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

PIE/BWPIE/NEPRA-2835
December 27, 2023

To,

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 BAHAWALPUR INDUSTRIAL ESTATE.**

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 Bahawalpur Industrial Estate.

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 Bahawalpur, Punjab.

A Pay Order in the sum of Rs.1,182,134/- 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.

Moreover, PIEDMC (hereinafter the Applicant), vide this application hereby makes, constitutes, ordains, nominates and appoints M/s SAMD Consultants and all its employees, agents and relevant persons (hereinafter referred to as the "Authorized Representatives/ Authorized Agents"),to act under our authority and on our behalf, and to do or execute or to represent, institute, or file applications, documents, attend hearings, remove objections, make

statements, give evidence, affidavits on behalf of the Applicant, or to act in any legal capacity to pursue the attached application;

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

Thanking you and best regards.

DA/As above:

(ALI MUAZZAM SYED)
CHIEF EXECUTIVE OFFICER

Copy to:-

1. Director General Licensing, NEPRA.
2. General Manager Technical, PIEDMC.
3. General Manager Coordination, PIEDMC.
4. General Manager Business & Development, PIEDMC.
5. Chief Financial Officer (Acting), PIEDMC.
6. Company Secretary (Acting), PIEDMC.
7. Project Director, BWPIE.
8. Director, SAMD Consultants.

SAMD
CONSULTANTS

CERTIFICATE OF INCORPORATION

No. RP/3.79 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).

REGISTRAR JOINT STOCK COMPANIES

(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

SAMD CONSULTANTS

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- MALL 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~~ TWO THOUSAND FOUR.

REGISTRAR JOINT STOCK COMPANIES LAHORE

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

Memorandum

and

Articles of Association

of

PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY

SAMD CONSULTANTS

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 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 this Memorandum of Articles of Associa'

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
Mohsin 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-Aikman Road, GOR, Lahore.	
Mr. Khawaja Muhammad Owais	Khawaja Khuda Bakhsh	Pakistani	Industrialist	House No.2, Nisar Colony Kashina Dastgir Lahore.	
Mr. Sikandar Mustafa Khan	Bashir A. Khan	Pakistani	Chairman TEVTA	House No.30-D, Sarwar Road, Lahore Cantt., Lahore.	
Mr. Sabir P. Chohan	Dr. M. A. Chohan	Pakistani	Engineer	House No.16, St. No. 63, Sector F7/3, Islamabad.	
Mr. Almas Hyder	Dr. S. M. Naqi	Pakistani	Businessman	House No. L-41, Gulberg-II, Lahore.	
Mr. Syed Nabeel Hashmi	Syed Quwat Ali Shah	Pakistani	Chief Executive Thermosole Industsstris (Pvt.) Ltd.	House No. 698 Block-3 Sector C-I, Township, Lahore.	
Mr. M. I. Khurram	Haji Barkat Ali	Pakistani	Chief Executive Comfort Knitwear (Pvt.) Ltd.	45-E/I, Gulberg-III, Lahore	
Major (R) Shahnawaz Badar	S. M. Badar	Pakistani	Secretary Labour and Human Resources	House No. 88 GOR-III, Shadman, Lahore. House No. 224 F-10/3, Islamabad.	
Mr. Kamran Lashari	Sardar Abdul Majeed Khan Lashari	Pakistani	Secretary Environment Protection	House No.18 Fateh Sher Road Mozang, Lahore.	
Mr. Zaheer Ahmad Khan	Naseer Ahmad Khan	Pakistani	Engineer	122-R, Phase-II, Lahore.	
Dr. Faisal Bari	Abdul Bari	Pakistani	Economist	House No.29 Ghazi Road, Karachi, Mohallah Saddar Bazar, Lahore	

M. MUHAMMAD RASHID OATH COMMISSIONER HIGH COURT LAHORE. Advocate High Court Lahore

Dated the day of

ATTESTED

M. MUHAMMAD RASHID OATH COMMISSIONER Advocate High Court Lahore

WITNESS TO ABOVE SIGNATURES

Full Name:

Father's Name:

Full Address:

Nationality:

Signatures:

Occupation:

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 Five (05) 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

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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 $1/4^{th}$ 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 modification 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 or Regulations approved by the BOD;

X. to delegate any of his function(s) 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 Associat.

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 ful.	Signature
Mohsin 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-Aikman Road, GOR, Lahore.	
Mr. Khawaja Muhammad Owais	Khawaja Khuda Bakhsh	Pakistani	Industrialist	House No.2, Nisar Colony Kashina Dastgir Lahore.	
Mr. Sikandar Mustafa Khan	Bashir A. Khan	Pakistani	Chairman [illegible]TA	House No.30-D, Sarwar Road, Lahore Cantt., Lahore.	
Mr. Sabir P. Chohan	Dr. M. A. Chohan	Pakistani	Engineer	House No.1E, St. No. 63, Sector F7/3, Islamabad.	
Mr. Almas Hyder	Dr. S. M. Naqi	Pakistani	Businessman	House No. L-41, Gulberg-II, Lahore.	
Mr. Syed Nabeel Hashmi	Syed Owais Ali Shah	Pakistani	Chief Executive Thermosol Industsstrie (Pvt.) Ltd.	House No. 698 Block-3 Sector C-I, Township, Lahore.	
Mr. M. I. Khurram	Haji Barkat Ali	Pakistani	Chief Executive [illegible] Knitwear [illegible] Ltd.	45-E/I, Gulberg-III, Lahore.	
Major (R) Shahnawaz Badar	S. M. Badar	Pakistani	Secretary Labour and Human Resources	House No. 88 GOR-III, Shadman, Lahore. House No. 224 F-10/3, Islamabad.	
Mr. Kamran Lashari	Sardar Abdul Majeed Khan Lashari	Pakistani	Secretary Environment Protection	House No.18 Fateh Sher Road Mozang, Lahore.	
Mr. Zaheer Ahmad Khan	Naseer Ahmad Khan	Pakistani	Engineer	122-R, Phase-II, Lahore.	
Dr. Faisal Bari	Abdul Bari	Pakistani	Economist	House No.29 Ghazi Road, Karachi, Monallah Saddar Bazar, Lahore.	

Dated the day of

WITNESS TO ABOVE SIGNATURES

Full Name: Hasana Abbas Signature:

Father's Name: S. Mukhtar Hussain Occupation:

Full Address: 169 BL. LDA Flats

ATTESTED

Advocate High Court

DISTRICT OFFICER
Enterprises & Investment Promotion
for Registration of Stock Companies
Lahore

District Officer,
Enterprises & Investment Promotion
for Registrar

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ANNUAL REPORT

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INDEPENDENT AUDITORS' REPORT TO THE MEMBERS OF PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY REPORT ON THE AUDIT OF THE FINANCIAL STATEMENTS

Opinion

We have audited the annexed financial statements of Punjab Industrial Estates Development and Management Company (the Company), which comprise the statement of financial position as at June 30, 2022, 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, 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 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, 2022 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 *Auditors' 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.

Information Other than the Financial Statements and Auditors' Report Thereon

Management is responsible for the other information. The other information comprises the information included in the directors' report, but does not include the financial statements of the Company and our auditors' 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.

Other Offices at
Karachi : 92 (21) 3565 5975-6
Faisalabad : 92 (41) 854 1965/ 854 1965
Islamabad : 92 (51) 234 0490 & 93
Peshawar : 92 (91) 527 8310/ 527 7205
Kabul : +93 (799) 658155

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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 is responsible for overseeing the Company's financial reporting process.

Auditors' 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 auditors' 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.

- 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 auditors' 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 auditors' 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.

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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).

The engagement partner on the audit resulting in this independent auditors' report is Inam ul Haque.

RSM

RSM AVAIS HYDER LIAQUAT NAUMAN
CHARTERED ACCOUNTANTS

Place: Lahore
Date:
UDIN:

SAMD
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LAST ANNUAL RETURN

FORM A

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 Estates Development & Management Company

1.3 Fee Payment Details 1.3.1 Challan No. 1.3.2 [redacted] Amount 550/-

	dd	mm	yyyy
1.4 Form A made up to	06	02	2023
2.4 Date of AGM	16	02	2023*

* The AGM was required to be held on or before 28-10-2020, however the same was held on 16-02-2023 under directions of the Registrar of Companies u/s 117 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

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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 #	35202-8279686-3

2.11 **Chief Financial Officer:**

Name	Muhammad Tanvir
Address	North Commercial Area, Sundar Industrial Estate, Lahore.
NIC #	35201-1619403-9

2.12 **Secretary:**

Name	M. Shafiq ur Rehman
Address	North Commercial Area, Sundar Industrial Estate, Lahore.
NIC #	35202-9727145-1

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 #	

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2.15 **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	Asadullah Faiz, Secretary, Industries Commerce, Investment & Skills Development Dept.	ICI&SD Dept. Old P&D Building, 2 Bank Road, Lahore.	Pakistani	35200-1442522-5	06-02-2023
2	Jalal Hassan Chief Executive Officer-PBIT	Punjab Board of Investment & Trade, 23 Aikman road GOR-1, Lahore.	Pakistani	35200-1455551-9	01-07-2022
3	Mujahid Sherdil Secretary Finance Department	Finance Dept. Civil Secretariat Lahore.	Pakistani	35202-2865582-5	22-12-2022
4	Asadullah Faiz, Secretary Labour & Human Resource	Labour & Human Resource Dept., 2 Bank Road, Lahore.	Pakistani	35200-1442522-5	06-02-2023
5	Ali Muazzam Syed Chief Executive Officer-PIEDMC	Commercial Area, Sundar Industrial Estate, Lahore.	Pakistani	35202-8279686-3	01-02-2021
6	Chairperson TEVTA	96-Gulberg Road, Lahore.	Pakistani		Vacant

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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 & Skills 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:

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.

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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
2 1	0 2	2 0 2 3

DISTRICT OFFICER (PWM)
For Registrar Joint Stock Companis
Lahore

DISTRICT OFFICER (PWM)
For Registrar Joint Stock Companis

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FORM 29

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 Estate Development & Management Company |

1.3 **Fee Payment Details** 1.3.1 Challan No. [ ] 1.3.2 Amount | 550/- |

PART-II

2. Particulars*:

Present Name in Full	NIC 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:									
Asadullah Faiz, Secretary, Industries Commerce, Investment & Skills Development Dept.	35200-1442522-5	Chaudhry Faiz Muhammad	Old P&D Building, 2-Bank Road, Lahore.	Ex-Officio Director	Pakistani	Govt. Employee	06-02-2023	Assigned additional change in place of Sohail Ashraf	Ex-Officio Director

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Asad Ullah Faiz, Labour & Human Resource Department	35200-1442522-5	Chaudhry Faiz Muhammad	Old P&D Building, 2-Bank Road, Lahore.	Ex-Officio Director	Pakistani	Govt. Employee	31-01-2023	Appointed in place of Nabeel Javed	Ex-Officio Director
Mujahid Sherdil Secretary, Finance Department	35202-865582-5	Azer Sherdil	Civil Secretariat, Lahore.	Ex-Officio Director	Pakistani	Govt. Employee	22-12-2022	Appointed in place of Dr. Wasif Khurshid	Ex-Officio Director
Jalal Hassan Chief Executive Officer-PBIT	35200-1455514-9	Jawad Hassan	Punjab Board of Investment & Trade, 23 Aikman road GOR-1, Lahore.	Ex-Officio Director	Pakistani	PBIT Employee	01-07-2022	Given additional charge of CEO	Ex-Officio Director
Ali Muazzam Syed Chief Executive Officer-PIEDMC	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
Chairperson TEVTA	-	-	96-Gulberg Road, Lahore.	Ex-Officio Director	Pakistani	Private Sector	-	Vacant	Ex-Officio Director
2.2 Ceasing of office/Retirement/Resignation:									
Muhammad Anees Khawaja	36302-4648285-3	Khawaja Muhammad Younus	Mehr Manzil, O/S Lohari Gate, Multan.	Chairman / Independent Director	Pakistani	Business	01-04-2022	Govt. of Punjab de-notified Independent Directors vide Notification # AEA-I-15-22/2002(P-V) of ICI&SD Department dated 26-1-2023	De-notified
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-	

REGISTRAR JOINT STOCK COMPANIES LAHORE

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Dr. Sumaira Rehman	35202-9760853-0	Dr. Ch. Abdul Rehman	Superior University, 17-K.M Mian Raiwind Road, Lahore.	Independent Director	Pakistani	Educationist	01-04-2022	-do-	-do-
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-	-do-
Yasir Asghar Bucha	35201-2545128-1	Noor Asghar Bucha	77 Peer Khurshid Colony, Multan	Independent Director	Pakistani	Business	01-04-2022	-do-	-do-
Mian Abuzar Shad	35202-2532223-9	Mian Muhammad Shafi	170-H, Model Town, Lahore.	Independent Director	Pakistani	Business	01-04-2022	-do-	-do-
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-	-do-
Sajid Saleem Minhas	35202-0669048-7	Muhammad Saleem Minhas	House # 79-C, DHA, Phase-V, Lahore.	Independent Director	Pakistani	Business	01-04-2022	-do-	-do-
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-	-do-

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2.3 Any other change in particulars relating to columns (a) to (g) above:									

* 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.

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.

REGISTRAR JOINT STOCK COMPANIES PART-III LAHORE

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		

Estates Development and Management Co. (Govt. of Punjab) Company Secretary

	Day		Month		Year			
3.5 Date	0	7	0	2	2	0	2	3

13/6/23

DISTRICT OFFICER (IPWM)
For Registrar Joint Stock Companies
Lahore

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

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

Head Office: Commercial Area (North) Sundar Industrial Estate, Sundar, Raiwind
Tel: 042-35291201-5 Fax: 042-35291206
Website: www.pidmc.com.pk

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NET WORTH / DEBT & EQUITY RATIO

NET WORTH CERTIFICATE

This is to certify that the **Net worth of M/s. Punjab Industrial Estate Development & Management Company** as on June 30, 2022, was **Rupees 6523.36 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 2021-22 audited by independent auditors.

For and on behalf of PIEDMC

(Muhammad Tanveer)
(Senior Manager Accounts)

Date: 4/12/23

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Annexure "A"

COMPUTATION OF NET WORTH

The net worth has been computed as per the format given below for the Financial Year Ending June 30, 2022.

Particulars	Rupees In Million
Paid up Capital (A)	50.00
Add: Equity Share Premium (B)	-
Add: Reserve & Surplus (excluding revaluation reserves) (C)	6475.41
Less : Statutory Reserves (D)	-
Less: Revaluation Reserves (E)	-
Less: Accumulated losses if any – (F)	-
Less: Intangible Assets included in the balance sheet (G)	1.05
Less: Miscellaneous Expenditure to the extent not written off– (H)	-
Total Net worth ((A+B+C)-(D+E+F+G+H))	**6523.36**

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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, 2022, was **1.71** 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 2021-22 audited by independent auditors.

Particulars	Financial Statement Note No.	Rupees In Million
Long term financing	6	3,103.80
Current portion of long term financing	6	8,043.55
Total Debit (A)		**1,1147.35**
Paid up Capital	5	50.00
Excess of income over expenditure as per statement of change in equity		6,474.41
Total Equity (B)		**6,524.41**
Debit Equity Ratio (A/B)		**1.71**

For and on behalf of PIEDMC

(Muhammad Tanveer)
(Senior Manager Accounts)

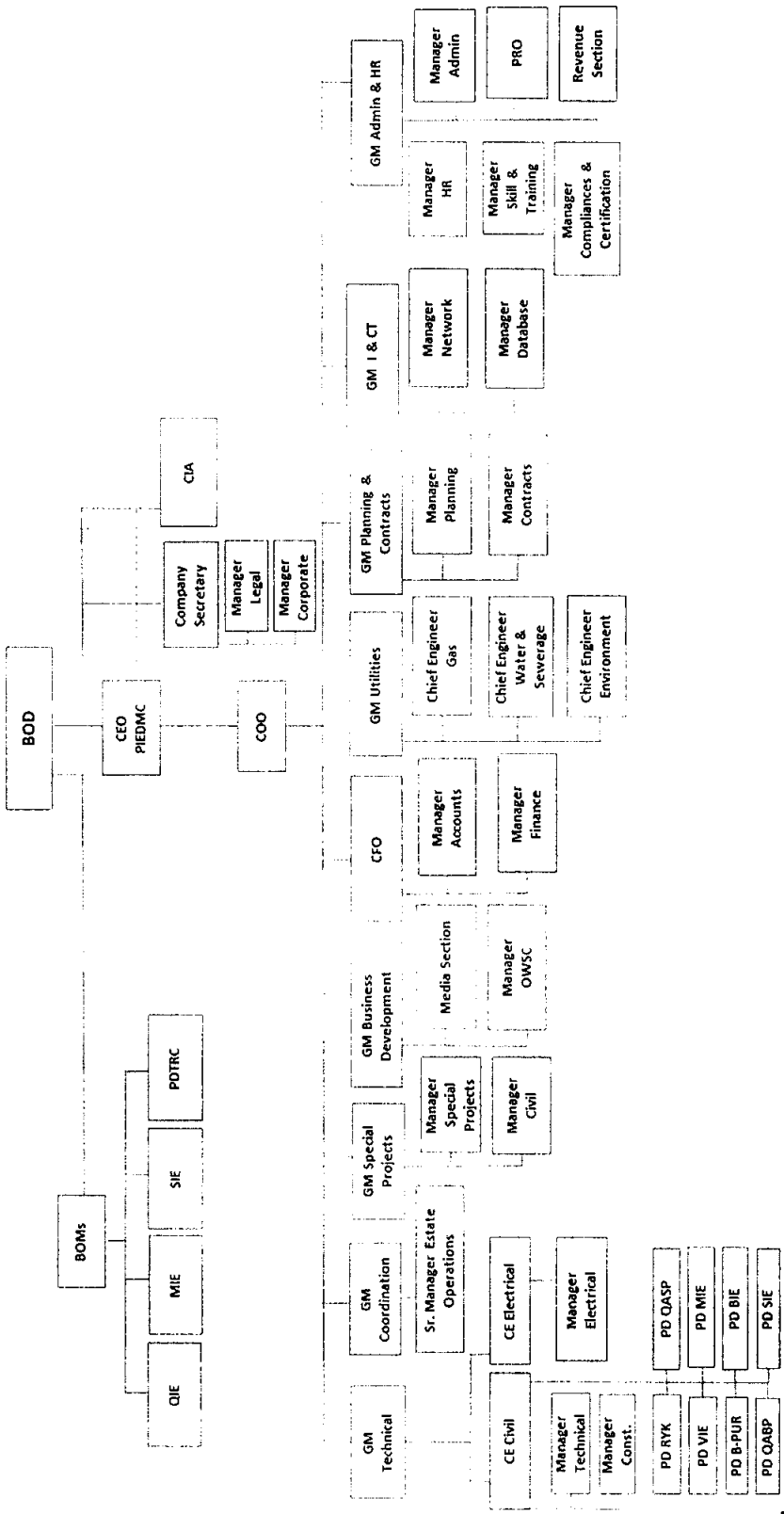
Date: 4/12/23

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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

Annex - 'A'



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Organogram approved by the BOD in its 151st meeting dated 30-08-2021

Punjab Industrial Estates Delopment and Management Company (PIEDMC)

Employees Data For NAPRA

Official Data

S. No.	Emp. No.	Employee Name	Designation	Department	Deployed	Grade	Date of Joining	Job Status
1	1319	Ali Muazzam Syed	CEO-PIEDMC	CEO Office	Head Office	12	08-Jul-20	Contractual
2	1346	Tariq Hameed	Chief Internal Auditor	Internal Audit	City Office	11	09-Jan-23	Contractual
3	404	Nouman Rafique	Chief Engineer Technical	Gas	Head Office	10	09-Mar-11	Regular
4	936	Khizar Hayat	CE (P&C)/PD-QASP	Planning & Contracts	Head Office	10	14-Jun-10	Regular
5	1315	Muneeb Ahmad Dar	Chief Engineer Electrical	Electrical	Head Office	10	10-Feb-20	Contractual
6	427	Zafar Allam	Manager Technical & PD-SIE	Engineering	Head Office	9	29-Apr-08	Regular
7	910	Muhammad Aamir	Manager Electrical	Electrical	Head Office	9	04-Aug-08	Regular
8	1322	Sohail Anwar	Deputy Manager Electrical	Electrical	Head Office	8	20-Apr-21	Contractual
9	907	Zia-ur-Rehman	Asst. Manager O & M	Electrical	VIE Office	7	10-Mar-08	Regular
10	1098	Haris Rashid	Electrical Engineer	Electrical	Head Office	6	15-Jan-14	Regular
11	1182	Sarfraz Ali	Electrical Engineer	Electrical	Head Office	6	20-Jul-16	Contractual
[redacted]	[redacted]229	Muhammad Hashim Amin	Electrical Engineer	Electrical	Head Office	6	01-Dec-16	Contractual
13	982	Syed Sana Haider	Sub Engineer (Electrical)	Electrical	QABP Office	5	01-Apr-11	Regular
14	984	Habib-ur-Rehman	Sub Enginer (Electrical)	Electrical	QABP Office	5	19-Aug-14	Contractual
15	1012	Umar Sohail	Senior Technician (Electrical)	Electrical	RIE Office	5	26-Jul-11	Regular
16	1089	Muhammad Khan	Sub Engineer (Electrical)	Electrical	RIE Office	5	04-Mar-13	Regular
17	1249	Syed Ghazanfar Ali Naqvi	Sub Engineer (Electrical)	Electrical	MIE Office	5	11-Apr-17	Contractual
18	1244	Muhammad Irfan	Electrical Supervisor	Electrical	QASP Office	4	03-Apr-17	Contractual
19	1264	Muhammad Ejaz	Electrical Supervisor	Electrical	RIE Office	4	30-Oct-17	Contractual
20	1103	Ihtisham Ali	Electrician	Electrical	Head Office	3	01-Sep-14	Contractual
21	1210	Muhammad Atif Ibrahim	Electrician	Electrical	Head Office	3	05-Sep-16	Contractual
22	1247	Malik Abdul Rehman	Electrician	Electrical	QASP Office	3	03-Apr-17	Contractual
23	1265	Manzoor Yaqub Masih	Electrician	Electrical	BIE Office	3	31-Oct-17	Contractual

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ALI MUAZZAM SYED, PMP

Address: 504-XX, Defence Housing Authority, Phase-III, Lahore 54792
Tel: (042) 35693749, (0300) 4425953 **E-mail:** alimuazzamsyed@gmail.com

EDUCATION

The Ohio State University, The Fisher College of Business, Columbus, OH, USA
Master of Business Administration (MBA), Major: Operations & Logistics, June 2003
Major **GPA: 3.5**

Michigan State University, East Lansing, MI, USA
Master of Science in Civil Engineering (Major: Transportation), December 2000
Major **GPA: 3.7**

NUST (then MCE), Risalpur, Pakistan
Bachelor of Science in Civil Engineering, March 1990
Honour Division, **Grade: A**

The Ohio State University, The Fisher College of Business, Columbus, OH, USA
Six Sigma Black Belt Course, April 2009
Achieved Six Sigma Black Belt Certificate and 18 credit hours towards Masters of Business Operations

EXPERIENCE

GENERAL MANAGER – INFRASTRUCTURE – Khyber Pakhtunkhwa Economic Zones Development and Management Company, Peshawar; November 2016– To date

- Headed the technical department and a team of over 45 professionals.
- Rehabilitated three industrial estates (3000 acres) and developed one SEZ (424 acres).
- Provided complete engineering and technical support for launch of Rashakai SEZ under CPEC.
- Initiated new projects in different districts of KP.

