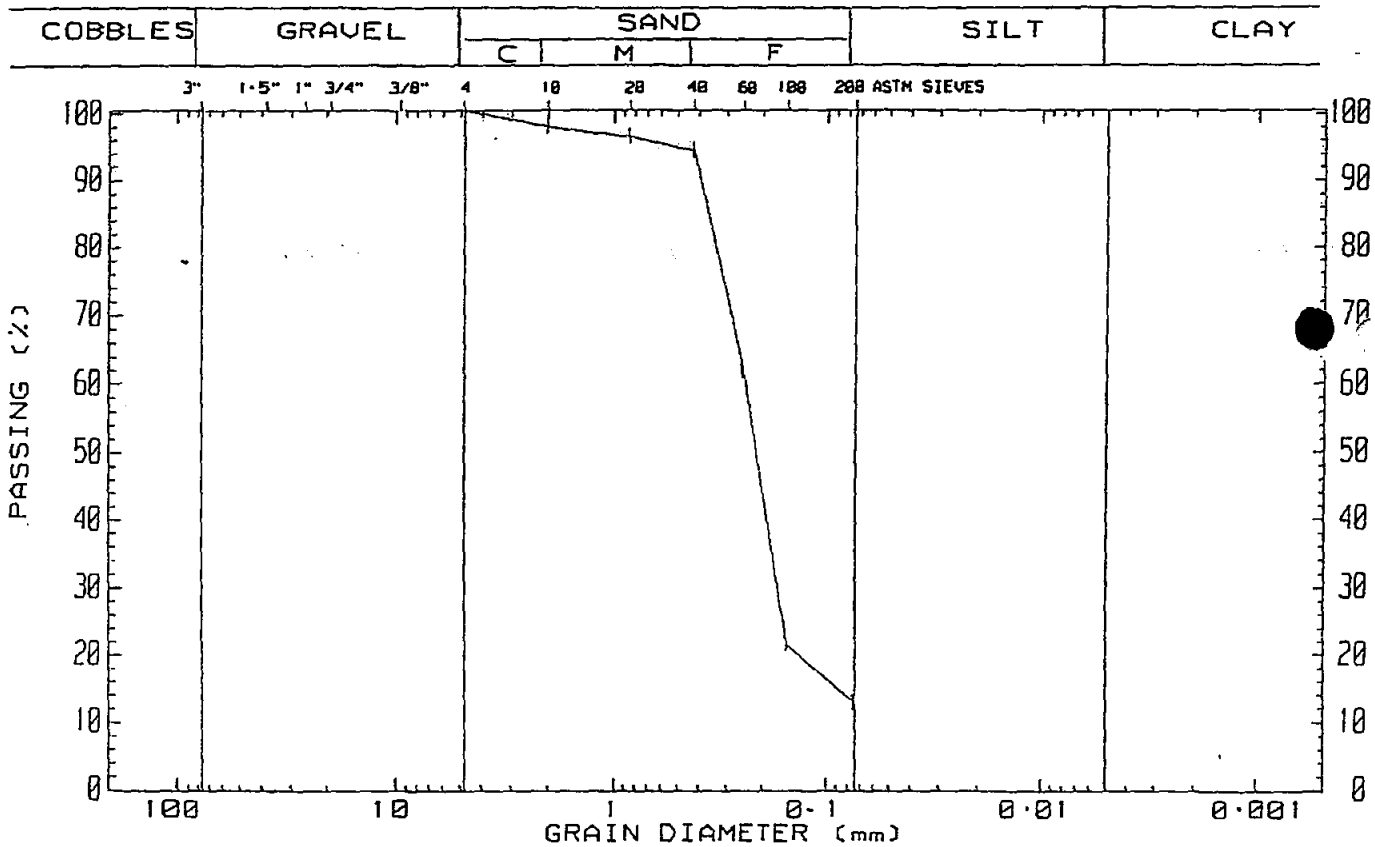
SOILCOI

SOIL MECHANICS LABORATORY

GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RA
 SITE SUNDER ROAD
 BOREHOLE BH-3 SAMPLE SPT-4
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 4.00 - 4.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	Cu	Cc
		from	to												
Gr	11	4.00	4.45	-	-	87	13		-	2.4E-01	2.2E-01	1.7E-01	5.9E-002	4.2E+00	1.9E+00

NOTES.

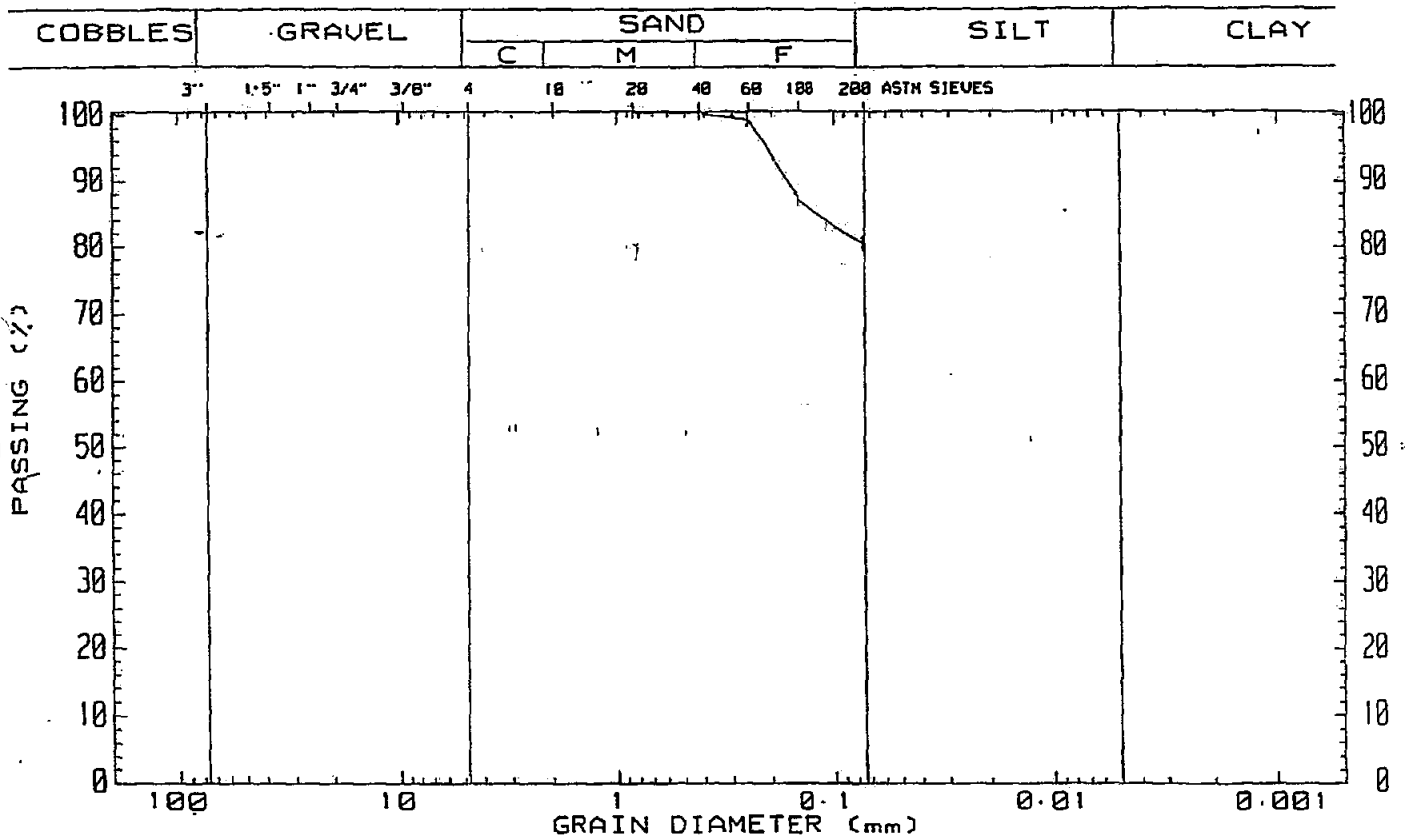
* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr-1 LAB REF 74/2003

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SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z.M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE BH-3A SAMPLE SPT-1
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 0.00 - 0.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G-1	11	0.00	0.45	-	-	20	80			9.6E-03*	3.4E-03*	4.4E-04*	5.6E-005*	1.7E+02	3.6E-01

NOTES

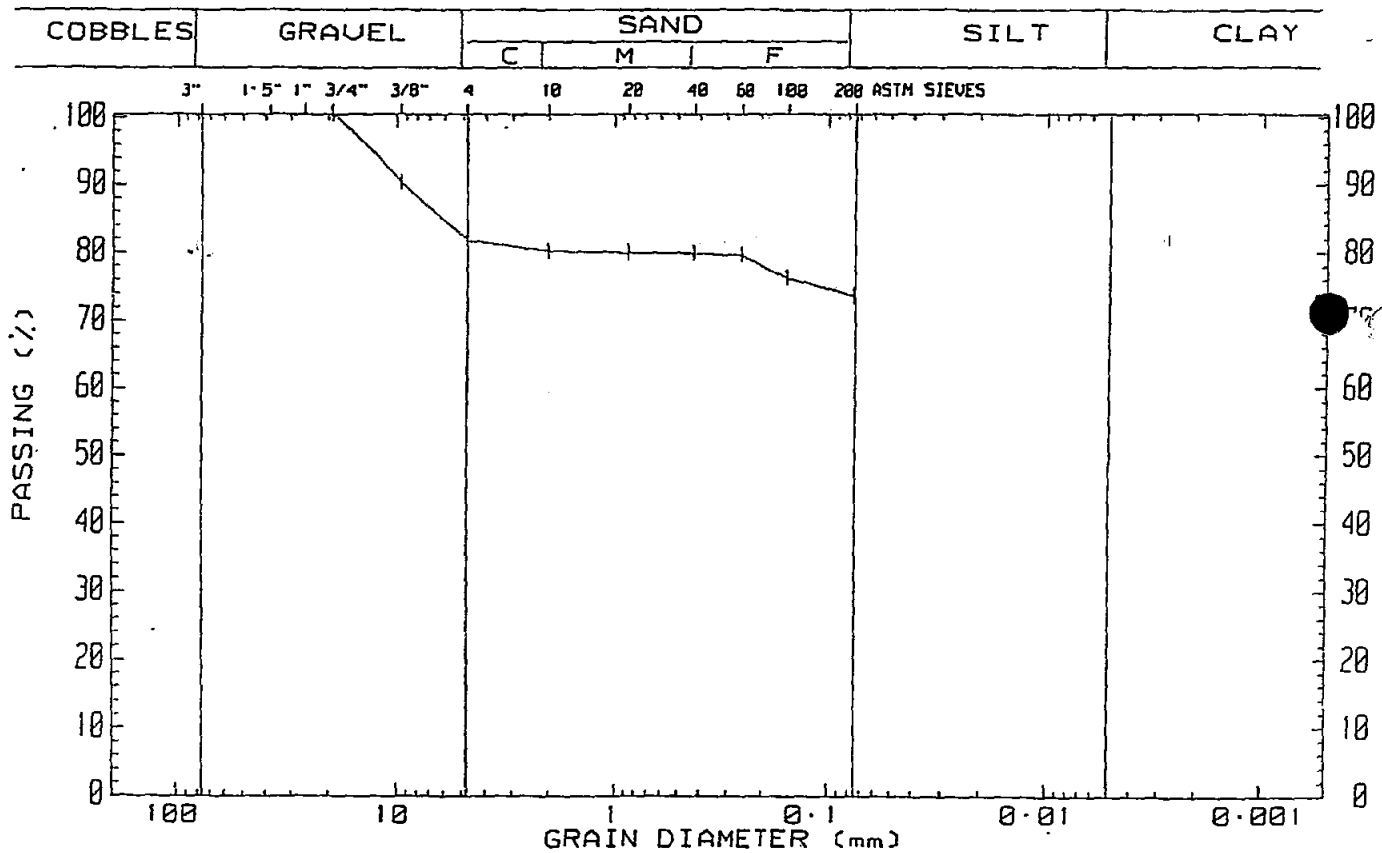
* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003

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SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M.

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RA
 SITE SUNDER ROAD
 BOREHOLE BH-5 SAMPLE SPT-1
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 1.00 - 1.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G	11	1.00	1.45	-	19	8	73			2.0E-03*	1.3E-04*	5.4E-07*	2.3E-009*	8.6E+05	6.5E-02

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003

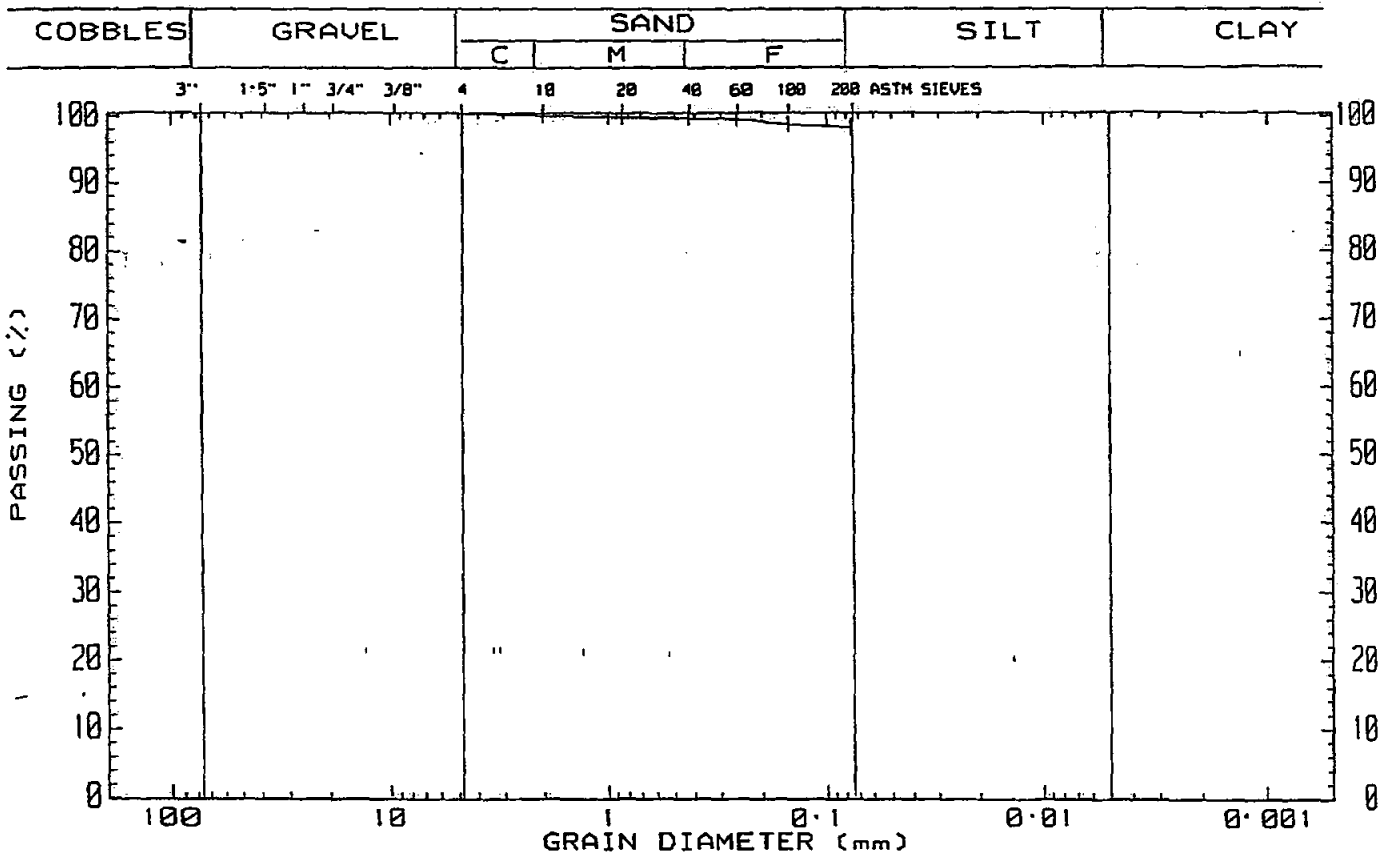
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SOILCON

SOIL MECHANICS LABORATORY GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M.

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIN
 SITE SUNDER ROAD
 BOREHOLE BH-6 SAMPLE SPT-2
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 2.00 - 2.45
 TEST DATE 24-09-03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G	11	2.00	2.45	-	-	2	98			5.0E-30*	1.8E-37*	2.4E-52*	3.1E-067*	1.6E+37	3.6E-08

NOTES

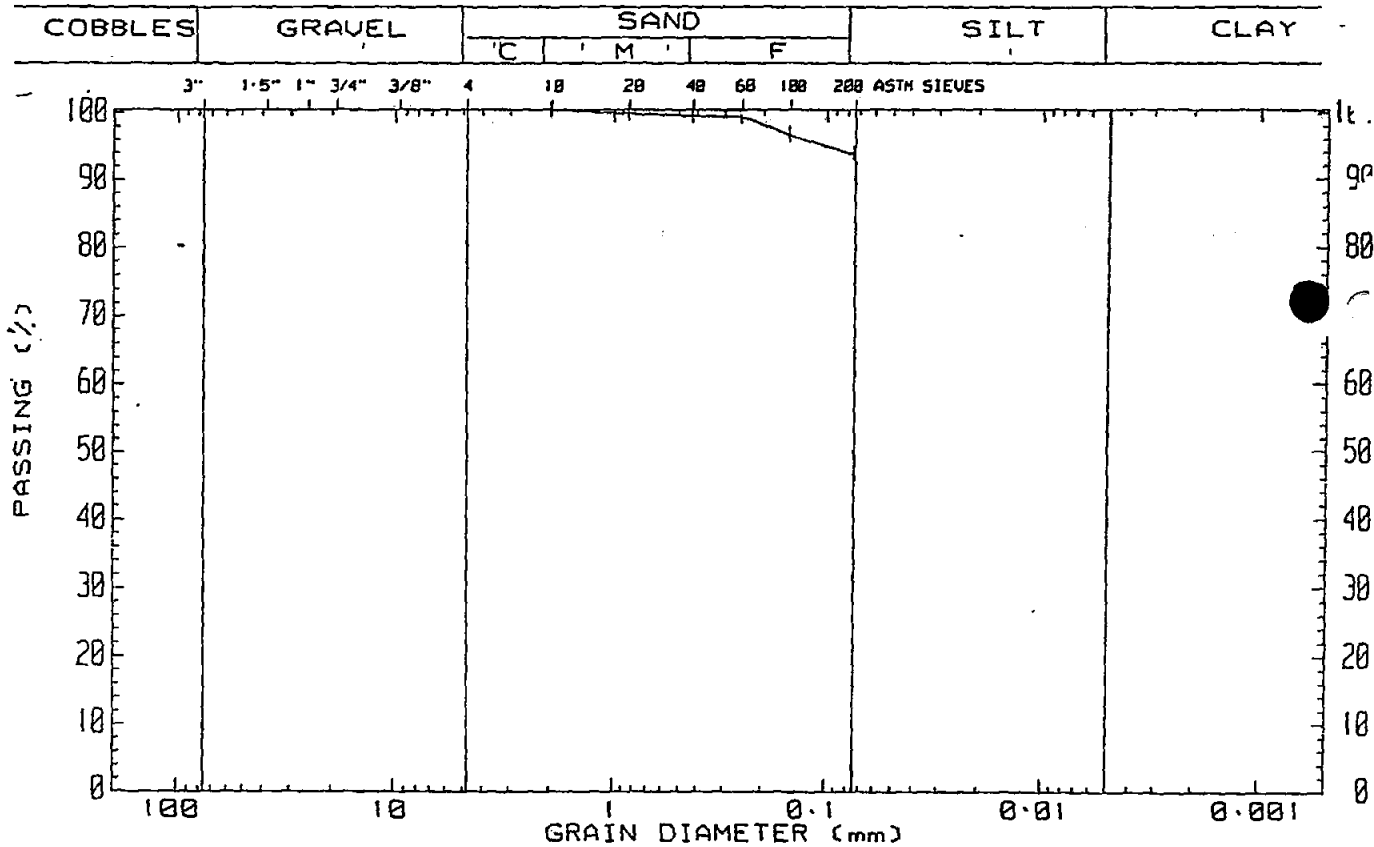
* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr-1 LAB REF 74/2003

SOILCL

SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M.

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT
 SITE SUNDER ROAD
 BOREHOLE TP-1 SAMPLE DS-2
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 2.00 - 2.00
 TEST DATE 24-09-03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
9	11	2.00	2.00	-	-	7	93			2.3E-05*	2.0E-06*	1.6E-08*	1.2E-010*	1.8E+05	8.0E-02

NOTES

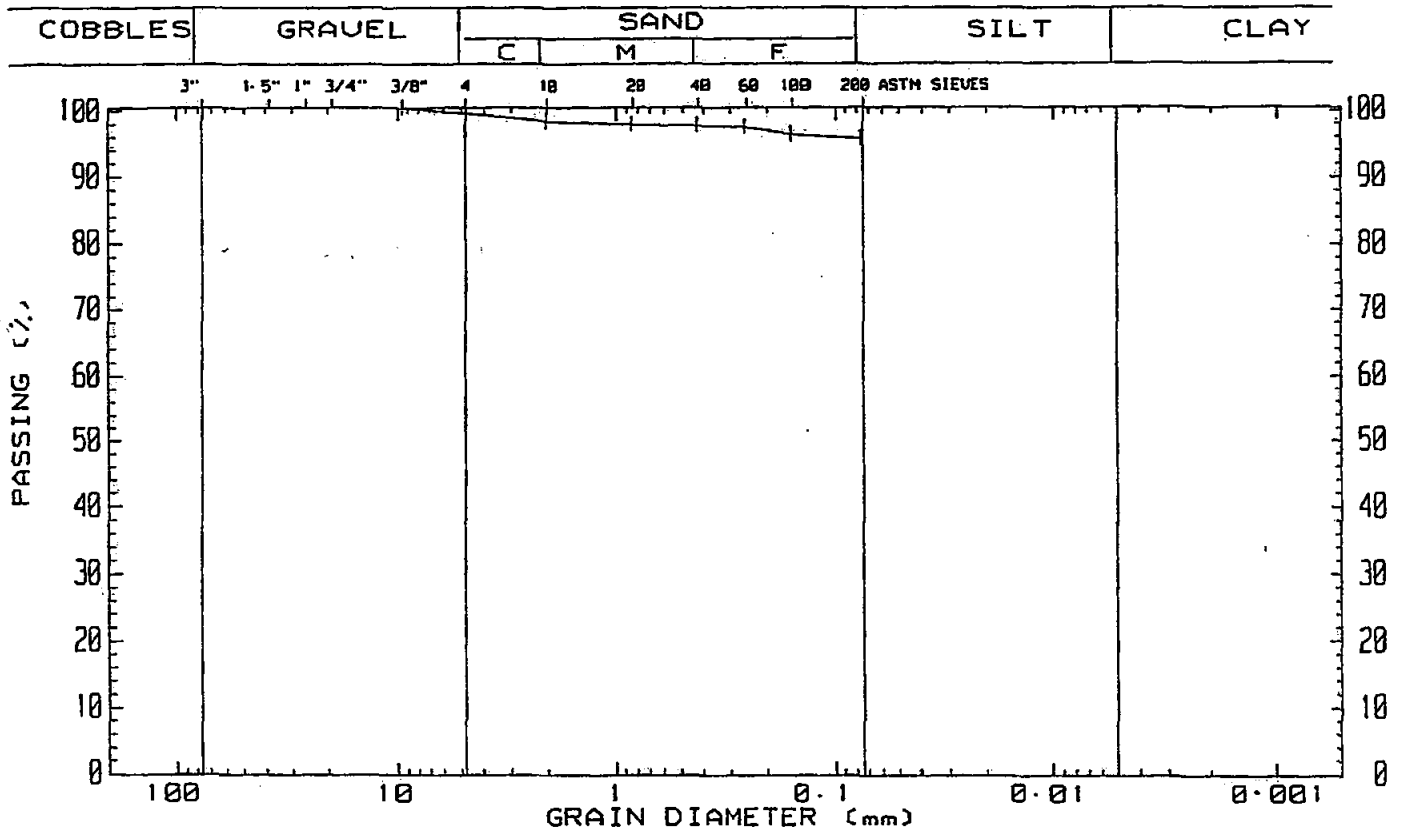
* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr1 LAB REF 74/2003

SOILCON

SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE TP-2 SAMPLE BS-1
 SPECIMEN 1 TYPE UNDISTURBED
 DEPTH [m] 1.00 - 1.30
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	Cu	Cc
		from	to												
G-1	11	1.00	1.30	-	1	4	95			4.7E-20*	3.4E-25*	1.8E-35*	9.8E-046*	4.8E+25	7.3E-06

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003

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Geotechnical Testing Laboratories

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LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :.. INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND-SUNDER ROAD**Location :.. RAIWIND****Client :. NESPAK****BH / TP.No.:.BH-1****Sample No.: SPT-1****Depth:. (m): 1.00—1.45**

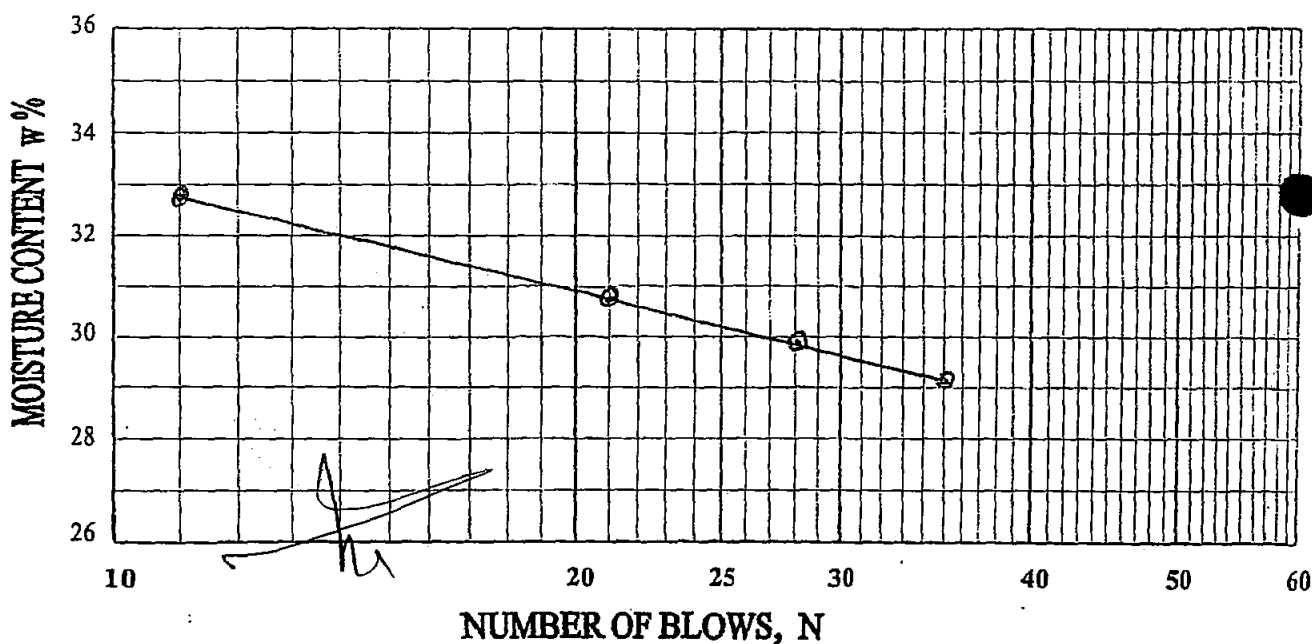
LIQUID LIMIT

Number of Blows, N	11	21	28	35	
Moisture Content %	32.81	30.82	29.91	29.10	

PLASTIC LIMIT

Moisture Content %	19.76	20.19	19.99
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
30 %	20 %	10

**Lab Ref :**
74/2003**Tested By :**
Saeed**Approved By:**
Engr. Zubair
Masoud**Dated :**
24/09/2003

**SOILCON**

Geotechnical Testing Laboratories

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LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD**Location : RAIWIND****Client :: NESPAK****BH / TP.No.: BH-1****Sample No.: SPT-5****Depth.. (m) : 5.00—5.45**

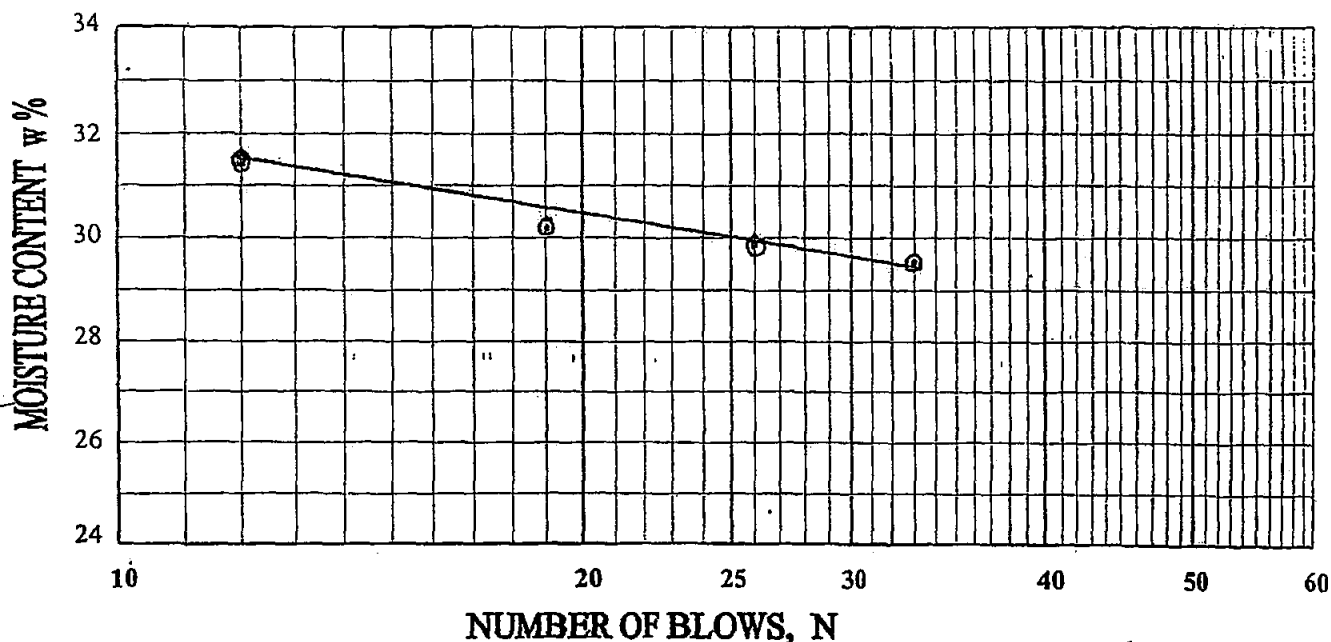
LIQUID LIMIT

Number of Blows, N	12	19	26	33	
Moisture Content %	31.46	30.15	29.90	29.46	

PLASTIC LIMIT

Moisture Content %	20.19	20.18	20.05
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
30 %	20 %	10

**Lab Ref :**
74/2003**Tested By :**
Saeed**Approved By:**
Engr. Zubair
Masoud**Dated :**
24/09/2003

**SOILCON**

Geotechnical Testing Laboratories

18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT : INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND-SUNDER ROAD**Location :** RAIWIND**Client :** NESPAK**BH / TP.No.:** BH-2**Sample No.:** DS-1 Surface**Depth:** (m) 0.00—0.10

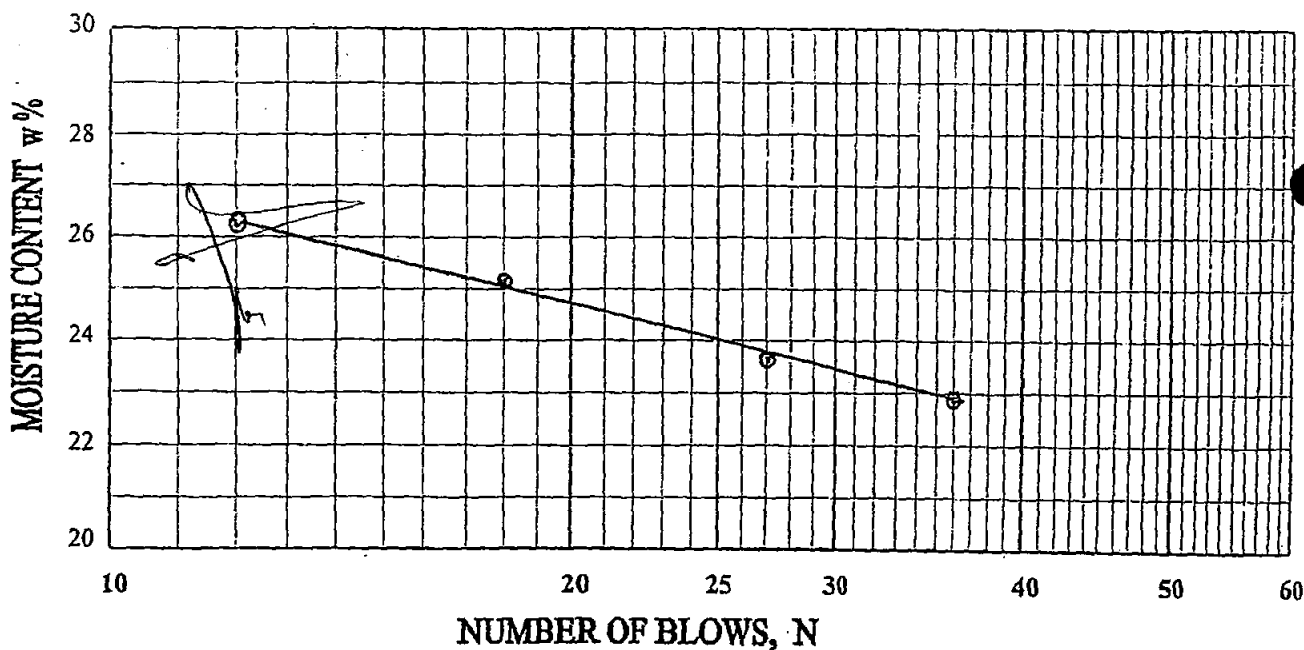
LIQUID LIMIT

Number of Blows, N	12	18	27	36	
Moisture Content %	26.17	25.10	23.63	22.90	

PLASTIC LIMIT

Moisture Content %	17.81	17.62	17.80
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
24 %	18 %	06



Lab Ref : 74/2003	Tested By : Saeed	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT : INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD		
Location : RAIWIND		Client : NESPAK
BH / TP.No.:BH-3	Sample No. SPT-2	Depth:. (m): 2.00—2.45

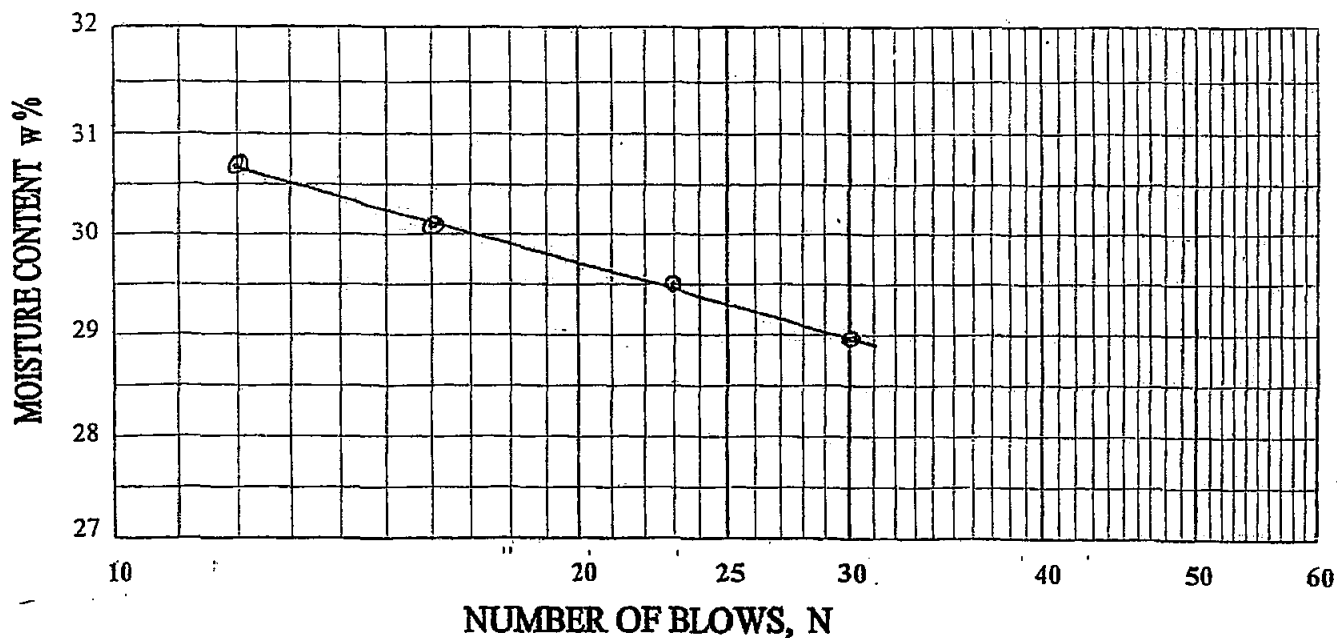
LIQUID LIMIT

Number of Blows, N	12	16	23	30	
Moisture Content %	30.63	30.09	29.50	28.95	

PLASTIC LIMIT

Moisture Content %	21.01	20.98	21.10
---------------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
29 %	21 %	08