CHIEF ENGINEER– Punjab Industrial Estates Development and Management Company, Lahore; November 2015 – November 2016

- Remained project director of Quaid-e-Azam Apparel Park in Sheikhupura.
- Managed all affairs related to successful project management.

PROJECT DIRECTOR - Punjab Land Development Company, Lahore
November 2011 – November 2013

- **Ashiana-e-Iqbal Hosuing Scheme, Lahore**: Headed the largest housing project in public sector designed for low income group (10,000 units) with an estimated cost of Rs. 14,000 Million. Led conception, land acquisition, and design phases.
- **Ashiana Hosuing Schemes, Bahawalpur, Kasur and Chiniot**: Headed these three housing projects worth 1,000 Million each. Led conception, land acquisition, and design phases.
- **Ashiana Hosuing Schemes, Sahiwal and Faisalabad**: Headed these two housing projects worth 1,000 Million each. Led conception, land acquisition, design, procurement and supervision phases.

DIRECTOR INFRASTRUCTURE - Punjab Board of Investment & Trade, Lahore
June 2011 – November 2011

- Advised investors, both local and overseas, on all infrastructure related investments.
- Developed project proposals for generating private / foreign investment.

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TECHNICAL MANAGER/ OFFICIATING CEO – Punjab Industrial Estates Development and Management Company, Lahore; January 2004 – August 2010

- Held additional charge of CEO, whenever required.
- Headed and managed the most important division of the company, and held the senior most managerial position after CEO.
- Advised Chairman/ BOD/ BOM on all technical/ engineering and infrastructure related matters.
- Headed following projects:
  - Development of Sundar Industrial Estate, Lahore - Rs. 4,000 Million (2004-2007)
  - Rehabilitation of Quaid-e-Azam Industrial Estate - Rs. 535 Million (2005-2008)
  - Rehabilitation of Multan Industrial Estate - Rs. 110 Million (2004-2005)
  - Development of Multan Industrial Estate (Phase-II) - Rs. 900 Million (2006-2010)
- Performed all roles related to development of Sundar Industrial Estate right from conception, designing, procurement, supervision through till substantial completion and formal inauguration.
- Carried out successful upgradation of Multan and Quaid-e-Azam Industrial Estates. Received appreciations for excellent performance and results.
- Teamed up with Chairman and performed pivotal roles in raising the company.
- Ensured that all project deliverables meet stakeholders' requirements.
- Performed all roles involved in selection of consultants & contractors as per PPRA.
- Performed all roles involved in master planning of estates.
- Prepared 'Financial Plans/ Financial Models' of all projects and received appreciation for high quality of work.
- Prepared, without any outside assistance, feasibility reports/ proposals/ concept papers of new projects. Received appreciation for the high standards and quality of content and presentation.
- Represented company at high forums and gave presentations when required.
- Prepared PC-1/ PC-II, whenever required, for the approval of the Government and without any outside assistance.
- Prepared contract documents of small/ large projects, whenever required, meeting PEC/ FIDIC standards.
- Ensured efficient contract management to safeguard project interests.
- Performed contractual role(s), as assigned. Remained 'The Engineer' of all major projects.
- Ensured efficient project communication management, including schedules, reports etc.
- Prepared 'Building Bye Laws' and got BOD's approval. Suggested changes, whenever required, and sought BOD's approval.
- Performed building control functions including approval of building plans at Sundar Industrial Estate and for a limited duration in Multan and Quaid-e-Azam Industrial Estates.

Teaching Associate – Corporate Finance, Fisher College of Business, Columbus, OH, USA
January 2003 – June 2003

- Taught 600 level (senior level) corporate finance course to over 40 US students at the two regional campuses of the Ohio State University.

MBA Intern – Behlen Manufacturing Company, Columbus, NE, USA
June 2002 – September 2002

- Carried out financial analysis for both outsourcing and vertical integration options.
- Performed a detailed analysis on company's strategy of growth through acquisition.
- Developed a model for tubing division to allocate costs based on Activity Based Costing method.

Transportation Engineer – Walter P. Moore & Associates, Inc., Houston, TX, USA
January 2001 – September 2001

- Designed roads, highways, bridges and retaining walls in the city of Houston, TX.
- Planned improvement of underground utilities.
- Prepared detailed plans in team setting resulting in approval from local authorities.
- Advised and worked with clients in Houston, TX on matters related to traffic improvement, such as congestion reduction, installation of traffic signals/ traffic signs, speed improvement, traffic safety and noise mitigation.

Research Assistant – Department of Civil Engineering, M.S.U, East Lansing, MI, USA
August 1999 – December 2000

Carried out research with a group of faculty members of the 'Department of Civil and Environment Engineering' on following projects for Michigan DOT:

- Traffic congestion and conversion of 4 lane roads to 3 lane roads in East Lansing, MI.
- Parking problems and conversion of one way streets to two way streets in downtown Lansing, MI.

Pakistan Army – Corps of Engineer, Sep 1984 – May 1999

Garrison Engineer – Nowshera Cantonment, Pakistan, March 1995 – May 1999

- Managed over 700 personnel including engineers, technicians, tradesmen and laborers.
- Prepared 'Master Plan' for development of Nowshera Cantt for next 25 years (till 2020).
- As 'ex-officio member' of Cantonment Board played active role in the development of Nowshera cantonment and in welfare of its residents. Acted as 'Appellate Authority' on building control matters.
- Advised clients in preparation and planning of future civil engineering projects.
- Executed all civil engineering works, including both new and maintenance works.
- Carried out all procurements and local purchases.
- Ensured uninterrupted flow of utility services in area of responsibility.
- Maintained the optimum level of inventory for all day-to-day business.
- Managed over 300 contracts, successfully closed all of them. Revived sick projects and settled outstanding audit objections which were pending for years.

Frontier Works Organization, Shikarpur, Pakistan, October 1992 – March 1995

- Worked as 'Assistant Project Manager (Procurement)' on 100 KM highway project (N-55), Ratodero-Shikarpur section.
- Located sources of construction materials and got approval from local and international consultants.
- Ensured uninterrupted supply to all sections of the road.

Corps of Engineers – Pakistan Army, September 1984 – October 1992

- Served in various battalions of Pakistan Army, Corps of Engineers after passing out in top 10 from Pakistan Military Academy, Kakul in September 1984.
- Attended courses of military instructions and always remained among top position holders in all of them.
- Always got letters of appreciations on outstanding performances in courses/ training.
- Performed various staff and field duties, with varying degrees of responsibilities.

SKILLS

- Technical/ Report writing
- Feasibility studies
- Statistical analysis
- Business plan writing
- Financial analysis including business valuation
- Presentation, both oral and written
- IT Skills, with proficiency in Microsoft Office (including Project), Visual Basic, Statistical Software, and Transportation/ Traffic packages etc.

PROFESSIONAL CERTIFICATIONS

- Project Management Professional (PMP), USA
- Six Sigma Black Belt Certificate from USA
- Plant Tissue Culture from PARC, Islamabad

PROFESSIONAL ACTIVITIES / AFFILIATIONS

- Member, Project Management Institute (USA)
- Member, Operations and Logistics Management Association (USA)
- Member, Institute of Transportation Engineers (USA)
- Member, Pakistan Engineering Council
- Member, Institute of Engineers, Pakistan

SAMD CONSULTANTS

TARIQ HAMEED | Fellow of Chartered Accountants
Office: 32-A, Azmat House, Davis Road, Lahore
c : +92 321 4428432 | +92 321 8456702
e: tariqhameed.fca@gmail.com , tariq@hameedandco.com



Career Objective

Interested to work in a senior and responsible position with growth oriented organization where my qualification and skills will be utilized, and further developed, for the success of the organization and myself.

Professional Qualifications

- Chartered Accountant from the Institute of Chartered Accountants of Pakistan (ICAP)

Professional Experience

Teaching at National College of Business Administration & Economics (NCBA&E), Pakistan Institute of Public and finance Accountant (PIPFA) Superior Collage Lahore as visiting facility in evening MBA classes. Subjects includes:-
1)- Financial Management 2)- Advance Financial Accounting 3)- Audit and Assurance

Hameed and Co. (Fellow of Chartered Accountants)
Partner From July 2009 till to March 2019 & From October 2019 till to date

Provide opinion, consultation and reporting on different areas which includes:-

- Monitoring business performance and cash flow
- Overseeing the budget and that everyone is sticking to them
- Working with department and teams with supervising your own accounts team
- Planning for thr future and competitor analysis
- Strategic planning, financial models, Financial accounting and reporting Develop and maintain timely and accurate financial statements and reports that are appropriate
- Develop, implement, and ensure compliance with internal financial and accounting policies and procedures.
- Develop and maintain financial accounting system for cash management, accounts payable, accounts receivable, credit control, and petty cash. Reconcile bank and investment accounts: and manage cash flow.
- Review monthly results and implement monthly variance reporting as compared to budget.
- Manage cash flow and prepare cash flow forecasts in accordance with policy.
- Develop and implement policies and procedures as required to ensure that financial information is secure.
- Participate as a member of the Finance Committee. Assist the Board of Director in financial reporting as required at Board meetings and the Annual General Meetings and provide advice to support the decision making process.
- Payroll preparation and administration prepare payroll functions to ensure that employees paid in accurate manner.
- Budget preparation using the "different-Based" approaches for budgeting: prepare the annual budget in consultation with the Executive Director and Treasurer and/or Finance Committee.
- Examine and analyze journal and ledger entries, bank statement, inventories, expenditures, tax return and other accounting and financial records, documents and system.
- Prepare detailed reports on audit findings and make recommendations to accounting and management practices
- Conduct field audits of business to ensure compliance with provisions of Tax law or other statutory requirements
- Report to management about asset utilization and audit results, and recommend changes in operation and financial activities.
- Inspect account books and accounting systems for efficiency, effectiveness, and use of accepted accounting procedures to record transactions
- Examine and evaluate financial & information systems, recommending controls to ensure system reliability and data integrity.
- Supervise auditing of establishments, and determine scope of investigation required
- Examine whether the organization's objective are reflected in its management activities, and whether employees understand the objectives.
- Examine records & interview workers to ensure recording of transactions and compliance with laws and regulations.
- Examine records, tax returns, and related documents pertaining to settlement of decedent's estate.
- Articling students in accounting firms

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TARIQ HAMEED | Fellow of Chartered Accountants
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Punjab Industrial Estate
Chief Internal Auditors
From April 2019 till to September 2019
Conduct per transaction audit. Arrange Audit Committee meeting as audit committee secretary. Coordinate with board members. Conduct visits of different sites on behalf of Audit department. Prepared Audit Manual and Audit Chartered. Ensure compliance of Corporate Governance.

SKP Consulting Limited
Director Projects
From January 2007 till June 2009

As Director Projects, handled eight (8) branches over pan Pakistan and have authority to singed Business Appraisal and Financial Reports and then forwarded to different banks.

Following are my job description:-

- Reviewed the Business Appraisal and Financial Reports of different corporate and consumer financing which forwarded to me through quality assurance department for final review and signature.
- Perform analytical procedure on Business Appraisal and Financial Report of different products of bank.
- Review assumptions used in order to prepare financial statement which includes Profit & loss, Balance sheet, cash flow.
- Developed complete policy and procedures for business appraisal department.
- Forwarded proposal to different banks for enlistment of SKP Consulting Limited.
- Apply analytical procedures on different banks business appraisal reports.
- Coordinate with quality assurance department and different branches of SKP Consulting Ltd. to resolve issue, if any on any report and take final decision.
- Provide consultancy to different client at corporate/consumer level for sanction/enhancement of loan.
- Developed **DMS system** in which all the documents can available online at any time at any where.
- SKP conduct in-house **NPS (Netsol Payroll Software)** training, through this software in near future we will outsource our payroll services to different organization.
- System review and finalization of **SOP** of SKP consulting limited for all nine branches.
- Provided services to **"M/s Income Sole software house"** for development of software.
- Got **"SAP FICO (Financial and Controlling) R/3 EP 4.7"** training from Abacus Consulting Lahore which in brief includes.

SPEL Packaging Industries (Private) Limited
(SPEL Group of Companies)
Manager Finance
From January 2005 till December 2006

While working with the above-mentioned organization, I had an opportunity to manage following job responsibilities.

- Implementation of accounts and finance department policies starting from hiring of personnel to development of accounting and internal control systems, designing and implementing reporting system of the company.
- Approval of projected financial statements, budgets, analysis and cash flow statements for the negotiation of various credit lines with the banks and supervision of those credit facilities.
- Monitor the monthly and annually budgeted Financial Statement and its variances.
- Preparation of MIS report on daily basis and forward to Chief executive.
- Monitor and manage the duty payment in case of ex bounding of material from custom bound.
- Ensuring compliance of income tax and sales tax requirement relating to preparation and submission of income tax and sales tax returns of the company and also of the employees of the company.
- Finalization of annual financial statements for external audit purpose and also of monthly internal management accounts.

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- Carrying out product costing for effective decision making with regard to pricing of orders and quoting tenders to various prospective local and export customers.
- Devising and implementing cost control techniques and extending help in optimized production planning.
- Successful supervision of designing of General ledger, Payroll and Inventory modules of Accounting Software.

Sheikh and Chaudhri Chartered Accountants
Manager Audit
November 1998 to December 2004

My responsibilities included planning, coordinating, supervising and reviewing audits. I was also involved in accounting and special engagements including review of accounting, information and internal control systems of different clients.

- Providing corporate consultancy and internal audit
- Conducted tax matters including both sales tax of the companies and income tax of individuals, firms and companies, computation of assessable income and wealth statements
- Appointment as a special auditor u/s 32-A of the Sales Tax Act 1990, including calculation of input and output taxes, reconciliation of stock with physical count and calculation of penalties
- General practice of Auditing, Accounts, Taxation and management consultancy
- Finalization of professional opinion regarding Accountancy, Taxation laws and Secretarial practices
- Preparation of Feasibility reports of different industries
- Preparation of Audit Strategy and planning
- Review of implementation of Audit program
- Finalization of final and interim audit reports of different clients
- Review of work done by the supervisors at different Audits and discussions with the clients relation to the queries raised during the work done by the audit staff
- Preparation of the management letter and suggestions on system weakness in the internal control system of the organization and discussion in the board of the directors meetings
- All reporting to the partner of the firm
- Conducted different types of assignments polishing my skills in following areas

Computer Knowledge:

- Microsoft Office
- Efficient and effective handling of tailored accounting packages
- I have also rendered services to software house M/s Income Sole for development of ERP, for assessment of existing software, design, security, implementation and subsequent monitoring.

Personal Information:

- Nationality: Pakistani
- Marital Status: Married
- DoB: 1975

References:

1- **Ali Latif** (Mobile +92 300 8474868)
ICAP Council Member
2- **Akram Awan** (Mobile +92 321 3333089)
GM Finance | RUBA Special Economic Zone

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ENGR. NOUMAN RAFIQUE



Home address:
H#19/a, St. # 12 Main Bazar Qasoor Pura Ravi Road Lahore
Tel # 042-7704396 (Res), 0345-4057670
E-mail: noumanmughal76@yahoo.com, nouman76@gmail.com

PERSONAL DATA:

FATHER NAME:	Prof. Muhammad Rafique (Late)
CNIC NO.	35202-2250397-3
NATINALITY & DOMICILE:	Pakistani / Lahore
DATE & PLACE OF BIRTH:	21st Nov. 1976 (Lahore)
MARITAL STATUS:	Married
PROFESSION:	Civil Engineering

OTHER TRAININGS:

- **PMP** Certification Training Course (40-PDU'S).
- 4-day Workshop on Cash & Work Plan for Annual Development Programme.
- Ms-Project, Project Maker, Ms-Office, Auto-cad.

PROFESSIONAL AFFILIATION:

Member of Pakistan Engineering council (Civil/19630)

QUALIFICATION:

DEGREE	PASSING YEAR	INSTITUTE	DIVISION
M.Sc Civil Engineering	2006	UET- LAHORE	1St (70%)
B.Sc Civil Engineering	1999	UET- TAXILA	1St (76%)

BRIEF EXPERIENCE:

Practicing Professional Engineer since 1999 in the field of multi storey buildings, Roads, Environmental & Public health Engineering (Sewerage & Drainage System), Water Supply Works, Waste Water Treatment Plants & Contract Management (FIDIC based).
The major activities performed during my career are describe under,

PUBLIC HEALTH & ENVIROMENTAL PROJECTS:

As a **Manager Planning & Contracts** responsible for design review of infrastructure works (Roads, Sewerage and Water Supply network),evaluate the study reports, design criteria, preliminary design reports, draft final design reports, design calculations, FIDIC based contracts documents, Engineer's cost estimate, draft final tender documents including tender drawing and bill of quantities (BOQ).
These documents were also evaluated for storm water and waste water collection systems. Major components of assignments are population projection, socio-economic survey, study of climate, infiltration rates, analysis of rainfall data, field investigations, planning and design of waste/storm water collection system, waste/storm water pump stations and improvement in the existing drainage systems.

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ENGR. NOUMAN RAFIQUE

WASTEWATER TREATMENT PLANTS:

As a Manager Construction, responsible for design review, supervision and tender evaluation of Combined Effluent Treatment Plant at Sundar Industrial Estate. Assignments comprise evaluate the study reports, design criteria, FIDIC/EPC, Turnkey contracts documents, preliminary design reports, draft final design reports, design calculations, engineer's cost estimate, draft final tender documents including tender drawing and bill of quantities.

The major components of Combined Effluent Treatment Plant are wet and dry wells, screening chamber, grit chambers, aeration tanks, surface aerators, secondary settling tanks and plant buildings.

ROADS, HIGHWAYS PROJECTS:

As a Manager Construction, responsible for design review and evaluation of the roads of Sundar Industrial Estate, Quaid-e-Azam Industrial Estate and Multan Industrial Estate. Assignments comprise evaluate the soil investigation reports, cross section of earth work, detailed geometric design, traffic study, design of pavement, design of intersections, final design reports, design calculations, engineer's cost estimate, feasibility study reports and PC-1, draft final tender documents including tender drawing and bill of quantities (BOQ).

MULTI STOREY BUILDING PROJECTS:

As a Project Engineer, responsible for design review and evaluation of the head office building having 6-levels at Sundar Industrial Estate and Multan Industrial Estate. Assignments comprise evaluate the soil investigation reports, co-ordination with the structural engineer, public health engineer and electrical engineer, evaluate the proposal drawings, final design reports, design calculations, engineer's cost estimate, feasibility study reports and PC-1, final tender documents including tender drawing and bill of quantities (Boq's).

As a Project engineer, supervised the construction of FC college projects, Lahore grammar school projects and Kinnaird college projects.

A) **Employing Agency:** **M/s KAA & M/s BMC (Consultants)**
Title of Position: **Manager Planning & Contracts**
Location of Assignment: **Pakistan**
Period of Assignment: **Oct-2010- Till Date**
Project: **Establishment of Shahbaz Air Base (SAB) Jaccoabad**

Main Project Features:
Establishment of Shahbaz Air Base Jaccoabad including Technical & Residential buildings/Blocks, Rigid & Flexible pavement, Runways, Aprons, Walkways, cycle track and shoulders, Sewerage and Drainage network, Water Supply system, Pressure supply system, Underground Electricity system, Boundary wall, Combine Effluent Treatment Plant/ waste water treatment plant, FIDIC/ EPC Turnkey project, Design of the Head Office building, Solid Waste Management.

Activities:
As a Manager Planning & Contract responsible for contract administration & management, preparation of VO's, verification of rate analysis, design review, evaluation of technical assignment including Infrastructure & Public health Engineering, Sewerage & Drainage System, Water Supply Works & Waste Water Treatment Plants and Contract (FIDIC) management and pre-qualification of Contractors for new projects.

B) **Employing Agency:** **PUNJAB INDUSTRIAL ESTATE**
Title of Position: **Manager Planning & Contracts**
Location of Assignment: **Pakistan**
Period of Assignment: **July- 2007 to Oct. 2010**
Project: **Establishment of Sundar Industrial Estate Lahore, Pakistan**

Main Project Features:
Establishment of Sundar Industrial Estate (infrastructure development) in 1600 Acre, Rigid & Flexible pavement, Walkways, cycle track and shoulders, Sewerage and Drainage network, Water Supply system, 10-Overhead water tanks, Underground Electricity system, Estate Boundary wall, Combine Effluent Treatment Plant/ waste water treatment plant, FIDIC/ EPC Turnkey project, Design of the Head Office building, Solid Waste Management.

Activities:
As a Senior Engineer / Deputy Project Manager responsible design review, project management and technical evaluation of Roads and highways, Environmental & Public health Engineering, Sewerage & Drainage System, Water Supply Works & Waste Water Treatment Plants and Contract (FIDIC) management and pre-qualification of Contractors.

C) **Employing Agency:** **M/s PERVAIZ VANDAL & ASSOCIATES**
Title of Position: **Project Engineer**
Location of Assignment: **Lahore**
Period of Assignment: **July 1999 to Aug. 2004**
Project: **Construction of Post Graduate Blocks Phase-II & III.**
Client: **Kinnaird College for Women Lahore.**

Main Project Features:
Covered area 80,000 Sft, Brick masonry load bearing structures, Main special brick/gutka elevations, special brick jallies, arches and gutka flooring, Balcony designs, Landscaping development, split type Air conditioning system, Patio and Atrium details, Marble flooring.

ACTIVITIES:
- Project Management.
- Quality assurance and testing.
- Co-ordination with sub- consultants.
- Co-ordination with Clients.
- Evaluation of the Architectural, Structural, Plumbing, Electrical & HVAC drawings for construction.
- Evaluation of the Contract documents.
- Material Inspection.
- Construction supervision.
- Preparation of bill of quantities.
- Preparation of bar bending schedules.
- Preparation of PC-1 Performa.
- Verification of Contractor bills.
- Preparation of rate analysis.
- Preparation of bar bending schedules.
- Verification of sites layouts.
- Preparation of technical reports.

D) **Employing Agency:** PERVAIZ VANDAL & ASSOCIATES
Title of Position: Project Engineer
Location of Assignment: Lahore
Period of Assignment: Aug. 2003 to June-2007
Projects: Construction of Auditorium, Swimming pool, Junior and Senior Sections.
Client: Lahore Grammar School.

Main Project Features:
Total covered area 76,000 Sft, Frame structures, Swimming pool, Auditorium hall, Amphi theater, Main special brick/gutka elevations, special brick jallies, arches and gutka flooring, Landscaping development, split type Air conditioning system, Marble flooring.

ACTIVITIES:

- Project Management.
- Quality assurance and testing.
- Co-ordination with sub- consultants.
- Co-ordination with Clients.
- Evaluation of the Architectural, Structural, Plumbing, Electrical & HVAC drawings for construction.
- Evaluation of the Contract documents.
- Material Inspection.
- Spot Checking.
- Preparation of bill of quantities.
- Preparation of bar bending schedules.
- Preparation of PC-1 Performa's.
- Verification of the Contractor bills.
- Preparation of rate analysis.
- Preparation of bar bending schedules.
- Verification of sites layouts.
- Preparation of technical reports.

E) **Employing Agency:** PERVAIZ VANDAL & ASSOCIATES
Title of Position: Project Engineer
Location of Assignment: Lahore
Period of Assignment: Oct. 2005 to June- 2007
Projects: Construction of Business & Science buildings.
Client: Forman Christian (FC) College Lahore.

Main Project Features:
Total covered area 2,75,000 Sft, Frame structures, Auditorium hall, Main special brick/gutka elevations, special brick jallies, arches and gutka flooring, Landscaping development, Centrally Air conditioning system, Marble flooring.

ACTIVITIES:

- Project Management in respect of quality assurance, cost & time control.
- Quality Control.
- Co-ordination with sub- consultants.
- Co-ordination with Clients.
- Evaluation of the Architectural, Structural, Plumbing, Electrical & HVAC drawings for construction.
- Evaluation of the Contract documents.
- Material Inspection.
- Spot Checking.
- Preparation of bill of quantities.

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- Preparation of bar bending schedules.
- Preparation of PC-1 Performa's.
- Verification of the Contractor bills.
- Preparation of rate analysis.
- Preparation of bar bending schedules.
- Verification of sites layouts.
- Preparation of technical reports.

Extra Activities:
Member of the human blood donor society Lahore.
Cricket & News paper reading.

Language Capability

English & Urdu - Excellent in speaking reading and writing.

CURRICULUM VITAE



Khizar Hayat

H#26, Abubakar Block, Gulshan-e-Madina, Sargodha road, Faisalabad.

E-mail:khizar63@yahoo.com

Phone# 041- 8811786 Mobile# 03006623667

D.O.B:12th January 1963.

Objective:

To attain a position in an organization offering challenge and opportunity to reach its highest echelon by contribution to its mission, with over twenty two years of experience in electrical and telecommunication industry.

Summary of Experience:

Experienced on various managerial/monitoring/coordinating and executing positions in leading telecommunication and electrical companies i.e. PTCL, Nespak respectively, hands on construction experience of high voltage transmission lines, development projects of PVC duct, optical fiber and access network in addition to operation & maintenance and buildings construction including land acquisition for huge & normal buildings scattered in far flung areas, provision of commercial power connections from WAPDA and standby generator having calculated the electrical load. Experienced in construction of 500 KV transmission line while working as Engineer in Nespak.Experienced in targeted projects completion through contractors as well as consultants subject to project volume, by using proactive approach in timely resolution of issues, keeping close coordination with relevant teams and agencies like TMA, Road Department, Development Authorities, Sui Gas, PEPCO, Railway, NLC/FWO. Dynamically experienced in installation of electrical, telecommunication and building projects with advanced technical knowledge to make valuable contribution towards success of company and assist others in positive development growth for timely completion of projects by optimal utilization of resources. A proactive project manager in timely completion of projects by close coordination with other agencies/departments achieving good quality and strong work ethic and ability to motivate staff to excellence. Time to time deputed as coordinator on behalf of PTCL with District Government Faisalabad for re-location of PTCL existing

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installations in road rehabilitation projects as well as in Lahore during 1997-98, attended daily meetings with different departments under the Chairmanship of, the then political secretary to Chief Minister Punjab.

Experienced in prequalification of consultant and contractor firms for designing and execution of development projects and procurement of allied items, preparation of tender documents including contractual terms and conditions, items specifications with BOQ, projects cost estimation, process of tendering, rates analysis comparable with market, their approvals , work awards receipts of materials and entrance/distribution in inventory stock registers worth millions.

Extra ordinary experienced in selling of new telephone connections and value added services and always kept the customers satisfied by properly handling of their complaints, reduced the network faults by administering the techniques of corrective especially preventive maintenance. Experienced in dealing with Parliamentarians regarding new telephone connection quota and installation of telephone exchanges approved in their constituencies. Knowledge/skill of MS office computer operating systems like word, excel, AutoCAD, power point, e-mailing etc. PTCL included in its highest rated employee's category as **KEY TALENT** while offering voluntarily separation scheme. Retired in April-08 by opting voluntarily separation scheme while working as Divisional Engineer(BPS-moved over 19) looking after as Director from time to time in Pakistan Telecommunication Company Ltd.

Positions held in various organizations:

1-Chief Technical Officer(JUNE-08 to Mar-10) in the company "NIAZ BUILDERS LAHORE" associated with telecom sector companies like **World Call, Wateen, Multinet**, executing their projects of **Optical Fiber** cable networks at Faisalabad and Lahore. Overall company management to control projects, financially and administratively worth Millions with sizeable savings in addition to clients satisfaction.

2-Divisional Engineer Development-1 PTCL Fsd (JAN-2000 to MAR-08)

Selection of sites as per specified criteria.

Acquisition of lands on selected sites.

Construction of **10 buildings** including its electrification with covered area about **1000 sft** each, scattered all over district Faisalabad for installation of exchanges after completion of tendering process.

Provision of WAPDA commercial power connections to new telephone exchanges scattered in various locations.

Handing over of completed buildings after making charge reports.

Planning of underground cable network of 65-K lines digital exchanges and 20-K lines **optical fiber** access network.

Preparation of estimates, pursuance for sanctions, funds allotment and store material purchase/allocations.

Collection of store materials for laying of network.

Work award to the contractors after completion the tendering process.

Completion of cable network and its joint testing by quality assurance alongwith it's handing over to operation wing.

Construction of corporate environment **four-storey building** with covered area about **45000 sft**, two double storey **Customer Service Centers** each with covered area about **7000 sft** and one medium type telephone **exchange building** with covered area about **4500 sft** including electrification with essential protection , fire/smoke alarm , telecommunication / data , air-conditioning , standby generator, lift systems along with electrical load calculation for provision of electrical power supply & capacity of standby generator to cope with essential load requirement provisions through following procedures.

a) Finalization of building design after having competition among renowned prequalified consultants.

b) Preparation of tender documents, working drawings and BOQ etc.

c) Process of tendering and its work award to the lowest bidder.

d) Completion of building by preparation its completion schedule.

3-Divisional Engineer Phones Sargodha Road PTCL Faisalabad (JUL-1998 toJAN-2000)

Managed Installation of 5-K new telephones connections.

Corrective and preventive maintenance of cable network of 20-K lines.

4-Divisional Engineer Development P-III Lahore (JUN-1997 to JUL-1998)

Planning of underground cable network of 10-K lines digital exchanges.

Preparation of estimates, pursuance for sanctions, funds allotment and store material allocations.

Collection of store materials for laying of network.

Work award to the contractors after completion the tendering process.

Completion of cable network and its joint testing by quality assurance alongwith its handing over to operation wing.

5-Divisional Engineer Phones Peoples Colony PTCL Faisalabad (NOV-1992 toJUN-1997)

Managed Installation of 20-K new telephones connections.

Corrective and preventive maintenance of cable network of 20-K lines.

6-Assistant Divisional Engineer (BPS-17) in Pakistan Telecommunication Company Ltd 1988-92.

Operation and maintenance of 10-k lines EWSD exchange.

Laid underground cable duct system.

Laid cable network. Acquisition of lands for construction of buildings .

7-Junior Engineer in NESPAK Pvt Ltd 1987-88.

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Supervision for construction of 500kv WAPDA transmission line as per designed specifications in the vicinity of Sahiwal and Sharaqpur.

Education:

B.Sc. Electrical (Power) Engineering(1987)with **HONOURS** securing 86% marks and **FIRST** position in all disciplines of UET Taxila.

F.Sc. Pre-Engineering (1981) securing 70% marks from Govt.College Faisalabad.

SSC. Science (1978) securing 72% marks and **FIRST** position in Govt.High School Chak No.2 JB Faisalabad.

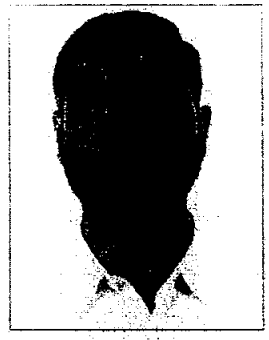
Trainings.

Training (1988-90) in switching, transmission, outside plant/cable network, satellite communication, optical fiber from Telecommunication Staff College Haripur Pakistan.

Computer operating systems, M.S.Project-98, Data Communication from ICT Islamabad.

Affiliation:

Member of Pakistan Engineering Council.



Engr. Muneeb Ahmad Dar

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ACHIEVEMENTS & OBJECTIVE

I have been involved in EPC projects throughout my career for construction, erection, installation, testing & commissioning of 220kV & 132kV substations switchyard, Control Buildings and 500kV & 220kV Transmission lines. I manage team of Engineers, HSE officers, QA/QCs with strict adherence to time schedule, strict compliance of HSE & QA/QC requirements, reporting to Project Manager, completion of project within allocated resources, preparation of project budget, preparation of project plan including shutdown plan, selection of sub-contractors and preparation of Change Orders. I desire to use my skills and experience of managing & handling construction projects for HV Grid stations, Control Buildings and transmission lines as per the satisfaction of client and in the interest of Employer Company. I am sure to carry out any responsibility given to me in the field of my experience with the best of my efforts. Insha'Allah.

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WORK EXPERIENCE

December 2018 to April 2019 **DESCON Engineering Ltd. Pakistan.** 0.5

Position Held: **Manager Electrical**

PROJECTS HANDLED: **Revamp and Turn Around of PARCO Oil Refinery, Pakistan.**

Description: It is multi-Billion Rupees Project to revamp and turnaround of PARCO Oil Refinery for increasing the oil production.

Responsibilities:

- To manage the Electrical activities relating to the revamp & Turn Around work like installation of new switchgear panels, installation of new motors, cable laying for power supply for new and existing equipments, electrification of Control Building, etc.
- To manage Electrical Site Office staff including site engineers, planning engineers, Procurement engineers, supervisors.
- Reporting directly to Project Manager Revamp Project, DESCON and Project Manager, PARCO.

May 2017 to December 2018 **BARQAAB Consulting Services (Pvt.) Ltd. Pakistan.** 1.7

Position Held: **Construction Manager**

PROJECTS HANDLED: **Construction of Outdoor type 220/132kV Grid Station, Nowshera and 220kV Transmission Line.**

Description: It is multi-million Dollar Project by NTDC with loan from Asian Development Bank. The main purpose of the construction of Grid station & Transmission Line is to provide stable power supply to Nowshera city.

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Responsibilities:

- Supervision of civil works, installation, erection, testing & commissioning activities for substation and control building.
- Supervision of civil works, erection, stringing and testing of 220kV Transmission Line feeding for 220kV S/S Nowshera.
- To review the project schedule for substation, control building and transmission line with respective contractors and coordinate with NTDC to remove the bottlenecks for completing the project as per schedule and as per contract requirements.
- Reporting directly to Project Manager, BARQAAB Consulting Services and Executive Engineer, NTDC, Peshawar.

July 2013 – July 2015 and February 2016 –March 2017 **AL Gihaz Contracting Company, Saudi Arabia.**

Position Held: **Construction Manager**

PROJECTS HANDLED: **Upgrading of Power Systems, SAUDI ARAMCO Southern Area Oil Operations.**

Description: It is multi million Riyal Project with thirty six locations for upgrading the existing 115kV substations and Transmission Lines alongwith construction and electrification of control buildings. The projects sites are scattered all over southern area of Saudi ARAMCO oil operations and is under direct supervision of Saudi ARAMCO. The purpose of project is to provide reliable power supply to Saudi ARAMCO oil facilities.

Responsibilities:

- Upgrading of 115kV outdoor substations switch yards and construction of new control buildings.
- To manage a staff of 250-300 persons including site managers, site engineers, safety officers, QA/QC supervisors/inspectors, planning engineers, administrative staff.
- To prepare Yearly budget in coordination with Project Director and Project Control Manager.
- To properly manage yearly budget allocated in the area of jurisdiction.
- To make plan for the project in coordination with Planning Engineer to complete the project up to the satisfaction of the client within stipulated time and allocated budget.
- To make shutdown plan in coordination with planning engineers.
- To ensure timely arrival of equipment/material to sites to avoid delay in construction activities.
- Reporting directly to Project Director and Saudi ARAMCO Project Management Team regarding the daily site activities, achievements, obstructions, plans, etc.
- Liaison with Saudi ARAMCO for approval of Energization Packages for substations.
- To prepare subcontracting plan and Liaison with Saudi ARAMCO for finalization of the subcontractors. Progress review and shut down plan review meetings with client (Saudi ARAMCO).

October 2015 to January 2016 **PAK THERM (Pvt.) Ltd.**

Position Held: **Electrical Manager**

Responsibilities:

- To manage a team of Engineers and Technicians for manufacturing the Distribution and Power Transformers within stipulated time period and budget.

11.3

March 2002 – May 2013 **Dar Al Riyadh Engineering Consultants, Saudi Arabia.**
Working for Saudi Electricity Company, Abha, Saudi Arabia

Projects Handled

Substations (132/13.8kV, 132/33kV, 132/33/13.8kV). Outdoor and GIS type.

Position Held: **Project Engineer**

Description: The Power Projects under the Saudi Electricity Company were designed to provide reliable power supply to public and industrial consumers. These Projects include the upgrading of existing substations and construction of new substations and Transmission Lines.

Responsibilities:

- Design Drawings review for 132kV substations switchyards and control building.
- Supervision of construction, installation, erection, testing & commissioning activities for 132kV substations and control building.
- Represent Saudi Electricity Company at all levels of project implementation.
- Provide all technical assistance to Saudi Electricity Company from design review stage of project to Final Acceptance Certificate of the project.
- To attend Project Kick of Meetings, design review meetings, progress review meetings and overall project progress review meetings.
- Reporting directly to Divisional Manager, Saudi Electricity Company.
- To coordinate between various SEC departments for better and in time completion of the Projects in special coordination with SEC Maintenance Department.
- To arrange outages for the contractor in different phases of the project in coordination with concerned SEC departments.
- To attend and inspect the completion of punch list items and warranty period defects after issuance of Technical Clearance Certificate & Provisional Acceptance Certificate of the project.
- To inspect the project spare parts, special tools and dismantled material, if any, in coordination with contractor and SEC-Assets Maintenance Department and handing over the spare parts and dismantled material to SEC warehouse in coordination with contractor, SEC-AMD and material department.
- To participate in final inspection of the s/s with all concerned SEC departments before issuance of the Final Acceptance Certificate for the project to the contractor.

10.10

May 1991 – Feb 2002 **Pakistan Water and Power Development Authority (WAPDA)**

Assistant Director Design (Transmission & Grids)
Sub Divisional Engineer-Extra High Voltage Department

Description: The Power Projects under Pakistan WAPDA were designed to provide reliable power supply to public and industrial consumers. These Projects include the upgrading of existing substations and construction of new substations and Transmission Lines.

Responsibilities:

- Preparation of complete Design Drawings for 132kV outdoor substations switchyards and control building.
- Calculations for Electrical Equipments/ material required for the construction of 132kV substations and control building electrification.
- Supervision of construction of 132kV Grid stations to check that work is carried out as per WAPDA approved drawings.

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- Construction, erection, installation, testing & commissioning of 220kV Islamabad-Peshawar Road substation alongwith construction of Control building.
- Supervision of civil works, erection, stringing and testing of 220kV Transmission Line feeding for 220kV S/S Islamabad- Peshawar Road.
- Supervision of civil works, erection, stringing and testing of 500kV Transmission Line (In-Out) for Ghazi-Barotha Hydel Power Project.
- Incharge 500kV stores, Lawrencepur which was used to store and issue the material for 500kV Transmission Lines.

Aug 1989 – March 1991 1.8 **M/S Butt Brothers and Company, Lahore, Pakistan**

Maintenance Engineer
Responsibilities:
Worked as Maintenance Engineer for maintenance of Electro Medical Equipments.

EDUCATION

June 1989	Electrical Engineering, (B. Sc.) University of Engineering and Technology, Lahore, Pakistan.

OTHER CERTIFICATES/TRAININGS

Management Course	WAPDA Academy, Tarbela, Pakistan
Technical Training Course	WAPDA Engineering Academy, Faisalabad, Pakistan.
Safety Orientation Certificate	Saudi ARAMCO, Saudi Arabia.
H2S Safety Awareness Course & SCBA Training	Gulf Wells Co. for Oil & Gas Services, Saudi Arabia.

IT SKILLS

Well versed in MS office, Outlook.

MEMBERSHIPS

Professional Engineer	Pakistan Engineering Council, Pakistan.
Member	Institute of Engineers, Pakistan.
Member	Saudi Council of Engineers, Saudi Arabia.

PERSONAL INFORMATIONS

Gender:	Male
DOB:	30-01-1965
Marital status:	Married (wife + 2 children)
Religion:	Islam
Residence:	Lahore, Pakistan.

CURRICULUM VITAE



Name	:	**ZAFAR ALAM**
Father's Name	:	TAJ MUHAMMAD
Profession	:	Civil Engineering
Address	:	79, K-3, Wapda Town Lahore.
Contacts	:	(92) (42) **5180579, 6129760** **0300-4575762**
E-mail	:	zafar_alam76@hotmail.com
Professional Membership	:	Pakistan Engineering Council (21218/civil)

KEY QUALIFICATIONS:

More than seven years of experience in Construction Management / Supervision and also in design of many kinds of industrial, commercial buildings, and big and small housing units and performed interactive co-ordination with consultants and clients for their successful completion.
Also have a good experience in Pre-engineered metal building system while working in a UAE company **Mammut Pakistan**. Fully capable of making bar bending schedules, preparing BOQs, operating AutoCAD and other softwares related to site and design work as well.

PROFESSIONAL EDUCATION:

Name of institution	Year	Degree/Diploma
UET, Lahore	2006	MSc.Civil Engg.(Str.)
UET, Lahore	2000	BSc. Civil Engg.

COMPUTER KNOWLEDGE:

- Sap2000
- AutoCAD 2004
- Office 2000(Word, Excel, Powerpoint)
- E-mail, Internet browsing trouble shouting etc.
- Primavera (certified from Engineering Congress)

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EXPERIENCE:

Name of Employing Agency	**Redco International Doha, Qatar.**
Title of position	Civil Engineer
Location of Assignment	Doha, Qatar
Period of Assignment	August 2006 to date

Following assignments and duties have been performed and continuing i-e,

- Worked as Senior Project Engineer on Lusail Development Project worth of 400 millions Riyals. Main duties were to supervise mass concrete blocks production of 50 tons each, their transportation to site, preparation of foundations and erection on site.
- Successfully completed Al Sheikh Hamad bin Jasim Althani villa having 2 Km long pre-cast boundary wall and a substation of covered 2500 m^2 within 3 months while working as a project engineer. Main duties were to design pre-cast foundations, columns, and supervised their Productions and erection on site, also prepared shops drawing for substation beam elevations and sections.
- Presently was working as Project Manager for the construction of 23 nos. of pre-cast buildings (total covered area = 48000 m^2) worth of 36 millions Riyals. Also including work scope was to design and construct cast insitu foundations, and erection of pre-cast wall panels with Hollow Core slabs.

Name of Employing Agency	**Civil and Urban Engineers**
Title of position	Assistant Design Engineer
Location of Assignment	Lahore
Period of Assignment	December 2004 to July 2006

Following assignments and duties were performed.

- Designed roof system of Boiler house for Tandliawala Sugar mill.
- Designed Gujarat Hospital of 200 beds in brick masonry foundations, slab and beams.
- Designed 2- storey Sun Rising School Defence Lahore while using sap2000.
- Designed slab and beams of 150 Bed Social Hospital Muzzafar Ghar.
- Designed various big and small housing units in Lahore manually and also using sap2000 .
- Designed slab and beams of Social Security Hospital Manga Mandi.
- Designed completely of 3 storeys Hostel for Ali Institute Lahore including basement using sap2000.
- Design many Residential and Commercial Buildings in Lahore.

- Prepared BOQ for Kamran Industry, Sundar Industrial Estates.
- Prepared BOQ for Tec Pvt Limited, Sundar Industrial Estates.
- Prepared BOQs for Bank Alfalah, 15 Branches in Punjab.
- Prepared BOQ for 18th Storey Building at MM Alam road Lahore.

Name of Employing Agency	**Mammut Building System Pakistan.**
Title of position	Technical and Sales Support Engineer
Location of Assignment	Lahore
Period of Assignment	June 2003 to December 2004. (1.5 yrs)

Involved in Estimation, Coordination, Supervision and erection coordination in the following Projects.

- Shed of 6000 m^3 covered area of Water Treatment Plant Nestle Karachi.
- Storage Shed of 5000 m^3 covered area for Nestle Sheikhipura.
- Various Warehouses for Packages Limited Lahore.
- Coal Shed of 500 m^3 for Fauji Cement.
- 700 m^3 Coal Shed for Lucky Cement.
- 450 m^3 Storage Shed for ICI Pakistan.
- Shed for Plastic container Karachi.
- Sports Hall in Lums, Lahore.
- Sports Hall in Aitcheson College Lahore.
- Roof Systems in Exhibition Hall Fortress Lahore.

Name of Employing Agency	**Millac Foods (Pvt) Limited**
Title of position	Assistant Civil Engineer
Location of Assignment	5 km Raiwind Manga Road.
Period of Assignment	May 2001 to May 2003. (2 yrs)

Following Duties were performed

- Site Supervision of Powdered Milk Plant including Chilling Section, Sprayer Dryer, Roads construction, Sewerage system, under ground water tank and Tube well installation etc.
- Performed cube and soil compaction tests on site.
- Bills verification of contractor "Habib Rafiq" from client side.
- Successful coordination between contractor and design office.

LANGUAGE CAPABILITY

English Urdu and Punjabi- Excellent in speaking reading and writing.