Lab Ref : 74/2003	Tested By : Saeed	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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Geotechnical Testing Laboratories

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LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND - SUNDER ROAD		
Location :: RAIWIND		Client:: NESPAK
B.H / T.P. No.:: BH-2	Sample No.:: SPT-3	Depth:: (m): 3.00—3.45

LIQUID LIMIT

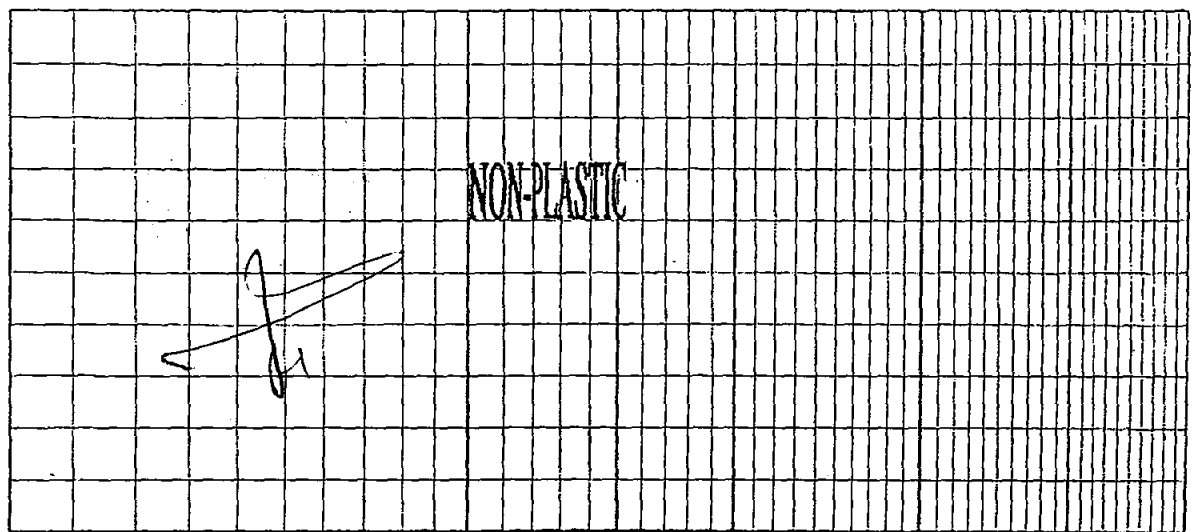
Number of Blows, N	11	Further reading not possible	
Moisture Content %	25.78		

PLASTIC LIMIT

Moisture Content %			
--------------------	--	--	--

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
- %	- %	-

MOISTURE CONTENT W %



10 20 25 30 40 50 60

NUMBER OF BLOWS, N

Lab Ref : 74/2003	Tested By : M.Saleem	Checked By.:: M.Saleem	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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**SOILCON**Geotechnical Testing Laboratories
18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :.. INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND-SUNDER ROAD**Location :.. RAIWIND****Client :. NESPAK****BH / TP.No.:BH-3A****Sample No.: SPT- 0/****Depth:. (m): 0.00—0.45**

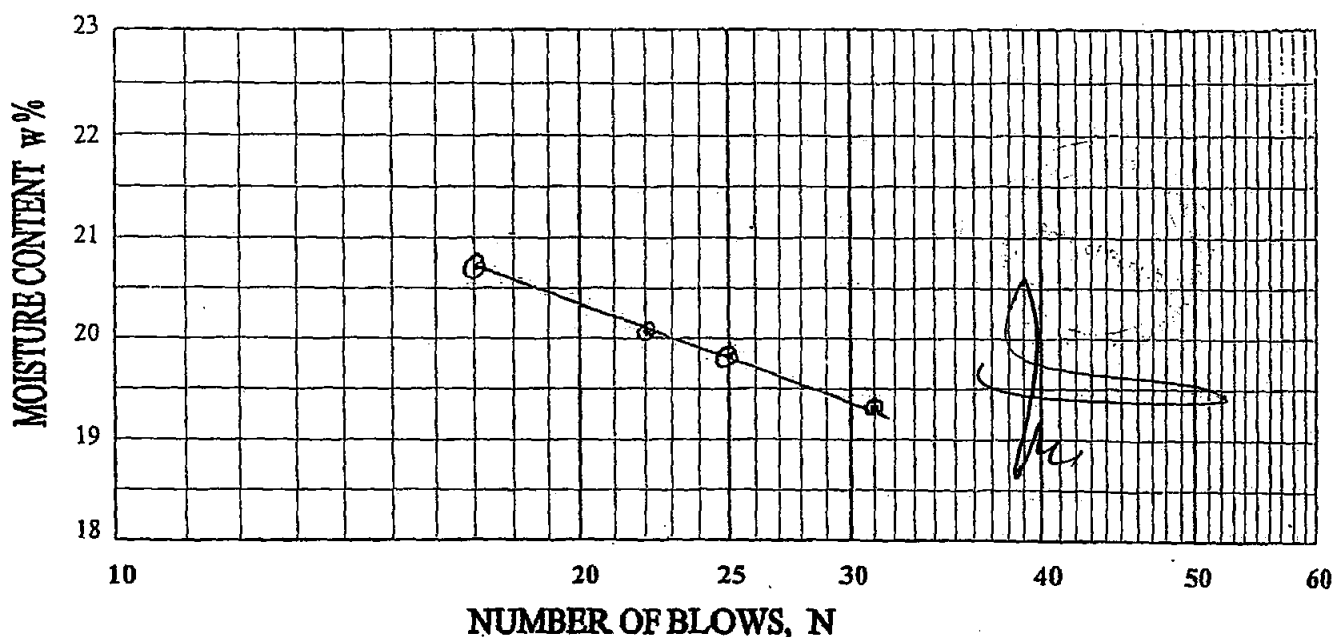
LIQUID LIMIT

Number of Blows, N	17	22	25	31	
Moisture Content %	20.69	20.05	19.79	19.34	

PLASTIC LIMIT

Moisture Content %	14.94	14.76	14.83
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
20 %	15 %	05



Lab Ref : 74/2003	Tested By : Saleem	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
----------------------	-----------------------	--	-----------------------

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Geotechnical Testing Laboratories

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LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD**Location : RAIWIND****Client :: NESPAK****BH / TP.No.: BH-5****Sample No.: SPT-1****Depth.: (m): 1.00—1.45**

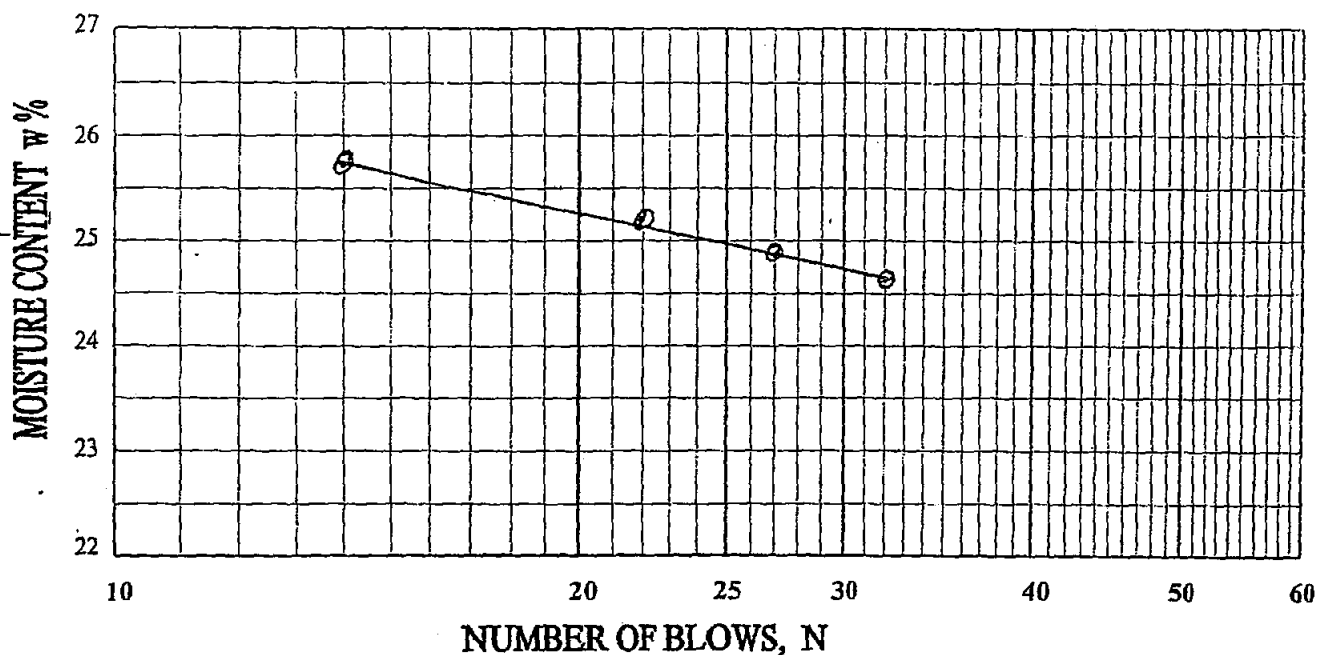
LIQUID LIMIT

Number of Blows, N	14	22	27	32	
Moisture Content %	25.68	25.18	24.85	24.65	

PLASTIC LIMIT

Moisture Content %	17.24	17.35	17.38
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
25 %	17 %	08



Lab Ref : 74/2003	Tested By : M. Saleem	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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Geotechnical Testing Laboratories

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LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND - SUNDER ROAD**Location : RAIWIND****Client : NESPAK****BH / TP.No.: BH-6****Sample No.: SPT-2****Depth: (m): 2.00—2.45**

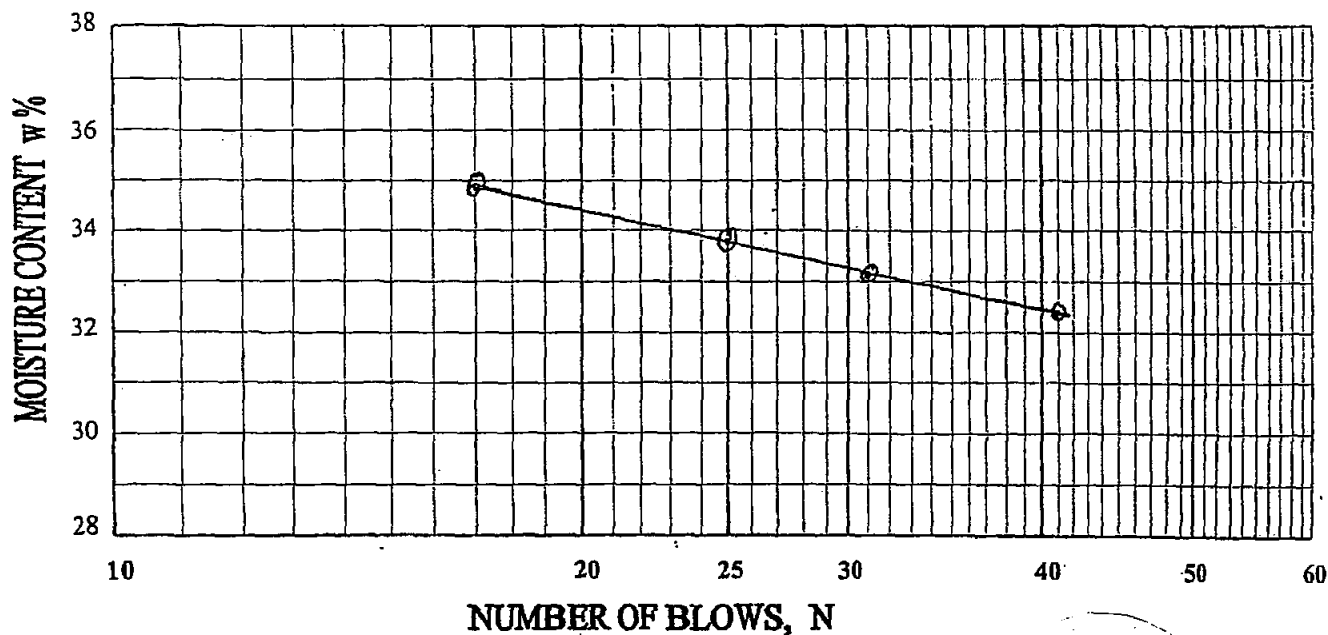
LIQUID LIMIT

Number of Blows, N	17	25	31	41	
Moisture Content %	34.90	33.71	33.10	32.37	

PLASTIC LIMIT

Moisture Content %	21.01	21.19	21.11
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
34 %	21 %	13



Lab Ref : 74/2003	Tested By : Saeed	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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LIQUID & PLASTIC LIMIT (ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD

Location : RAIWIND

Client :: NESPAK

BH / TP.No.:: TP-1

Sample No. DS-2

Depth:: (m): 2.00

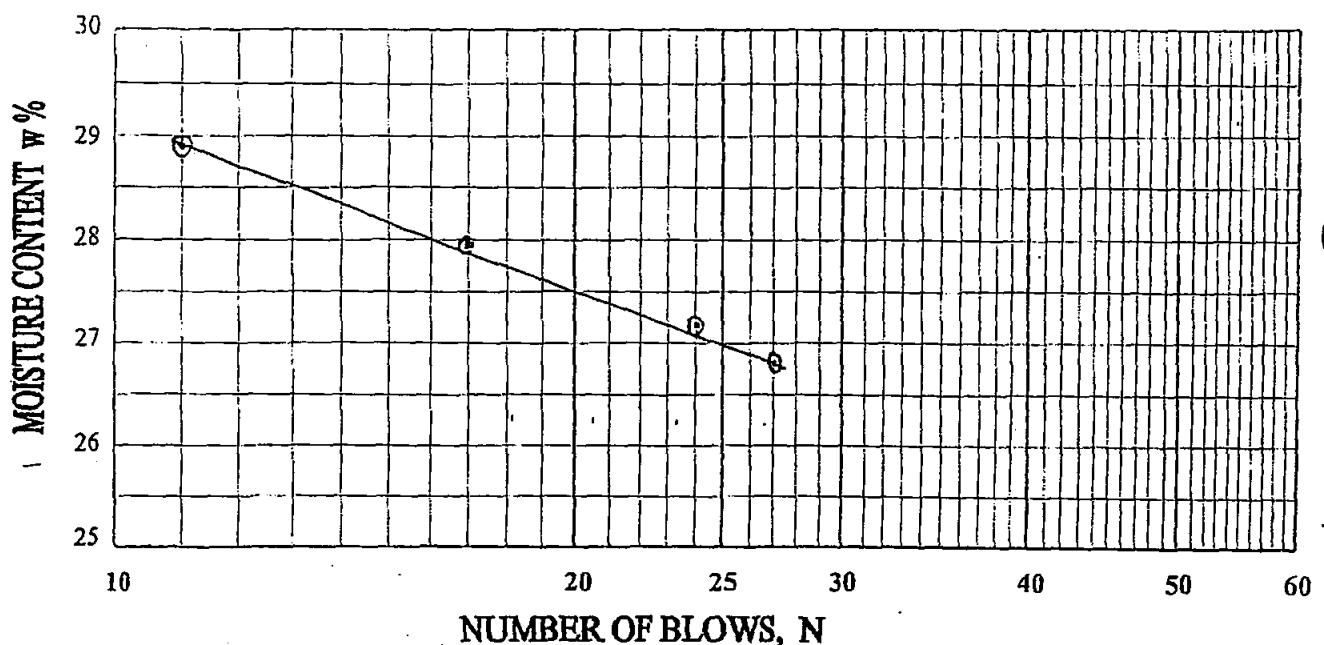
LIQUID LIMIT

Number of Blows, N	11	17	24	27	
Moisture Content %	28.89	27.96	27.15	26.78	

PLASTIC LIMIT

Moisture Content %	19.78	19.84	19.82
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
27 %	20 %	07



Lab Ref : 74/2003	Tested By : Saeed	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD**Location : RAIWIND****Client :: NESPAK****BH / TP.No.: TP-2****Sample No.: BS-1****Depth:. (m): 1.00—1.30**

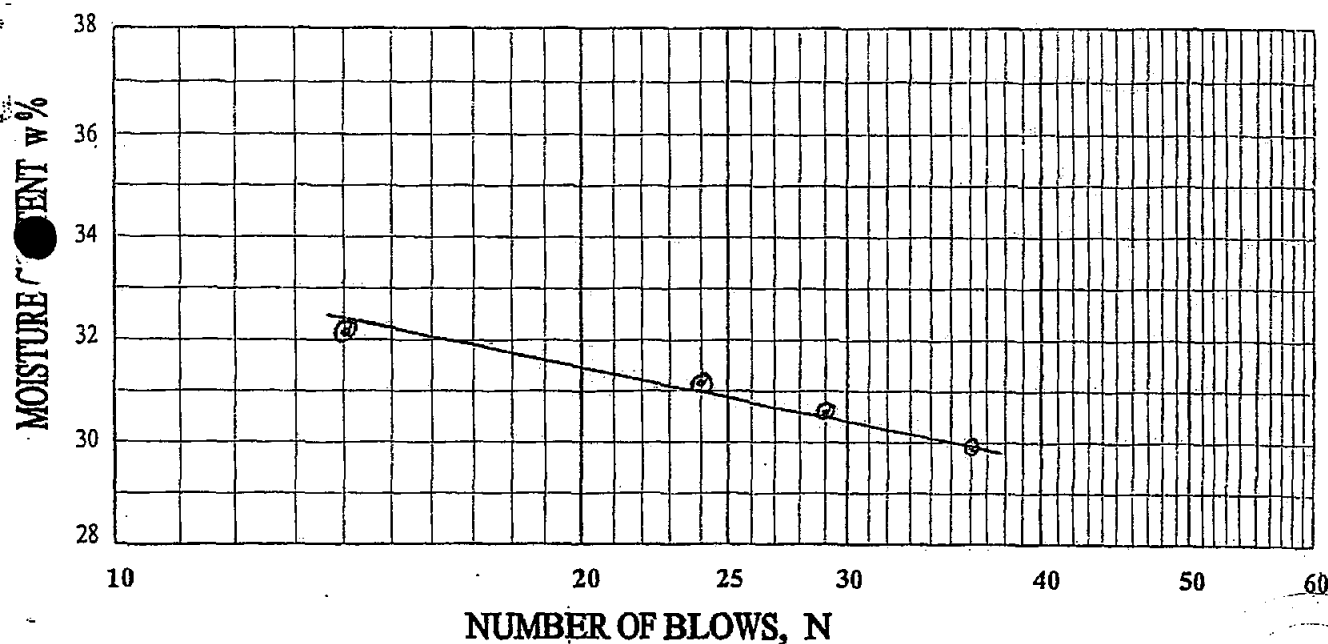
LIQUID LIMIT

Number of Blows, N	14	24	29	36	
Moisture Content %	32.06	31.12	30.61	29.93	

PLASTIC LIMIT

Moisture Content %	20.13	20.32	20.37
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
31 %	20 %	11



Lab Ref : 74/2003	Tested By : M.Saleem	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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APPENDIX-E

PLATES

A handwritten signature or set of initials, possibly 'Jm', written in a cursive style.

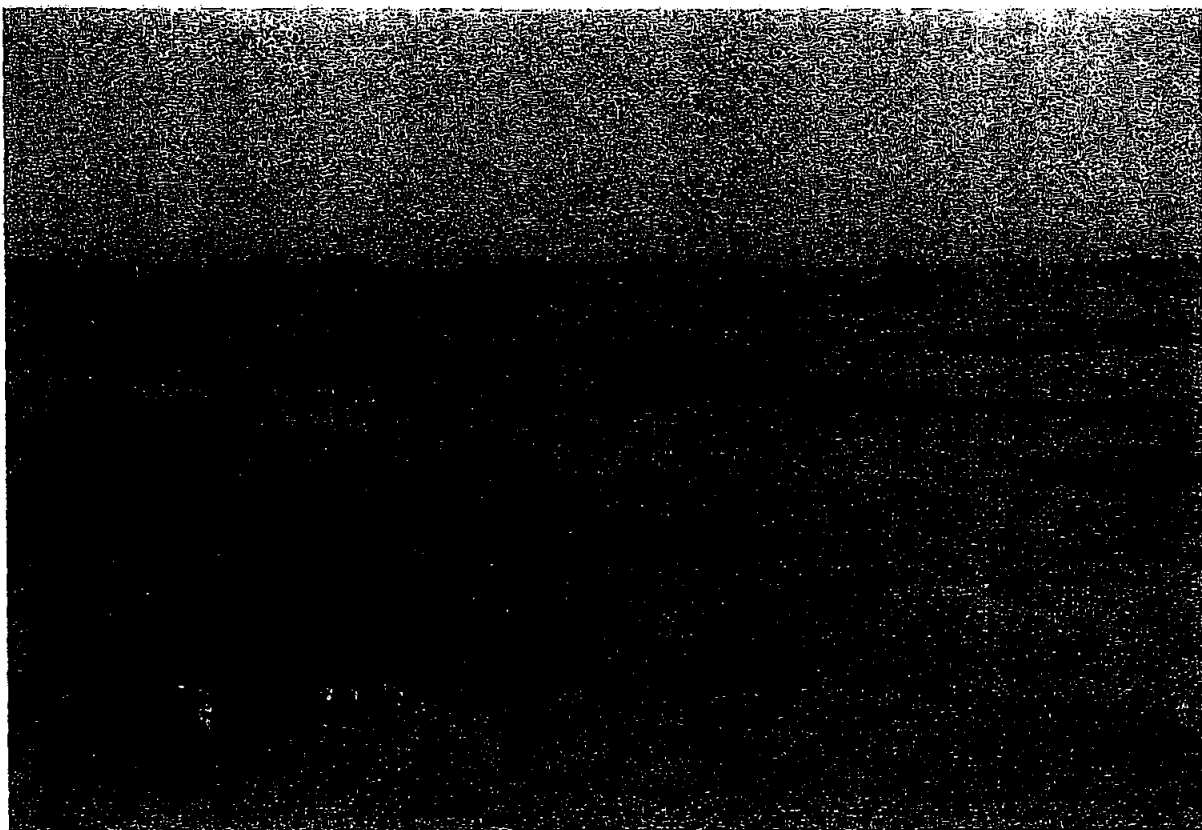


Plate 1: A panoramic view of the proposed industrial estate site, looking towards north-west direction

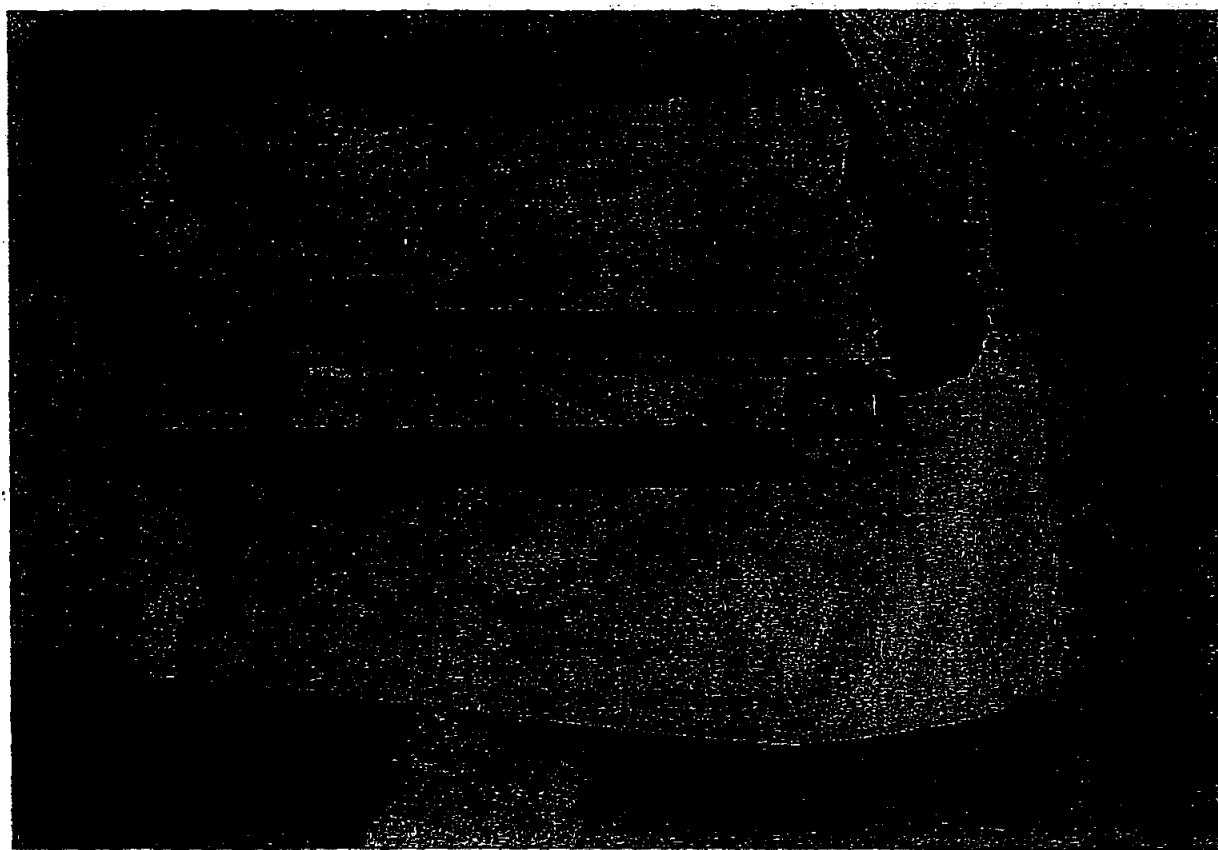


Plate2: Standard Penetration Test (SPT) sample being extracted from split barrel

[Handwritten signature]

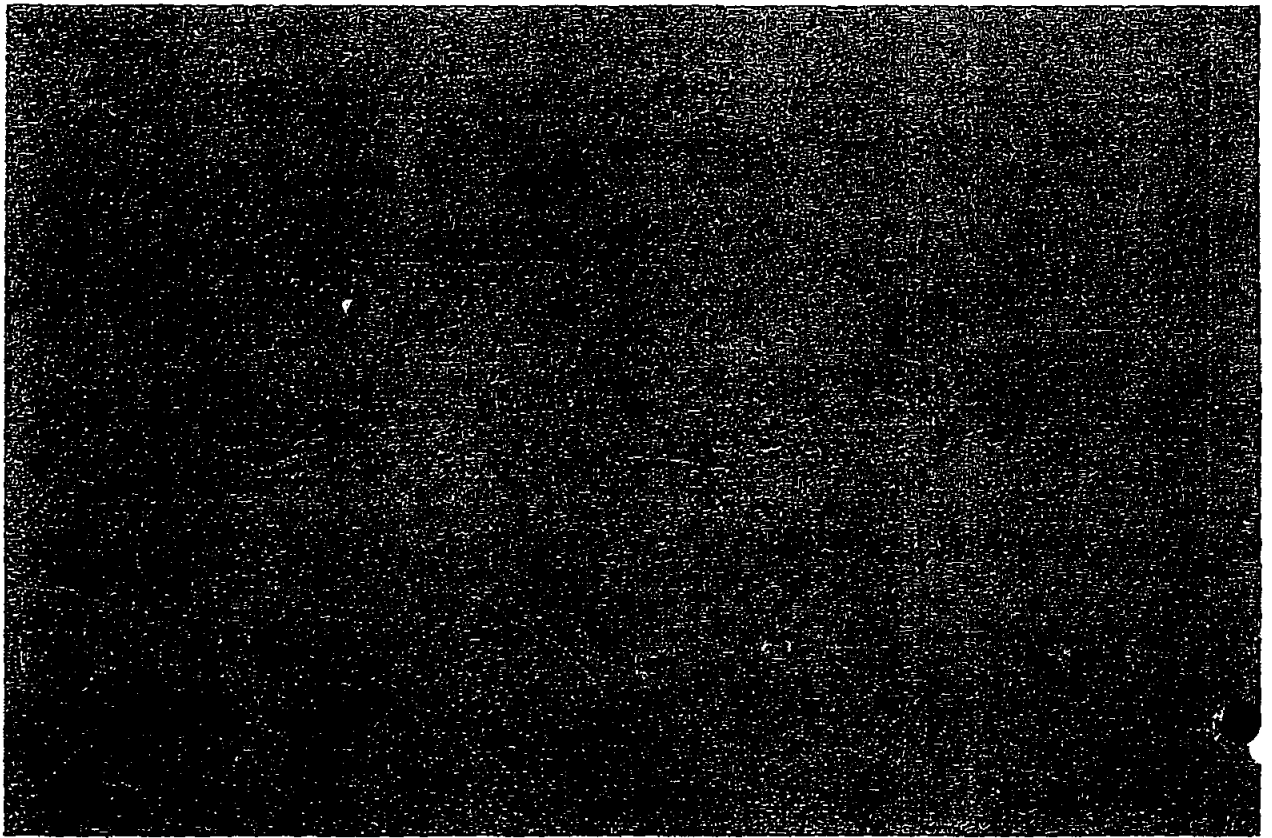


Plate 3: Surface cracks visible in the dry pockets at the site, indicating slightly swelling nature of soil

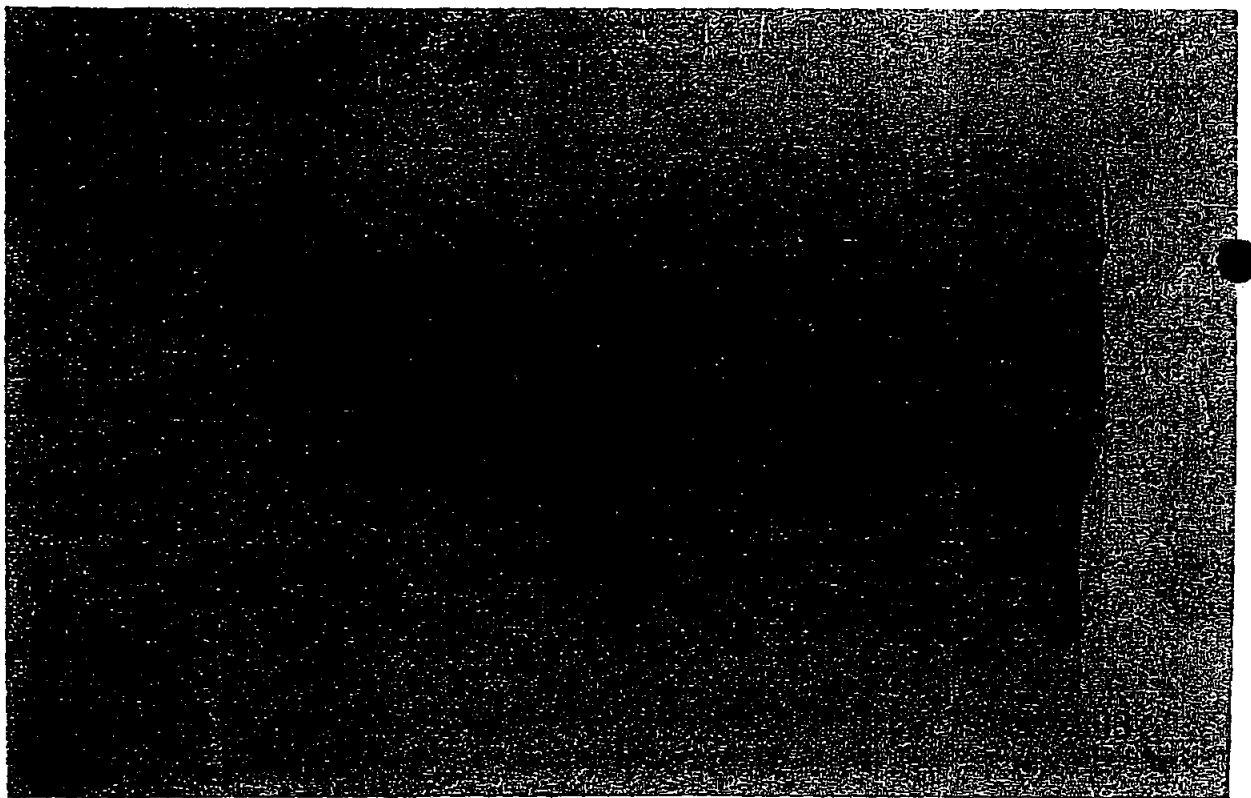


Plate 4: A view of an excavated test pit for physical inspection of the ground

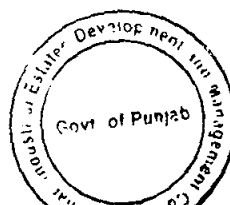
**Punjab Industrial Estate Development and
Management Company (G) Limited**

**PROPOSED INDUSTRIAL ESTATE AT
RAIWIND-SUNDER ROAD**

**REPORT ON
EVALUATION OF SITE FOR
SUITABILITY OF CONSTRUCTION**

OCTOBER 2003

*1x Set
Given to PEO
for Record.*



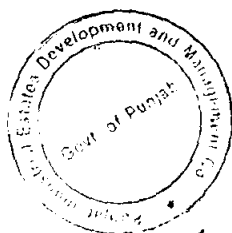
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
Geotechnical & Geoenvironmental Engineering Division
NESPAC House, 1-C, Block N, Model Town Extension, Lahore
Email: gtmesp@vol.net.pk

156-02/024/M/30/(2003)

**Punjab Industrial Estate Development and
Management Company (G) Limited**

**PROPOSED INDUSTRIAL ESTATE AT
RAIWIND-SUNDER ROAD**

**REPORT ON
EVALUATION OF SITE FOR
SUITABILITY OF CONSTRUCTION**



OCTOBER 2003



NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
Geotechnical & Geoenvironmental Engineering Division
NESPAK House, 1-C, Block N, Model Town Extension, Lahore
Email: gtnesp@wof.net.pk

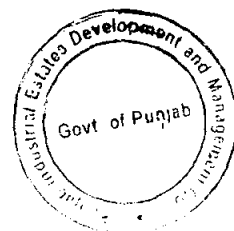
156-02/024/M/30/(2003)

PROPOSED INDUSTRIAL ESTATE AT RAIWIND - SUNDER ROAD

REPORT ON EVALUATION OF SITE FOR SUITABILITY OF CONSTRUCTION

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Fig. A-3	Subsurface Soil Logs
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EXECUTIVE SUMMARY

The Government of the Punjab aims to achieve an orderly, planned and rapid industrialization of the Province by developing a chain of industrial estates in different cities which will provide turnkey solutions to the problems faced by prospective entrepreneurs. The industrial estates will be developed through a new institution, namely the Punjab Industrial Estate Development and Management Company (G) Limited, (PIEDMC).

One of the sites earmarked for this purpose by PIEDMC is located on Raiwind-Sunder Road and is spread over an area of 1000 acres. National Engineering Services Pakistan (Pvt.) Limited (NESPAK) has been engaged for evaluation of the site for suitability of construction.

Limited geotechnical and geophysical studies were considered necessary as a part of the evaluation of the site for this specific purpose. These investigations included field investigations, electrical resistivity survey and laboratory testing. Besides, groundwater potential and drainage of the site were also considered.

The field investigations were planned by NESPAK for generating necessary parameters required for the evaluation of the site for construction purposes. These were carried out by hiring a specialist drilling contractor viz. M/s Berkeley Associates Lahore, under full-time supervision of experienced geotechnical engineers of NESPAK. The field work comprised drilling of seven boreholes of upto 5m depth, excavation of two testpits of 2m depth each and electrical resistivity survey. Specific field tests and soil sampling were also carried out in the boreholes and testpits.

The representative soil samples were tested in SOILCON Geotechnical Testing Laboratories, Lahore, for classification and limited chemical testing.

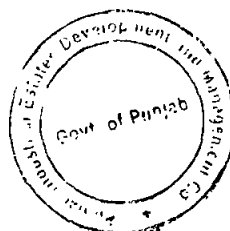
The lithological distribution of soils consists of slightly cohesive, generally firm to stiff silty clay/ lean clay from 1.0 to 3.5m depth, followed by firm to stiff sandy silt/silt of 1.0 to 3.0m thickness in turn followed by medium dense silty fine sand. Groundwater is present at a depth of 4.5 to 5.0m below top of ground.

The subsurface generally appears suitable for supporting light to medium loads through spread foundations placed at 1.0 to 2.0m depth. Besides, some isolated weak spots are also expected, which will require special measures to be adopted.

Tests on soil/water samples for determination of amount of aggressive chemicals like sulphates and chlorides in the soil have revealed that salt concentration is high enough to trigger an attack on concrete and steel work below ground. Hence special protection measures would be required to protect the substructures against any chemical attack.

No surface drainage problems are foreseen as water can be disposed in the Rohi nullah flowing in the eastern part of the site. Adequate quantity of good quality groundwater is available below a depth of 50m.-

No cognizable problem is foreseen for the construction of the industrial estate at the Raiwind-Sunder Road site, however, detailed geotechnical investigations will have to be carried out at the detailed design stage, specifically at the locations where large and important structures are planned to be located.



PROPOSED INDUSTRIAL ESTATE AT RAIWIND - SUNDER ROAD

REPORT ON EVALUATION OF SITE FOR SUITABILITY OF CONSTRUCTION

1. INTRODUCTION

1.1 General

Punjab Industrial Estate Development and Management Company (G) Limited (PIEDMC) is planning to develop an Industrial Estate at Raiwind - Sunder Road. The site proposed for this purpose consists of a 1000 acres piece of land located at a distance of about 6 km, off Multan road on Raiwind - Sunder road (Appendix A, Fig.A-1). Physiographically, the site generally consists of barren land with cultivated pockets in the north-west area of the site.

National Engineering Services Pakistan (Pvt) Limited (NESPAK) are providing the necessary engineering consultancy services for the evaluation of site for suitability of construction.

It was planned to evaluate the site by limited geotechnical and geophysical studies, along with visual observations regarding its condition, possible drainage and the conditions of roads and buildings present in the vicinity.

M/s Berkeley Associates Lahore were engaged as the contractor for carrying out geotechnical investigations at the site after competitive bidding. Laboratory testing was carried out at SOILCON Geotechnical Testing Laboratories, Lahore. The entire field work was done under the guidance and full-time supervision of NESPAK geotechnical engineers.

This report presents a summary of the preliminary investigations carried out at the site along with our evaluations and recommendations.

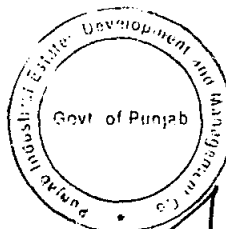
1.2 Objectives of Study

The study was aimed at developing a fair estimate about the suitability of the site for construction and identification of any potential problematic areas. Experts in the fields of geotechnical, groundwater, environment and public health engineering carried out observational studies and limited physical testing to meet the objectives.

1.3 Scope of Work

The scope of work included geotechnical investigations for assessment of foundation conditions, electrical resistivity survey to establish the availability/suitability of groundwater for construction/general use and drainage conditions at the site.

Geotechnical investigations comprised drilling of boreholes, excavation of testpits along with field and laboratory testing.




2. RECONNAISSANCE OF THE SITE

A detailed reconnaissance of the project area was carried out by experts of NESPAK prior to planning the investigation programme, which would best suit the intended objectives. The reconnaissance revealed that the proposed site consists of barren land in general and contains some cultivated pockets in its north-west direction. The site is located on the Raiwind-Sunder road and is also accessible by metalled tracks off-shooting from Raiwind-Sunder road.

The site is fairly level and lies below the adjacent roads by 1.0 to 1.25m. Some of the cultivated fields were watered at the time of the study. Some dry patches show mild alligator cracking of the ground. Rohi nullah crosses the site, in its east direction.

The roadways as well as the structures present in the vicinity of the site did not show any damage/distress, which could be associated to the weak ground condition.

On the basis of the above information, an appropriate study plan was developed and later implemented in the light of the knowledge gained through reconnaissance.

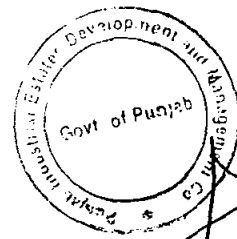


3. ENGINEERING STUDIES

3.1 Planning

The engineering studies at the proposed site were aimed at obtaining information regarding geo-engineering characteristics of the subsoils, groundwater and drainage potential of the site. Following studies were planned to be carried out at the site:

- Execution of boreholes upto a maximum depth of 5.0m using hand auger/light percussion method of boring.
- Performance of standard penetration tests (SPTs) in the boreholes at a depth interval of 1 m together with collection of SPT samples.
- Excavation of testpits upto a maximum depth of 2.0m each below ground level.
- Collection of undisturbed block samples and disturbed soil samples at selected horizons from the testpits.
- Logging of boreholes/testpits.
- Electrical resistivity survey of the site.
- Physical observations for the drainage of the site.



The location of the respective boreholes/testpits executed at the site and the electrical resistivity survey probe points are indicated on the Geotechnical Investigation Plan (Appendix A, Fig. A-2).

3.2 Studies at Site

3.2.1 Preliminary Foundation Investigation

3.2.1.1 Drilling of Boreholes

Seven boreholes were drilled at the site by hand auger/light percussion method. Depth of boreholes ranged from 1.5m to 5.0m. Cylindrical augers were used to advance the boreholes of 150 mm diameter upto the groundwater table. Light percussion method of drilling was used with casing for drilling below the ground water table. Borehole logs are appended to this report as Appendix B.

3.2.1.2 Standard Penetration Tests

Standard penetration tests were conducted in the boreholes at a depth interval of 1.0 m. The SPT samples collected from were preserved for laboratory testing. The SPT blow count, penetration of the split spoon sampler along the depth of borehole the respective borehole logs. A Field SPT Profile is appended Appendix C, Fig. C-1

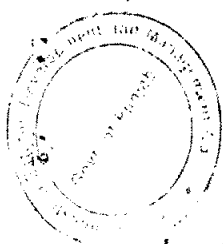
3.2.1.3 Excavation of Testpits

Two testpits were excavated to a maximum depth of 2.0m below surface level. These pits served the following purpose:

- Visual inspection of the subsurface
- Recovery of an undisturbed block sample for classification of evaluation of foundation conditions
- Collection of disturbed samples for classification and determination natural moisture content

3.2.1.4 Logging of Boreholes/Testpits

Careful logging of all the boreholes and testpits was done by NESPAI geotechnical engineers to describe the lithology and stratigraphy of subsurface materials. Other relevant information like SPT data, sampling details, groundwater level etc. was also noted on these logs. The field logs were later finalized on the basis of laboratory test results. The subsurface soil logs developed on the basis of the corrected borehole logs are appended to this report as Appendix A, Fig.A-3, while the detailed borehole/testpit logs are appended to this report as Appendix-B.



3.2.1.5 Sampling

The soil samples collected in the split spoon sampler (SPT) during SPT in boreholes were preserved as disturbed samples. Besides some disturbed samples (DS) from the boreholes were collected for determination of moisture content and chemical aggressivity. An undisturbed block sample (BS) was also collected from one testpit. Four water samples (WS) were also collected from the boreholes and the tubewell/hand pump located in the vicinity of the site.

3.2.2 Ground Water Potential

Electrical resistivity survey was carried out at three locations within the study area to ascertain the subsurface hydrogeological conditions. The results of this survey (Appendix A, Fig. A-4) has shown that relatively better quality water is expected below a depth of about 50m in the south-eastern side of the site area, near Rohi nullah. The water quality in the upper 50 meters zone of subsoil is generally brackish.

Many of the tubewells in the Raiwind-Sunder Road area are yielding good quality water. The study of the area shows that good quality groundwater is available in the area in adequate quantity. It is proposed to extract the same from below 50m depth through vertical turbine pumps of requisite capacity and required head.

3.2.3 Drainage Observations

The area has no major drainage problem. Properly designed surface drain network along the roadway may be designed to discharge into Rohi nullah flowing in the east of the site.

3.3 Laboratory Evaluations

3.3.1 General

Selected disturbed as well as undisturbed soil samples and water samples collected during subsurface investigations were tested in the laboratory for determination of physical and chemical characteristics.

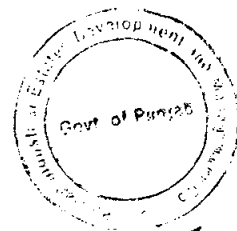
All the testing was done as per ASTM or the equivalent BS standards. The following laboratory tests were performed on the soil samples:

- Grain size Analysis
- Atterberg Limits
- Chemical Analysis

Water samples were subjected to chemical tests.

Laboratory testing was carried out at SOILCON Geotechnical Testing Laboratory, Lahore. Appendix-D of this report presents results of individual tests carried out on disturbed as well as undisturbed soil samples in the laboratory.

Appendix D, Table D-1 presents a summary of the laboratory test results.



3.3.2 Test Results

In-situ dry density was determined on one undisturbed soil sample. The result of test carried out show that dry density is 1.61 g/cm^3 .

The natural moisture content determined on six soil samples indicate that values generally range from 15 to 28%.

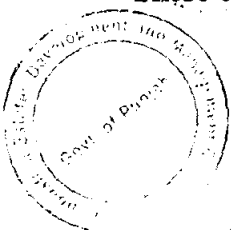
For determination of particle size distribution of different substrata, eleven (11) grain size analyses were conducted on the representative samples. The tests have revealed presence of 13% to 98% of material finer than # 200 sieve.

Ten (10) Atterberg limit tests carried out on the cohesive soils show that the liquid limit (LL) ranges from 20 to 34 while the plasticity index (PI) ranges between 5 and 13. On the basis of the classification tests, the soils are predominantly classified as lean clays, silty clays/clayey silts and silty fine sands.

Chemical tests were carried out on five (5) soil samples, collected at 0 to 3.45m depth from selected boreholes/testpits and from the natural surface. The tests indicate that the sulphate content at these locations ranges from 0.006 % to 0.437%, the chloride content varies from 0.004% to 0.392% while the total dissolved salts varies from 0.12 % to 3.98%. The higher salt concentration corresponds to the surface sample showing visible efflorescence.

The chemical analysis of groundwater indicates that soluble sulphate content range from 274 to 487ppm, the chloride content range from 50 to 213ppm and total dissolved salts ranging from 740 to 1560ppm. The pH values range from 7.50 to 7.75.

In order to prevent both sulphate and chloride attacks, the standard specifications require the use of slag cement (BS 146) or use of a blend of ordinary Portland cement (OPC) with slag cement for the concrete works in contact with ground. These cements are commercially available in the Punjab.



4. SUBSURFACE GEOTECHNICS

In general, subsurface stratigraphy at the site consists of three basic lithological units as given below:

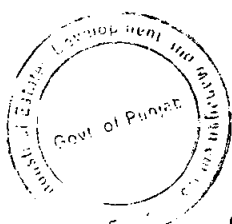
- i) Lean Clay/Silty Clay
- ii) Sandy Silt/Silt
- iii) Silty fine Sand/fine Sand

These soils are the alluvial deposits of the recent geologic times. The subsurface stratigraphy is as discussed below:

The first soil unit of brown silty clay/lean clay forms the topsoil cover at the site at all the locations and generally continues to a depth of 1.0m-3.5m below top of ground (except one location where it continues to the bottom of the borehole). This stratum contains trace fine sand and trace to little concretions at places. It is present in a soft to a stiff state of consistency and has low to medium plasticity.

The second soil unit of brownish grey sandy silt/silt underlies the upper silty clay/lean clay stratum. This layer has a thickness of 1.0 to 3.0m and is present in a firm state.

The third soil unit of brownish grey non-plastic fine silty sand underlies the silt/silty sand stratum. It is present in a loose to medium-dense state.

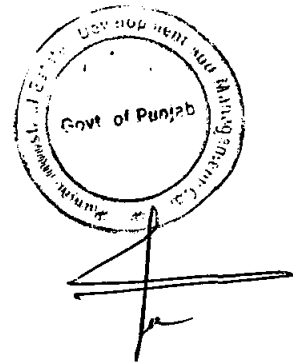


5. CONCLUSIONS AND RECOMMENDATIONS

The results of the above studies and the test results indicate general suitability of the site for construction. The pertinent conclusions and recommendations are as follows:

- (a) Physiographically, the site generally consists of barren land with cultivated pockets in the northwest area of the site.
- (b) The lithologic distribution of soil strata consists of slightly cohesive, soft to stiff clayey silt/silty clay or lean clay from 1.0 to 3.5 m depth (topsoil), followed by firm silts of 1.0 to 3.0 m thickness in turn followed by loose to medium-dense silty fine sand.
- (c) The groundwater table is present at a depth of 4.5 to 5.0 m below the top of ground. 14' to 16'
- (d) Some isolated pockets contain slightly swelling soils in the upper 1.0 to 2.0 m zone, which is manifested by the presence of alligator cracks in the ground.
- (e) The subsurface generally appears suitable for supporting light to medium loads through spread foundation placed at 1.0 to 2.0 m depth. Besides, some isolated weak spots are also indicated which will require either placement of spread foundations at deeper depths or replacement of weak soil with select granular material after proper compaction in layers.
- (f) No cognizable problem is foreseen for the construction of roadways, except that good quality borrow sources will have to be explored in the vicinity of the site.
- (g) Tests on soil/water samples for determination of aggressive chemicals like sulphate and chlorides have revealed that the salt concentration is high enough to trigger an attack on concrete and steel work below ground. Therefore some proper measures, to counter the attack of these aggressive chemicals on the structures below ground, are foreseen. These may include, use of slag cement or blending ordinary Portland cement with slag cement as well as using low permeability concrete by addition of admixtures, for all construction below ground.

- (h) The area has no major drainage problem. Properly designed surface drain network along the roadways may be designed to discharge into Rohi nullah flowing in the eastern part of the site.
- (i) The results of electrical resistivity survey show presence of acceptable quality of water below 50m depth. The aquifer at that depth appears to be capable of supplying sufficient quantity of good quality water for the requirement of the users. The potential of groundwater may be harnessed by sinking tubewells into the deeper aquifer.



APPENDICES

- APPENDIX-A

**SITE LOCATION PLAN,
GEOTECHNICAL INVESTIGATION PLAN,
SUBSURFACE SOIL LOGS & COLUMNAR
SECTION**

- APPENDIX-B

BOREHOLE & TESTPIT LOGS

- APPENDIX-C

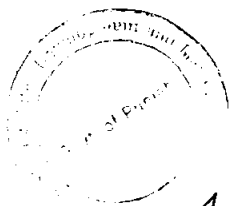
SUBSURFACE CHARACTERISITCS

- APPENDIX-D

LABORATORY TEST RESULTS

- APPENDIX-E

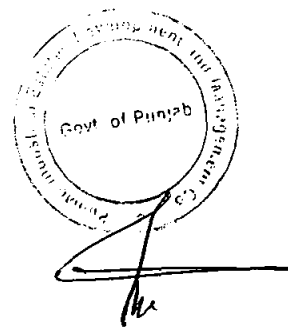
PLATES

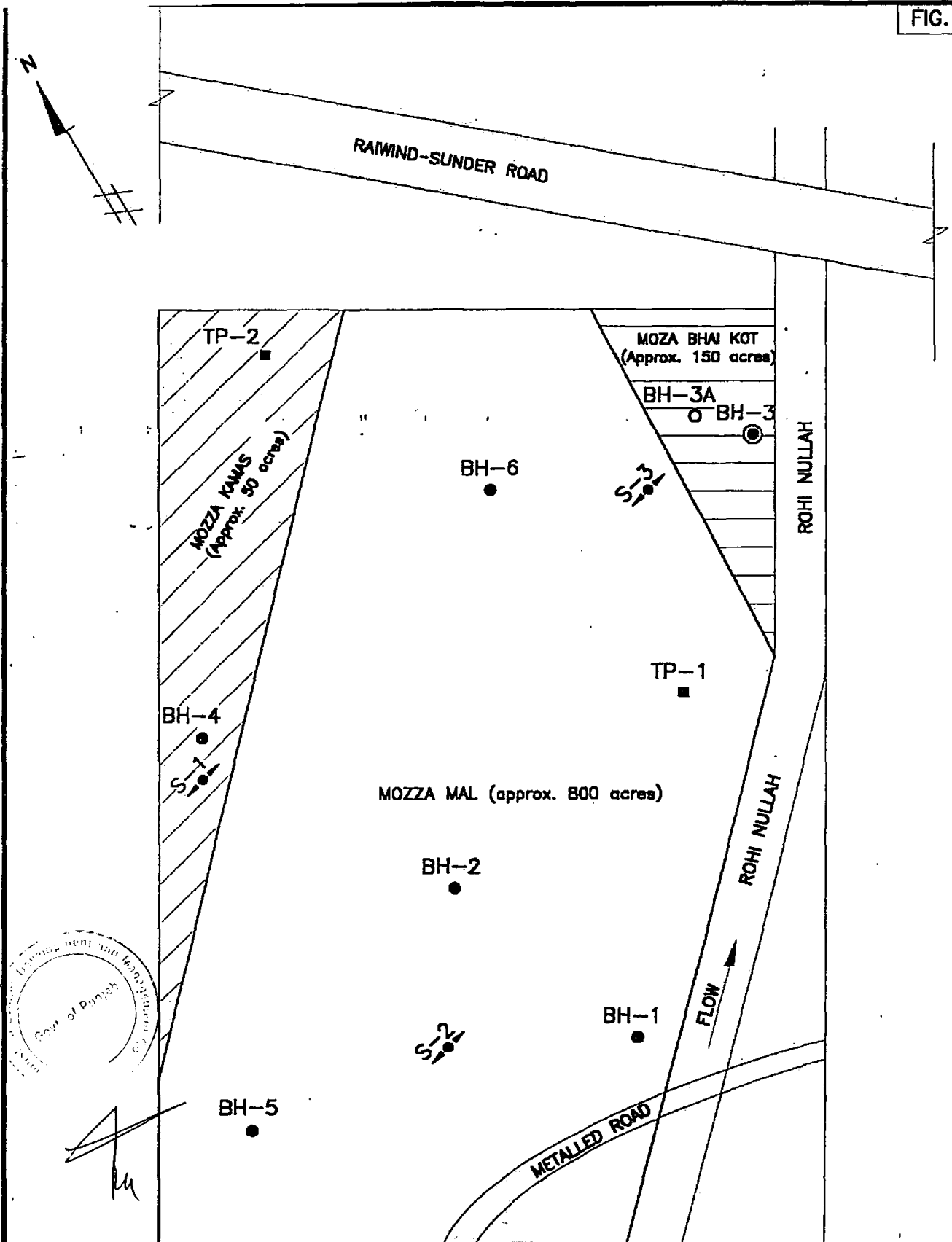


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**SITE LOCATION PLAN, GEOTECHNICAL
INVESTIGATION PLAN, SUBSURFACE SOIL
LOGS & COLUMNAR SECTION**

- *Fig. A-1* *Site Location Plan*
- *Fig. A-2* *Geotechnical Investigation Plan*
- *Fig. A-3* *Subsurface Soil Logs*
- *Fig. A-4* *Columnar Section showing
Interpreted Subsurface Lithology*





LEGEND.

- TESTPIT 2m DEEP
- BOREHOLE 5m DEEP
- ⊙ BOREHOLE 4.5m DEEP
- BOREHOLE 1.5m DEEP
- ↗ LOCATION OF ELECTRICAL RESISTIVITY SURVEY PROBE POINT

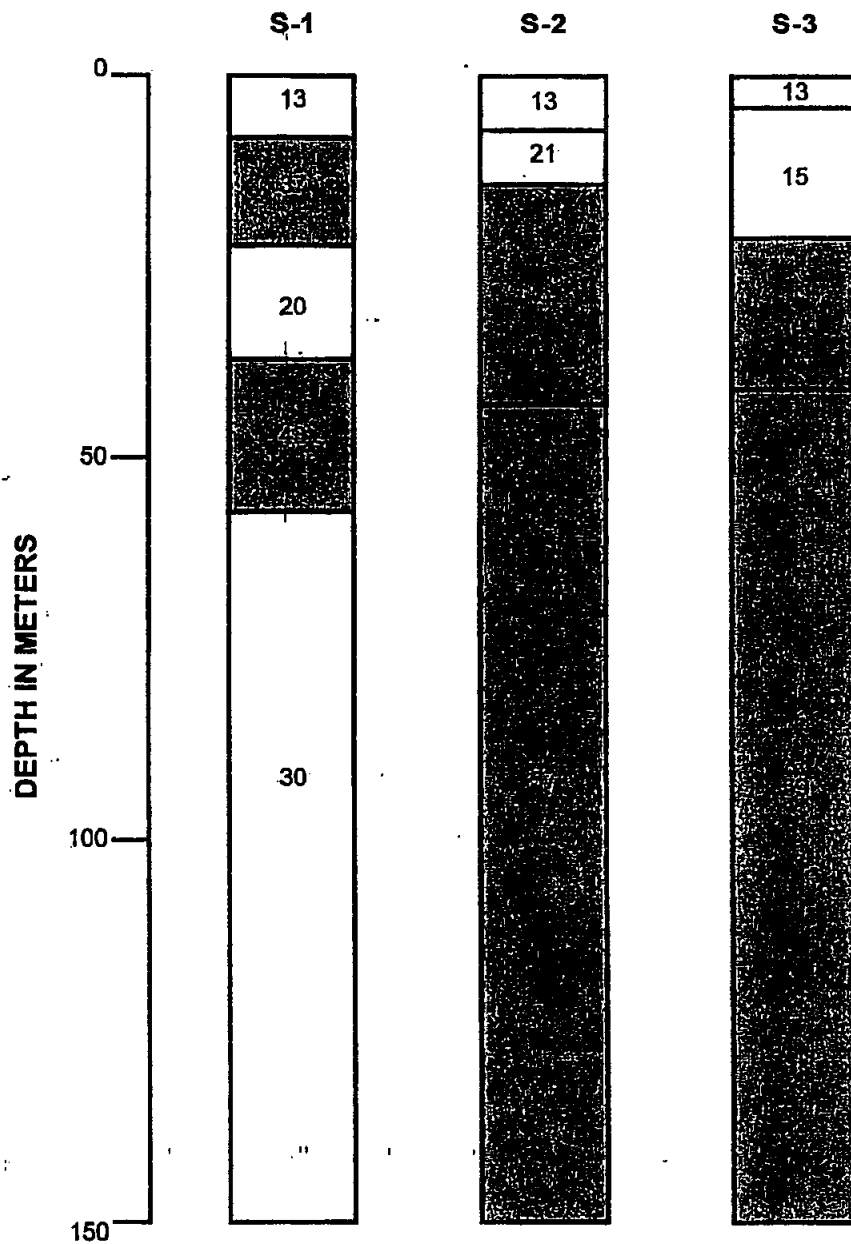
SCALE: NOT TO SCALE




PROPOSED INDUSTRIAL ESTATE AT
RAIWIND-SUNDER ROAD

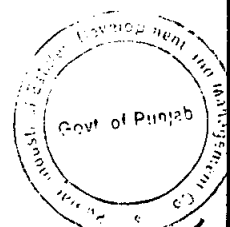
GEOTECHNICAL INVESTIGATION
PLAN

FIG. A-4

COLUMNAR SECTION SHOWING INTERPRETED SUBSURFACE LITHOLOGY



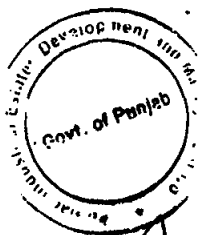
- LEGEND**
-  Resistivity 0-10 ohm-meter
Mainly clay, brackish water
 -  Resistivity 11-30 ohm-meter
Mainly silty clay with some sand layers, brackish water
 -  Resistivity 31-60 ohm-meter
Mainly sand with minor clay layers, fresh water



**PROPOSED INDUSTRIAL ESTATE
AT RAIWIND-SUNDER ROAD**

APPENDIX-B

BOREHOLE & TESTPIT LOGS






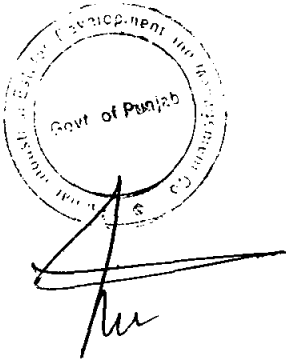
NATIONAL ENGINEERING SERVICES
PAKISTAN (Pvt.) LIMITED, LAHORE

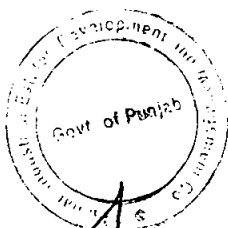
BOREHOLE NO. BH-3

SHEET 1 OF 1

BOREHOLE LOG

Job No. 156-02 Project INDUSTRIAL ESTATE AT RAIWIND- SUNDER ROAD Location MOZZA BHAI KOT
Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/s BERKELEY ASSOCIATES
Type of boring HAND AUGERING Drilling Fluid - Ground Water Depth 4.30 m
Coordinates - Ground Elevation 29.27 m* Date 21-9-2003 To 21-9-2003

Depth (m)	Sample No.	Legend	Classification Symbol	Description of Material	Dia of Casing/ Hole	P.L. N.M.C. L.L.										Remarks	
						SPT Blows/30cm											
0.0						10	20	30	40	50	60	70	80	90	100		
1.0	SPT-1		CL	Brown, firm, LEAN CLAY, medium plasticity, medium dry strength trace fine sand, trace roots and concretions.	DIA OF BH=150 mm	6										* Measured w.r.t. an assumed BM=100ft (30.48m).	
2.0	SPT-2					6											
3.0	SPT-3					8											
4.0	SPT-4	10															
4.5				BOTTOM OF BOREHOLE												Augering could not be proceeded.	
<div></div>																	



INDUSTRIAL ESTATE AT
RAIWIND—SUNDER ROAD

Job No.	156-02	Project	RAIWIND-- SUNDER ROAD	Location	MOZZA MAL (BARREN LAND)
Site Incharge	AH/OHQ/MAK	Client	PIEDMC	Contractor	M/s BERKELEY ASSOCIATES
Type of boring	HAND AUGERING	Drilling Fluid	-	Ground Water Depth	NOT ENCOUNTERED
Coordinates	-	Ground Elevation	29.27 m	Date	21-9-2003 To 21-9-2003

[illegible]

INDUSTRIAL ESTATE AT
RAIWIND— SUNDER ROAD

Job No.	156-02	Project	INDUSTRIAL ESTATE AT RAIWIND - SUNDER ROAD	Location	MOZZA KAMAS
Site Incharge	AH/OHQ/MAK	Client	PIEDMC	Contractor	M/s BERKELEY ASSOCIATES
Type of boring	HAND AUGERING	Drilling Fluid	-	Ground Water Depth	NOT ENCOUNTERED
Coordinates	-	Ground Elevation	31.78 m*	Date	21-9-2003 To 21-9-2003

Depth (m)	Sample No.	Legend	Classification Symbol	Description of Material	Dia of Casing/ Hole	SPT Blows/30cm										Remarks	
						P.L. ▽	10	20	30	40	50	60	70	80	90		100
0.0																	
1.0	SPT-1		CL-ML	Brown, firm, SILTY CLAY, low plasticity, low to medium dry strength.													* Measured w.r.t. an assumed BM=100ft (30.48m).
2.0	SPT-2		ML	Brown, firm, SILT, slight plasticity, low dry strength, trace concretions.													
3.0	SPT-3			Brown, firm, SILT with sand, non plastic, trace mica.													
4.0	SPT-4																
5.0	SPT-5		SM	Brown, loose, SILTY fine SAND, trace mica, moist.													
5.45			ML	Brown, soft, SANDY SILT, trace mica.													
					BOTTOM OF BOREHOLE												

BOREHOLE LOG

**INDUSTRIAL ESTATE AT
RAIWIND - SUNDER ROAD**

Location MOZZA MAL

Job No. 156-02 Project

Site Incharge AH/OHQ/MAK

Client **PIEDMC**

Contractor M/s BERKELEY ASSOCIATES

Type of boring HAND AUGERING

Drilling Fluid.

Ground Water Depth NOT ENCOUNTERED

Coordinates

Ground Elevation 30.67 m*

Date 21-9-2003 To 21-9-2003

Depth (m)	Sample No.	Legend	Classification Symbol	Description of Material	Dia of Casing/ Hole	P.L.	N.M.C.		L.L.	Remarks							
						▽	x		o								
						SPT Blows/30cm											
0.0						10	20	30	40	50	60	70	80	90	100		
1.0	SPT-1		CL	Brown, firm, LEAN CLAY, low to medium plasticity, low dry strength, trace fine sand, little concretions, dry.	DIA OF BH=150 mm												
2.0	SPT-2																
3.0	SPT-3																
4.0	SPT-4		SM	Brown, loose, silty fine SAND, trace mica, dry, moist to wet from 5.0 m.													
5.0	SPT-5																
5.4	DS-1																
						BOTTOM OF BOREHOLE											



NATIONAL ENGINEERING SERVICES
PAKISTAN (Pvt.) LIMITED, LAHORE

BOREHOLE NO. BH-6

SHEET 1 OF 1

BOREHOLE LOG

Job No. 156-02 Project INDUSTRIAL ESTATE AT RAIWIND- SUNDER ROAD Location MOZZA KAMAS
Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/s BERKELEY ASSOCIATES
Type of boring HAND AUGERING Drilling Fluid - Ground Water Depth 5.0 m
Coordinates - Ground Elevation 29.80 m* Date 21-9-2003 To 21-9-2003

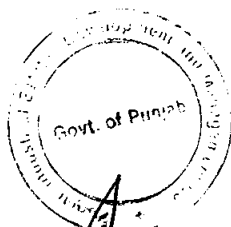
Depth (m)	Sample No.	Legend	Classification Symbol	Description of Material	Dia of Casing/ Hole	P.L. ▽	N.M.C. x	L.L. ○	Remarks
						10	20	30	
0.0						10	20	30	
1.0	SPT-1		CL	Brown, firm to stiff, LEAN CLAY, medium plasticity, medium dry strength, trace concretions, trace fine sand, dry.					
2.0	SPT-2		CL						
3.0	DS-1		CL-ML	Brown, firm, SILTY CLAY, medium plasticity, medium dry strength, moist.					
4.0	SPT-3		CL-ML						
5.0	DS-2		SM	Brown, medium-dense, SILTY fine SAND, trace mica, moist to wet.					
6.0	SPT-4		SM						
7.0	SPT-5		SM						
8.0									
9.0									
10.0									

DIA OF BH=150 mm

BOTTOM OF BOREHOLE

* Measured
w.r.t. on
assumed
BM=100ft
(30.48m).

GWT





NATIONAL ENGINEERING SERVICES
PAKISTAN (Pvt.) LIMITED, LAHORE

Test Pit No. TP-1

Sheet 1 OF 1

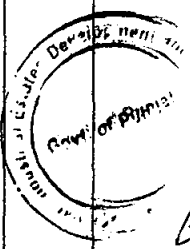
TESTPIT LOG

Job No. 156-02 Project INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD Location MOZZA MALL

Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/S BERKELEY ASSOCIATES

Coordinates N = E = Ground Elevation 29.20 m* Date 21-9-2003

Depth in meter	Elevation in meter	Legend	Unified Classification Symbol	DESCRIPTION OF MATERIAL	Sample Type/No.	Field Density Test		Lab. Density Test		Inplace % Compaction	REMARKS
						Wet Density g/cm ³	Moisture Content %	Max. Dry Density g/cm ³	Optimum m.c. %		
0.0				Brown, firm to stiff, clayey SILT with concretions, trace sand, moist.							* Measured w.r.t. an assumed BM=100ft (30.48m).
0.5				Brown, firm, SILT with sand, slightly moist.							
1.0			ML		DS-1						
1.5											
2.0					DS-2						
				BOTTOM OF TESTPIT							





NATIONAL ENGINEERING SERVICES
PAKISTAN (Pvt.) LIMITED, LAHORE

Test Pit No. TP-2

Sheet 1 OF 1

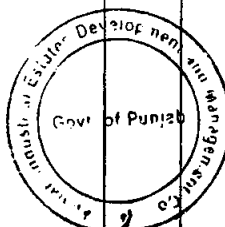
TESTPIT LOG

Job No. 156-02 Project INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD Location MOZZA KAMAS
Site Incharge AH/OHQ/MAK Client PIEDMC Contractor M/S BERKELEY ASSOCIATES
Coordinates N = E = Ground Elevation 31.45 m* Date 21-9-2003

Depth in meter	Elevation in meter	Legend	Unified Classification Symbol	DESCRIPTION OF MATERIAL	Sample Type/No.	Field Density Test		Lab. Density Test		Inplace % Compaction	REMARKS
						Wet Density g/cm ³	Moisture Content %	Max. Dry Density g/cm ³	Optimum m.c. %		
0.0				Brown, stiff, LEAN CLAY, medium plasticity, non dilatant, trace concretions, trace fine sand.							
0.5											
1.0			CL	Brown, stiff, LEAN CLAY, slightly moist, high plasticity, non dilatant.	BS-1						
1.5					DS-1						
2.0			CL-ML	Brown, firm, SILTY CLAY/CLAYEY SILT, low plasticity.	DS-2						
				BOTTOM OF TESTPIT							

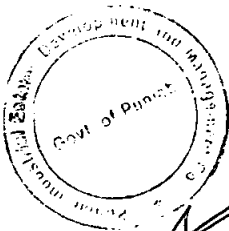
* Measured w.r.t. on assumed BM=100ft (30.48m).

BS-1 1.0-1.3 m.