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UMAR SAEED



7-E, Phase 1, DHA,
Lahore, Pakistan
Cell: 92.345.4225565
Email: umarsaeeds@yahoo.com
D.O.B: 09/07/70

EDUCATION AND QUALIFICATION

Preston University - Karachi
E MBA in Project Management - 2001

N.W.F.P University of Engineering & Technology - Peshawar
B.Sc Civil Engg - 1992

ORACLE Corporation – USA
ORACLE Data Base Administrator

COURSES ATTENDED

Project Management – Lahore University of Management Sciences (LUMS)

Project Management Professional (PMP) Boot Camp – PMI Lahore Chapter

Primavera Project Planner P-3 – Pakistan Engineering Congress

AutoCAD 2006 – Pakistan Engineering Congress

MEMBERSHIPS

Pakistan Engineering Council	Member: Civil 15734
Pakistan Engineering Congress	Member: 4113
Institute of Engineers, Pakistan	Member: M-15875
Project Management Institute, USA:	Member: 1392390

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PROFESSIONAL EXPERIENCE

1. **CONEX Pakistan (Pvt) Ltd** – Lahore, Pakistan

   a. **General Manager Construction**: ***May 2012 to Date***
   (1 year 7 months)

   (1) Scope of Work:

   a. ***Infrastructure development of DHA Phase VIII, Lahore*** *that includes construction of roads, laying of water supply and sewerage network, construction of OHWTs and surface drainage system. (Financial layout of approx* ***Rs 6.0 Billion****)*

   (2) Responsibilities:

   a) Responsible for Planning, organizing, coordinating and controlling the overall operational activities of the construction projects of the company.
   b) Responsible for ensuring that operational activities are carried out in accordance with laid down specifications and standards.
   c) Implement project work plans as appropriate to meet changing needs and requirements.
   d) Effectively involved in devising company's methodology and responsible for maintaining company's standards.
   e) Review budget estimates and cost tracking reports.
   f) Communicating with a range of people including the client, sub contractors, suppliers, public and work force.
   g) Supervising / implementing quality assurance procedure.
   h) To ensure project documents are complete, current, and maintained.
   i) To analyzes project profitability, revenue, margins, rates and utilization of resources.
   j) Check / Review deliverables completed before handing over to client.
   k) Liaise with client to resolve various issues pertaining to the drawings / site.

l) Conduct technical reviews to improve quality and to eradicate financial losses.

m) Ensure judicious and stringent use of financial resources in line with the planned execution schedule so that project timelines are met within the budget.

n) Facilitate project team by regularly providing technical support and conducting technical reviews.

o) Oversee procurement of equipment, material demanded by the respective project managers and ensure timely initiation of the demand and subsequently inspection for quality and account for quantity of material / equipment supplied.

2. **Eden Housing Ltd** – Lahore, Pakistan

a. **Sr Project Manager**: ***May 2009 to May 2012***
(3 years)

(1) Scope Of Work:

a. Construction of 2000 houses of different sizes (2-1/2 to 12 Marla) including Infrastructure development of Eden Garden & Eden Garden Extension. Site located at Ferozepur road (Financial layout of approx ***Rs 7.0 Billion)***

b. Construction of Chairman's Residence at Thokhar Niaz Baig, Lahore. (Covered area - 60,000 sft)

(2) Responsibilities:

a) Responsible for successful completion of the project within the scheduled time and laid down budget.

b) Negotiate and award contracts to various contractors on behalf of Eden Housing Ltd.

c) Monitor all construction activities including construction of houses as well as infrastructure development.

d) Conduct regular site visits and interact with contractors and supervisory engineering staff.

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e) Oversee the performance of contractors and engineers through established progress measuring / monitoring systems.

f) Review progress on project activities resource usage and cost incurred.

g) Resolve project problems, conflicts, changes, & bottle necks that hinder project's progress.

h) Collect verified information on work results of various activities performed by the construction team. Analyze the data with the baseline schedule to reflect the variance, change in sequence / methods etc.

i) Preparation of weekly, monthly & three monthly look ahead schedule.

j) Preparation of monthly, quarterly & six monthly material requirements.

k) Coordination with the consultants for drawings & data regarding execution of works.

l) Quality Assurance (Q/A) and Quality Control (Q/C).

3. **Punjab Industrial Estates Development & Management Company** – Lahore, Pakistan

a. Manager Construction & In charge, Sundar Industrial Estate:

July 2008 to May 2009
(11 months)

(1) Scope of Work: ***Infrastructure Development*** *of 1655 Acres of land to accommodate approx 650 Industrial units of different natures. Development included around 30 km RCC roads, 45 km of water supply network, 45 km of sewerage network, 3 km of force main, disposal station, overhead water tanks & landfill sites (Financial layout of approx* ***Rs 6 Billion****)*

(2). Responsibilities:

a) Negotiate and award of contract to various contactors.

b) Monitoring all construction related activities.
c) Liaison with the contractors & consultants to update information on project scope, schedule & changes.
d) Regular visits of project site to review the progress of the project activities, resource usage & cost effects.
e) Project progress reports and briefings.
f) Checking Interim Payment Certificates (IPC's)
g) Exchange of plans, BOQs, drawings & technical information with the contractors & consultants.
h) Coordination meetings with the contractors & consultants.
i) Site management including administration & security control.
j) Quality Assurance (Q/A) & Quality Control (Q/C).

4. **M/s Excelsior Engineering Associates** – Lahore / Rawalpindi, Pakistan

a. Site Engr, Manager Construction, Director Operations:

January 1995 to June 2008
(13 years 6 months)

(1) Scope of Work: *Construction projects of buildings, roads, external services with different public & private sectors incl MES (Army), NHA, Local Govt Rawalpindi & DHA etc. (Financial layout of approx **Rs 6 Billion**)*

(2). Responsibilities:

a) Preparation of tender bids / Negotiation of contract agreement with various clients.
b) Monitoring of all construction related activities including site supervision.
c) Liaison with client and consultant for BOQ's, drawings & technical information.
d) Manpower, material resources & Engg plant / machinery management.
e) Quality Assurance (Q/A) and Quality Control (Q/C).
f) Preparation of Interim Payment Certificates (IPC's).

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g) Interaction with parent deptts for payments, etc

5. **M/s Universal Corporation (Pvt) Ltd** – Rawalpindi, Pakistan

a. Site Engineer. ***July 1992 to December 1994***
(2 year 6 months)

(1) Scope of Work: *Construction of 6 storey PTCL Head Quarter Building. Islamabad.*
*(Financial layout of approx **Rs 80 Million**)*

(2). Responsibilities:

a) Execution of works as per construction drawings.
b) Preparation of Bar Bending Schedule
c) Preparation of IPCs
d) Quality Control (Q/C)
e) Interaction with consultant and client.

6. **STRONG POINTS.**

a) Graduate Engineer
b) MBA in Project management
c) More than 21 years experience in construction of roads, buildings & external services with various deptts.
d) Preparation of Bill of Quantities, Vetting & Rate Analysis.
e) Preparation of Project planning & Quality Assurance Processes.
f) Planning, monitoring & evaluation of project through Primavera Project Planner.
g) Specialization in development of Housing societies.



AMINA FAISAL

Address: House No. 109 G, Street 7, Phase V, DHA, Lahore, Pakistan.
Email: aminafaisal@gmail.com
Contact: +92 305 4583143

Looking for a strategic role in dynamic organization where I can enhance my leadership, decision making & analytical skills among a diversified group of people passionate for innovation & growth.

Career Highlights

- Masters in Finance and Economics from Lahore School of Economics. Certificate in Human Resource with distinction from Northern Sydney Institute of TAFE, Australia. Certificate from Canberra (Australia) Institute of Technology in MYOB Accounting.
- A diversified experience of **over 15 years** out of which 10 plus years are of working outside Pakistan.
- Currently working as **Marketing Manager of Punjab Industrial Estates** from August 2017 to date. My role is to make marketing strategies, Marketing plans, product development, branding, design and coordinate promotional campaigns & PR and make strategic partnerships.
- Worked as **Business Head for Cold Stone Creamery Pakistan** for more than 2 years. During that tenure I was leading 100 plus staff spread all across Pakistan. Opened in all major cities of Pakistan 5 Cold Stone Creamery outlets in 1 year. The opening included identifying potential sites, negotiations with the mall management/land lords, discussions with architect, opening of stores with launch events.
- Recognized by the foreign principals year on year (Kahala Management USA) for the outstanding work in managing the stores as per the worldwide Standard Operating Procedures.
- Well versed with the local laws and regulations pertaining to food industry, labor laws, and taxation laws in all cities of Pakistan. Participated in international trainings of Cold Stone Creamery and also led the team in international competitions and won prizes and position at international level.
- **Successfully launched a Womenswear brand 'BONITA' for Chenone** and also executed a nationwide brand campaign worth Rs 5 million increasing their sales by 25% for that quarter.
- **Rebranded and re launched** the **international footwear brand 'Pretty Fit' in Pakistan.**

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Key Professional Skills & Personal Attributes:

- Extensive project management skills to take a project from conceptual stage to completion stage.
- Widespread operations and marketing experience within the retail sector. That includes planning and execution of marketing campaigns.
- Excellent written, communicational and interpersonal skills acquired through my project management experience and liaising with multiple stakeholders at different levels.
- Ability to plan, prioritize and schedule various types of work in detail.
- With the education in Human Resource, I know how to make a team with the correct mix of skills and experience and the staff retention policy by keeping them motivated in their current roles.
- Ability to manage multiple tasks. Conducting, managing & completing a project within the defined timelines and costs.
- With my Masters in Economics and Finance, I am able to write analytical reports for the Board of Directors enabling them to form an opinion.
- An accountancy professional with learnt skills of Sustainability, CSR, Integrated Reporting IR, Startups and Business incubation and Entrepreneurship

Quick learner & proactive behavior	Multi tasker	Excellent analytical thinking
Organization development & entrepreneurial skills	Management, team leadership & decision making skills	Effective business communication and client relationship skills

Professional Achievements (evidenced for attributes mentioned above):

- Attended Trainings from the Platform of Punjab Industrial Estates on PPPs and Project financing in 2017.
- Attended session on Capacity Building organized by the Planning and Development Department of Public and Private Partnership Cell in 2017.
- Recognized internationally for setting up Cold Stone Creamery in Pakistan with a minimal involvement of Foreign Principals.
- Opened first Chenone women's wear standalone store in Lahore as the lead project manager.
- Re-branded and relaunched a restaurant (charcoal grill) with a strength of 100 plus staff.
- Responsible for maintaining the cost and budget associated to each assignment and have been able to meet the target revenues with an average growth of 50% (standard 25%) with no bad debts history.
- Did Human Resource courses from Australia and also did courses for accounting software as well.
- The certificate I did in Human Resources, I was the only candidate who got distinction in the following 4 areas:
    - Human Resource Policies and Practices.
    - Coordination of Human Resource Services.
    - How to Process Job Vacancies.

- Training and Development.
- Passed all the exams from Graduation to masters in first attempts.

Professional Experience

Punjab Industrial Estates Development and Management Company, Government of Punjab, Lahore, Pakistan
Working as *"Manager Marketing"*, August 2017 to date

Responsibilities Are:

1. Liaise with other departments to guide a unified approach to customer service, distribution etc. that meets market demands
2. Define marketing strategies to support the company's overall strategies and objectives
3. Develop a feasible marketing plan for the department and oversee its day-to-day implementation
4. Plan and organize marketing functions and operations (product development, branding, communications etc.), and ensure they project the company's unique "voice"
5. Design and coordinate promotional campaigns, PR and other marketing efforts across channels (digital, press etc.)
6. Create a solid network of strategic partnership ensuring all business aspects of master agreement are implemented and followed.
7. Ensuring all products, marketing initiatives and operations systems are aligned appropriately
8. Ensuring consistent image, brand / product compliance and customer satisfaction is met at every level

Venus Pakistan (Private) Limited, Lahore, Pakistan
Worked as *"Business Head for Cold Stone Creamery Pakistan"*, April 2015 – July 2017
Responsibilities/Accomplishments Were:

1. Ensuring all business aspects of Master Agreement are implemented and followed
2. Ensuring all products, marketing initiatives and operations systems are aligned appropriately
3. Ensuring consistent image, brand / product compliance and customer satisfaction is met at the store level and corporate level
4. Providing brand positioning and strategic direction for the development of the brand in the territory Overseeing and ensure all roles, responsibilities, and programs (from store manager to training manager to all corporate positions including Marketing, PR, Logistics, Construction, Store Design, Development) are implemented as appropriate
5. Overseeing all store operations including inventory and ordering
6. Overseeing recruitment and training of staff
7. Identifying potential locations for new outlets
8. Complete rollout guides related to all marketing promotions customizes and create all marke ting material
9. Staying current with marketing trends and implement promotions to increase sales
10. Responsible for marketing calendar
11. Handle all social media communications

Chenone Stores Limited, Lahore, Pakistan
Worked as *"Project Manager"*, March 2013 – January 2015
Responsibilities/Accomplishments Were:

1. Developing the project plan and getting it approved by the management.
2. Site Selection and liaising with real estate groups.
3. Finalizing the store design and interior by working closely with the architects and interior des ign team. Working closely with the merchandising and product development department to finalize the product mix.
4. Coordinating with visual merchandiser and designers.
5. Marketing and branding (logos, brand shoot, and catalog).
6. Overseeing payroll, new hires and training of staff
7. Timely execution of the project keeping in line the budget.
8. Focusing on Employee Retention and key Employee identification initiatives.
9. Raising purchase orders, tracking goods movement.
10. Leading and motivating the team to reach the desired goal.
11. PR activities and launches

NAQSH Jewelry, Singapore
Worked as *"Sales and Marketing Manager"*, February 2006 – June 2012
Singapore based online jewelry brand dealing in handmade Turkish jewelry
Responsibilities/Accomplishments Were:

1. Liaising with vendors in Turkey for sourcing
2. Placing the jewelry orders
3. Looking after the social media
4. Organizing exhibitions at various occasions like Diwali, Eid, Christmas etc
5. Responsible for meeting sales targets
6. Responsible for marketing and brand initiatives
7. Responsible for all PR and Media related activities

CHASE Recruitment, Singapore
Worked as *"Recruitment Consultant"*, February 2001 – January 2005
A Sydney based recruitment agency specializing in recruiting for the retail industry
Responsibilities/Accomplishments Were:

1. Taking briefs from clients to assist with candidate searches and screening candidates profile
2. Conducting reference checks and managing candidate database – updating their files.
3. Responding to general candidate queries and arranging interviews, and doing follow.
4. Drafting and managing Internet & website advertisements.
5. Producing monthly Candidate 'Talent Bank'.
6. Pitching to new clients.
7. Monitoring of candidates and getting feedback from clients.

Qualification

-Master of Science – Finance and Economics from Lahore School of Economics 2000
-Bachelor of Arts from Kinnaird College Lahore 1998

Certification

- Certificate in Human Resources
  Human Resources Policies & Practices (Distinction), Coordinate Human Resource Services (Distinction), Process Job Vacancies (Distinction). Training & Development (Distinction)
- Certificate from Canberra (Australia) Institute of Technology in MYOB Accounting.

Other information:

- Currently Residing in Pakistan
- Dual Nationality Holder (Pakistan and Australia)
- Previous Residency: Singapore & Australia
- DOB June 22, 1978
- Mother of a charming little girl

References available on request

SAMD
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Full Name	**Farukh E Johri**
Nationality	Pakistani
Education	B.Sc. Civil Engineering, 1990 Master of Engineering (Hons) Australia, 1992 Courses in Project Financing – Institute of Finance New York, 2012 Diploma in Project Management - 2018
Professional Qualifications	Member Institution of Engineers, Australia Member Project Management Institute Member Pakistan Engineering Council
Contact Details:	Email: fjohri@hotmail.com Mobile: +92 3094879620
New South Wales Licences:	- Driving 1C - NSW White Card – 10547298
Countries worked:	**Australia, Qatar, UAE, Oman, Malaysia, Pakistan, Thailand, Singapore, Cambodia, Laos, , Afghanistan, Libya, UK, Macau, Hong Kong, Mauritius, Libya, and Republic of Fiji**

Synopsis

I am a Civil Engineer and working in transportation/infrastructure sector for last 29 years. I have extensive experience in Highway design & construction, Airport planning & Engineering, Rail and Port Development, Project/contract management, asset management and people management.

Presently I am working with Surbana Jurong/SMEC Group as Director Transport in Lahore Office. I am responsible for the infrastructure projects worth over USD500million

I had worked as Senior Project Manager with Ashghal (Qatar Public Works Authority) from 2014 to 2018. Ashghal (Public works Authority) is the government authority responsible for the infrastructure development in the State of Qatar. I was working on Local Roads and Drainage Programme which valued around USD35Billi. The works included monitoring progress of the construction works, site management, review of health and safety and Stakeholder management. Review of site and variation orders, Extension of time, Recovery plans, S curves, Earned values, CPI, SPI, Pre Tender estimates, prequalification of consultants and contractors and member of the interview committee.

I also worked as Associate Director in AECOM/URS from 2003 to 2014. Farukh was responsible for the business development of Highways and Infrastructure section in South Asia and South East Asia which included Pakistan, Myammar, Cambodia, Malaysia, Laos, Vietnam, Thailand and Singapore. Business development included new projects, preparation of technical and financial proposals, risk

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management, tender board and submissions of proposals. The turnover of the sections was around US$2million.

I have gained experience in Transportation Sector with broader back ground in Highway planning and Design, Project financing, budgeting, Aviation engineering and Pavement Engineering, construction materials and rail sector. I have exposure to design methods such as Austroads, JKR, AASHTO, Saudi Arabia and Kuwait. I have in depth knowledge of Road planning and design, pavement design, drainage design mechanistic analysis of pavements using different computer software's. I had been involved in the design and construction of roads in different countries. Has extensive experience in using FAA, ASTM, ICAO such as Annex 14 standards in different aviation projects. I was deputy project manager for New Doha International Airport, the work included design of runways, aprons and taxiway system, geometrical design, pavement design, quantities and report writing. I was responsible for the new and rehabilitations design of pavements of major roads and airports in Australia, Middle East and Asia. I have used HDM-4 computer software on number of road projects, which included data collection, interpretation of data, Network level analysis, Project level analysis and performing economic analysis for the feasibility of the projects

I had been actively involved in the construction of roads and as RE worked on major road projects in Asia and Middle East. The work included overall supervision of contractor's work according to specifications, liaison with the client and the contractor on technical and management issues.

I have attended numerous seminars/ lectures on pavement engineering and presented technical papers at international conferences.

Professional History

September 2018 – To date **Director Transport – Surbana Jurong/SMEC Group**

As a head of transport section, I am responsible for day to day running of the section, dealing with technical and financial issues, business development and HR issues for design and site offices. I am project director for the following projects:

- Construction Supervision of Sukkur Multan Motorway (392Kms) - Pakistan
- Feasibility study for preparation of Central Asia Regional Economic Cooperation Corridors 5 and 6 – Afghanistan – ADB funded.
- Central Asia Regional Economic Cooperation Regional Improving Border Services (CAREC-RIBS) Project – ADB funded.
- GIS survey and Development of Geo Database for entire NHA road network, Approx. 12,000Kms

April 2018 – September 2018

Technical Adviser – Australasia Supply Chain Pty Ltd, Sydney Australia

Technical advice on the modular construction for residential and commercial buildings. Project manager for the modular building structure at Morree, NSW for the motel property. Prepared cost estimates, council's approval and reports.

June 2014 – Dec 2017

Senior Projects Manager – Road Projects Management Department (Ashghal) – Public Works Authority, Qatar

I worked as Senior Project Manager in Roads Project Department for the QR 100Bn (US $27 Bn) Local Roads and Drainage Programme. Ashghal has appointed Parsons Brinckerhoff as the Programme Management Consultant to provide world class infrastructure to the residents of Qatar and Doha in particular. Presently five (5) General Engineering Consultants have been appointed to provide Design and Construction Supervision services for the 220 projects. The appointment of Contractors under a Framework Agreement will commence in 2013.

The works include overall supervision of PMC and GEC, review baseline programmes, technical queries and project management, Approve Interim Payment Certificates, lead technical and progress meetings, liaison with stakeholders and overall responsibility of delivery of the project within stipulated time frame and budget. The infrastructure projects include highways, drainage, micro tunneling, utilities, traffic management & diversion and construction works.

The work included review of EOT, site instructions, variation orders and Interim payment certificates. The monitoring of the construction works, progress works using S curves, Earned value, CPI, SPI and preparation of Dash Boards. Technical issues and stakeholder management on construction works.

The works are also included review of the positive and gravity drainage system, ground water, storm water system and TSE system. The review of micro tunnelling method statement, Quality plans, HSC plans, resource plans and contract documents. Also carried out the structural design of the slabs and beams for industrial buildings and residential dwellings including the associated works drainage, sewerage, foot paths, soft and hard landscape.

Project Manager for the following Projects:
- Contract C2015/46 – Roads and Infrastructure in Al Sailiya – North of Salwa Road (Value QAR573 million)

- Contract C2014/53 – Muaither Area Sewage CP773/1 – DW050 Package 1 – (Value QAR117 million)
- C2014/037 – Flow Diversion Schemes in Al Wajba and New Al Rayyan (PS12 & PS12A) – (Value QAR118million)
- IA 14/15 C043 ST – Roads & Infrastructure in Muaither West Area (Value QAR 600million)
- DS16 Package 1 –Infrastructure development, Micro-tunneling and pump station.