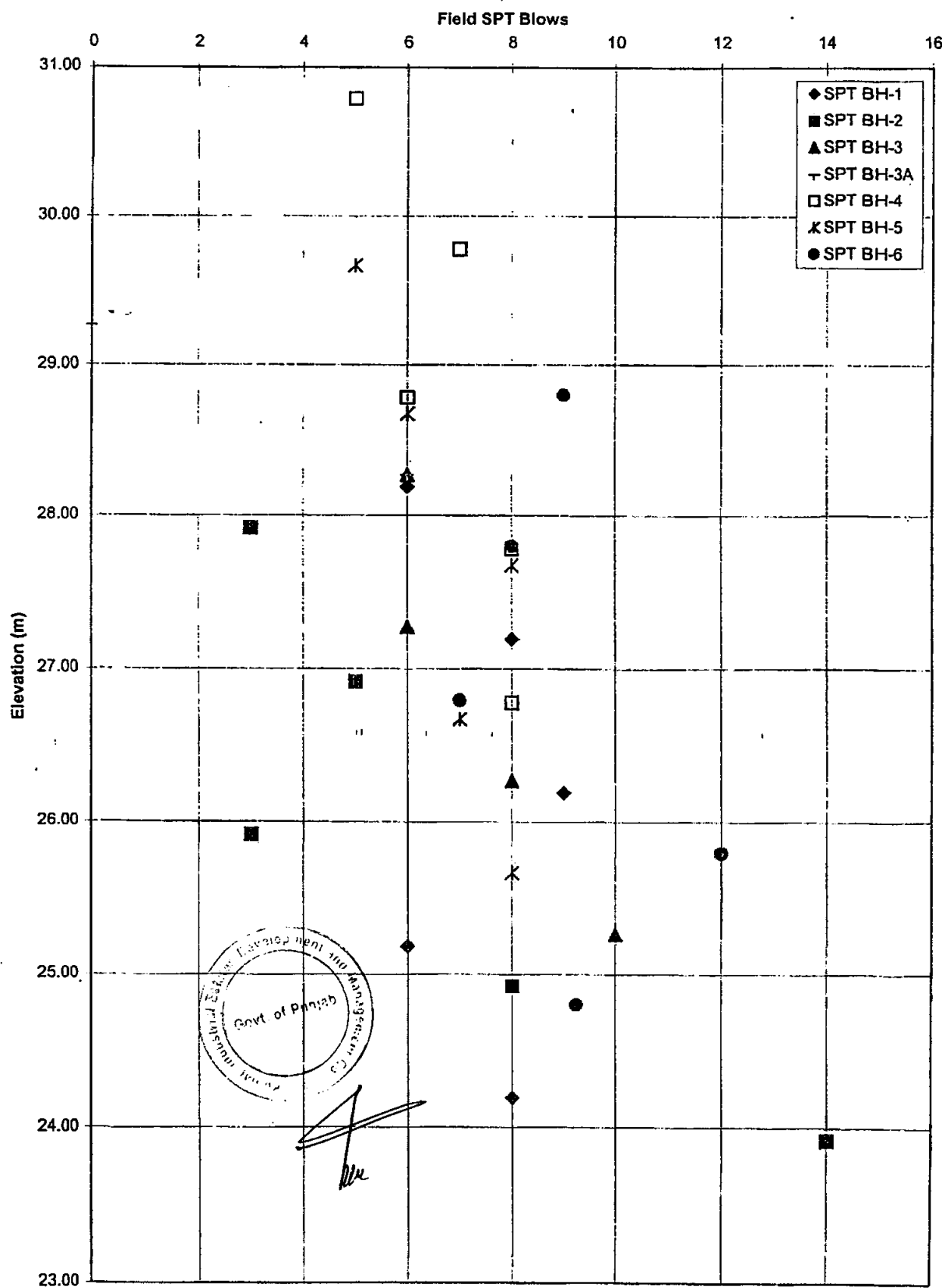
SUBSURFACE CHARACTERISTICS

- *Fig. C-1 Field SPT Profile*
- *Fig. C-2 Variation of Moisture Content with Elevation*



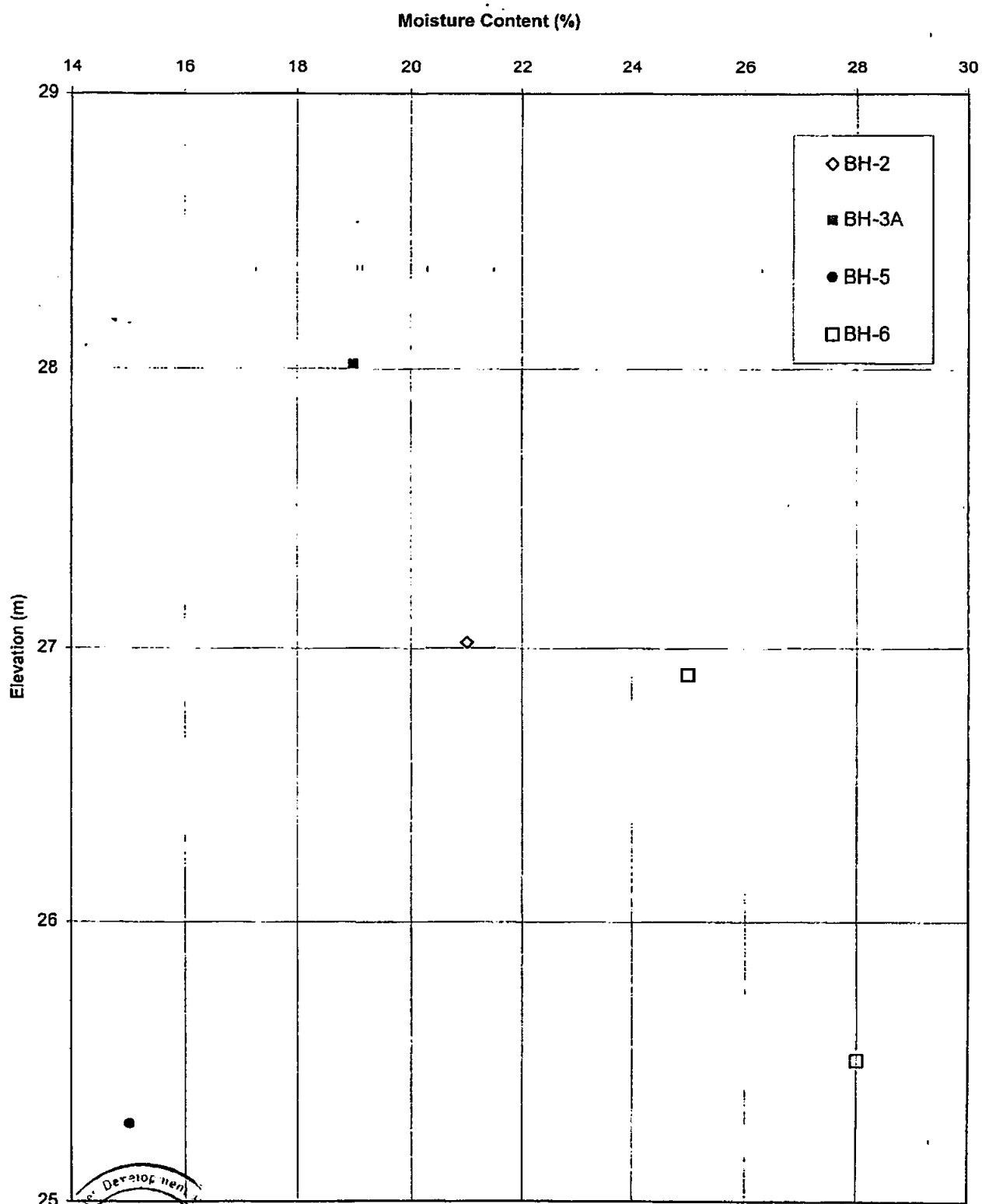
PROPOSED INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD

Field SPT Profile



PROPOSED INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD

Variation of Natural Moisture Content with Elevation

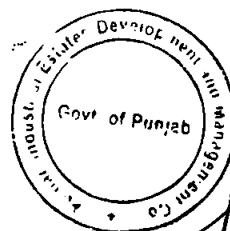
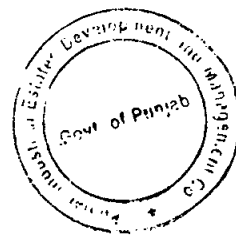


By order of the Director, Punjab
Govt. of Punjab

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LABORATORY TEST RESULTS

- *Table D-1 Summary of Laboratory Test Results*
- *Detailed Test Result Sheets*



PROPOSED INDUSTRIAL ESTATE AT RAIWIND-SUNDER ROAD

SUMMARY OF LABORATORY TEST RESULTS

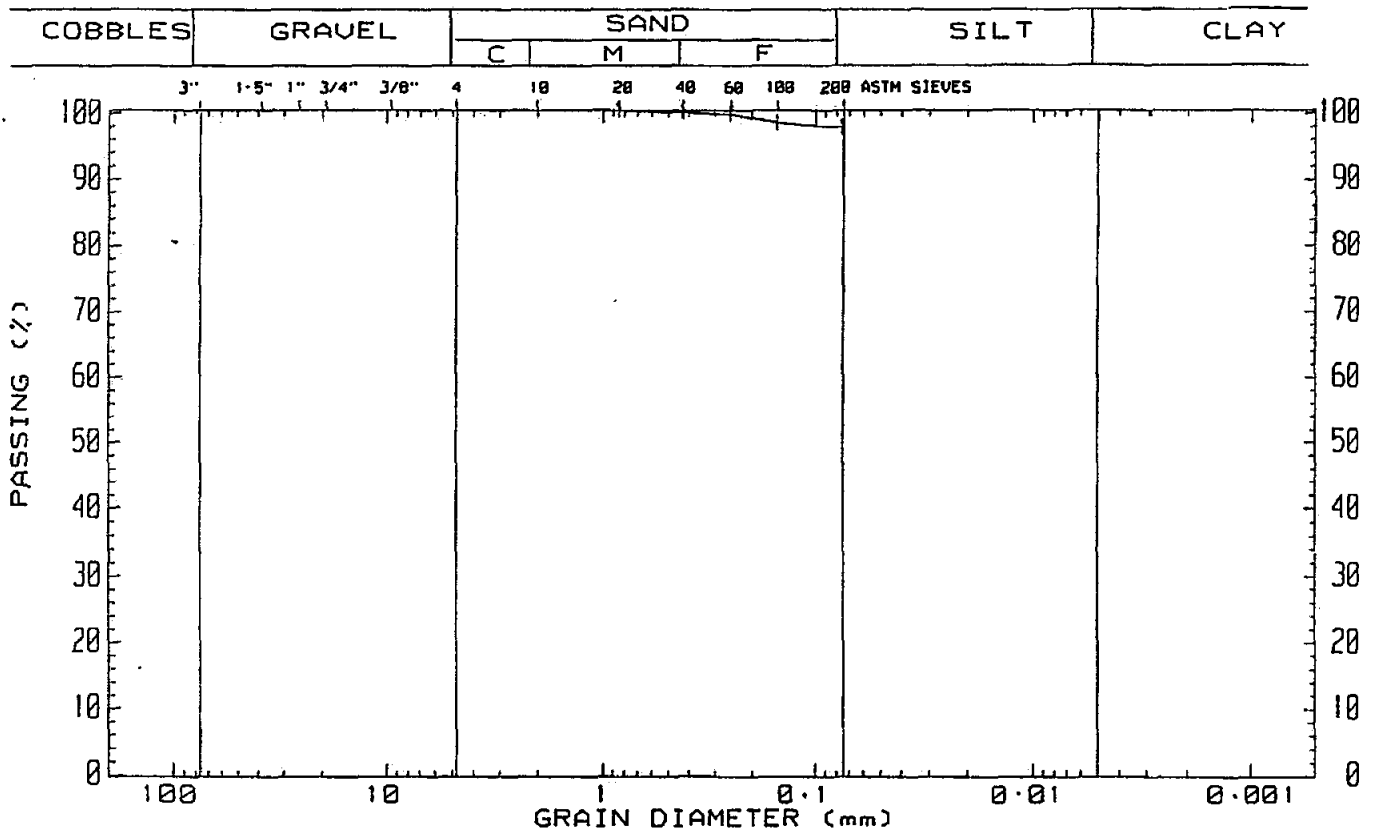
Sr. No.	Borehole/ Testpit No.	Sample No.	Depth	In-situ Dry Density	Natural Moisture Content NMC	Grain Size Distribution					Atterberg Limits			Classification Unified Soil Classification System	Total Dissolved Salts	Sulphate Content	Chloride Content	pH
											LL	PL	PI					
			(m)	(g/cm ³)	(%)	# 4	# 10	# 40	# 100	# 200	(%)	(%)			(%)	(%)	(%)	
1	BH-1	SPT-1	1.00-1.45	-	-	100	100	100	99	97	30	20	10	CL	-	-	-	-
2	BH-1	SPT-5	5.00-5.45	-	-	100	100	99	98	97	30	20	10	CL	-	-	-	-
3	BH-2	DS-1	0.00-0.10	-	-	100	100	99	91	85	24	18	6	CL-ML	3.98	0.437	0.392	10.4
3	BH-2	DS-2	-	-	21	-	-	-	-	-	-	-	-	-	-	-	-	-
4	BH-2	SPT-3	3.00-3.45	-	-	100	100	100	84	72	-	-	-	ML	0.21	0.012	0.072	7.85
5	BH-2	WS-1	5.00-5.00	-	-	-	-	-	-	-	-	-	-	-	1560 ppm	487 ppm	213 ppm	7.75
6	BH-3	SPT-2	2.00-2.45	-	-	100	100	100	99	97	29	21	8	CL	0.21	0.013	0.055	7.75
7	BH-3	SPT-4	4.00-4.45	-	-	100	98	94	21	13	-	-	-	SM	-	-	-	-
8	BH-3A	SPT-1	0.00-0.45	-	-	100	100	100	87	80	20	15	5	CL-ML	0.125	0.006	0.013	8.14
9	BH-3A	DS-1	1.25-1.25	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-
10	BH-5	SPT-1	1.00-1.45	-	-	81	80	80	78	73	25	17	8	CL	0.12	0.014	0.0044	7.52
11	BH-5	DS-1	5.40-5.40	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-
12	BH-6	SPT-2	2.00-2.45	-	-	100	100	100	99	98	34	21	13	CL	-	-	-	-
13	BH-6	DS-1	2.90-2.90	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-
14	BH-6	DS-2	4.30-4.30	-	28	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TP-1	DS-2	2.00-2.00	-	-	100	100	99	97	93	27	20	7	CL	-	-	-	-
16	TP-2	BS-1	1.00-1.30	1.61	24	99	98	98	95	95	31	20	11	CL	-	-	-	-
17	TUBEWELL (NEAR BH-4)	WS-1	-	-	-	-	-	-	-	-	-	-	-	-	740 ppm	274 ppm	50 ppm	7.50

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SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

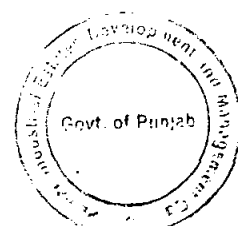
CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWINI
 SITE SUNDER ROAD
 BOREHOLE BH-1 SAMPLE SPT-1
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 1.00 - 1.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G-1	11	1.00	1.45	-	-	3	97			1.0E-17*	5.9E-22*	2.0E-30*	6.7E-039*	1.5E+21	5.0E-05

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003

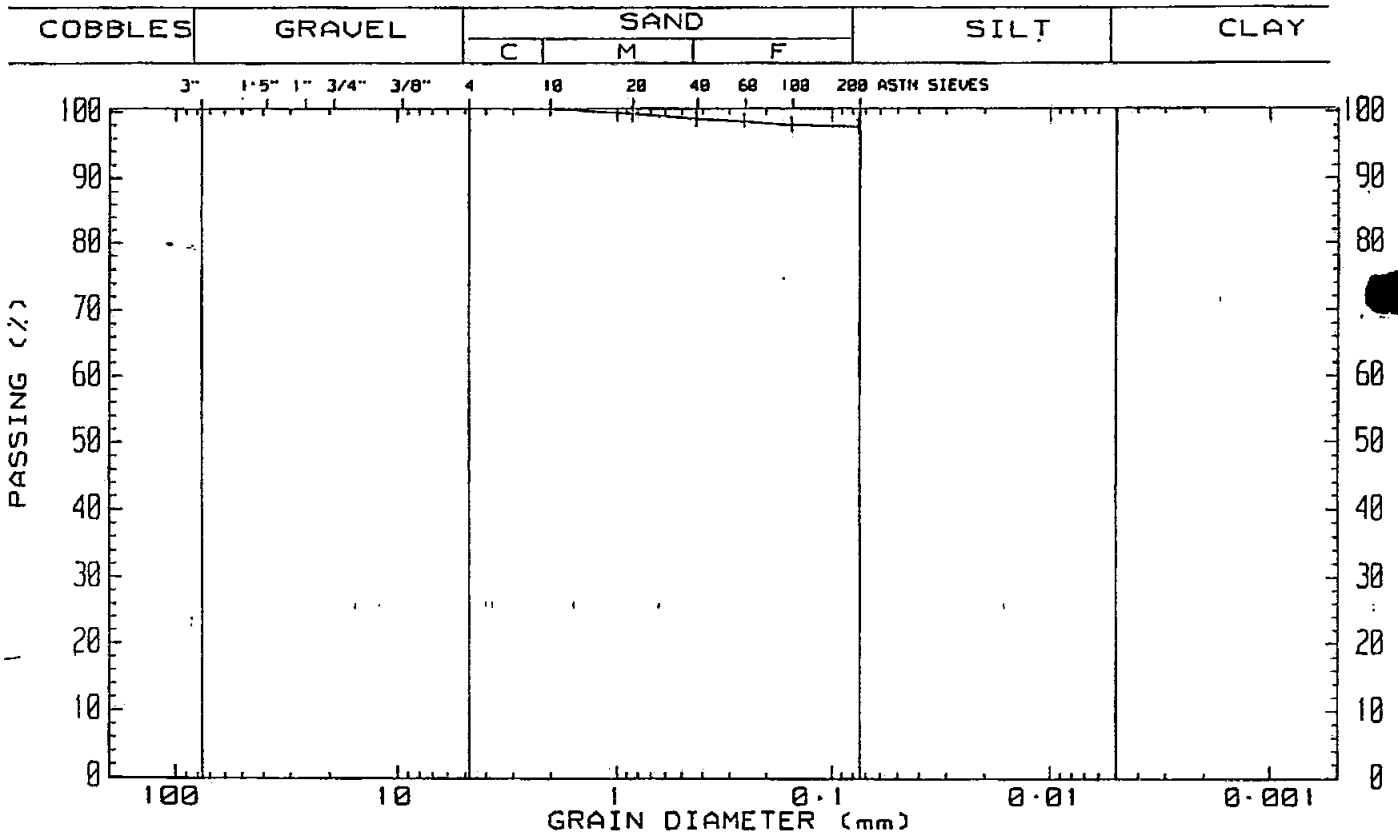


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SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

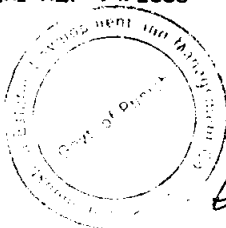
CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWI
 SITE SUNDER ROAD
 BOREHOLE BH-1 SAMPLE SPT-5
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 5.00 - 5.45
 TEST DATE 24-09-03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	Cu	Cc
		from	to												
G-1	11	5.00	5.45	-	-	3	97			2.1E-49*	3.9E-62*	1.3E-87*	4.7E-113*	4.4E+63	1.9E-13

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003



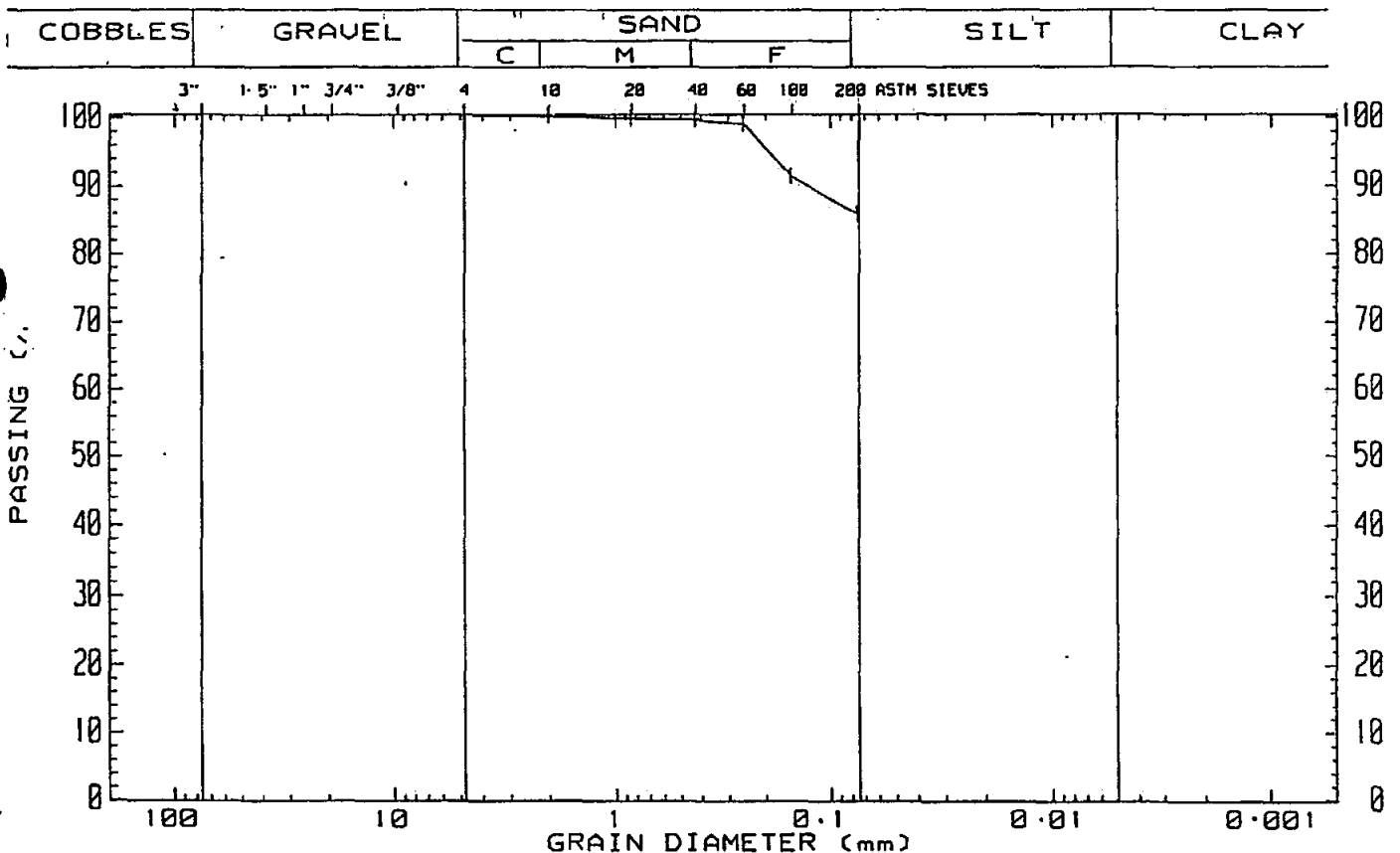
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GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE BH-2 SAMPLE SURFACE
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 0.00 - 0.10
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	Cu	Cc
		from	to												
Gr 1	1	0.00	0.10	-	-	15	85			2.9E-03	8.3E-04	6.6E-05	5.2E-06	5.6E+02	2.8E-01

NOTES

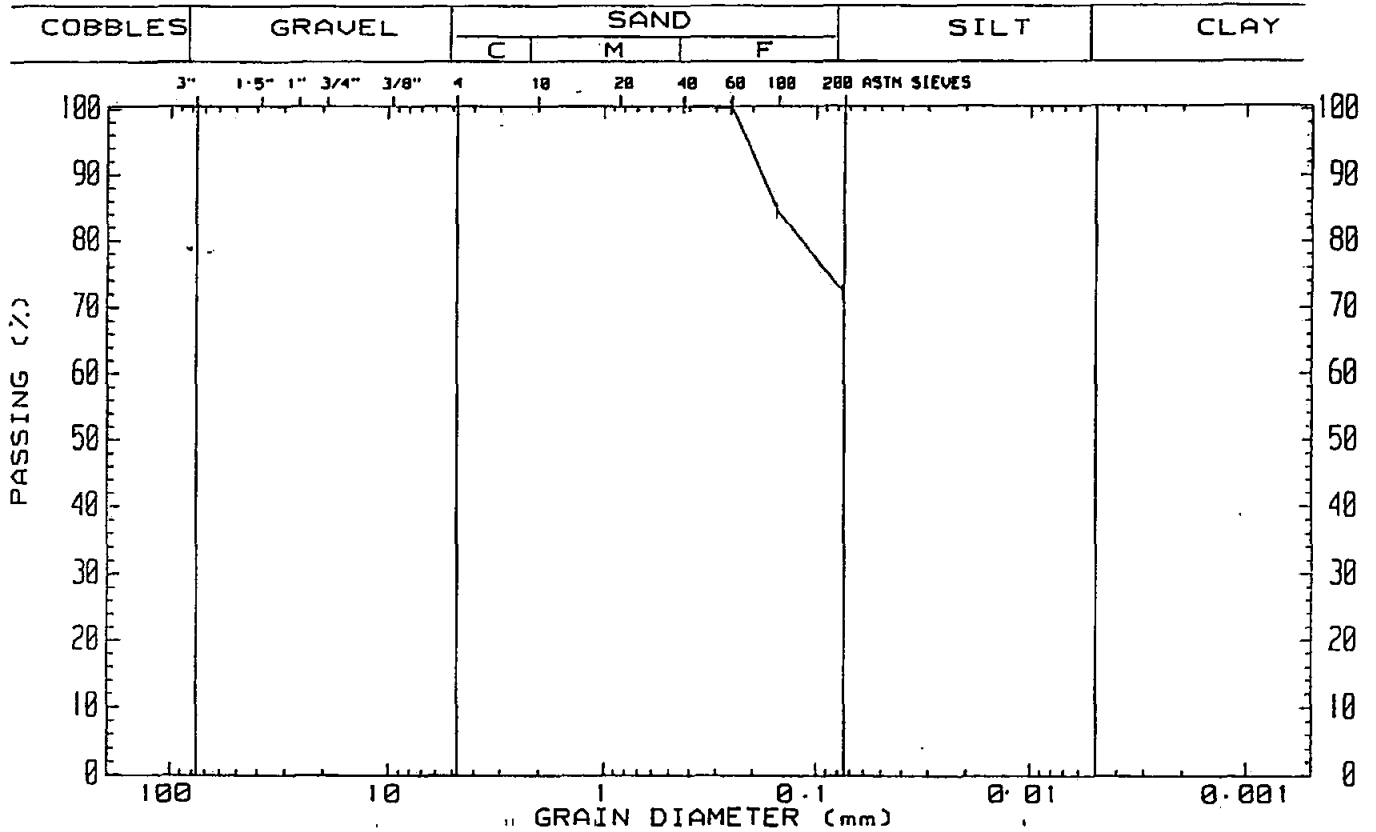
* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr1 LAB REF 74/2003

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SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARID	ENGR-Z.M

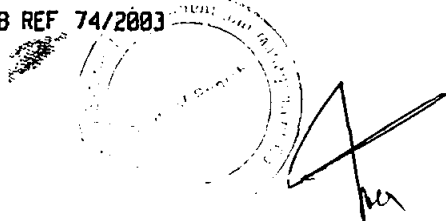
CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE BH-2 SAMPLE SPT-3
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 3.00 - 3.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
Gr	11	3.00	3.45	-	-	28	72			3.8E-02*	2.2E-02*	7.0E-03*	2.3E-03*	1.7E+01	5.7E-01

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr1 LAB REF 74/2003



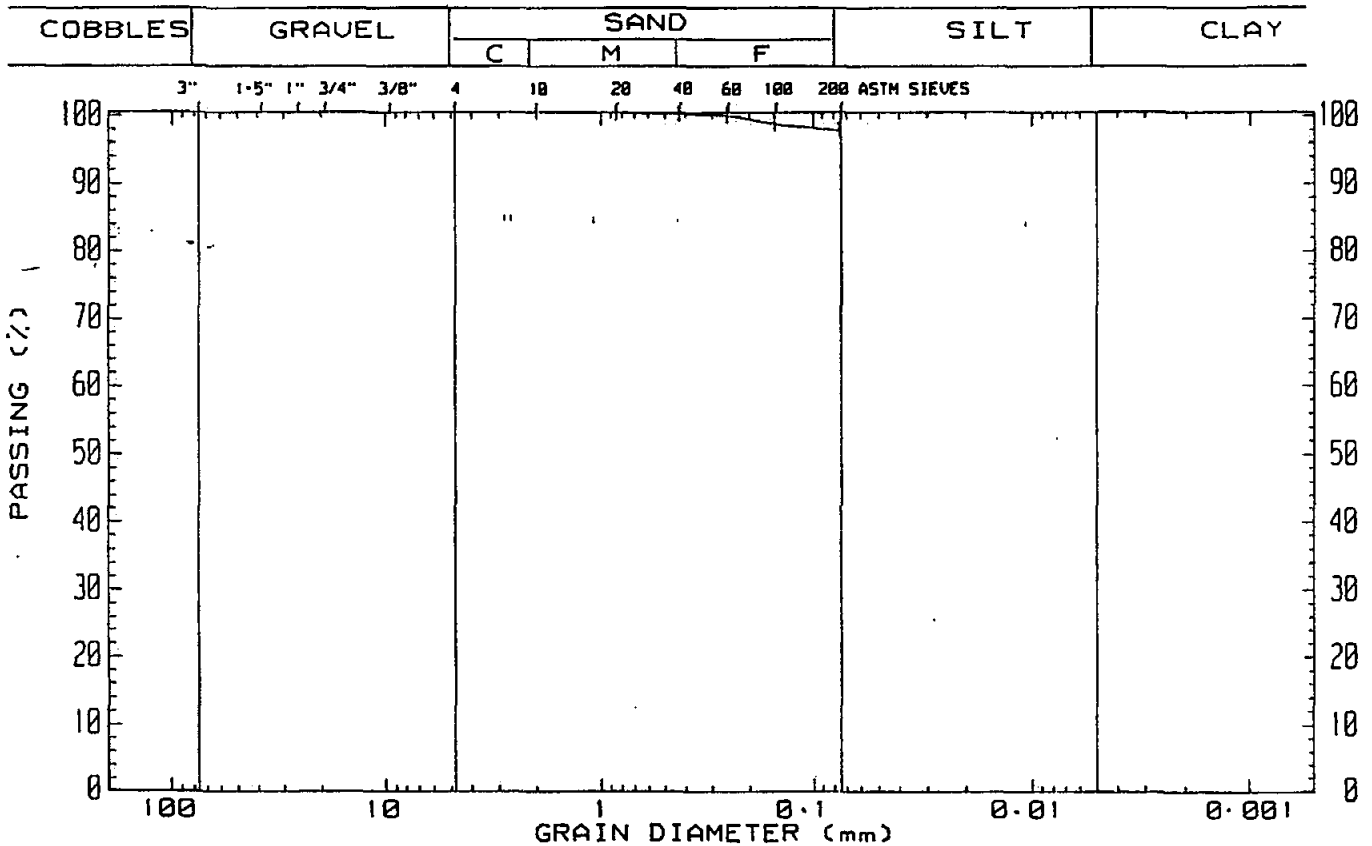
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GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

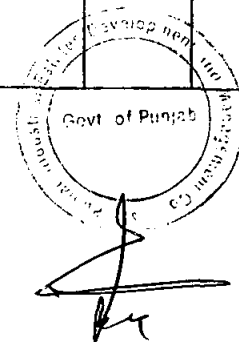
CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE BH-3 SAMPLE SPT-2
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 2.00 - 2.45
 TEST DATE 24-09-03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G-1	11	2.00	2.45	-	-	3	97			1.1E-13*	7.2E-17*	3.4E-23*	1.6E-029*	6.6E+15	6.9E-04

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003

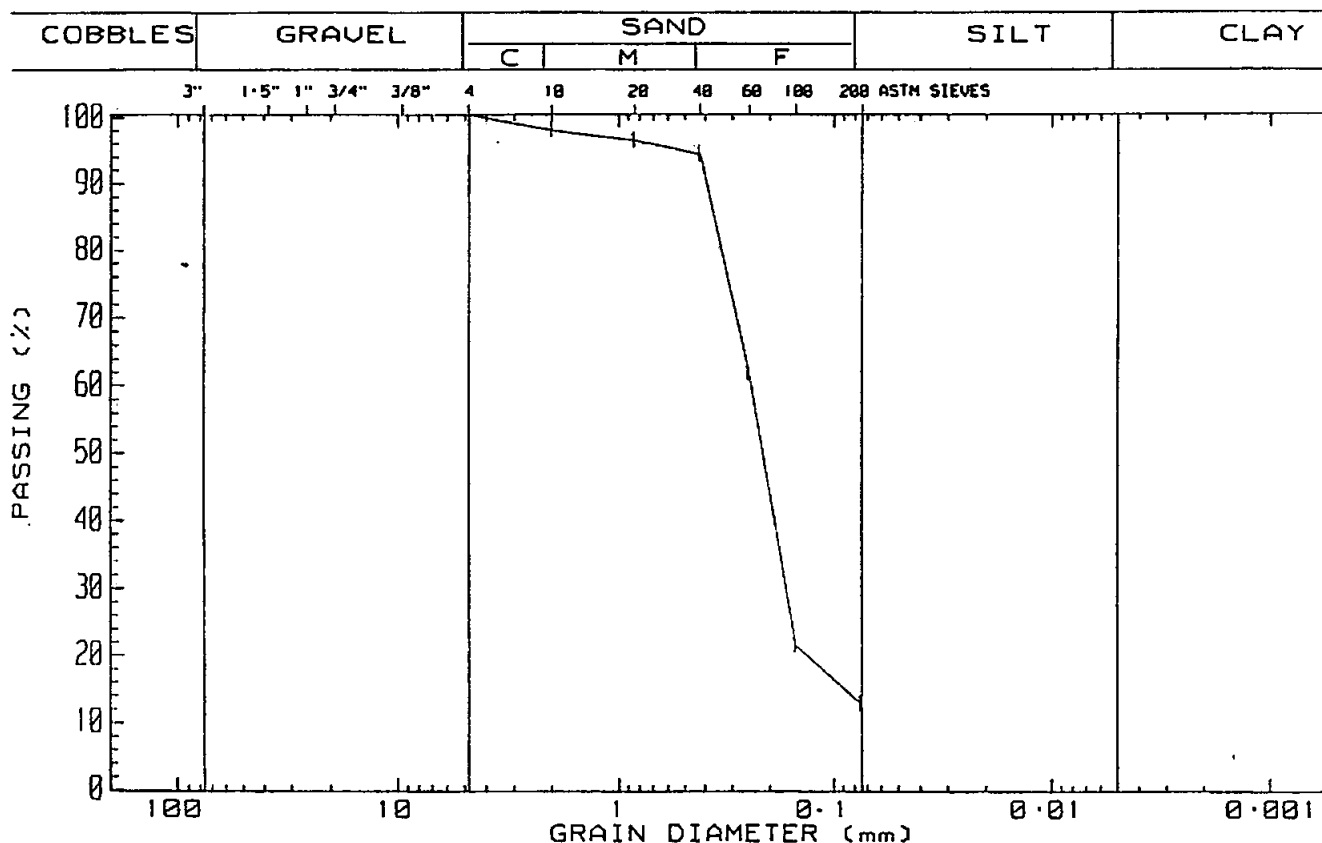


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SOIL MECHANICS LABORATORY GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIN
 SITE SUNDER ROAD
 BOREHOLE BH-3 SAMPLE SPT-4
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 4.00 - 4.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	Cu	Cc
		from	to												
G	11	4.00	4.45	-	-	87	13	-	-	2.4E-01	2.2E-01	1.7E-01	5.9E-002	4.2E+00	1.9E+00

NOTES.

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr1 LAB REF 74/2003

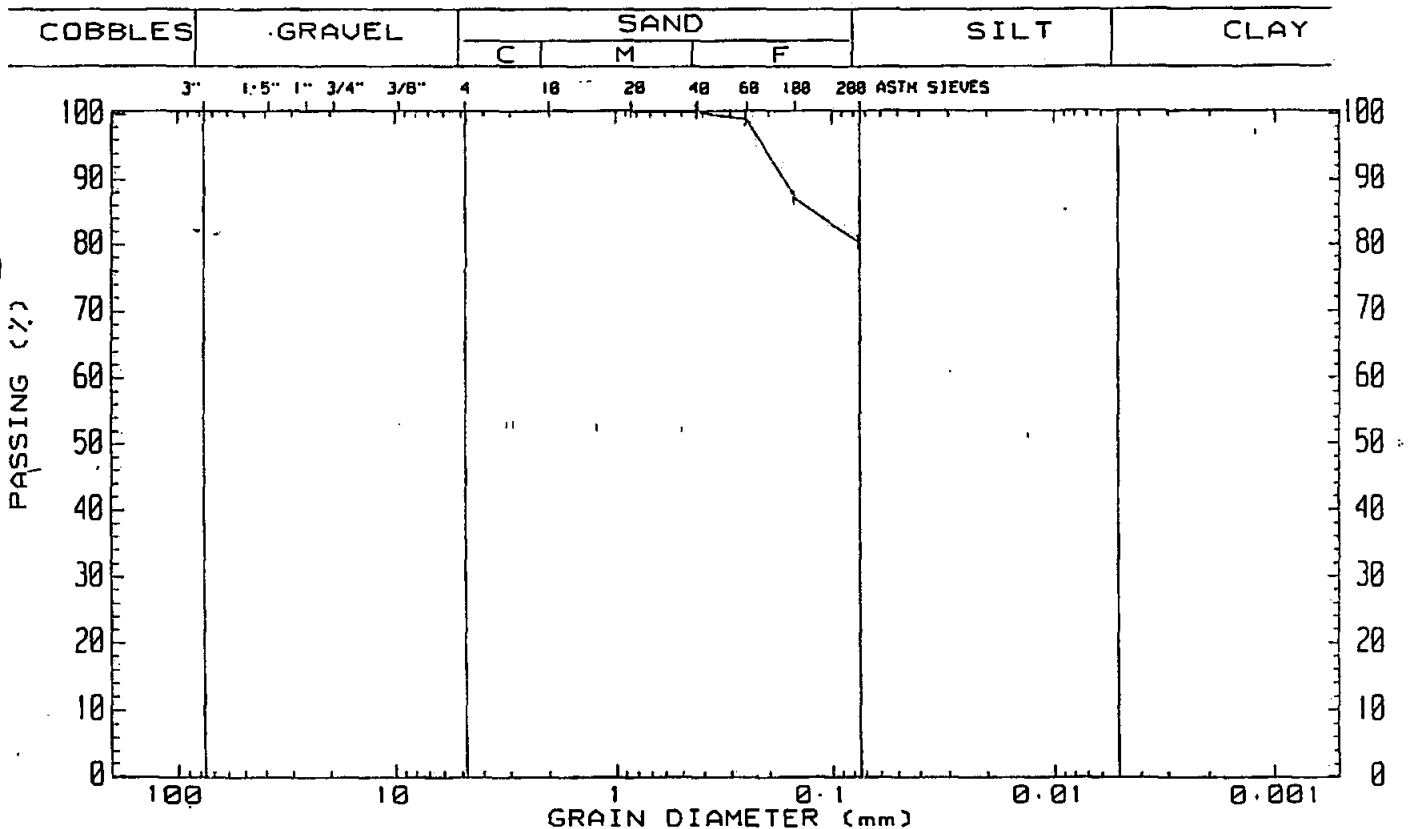
(Seal of Project)

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SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z.M

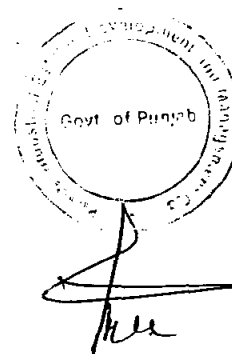
CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE BH-3A SAMPLE SPT-1
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 0.00 - 0.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	Cu	Cc
		from	to												
G	11	0.00	0.45	-	-	20	80			9.6E-03*	3.4E-03*	4.4E-04*	5.6E-005*	1.7E+02	3.6E-01

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003



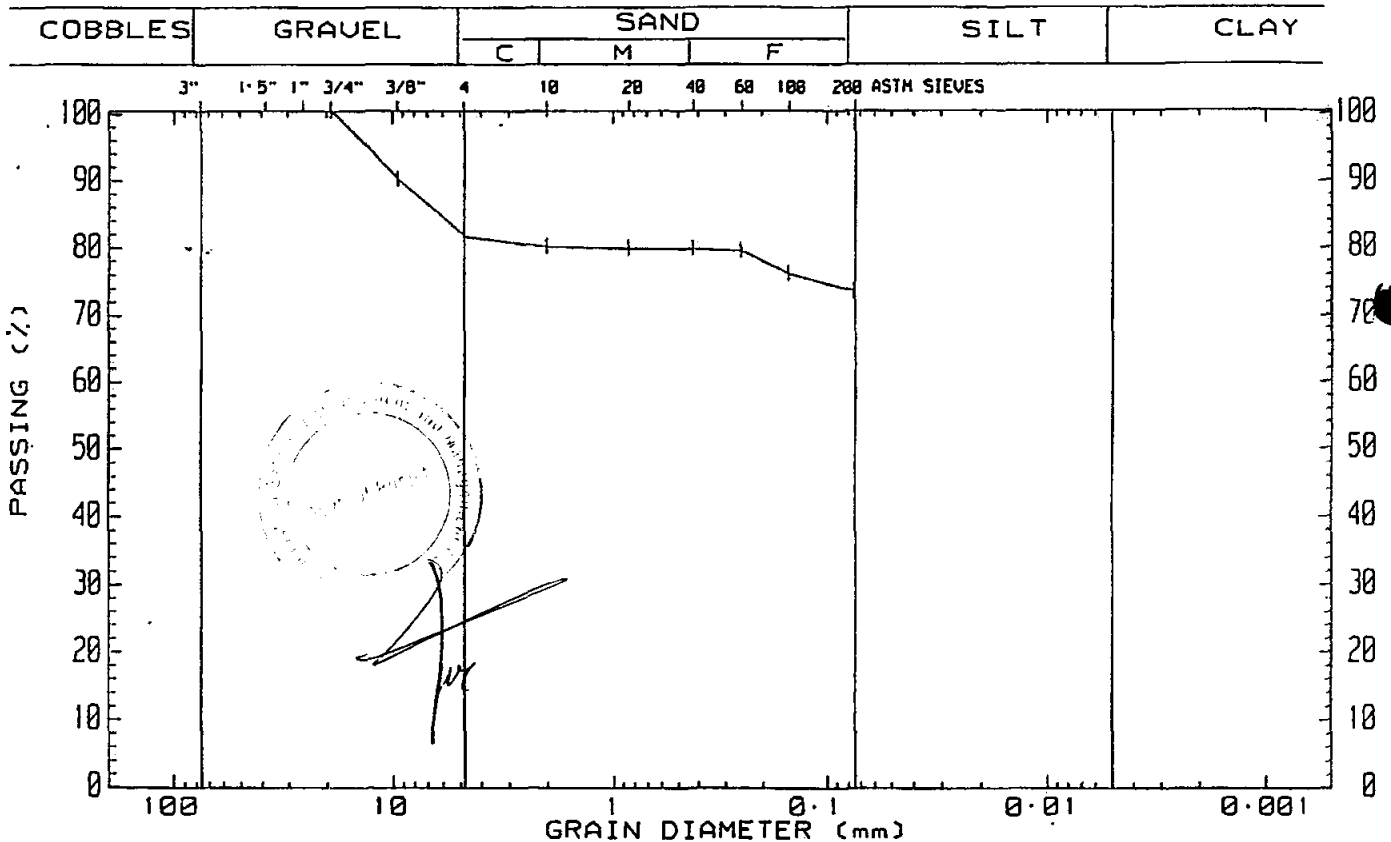
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SOIL MECHANICS LABORATORY

GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M.

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWINI
 SITE SUNDER ROAD
 BOREHOLE BH-5 SAMPLE SPT-1
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 1.00 - 1.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G-1	1	1.00	1.45	-	19	8	73			2.0E-03*	1.3E-04*	5.4E-07*	2.3E-009*	8.6E+05	6.5E-02

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003

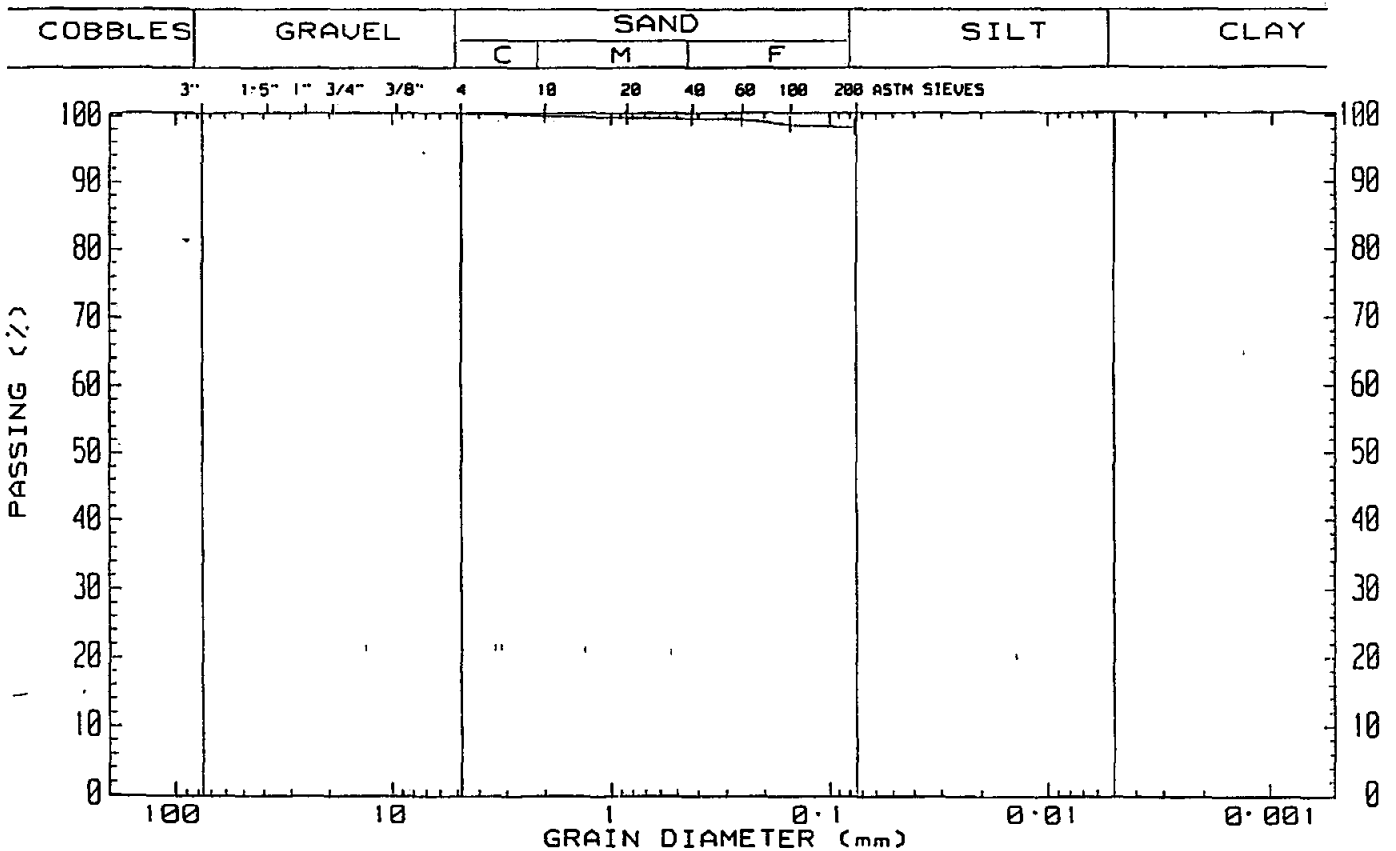
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GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M.

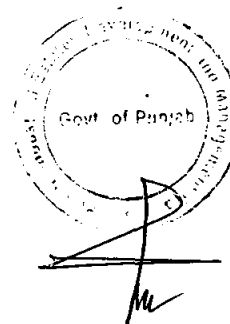
CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIN
 SITE SUNDER ROAD
 BOREHOLE BH-6 SAMPLE SPT-2
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 2.00 - 2.45
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
Gr	11	2.00	2.45	-	-	2	98			5.0E-30*	1.0E-37*	2.4E-52*	3.1E-067*	1.6E+37	3.6E-08

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr-1 LAB REF 74/2003

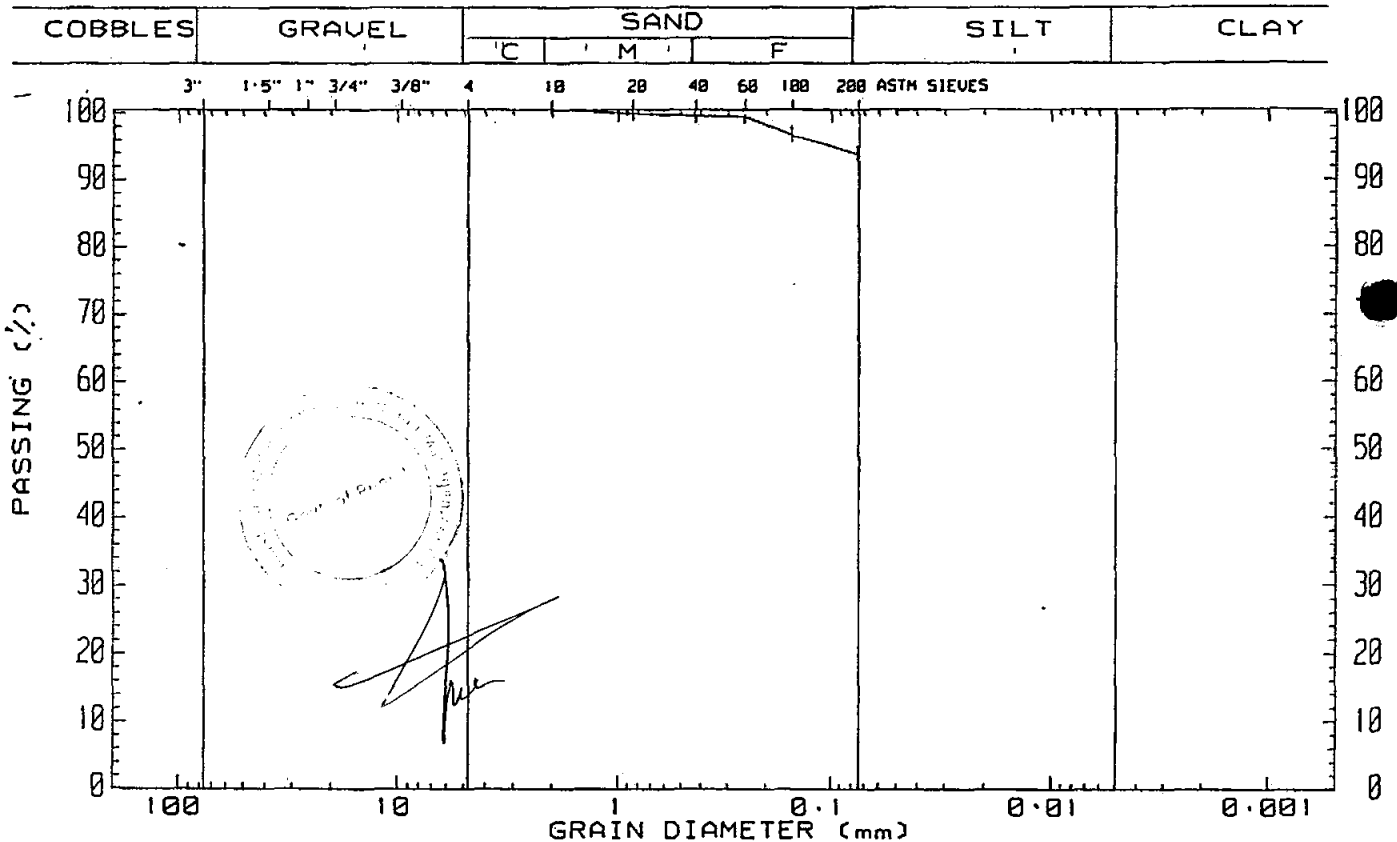


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SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M.

CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWI
 SITE SUNDER ROAD
 BOREHOLE TP-1 SAMPLE DS-2
 SPECIMEN 1 TYPE DISTURBED
 DEPTH [m] 2.00 - 2.00
 TEST DATE 24-09-03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
Gr	11	2.00	2.00	-	-	7	93			2.3E-05*	2.0E-06*	1.6E-08*	1.2E-010*	1.8E+05	8.8E-02

NOTES

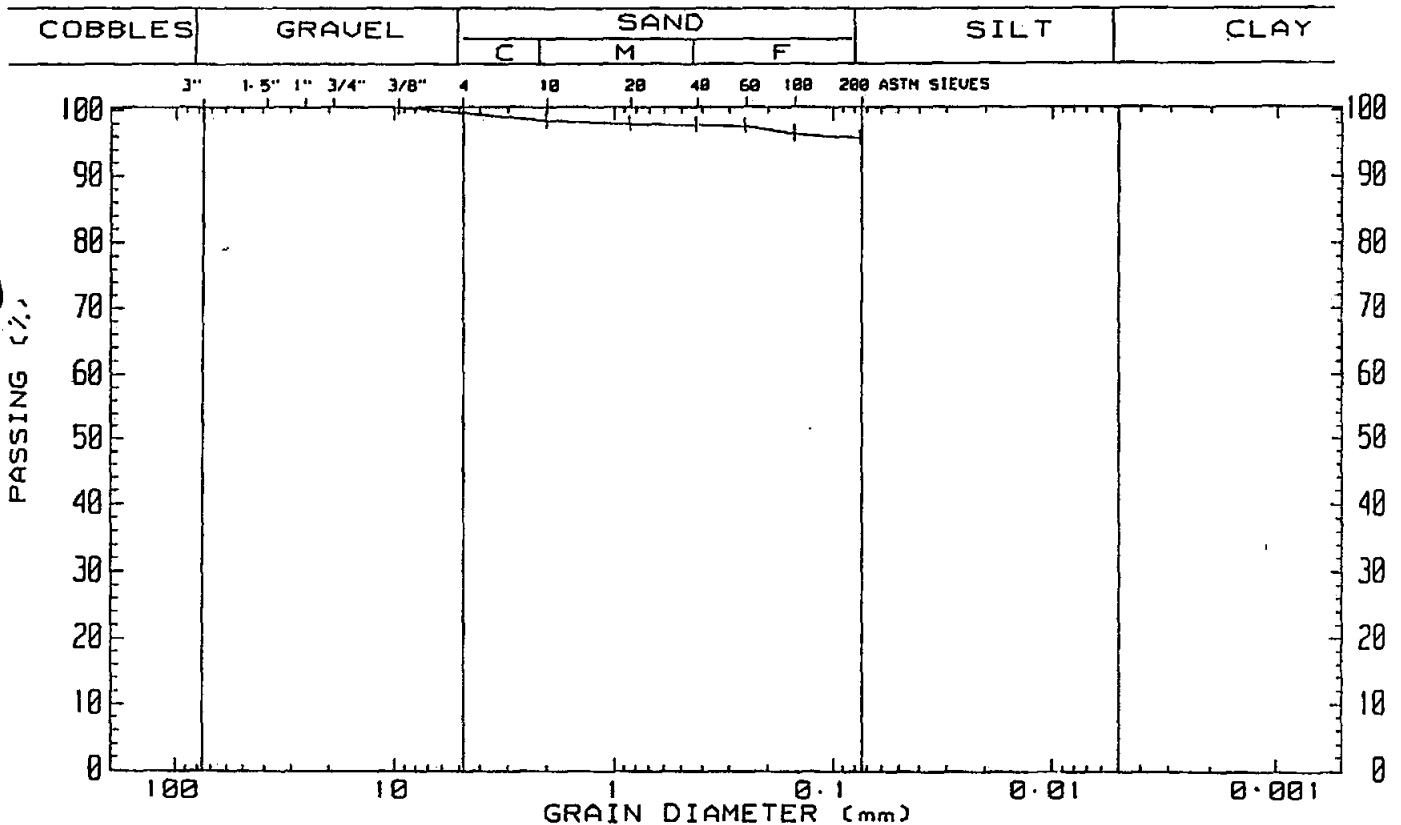
* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 Gr1 LAB REF 74/2003

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SOIL MECHANICS LABORATORY
GRAIN SIZE ANALYSIS

REV	DATE	OPERATOR	SUPERVISOR
0		TARIO	ENGR. Z. M

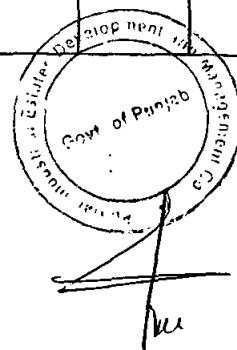
CLIENT NESPAK
 PROJECT INDUSTRIAL ESTATE DEVELOPMENT AT RAWIND
 SITE SUNDER ROAD
 BOREHOLE TP-2 SAMPLE BS-1
 SPECIMEN 1 TYPE UNDISTURBED
 DEPTH [m] 1.00 - 1.30
 TEST DATE 24.09.03



SPECIMEN	SYMBOL	DEPTH (m)		% COBBLES	% GRAVEL	% SAND	PASSING % 200 ASTM	% SILT	% CLAY	D ₆₀ [mm]	D ₅₀ [mm]	D ₃₀ [mm]	D ₁₀ [mm]	C _u	C _c
		from	to												
G-1	11	1.00	1.30	-	1	4	95			4.7E-20*	3.4E-25*	1.8E-35*	9.8E-046*	4.8E+25	7.3E-06

NOTES

* OBTAINED BY EXTRAPOLATION OF EXPERIMENTAL DATA
 G-1 LAB REF 74/2003



**SOILCON**Geotechnical Testing Laboratories
18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :.. INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND-SUNDER ROAD**Location :.. RAIWIND****Client :. NESPAK****BH / TP.No.:BH-i****Sample No.: SPT-1****Depth:. (m): 1.00—1.45**

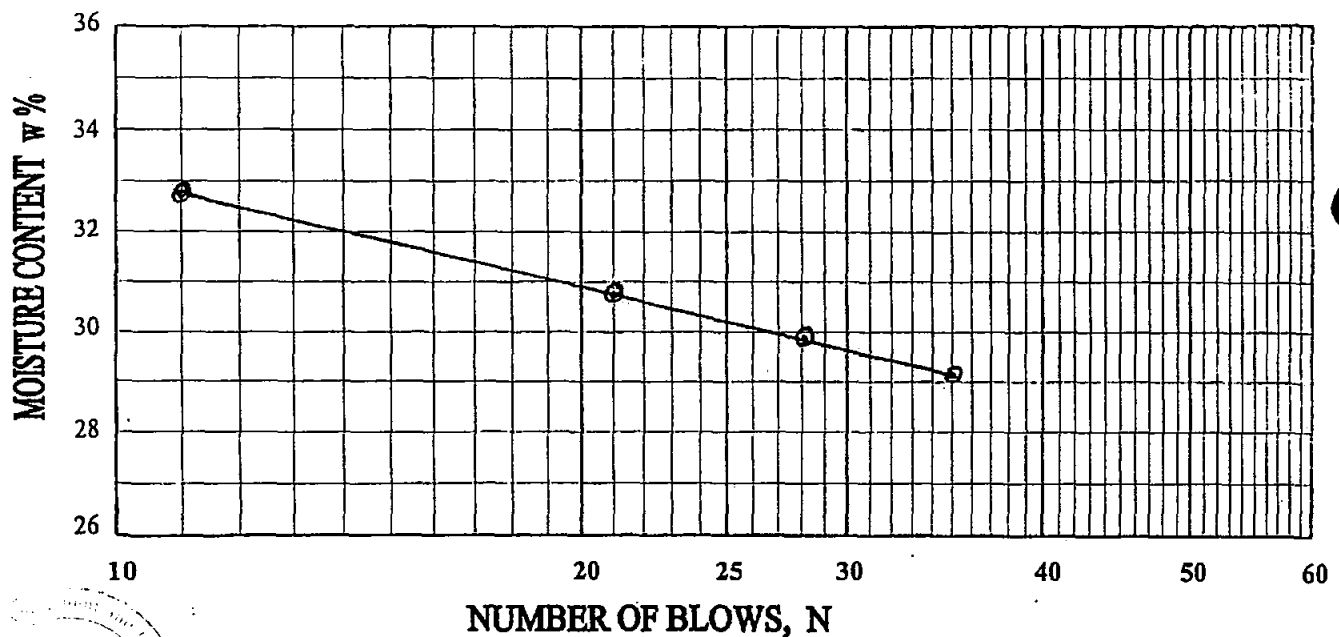
LIQUID LIMIT

Number of Blows, N	11	21	28	35	
Moisture Content %	32.81	30.82	29.91	29.10	

PLASTIC LIMIT

Moisture Content %	19.76	20.19	19.99
--------------------	-------	-------	-------

LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
30 %	20 %	10

**Lab Ref :**
74/2003**Tested By :**
Saeed**Approved By:**
Engr. Zubair
Masoud**Dated :**
24/09/2003

**SOILCON**

Geotechnical Testing Laboratories

18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD**Location : RAIWIND****Client :: NESPAK****BH / TP.No.:BH-1****Sample No.: SPT-5****Depth.: (m): 5.00—5.45**

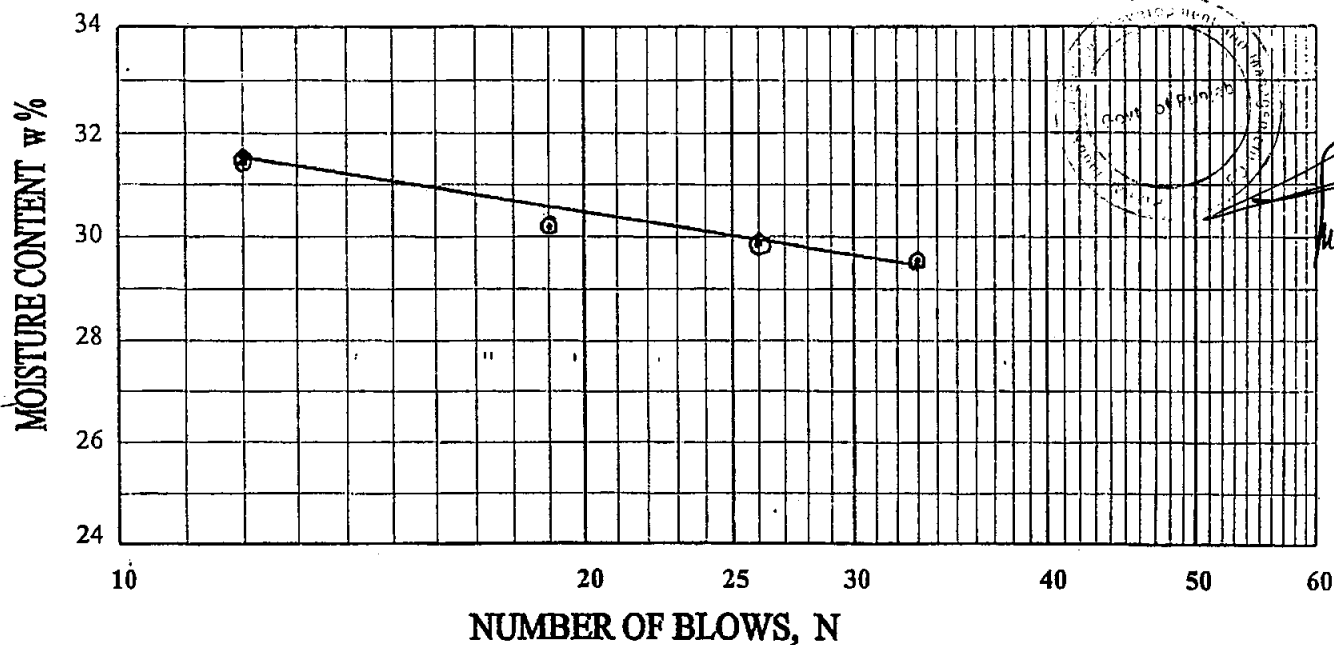
LIQUID LIMIT

Number of Blows, N	12	19	26	33	
Moisture Content %	31.46	30.15	29.90	29.46	

PLASTIC LIMIT

Moisture Content %	20.19	20.18	20.05
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
30 %	20 %	10

**Lab Ref :**
74/2003**Tested By :**
Saeed**Approved By:**
Engr. Zubair
Masoud**Dated :**
24/09/2003

**SOILCON**

Geotechnical Testing Laboratories

18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT : INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND-SUNDER ROAD		
Location : RAIWIND		Client : NESPAK
BH / TP.No.: BH-2	Sample No.: DS-1 Surface	Depth. (m) 0.00—0.10

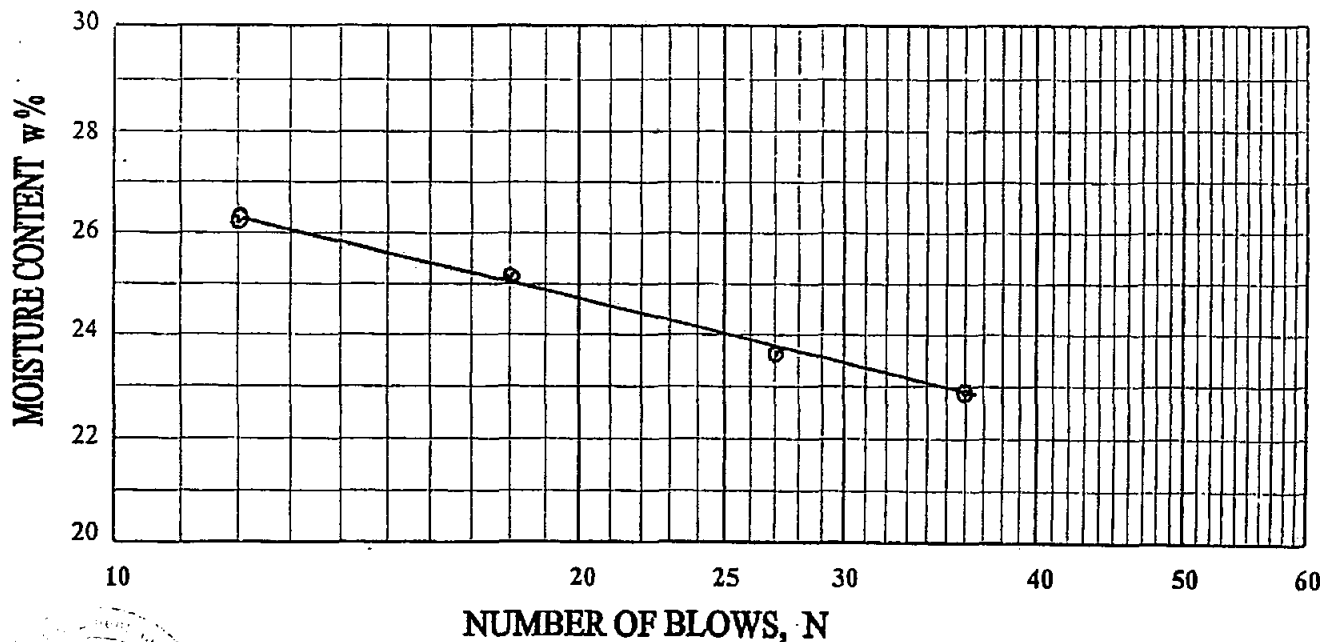
LIQUID LIMIT

Number of Blows, N	12	18	27	36	
Moisture Content %	26.17	25.10	23.63	22.90	

PLASTIC LIMIT

Moisture Content %	17.81	17.62	17.80
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
24 %	18 %	06



Lab Ref : 74/2003	Tested By : Saeed	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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**SOILCON**

Geotechnical Testing Laboratories

18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD**Location : RAIWIND****Client :: NESPAK****BH / TP.No.:BH-3****Sample No. SPT-2****Depth:. (m): 2.00—2.45**

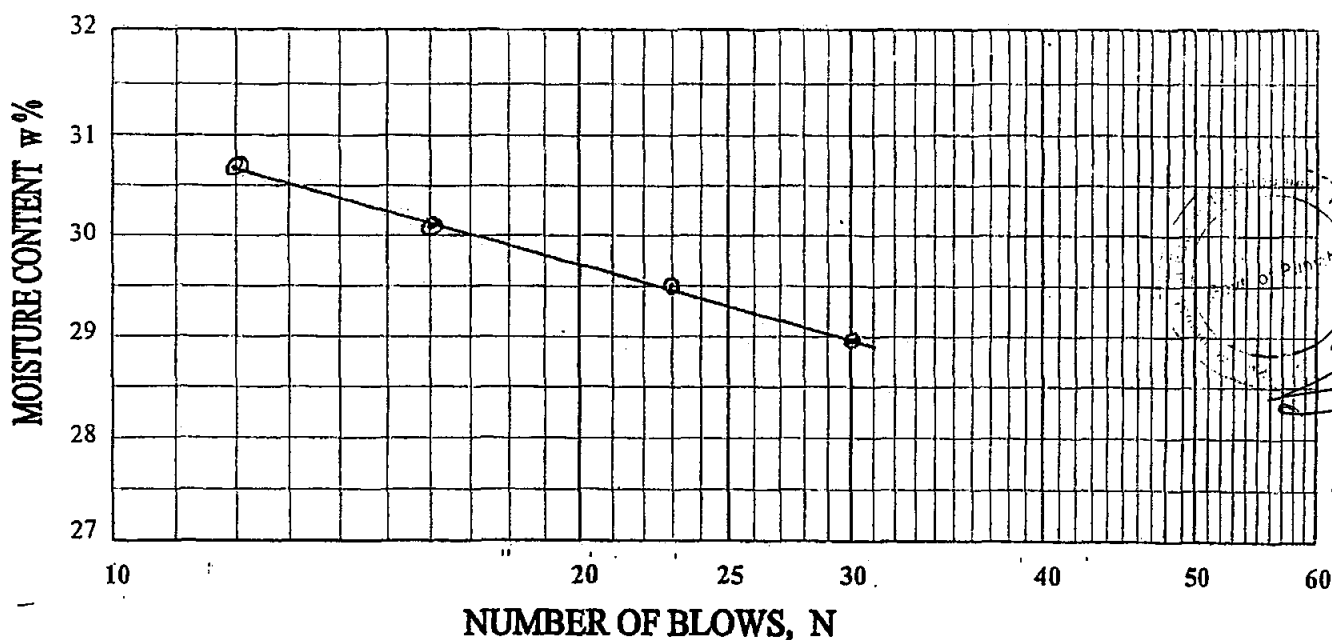
LIQUID LIMIT

Number of Blows, N	12	16	23	30	
Moisture Content %	30.63	30.09	29.50	28.95	

PLASTIC LIMIT

Moisture Content %	21.01	20.98	21.10
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
29 %	21 %	08

**Lab Ref :**
74/2003**Tested By :**
Saeed**Approved By:**
Engr. Zubair
Masoud**Dated :**
24/09/2003

**SOILCON**

Geotechnical Testing Laboratories

18-Km, Multan Road, Lahore. Ph. 7510942-3

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND – SUNDER ROAD**Location :: RAIWIND****Client:: NESPAK****B.H / T.P. No.:: BH-2****Sample No.:: SPT-3****Depth:. (m): 3.00—3.45**

LIQUID LIMIT

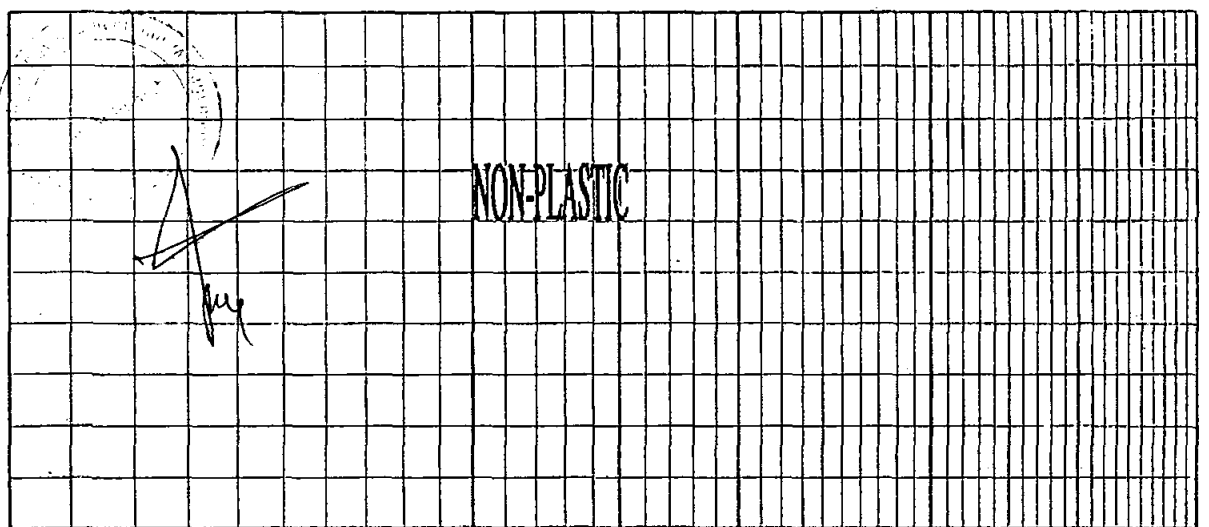
Number of Blows, N	11	Further reading not possible			
Moisture Content %	25.78				

PLASTIC LIMIT

Moisture Content %			
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
- %	- %	-

MOISTURE CONTENT w %



10 20 25 30 40 50 60

NUMBER OF BLOWS, N

Lab Ref : 74/2003	Tested By : M.Saleem	Checked By.: M.Saleem	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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**SOILCON**Geotechnical Testing Laboratories
18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :.. INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND-SUNDER ROAD		
Location :.. RAIWIND		Client :. NESPAK
BH / TP.No.:BH-3A	Sample No.: SPT- 01	Depth:. (m): 0.00—0.45

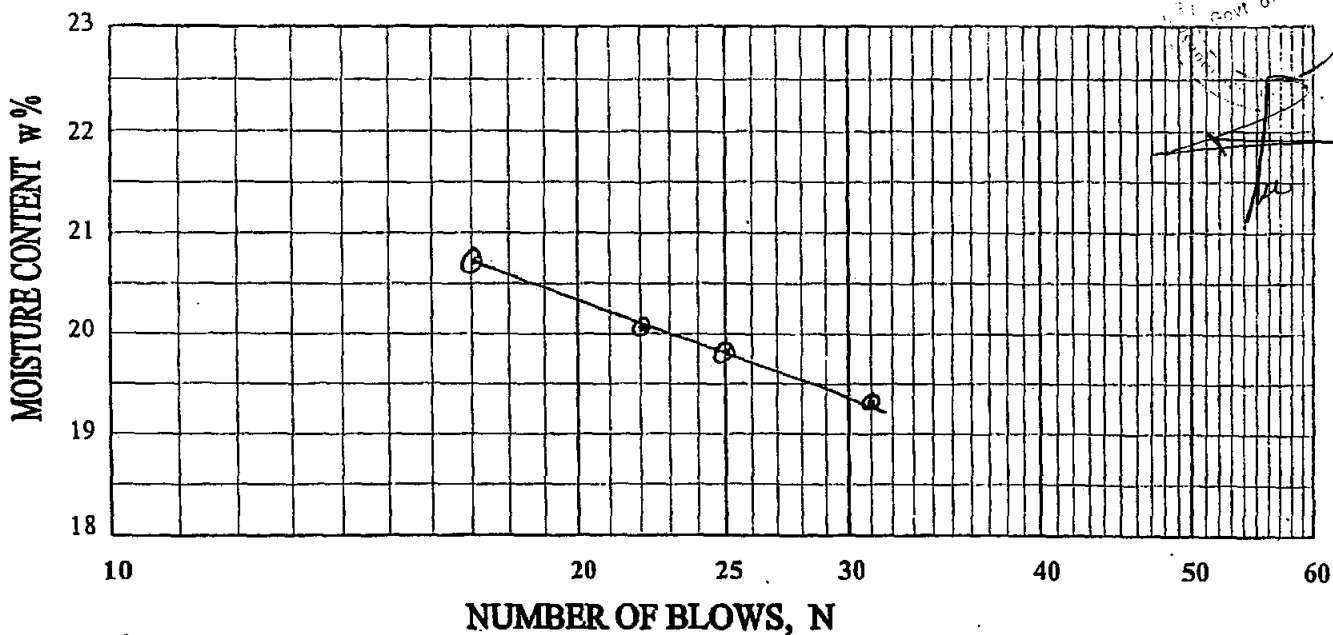
LIQUID LIMIT

Number of Blows, N	17	22	25	31	
Moisture Content %	20.69	20.05	19.79	19.34	

PLASTIC LIMIT

Moisture Content %	14.94	14.76	14.83
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
20 %	15 %	05



Lab Ref : 74/2003	Tested By : Saleem	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT : <i>INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD</i>		
Location : <i>RAIWIND</i>		Client : <i>NESPAK</i>
BH / TP.No.: <i>BH-5</i>	Sample No.: <i>SPT-1</i>	Depth:. (m): <i>1.00—1.45</i>

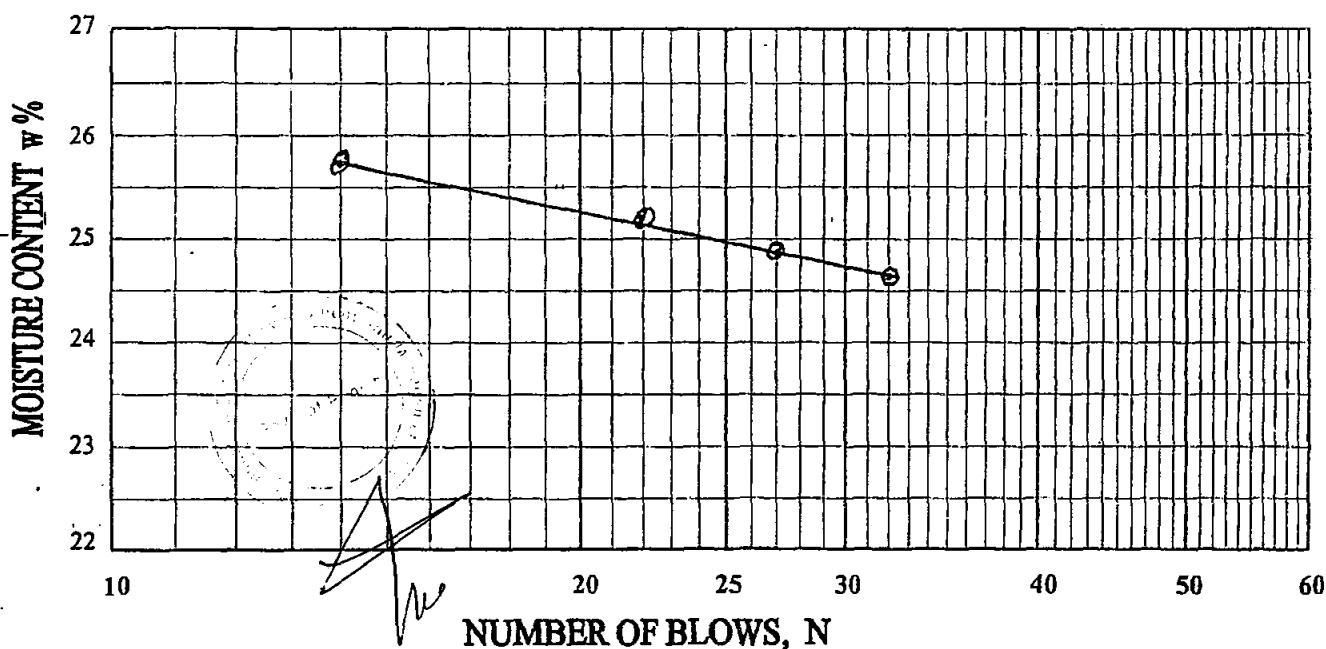
LIQUID LIMIT

Number of Blows, N	14	22	27	32	
Moisture Content %	25.68	25.18	24.85	24.65	

PLASTIC LIMIT

Moisture Content %	17.24	17.35	17.38
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
25 %	17 %	08