June 2010 – May2014

URS | AECOM

Associate Director – Head of Highways/Infrastructure Section URS

- Responsible for business development in South East Asia which includes Singapore, Thailand, Laos, Cambodia, Pakistan, Malaysia, Macau and Hong Kong.
- Responsible for highway/infrastructure including rail section in Kuala Lumpur office
- Proposal manager for the Terminal extension project as PMC (Project management consultant role) for the Brunei International Airport in association with NACO. The work included technical and financial proposals, presentation to the tender board, presentations to the client (BEDB, Brunei), review of the master plan study prepared by CPG Singapore.
- Project manager for the evaluation of airside pavements at Macau International airport. The work included, site investigation using HWD and GPR, visual inspection, rehabilitation designs project management and reporting (Consultancy fee US$200,000)
- The project involves planning and design of all infrastructures for the proposed development to transform the pristine island of Koh Rong into Asia's first environmentally planned resort destination. The developments include an airport, marina, port and roads to proposed locations for resorts, hotels, golf courses, shopping, restaurants, bars and entertainment centres. Project Manager for the infrastructure planning and design and engineering design of the airport and roads which included design using FAA, ICAO guidelines, technical specifications and report writing.
- Deputy project manager for the approval of B747-8 on different airports in South East Asia including Indonesia, Malaysia, Macau, Thailand and Vietnam
- Project manager for the extension of East and West apron (Code C and Code E) at Phnom Penh International airport, Cambodia. The works included topographical survey, apron detailing, pavement design, technical specifications, mast lighting, positioning of aircrafts, line marking using ICAO guide lines drainage design and report writing.
- Proposal manager for the following railway projects:
  - Feasibility study for the Tram system in Malaka city
  - Pre-feasibility study for the Sabah rail
  - Noise and Vibration study for MRT project in Kuala Lumpur

- Review of railway feasibility prepared by Leighton Contractors for Kajian Peningkatan Infrastructure Sediada Line. The work included review of alignment, traffic forecasting, construction cost and benefits. EIRR and NPV.
- GPR testing for the Double Tracking project in Malaysia. This involved using a combination of Ground Penetrating Radars (270MHz, 400MHz and 900MHz) for detection and mapping of shallow and deeper geotechnical features to identify extents and cause of the sinkholes. As Project manager responsible for the coordination of all works. Planned and organised fieldwork and operations. Supervised GPR fieldwork and operations. Analysed and interpreted GPR data and reporting.
- London North East S&C Trackbed Renewals, as Project Manager Used a variety of data from High Speed Track Recording Coach Data, Historic Track Quality Data, Engineering Walkover Surveys and Desk Studies to provide a comprehensive assessment of existing trackbed for 20 nos. proposed renewal sites within the London North Eastern Region.
- Proposal manager for the design and construction supervision works for the Bascule Bridge in Kuala Terengganu, Malaysia
- Proposal manger for the detailed design of terminal extension at Phnom Penh International Airport, Cambodia.
- Programme manager for the LDP, SPRINT and LATAR highways in Kuala Lumpur. Progress of the projects based on schedule, liaison with client and consultants on technical and financial issues.
- Project manager for the strengthening design of runway at Macau International Airport. The work included study of different asphalt overlay options on runway, whole of life costing, scheduling, risk assessment of each option and recommendations and reporting.

October 2003 to June 2010 Principal Engineer – Head of Highways/Pavement section
Scott Wilson Sdn Bhd, Malaysia

Activities

- Overall, supervision of the engineers involved in the highways/pavement design works. This includes review of technical reports, liaison with staff on technical issues and site visits. Also responsible for the P&L of the section and budgeting.
- Review Traffic and rigid pavement designs for Hong Kong Disney land Project - Hong Kong.
- Provided technical input during construction for Matak Airport strip refurbishment project - Indonesia.
- As a member of design team, carried out rehabilitation design for Karak – Kuala Lumpur Highway approximately 60 kms. The work included overall supervision of the design activities, technical issues, presentation to client on different recommended strengthening designs, specifications, BOQ and preparation of technical reports and tender documents - Malaysia.

- Federal Highway Route 2 (90 lane km): Pavement evaluation, materials investigation, strengthening designs and cost analysis, for different packages - Malaysia.
- Project Manager for Audit/Review of pavement design for East Coast Expressway. The work included, review of information, traffic analysis and pavement design using different techniques i.e. JKR, AASHTO etc and report writing – Malaysia.
- Project Manager for research work for High Performance Asphalt surfacing in Malaysia, work included literature review (Porous Asphalt, HMA, Stone Mastic Asphalt, Polymer Modified Binders), laboratory tests (Bitumen testing, aggregate testing) and performance testing (Such as ITFT, ITSM, RLAT) and reporting - Malaysia.
- Project Manager for Aviation Fibreturf Trial at Changi International Airport. The work included overall supervision of site works, testing, site visits, report writing and technical and financial issues – Singapore.
- As a member of design team, involved in the pavement evaluation using HWD testing on Hong Kong International Airport. Also responsible for the HWD back-analysis, interpretation and analysis of results, computation of ACN/PCN and report writing – Hong Kong.
- As a member of design team, involved in the design of Aircraft Hanger at KLIA, Kuala Lumpur. The works included design of the hanger floor, co-ordination with the client on technical and commercial issues – Malaysia.
- Project Manager for structural evaluation of two airports in Cambodia. The work included overall supervision of site works, review of data, interpretation of results, liaison with client on technical and financial issues and report writing – Cambodia.
- As a member of design team, responsible for the pavement design of East, West Runways, Taxiways and Aprons for New Doha International Airport. The designs were carried out using FAA methods (LEDFAA). Also prepared specifications, Drawings and reports - Qatar.
- Carried out pavement design review for the Area A3 Development – Laemchabang Port, Thailand – Container yard and Access road pavements - Thailand.
- Project manager for the rehabilitation of SPRINT Highway in Kuala Lumpur. The work included supervision of contractor, analysis of data, database for Sprint Highway according to TEAM (MHA Guidelines), report writing and liaison with client and contractor on technical and commercial issues - Malaysia.
- Project manager for the rehabilitation of Area 7 packages in UK. The work included analysis of data, back analysis and rehabilitation design using Department of Main Roads UK - UK.
- Project manager for the rehabilitation design of South Luzon Expressway in Philippines. The work included visual survey, HWD testing, destructive and non-destructive testing, and analysis of data, back analysis and rehabilitation designs - Philippines.

- As a member of design team, involved in the design of lead-in taxiway and two rapid exit taxiways at HKIA (Hong Kong International Airport). The work included pavement design, geotechnical issues, review of specifications and report writing – Hong Kong.
- As a pavement specialist, visited Sohar Port Construction site. The work included site visits, recommendation in order to reduce the overall pavement, supervise construction activities and report writing - Oman.
- As a design team member, provided technical advice on the pavement designs for KICT (Karachi International Container Terminal) port. The work included review of pavement design for green and brown sites, review of specifications and liaison with client on technical issues – Pakistan.
- Project Manager for Peer Review of Pavement Design for Dubai International Airport. The work included review of the flexible pavement design, material specifications and report writing. Client: Department of Civil Aviation – Dubai
- Project Manager for Hazira Port Project in India. The work included pavement design for container yard areas and access roads according to British Port Authority Pavement Design Manual. Client: Port Singapore Authority.
- Project Manager for the Evaluation and Rehabilitation designs of the pavements for Brunei International Airport. The work included PCI survey, skid resistance survey, profile survey, HWD testing, trial pits, DCP, boreholes, laboratory testing, interpretation of data, ACN/PCN analysis, strengthening designs , tender documents and reporting. Presentations to DCA and Minister of Communications, Brunei. Client: Department of Civil Aviation – Brunei
- Project manager for the inspection of 120Kms road for Nam Theun 2 Hydroelectric project in Laos. The work included review of road designs, slope stability and specifications and construction. Client: Government of Lao – Laos
- Project manager for the pavement condition assessment surveys for East coast expressway and KL – Karak Highway. Client: MTD Prime
- Project manager for the review of pavement designs for Saigon premier port terminal in Vietnam. Client: TOA Corporation – Japan
- Project manager for the evaluation of pavements and ACN/PCN for Hong Kong International Airport. The work included HWD testing, interpretation of data, ACN/PCN analysis and reporting. Client: Airport Authority Hong Kong.
- Bid manager for Pavement Management System project in Brunei for 2700Kms roads. The work included preparation of technical and financial proposals, costing, risk assessment, contract review, liaison with client and local partners and report writing.
- Bid manager for D& B contract for Brunei International Airport. The works included costing, risk assessment, internal tender board, contract review, JV contract, sub-consultancy agreements, technical and financial proposal.

- Project manager for pavement condition assessment of LDP highway. Approximately 200Lane Kms. The worked included data collection and analysis of results using HDM4. Different options using HDM 4 and rolling works programme.
- Project Manager for the Evaluation of pavements at Hong Kong International Airport. The work included overall project management, mobilization of the resources, HWD testing, traffic studies, PCN/ACN analysis and report writing.

Nov 1999 to Oct 2003

Senior Engineer
National Engineering Services (Pvt.) Limited - OMAN

Activities

- Project Engineer for rehabilitation design of M9 Motorway (Karachi to Hyderabad), which included detailed design, alignment design non-destructive testing, BOQ and tender documents.
- As a member of design team, involved in alignment study, traffic surveys, geotechnical investigation, pavement design and tender documents for N5 – National Highway from Rahim Yar Khan to TMP Section, approximately 90kms. (Client: National Highway Authority)
- Project Manager for the 10 residential houses in OMAN. The works included the structural design of the footing, earth works, beam design and slabs. Prepared tender documents, BOQ frame works and bar bending schedule for the construction works. The works associated with the residential dwelling such as water, sewerage, footpaths, gates levels were also included.
- Project Manager for Rehabilitation design of Nizwa – Thumrait road (15 Km) in Oman. The responsibilities involves mobilization of staff for visual condition survey, destructive testing along the alignment and project management. The design report includes pavement investigation and design, rehabilitation using world model HDM-4 and preparation of tender documents (Client: Ministry of Transport and Communications, Sultanate of Oman).
- Prepared Technical and financial proposal for Government of Pakistan for Comparative study between Flexible and Rigid Pavements.
- Farm to Market Roads in Pakistan – Funded by Asian Development Bank.
- Deputy Project Manager for Batinah Highway Rehabilitation Project (253 Km Long road in Sultanate of Oman. The work included mobilization of staff, supervision of visual survey, structural survey, and serviceability survey and traffic studies. Preparation of inception report. Recommendation of different rehabilitation measures using HDM-4 software and recommending rolling works programme. Also prepared tender documents, BOQ and Engineer's Estimate (Client: Ministry of Transport and Communications, Sultanate of Oman).
- Resident Engineer for Duqm to Al Kihail road approximately 187 km long, responsibilities involved supervision of contractor work, all road activities, and problems at site and liaison with the client

on technical and financial matters. Client: Ministry of Transport and Communications, Sultanate of Oman. Project Cost US $ 16.0 Millions.

- Resident / Civil Engineer for Lakbi – Sawaqra Coastal Highway in Sultanate of Oman. The Work included the overall supervision of the contractor's work, dealing with site problems and recommendations according to Project specifications. Client: Ministry of Transport and Communications, Sultanate of Oman.
- Responsible for geotechnical investigations, pavement design, geometric design and report writing for the following projects in Sultanate of Oman:
  -Sohar - Buraimi Dualization Project
  -Marmul - Shaleem - Sawaqrah Road Project
  -Muskin - Rustaq Road Project
  -Nizwa - Thumrait Rehabilitation Project
- Project Manager for Feasibility Study of Rustaq Miskin Road Project in Sultanate of Oman. The work included computation of VOC's and VTT and economic appraisal using HDM-4 computer software and different rehabilitation strategies over the analysis period, cash flow, and risk analysis. Client Islamic Development Bank
- Project Manager for Feasibility study of Nizwa -Thumrait Road Approx 200 km existing road. The task included the rehabilitation design and different rehabilitation design for the design period. The economic appraisal using HDM4 computer model. Client Islamic Development Bank
- As a member of design team carried out rehabilitation design of Kabul, Jalalabad – Thorkham Highway in Afghanistan, approximately 225 km. The work included condition survey of road, supervision of geotechnical investigations and rehabilitation design based on AASHTO and Road Note approaches.(Ministry of Public Works, Kabul).
- Assisted Engineers of DGR (Directorate General of Roads) Sultanate of Oman in establishing PMS, which included the network survey of roads, inventory and establishing Road network database for Works programme. Also carried out Calibration 1 and 2 of HDM-4 for Oman Network.
- Designed rigid pavement for the bus depot in Faisalabad, Pakistan. The work included design of rigid pavement considering empirical and mechanistic design methods.
- Responsible for the rehabilitation design of existing carriageway from Rahim Yar Khan to TMP approximately 18 kms. The work included geotechnical investigations by digging test pits, visual condition survey, traffic studies and review and analysis of FWD data. The deflections bowl was analyzed with MODULUS to compute back-calculated Moduli of different layers. The design was recommended on the basis of laboratory and site investigations. Client: National Highway Authority, Islamabad

Mar 1996 to Oct 1999

Pavement Management Services

Senior Engineer
Pavement Management Services, Sydney, Australia (Now FUGRO-PMS)

Activities

- Carried out Flexible and Rigid pavement designs for major roads using AUSTROADS guidelines.
- Performed overlay and reconstruction design for Cook's Highway in Cairns approx. 3.6 Km that included mechanistic design using CIRCLY. The whole of life costing of different designs was carried out and most feasible design was recommended (Client, Queensland Transport).
- Performed Falling weight deflectometer testing in Campbell town for structural response of pavement and design overlays by using ELMOD (Client, Campbell town City Council).
- Designed Flexible and Rigid pavement of Lyon Park Road, a new route from Epping road to industrial zone, which also included whole of life costing of different designs (Client, Ryde City Council).
- As Project Engineer performed pavement condition visual surveys FWD testing for Leihhardt city council which included identification of different distresses in the pavement (Approx 80 Lane Kms).
- Carried out visual survey for Ryde city council (Approx. 116 Lane Kms)
- Carried out structural response of pavement using FWD for Ryde and Liverpool City Councils and uploading data into SMEC PMS System.
- Prepared technical report for Parkes Way, Canberra which included review of design and back calculation of moduli from ELMOD & EFROMD2 (Client, HTL - Reinhold).
- Prepared technical report for Federal Highway, Canberra, which included different rehabilitation designs (Client, R. D Gossip).
- Responsible for Annual Pavement Management report 1996-97 for Ryde City Council, which included data collection, uploading into PMS, ideal strategies, budgeted strategies, future works program and AAS27 report.
- Worked as Project Engineer for data collection and uploading the data into SMEC PMS for Gold Coast City Council which included collection of different pavement distresses and asset items for approx. 8000 lane kms in Gold Coast area. Also responsible for cost effective operation of the Project.
- Project Engineer for network testing of Campbelltown City Council which included scheduling of the Project using WINPROJECT, Processing of all data i.e. visual survey, 3 Laser profilometer and falling weight deflectometer using Microsoft Access and Excel Spreadsheet. Also responsible for the completion of the Project within time limit.
- Responsible for planning of the Projects using Visual/Maintenance Management System.
- Prepared a technical report for Newcastle City Council, which included Heavy weight deflectometer testing, and computation of CBR from Load - Deflection Bowl.
- Prepared a technical report for Transport and Urban Planning Pty. Ltd., which included heavy weight deflectometer testing, traffic calculations and overlay thicknesses. The design report also

included whole of life costing and contribution rates computed on the basis of quarry trucks. Client, Transport and Urban Planning.

- Prepared a tender document for Department of Transport, South Australia that included visual collection of road network approximately 12,500 lane Kms. The tender document included the data collection methodology, mobilization of crews and costing of the Project.
- Prepared a tender document for Callundra City Council, which included data collection for SMEC system in Callundra.
- Project Engineer for visual data collection of performance specified maintenance contract (PSMC) of Hornby - Warringah region in Sydney. Client: Roads and Traffic Authority (RTA), Sydney.
- Responsible for preparing a technical report for Olympic Co-ordination Authority which included visual/video survey, serviceability and structural survey of the roads in Homebush area (Olympic Village). The design report included overlay thicknesses and overall condition of the road network.
- Project Engineer for visual survey of RTA Hornsby Warringah Network approx 1800 lane kms in Sydney. The survey includes overall management of visual crews, technical issues and database management.
- Prepared design report for Wall Park Avenue which includes structural testing using falling weight deflectometer, remaining life assessment and different rehabilitation based on Austroads Design Guide using CIRCLY. The traffic counts were carried out using Truvelo TDL-500 equipment to estimate the percentage of commercial vehicles.
- Incharge for traffic data collection and reporting for RTA PSMC maintenance contract, Hornsby - Warringah network.
- Project Engineer for the Pavement Condition Survey of Royal Botanic Gardens. The survey included visual and structural survey using video logging and Heavy weight Deflectometer. The report included current condition of the network and five years future maintenance strategies using PARMMS based on HDM 4 World Bank Model.
- Prepared procedures and work instructions for traffic classification, Structural testing using Falling Weight Deflectometer and Skid Resistance using Road Analyzer Recorder. The procedures were written according to the NATA (National Association of Testing Authority, Australia).
- Supervised Visual and Structural Testing for bus depots in Sydney on Concrete pavements and prepared report including rehabilitation techniques according to World Bank HDM IV model.
- Project Manager for Salisbury network Survey that included mobilization of crew, quality plans and Project Management.
- Project Manager for City of Marion network survey - Day to day running of the Project, technical issues and liaison with the client on all aspects of the Project including supply of Database in PARMMS 4 format.
- Project Manager for City of Adelaide network survey, which includes day-to-day running of Project and liaison with the client on all aspects of Project.
- Project Manager for RTA Asset Survey 1999 which includes hiring of crew members, running of the Project, liaison with the client on

all aspects of the Project and provide data into suitable format using relational database – Access
- As Operations Manager was responsible for the day to day running of asset monitoring division.

Jan 1996 to Mar 1996 **Civil Engineer, Parramatta City Council, Parramatta-Australia**

Activities
- Carried out road and drainage inventory survey for Council's Asset Management System. Assessing the condition of road pavement, Kerb & gutter, footpath and nature strip. Drainage pits and storm water pipelines conditions so as to put these into the computerised database.
- Prepared tender and contract documents for road construction works
- Prepared database for HDM III.

1992 to 1995

Senior Engineer
National Engineering Services Pakistan (Pvt.) Ltd.

Activities
- Geometric design of urban and rural roads using AASHTO guidelines.
- Supervised 150Km long Highway as Assistant Resident Engineer, which includes overall management of the project, monthly progress reports, dealing with technical issues, progress monitoring, attending meetings and approval of Interim payment certificates.
- Prepared project control estimates, project monitoring, project budgets and project management for major projects.
- Supervised drilling work at bridge sites and geotechnical investigations along the proposed alignment of motorway. Also supervised axle-load study on motorway project.
- Designed deep foundations of bridges, slope stability of embankments, settlement analysis, stabilisation of subbase and report writing for the Pakistan Motorway Project, in association with the French company (BCEOM).

Achievements

- Successful completion of motorway designs ($320 Million) in association with an international firm (BCEOM) French Consultant.
- Carried out vertical, horizontal alignment, super elevation design using AASHTO guide lines
- Developed a program in spreadsheet and Basic for allowable pile capacities and soil classification.
- Designed Flexible Pavements for various projects which included AASHTO, Road Note 31 and Shell approaches. Also performed mechanistic analysis using ELSYM5, Kenlayer, Chevron X and Dama programs.
- Established the policy and objectives needed for the development of PMS

1991 to 1992 Tutor Engineering)

University of Wollongong, Australia- (Department of Civil

Activities

- Tutored undergraduate students (70 Nos) in civil engineering courses in soil mechanics and surveying subjects.
- Assisted course adviser in preparing weekly assignments, class tests and final examination.
- Supervised laboratory experiments - Triaxial Test, Unconfined Compression Test, Consolidation Test, Proctor Compaction Test, Shear Box Test and Permeability Test.
- Organized field trips to BHP steel industry and sewerage Plant at Richmond, Sydney.

1990 to 1991

Civil Engineer, Turkpak International (Pvt.) Limited, Pakistan

Activities

- Prepared technical and financial proposals for various infrastructure projects.
- Member of design team for carrying out foundation and structural design of a Pickling Plant in Sultanate of Oman.
- Provided technical assistance and co-ordination with the design team and senior administration.

Achievements

- Technical solution for problems associated with the designs.
- Completion of project within time limit and with profit of over 10%.

Farhan Munawar
Mobile: +92-300-8474740
farhanmunawar@lumsalumni.pk
23rd February, 2019

General Manager HR & Admin
Punjab Industrial Estates Development and Management Company
Lahore

Dear Sir/Madam

I wish to apply for vacancy of "General Manager Admin & HR at PIEDMC" advertised in leading newspapers.

I have more than 15 years of work experience with organizations in Turkey, Indonesia, UAE and Pakistan after completing my Associate Degree from Bogazici University, Istanbul, Turkey. From 2007-2011, I have completed my Bachelors in Business Administration (Hons) from FAST-NU. Additionally, I have Masters in Business Administration (Executive) from SDSB-LUMS. I have served two section 42 companies under GoPb as Manager Operations and General Manager Operations (HR) (for more than 4 years). My last assignment was with Descon Engineering Limited as Head BD – Infrastructure Division. During the last one year I am part of an entrepreneurship/partnership venture.

Please allow me to highlight my professional experiences pertinent to subject position:

1. *HR Operations and Facilities Maintenance:*
    - *Manager Operations Central Dubai Area Berkeley Services (Facilities Management) U.A.E.*
    - *General Manager Operations(HR) Section-42 Government of Punjab, managed four direct departmental reports and staff of more than 200 employees*

2. *HR/Administration, Procurement, Security and Transport:*
    - *Worked as Manager Operations LTC-GoPb , supervised 8 transport companies under the umbrella of Government of Punjab to manage operations*
    - *Head HR & Admin Albayrak Holding – Metro Bus Project Lahore*

3. *Experience of working in Turkey, Indonesia, U.A.E and Pakistan with multicultural teams and in multilingual environment.*

4. *Significant experience in HR, Administration/Procurement and Financial Management*

5. *Proficient management and preparation of correspondence and communications*

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6. *Efficient report writing and presentation skills as significant part of BBA(Hons) and LUMS MBA(Executive) degree programs*

7. *Significant coursework in Finance and HR , graduate cum laude and maintained GPA of 3.63 in both FAST and LUMS*

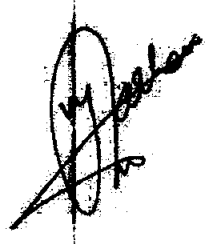
8. *Proficiency in Turkish Language*

I have attached my CV for further details. I believe I can make a positive contribution to this position by adding value based on my experience of HR/Admin/Operations in corporate sector and strong academic back ground. I would welcome the opportunity to meet with you for an in-depth discussion. I am available for an interview at your earliest convenience, please contact me via phone or email to arrange a time and date for us to meet.

Thank you for your time and consideration and I look forward to speaking with you soon.

Sincerely

Farhan Munawar



References:

1. *Dr. Ahtasham-ul-Haq*
   Managing Director
   LDCMMC- Government of Punjab- Section-42
   0321-8404442
   Direct reporting to MD as GM Operations
2. *Mr. Omer Pirzada*
   Chief Operating Officer
   LTC-Government of Punjab-Section-42
   0300-4003969
   Direct reporting to COO as Manager Operations

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Suleman Dawood
SCHOOL OF BUSINESS
EMBA 2013

FARHAN MUNAWAR

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Mobile: +92-300-8474740
E-mail: farhanmunawar@lumsalumni.pk



CAREER PROFILE

More than 15 years of diversified and successful track record in managing HR/Admin/Operations and strategic business development with experience in managing cross-cultural teams and distribution networks.

EDUCATION

Lahore University of Management Sciences [LUMS] **2013**
Master of Business Administration (Executive)-HR/Operations

National University of Computers and Emerging Sciences [FAST-NU] **2011**
Bachelor of Business Administration (Hons) (HR/Finance) Cum Laude

Bogazici University, Istanbul, Turkey **1999**
Associate of Science (Department of Chemical Engineering)

WORK EXPERIENCE

Descon Engineering Limited **Oct 17 – Dec 17**
Head Business Development-Infrastructure Division
Descon Engineering Limited is an integrated engineering services and manufacturing company operating in Pakistan and the Middle East. It is in the business of delivering client-specific solutions for projects related to Energy, Infrastructure and Process industry. The integrated package of services encompasses engineering, procurement, manufacturing, construction, commissioning and maintenance.