Lab Ref : 74/2003	Tested By : M.Saleem	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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**SOILCON**

Geotechnical Testing Laboratories

18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT:: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD**Location : RAIWIND****Client :.NESPAK****BH / TP.No.: BH-6****Sample No.: SPT-2****Depth:. (m): 2.00—2.45**

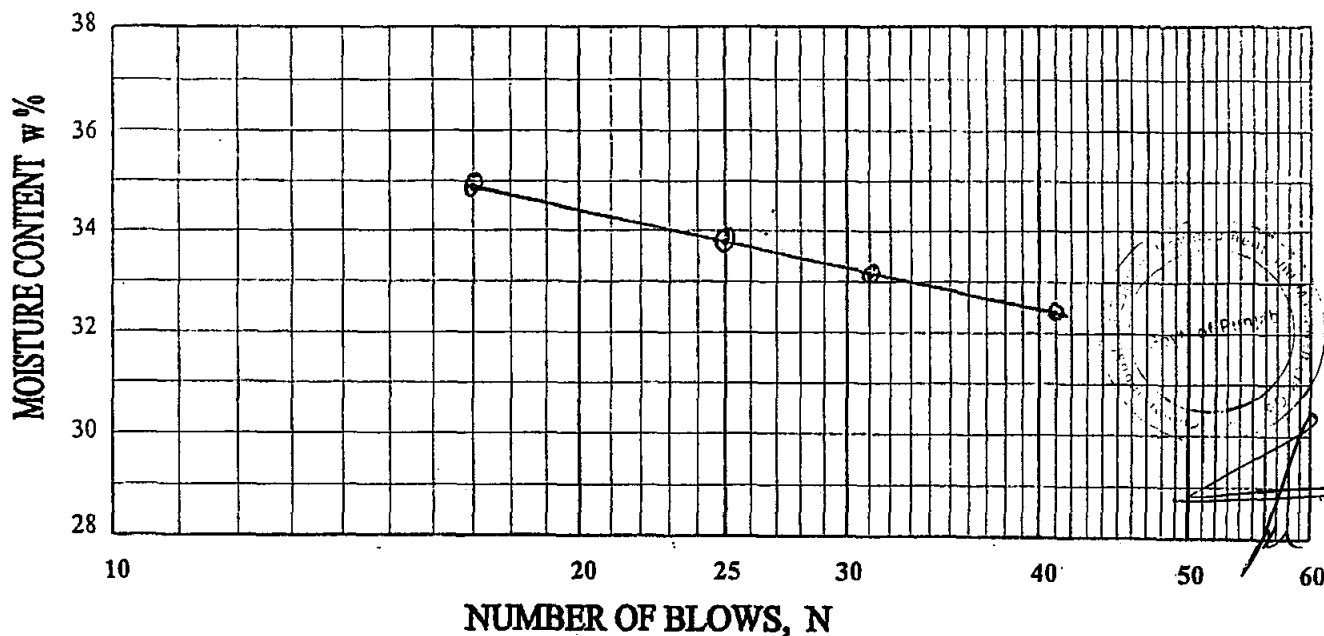
LIQUID LIMIT

Number of Blows, N	17	25	31	41	
Moisture Content %	34.90	33.71	33.10	32.37	

PLASTIC LIMIT

Moisture Content %	21.01	21.19	21.11
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
34 %	21 %	13

**Lab Ref :**

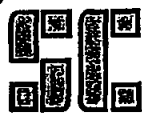
74/2003

Tested By :

Saeed

Approved By:Engr. Zubair
Masoud**Dated :**

24/09/2003

**SOILCON**

Geotechnical Testing Laboratories

18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT : INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD		
Location : RAIWIND		Client : NESPAK
BH / TP.No.: TP-1	Sample No. DS-2	Depth:. (m): 2.00

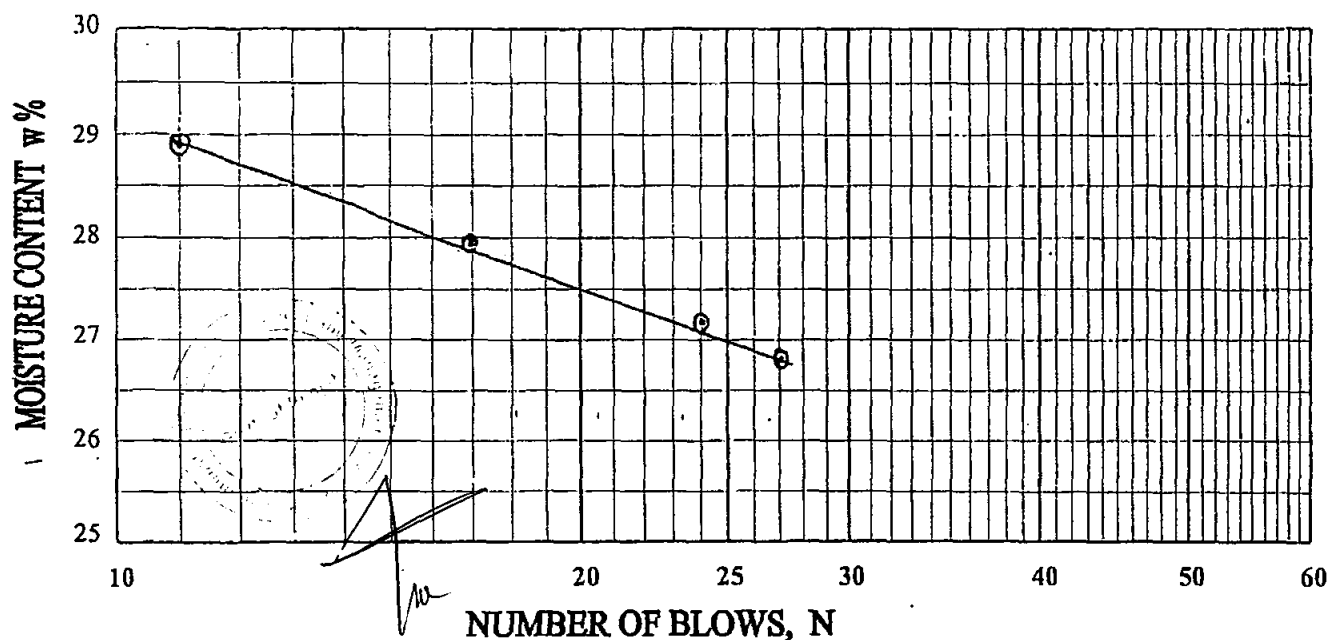
LIQUID LIMIT

Number of Blows, N	11	17	24	27	
Moisture Content %	28.89	27.96	27.15	26.78	

PLASTIC LIMIT

Moisture Content %	19.78	19.84	19.82
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LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
27 %	20 %	07



Lab Ref : 74/2003	Tested By : Saeed	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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**SOILCON**

Geotechnical Testing Laboratories
18-Km, Multan Road, Lahore. Ph. 7510942

LIQUID & PLASTIC LIMIT

(ASTM D-4318)

PROJECT :: INDUSTRIAL ESTATE DEVELOPMENT AT RAIWIND -SUNDER ROAD

Location : RAIWIND

Client :: NESPAK

BH / TP.No.: TP-2

Sample No.: BS-1

Depth.: (m): 1.00—1.30

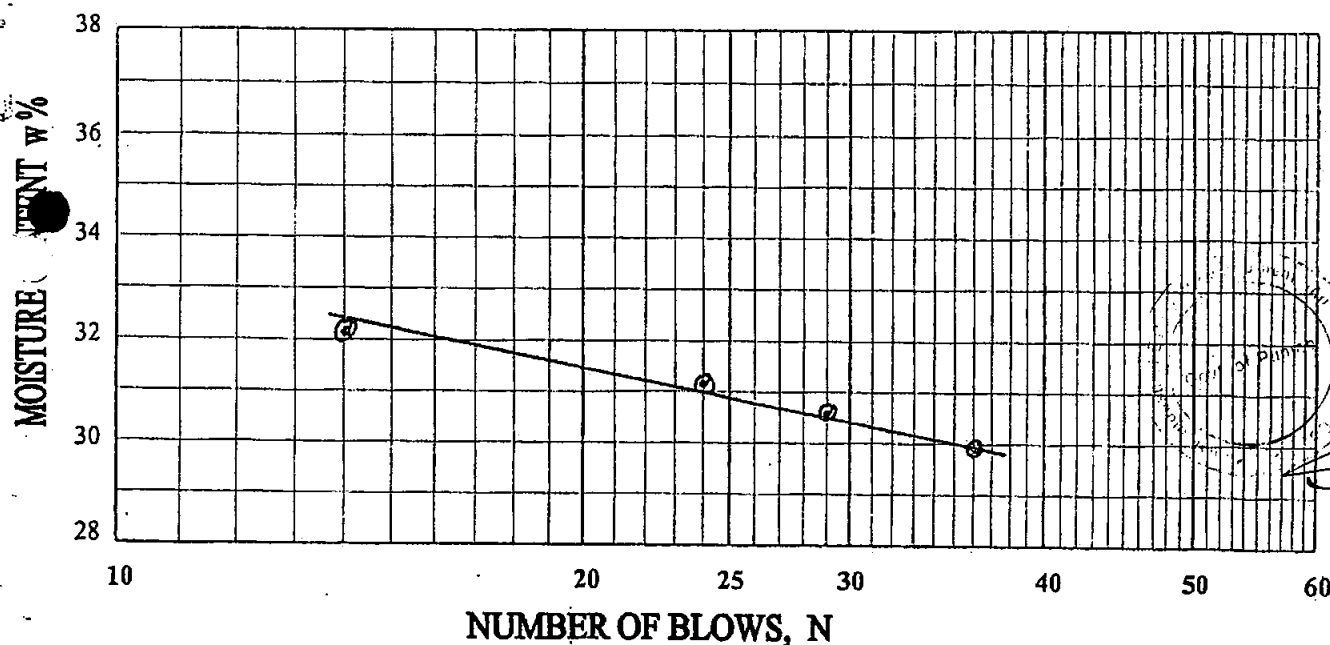
LIQUID LIMIT

Number of Blows, N	14	24	29	36	
Moisture Content %	32.06	31.12	30.61	29.93	

PLASTIC LIMIT

Moisture Content %	20.13	20.32	20.37
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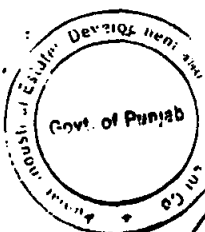
LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
31 %	20 %	11



Lab Ref : 74/2003	Tested By: M.Saleem	Approved By: Engr. Zubair Masoud	Dated : 24/09/2003
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APPENDIX-E

PLATES



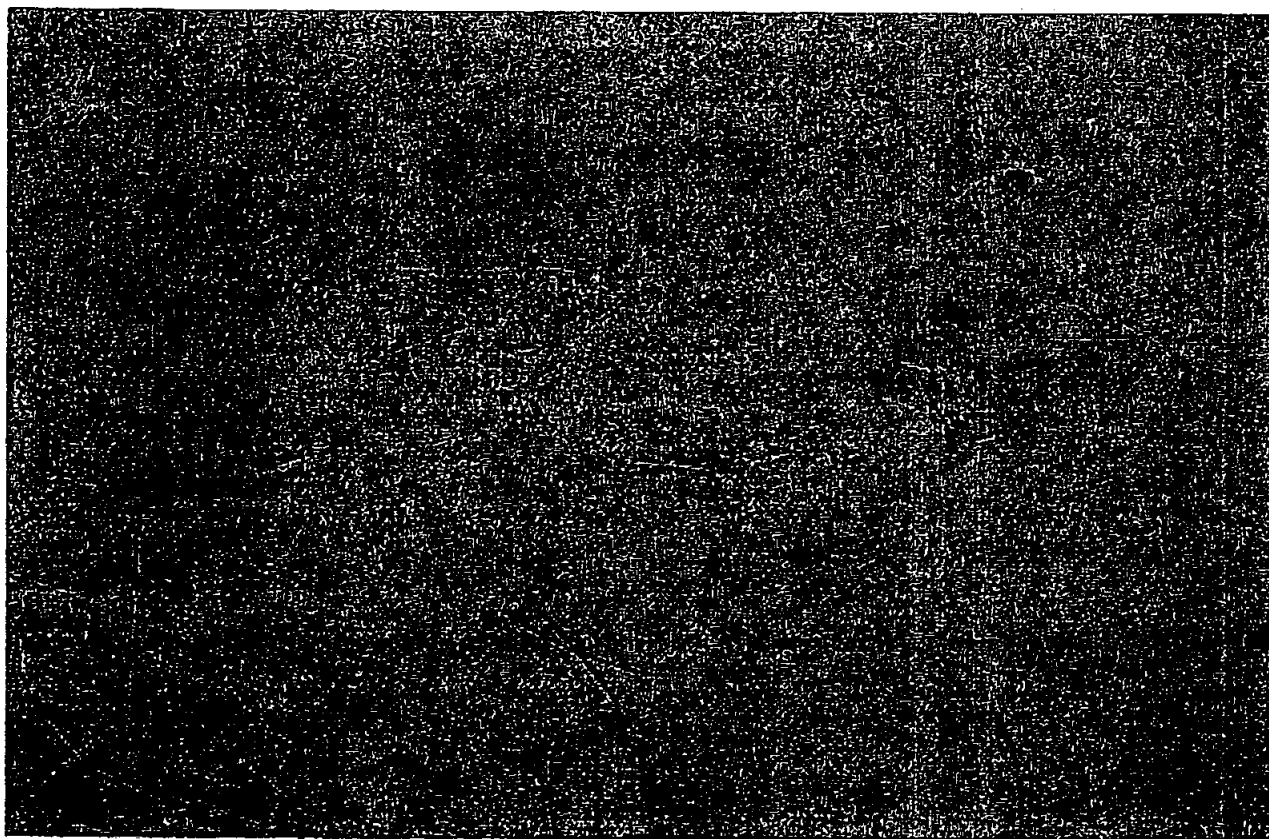


Plate 3: Surface cracks visible in the dry pockets at the site, indicating slightly swelling nature of soil

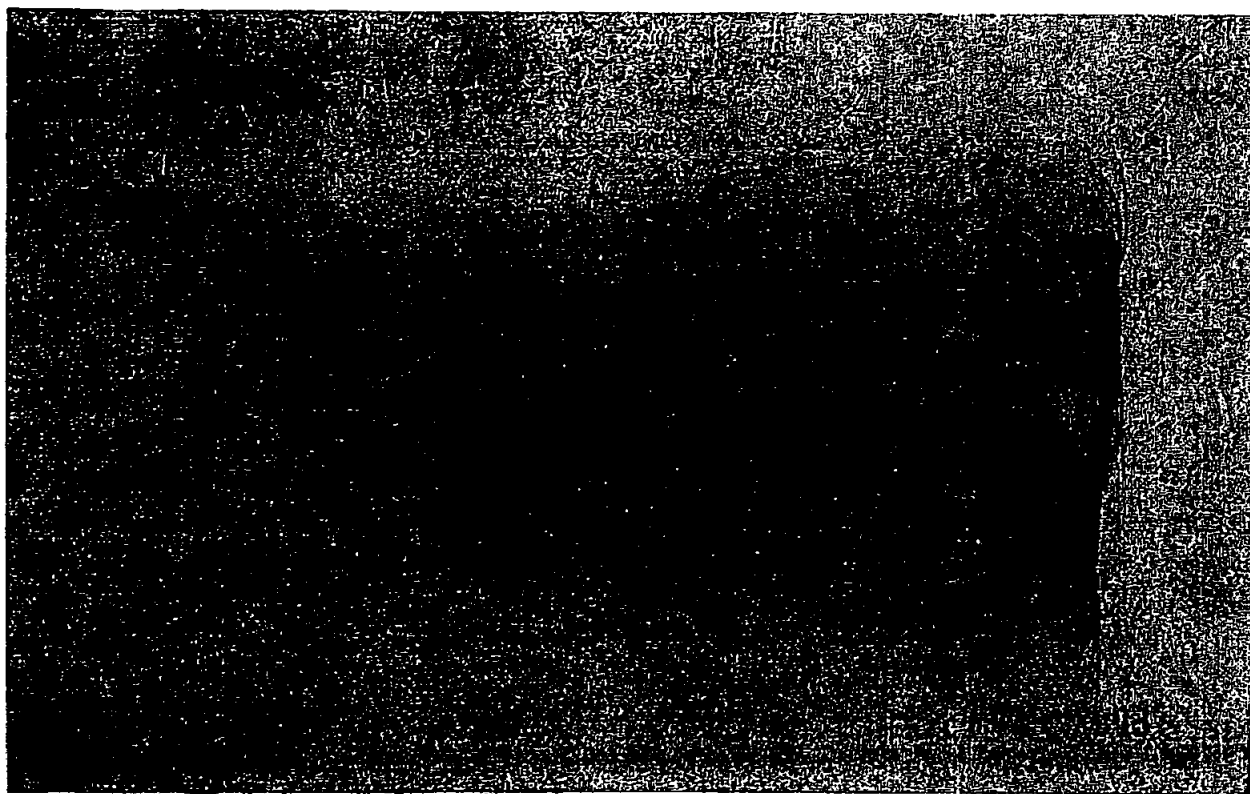
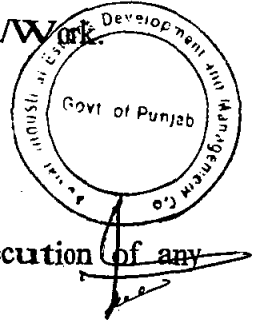


Plate 4: A view of an excavated test pit for physical inspection of the ground

1. SAFETY, HEALTH, AND ENVIRONMENT (SHE) FOR ELECTRICAL O & M WORKS

Areas to be addressed while making Electricity O & M SHE Manual:

- Study the nature of complaint/Fault/Work to do the job safety analysis.
- Planning & Preparation for SHE according to the nature of complaint/Fault/Work.
- Selection of Tools & protective gears according to complaint/Fault/Work.
- Preparation of Skilled workers with selected Protective gears.
- Evaluate the environment of work place under complaint/Fault/Work.
- Comply the work place ethics.
- Firefighting procedure & Standards compliant shall assure before execution of any complaint/Fault/Work plan.
- Identify the area /equipment under complaint/Fault/Work.
- Comply the Procedure to get PTW (Permit to work).
- Cordon off the area under complaint/Fault/Work.
- Isolate the live part/Area from the effected or under work area /equipment as per nature of complaint/Fault/Work.
- Earth the equipment /system under fault with earth set on both sides of equipment in case of fault to avoid any electric shock.
- Use the calibrated Measuring Instruments to ensure the isolation of equipment under complaint/Fault/Work i.e. HT/LT Tester etc.
- Tag in /Tag Out the switching on Operational Board by the despatcher and on equipment by the Engineer /Supervisor to avoid any operational mishap.
- Maintenance /Installation/Repairing shall be done as per Equipment Manual.
- After execution of plan for complaint/Fault/Work, system shall be restored as per original design to avoid any operational hazards.
- Check the design parameters of system to ensure the quality of work executed for complaint/Fault/Work.
- Keep the work place clean after handling complaint/Fault/Work.
- Cancellation of PTW (Permit to work) as per procedure.
- Technical input after carrying the job shall be part of report, drawing, data and operational board if required to avoid electrical operational hazards.
- Ensure the availability of First Aid medicine, Gadgets & Gears kit as per site requirement.
- Emergency Management Services shall be on board 24/7/365.
- Work at height through Ladder and scaffoldings technical training and developments to ensure safety.
- SHE Compliance report Weekly /Fortnightly/Monthly.
- SHE audit.
- SHE compliance surprise visit by the SHE manager on work place to ensure the compliance.
- Calibration of safety gadgets with due course of time to ensure health of equipment.
- Ensuring the safety, fire prevention, Firefighting, fire management and accident



management drills.

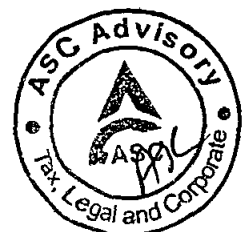
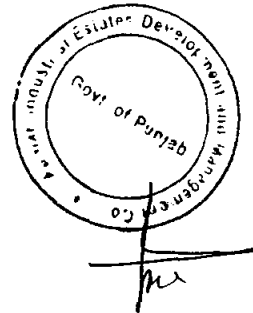
- T & D for learning about electrical hazards.
- SHE Risks evaluation and mitigation through effective risk management.
- Placement of SHE signs and precautions.
- Providing Hygiene environment management system.
- SHE compliance Award and Allowances.
- SHE Awareness and orientation workshops.
- Technological changes acceptance attitude development for effective compliance of SHE.
- Ensure the usage and safe handling of personal protective equipment (PPEs) during electrical works.
- Proper Implementation of Traffic management plan (e.g.; Give way to emergency vehicles, such as fire tenders, Rescue vehicles Ambulances etc.).
- Comprehensive Emergency preparedness and response plan.
- Waste disposable mechanism for combustible and non-combustible materials.
- Accident /Emergency report format for record keeping.
- Develop Key performance indicators (KPIs) for effective implementation of SHE manual.
- Any other point to be incorporated for effective compliance of SHE.

2. SAFETY ADVISORY

SUMMER / MONSOON SAFETY ADVISORY

WORKING OUTDOORS:

- Make sure your safety gear is in a serviceable/usable condition; use PPE.
- Keep a small towel/ piece of cloth and wipe your tools dry before you use them.
- Use Gum boots and check that the soles have proper tread which avoids slipping.
- Ensure use of safety belt while working at heights.
- Keep away from trees, tall objects, metal objects and water during a thunderstorm.
- Look out for open manholes if you have to wade through standing water, use a stick to feel the ground in front.
- Move cautiously because rain causes slick surfaces, work more slowly particularly when climbing ladders
- Make sure you can be seen. Wear high-visibility clothing, especially in areas with vehicle traffic and heavy machinery.
- Stay clear of areas where there is a lot of debris or downed trees. It could conceal an energized power line.
- Stay clear of chain link fences that may be energized if touching a downed line.
- Stay away from any water that may have downed wires in or near the area.



TIPS FOR WORKING IN COLD WEATHER:

- Dress in layers so you can adjust for colder conditions but avoid sweating. Cover the head & wear gloves.
- Wear face protection to avoid skin exposure, depending on how cold it is, use sunglasses if it is sunny.
- Cover mouth & nose in extreme cold so that the air you breathe is not immediately cold to your lungs.
- Apply ointments/lotion/oil to keep the skin protected from dryness.

EARTHQUAKE ADVISORY

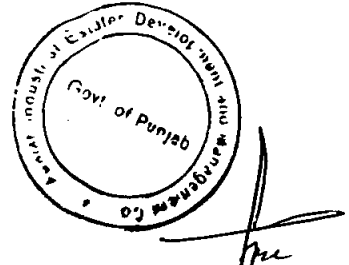
Actions required to be taken during an earthquake.

During the Earthquake:

- If you are indoors, stay there. Quickly move to a safe location in the room such as under a strong desk, a strong table, or along an interior wall. The goal is to protect yourself from falling objects and be located near the structural strong points of the room. Avoid taking cover near windows, large mirrors, hanging objects, heavy furniture, heavy appliances or fireplaces.
- If you are cooking, turn off the stove and take cover.
- If you are outdoors, move to an open area where falling objects are unlikely to strike you. Move away from buildings, power lines and trees.
- If you are driving, slow down smoothly and stop on the side of the road. Avoid stopping on or under bridges and overpasses, or under power lines, trees and large signs. Stay in your car.

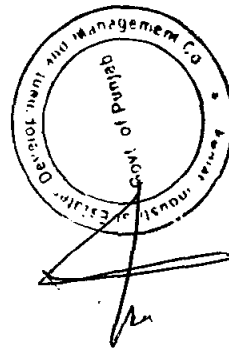
After the Earthquake:

- Check for injuries, attend to injuries if needed, help ensure the safety of people around you.
- Check for damage. If your building is badly damaged you should leave it until it has been inspected by a qualified professional.
- If you smell or hear a gas leak, get everyone outside and open windows and doors. If you can do it safely, turn off the gas at the meter. Report the leak to the gas company and fire department. Do not use any electrical appliances because a tiny spark could ignite the gas.
- If the power is out, unplug major appliances to prevent possible damage when the power is turned back on. If you see sparks, frayed wires, or smell hot insulation turn off electricity at the main fuse box or breaker. If you will have to step in water to turn off the electricity you should call a professional to turn it off for you.






What you need to do during and after the rains/storm:

- Stay abreast with the news and advisories
 - Avoid moving out on the streets until the storm passes
 - Park your vehicles in location to prevent from damage due to falling items (trees, billboards, etc.)
 - Stay away from accumulated water around electrical installations.
 - Don't attempt to repair electrical system or pull wet tree limbs off electric lines.
 - Don't touch wet electrical switches. Particularly outdoor switches must be touched using non-conductor material.
 - Do not lock motorcycles or bicycles with electric poles.
 - Do not touch or fiddle with any falling electric wires.
-



3. SAFETY LEAFLETS




LIFE IS PRECIOUS - BE CAREFUL!


SAFETY MESSAGE

Use of electricity is a convenience, but it can be dangerous. Please read the instructions and safety warnings carefully. If you do not understand the instructions, please contact the manufacturer or a qualified electrician. Do not use electricity if you are not qualified to do so.


ELECTRICAL SAFETY

- 1. Always use proper wiring techniques. Do not overload circuits.
- 2. Do not touch electrical wires or components unless you are qualified to do so.
- 3. Always turn off the power before working on any electrical system.
- 4. If something is not working properly, do not touch it. Call a qualified electrician.
- 5. Do not use electrical equipment in wet areas or near water.
- 6. Do not use electrical equipment in the presence of flammable gases or liquids.
- 7. Do not use electrical equipment in the presence of oxygen.
- 8. Do not use electrical equipment in the presence of fire.
- 9. Do not use electrical equipment in the presence of lightning.
- 10. Do not use electrical equipment in the presence of high winds.
- 11. Do not use electrical equipment in the presence of heavy rain.
- 12. Do not use electrical equipment in the presence of snow.
- 13. Do not use electrical equipment in the presence of ice.
- 14. Do not use electrical equipment in the presence of fog.
- 15. Do not use electrical equipment in the presence of mist.
- 16. Do not use electrical equipment in the presence of dust.
- 17. Do not use electrical equipment in the presence of dirt.
- 18. Do not use electrical equipment in the presence of oil.
- 19. Do not use electrical equipment in the presence of grease.
- 20. Do not use electrical equipment in the presence of paint.
- 21. Do not use electrical equipment in the presence of varnish.
- 22. Do not use electrical equipment in the presence of glue.
- 23. Do not use electrical equipment in the presence of cement.
- 24. Do not use electrical equipment in the presence of plaster.
- 25. Do not use electrical equipment in the presence of brick.
- 26. Do not use electrical equipment in the presence of concrete.
- 27. Do not use electrical equipment in the presence of stone.
- 28. Do not use electrical equipment in the presence of wood.
- 29. Do not use electrical equipment in the presence of metal.
- 30. Do not use electrical equipment in the presence of plastic.
- 31. Do not use electrical equipment in the presence of rubber.
- 32. Do not use electrical equipment in the presence of leather.
- 33. Do not use electrical equipment in the presence of fabric.
- 34. Do not use electrical equipment in the presence of paper.
- 35. Do not use electrical equipment in the presence of cardboard.
- 36. Do not use electrical equipment in the presence of glass.
- 37. Do not use electrical equipment in the presence of crystal.
- 38. Do not use electrical equipment in the presence of jewelry.
- 39. Do not use electrical equipment in the presence of watches.
- 40. Do not use electrical equipment in the presence of keys.
- 41. Do not use electrical equipment in the presence of coins.
- 42. Do not use electrical equipment in the presence of paper clips.
- 43. Do not use electrical equipment in the presence of staples.
- 44. Do not use electrical equipment in the presence of pushpins.
- 45. Do not use electrical equipment in the presence of nails.
- 46. Do not use electrical equipment in the presence of screws.
- 47. Do not use electrical equipment in the presence of bolts.
- 48. Do not use electrical equipment in the presence of nuts.
- 49. Do not use electrical equipment in the presence of washers.
- 50. Do not use electrical equipment in the presence of spacers.
- 51. Do not use electrical equipment in the presence of shims.
- 52. Do not use electrical equipment in the presence of spacers.
- 53. Do not use electrical equipment in the presence of shims.
- 54. Do not use electrical equipment in the presence of spacers.
- 55. Do not use electrical equipment in the presence of shims.
- 56. Do not use electrical equipment in the presence of spacers.
- 57. Do not use electrical equipment in the presence of shims.
- 58. Do not use electrical equipment in the presence of spacers.
- 59. Do not use electrical equipment in the presence of shims.
- 60. Do not use electrical equipment in the presence of spacers.

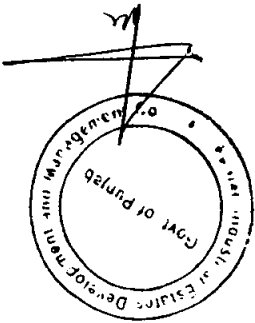




To give you the most reliable product, we use the best materials and the most advanced technology available. All our products are made in the USA.







BE CAREFUL DURING THE RAIN

Downed power lines are not safe to touch, not to be near.

Keep your children away from power sockets.

Don't touch electrical appliances when you are barefoot or have wet hands.

Don't ring the doorbell with wet shoes.

Be roots and feet off boards, trees, electricity poles and transformers during rainy and windy weather.

Stay clear of any electrical appliances that are submerged in floodwater. Take extra care of the elderly and children.

Be aware of cable TV and internet wires as they can be dangerous during rain.

SAFETY

GOVT. OF PUNJAB

4. NEPRA GUIDELINES FOR POWER SAFETY CODE FOR
TRANSMISSION & DISTRIBUTION LICENSEES
(First Edition November, 2014)

PSC- 6 Detailed Instructions of Power Safety to be considered while preparing the Power Safety Manual

PSC-6.1 Purpose, Scope & Philosophy of Safety Policy

Each licensee shall elaborate the purpose & scope of overall safety policy, vision of the licensee about safety, fundamentals of the power safety and the issuance of power safety manual to all concerns.

Duties & responsibilities of safety team/safety directorate & others regarding training, record, implementation, auditing and preventive action shall be clearly defined by each Licensee. The Licensee shall provide such records to NEPRA as and when required.

PSC-6.2 Basic Safety Guidelines

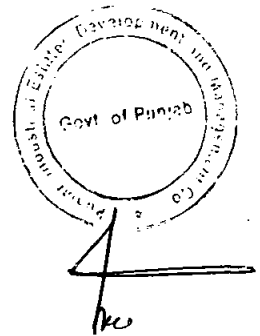
The licensee shall provide the basic safety guidelines primarily for persons who have not been appointed as competent persons under power safety code or persons who work beyond their scope of competence.

The basic safety guidelines shall comprise but not limited to the following:

- General Principals
- Operations
- Fire Precautions & work in confined space
- Work in Substations & Compounds

The general basic principles of safety shall also be observed i.e.:

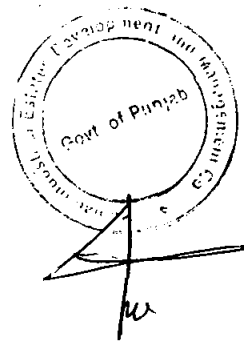
- Identification of Hazards
- Elimination of Hazards
- Controlling of Hazards
- Protection against injuries
- Minimizing the severity of injury
- Avoiding for future occurrences



Unsafe conditions or unsafe acts shall be clearly defined, as the good operation is only the safe operation.

Examples of un-safe conditions be clarified i.e.:

- Improper Guarding
- Defective material or equipment
- Hazardous arrangements/Insufficient lighting
- Improper ventilation
- Unsafe Clothing
- Unsafe Design & Construction



Examples of Un-Acts be clarified i.e.:-

- Operating without Authority or Warning
- Operating or Working at unsafe Speed
- Making safety devices In-operative
- Use of unsafe equipment or improper use of equipment
- Unsafe Loading
- Placing or Leaving Objects
- Mixing improper Packing
- Taking unsafe Position or Posture
- Working on equipment without taking proper precautions
- Distracting, Teasing or Startling
- Failure to use safe clothing or protective equipment

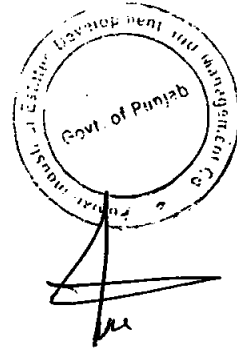
From operation point of view, other factors be also considered

i.e.:

- Shift Duties
- Reporting of duty in unfit condition
- Assistance from employees not on duty



- **Inspection of Grid Station Equipment**
- **Weather information**
- **Interference of animals**
- **Visitors**
- **Working of employees of other organizations**
- **Identification of operating equipment**

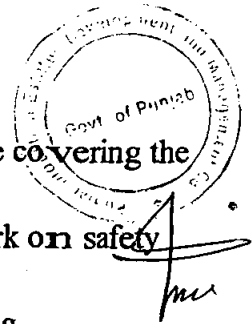


PSC-6.3

General Provisions for Safety

The general provisions of safety shall be provided by each licensee covering the followings:

- The provisions for workers /operators to object to doing work on safety grounds.
- The use & wearing of safety equipment & protective clothing.
- Physical fitness & personal conduct of the worker before and during on job
- Arrangement and procedure of job briefing before the work is started
- Requirements to safe guard the public and property when work in progress
- Requirements for housekeeping in a safe working in conditions
- Arrangements and requirements of Fire protection
- Requirements, arrangements and use of proper tools and plants for the proper and safe storage lifting and carrying of different types of material
- Procedure and reporting requirements of patrolling of lines
- Procedure for tree trimming
- List of common protective devices and equipment use for the safety purpose.



PSC-6.4

Safety Policy for Electrical Equipment & Materials from Design & Execution Point Of view

Each Licensee shall establish the design section, which shall be responsible for complete detailed engineering design and execution of electrical equipment and materials from power safety point of view. All design aspects/design criteria shall be provided to NEPRA as & when required and complete record shall be maintained by each Licensee.

Detail regarding improvement in existing electrical protective equipment shall be clearly provided i.e.:

- Protective measures as per IEC or international engineering standards in 11KV Panels in order to diagnose the fault in case the live conductor falls on rocks or any dry surface and in result may cause damage to people or property.
- Protection of Transformers
- Protection of 11KV lines with protective devices
- Protection of cables against fires, as in some instances cable may become a carrier of fire.

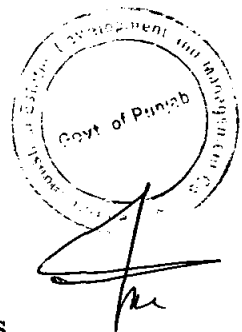


Safety Measures from Operation & Maintenance Point of View

Safety measures for operation & maintenance shall cover but not limited to the following:

- **General Safety Requirements**

- Access to and work in operational premises, underground chambers & confined spaces
- Working with vessels that contain oil or flammable liquids.
- Access to & work in fire protected areas.
- Climbing of Poles, towers & structures
- Access to high voltage apparatus and structures
- Arrangements for high voltage switching operations
- The use of voltage testing devices
- The procedure to follow when excavating near live cables.
- The use of mobile plant and equipment near overhead lines.



- **Safety Precautions for work on or near High Voltage Systems**

- This section includes the all-precautionary measures and procedures to be followed while working on or near any high voltage system;
- The general safety principles to follow to ensure safe working.
- The arrangements for insuring safe isolation of apparatus and conductors
- The methods to be used to discharge and earth high voltage equipment
- The procedure to follow when approaching live high voltage conductor and insulators supporting them.
- The procedure to follow for work in substation and switching substations containing exposed live high voltage conductors
- Permits to Work
- Sanctions for Tests
- Limitations of Access

For Permit to work (PTW), specimen shall be provided by each DISCO/NTDC in the safety manual covering the following but not limited to the following:

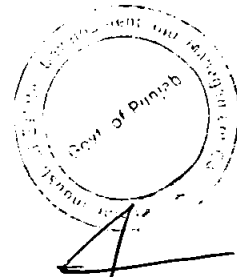
- Application of PTW
- Issuance of PTW



- Receipt of PTW
- Clearance of PTW
- Cancellation of PTW

For sanction of test & the limited work certificate the following points must be considered:

- Preparation
- Issues and receipt
- Transfer
- Clearness and cancellation



Requirement: Each Licensee shall provide the PTWs with the ~~minimum~~ details as mentioned above.

C: Procedures for work on particular items of plant, Apparatus or Conductors

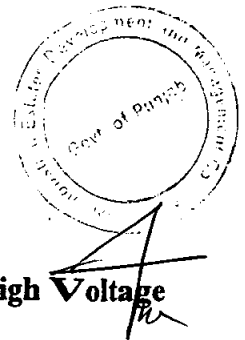
Each licensee shall cover operations which require procedures to be followed which are additional to the general ones.

- General safety precautions to be taken for use of cleaning solvents, Handling of toxic or hazardous materials, Glass fiber thermal insulation, Explosives, radio actives and radiations, High voltage testing, leak checking, pressure vessels/cylinders, underground man-holes.
- Procedures for safe working of remotely and automatically control equipment shall be established by each DISCO/NTDC after consultation with NPCC or RCC which ever case is applicable & shall be provided in power safety manual.
- With-drawable apparatus
- Bus-bars, bus-bar spouts and bus-bar connections of multiple panel /switchboards
- High voltage apparatus and plant operated by or containing compressed air with other gases or operated by hydraulic power
- Transformers
- High voltage static capacitors
- High voltage cables



The type & classification of cables along with voltage rating shall be clearly defined by each DISCO/NTDC

- High voltage overhead lines
- single or multiple circuit, high voltage overhead lines, with all conductors' dead
- Double circuit, high voltage overhead line, with one circuit live
- High voltage regulator
- Industrial panels/grid end panels as per prevailing voltage levels
- DC station batteries
- Disconnect switches/isolators
- Instrument transformer (CTs, PTs, and CVTs)
- Insulating oils, oil tanks, SF6 gas and gas cylinders,



D: Safety Precautions for High Voltage Live Line work on High Voltage Over Head lines

It shall include:

- The authorization requirements for staff carrying out the operations
- The live line tools and equipment to be used and the arrangements for keeping them in good condition must be clearly defined such that:
- Complete package of T & P (hand tools and machine tools), extension ladder fiber, adjustable strain pole, conductive shoes, conductive suit (Socks, gloves, trousers, shirt etc.), torsion, nut, torsion ratchet wrench, strain link stick, hot-end suspension yoke, cotter key pusher, strain pole carrier, moisture eater, abrasive cleaning pad, hot-stick tester, hit-test insulator tester, generator 5 KW, live-line rope etc.
- The general safety precaution to follow

E: Safety Precautions for the Testing of High Voltage Systems

This shall consist of the followings:

- General precautions to take

- Work under a sanction for test
- The testing of high voltage apparatus

F: Safety Precautions and procedures applicable to Low Voltage Systems

- General requirements for work on dead low voltage apparatus and lines
- Additions precautions for work on dead low voltage cables



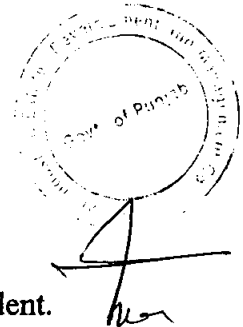
- Additional precautions for work on dead low voltage overhead lines
- Precaution for work on live low voltage apparatus
- Precaution for work on live low voltage overhead lines
- Precaution for work on live low voltage cables
- Testing of low voltage apparatus
- Calibration of electrical testing equipment.

PSC-6.6

Safety for Power Plants

Each licensee shall cover the specific safety requirement for the power plant working environment and shall include but not limited to the followings;

- Boiler operation
- Boiler maintenance
- Turbo generator operation & maintenance
- Import plant auxiliaries
- Water plant treatment
- Workshop of the power plant
- SOPs in case of spillage in the plant & in case of fire accident.
- Work permits electrical maintenance section
- Works permit for maintenance section
- Works permit for instrument/control section

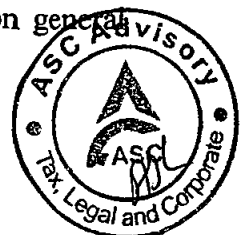


PSC-6.7

Safety Policy for Transportation

Each licensee shall cover the all procedures related to

- General Instructions
- SOPs for checking/maintenance
- Driving
- Parking
- Operation of trucks, trailers & forklift trucks
- SOPs, to be followed in case of accident.
- Speed limits inside the premises of NTDC/DISCO works/sites & on general



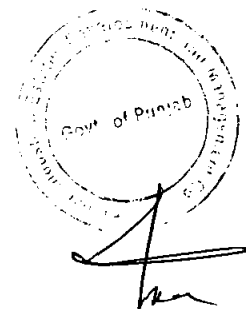
- public roads/areas.
- Training of drivers
- Motivational methodologies for drivers.

PSC-6.8

First Aid Procedures

First aid procedures shall cover the procedures, guidelines, implementation strategies and complete data base & suggested measures for preventive action and shall include but not limited to the followings:

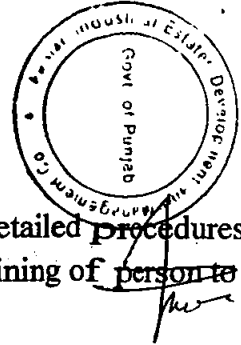
- General instructions
- Hemorrhage (bleeding) and including the measures for internal hemorrhage, nose bleeding
- Physical/electric shock
- And also the informative charts describing the effects with respect to current level, human body resistance and the other factors that affect the human body
- Sun stroke, head stroke
- Fainting
- Fractures (broken bones)
- Transportation/shifting of the victims
- Wounds
- Splinters or foreign substances in the body
- Animal/snake bites
- Burns (thermal, electrical & chemical)
- Eye injuries
- Sprains/strains,
- Bruises
- Frost bite
- Heimlich maneuvers



PSC-6.9**Resuscitation & Rescue Procedures**

Resuscitation & rescue procedures shall include but not limited to the followings:

- General instructions
- Methods of pole top rescue
- Artificial respiration



Requirement: These shall be defined by each Licensee with detailed procedures and understandable diagrams/pictures and methodology for training of person to perform such activity.

PSC-6.10**Data Base of Power Safety and Operation and Maintenance Charts**

Each licensee shall cover the complete information regarding operation and maintenance charts and these shall be readily accessible to all concerned. There shall be no confusion from tagging/marketing point of view for electrical equipment & materials.

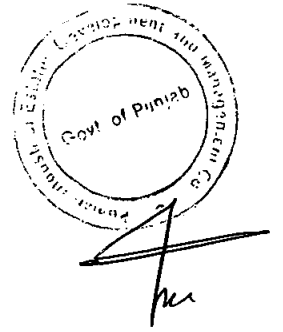
In addition to this other charts i.e.

- Charts related to clearances form electrical equipment & material functioning point of view
- Safety signs/signals charts at required locations/places
- Exit signs
- Charts for safety instructions for visitors/contractors/others
- Charts for useful knots
- Charts for strengths & weight of material
- Charts for safe loads on different types of ropes
- Charts for safe working of cranes
- Operation and maintenance charts
- Fire extinguishers
- Road signs
- Warning signs
- Danger signs
- Charts for allowable factor of safety, clearances & other applicable data



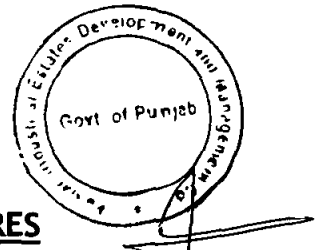
- Permit to works (PTWs)
- Charts for motivation of staff /persons
- Maintenance & inspection schedules
- Charts for conversion tables and
- others required as per standard engineering practices

These charts shall be understandable to workers/labor in Urdu also, in addition to English



Schedule-III

SIE INTRODUCTION & GEOGRAPHICAL FEATURES



Sundar Industrial Estate is located at 45-KM from Lahore. The geographical location map is attached.

Sundar Industrial Estate comprising of 1763 acres of land was inaugurated in Feb, 2007 and is a vision turned into reality. It is the first project assigned to PIEDMC & was envisioned to be an 'island of facilitation in the sea of harassment' for prospective industrialists.

The objective was to develop an industrial estate where issues of industrialists are handled and problems solved through 'One Window' operation. There are more than 550 factories in production.

The Electrification system had been designed by M/S PowerCom, Consulting firm duly registered with Pakistan Engineering Council and LESCO / PEPCO / WAPDA. Punjab Industrial Estates Development & Management Company (PIEDMC) has established dedicated 132/11.5kV Air Insulated Switchgear (AIS) Grid Station (4 x 40MVA Trafo Bays) with approved load of 104MW for Sundar Industrial Estate.

Project Technical Description:-

1. Distribution System Configuration, service territory, Right of Way, Feeder Maps

The distribution system consist on 40 no's of 11kV feeders including 4 express feeders. Service territory is Sundar Industrial Estate for which land has been acquired and right of way has been procured. PIEDMC intends to obtain distribution license for Sundar Industrial Estate for power distribution within its territory.

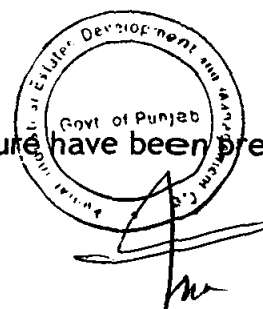
2. Voltage Levels and Regulation

Main feeders are 11KV underground and LT distribution is 415V. The voltage levels are as per permissible limits of IEC/WAPDA specifications DDS-71 2004 and regulations as per P-13:66.

3. Type of Distribution System

Underground ring main cable distribution system has been laid down providing electricity to all consumers in the premises of Sundar Industrial Estate.

Electrical PIEDMC. The task risk analysis and detailed procedure have been prepared and being adopted by PIEDMC / BOMSIE field staff.



8. Maintenance Plan and Procedures:-

Maintenance plans are prepared by Electrical department in advance on monthly/quarterly basis. Maintenance charts are updated regularly for line materials, transformers, distribution boxes and cable joints. Procedures have been developed by the qualified engineers of consultant and executions are carried out under qualified, trained and experienced supervisory staff by the help of line staff. Proper T&P (tools and plants) including cable fault locator, surge generator, safety belt, safety hat, boots, earthing sets, safety gloves, protective gloves, torches insulated pliers; screw drivers etc are provided to field staff and are checked regularly. Trouble shooting procedure is also made available to the field staff.

9. Fault Location / Trouble Shooting Procedure:-

Earth fault indicators are installed to help in quick identification and to minimize the fault durations. 11KV high Voltage apparatus, Surge generator, cable fault locator / High Pot is used to locate the 11KV cable fault expeditiously. Sufficient hardware material like cables, straight through joints and termination kits are made available with Electric store to minimize power outage time.

10. Emergency Provisions:-

Besides availability of sufficient line materials, skilled staff is available for emergency services. Alternate feeding from 11KV express feeders and alternate transformers make it easy to handle any abnormal/emergency situation.

11. Patrolling and Inspection Procedure:-

The Electric staff BOMSIE patrols the area and carry out visual inspection of equipment for any physical damages or fault and reported to Central Operation Control Room. The same then is handed over to the required staff to attend the fault and restoration of supply under the supervision of qualified supervisor. For this purpose, proper procedure and SOP has been framed and being implemented.

12. Customer Services Data / Manuals:-

Dedicated Customer Services Section is taking care of all the requirements from the time of customer's complaint regarding electricity applications for power supply till the electric connection is provided. The idea of 'One Window Services' has been adopted in its true spirit.

14. Protection Control and Measuring Instruments:-

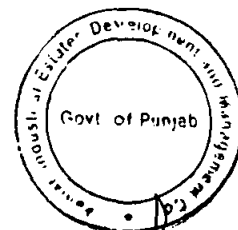
All protection control and allied instrumentations is provided on 132KV SIE grid station as per WAPDA/NTDC/PEPCO standard to safe guard whole National system and all 11KV feeders of Sundar. The protection and instrumentation equipment including KWh, KVARh, voltage and current meters, over current, earth fault and DC supervision relays are installed at Incoming and Outgoing panels to protect system.

15. Type of Metering System to be used:-

WAPDA/NTDC approved Automated Meter Reading (AMR) Energy Meters are installed along with implementation of Advanced Metering Infrastructure (AMI) for directly transmission of data to BOMSIE / end users.

Following types of Energy Meters are installed:-

- Whole Current ; upto 25kW consumers
- LT TOU ; from 25kW upto 500kW
- HT TOU ; above 500kW



16. Metering and Testing Facility:-

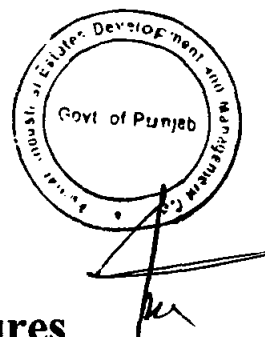
To ensure proper billing to customers of Sundar, all energy meters are being purchased as per WAPDA/NTDC Standards and Specifications from the approved meter manufacturers of WAPDA/NTDC/LESCO who will ensure the accuracy of these meters. However, doubtful meters will be tested on site with standard testing equipment. The factory tested and calibrated standard energy meters are installed at each individual consumer premises that are tested as per manufacturer's recommendation for routine testing or on the complaint / dispute with the consumer/s.

17. Communication System:-

Communication between Central Control / Operation Room and the field staff has been established through cell phones and walki talkies.

18. Training and Development:-

PIEDMC / BOMSIE has devised mechanism for capacity building and trainings to skilled technical staff through engagement of concerned firms / consultants.



Training and Development Procedures

Introduction

In order to keep PIEDMC Electrical Staff fully updated with the electrification in Industrial Estates, PIEDMC has established a Training and Development Manual.

Training is provided to employees of Customer Services and the Electrical department.

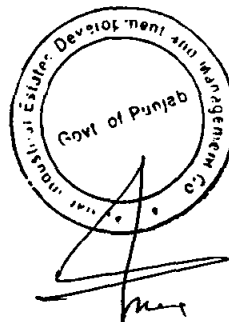
Training at regular interval is arranged by Chief Engineer for the Technical Staff where new and efficient maintenance and fault locating methods are being explained for implementation.

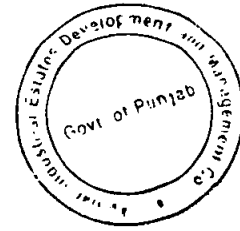
The Employees from customer relations are also updated at regular intervals of any change in customer policy and change of Tariff etc.

All the operations and maintenance (O&M) staff of Sundar Industrial Estate (SIE) are trained as per the training manuals of Lahore Electric Supply Company (LESCO). The staff is trained to provide high quality services and are trained in the following areas:

- Introduction to Training Programmed Organization and System
- Overview of role and Duties of Line Superintendent.
- Material of use in construction line
- Use and care of T&P.
- Service Installation(LT & HT)
- Patrolling of lines
- First aid skills and practices
- Basic electricity concept, testing/measure instruments and their uses
- Distribution system standards and specifications
- Distribution system planning

- Installation of Earth system
- Distribution system operation
- Distribution system maintenance
- Location of faults and consumer complaints
- Safety and Safety equipment
- Fire prevention and control
- Distribution system mapping
- Energy meters-Installation, checking and maintenance.





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LESCO Tariff for 2022 | Electricity Unit Rates in Pakistan

LAST UPDATED ON JUNE 23, 2022 BY JOHN THOMAS

Not everybody knows about the LESCO Tariff and the difference between 2019 and 2020 electricity rates. What is the price of 1 unit of electricity? These are the facts and figures everybody wants to know about.

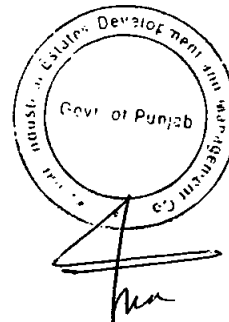
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It's no surprise that the schedule of electricity rates fluctuates and goes up and down with the passage of time. And it is happening a lot these days due to the renewal of agreements with IPPs (Individual power producers) so it put an immense effect on electricity prices. Well, this is a separate discussion and we will also write about the recent electricity agreement changes.



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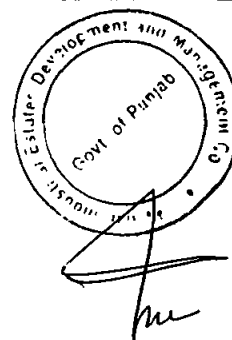
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Let's move to the point that is, what is the LESCO/Wapda unit rate and what is the electricity rate in Pakistan, etc?

Are you getting it?

Moreover, it is also a fact that the tariff amount or electricity pricing depends upon various factors. Perhaps, those factors are brought into a highlight by the electricity supply companies themselves.

First of all, let's shed some light on Peak and Off-Peak hours, and then we will talk about MEPCO Tariff and details for IESCO Tariff

Contents [hide]

LESCO Peak and Off-Peak Hours

Rates For 1 Unit of Electricity

SCHEDULE OF ELECTRICITY TARIFF W.E.F 05-11-2021

Here is the detailed breakdown of the LESCO Electricity Tariff.

A1 General Supply Tariff-Residential

SCHEDULE OF ELECTRICITY TARIFF W.E.F 12-02-2021

SCHEDULE OF ELECTRICITY TARIFF W.E.F 2019

SCHEDULE OF ELECTRICITY TARIFF W.E.F JULY 2019

SCHEDULE OF ELECTRICITY TARIFF W.E.F OCTOBER 2019

SCHEDULE OF ELECTRICITY TARIFF W.E.F DECEMBER 2019

Frequently Asked Questions

1. What is LESCO Tariff?
2. What are Peak and Off-Peak Hours?
3. What is the price of 1 unit of electricity?
4. What are LESCO Tariff Slabs?
5. How is the tariff hike controlled?
6. What are the types of tariffs?

✓ IESCO Peak and Off-Peak Hours

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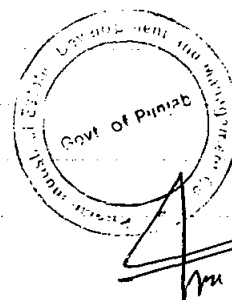
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Below are the Peak and Off-Peak Hours details along with months and timings.

PEAK / OFF-PEAK TIMINGS

Season	Peak Timing	Off-Peak Timing
Dec to Feb	5 PM to 9 PM	Remaining 20 hours
Mar to May	6 PM to 10 PM	-do-
Jun to Aug	7 PM to 11 PM	-do-
Sep to Nov	6 PM to 10 PM	-do-



Rates For 1 Unit of Electricity

LESCO has a different unit price for domestic and commercial users. As inflation is rising, LESCO also has revised the Electricity per unit rate and has increased the prices.

As domestic users are more curious about unit prices so we will share unit prices for domestic or residential consumers here.

- For the 1-100 Units: 9.42 Rs. per unit
- For the 100-200 Units: 11.74 Rs. per unit
- For the Next 201-300 Units: 13.83 Rs. per unit
- For 301-400 Units: 21.23 Rs. per unit
- For 401-700 Units: 21.23 Rs. per unit
- Above 700 Units: 24.33 Rs. per unit

Please note As per the Authority's decision residential consumers will be given the benefits of only one previous slab. That means you can not take the benefit of all slabs. Only 2 slabs will be applicable to your number of units consumed.

Here are the complete details with the unit price and technical features.

SCHEDULE OF ELECTRICITY TARIFF W.E.F 05-11-2021

Here is the detailed breakdown of the LESCO Electricity Tariff.

A1 General Supply Tariff-Residential

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff	Variable Charges (Rs/KWh)	Applicable Variable Charges
a)	For sanctioned load less than 5 kW				
✓	Protected				

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iv	a.101-200 Units		16.41	10.06
	Un-Protected			
v	001-100 Units		14.59	9.42
vi	100-200Units		16.41	11.74
vii	201-300 Units	-	17.53	13.83
viii	301-400 Units	-	19.07	21.23
ix	401-500 Units		19.07	21.23
x	501-600 Units		19.07	21.23
xi	601-700 Units		19.07	21.23
xii	Above 700 Units	-	20.61	24.33
b)	For Sanctioned load 5 kW & above			
		Peak	Off-Peak	Peak Off-Peak
	Time of Use	-	20.27 13.1	24.33 18.01

As per Authority's decision residential consumers will be given the benefits of only one previous slab

Under Tariff A-1, there shall be a minimum monthly customer charge at the following rates even if no energy is consumed.

a) Single Phase connections: Rs. 75/- per consumer per month

b) Three-phase connection: Rs.150/- per consumer per month

A2 General Supply Tariff-Commercial

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
a)	For Sanctioned load less than 5 kW		19.56	21.34
		440		
b)	For Sanctioned load 5 kW & above		19.22	23.04
			Peak Off-Peak	Peak Off-Peak
c)	Time of Use	440	21.02 13.49	24.94 18.97

Under Tariff A-2, there shall be a minimum monthly customer charge at the following rates even if no energy is consumed.

a) Single-phase connections: Rs. 175/- per consumer per month

b) Three-phase connections: Rs. 350/- per consumer per month

A3 General Services

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
a)	General Services		17.05	20.9

Under Tariff A-3, there shall be a minimum monthly customer charge at the following rates even if no energy is consumed.

a) Single-phase connections: Rs. 175/- per consumer per month

✓b) Three-phase connections: Rs. 350/- per consumer per month

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B1 (a)	Up to 25 kw (at 400/230 volts)	-	18.31	-	18.62
B2(a)	exceeding 25-500 Kw (at 400 Volts)	440	17.87	-	18.12
	Time of Use		Peak	Off-Peak	Peak Off-Peak
B1 (b)	Up to 25 kw	-	21.19	13.41	22.18 16.62
B2 (b)	exceeding 25-500 Kw (at 400 Volts)	440	20.98	13.5	22.12 16.41
B3	For All Loads up to 5000 KW(at 11,33 KV)	420	21.11	12.63	22.12 16.32
B4	For All Loads (at 66,132 KV & above)	400	20.93	12.97	22.12 16.22

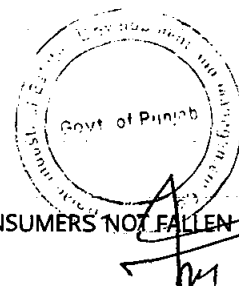
For B1 consumers there shall be a fixed minimum charge of Rs. 350 per month.

For B2 consumers there shall be a fixed minimum charge of Rs. 2,000 per month.

For B3 consumers there shall be a fixed minimum charge of Rs. 50,000 per month.

For B4 consumers there shall be a fixed minimum charge of Rs. 500,000 per month.

C-SINGLE POINT SUPPLY FOR PURCHASE IN BULK BY A DISTRIBUTION LICENSEE AND MIXED LOAD CONSUMERS NOT FALLEN IN ANY OTHER CONSUMER CLASS



Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff	Variable Charges (Rs/KWh)	Applicable Variable Charges
C-1	For supply at 400/230 Volts				
a)	Sanctioned load less than 5 kW -			24.36	22.02
b)	Sanctioned load 5 kW & up to 500 kW	440		21.31	21.52
C-2(a)	For supply at 11,33 kV up to and including 5000 kW	420		17.03	21.32
C-3(a)	For supply at 66 kV & above and sanctioned load above 5000 kW	400		15.11	21.22
	Time Of Use		Peak	Off-Peak	Peak Off-Peak
C-1(c)	For supply at 400/230 Volts 5 kW & up to 500 kW	440	22.43	15	24.94 18.34
C-2(b)	For supply at 11,33 kV up to and including 5000 kW	420	20.4	12.89	24.94 18.14
C-3(b)	For supply at 66 kV & above and sanctioned load above 5000 kW	400	19.51	11.68	24.94 18.04

D-AGRICULTURE TARIFF

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff	Variable Charges (Rs/KWh)	Applicable Variable Charges
D-1(a)	SCARP less than 5 KW	-		22.92	19.02
D-2(a)	Agricultural Tube Well	200		17.63	8.69
			Peak	Off-Peak	Peak Off-Peak

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Note: The consumers having sanctioned loads less than 5 kW can opt for TOU metering.

E-TEMPORARY SUPPLY TARIFF

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff	Variable Charges (Rs/KWh)	Applicable Variable Charges
E-1(i)	Residential Supply	-		21.73	24.47
E-1(ii)	Commercial Supply	-		19.23	21.73
E-2	Industrial Supply	-		18.38	19.7

Note: For the categories of E-1(i&ii) above, the minimum bill of the consumers shall be Rs. 50/- per day subject to a minimum of Rs. 500/- for the entire period of supply, even if no energy is consumed.

F – Seasonal Industrial Supply TARIFF

125% of relevant Industrial Tariff

Note: Tariff F consumers will have the option to convert to regular tariff and vice versa. This option can be exercised at the time of a new connection or at the beginning of the season. Once

G-PUBLIC LIGHTING

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff	Variable Charges (Rs/KWh)	Applicable Variable Charges
	Street Lighting	-		19.02	22.02

Under Tariff-G, there shall be a minimum monthly charge of Rs. 500/- per month per kW of lamp capacity installed.

H- RESIDENTIAL COLONIES ATTACHED TO INDUSTRIAL PREMISES

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff	Variable Charges (Rs/KWh)	Applicable Variable Charges
	Residential Colonies attached to industrial premises	-		21.02	22.02

I – RAILWAY TRACTION

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff	Variable Charges (Rs/KWh)	Applicable Variable Charges
	Railway Traction	-		19.17	22.02

K-SPECIAL CONTRACTS

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff	Variable Charges (Rs/KWh)	Applicable Variable Charges
1	Azad Jammu & Kashmir (AJK)	400		14.23	19.24
	Time of Use	400	Peak	Off-Peak	Peak Off-Peak
			18.63	11.95	24.94 18.04
2	Rawat Lab	-		17.07	22.02

SCHEDULE OF ELECTRICITY TARIFF W.E.F 12-02-2021

A1 General Supply Tariff-Residential

Sr.	Tariff Category/Particulars	Fixed Charges	Uniform Tariff	Variable	Applicable Variable
✓					

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For Consumption exceeding 50 Units			-	-
ii	For first 100 Units	-	14.89	7.74
iii	a.101-200 Units		16.41	10.06
iii	b.201-300 Units	-	17.53	12.15
iv	301-700 Units	-	19.07	19.55
v	Above 700 Units	-	20.61	22.65
b) For Sanctioned load 5 kW & above				
			Peak	Off-Peak
			Peak	Off-Peak
	Time of Use	-	20.27	13.1
			22.65	16.33

As per Authority's decision residential consumers will be given the benefits of only one previous slab

Under Tariff A-1, there shall be a minimum monthly customer charge at the following rates even if no energy is consumed.

a) Single Phase connections: Rs. 75/- per consumer per month

b) Three-phase connection: Rs.150/- per consumer per month

A2 General Supply Tariff-Commercial

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)		Applicable Variable Charges	
a)	For Sanctioned load less than 5 kW	440		19.56		19.95
b)	For Sanctioned load 5 kW & above			19.22		21.63
			Peak	Off-Peak	Peak	Off-Peak
c)	Time of Use	440	21.02	13.49	23.55	17.58

Under Tariff A-2, there shall be a minimum monthly customer charge at the following rates even if no energy is consumed.

a) Single-phase connections: Rs. 175/- per consumer per month

b) Three-phase connections: Rs. 350/- per consumer per month

A3 General Services

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
a)	General Services		17.05	19.51

Under Tariff A-3, there shall be a minimum monthly customer charge at the following rates even if no energy is consumed.

a) Single-phase connections: Rs. 175/- per consumer per month

b) Three-phase connections: Rs. 350/- per consumer per month

B Industrial Supply Tariff

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)		Applicable Variable Charges	
B1	(a Up to 25 kw (at 400/230 volts)	-	18.31		-	17.23
B2(a)	exceeding 25-500 Kw (at 400 Volts)	440	17.87		-	16.73
	Time of Use		Peak	Off-Peak	Peak	Off-Peak

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B3	For All Loads up to 5000 KW(at 11,33 KV)	420	21.11	12.63	20.73	14.93
B4	For All Loads (at 66,132 KV & above)	400	20.93	12.97	20.73	14.83

For B1 consumers there shall be a fixed minimum charge of Rs. 350 per month.

For B2 consumers there shall be a fixed minimum charge of Rs. 2,000 per month.

For B3 consumers there shall be a fixed minimum charge of Rs. 50,000 per month.

For B4 consumers there shall be a fixed minimum charge of Rs. 500,000 per month.

C-SINGLE POINT SUPPLY FOR PURCHASE IN BULK BY A DISTRIBUTION LICENSEE AND MIXED LOAD CONSUMERS NOT FALLEN IN ANY OTHER CONSUMER CLASS

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
C-1	For supply at 400/230 Volts			
a)	Sanctioned load less than 5 kW	-	24.36	20.63
b)	Sanctioned load 5 kW & up to 500 kW	440	21.31	20.13
C-	For supply at 11,33 kV up to and including 5000	420	17.03	19.93
2(a)	kW			
C-	For supply at 66 kV & above and sanctioned load	400	15.11	19.83
3(a)	above 5000 kW			
	Time Of Use		Peak Off-Peak	Peak Off-Peak
C-1(c)	For supply at 400/230 Volts 5 kW & up to 500 kW	440	22.43 15	23.55 16.95
C-2(b)	For supply at 11,33 kV up to and including 5000 kW	420	20.4 12.89	23.55 16.75
C-3(b)	For supply at 66 kV & above and sanctioned load above 5000 kW	400	19.51 11.68	23.55 16.65

D-AGRICULTURE TARIFF

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
D-1(a)	SCARP less than 5 KW	-	22.92	17.63
D-2(a)	Agricultural Tube Well	200	17.63	7.3
			Peak Off-Peak	Peak Off-Peak
D-1(b)	SCARP 5 KW & above	200	23.76 14.25	20.55 13.3
D-2(b)	Agricultural 5 KW & above	200	21.44 13.04	7.3 7.3

Under this tariff, there shall be minimum monthly charges Rs. 2000/- per consumer per month, even if no energy is consumed.

Note: The consumers having sanctioned load less than 5 kW can opt for TOU metering.

E-TEMPORARY SUPPLY TARIFF

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
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1(ii)

E-2 Industrial Supply

18.38

18.31

Note: For the categories of E-1(i&ii) above, the minimum bill of the consumers shall be Rs. 50/- per day subject to a minimum of Rs. 500/- for the entire period of supply, even if no energy is consumed.

F – Seasonal Industrial Supply TARIFF

125% of relevant Industrial Tariff

Note: Tariff F consumers will have the option to convert to regular tariff and vice versa. This option can be exercised at the time of a new connection or at the beginning of the season. Once exercised, the option remains in force for at least one year.

G-PUBLIC LIGHTING

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
	Street Lighting	-	21.02	20.63

Under Tariff-G, there shall be a minimum monthly charge of Rs. 500/- per month per kW of lamp capacity installed.

H- RESIDENTIAL COLONIES ATTACHED TO INDUSTRIAL PREMISES

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
	Residential Colonies attached to industrial premises	-	21.02	20.63

I – RAILWAY TRACTION

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
	Railway Traction	-	19.17	20.63

K-SPECIAL CONTRACTS

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Applicable Variable Charges
1	Azad Jammu & Kashmir (AJK)	400	14.23	17.55
	Time of Use	400	Peak 18.63 Off-Peak 11.95	Peak 23.55 Off-Peak 16.65
2	Rawat Lab	-	17.07	20.63

SCHEDULE OF ELECTRICITY TARIFF W.E.F 2019

A1 General Supply Tariff-Residential

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Nepra Variable Charges Rs/kwh	Applicable Variable Charges	Government Subsidy
					Fixed Charges Rs/Kw/M	Variable Charges Rs/Kw/M

a) For Sanctioned load less than 5 kW

i	Up to 50 Units	-	4.00	4.0	2.0	2.0
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✓ For Consumption exceeding 50

←

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iii	b.201-300 Units	-	16.83	15.27	10.20	5.07
iv	301-700 Units	-	18.54	16.91	17.60	-0.69
v	Above 700 Units	-	20.94	19.24	20.70	-1.46

b) For Sanctioned load 5 kW & above

		Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
Time of Use	-	19.33	12.80	18.81	12.5	20.70	14.38	-	-1.89 -1.88

As per Authority's decision residential consumer will be given the benefits of only one previous slab

Under Tariff A-1, there shall be minimum monthly customer charge at the following rates even if no energy is consumed.

a) Single Phase connections: Rs. 75/- per consumer per month

b) Three phase connection: Rs.150/- per consumer per month

A2 General Supply Tariff-Commercial

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Nepa Variable Charges Rs/kwh	Applicable Variable Charges	Government Subsidy	
						Fixed Charges Rs/Kw/M	Variable Charges Rs/Kw/M
a)	For Sanctioned load less than 5 kW		19.26	19.08	- 18	-	1.08
b)	For Sanctioned load 5 kW & above 400.00		18.01	16.81	- 19.68	-	-2.87
			Peak Off-Peak	Peak Off-Peak	Peak Off-Peak		Peak Off-Peak
c)	Time of Use	400.00	20.09 13.48	19.18 12.26	21.6 15.63	-	-2.42 -3.37

Under Tariff A-2, there shall be minimum monthly customer charge at the following rates even if no energy is consumed.

a) single phase connections: Rs. 175/- per consumer per month

b) Three phase connections: Rs. 350/- per consumer per month

A3 General Services

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Nepa Variable Charges Rs/kwh	Applicable Variable Charges	Government Subsidy	
						Fixed Charges Rs/Kw/M	Variable Charges Rs/Kw/M
a)	General Services		17.56	17.6	- 17.56	-	0.04

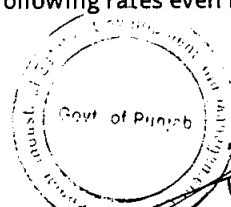
Under Tariff A-3, there shall be minimum monthly customer charge at the following rates even if no energy is consumed.

a) single phase connections: Rs. 175/- per consumer per month

b) Three phase connections: Rs. 350/- per consumer per month

B Industrial Supply Tariff

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Nepa Variable Charges Rs/kwh	Applicable Variable Charges	Government Subsidy	
						Fixed Charges Rs/Kw/M	Variable Charges Rs/Kw/M
B1	(a Up to 25 kw (at 400/230 volts)	-	18.32	17.59	- 15.28	-	2.31
B2	(a)exceeding 25-500 Kw (at 400 Volts) 400.00		15.79	14.95	- 14.78	-	0.17
	Time of Use		Peak Off-Peak	Peak Off-Peak	Peak Off-Peak		Peak Off-Peak



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B3

For All Loads up to 5000 KW(at 11,33 KV) 380.00 20.39 12.61 20.58 11.61 18.78 12.98 - 1.8 -1.37

B4 For All Loads (at 66,132 KV & above) 360.00 20.27 13.25 20.25 12 18.78 12.88 - 1.47 -0.88

For B1 consumers there shall be fixed minimum charge of Rs. 350 per month.

For B2 consumers there shall be fixed minimum charge of Rs. 2,000 per month.

For B3 consumers there shall be fixed minimum charge of Rs. 50,000 per month.

For B4 consumers there shall be fixed minimum charge of Rs. 500,000 per month.

C-SINGLE POINT SUPPLY FOR PURCHASE IN BULK BY A DISTRIBUTION LICENSEE AND MIXED LOAD CONSUMERS NOT FALLEN IN ANY OTHER CONSUMER CLASS

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)		Nepra Variable Charges Rs/kwh		Applicable Variable Charges		Government Subsidy Fixed Charges Rs/Kw/M Variable Charges Rs/Kw/M	
C-1	For supply at 400/230 Volts									
a)	Sanctioned load less than 5 kW	-	21.32		16.2		18.68	-	-2.48	
b)	Sanctioned load 5 kW & up to 500 kW	400	20.13		15.7		18.18	-	-2.48	
C-	For supply at 11,33 KV up to and 2(a) including 5000 kW	380	15.61		15.21		17.98	-	-2.77	
C-	For supply at 66 KV & above and 3(a) sanctioned load above 5000 kW	360	14.42		13.97		17.88	-	-3.91	
	Time Of Use		Peak Off Peak	Peak Off Peak	Peak Off Peak	Peak Off Peak	Peak Off Peak		Peak Off-Peak	
C-1	For supply at 400/230 Volts 5 kW & up to 500 kW	400	21.52 14.99	19 12.5	21.6 15				-2.6 -2.5	
C-	For supply at 11,33 KV up to and 2(b) including 5000 kW	380	19.73 12.57	19 12.1	21.6 14.8				-2.6 -2.7	
C-	For supply at 66 KV & above and 3(b) sanctioned load above 5000 kW	360	18.49 11.59	19 12	21.6 14.7	-			-2.6 -2.7	

D-AGRICULTURE TARIFF

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)		Nepra Variable Charges Rs/kwh		Applicable Variable Charges		Government Subsidy Fixed Charges Rs/Kw/M Variable Charges Rs/Kw/M	
D-1(a)	SCARP less than 5 KW	-	23.17		23.17		15.68	-	7.49	
D-2	Agricultural Tube Well	200	14.56		14.56	-	5.35	-	9.21	
			Peak Off Peak	Peak Off Peak	Peak Off Peak	Peak Off-Peak			Peak Off-Peak	
D-1(b)	SCARP 5 KW & above	200	20.87 14.03	22 12.02	18.6 11.35	-			3.4 0.67	

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Note: The consumers having sanctioned load less than 5 kW can opt for TOU metering.