Key Responsibilities:

- Liaison with PMO's of public sector clients (Wapda, Irrigation Department, SEDA, PEDO, CAA etc.) for update on current infrastructure projects like dams, canals, barrages etc.
- Follow up of upcoming public or private sector infrastructure projects and preparation of competitive bids for infrastructure projects in consultation with concerned department teams
- Maintain business relationship with international and local vendors and local representatives of multinationals for potential joint ventures

Lahore Division Cattle Market Management Company-Government of Punjab-Pakistan **Aug 15 – Sept 17**
General Manager Operations (HR)
LDCMMC is owned by Government of Punjab, registered under section 42 of Companies Ordinance 1984, it has the mandate of establishing, operating and regulating markets in Lahore Division which include Lahore, Sheikhupura, Kasur, Pattoki and Nankana.

Key Responsibilities:

- Establishing and implementing of objectives and SOP's in line with HR and Operations manuals
- Implementing HR polices along with selection, training and performance appraisal
- Managing outsourced services contracts like transport/logistics, parking lots, maintenance of facilities and assets
- Preparing and implementing operational and procurement plan in accordance with approved annual budget
- Managing the correspondence for support needed from government agencies like DCO's Office and City Traffic Police
- Presenting reports and projects output/results to BOD and related government officers for policy formation
- Ensuring that company goals are met in a timely fashion by the efficient and effective management of personnel and resources
- Monitoring complaint cell and grievance handling mechanisms

Lahore Transport Company (LTC)-Government of Punjab-Lahore-Pakistan **Feb 14 – Aug 15**
Manager Operations (HOV)
LTC is owned by Government of Punjab, registered under section 42 of Companies Ordinance1984, it has the mandate of deployment and regulation of urban transport (Buses, Taxis, Mini-Vans, and Rent-a-Car) services in

Lahore. LTC awards urban/sub-urban bus routes and permits to private companies through exclusive route franchise awards under Public Private Partnership framework backed by concession agreements.

Key Responsibilities:

- Trained drivers for using Onboard Information Units and E-Ticketing devices
- Formulated operational plans and coordinated with local/foreign operators/government departments for implementation of those plans
- Conducted inspections on various urban routes to ensure operational compliance of parameters and plans issued by planning department
- Managed the correspondence for support needed by foreign operators from government agencies like Transport Department, DCO's Office and City Traffic Police.
- Presented reports and projects output/results to BOD and related government officers for policy formation
- Participated in various social ventures/programs by Government of Punjab e.g. dedicated arrangements for disabled persons in all public facilities
- Social enterprise activities: monitored the performance of student discount cards and free old age citizen travel cards

Albayrak Holding/ Platform Turkey (Pakistan Branch) (Metro Bus/Urban Bus Routes) **Oct 12- Nov 13**
Head of Department HR & Admin
Organization is responsible for procurement, operations and maintenance of articulated Metro buses for the much acclaimed Mass Rapid Transit system in Lahore. Platform also operates 172 buses at different urban and sub-urban routes in Lahore region under contracts with Lahore Transport Company.

Key Responsibilities:

- Established HR department with 12 HR personnel responsible for more than 900 employees
- Implemented HR policies consistent with those of Albayrak Holding Turkey
- 90% reduction in penalties which are imposed by Punjab Metro Bus Authority owing to non-compliance in HR related issues
- Conducted at least 8 goal oriented trainings for different cadres which significantly improved KPI's
- Managed legal and compliance issues like EOBI and social security and ensured timely sharing of data required by different government departments
- Streamlined the process/flow of information among different subsidiaries of Albayrak Holding
- Deployed a system of employee recognition based on monthly performance on assigned target

Berkeley Services Group U.A.E (Facilities/Property Management Services) **Jan 06-Feb 07**
Operations Manager-Central Dubai Area
The group employing over 2600 staff is among the leading service providers in real estate with clients all over UAE. The services include maintenance, landscaping, security and cleaning.
Key Responsibilities:

- Managed contracts/operations of security/cleaning division including procurement/ inventory management
- Supervised the allocation of 360 employees, equipments and resources for different projects
- Prepared, bid, negotiated and won contracts with multinational facilities e.g. Citibank, Emirates/DNATA, HSBC and various shopping malls
- Evaluated and appraised the performance of 3rd party logistic operators

PT. Farah Karpindo Lestari, Jakarta, Indonesia (Textile/Home décor/Furniture) **Dec 02-Oct 05**
Assistant Manager Operations-Supply Chain
The organization is involved in import and export of home textiles, carpets, furniture items and other home décor products. It has exclusive distribution rights for markets in Indonesia, Malaysia and Australia. Moreover, the organization operates a chain of retail showrooms across Indonesia.
Key Responsibilities:

- Managed demand and supply for all retail outlets across Indonesia
- Negotiated with and procured from suppliers in Turkey, U.A.E and E.U
- Trained 80+ sales staff and outlet managers
- Successfully managed the expansion from 10 to 16 outlets within 2 years
- Introduced new products in textile section into Indonesian and Malaysian markets benefiting the organization by 15% increase in sales and increased market penetration

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Atlas Carpet and Weaving Mills, Istanbul, Turkey **Aug 99-Oct 02**
Business Development Executive
The organization was ranked among the top weaving mills in Turkey in terms of capacity and exports.
Key Responsibilities:

- Participated in exhibitions for tapping customers across the globe and developed new market in Indonesia
- Coordinated and liaised with buyers and production managers for order preparation and shipments
- Decreased delivery time by 10% for exports/outbound shipments to Malaysia, Indonesia and Australia

MDM Tekstil Dis Ticaret LTD. STI, Istanbul, Turkey **Aug 93-Aug 97**
Sales and Distribution Executive
The core operations of the company were import and distribution of textile products all over Turkey.
Key Responsibilities:

- Coordinated with international producers
- Managed the demand from local distributers

PROJECTS

Alternate Performance Appraisal for Pakistan Army (MBA-FYP)

- Proposed Management by Objectives (MBO's) approach for reduction in subjectivity in current Officers Evaluation Reports(OER's)

Evaluation of "Corporate Social Responsibility" in Pakistani Organizations (BBA-FYP)

- Compared awareness of "CSR" in local organizations and multinationals

ADDITIONAL SKILLS AND EXPERIENCE

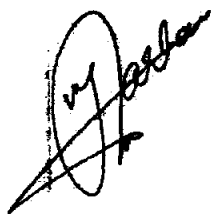
- Excellent communication and presentation skills
- Strong analytical and problem solving skills
- Proficiency in speaking Turkish

HONOURS AND AWARDS

- Remained among top three participants in MBA(Exec) and member dean's list in BBA(Hons)
- Secured scholarships in secondary and higher secondary school board examination

TRAINING/CERTIFICATION

- Clean Development Mechanism (CDM) Assessment of PC-1 of Public Sector projects, Cabinet Secretariat, Climate Change Division, Government of Pakistan
- Capacity Building of Public Private Partnership (PPP) Nodes, Planning and Development Department, Government of Punjab
- PPRA Rules



House # 29.b, Street # 5,
Nabipura Araian Baghbanpura
Lahore

Phone: 00923235546162
E-mail
Muhammad_aamir23@yahoo.com



Muhammad Aamir
Bachelor of Technology (Hons) Electrical Power
& Master in Business Admistration (Human Resource Management)
With Seven year Cumulative Experience

I AM AN ASSIDUOUS AND ENTHUSIASTIC ELECTRICAL ENGINEER HAVING CONCEPTUAL AND TECHNICAL SKILL WITH PRACTICAL EXPERIENCE & LIKE TO WORK IN CHALLENGING ENVIRONMENT OF ORGANIZATION TO UPLIFT CONCERNED DEPPARTMENT.

Projects

- Monitoring of testing & commissioning of 132/11 kv grid station Sundar industrial estate along with testing commissioning of 31.5 / 40 MVA transformer (Siemens) and testing commissioning of 10 no's 11 kv panels.
- laying, testing , commissioning of 11 KV 02 no's feeders (Radial for 10 MW load) for M/S Tetra Pak along with design of protection scheme and erection ,testing commissioning of 11 kv metering and protection panel .
- Design and laying, testing , commissioning of 11 KV 01 no's feeders (Radial for 3 . 2 MW load)for M/S Gourmet along with design of protection scheme and erection ,testing commissioning of 11 kv metering and protection panel .

Education	July 2005 to 2007 Allama Iqbal Open University Islamabad. **Masters of Business Administration (Human Resource Management).** Sep 1999 to Sep 2003 University of Engineering & Technology Lahore. **Bachelor of Technology (Pass) & (Hons) in Electrical Power.**

SAMD CONSULTANTS

Professional experience

August 2008 TO UP TO DATE PUNJAB INDUSTRIAL ESTATES(Sundar Industrial Estate) Lahore

Jr. Engineer Electrical

- Assistant Manager of all electrical activities at Sundar industrial estate Lahore.
- At managerial level of technical working with M/S Siemens operation and maintenance of 36 no's 11 kV feeders supplying electricity to the more than 300 national and multinational industries.
- Managing weekly / fortnightly/monthly/ Quarterly/biannually/annually maintenance Schedule for RMU (3way 4 way SSBs) and Transformer.
- Designing and erection testing, commissioning of the network extension of 11 KV systems to supply the electricity to under developed infrastructure area.
- Overall supervision of operation & maintenance of electrical 11 KV U.G cable systems (500 mm sqr and 120mm sqr) for all mixed nature industries of estate.
- Operation and maintenance of street light covering the 1600 acre area.
- Monitoring the Meter installation of all KWH /L.T /H.T meter (MDI TOU Meter & Electromechanical meter).
- Programming of MDI meters (Syed Bhies & Elster) for different industrial & commercial connection as per requirement.
- 11 KV Protection Relays setting for circuit breakers on different Industrial panel.
- Testing and commissioning of 36 no's of11 kV feeders at 132 KV grid station after Meggering and hipot.
- Monitoring of Reading of all industrial tariff connections.
- Efforts for Minimization of electrical line losses of the overall system.
- Making of feasibility for all industrial & commercial tariff connection up to 5000 KW.
- 11 KV panel inspections (Testing of CT, s Protection Relay i.e. Hipot, over current, earth fault) Consumer metering & protection panel.
- Managing the load of up to 36 MW.
- Verification of material, O & M and Extra O & M invoices of contractors, such as Siemens.
- Handling of Issues regarding the electrical connection.
- Issues resolution with other different government department i.e. LESCO Wapda.
- Correspondence with executive management of the Organization and outside.
- Regular meetings with high ups for coordination and progress review.

December. 2006 to July 2008 Vocational Training Institute Wazirabad, (PVTC) Lahore

Manager /Principal

- Overall incharge of institute.
- To manage all the activities related to the training & development.
- To make analysis and deal with financial & accounting matters, budgeting, reporting.i.e financial statements etc.
- Being the secretary of selection committee and immediate to all staff,
  Recruitment & performance evaluation of staff and concerned matters
  Directly / indirectly performed by me.
- To run MIS, GL accounting (General ledger) & TP (trainee profile) software successfully with managerial approaches.
- Cost & Quality control of training in all departments ,

- Official correspondence with head office and other government, private offices.
- Events management at district level.
- Conflict resolution among the crew of the Organization.
- Feasibilities of new demand driven trade as per feedback of industries.
- To run the admission campaign in rural and urban areas.
- To attend internal and external audit for the funds.
- To arrange pedagogical training session for the teaching staff.
- Making SWOT analysis of the organization to run the institute more progressively.
- Having the continues meeting of district progress review meeting with collogue and management.
- To procure all the consumable and non consumable items for the institute being chief procurement officer.
- To arrange the funds for the pass outs for the self employment from bait-ul-mall deptt.
- To get funds from provisional Zakat Council and district Zakat Council
- Creating new jobs opportunities for the pass outs by dealing with local Industries with the help of Board of Management.

July, 2003 to September 04 Pakistan Atomic Energy Commission Khushab.

Sr.Tech Electrical

- To manage all site area as general shift incharge,
- New electrical equipment installation testing and commissioning i.e. motors up to 150 H.P (DOL Star Delta and Reveres & forward etc).
- Operation & maintenance of existing equipment such as generator(1500 KVA), induction
- Motors control and power circuit of power & lighting load, checking of panels wiring etc.
- Operation & maintenance of underground electrical system such as H.V & L.V cables, Ring main units (3 way 4 way), pad mounted transformers (200 to 750 Kva), induction & synchrounse Motors.
- Wiring installation testing and commissioning of site workshop.
- Wiring installation testing and commissioning of site offices.
- Earthing & floor grid earthing for protection scheme.
- Earthing & floor grid earthing for protection scheme.
- Report writing about daily activity staff management remained under my supervision.

January 2002 to January 2003 WAPDA LESCO Lahore.

Line Superintendent I

- Technical administration of operation & maintenance all 05 no's 11 KV over head feeder's.
- Operation and maintenance of Low Tension distributing system
- more than five feeders.
- New connection both domestic and industrial (B1, B2, B3) up to 5000 KW.
- Load division & transformers maintenance of (50 KVA to 450 KVA) transformers.
- Follow up duties to control theft of electricity.
- Supervision of Major's complaint handling such as (Feeder Dead Short, feeders break down).
- Designing, laying testing and commissioning of over head 11 KV feeders.
- Store record keeping, bookkeeping and report writing of all activities regarding O & M.
- Meeting with high ups regarding line losses and O & M.
- And all other concerned matters were also remained under my supervision.

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Internships

1. One year internship in Wapda (LESCO) 132kv yard & GIS type grid stations as a Trainee Engineer.

1. Over all assistance in Operation and maintenance of grid station.
2. Monitoring of load management of all 12 no's 11 kv feeders.
3. Operation regarding tape changing for regulation of voltage Variation.
4. Making daily reports for official correspondence.
5. Events Management regarding monthly ,quarterly ,six monthly Maintenance.
6. O/C E/F electromechanical(CDG) and digital Siemens, vamps relay Setting for 11 kv panel with coordination of P & I department.

2. Six month internship in Victoria & Sohail Mechanical complex as Trainee Engineer.

1. Overall supervision of installation, testing and commissioning of water Pumps (submersible etc).
2. Design of motor control and power circuit as per requirement i.e. Star Delta ,reveres Forward and DOL for different site as service engineer.
3. Maintenance of all control and power circuit.
4. Over all supervision of factory based electrical installation and maintenance issues.

3. Three month internship in Tetrapak (packages) as Trainee Engineer.

1. Supervision of all electrical activities under the management of incharge electrical in board mill side.
2. Design of motor control and power circuit as per requirement i.e. D.C series/shunt Thyrister control motor induction motors with inverters control and synchronic motors of Different paper and pulp machines.
3. Installation ,testing ,commissioning of new motors was remained under my Supervision.
4. Repiar and maintenance of different light load circuit were also under my supervision
5. Report Writing of daily activity.

4. Three month internship in ptcl digital exchange shahdra Lahore as Trainee Engineer.

1. Operation and maintenance of 50 KVA generators.
2. Over all look after of fully automatic digital telephonic exchange made Ericson.
3. Attending the in house based complaints regarding communication
3. report writing of daily activities

Languages	English, Urdu and Punjabi.

Summary of Qualifications

Examination	Year	Marks Obtained	Division	University / Board
MBA (HRM)	2007	66%	First	AIOU Islamabad
B.Tech (HONS) Electrical Power	2005	87%	2nd Position	UET Lahore
B.Tech (Pass) Electrical Power	2003	77%	2nd Position	UET Lahore
DAE Electrical	1999	69%	First	PBTE Lahore
Matriculation Science	1995	75%	First	BISE Lahore

Computer Skills	• Having good command on M.S Office professional Window X P and Internet Utilities. • Having Short courses of computer.
Distinction	• Second position in B.Tech (Hons) in UET Lahore • Second position in B.Tech (Pass) in UET Lahore
Courses	• One month managerial training in STTI TEVTA Lahore. • One week managerial competency training in PITAC Lahore.
Running course	• Certification of charted Engineer from City & Gild institute United kingdom (U.K)(online)
Hobbies	• Books reading on Islam & literature.
Reference	• Available according to the requirement.
Other Information	
Father's Name	Amanat Ali
Date of Birth	16 March. 1979
NIC #	35200-1518270-9
Nationality	Pakistani

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Sohail Anwar
Construction Manager

email: sohailanwar554@gmail.com
cnic: 3130331366787
cell: 9203337440071
Disabled: No

Objective

To move up the ranks in an institution of reputation and excellence wherein there is immense room for personal and career development.

Work Experience

Construction Manager at MEP Solutions

06-Aug-2017 - Present

Uploaded Experience

Project Execution and Management. Supervision of Overall MEP Works. Execution of Industrial, Commercial Buildings. Verifications of Sub-Contractors Bills, Execution of Electrical Allied Systems(FAT). Estimating and Costing .Laying HT/LT underground cables .Installation HT/LT Panels. Magering test. On Load and Off Load Earthling test, Installation Commissioning BTD. Excellent Communication Skill. Installation Electrical Lighting Poles.

Punjab Jobs online

Sr. Executive at Huawei Technologies Pakistan (Pvt) Ltd

01-Dec-2015 - 31-Jan-2017

Uploaded Experience

Installation and commissioning of Huawei BTS 3012, 3012AE, 3900, 3900A Installation of ACBS systems and fire alarms boxes. Installation and Commissioning of ATS panels and MV Panels, Installation and testing of power equipment Eltek and Emerson and Surge Protection Device (SPD).

Sr. Executive (AN Ops) at Pak Telecom Mobile Limited (Ufone GSM)

11-Sep-2006 - 30-Nov-2015

Uploaded Experience

Initiate Power Requirement Expansions and prepare RFPs. Scope of Work, Technical Specifications of Products Installation and Commissioning of (Gen Sets) Fire Suppression System, Batteries, UPS, Rectifier Systems, grounding and testing etc. Design, Cultivate & Implement SOPs, Processes & Framework for projects. both in power and electrical equipment with field team. Regular performance monitoring of plans and process to ensure the maximum efficiency.

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Electrical Engineer at Siemens Pakistan Engineering Co. Ltd

01-Jul-2005 - 30-Jun-2006

Uploaded Experience

• Study of electrical design, specification and technical drawings. • Part of my responsibilities to check and review the plans and specifications for the adequate installation of system and quality implementation. • Coordinate with the procurement department to ensure material delivery in time and as per required specification standard quality. • Electrical low voltage devices installation testing and commissioning. • Installation of breaker, MCB, MCCB, DBs, SMDP,ACB, VCB,GENSETS. • Installation of ATS Panels and laying cables according to the load. • Monitoring and supervision of fire alarms. • Monitoring and supervision of structure cabling for Card Access. CCTV cameras & Voice/Data Outlets. • Monitoring and Supervision of high and Low voltage system works. • Monitoring and supervision of Lighting and power works. • Prepare the daily, weekly and monthly progress report. • Attending meetings with clients to monitor project quality and progress BMS Installation commissioning and operation.

Electrical Engineer at Ibrahim Fibers Limited

28-Oct-2003 - 01-Jul-2005

Uploaded Experience

Punjab Jobs online

• Erection of plants and installing power cables. • Monitoring and supervision of cable laying in Trays & underground Trenches. • Programming of PLCs S7 Module • Monitoring and Supervision of Caterpillar Generator • Supervision and monitoring of inverter systems and UPS • Supervision and monitoring HT/LT systems • Management of electrical department • Monitoring and supervision of cable tray works. • Installation and testing ELCB (Earth Leakage Circuit Breaker) • Installation and Supervision of VFD at plant. • Monitoring and Supervision of HVAC system.

Line Superintendent, Grade-I at Pakistan Water and Power Development Authority

01-Jun-2002 - 12-Oct-2002

Uploaded Experience

Installation of Transformers, LT and HT poles, Installation and commissioning capacitor with power Line, Installation of Energy Meters and MDI Meters, Monitor and supervision of Lighting system, Installation and testing CT/PT, Checking of electrical certificates according to the load.

Education

Matric

(Secondary School Certificate)

CURRICULUM VITAE

OBJECTIVE : To seek employment that offers personal and Carrier growth.

PERSONAL INFORMATION :

Name	:	ZIA-UR-REHMAN
Father's Name	:	ABDUL GHAFFAR
Date of Birth	:	11-12-1983
Marital Status	:	Single
Religion	:	Islam
Nationality	:	Pakistani
Domicile	:	Okara (Punjab)
N.I.C. No.	:	35302-5813885-5
Permanent Address	:	House No. 130, Street No. 5, Mohallah Gulraiz Colony Okara
Contact	:	0300-4286665

SYNOPSIS OF QUALIFICATION :

Qualification	Board / University	Marks
Matric	Board of Intermediate & Secondary Education Lahore	512/850
Diploma of Associate Engineer (Electrical)	Punjab Board of Technical Educational Lahore	2220/3550

COMPUTER SKILLS:

- Diploma in Office Management.

EXPERIENCE:

- 2 Years Experience as a Electrical Supervisor in Lika Ice Cream Lahore.

SAMD CONSULTANTS

CURRICULUM VITAE

OBJECTIVE : To seek employment that offers personal and Carrier growth.

PERSONAL INFORMATION :

Name	:	ZIA-UR-REHMAN
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Diploma of Associate Engineer (Electrical)	Punjab Board of Technical Educational Lahore	2220/3550

COMPUTER SKILLS:

- Diploma in Office Management.

EXPERIENCE:

- 2 Years Experience as a Electrical Supervisor in Lika Ice Cream Lahore.

Zia Rehman
10-3-2008

Board of Intermediate and Secondary Education, Bahawalpur

01-Apr-1989 - 31-Jul-1991

Science

Achieved Percentage: 46.11%

Uploaded Degree

DAE (Diploma of Associate Engineering)

(Higher Secondary School Certificate)

Sindh Board of Technical Education

01-Jan-1992 - 04-Aug-1996

Electrical

Achieved Percentage: 82.57%

Uploaded Degree

Bsc (Electrical Engineering)

(Masters Bachelors (Hons))

University of Engineering & Technology, Lahore

01-Sep-1997 - 22-Dec-2001

Electrical

Achieved Percentage: 54.56%

Uploaded Degree

Punjab Jobs online

Training(s)

GSM BSS Training

Huawei University China

18-Dec-2006 - 29-Dec-2006

SAMD CONSULTANTS

HARIS RASHID

Personal Information:	***Present Address:***
S/O: Mr. Abdul Rashid Chughtai	*House#: 338 Lalazar Aslam Shaheed Road,*
Date of Birth: 10/02/1986.	*Rawalpindi , Pakistan*
Langages: English, Urdu.	*Phone # : 0092-051-5513339*
Marital Status: Single.	*Mobile#: 0092-0321-5340532*
Religion: Islam.	*E-mail:* haris_chughtai@yahoo.com

Objective	*To be a constituent of an exceedingly proficient association that relies on top-notch values of skill, excellence and joint effort. I like to accept challenges and deliver on time.*
Experience	*Internship experience in* ***Pakistan Telecom Company Limited.*** • *Worked in New Generation Network (NGN) Department where we make database of NGN Department in C++.*

Education

Session	***Board/University***	***Degree / Certificates***
2004-2009	***CASE** affiliated with **UET TAXILA** Recognized by HEC& PEC*	***B.Sc Electrical Engineering With Specialization in Telecom Engineering.***
2002-2004	*Askari College for boys,Rawalpindi*	*HSSC (Pre Engineering) (Marks=714/1100)*
2002	*F. G.Cantt Public School, Mehfooz Road, Rawalpindi.*	*SSC (Metric) (Marks=567/850)*

Projects

Final Year Project:

Design and Implementation of Solar Tracking System with using GSM.

Semester Projects:

Hardware Designed Projects

- *Using **Microcontroller AT89S52***
  - *Car parking system.*
  - *Car line tracking system.*
- *Audio amplifier*
- *Amplitude Modulator (AM) receiver and transmitter.*
- *Traffic signal control system.*
- *Power supply of 15volt.*
- *Construction of Step down Transformers.*
- *Driver board of dc and ac motor.*

Software Designed Projects

- *Design a GMSK modem in matlab.*
- *Design a database of case library in C++.*

Management-based Project

*Project Planning of "**Water and Power Development Authority (WAPDA)**" Transformer House using MS Project creating GANTT charts & drawing Timeline etc.*

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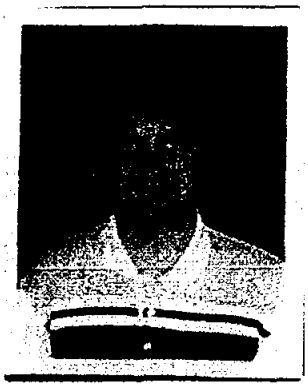
H.A-Chughtai.

Management Subjects Studied	*Entrepreneurship* *Total Quality Management (TQM)* *Engineering Project Management (EPM)* *Principles of Management* *Engineering Economics* *Comm. Skills & Tech. Report Writing,* *Communication Skills etc.*
Major Subjects Studied	*Industrial automation, Embedded Systems Design, Power Electronics, Electronics design and practices, Electromechanical Systems , OOP &Data structure, Network circuit Analysis. Data Communication Network.*
Specialization Subjects Studied	*Telecom switching, Wireless system, Digital communication system, microwave and Antenna design.*
Computer Skills	***Computer Languages:***

C&C++	*Assembly Language*	*AutoCAD*	*Verilog HDL*
Matlab			
Tools Used:			
PCB Express	*Multisim*	*Electronic Workbench*	*PSPICE*
Pic C Compiler	*Mikro C*	*Pic Simulator*	*Cygwin*
Keil uVision	*Xilinx ISE 9.1*	*MS Visual Studio*	*ADS*
MS Office	*MS Visio*	*MS Word*	*MS Project*

Reference	*Will be furnished upon demand.*
Hobbies	*Cricket, Computer, Watching movies.*

H.A Chughtai.



Sarfraz Ali

Flat no 27-F Bank Colony
Rasool Park Ichra Appartments,
Ichra
Lahore
Pakistan

E-mail: sarfraz_22@live.com
Phone: +923228671217

OBJECTIVE

A highly enthusiastic graduate accustomed to work under pressure with the ability to lead looking for the right opportunity to learn and grow with a reputed organization

EDUCATION

MS Engineering Management — **2015 — 2017**
Superior University Lahore

BSc Electrical Engineering — **2010 — 2014**
Superior University Lahore

FINAL YEAR PROJECT

- 3-phase Solar & Wind Tie Inverter

ACHIEVEMENTS

- Participation in Brand Activation Campaign Of Newspaper "Daily Naibaat" Lahore 2012
- Participation in workshop "Art of Scientific Research Paper Writing" Superior University Lahore 2014
- Study tour to "Ghazi Barotha Hydropower Plant KPK" 2014
- Study tour to "PTCL Staff College KPK" 2014

WORK EXPERIENCE

Pak Electron Limited, Lahore — **August 2015 — September 2015**
Internship

Coca Cola Beverages Pakistan Ltd Ryk — **January 2015 — February 2015**
Internship

SKILLS & INTERESTS

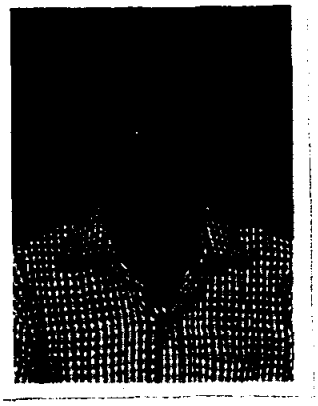
MS Office, MS Project, MS Visio, C++, Music, Painting, Research & Development, Internet Browsing

REFERENCES

Will be provided upon request

SARFRAZ

SAMD CONSULTANTS



Muhammad Hashim Amin

BS Electrical Engineering

Address: House no 10, E-Block MUHAFIZ TOWN, LAHORE, PAKISTAN.
Mobile: 0092-321-3649199
Email: hashim7a@gmail.com

Professional Objective

To pursue a challenging career and be part of a progressive Organization that gives scope to enhance my knowledge, skills and to reach the pinnacle in the computing and research field with sheer determination, dedication and hard work.

Core Areas

Electrical Engineering

Major Courses

- Electric Circuits Analysis
- Electronics
- Computer Programming
- Computer Logic Design
- Electric Machines
- Electro mechanical Systems
- Advance Digital Logic Design
- Signals and Systems
- Digital Signal Processing
- Analogue and digital communication
- Microprocessor Systems and Interfacing
- Feedback Control Systems
- Power electronics
- Industrial automation and process control
- Database management system
- Engineering ethics, management and economics.

Software & Languages

- Proteus
- Logic Works
- visual studio
- MATLAB
- Keil
- XILINX
- AUTO CAD
- Step 7 (Siemens PLC)
- Lab View
- C++,C#
- WinProLadder (Fatek PLC)
- Ladder logic

M. Hashim Amin

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Academic Qualification

Degree	Board/University
BS (Electrical Engineering) (2010-2015)	National university of computers and emerging sciences (FAST-NU) Lahore
F.Sc (Pre Engg) (2007-2009)	Board of Intermediate & Secondary Education Lahore
Matric (Science) (2006)	Board of Intermediate & Secondary Education Lahore

Semester Projects

- Designed and implemented an elevator on ladder logic in industrial process control lab (step 7)
- Designed and implemented a keypad and timer on 8052 microcontroller
- Digital library in C++
- Digital calendar for 50 years in C++
- Designed a battery charger (0-30V)
- Designed a website (Flight Inquiry System) in database management system

Final Year Project

INTELLIGENT-TRAFFIC LIGHT SYSTEM USING PLC

Intelligent traffic light system using PLC and Image Processing in C++ OpenCV. The system is capable of detecting presence and number of vehicles on road and react accordingly After counting number of vehicles the traffic signal will be green for sufficient time to pass the detected vehicles.

Skills

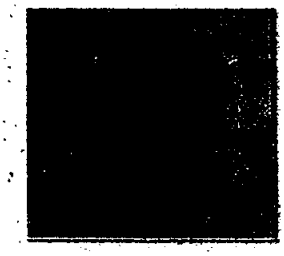
Communication Skills	Good written and Oral communication skills in both English and Urdu.
Interpersonal Skills	Having good sense about code of conduct with different hierarchy of people.
Problem Solving Skills	Working in a team guides me to find solutions to problems in a calm and efficient manner.

M. Hashim Amin

05-Years 12

SYED SANA HAIDER

Mohala Machi wala, Post office Chawinda
Tehsil Pasroor, District Sialkot.
Haider 212 @ Gmail.com
Voice 0333-8628972.



OBJECTIVE

To contribute towards the growth and development of a dynamic organization that offers challenging opportunities and appreciates performance criterion.

EXPERIENCE

September 2005 to February 2006.

Army welfare housing scheme.

Work as electrical sub-engineer in A.K. construction company (Pvt)Ltd. Lahore.
Following project completed my under supervision.

a- Main Road lights completed under my supervision.
b- Main transformer 1500 kva installed with my coordination.

Since March 2006 to date

Presently I am working in Punjab Social Security Health management company since March 2006 and following work done under my supervision and coordination. This project is 200 bedded hospital and teaching institute with cover residential area.

Detail of work

a- Install piping in all roof and wall with 4mm heave wire.
b- Install bear conductor 95mm with 200 ft earth hole for earthling purpose.
c- Install HT penal WAPDA side with coordination WAPDA electrical engineers.
d- Install Transformer 1250 kva with 620mm heave wire attached from HT penal into project Transformer.
e- Install LT penal with different size of wire from project Transformer to LT penal.
f- The above mention project completed according to the electrical consultant and minor addition, alteration, in electrical design modified according to the side requirement by me.

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g- Our company have a 52 residential flats (30 family accommodations and 22 bachelors flats. Which is installed single phase sub electrical meter in every bachelors rooms and family accommodations.

h- End of the month we checked reading of electric meter and unit mention it into READING book and prepared bill unit amount and submit it into Manager Accounts for deduction payment in every person salary.

i- Note:- The above mention post is managerial leave which I am dealing independently and directly report to the Chief Operating Officer either my designation is sub-engineer electrical but I am performing my duties on Head of the department (Electrical)

SAMIN TEXTILE MILLS (PVT.) LTD.

March-2010 since to date:-

- Presently I am working on (Internship as electrical sub engineer) basis in POWER HOUSE. The Power house capacity is 07 MW. (04 engine Gas (Jan backer) and 03 engine is working on Diesel (caterpillar) and I am successfully working / learning in above mention co.

ACADEMIC QUALIFICATION

a- Diploma of associate engineering in electrical.
(Govt Poly Technical Institute Sialkot.
b- Metric with science.

COMPUTER LITERACY

a- 06 months computer training program in Private Institute at Lahore.
b- M.S. Office.
c- Operating Soft ware accordingly.
d- Auto computer added drawings.

PERSONAL PROFILE

a-	Fathers Name	Mr. Syed Atta-U-llah
b-	Date of Birth	June 01-1985.
c-	Domicile	Punjab
d-	NIC	34602-8483090-5

Personal Comments

For somatically and favorable consideration please.

RESUME

HABIB-UR-REHMAN

PERSONAL INFORMATION:

Fathers Name: Ghulam Muhammad

Date of Birth: 23-03-1989

CNIC: 35503-0126214-1

Nationality: Pakistani

Domicile: Sheikhupura (Punjab)

Martial Status: Single

Religion: Islam

MAILING ADDRESS

Marrar Rorlwala chak no 41 /R-b
Teh.Sangla hill Dist:Nankana Sahib

E-MAIL ADDRESS

Habib_pie@yahoo.com

CONTACT

Cell #: 0334-6205145

OBJECTIVE:

I am looking for an environment. Where I may apply and utilize my knowledge to best of my abilities for development and growth of my professional career on the base of my integrity, honesty and hard working.

KEY SKILLS AND ATTRIBUTES

- Multi-Lingual: , Urdu, Punjabi
- Leadership & supervision ability
- Confident communicator: Highly developed clear & concise presentation skills

EDUCATION AND QUALIFICATIONS

- **2004**
  Board of Intermediate & Secondary Education, Lahore
  MATRICULATION
- **2007**
  Punjab Board Of Technical Education, Lahore
  3 year Diploma D.A.E (Electrical) From G c t faisalabad.

COMPUTER SKILLS

- Hardware & Software Repair
- Internet
- Adobe Photoshop
- In Page

PROFESSIONAL & WORKING EXPERIENCE:

- I have worked at many kinds of Gen sets NEQ,OLYMPIAN,POWER TECH,SIEMENS,METS,FG WILSON,IMPAC and lister petter with DSC operating module.
- I have good working experience at many kinds of ATS panels (Ghadder duel PLC,single PLC without PLC,Areena Tech,Hight Tech,Allied Eng.Duel,Combine Eng.Duel and Siemens made).

MASOOD TEXTILE MILLS (PVT)LTD

Worked with Masood Textile as a "Trainee Electrician"

Worked from 2 June 2007 to 31 July 2008 Faisalabad.

3G POWER SERVICES (PVT)LTD.

(Mobilink power operation & Maintenance)

Worked with 3GS as a "Electrical Technician"

Worked from 01 Aug 2008 to 04 Dec 2008.

Job Responsibilities are as under:

- Making schedule maintenance of gensets.
- Attend daily complaints in field related with gensets & ATS panels.
- Repairing all ATS & AMF and distribution panels.

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RESUME

HIGHT TECH ELECTRIC ENGINEERING & SERVICES.
(Warid operation & Maintenance)
Worked with HIGHTECH Eng. & Services as a "Senior Technician" Housing Colony Sheikupura.
From 06 Dec 2008 to 10 Apr 2009.
Job Responsibilities are as under:

- Termination of power cable.
- Installation of components.
- To attend daily complains of site.
- Repairing of breakers and contactors relays.
- Repairing of all kind Gensets modules.
- Maintenance of operating of all Generators.

MOD MECH NGINEERING & SERVICES
Worked With Mod Mech Eng. & services as a "Supervisor" at Mobilink Power Project
Worked form 13Apr2009 to 31Jan2010 in Jhang Region.
JOB RESPONSIBILITIES ARE AS UNDER:

- Programming of power tech,DSC,NEQ,DKG modules and others.
- Installation of electrical components.
- To attend daily complains in field related with genset and ATS panels.
- Making the AMF panels with relays with operating all safeties of genset without any operating module.

IMPERIAL ELECTRIC COMPANY (PVT) LTD.
Worked With Imperial Electric Co. As a Electrician
Worked form 23may2010 to 31March2011.
Job Responsibilities are as under:

- Tasting of gensets and AMF & ATS panels.
- Making ATS & AMF panels.
- Installation of ATS,AMF,distribution and alarms panels.
- Repairing of breakers,contactors and relays.

PUNJAB INDUSTRIAL ESTATES
(DEVELOPMENT AND MANAGEMENT COMPANY)
Worked With PIEDMC As a Electrician
Worked form 05Apr2011 to till now in Sundar Industrial Estate.
Job Responsibilities are as under:

- Termination of HT & LTpower cables.
- Jointing of HT & LT power cables.
- Switching and operating of HT panels.
- Maintenance of Transformers and VCB panles.
- Making of B1,B2,B3,B4 and temporary meters connections.

Curriculum Vitae

Umar Sohail

Objective:

- To work with a well reputed organization where I can use my knowledge and strengths for the betterment of not only my future but also for the betterment of organization.

Personal Detail:

• Father's Name	:	Abdul Khaliq
• Date of Birth	:	02-12-1987
• Gender	:	Male
• C.N.I.C #	:	31304-1143015-9
• Nationality	:	Pakistani
• Marital Status	:	Single
• Address	:	Basti Ali Bakhsh Moza Alipur Tehsil Sadiqabad Distt. Raheem Yar Khan.
• Contact No.	:	0301-3664163

Qualification:

- **Matric**
  Marks: 448/850
  BISE Bhawalpur
- **Electrical Course 2Years**
  Govt. Technical Training Institute Raheem Yar Khan.

Experience:

SIEMENS

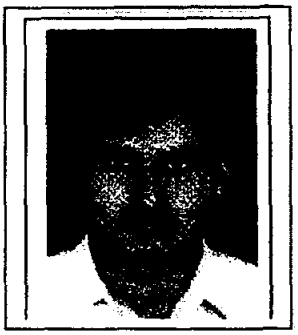
- I have worked as Electrical Supervisor in Siemens Sunder Industrial Estate under Ground Electrification Operation and maintenance Lahore.
- HT cable and LT Cable commissioning termination and cable jointing.
- Maintenance of HT Panel Transformer and Street Lights.
- Termination of transformer HT Panel & Ring Main Unit.

Special Experience:

- HT & LT Cable Lying.
- I well known how to operate cable fault locater & Fault Pin Point.

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Muhammad Khan's Resume



Personal Information

Name	Muhammad Khan
Fathers' Name	Muhammad Ramzan
National ID Card Number	32102-1473730-1
Date of Birth	19th December, 1987
Postal Address	House # E-38 Housing Colony, D G Khan Cement Company D.G.Khan. (Pakistan)
Domicile	Mianwali, Punjab.
Nationality	Pakistani
Religion	Islam
Marital Status	Married
Mobile	+92343-5009839,+92333-8589266

Summary

Over Five years experience.

Experience

	Position	Company	From	To
1.	Supervisor (Electrical)	Siemens Pakistan Engineering Co Ltd,	April,2009	Till date

Job Description

- Project — Mangla Dam Rising Mirpur, Azad Kashmir.
- Client — WAPDA
- Consultant — MJV (Mangla Joint Venture)

Responsibilities

1. Underground HT & LT Distribution Systems.
2. Over Head Works (11 KV and .4 KV Distribution Systems).
3. Over Head Hardware Installation, Transformers Installation (50,100,200,400,630 & 1000KVA).
4. Distribution Box Installation.
5. Maintenance Box Installation.
6. Installation of Load Break Switch Boxes.
7. Glanding of Armored & PVC cables.
8. Termination of Distribution Box, Control Panel, Load Break Switch Box
9. Cable Joint of armored & PVC Cables.
10. Earthing Work.
11. Lighting Work.
12. Lighting Control Panel Installation.
13. Light Pole Erection.
14. IPC (Intern Payment Certificate) Work.
15. Request making.
16. Dealing with Consultant.

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	Position	Company	From	To
2.	Electrician	D G Cement Pvt. Ltd. Pakistan	Oct,2007	March,2009

Job Description

- Project Electrification on Cement Mill # 3.

Responsibilities

1. HT Panel Installation.
2. Distribution Box Installation.
3. Maintenance Box Installation.
4. Glanding of Armored & PVC cables.
5. Termination of Distribution Box.
6. Cable Joint of armored Cable and PVC Cables.
7. Motor Connection.
8. Earthing.
9. Lighting Works.
10. Lighting Control Panel Installation.
11. SD And SA Box Installation.
12. Cable Tray Installation.
13. Cable Laying (Power & Control Cables).
14. Erection of Lighting Poles.
15. Fuse Welding.
16. Control Termination.
17. Installation of Rope Switch.

Academic

	Degree	Institution	Year	Marks Obtained %	Division
1.	DAE	Punjab Board of Technical Education Lahore.	2007	77%	1st
2.	Matriculation	BISE, Dera Ghazi Khan.	2004	77%	1st

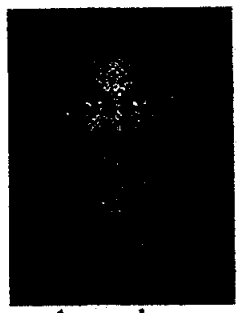
Skills

	Skill	Last Used	Year of Experience
1.	Microsoft Office	Currently using	4
2.	Typing	Currently using	4
3	Photoshop Designing	Currently using	4
4.	Email & Internet	Currently using	4
5.	AutoCAD	Currently using	4

Language

	Language	Proficiency
1.	English	Intermediate
2.	Urdu	Expert
3.	Saraiki	Expert

GHAZANFAR ALI



Cell # 0332-6090294
E-mail: ghazanfar5912@yahoo.com
Postal Add: H# 537-Cnear Hadria Mosque gulgasht colonyMultan

OBJECTIVE

Seeking a challenging and rewarding position in a dynamic organization where my qualification and work experience can be effectively utilized.

EXPERIENCE

- **Oct 2009 to Apr 2013** with Engro Foods Pvt Ltd as a EST(Engineering services Technician).
- **May 2013 to April 2016**with Nestle Pakistan Limited as a **FMS (Field Maintenance Staff).**

PERSONAL DATA

Father Name:	Syed Ashraf Abbas Naqvi
Date Of Birth:	23-05-1986
Religion:	Islam
CNIC #	36302-2813901-9
Domicile:	Multan(Punjab)
Marital Status:	Married

QUALIFICATION

DEGREE	YEAR	DIVISION	BOARD
B.TECH(ELT)	2015	3.5GP	GLOBAL INSTITUTE LAHORE
D.A.E(ELECTRICAL)	2009	1ST	KARACHI BOARD
MATRIC	2003	2ND	B.I.S.E MULTAN

Reference

Will be provided on Demand

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MUHAMMAD IRFAN
Cell: 03036505104
Address: Chak No 29 BC Tasil Bahawalpur

Personal Information

CNIC: 31202-7051186-9
Address: Chak No 29 BC Tehsil Bahawalpur
Marital status: Married

Objective

Seeking a challenging position in a highly professional organization in the field of Electrician which encourage continuous learning and creativity, provides exposure to new ideas and stimulates professional and personal growth.

Qualification

Under Matriculation

Professional Experience

Supervisor Electrical **PIEDMC** (2017 to Continue)

Installed and maintained commercial electrical systems.

Troubleshot and repaired issues, interpreting blueprints

Employ **PIEDMC** (2014 to 2017)

Experienced electrician adept at installing and maintaining commercial electrical systems. Proven track record in optimizing energy efficiency and ensuring project completion ahead of schedule

Employ **ADVANCED ELECTRONIC** (2012 to 2014)

Responsibilities

- **Project Oversight:** Supervise electrical projects from planning to completion, ensuring adherence to timelines and budgets.
- **Team Leadership:** Provide guidance and leadership to a team of electricians, assigning tasks and managing work schedules.
- **Quality Assurance:** Conduct inspections to ensure that electrical installations meet industry standards and project specifications.
- **Safety Management:** Enforce and promote safety protocols, conducting regular safety meetings and ensuring compliance with regulations.
- **Resource Allocation:** Efficiently allocate manpower and resources to maximize productivity and meet project goals.
- **Client Interaction:** Communicate with clients to understand project requirements, address concerns, and provide progress updates.

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- **Training and Development:** Mentor and train electricians, ensuring their skills align with project demands and industry advancements.
- **Problem Resolution:** Act as a point of contact for addressing and resolving issues that arise during project execution.
- **Budget Management:** Monitor project expenses, control costs, and seek cost-effective solutions without compromising quality.
- **Documentation:** Maintain accurate records of project milestones, expenditures, and any changes to project scope.

Key skills

- Project Management
- Team Collaboration
- Team Management
- Decision-Making
- Good Communication
- Time Management
- Clint Relation
- Technical Expertise
- Safety Management
- Problem-Solving

Language

- Punjabi
- Saraiki
- Urdu
- English

Reference

Reference will be provided on demand

22-11-2023

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For The Post of Electrician

MUHAMMAD IJAZ

Address:- shah Ghar, Post office Tranda Saway Khan,
Rahim Yar Khan. Punjab Pakistan
Mobile +92-301-7157595

OBJECTIVE

To obtain a challenging position with an organization, where I can apply my intensive training and skills to grow professionally as well as to pursue a career in progressive organization that provided job opportunities for career growth and professional development.