E-TEMPORARY SUPPLY TARIFF

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Nepra Variable Charges Rs/kwh	Applicable Variable Charges	Government Subsidy	
						Fixed Charges Rs/Kw/M	Variable Charges Rs/Kw/M
E-1(i)	Residential Supply	-	20.84	18.15	20.84	-	-2.69
E-1(ii)	Commercial Supply	-	18.39	18.47	18.39	-	0.08
E-2	Industrial Supply	-	16.36	14.70	16.36	-	-1.66

Note: For the categories of E-1(i&ii) above, the minimum bill of the consumers shall be Rs. 50/- per day subject to a minimum of Rs. 500/- for the entire period of supply, even if no energy is consumed.

F - Seasonal Industrial Supply TARIFF

125% of relevant Industrial Tariff

Note: Tariff F consumers will have the option to convert to regular tariff and vice versa. This option can be exercised at the time of a new connection or at the beginning of the season. Once exercised, the option remains in force for at least one year.

G-PUBLIC LIGHTING

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Nepra Variable Charges Rs/kwh	Applicable Variable Charges	Government Subsidy	
						Fixed Charges Rs/Kw/M	Variable Charges Rs/Kw/M
	Street Lighting	-	18.78	19.78	18.68		1.1

Under Tariff-G, there shall be a minimum monthly charge of Rs. 500/- per month per kW of lamp capacity installed.

H- RESIDENTIAL COLONIES ATTACHED TO INDUSTRIAL PREMISES

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Nepra Variable Charges Rs/kwh	Applicable Variable Charges	Government Subsidy	
						Fixed Charges Rs/Kw/M	Variable Charges Rs/Kw/M
	Residential Colonies attached to industrial premises	-	18.42	20.39	- 18.68		1.71

I - RAILWAY TRACTION

Sr. No.	Tariff Category/Particulars	Fixed Charges Rs/KW/M	Uniform Tariff Variable Charges (Rs/KWh)	Nepra Variable Charges Rs/kwh	Applicable Variable Charges	Government Subsidy	
						Fixed Charges Rs/Kw/M	Variable Charges Rs/Kw/M
	Railway Traction	-	17.9	17.9	18.68		-0.78

J- SPECIAL CONTRACTS UNDER NEPRA (SUPPLY OF POWER)

Government Subsidy

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J-1	For supply of 66 kv & above and having sactioned load of 20MW & above	360.00	16.14		11.77		17.88			-6.11
J-2(a)	For supply at 11,33 kv	380.00	16.46		14.1		17.98			-3.88
J-2(b)	For supply at 66 kv & above	360.00	16.36		14	-	17.88			-3.88
J-3(a)	For supply at 11,33 kv	380.00	16.46		14.1	-	17.98			-3.88
J-3(b)	For supply at 66 kv & above	360.00	16.36		14	-	17.88			-3.88
	Time of Use		Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak		Peak Off-Peak
J-1 (b)	For supply of 66 kv & above and having sactioned load of 20MW & above	360	20.66	14.33	18.60	11.62	21.60	14.70	-	-3.0 -3.08
J-2 (c)	For supply at 11,33 kv	380.00	20.66	14.44	18.60	11.72	21.60	14.80	-	-3.0 -3.08
J-2(d)	For supply at 66 kv & above	360.00	20.66	14.33	18.60	11.62	21.60	14.70	-	-3.0 -3.08
J-3(c)	For supply at 11,33 kv	380.00	20.66	14.44	18.60	11.72	21.60	14.80	-	-3.0 -3.08
J-3(d)	For supply at 66 kv & above	360.00	20.66	14.33	18.60	11.62	21.60	14.70	-	-3.0 -3.08

Note:

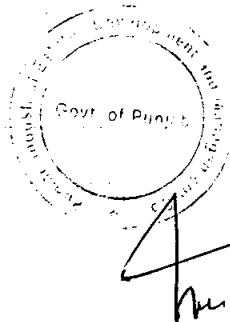
1:- Neelum Jhelum Surcharge at rate of Rs. 0.10 per KWh on all electricity consumers except lifeline domestic consumers of the category 'Residential-A' for Electricity Sold.

2:- Financial Cost Surcharge at the rate of Rs. 0.43 per KWh applicable to all the categories of Electricity Consumers except lifeline domestic consumers of the Category 'Residential-A' for Electricity sold.

SCHEDULE OF ELECTRICITY TARIFF W.E.F JULY 2019

A1 General Supply Tariff-Residential

Sr. No.	Tariff Category/Particulars	Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)		
a)	For Sanctioned load less than 5 kW				
i	Up to 50 Units				
	For Consumption exceeding 50 Units		-		
ii	For first 100 Units	1.49	-		
iii	a.101-200 Units	1.49			
iii	b.201-300 Units	1.49			
iv	301-700 Units	1.49	0.75		
v	Above 700 Units	1.49	0.75		
b)	For Sanctioned load 5 kW & above				
		Peak	Off-Peak	Peak	Off-Peak
	Time of Use	1.49	1.49	0.75	0.75



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	1st & 2nd Qtr		1st & 2nd Qtr	
	FY 2018-19 (Rs/KWh)		FY 2018-19 (Rs/KWh)	
a) For Sanctioned load less than 5 kW	1.49			
b) For Sanctioned load 5 kW & above	1.49		1.80	
	Peak	Off-Peak	Peak	Off-Peak
c) Time of Use	1.49	1.49	1.80	1.80

A3 General Services

Sr. No.	Tariff Category/Particulars	Uniform Qtrly	Applicable Uniform Qtrly
		Adjustment	Adjustment
		1st & 2nd Qtr	1st & 2nd Qtr
		FY 2018-19 (Rs/KWh)	FY 2018-19 (Rs/KWh)
a) General Services		1.49	1.80

B Industrial Supply Tariff

Sr. No.	Tariff Category/Particulars	Uniform Qtrly Adjustment		Applicable Uniform Qtrly Adjustment	
		1st & 2nd Qtr		1st & 2nd Qtr	
		FY 2018-19 (Rs/KWh)		FY 2018-19 (Rs/KWh)	
B1 (a	Up to 25 kw (at 400/230 volts)	1.49		1.80	
B2(a)	exceeding 25-500 Kw (at 400 Volts)	1.49		1.80	
	Time of Use	Peak	Off-Peak	Peak	Off-Peak
B1 (b)	Up to 25 kw	1.49	1.49	1.80	1.80
B2 (b)	exceeding 25-500 Kw (at 400 Volts)	1.49	1.49	1.80	1.80
B3	For All Loads up to 5000 KW(at 11,33 KV)	1.49	1.49	1.80	1.80
B4	For All Loads (at 66,132 KV & above)	1.49	1.49	1.80	1.80

C-SINGLE POINT SUPPLY FOR PURCHASE IN BULK BY A DISTRIBUTION LICENSEE AND MIXED LOAD CONSUMERS NOT FALLEN IN ANY OTHER CONSUMER CLASS

Sr. No.	Tariff Category/Particulars	Uniform Qtrly	Applicable Uniform Qtrly
		Adjustment	Adjustment
		1st & 2nd Qtr	1st & 2nd Qtr
		FY 2018-19 (Rs/KWh)	FY 2018-19 (Rs/KWh)

C-1 For supply at 400/230 Volts

a) Sanctioned load less than 5 kW	1.49	1.80
b) Sanctioned load 5 kW & up to 500 kW	1.49	1.80

C-2(a) For supply at 11,33 kV up to and including 5000 kW 1.49 1.80

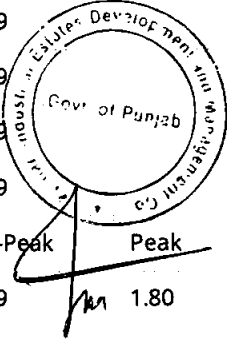
C-3(a) For supply at 66 kV & above and sanctioned load above 5000 kW 1.49 1.80

	Peak	Off-Peak	Peak	Off-Peak
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C-1(c) For supply at 400/230 Volts 5 kW & up to 500 kW 1.49 1.49 1.80 1.80

C-2(b) For supply at 11,33 kV up to and including 5000 kW 1.49 1.49 1.80 1.80

C-3(b) For supply at 66 kV & above and sanctioned load above 5000 kW 1.49 1.49 1.80 1.80



	1st & 2nd Qtr FY 2018-19 (Rs/KWh)		1st & 2nd Qtr FY 2018-19 (Rs/KWh)	
	Peak	Off-Peak	Peak	Off-Peak
D-1(a) SCARP less than 5 KW	1.49		1.80	
D-2(a) Agricultural Tube Well	1.49		1.49	
D-1(b) SCARP 5 KW & above	1.49	1.49	1.80	1.80
D-2(b) Agricultural 5 KW & above	1.49	1.49	1.49	1.49

E-TEMPORARY SUPPLY TARIFF

Sr. No.	Tariff Category/Particulars	Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)
E-1(i)	Residential Supply	1.49	1.80
E-1(ii)	Commercial Supply	1.49	1.80
E-2	Industrial Supply	1.49	1.80

F – Seasonal Industrial Supply TARIFF

125% of relevant Industrial Tariff

G-PUBLIC LIGHTING

Sr. No.	Tariff Category/Particulars	Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)
	Street Lighting	1.49	1.80

H- RESIDENTIAL COLONIES ATTACHED TO INDUSTRIAL PREMISES

Sr. No.	Tariff Category/Particulars	Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)
	Residential Colonies attached to industrial premises	1.49	1.80

I – RAILWAY TRACTION

Sr. No.	Tariff Category/Particulars	Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st & 2nd Qtr FY 2018-19 (Rs/KWh)
	Railway Traction	1.49	1.80

J- SPECIAL CONTRACTS UNDER NEPRA (SUPPLY OF POWER)

Uniform Qtrly Adjustment	Applicable Uniform Qtrly Adjustment
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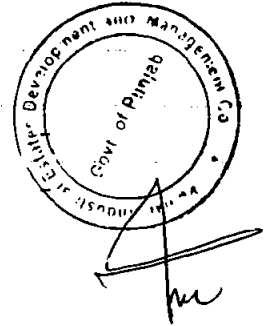
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J-2(a) For supply at 11,33 kv	1.49	1.80
J-2(b) For supply at 66 kv & above	1.49	1.80
J-3(a) For supply at 11,33 kv	1.49	1.80
J-3(b) For supply at 66 kv & above	1.49	1.80
Time of Use	Peak	Off-Peak
J-1 (b) For supply of 66 kv & above and having sanctioned load of 20MW & above	1.49	1.80
J-2 (c) For supply at 11,33 kv	1.49	1.80
J-2(d) For supply at 66 kv & above	1.49	1.80
J-3(c) For supply at 11,33 kv	1.49	1.80
J-3(d) For supply at 66 kv & above	1.49	1.80

SCHEDULE OF ELECTRICITY TARIFF W.E.F OCTOBER 2019

A1 General Supply Tariff-Residential

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)	Applicable Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)
a)	For Sanctioned load less than 5 kW		
i	Up to 50 Units		
	For Consumption exceeding 50 Units		
ii	For first 100 Units	0.53	
iii	a.101-200 Units	0.53	
iii	b.201-300 Units	0.53	
iv	301-700 Units	0.53	0.53
v	Above 700 Units	0.53	0.53



b) For Sanctioned load 5 kW & above

Time of Use	Peak	Off-Peak	Peak	Off-Peak
	0.53	0.53	0.53	0.53

A2 General Supply Tariff-Commercial

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)	Annual D.M and Qtrly Adjustment (Rs/KWh)
a)	For Sanctioned load less than 5 kW	0.53	0.53
b)	For Sanctioned load 5 kW & above	0.53	0.53
	Time of Use	Peak	Off-Peak
		0.53	0.53

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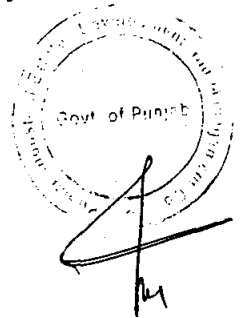
a) General Services	0.53	0.53
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B Industrial Supply Tariff

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)		Annual D.M and Qtrly Adjustment (Rs/KWh)	
B1	(a) Up to 25 kw (at 400/230 volts)	0.53		0.53	
B2	(a) exceeding 25-500 Kw (at 400 Volts)	0.53		0.53	
	Time of Use	Peak	Off-Peak	Peak	Off-Peak
B1 (b)	Up to 25 kw	0.53	0.53	0.53	0.53
B2 (b)	exceeding 25-500 Kw (at 400 Volts)	0.53	0.53	0.53	0.53
B3	For All Loads up to 5000 KW(at 11,33 KV)	0.53	0.53	0.53	0.53
B4	For All Loads (at 66,132 KV & above)	0.53	0.53	0.53	0.53

C-SINGLE POINT SUPPLY FOR PURCHASE IN BULK BY A DISTRIBUTION LICENSEE AND MIXED LOAD CONSUMERS NOT FALLEN IN ANY OTHER CONSUMER CLASS

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)		Annual D.M and Qtrly Adjustment (Rs/KWh)	
C-1	For supply at 400/230 Volts				
a)	Sanctioned load less than 5 kW	0.53		0.53	
b)	Sanctioned load 5 kW & up to 500 kW	0.53		0.53	
C-2(a)	For supply at 11,33 kV up to and including 5000 kW	0.53		0.53	
C-3(a)	For supply at 66 kV & above and sanctioned load above 5000 kW	0.53		0.53	
	Time Of Use	Peak	Off-Peak	Peak	Off-Peak
C-1(c)	For supply at 400/230 Volts 5 kW & up to 500 kW	0.53	0.53	0.53	0.53
C-2(b)	For supply at 11,33 kV up to and including 5000 kW	0.53	0.53	0.53	0.53
C-3(b)	For supply at 66 kV & above and sanctioned load above 5000 kW	0.53	0.53	0.53	0.53

**D-AGRICULTURE TARIFF**

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)		Annual D.M and Qtrly Adjustment (Rs/KWh)	
D-1(a)	SCARP less than 5 KW	0.53		0.53	
✓ D-1(a)	Agricultural Tube Well	0.53		0.53	

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D- 2(b)	Agricultural 5 KW & above	0.53	0.53	0.53	0.53
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E-TEMPORARY SUPPLY TARIFF

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)	Annual D.M and Qtrly Adjustment (Rs/KWh)
E-1(i)	Residential Supply	0.53	0.53
E-1(ii)	Commercial Supply	0.53	0.53
E-2	Industrial Supply	0.53	0.53

F – Seasonal Industrial Supply TARIFF

125% of relevant Industrial Tariff

G-PUBLIC LIGHTING

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)	Annual D.M and Qtrly Adjustment (Rs/KWh)
	Street Lighting	0.53	0.53

H- RESIDENTIAL COLONIES ATTACHED TO INDUSTRIAL PREMISES

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)	Annual D.M and Qtrly Adjustment (Rs/KWh)
	Residential Colonies attached to industrial premises	0.53	0.53

I – RAILWAY TRACTION

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)	Annual D.M and Qtrly Adjustment (Rs/KWh)
	Railway Traction	0.53	0.53

J- SPECIAL CONTRACTS UNDER NEPRA (SUPPLY OF POWER)

Sr. No.	Tariff Category/Particulars	Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)	Applicable Uniform Annual D.M and Qtrly Adjustment (Rs/KWh)
J-1	For supply of 66 kv & above and having sanctioned load of 20MW & above	0.53	0.53
J-2(a)	For supply at 11,33 kv	0.53	0.53
J-2(b)	For supply at 66 kv & above	0.53	0.53
J-3(a)	For supply at 11,33 kv	0.53	0.53
J-3(b)	For supply at 66 kv & above	0.53	0.53

✓ ←	Time of Use	Peak	Off-Peak	Peak	Off-Peak
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(c)

J-2(d)For supply at 66 kv & above	0.53	0.53	0.53	0.53
J-3(c)For supply at 11,33 kv	0.53	0.53	0.53	0.53
J-3(d)For supply at 66 kv & above	0.53	0.53	0.53	0.53

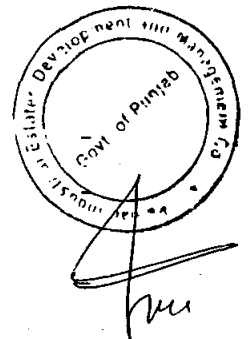
S.R.O 1168(I)2019. -Pursuant to section 31(7) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Federal Government notifies the adjustment in the approved tariff. on account of periodic adjustment for 3rd and 4th Quarters of FY 2018-19 and annual indexation/adjustment of distribution margin with the immediate application as determined and recommended by National Electric Power Regulatory Authority (NEPRA) vide decisions both dated September 27, 2019, in respect of Lahore Electric Supply Company Limited (LESCO), as Schedule I, IIA & IIB by way of amendment in its notification no. SRO. 05(1) 2019 dated January 1, 2019

The above adjustments are being notified along with tariff differential subsidy for lifeline, domestic consumers consuming up to 300 units, and the additional charge of Rs. 0.30 per unit for maintaining a uniform tariff on all categories of consumers (except for lifeline and domestic consumers consuming up to 300 units) so that the consolidated revenue requirement approved and determined by NEPRA on September 27, 2019 is maintained. The said adjustment shall be shown separately in the consumers' bill by the XWDISCOs and applicable for next twelve-monthly billing cycles effective from October 1st, 2019.

SCHEDULE OF ELECTRICITY TARIFF W.E.F DECEMBER 2019

A1 General Supply Tariff-Residential

Sr. No.Tariff Category/Particulars	Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
a) For Sanctioned load less than 5 kW		
i Up to 50 Units		
For Consumption exceeding 50 Units		
ii For first 100 Units	0.15	
iii a.101-200 Units	0.15	
iii b.201-300 Units	0.15	
iv 301-700 Units	0.15	0.07
v Above 700 Units	0.15	0.07
b) For Sanctioned load 5 kW & above		
Time of Use	Peak Off-Peak	Peak Off-Peak
	0.15 0.15	0.07 0.07



A2 General Supply Tariff-Commercial

Sr. No.Tariff Category/Particulars	Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
✓a) For Sanctioned load less than 5 kW	0.15	0.15

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A3 General Services

Sr. No.Tariff Category/Particulars	Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
a) General Services	0.15	0.15

B Industrial Supply Tariff

Sr. No.Tariff Category/Particulars	Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
B1 (a) Up to 25 kw (at 400/230 volts)	0.15	0.15
B2(a) exceeding 25-500 Kw (at 400 Volts)	0.15	0.15
Time of Use	Peak Off-Peak	Peak Off-Peak
B1 (b) Up to 25 kw	0.15 0.15	0.15 0.15
B2 (b) exceeding 25-500 Kw (at 400 Volts)	0.15 0.15	0.15 0.15
B3 For All Loads up to 5000 KW(at 11,33 KV)	0.15 0.15	0.15 0.15
B4 For All Loads (at 66,132 KV & above)	0.15 0.15	0.15 0.15

C-SINGLE POINT SUPPLY FOR PURCHASE IN BULK BY A DISTRIBUTION LICENSEE AND MIXED LOAD CONSUMERS NOT FALLEN IN ANY OTHER CONSUMER CLASS

Sr. No.Tariff Category/Particulars	Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
C-1 For supply at 400/230 Volts		
a) Sanctioned load less than 5 kW	0.15	0.15
b) Sanctioned load 5 kW & up to 500 kW	0.15	0.15
C-2(a) For supply at 11,33 kV up to and including 5000 kW	0.15	0.15
C-3(a) For supply at 66 kV & above and sanctioned load above 5000 kW	0.15	0.15
Time Of Use	Peak Off-Peak	Peak Off-Peak
C-1(c) For supply at 400/230 Volts 5 kW & up to 500 kW	0.15 0.15	0.15 0.15
C-2(b) For supply at 11,33 kV up to and including 5000 kW	0.15 0.15	0.15 0.15
C-3(b) For supply at 66 kV & above and sanctioned load above 5000 kW	0.15 0.15	0.15 0.15

D-AGRICULTURE TARIFF

Sr. No.Tariff Category/Particulars	Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
✓ D-1(a) SCARP less than 5 KW	0.15	0.15

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D-2(b) Agricultural 5 KW & above

0.15 0.15 0.15 0.15

E-TEMPORARY SUPPLY TARIFF

Sr. No. Tariff Category/Particulars

Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
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E-1(i) Residential Supply

0.15 0.15

E-1(ii) Commercial Supply

0.15 0.15

E-2 Industrial Supply

0.15 0.15

F – Seasonal Industrial Supply TARIFF

125% of relevant Industrial Tariff

G-PUBLIC LIGHTING

Sr. No. Tariff Category/Particulars

Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
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Street Lighting

0.15 0.15

H- RESIDENTIAL COLONIES ATTACHED TO INDUSTRIAL PREMISES

Sr. No. Tariff Category/Particulars

Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
---	--

Residential Colonies attached to industrial premises

0.15 0.15

I – RAILWAY TRACTION

Sr. No. Tariff Category/Particulars

Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
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Railway Traction

0.15 0.15

J- SPECIAL CONTRACTS UNDER NEPRA (SUPPLY OF POWER)

Sr. No. Tariff Category/Particulars

Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)	Applicable Uniform Qtrly Adjustment 1st Qtr. 2019-20 (Rs/KWh)
---	--

J-1 For supply of 66 kv & above and having sactioned load of 20MW & above

0.15 0.15

J-2(a) For supply at 11,33 kv

0.15 0.15

J-2(b) For supply at 66 kv & above

0.15 0.15

J-3(a) For supply at 11,33 kv

0.15 0.15

J-3(b) For supply at 66 kv & above

0.15 0.15

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J-2(d) For supply at 66 kv & above	0.53	0.15	0.15	0.15
J-3(c) For supply at 11,33 kv	0.53	0.15	0.15	0.15
J-3(d) For supply at 66 kv & above	0.53	0.15	0.15	0.15

S.R.O 1471(I)2019. -Pursuant to section 31(7) of the Regulation of Generation, Transmission, and Distribution of Electric Power Act, 1997, the Federal Government notifies the adjustment in the approved tariff. on account of periodic adjustment for 1st Quarter of FY 2019-20 as determined and recommended by National Electric Power Regulatory Authority (NEPRA) vide decisions of November 26, 2019, in respect of Lahore Electric Supply Company Limited (LESCO), as Schedule I, II.

The above adjustments are being notified along with tariff differential subsidy for lifeline, domestic consumer, and the additional charge of Rs. 0.11 per unit for maintaining a uniform tariff on all categories of consumers (domestic consumers) so that the consolidated revenue requirement approved and determined by NEPRA on November 26, 2019, is maintained. The said adjustment shall be shown separately in the consumers' bill by the XWDISCOs and applicable for the next twelve-monthly billing cycles effective from December 1st 2019.

Frequently Asked Questions

1. What is LESCO Tariff?

LESCO Tariff is the pricing plan for their consumers that what they are charging for each unit per month. However, the total amount of tariff includes the tax amount, electricity usage, and the cost of the produced and supplied electrical energy.

2. What are Peak and Off-Peak Hours?

The principal difference between Peak and Off-Peak hours is the price per unit. Due to the demand and consumption curve, peak hours' units get pricier. So try to reduce your electricity usage in between peak hours.

Peak hours are usually 5 PM to 11 PM but these timings fluctuate in the summer and winter seasons.

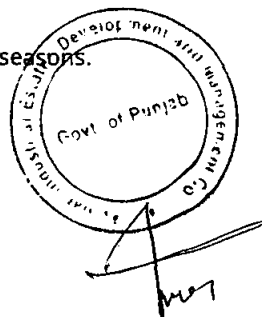
- Dec to Feb - 5 to 9 PM
- Mar to May - 6 to 10 PM
- Jun to Aug - 7 to 11 PM
- Sep to Nov - 6 to 10 PM

Rest are off-peak hours that are 20 hours.

3. What is the price of 1 unit of electricity?

Electricity price changes with each consumer type. If you are a domestic consumer, charges would be a little bit low for you. For industrial connections, prices go a little bit higher due to the heavy usage of electricity.

For 1 unit of electricity, the unit price for domestic consumers is Rs-9.42 per unit for 1st 100 units and after 1st 100 units, it will go up towards Rs-11.74 per unit according to NEPRA (Variable Charges) and so on.



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Read More: You can also [check your LESCO Bill Here](#).

4. What are LESCO Tariff Slabs?

LESCO Tariff Slab is a correlation between units consumed and the price for each unit. LESCO has a fixed rate for each slab and number of units so it facilitates the consumer according to their usage and needs.

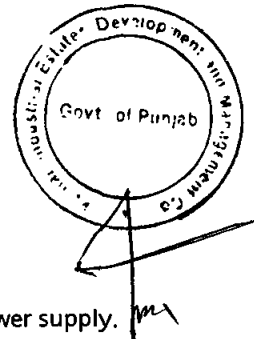
5. How is the tariff hike controlled?

When the tariff is likely to go on an increasing level, there are various methods through which it can be controlled. Besides controlling the tariff some measures are used by the government and the authorities to limit the price hike.

Learn more!

Tariff can be controlled through:

- Introducing well-formed flexible policies
- Finalize annual tariff or rates after renewing agreements
- Enhance efficiency transmission of Electricity
- Prevent Electricity Theft
- Consulting stakeholders



6. What are the types of tariffs?

Meanwhile, here we will discuss some of the key types of tariffs that are related to electricity and power supply.

Furthermore, this includes a Two-part tariff, Three-part tariff, Straight-line meter, and Seasonal or peak meter tariff. Thus, these are some of the most important tariff types.

However, there are many other tariffs also. Thus, if you want to know more about tariff-related details, then read more! If you also want to learn about [LESCO Customer Services](#) you may click on this link to read more about it.

Related Posts:

LESCO Tariff 2022 -
Track the updated
Per Unit Price

LESCO Tariff |
Revised Rates and
Guides 2022

Electricity Prices
Likely to hike by 48 to
58 rupees per unit

CW Garner
Pakistan's 8 Gold
Medals, Six Won by
WAPDA

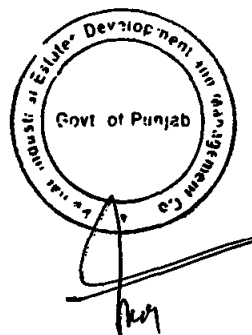
Electricity Theft: A
Menace | 39
Consumers Caught
Stealing...

LESCO CEO is going
to initiate Net-
Metering
Connections from...

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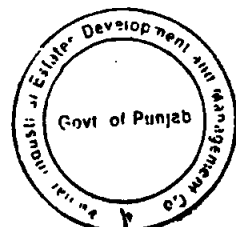
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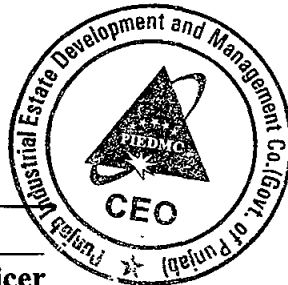
September 20, 2022

Undertaking
Refusal of Grant of License

We hereby undertake that Punjab Industrial Estate Development and Management Company (PIEDMC) applied to NEPRA for grant of Supplier license for Sundar Industrial Estate, Sunder Raiwind Road Lahore, under relevant NEPRA Licensing Procedures Regulations prevalent on and before on March 27, 2019.

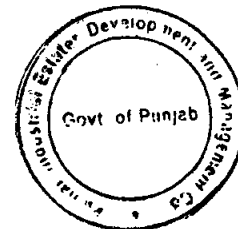
On January 27, 2022, the application was returned by NEPRA in light of judgement dated July 8, 2021 of Islamabad High Court due to which NEPRA had decided not to entertain applications for grant of distribution/supplier licenses till the expiry of the existing distribution licenses of DISCOs and notification of the rules and regulations as per NEPRA Amended Act, 2018.

We also undertake that this information is true to the best of our knowledge.



Chief Executive Officer

BOARD RESOLUTION





PUNJAB INDUSTRIAL ESTATES

DEVELOPMENT AND MANAGEMENT COMPANY

A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)




September 20, 2022

Undertaking

Board Resolution for Seeking of License

We hereby undertake that on the 134th meeting of the Board of Directors of Punjab Industrial Estate Development and Management Company (PIEDMC) dated May 4, 2019, permission was granted for submission of application to NEPRA for issuance of electric power supplier license for all industrial estates under the preview of PIEDMC. We also undertake that this information is true to the best of our knowledge.

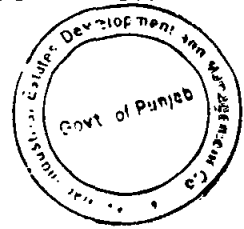


Chief Executive Officer





PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY



Agenda Item # 7:

Approval of BOD PIEDMC for obtaining Electricity Supplier License from NEPRA for all industrial estates of PIEDMC (Authority for the CEO).

The CEO presented the agenda. He informed the Board that PIEDMC intend to apply for getting Power Supplier License from National Electric Power Regulatory Authority (NEPRA) for sale of electricity within all industrial estates of PIEDMC. Therefore, permission is solicited to submit the application to NEPRA and also allow the CEO-PIEDMC to sign and complete the formalities with NEPRA in this regard.

This is the mandatory requirement for submission of application for Power Supplier License. The similar authorization was granted by the BOD in its 104th BOD Meeting for submission of application to NEPRA for issuance of electricity distribution license.

Recommendations:-

- The BOD is requested to grant permission for submission of application to NEPRA for issuance of Power Supplier License for all industrial estates of PIEDMC.
- The CEO PIEDMC be authorized & empowered to file and execute documents, contract and complete all related formalities on behalf of the company.

After discussing the agenda at length and giving due deliberation, the following resolution was passed:

Resolution (134-7)

RESOLVED THAT, "permission for submission of application to NEPRA for issuance of Power Supplier License for all industrial estates of PIEDMC is hereby granted."

FURTHER RESOLVED THAT, "The CEO PIEDMC is hereby authorized & empowered to file and execute documents, contract and complete all related formalities on behalf of the company."

Action by: GM (Technical)

[Signature]
Company Secretary

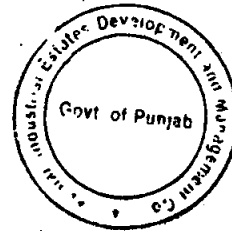
ATTESTED TO BE TRUE COPY

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB

[Signature]
Company Secretary

[Signature]
Chairman

AFFIDAVIT REGARDING AUTHENTICITY



E-STAMP

چوہدری ایسوسی ایٹس انشورنس

اڈال جاتی عمر ویدالہ



ID : PB-LHR-6009F3F32ED3C7C6

Type : Low Denomination

Amount : Rs 100/-

Description : AFFIDAVIT - 4

Applicant : Ali Muazzam Syed[35202-8279686-3]

S/O : Aslam Bahar Syed

Address : Lahore

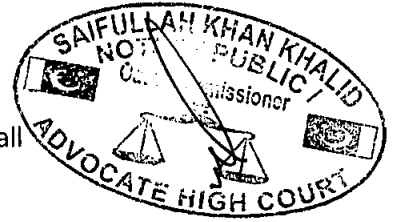
Issue Date : 18-Aug-2022 4:03:35 PM

Delisted On/Validity : 25-Aug-2022

Amount in Words : One Hundred Rupees Only

Reason : Affidavit

Vendor Information : Asad Hussain | PB-LHR-434 | Sundar Road Mall



نوٹ: یہ ٹرانزیکشن تاریخ اجرا سے سات دنوں تک کے لیے قابل استعمال ہے۔

AFFIDAVIT OF MR. ALI MUAZZAM SYED, CEO OF PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY (PIEDMC)) UNDER REGULATION 3(4)(g) OF NATIONAL ELECTRIC POWER REGULATORY AUTHORITY LICENSING (APPLICATION, MODIFICATION, EXTENSION AND CANCELLATION) PROCEDURE REGULATIONS, 2021

I hereby undertake that Punjab Industrial Estate Development and Management Company (PIEDMC) applied to NEPRA for grant of distribution license under NEPRA licensing regulation for the following industrial estates:

- Sundar Industrial Estate on April 4, 2011 for Distribution license and March 26, 2019 for Power Supplier License.
- Bhalwal Industrial Estate on October 17, 2016.
- Rahim Yar Khan Industrial Estate on October 17, 2016.
- Quaid-e-Azam Business Park on November 22, 2016.
- Vehari Industrial Estate on December 21, 2021

I also undertake that the above mentioned applications had been submitted to NEPRA but were returned by NEPRA in light of judgement dated July 8, 2021 of the Islamabad High Court due to which NEPRA had decided not to entertain applications for grant of distribution/supplier licenses till the expiry of the existing distribution licenses of DISCOs and notification of the rules and regulations as per NEPRA Amended Act, 2018.

Therefore, I hereby undertake that PIEDMC has not been granted any other license under the act.

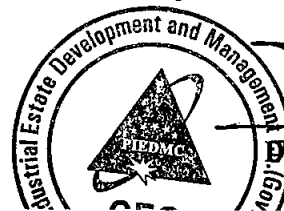
I, the above named deponent, do hereby solemnly affirm and declare on oath that the contents of this application and affidavit are true and correct to the best of the deponent's knowledge and belief and nothing has been concealed therein.



DEPONENT

VERIFICATION:

Verified on oath at Lahore on this the 22 day of September, 2022 that the contents of the above affidavit are true and correct to the best of the deponent's knowledge and belief and nothing has been concealed therein.



DEPONENT
ATTESTED
20/09/2022

E-STAMP

چوہدری ایسوسی ایٹس اشیا فروس
اڈامل جاتی عمرہ روڈ لاہور



ID : PB-LHR-A18220717ED3CD2E

Type : Low Denomination

Amount : Rs 100/-

Description : AFFIDAVIT - 4

Applicant : Ali Muazzam Syed[35202-8279686-3]

S/O : Aslam Bahar Syed

Address : Lahore

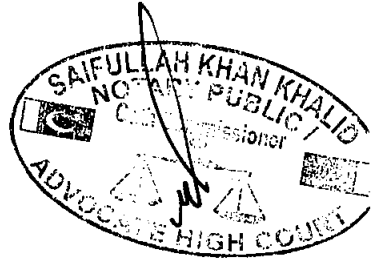
Issue Date : 18-Aug-2022 4:09:09 PM

Delisted On/Validity : 25-Aug-2022

Amount in Words : One Hundred Rupees Only

Reason : Affidavit

Vendor Information : Asad Hussain | PB-LHR-434 | Sundar Road Mall



نوٹ: یہ ٹرانزیکشن تاریخ اجرا سے سات دنوں تک کے لیے قابل استعمال ہے۔

AFFIDAVIT OF MR. ALI MUAZZAM SYED, CEO, ON BEHALF OF PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY (PIEDMC) UNDER REGULATION 3(7) OF NATIONAL ELECTRIC POWER REGULATORY AUTHORITY LICENSING (APPLICATION, MODIFICATION, EXTENSION AND CANCELLATION) PROCEDURE REGULATIONS, 2021 SUPPORTING THE APPLICATION

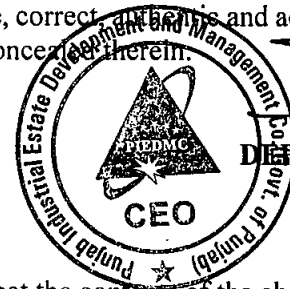
I, Ali Muazzam Syed, CEO, being the duly authorized representative of Punjab Industrial Estate Development and Management Company (PIEDMC) by virtue of BOARD RESOLUTION dated May 4, 2019, hereby apply to the National Electric Power Regulatory Authority for the grant of electric power supplier license to Punjab Industrial Estate Development and Management Company (PIEDMC) pursuant to section 23E of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

I hereby certify that the documents-in-support attached with this application are prepared and submitted in conformity with the provisions of the National Electric Power Regulatory Authority Licensing (Application, Modification, Extension and Cancellation) Procedure Regulations, 2021, and undertake to abide by the terms and provisions of the above-said regulations. I further undertake and confirm that the information provided in the attached documents-in-support is true and correct to the best of my knowledge and no material omission has been made.

A Pay Order in the sum of Rupees 2,339,082/- being the license application fee calculated in accordance with Schedule II to the National Electric Power Regulatory Authority Licensing (Application, Modification, Extension and Cancellation) Procedure Regulations, 2021, is also attached herewith.

Date:

I, the above named deponent, do hereby solemnly affirm and declare on oath that the contents of this application along with the documents and information submitted are true, correct, authentic and accurate to the best of the deponent's knowledge and belief and nothing has been concealed therein.



DEPONENT

VERIFICATION:

Verified on oath at Lahore on this the 22 day of September, 2022 that the contents of the above affidavit are true and correct to the best of the deponent's knowledge and belief and nothing has been concealed therein.

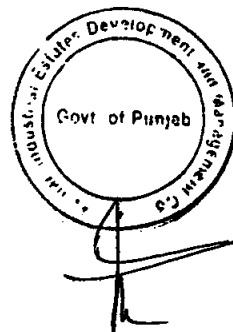


DEPONENT

(Company Seal)

ATTESTED
COMMIS

**UNDERAKING REGARDING POWER OF
NEPRA**





PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)



September 20, 2022

Undertaking

We hereby undertake that Punjab Industrial Estate Development & Management Company accepts NEPRA's power under all applicable NEPRA laws to amend or grant dispensation in relation to the electric power supplier license.



Chief Executive Officer