PROFESSIONAL EXPERIENCE

Company: -	MESI Enterprises
Post:-	Electrician
Projects:-	Income Tax Building, Lahore, Islamabad, Faisalabad
Nature of Job.	Maintenance of electrical circuits,
	Maintenance of UPS
	Installation of electrical circuits, DB's & LT Panels.
	Installation & Termination of LT Panels.
	Electrical wiring installation single phase & three phase
	Installation of Cable Tray & Cable Ladder.
	Laying of LT & HT Cable.

Company: -	Quality Private Limited
Post:-	Electrical Supervisor
Project:-	Income tax building Gujranwala
	Lahore Garments City Sundar Industrial Estate
	Sialkot dry port
	Wagah Railway Station.
Nature of Job:-	Installation of Cable Tray & Cable Ladder.
	Installation & Termination of LT / HT Panels.
	Installation & Termination of LT / HT Kits.
	Internal and external electrification.
	Installation of street lighting panels
	Installation of Vice data system
	Installation of fire alarm system

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Company: -	MESI Enterprises
Post:-	Senior Electrical Supervisor
Project:-	Allied Bank Head Office Garden town Lahore
	Kalma Chowk Flyover Lahore
	Bus rapid transit system Lahore
	Commercial Area Sunder Industrial Estate Lahore
	NESPAK House Lahore
	MES Military Engineer Service Lahore
	Water Treatment Plant Rahim Yar Khan
	Sui Northern Gas Pipeline Multan
	Guddu Barrage Kashmore
Nature of Job:-	Maintenance of electrical circuits ,
	Maintenance of UPS
	Installation of electrical circuits, DB's & LT Panels.
	Installation & Termination of LT Panels.
	Electrical wiring installation single phase & three phase
	Installation of Cable Tray & Cable Ladder.
	Laying of LT & HT Cable

Technical Education & Training

2 Year Electrical Diploma Govt. of the Punjab Trade Testing Board.

Academic qualification

Metric from BISE Bahawalpur (1998)

Personal

DOB	1981
Father Name	Muhammad Boota
Nationality	Pakistan
CNIC #	31303-3342897-7
Marital status	Married
Religion	Islam

IHTISHAM ALI

Contact No. +92-0345-7973519

PERSONAL INFORMATION

0345-5848579

⇨ Father's Name	:	Liaqat Ali
⇨ Domicile	:	Toba Tek Singh (Punjab)
⇨ Nationality	:	Pakistani
⇨ Religion	:	Islam
⇨ Date of Birth	:	09-04-1993
⇨ CNIC	:	33303-8013517-1
⇨ Address	:	Chak No. 519 GB, P/o Same, Tehsil & District Toba Tek Singh (Punjab)

CARRIER OBJECTIVE

⇨ To secure a position that offer challenge, growth and an opportunity to assume responsibility and exercise impendent judgment.

QUALIFICATIONS

CERTIFICATE/ DEGREE	SUBJECT	MARKS	PASSING YEAR	BOARD/UNIVERSITY
Matriculation	Science	634/1050	2009	BISE Faisalabad
D.A.E	Electronics	2241/3350	2013	PBTE Lahore

EXPEREICEN

Sub Engr.

01-01-14

- Worked as a **"Technician"** at Arshman Medical Traders T.T. Singh since 05-03-2013 to 31-03-2014. 25-06-14
- Worked as a **"Helper"** at Electro motion Lahore for 6 MONTHS.

COMPUTER SKILLS

- MS Office
- Internet + E-Mail
- Basic knowledge of Computer

LANGUAGE

- English
- Urdu

REFERENCE

- Reference will be furnished on demand.

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Muhammad Atif Ibrahim



Objective

Seeking a challenging position in prestigious organization where education,professional training,experience and commitment to excellence will be utilized.

Personal information

Date of birth: 10/09/1990
Place of birth: Lahore, Pakistan.
Address: Ahmad pur (Haveli Gaythyan Wali) P/O Raja jang District kasur.
Country: Pakistan
CNIC number: 35102-9045080-7
Passport number: BH1020801
Phone number: 03324390409
Email: mmmatif786@gmail.com

EDUCATION

(Aug- 2007)

- Matric in Science
  Christion Institute Raiwind.

CERTIFICATIONS / TRAININGS

(Aug2009-Aug2010)

- **Diploma in Computer Science (DCS)**
  Akbar Commercial & Computer College, Raiwind, Pakistan.

(2012-2014)

- **Diploma in Industrial Electrical (Two years)**
  Skill Development Council Lahore.

COMPUTER SKILLS

- Hardware & Software Repair
- Micosoft Windows 98/2000/Xp/Vista/7/8
- Microsoft Office 2003/2007/2010/2013/2015
- Internet
- Adobe Photoshop
- Coral Draw
- In Page

LANGUAGE SKILLS

- URDU (Fluently Read/Write/Understand)
- English (Fairly Read/Write/Understand)
- Punjabi (Fairly Read/Write/Understand)

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PERFOSIONAL & WORKING EXPERINCE

(10,sep,2009 to April,04,2011)

NORTHERN ENGINEERING CORPORATION

(CONSULTANT-CONTRACTOR-OPERATION AND MAINTENANCE SERVICES)

WORKED WITH NORTHERN ENGINEERING CORPORATION AS A ELECTRICIAN

WORKED FORM 05,SEP,2009 TO 04,APRIL,2011 IN NORTHERN ENGINEERING CORPORATION LAHORE .

(April,05,2011 to Till now)

PUNJAB INDUSTRIAL ESTATES

(DEVELOPMENT AND MANAGEMENT COMPANY)

WORKED WITH PIEDMC AS A ELECTRICAL HELPER

WORKED FORM 05,APRIL,2011 TO TILL NOW IN SUNDAR INDUSTRIAL ESTATE.

JOB RESPONSIBILITIES ARE AS UNDER:

- ATTEND THE ALL TYPES OF ELECTRICAL COMPLAINTS.
- TERMINATION OF HT & LT POWER CABLES.
- JOINTING OF LT POWER CABLES.
- SWITCHING AND OPERATING OF HT & LT PANELS.
- MAINTENANCE OF TRANSFORMERS AND VCB PANELS.
- INSTALLATION OF CONNECTIONS B1,B2,B3, AND TEMPORARY METERS.



MALIK ABDUL REHMAN
Cell: 031390600, 03007027593
Email: malikabdulmalikrehman@345gmail.com
Address: Basti Kukraa Mouza Banga
Tehsil & Distt Bahawalpur

Personal Information

CNIC: 31202-8758505-1
Address: Basti Kukraa Mouza Banga Tehsil & Distt Bahawalpur
Marital status: Married

Objective

Seeking a challenging position in a highly professional organization in the field of Electrician which encourage continuous learning and creativity, provides exposure to new ideas and stimulates professional and personal growth.

Qualification

Matriculation (Science) **(2011-2013)**
Punjab Board

Professional Experience

Electrician **PIEDMC** (April,2017 to Continue)

Installed and maintained commercial electrical systems.

Troubleshot and repaired issues, interpreting blueprints

Employ **SPARCO** (2015 to 2017)

Responsibilities

- Conduct routine inspections to identify and rectify electrical malfunctions or potential hazards.
- Collaborate with construction teams to plan and execute wiring installations in new buildings.
- Upgrade and replace outdated electrical components to meet current codes and standards.
- Respond promptly to emergency calls for repairs and provide effective solutions.
- Stay abreast of industry developments and incorporate new technologies for enhanced system performance.
- Collaborate with clients to understand their electrical needs and provide efficient solutions.
- Maintain accurate records of installations, repairs, and inspections for documentation purposes.
- Train and mentor apprentices, ensuring a skilled and knowledgeable workforce.

Key skills

- Electrician
- Teamwork
- Document controller
- Good Communication
- Time Management

Malik A Rehman
22/4/2023

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- Problem solving
- Technical Proficiency
- Safety Compliance

Language

- Punjabi
- Saraiki
- Urdu
- English

Reference

Reference will be provided on demand

Malik A. Rehman
22-11-2023

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For The Post of Electrician

MANZOOR YAQOOB

Address:-Chak No134/16-L Janubi,Tehsil Mian Channu District Khanewal
Mobile: - +92344-7358829, +923064325478

OBJECTIVE:-

To obtain a challenging position with an organization, where I can apply my intensive training and skills to grow professionally as well as to pursue a career in progressive organization that provided job opportunities for career growth and professional development.

PROFESSIONAL EXPERIENCE:-

Company: -	M/S (SKB) Saad ullah khan and Brothers,
Post: -	Electrician.
Nature of Job: -	Maintenance of electrical circuits,
	Installation of electrical circuits, DB's & LT Panels.
	Installation & Termination of LT/ HT Panels.
	Electrical wiring installation single phase & three phase
	Installation of Cable Tray.
	Laying of LT & HT Cable.

Company: -	Qalat Resident Office Afghanistan Engineer District
Post: -	Power Electrician
Nature of Job: -	Maintenance of electrical circuits,
	Maintenance of UPS,
	Installation of electrical circuits, DB's & LT Panels.
	Installation of LT Panels.
	Electrical wiring installation single phase & three phase

Technical Education & Training:-

2 Year Electrical Diploma Govt. of the Punjab Trade Testing Board.

Academic qualification:-

Metric from BISE Multan (2002)

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December 14, 2023

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

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TECHNICAL AND FINANCIAL PROPOSAL IN REASONABLE DETAIL FOR THE OPERATION, MAINTENANCE, PLANNING & DEVELOPMENT OF THE FACILITY AT BAWALPUR INDUSTRIAL ESTATE

MASTER PLANNING AND DETAILED DESIGNING FOR DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

11 kV OVERHEAD (HT/LT) EXTERNAL ELECTRIFICATION & ROAD / STREET LIGHTING NETWORK

DETAIL DESIGN

DESIGN REPORT

SEPTEMBER, 2023

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
NESPAK House 1-C Block N, Model Town Extension Lahore

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11 kV OVERHEAD (HT/LT)
EXTERNAL ELECTRIFICATION

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DESIGN BASIS AND CRITERIA

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PROJECT : MASTER PLANNING AND DETAILED DESIGNING FOR DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

LOCATION : BAHAWALPUR INDUSTRIAL ESTATE

BACKGROUND

Punjab Industrial Estate Development and Management Company (PIEDMC) is a company wholly owned by Government of Punjab and tasked to develop and manage industrial estates or economic zones in the province. Government of the Punjab has assigned to develop economic zones across the length and breadth of the province so that economic developments reach every segment of the whole population.

GENERAL

This section covers the Preliminary load estimation and preliminary design of electrical works required for Special economic zone of Bahawalpur Industrial Estate.

The design aspects of external electrification i.e. Distribution network of 11kV (HT/ LT) system, inside the Industrial Economic Zone. The 11 kV network for the scheme shall be fed from the nearby existing 132/11 kV substation. This report pertains to the Fifteen Numbers (15) numbers of 11 kV feeder. The proposed electrification system, HT/LT network has been planned overhead.

SALIENT FEATURES

The electrical features which shall be provided in economic zone are as:

1) 11kV Overhead Network (HT/LT) Network within the project premises.
2) Road/ street lighting network based on LED lights.

DESIGN CONCEPT

The entire 11kV Overhead HT/LT (11/0.415 kV) distribution network shall be laid in economic zone so as to provide distribution system to feed the industry. The primary 11kV power supply from the grid station through overhead conductor for onward feeding of 11/0.415 kV pole/pad mounted transformers for each facility. The 11kV

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network for the project shall be fed from the existing or proposed 132/11 kV substation. The electrification system, HT/LT network has been planned overhead. All LT network has been proposed overhead with AAC ANT only for Street lighting network has been proposed overhead conductor on HT poles. The HT distribution network have been designed in conformity to WAPDA /MEPCO standard. Distribution transformer shall be removed. From each outgoing MV panels installed at 132/11kV Grid Station, a primary MV cable feeder comprising of three (03) No's, 1 core 500 mm^2 (8.7/15kV) 11kV single core XLPE aluminum stranded conductor will emanate and shall be buried directly in the underground trenches upto HT poles installed in each of the respective feeders of the zone.

DESIGN FEATURES

The Industrial Economic Zone comprises of different sizes of Industrial plots has been fully followed and expected load has been assessed in light of the specified unit loading criterion. The following connected load criteria have been followed:

Sr. No.	Category	Electrical Load
1.	Industrial 0.5 Acer	100 kVA
2.	Industrial 1.0 Acer	200 kVA
3.	Mosque	0.015 W/ft^2
4.	Commercial	10 W/ft^2
5.	Society Office	07 W/ft^2
6.	Civic Centre	07 W/ft^2
7.	Shops	10 W/ft^2

The covered area and proposed electrical loading criteria for the disposal station, water works and parks etc. are given in the feeder transformer loading chart. The design factors considered are 1.25 diversity factor, 85% power factor and 75% development factor for 10 years. Load for those plots not covered under the criteria of WAPDA/MEPCO has been worked out on proportionate basis and accordingly the capacity of distribution transformers has been proposed. However, plot wise estimated industrial electrical load requirements for the project area given in the

transformer loading sheet (Attached), calculated using 100kVA per half Acre (0.5) in light of the meeting along with Client at PIE, Office, Lahore.

POWER FACTOR

In general, the power factor of 0.85 have been taken in electrical power estimation for industrial and other areas of the project.

ELECTRICAL LOADS

Based upon the load demand parameters, load estimation for different sizes of industrial plots alongwith criterion for assessment of load demand for Allied Buildings is given in transformer loading sheet (attached). The total estimated load for the Industrial Park has been calculated 69.90 MW / 82.23 MVA, an independent 132 kV Grid Station will be required in the Industrial Zone to supply electrical power to various load centers. The total estimated load shall be fed from independent 15 No.'s 11kV primary/trunk feeders with average capacity of 4.2 - 4.6 MW for each 11kV feeder.

ROAD / STREET LIGHT NETWORK

The Energy Efficient LED street light fixtures of suitable wattages to achieve lighting outputs in accordance with latest applicable international standards shall be provided. Separate 25 kVA pole mounted transformers is proposed to feed the proposed Road/street lighting system. The road lights shall be fed through light control panels, which can be fed from distribution transformers. The street light control panels comprising of control devices such as photo electric and time switch, control the on/off functions of street lighting through magnetic contactors. In case, where space is constrains, street lighting shall be proposed on HT poles with extension arm bracket of 3 meter with suitable wattage of LED. However, where HT poles are not installed, dedicated 10/12 Meters single or double arms shall be proposed to feed the Road/street lighting Pole arm extension shall be 1.0 - 1.25 meter with average luminance of 1.0 - 1.5 cd/sqm^2. The wattage of LED shall be 90, 120 and 150 Watts depending on ROW of the Roads.

TRANSFORMERS LOADING SHEET

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[redacted]FRASTRU[redacted]RE DEVELOPMENT OF BAHAWALPUR [redacted]STRIAL ESTATE
CHART FOR LOADING OF TRANSFORMER[redacted]

																							Total Diversified Load in Amps =						3575
		DEMAND							DETAIL OF COMMERCIAL/OTHER LOAD										Diversified		Total Diversified								
		Derails of Industrial Plots																	Load		Load								
Sr. No.	Feeder #	0.5 Acer 100 kVA	1 Acer 200 kVA	1.5 Acer 300 kVA	2 Acer 400 kVA	2.5 Acer 500 kVA	3 Acer 600 kVA	Total kVA	Name/ Description	Area of Plot	Area of Plot	No. of Floor	Max. Ground Covered Area	Total Covered Area	KW/ Sqft.	No. of Plot	Total Load (KW)	Inds. Plots P.F=0.85 (kW)	Comm/ others (kW)	(kW)	PF=0.85	T/F loading on 80%	Proposed Capacity of T/F	Sub-Total	Total	Detail of Plots/Area to be fed from this T/F		
		No.	No.	No.	No.	No.	No.	A		Acer	Sqft.		(%)	Sqft.			B	C=Ax0.85	D=Bx0.9	E=C+D	F=E/0.85	G=Hx0.8	H	KW	MW= kW/1000			
1			2					400	OHWT								136	340	122	462	544	1000	1250			17G, 18G, OHWT		
2		4						400										340		340	400	600	750			23G - 26G		
3		1	3					700										595		595	700	1000	1250			19G - 21G, 22G		
4			4					800										680		680	800	1000	1250			1F - 4F		
5		4						400										340		340	400	600	750	4457	4.46	40F - 43F		
6			4					800										680		680	800	1000	1250			5F - 8F		
7			4					800										680		680	800	1000	1250			9F - 12F		
8		4						400										340		340	400	600	750			36F - 39F		
9									Grid Station								340		306	340	400	400	500			Grid Station		
1		3						300										255		255	300	600	750			33F - 35F		
2			4					800										680		680	800	1000	1250			20F - 23F		
3			4					800										680		680	800	1000	1250			17F - 19F		
4			4					800										680		680	800	1000	1250	4420	4.42	13F - 16F		
5		3						300										255		255	300	600	750			30F - 32F		
6			4					800										680		680	800	1000	1250			26F - 29E		
7			3					600										510		510	600	1000	1250			27F - 29F		
8			4					800										680		680	800	1000	1250			24F - 26F		
1			4					800										680		680	800	1000	1250			1E - 4E		
2			4					800										680		680	800	1000	1250			5E - 8E		
3			4					800										680		680	800	1000	1250			22E - 25E		
4			4					800										680		680	800	1000	1250	4080	4.08	18E - 21E		
5			4					800										680		680	800	1000	1250			34E - 37E		
6			4					800										680		680	800	1000	1250			30E - 33E		
1			4					800										680		680	800	1000	1250			14E - 17E		
2			3					600										510		510	600	1000	1250			38E - 40E		
3			4					800										680		680	800	1000	1250			53E - 56E		
4			4					800										680		680	800	1000	1250	4590	4.59	[redacted]57E [redacted]60E		

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[redacted]RASTRU[redacted]RE DEVELOPMENT OF BAHAWALPUR I[redacted]TRIAL EST[redacted]TE
CHART FOR LOADING OF TRANSFORMER[redacted]

																			Total Diversified Load in Amps =					3575
		DEMAND							DETAIL OF COMMERCIAL/OTHER LOAD									Diversified Load		Total Diversified Load					
Sr. No.	Feeder #	Derails of Industrial Plots 0.5 Acer 100 kVA	1 Acer 200 kVA	1.5 Acer 300 kVA	2 Acer 400 kVA	2.5 Acer 500 kVA	3 Acer 600 kVA	Total kVA	Name/ Description	Area of Plot	Area of Plot	No. of Floor	Max. Ground Covered Area	Total Covered Area	KW/ Sqft.	No. of Plot	Total Load	Inds. Plots P.F=0.85	Comm/ others	(kW)	PF=0.85	T/F loading on 80%	Proposed Capacity of T/F	Sub-Total	Total	Detail of Plots/Area to be fed from this T/F
		No.	No.	No.	No.	No.	No.	A		Acer	Sqft.		(%)	Sqft.			B	C=Ax0.85	D=Bx0.9	E=C+D	F=E/0.85	G=Hx0.8	H	KW	MW= kW/1000	
5			4					800										680		680	800	1000	1250			41E - 43E, 48E
6	#04		4					800										680		680	800	1000	1250			49E - 52E
7			4					800										680		680	800	1000	1250			44E - 47E
1			4					800										680		680	800	1000	1250			1B - 4B
2			4					800										680		680	800	1000	1250			5B - 8B
3			4					800										680		680	800	1000	1250			9B - 12B
4			3					600										510		510	600	1000	1250	3910	3.91	13B, 65B, 66B
5	#05		4					800										680		680	800	1000	1250			67B - 70B
6			4					800										680		680	800	1000	1250			1D - 4D
1			4					800										680		680	800	1000	1250			11G - 14G
2		4						400										340		340	400	600	750			42A - 45A
3		3						300										255		255	300	600	750			39A - 41A
4									Truck Stand	3.6	129,600							250		250	294	400	500			Truck Stand
5			3					600										510		510	600	1000	1250			29A - 31A
6			3					600										510		510	600	1000	1250	4755	4.76	26A - 28A
7			4					800										680		680	800	1000	1250			11A - 14A
8	#06		4					800										680		680	800	1000	1250			7A - 10A
8			3					600										510		510	600	1000	1250			4A - 6A
1			2					400										340		340	400	1000	1250			15G - 16G
1			4					800										680		680	800	1000	1250			27G - 30G
2		1	3					700										595		595	700	1000	1250			31G - 34G
3		3						300										255		255	300	600	750			35G - 37G
4		4						400										340		340	400	600	750			38G - 41G
5		4						400										340		340	400	600	750	5220	5.22	42G - 45G
6	#07	3						300										255		255	300	600	750			46G - 48G
7		3						300										255		255	300	600	750			49G - 51G

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FRASTRU[illegible]RE DEVELOPMENT OF BAHAWALPUR [illegible]STRIAL ESTATE
CHART FOR LOADING OF TRANSFORMER

Total Diversified Load in Amps =	3575

Sr. No.	Feeder #	DEMAND: Details of Industrial Plots 0.5 Acer 100 kVA (No.)	1 Acer 200 kVA (No.)	1.5 Acer 300 kVA (No.)	2 Acer 400 kVA (No.)	2.5 Acer 500 kVA (No.)	3 Acer 600 kVA (No.)	Total kVA (A)	DETAIL OF COMMERCIAL/OTHER LOAD: Name/ Description	Area of Plot (Acer)	Area of Plot (Sqft.)	No. of Floor	Max. Ground Covered Area (%)	Total Covered Area (Sqft.)	KW/ Sqft.	No. of Plot	Total Load (KW) (B)	Diversified Load: Inds. Plots P.F=0.85 (kW) C=Ax0.85	Diversified Load: Comm/ others (kW) D=Bx0.9	Total Diversified Load: (kW) E=C+D	Total Diversified Load: PF=0.85 F=E/0.85	T/F loading on 80% G=Hx0.8	Proposed Capacity of T/F H	Sub-Total KW	Total MW= kW/1000	Detail of Plots/Area to be fed from this T/F
8									CETP									2500		2500	2941					CETP
1									Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750			26J - 33J
2									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			34J - 42J
3									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			43J - 51J
4									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			52J - 60 J
5									Commercial		1,125	4	100%	4,500	0.010	7	315		284	284	334	600	750			70J - 76J
6									Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750	3443	5.22	61J - 68 J
7									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			77J - 85J
8									Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750			1J - 7J , 69J
9									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			8J - 16J
10									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			17J - 25J
1									Vocational Training Institute	1.2	43,200	2	60%	51,840	0.007	1	363		327	327	384	400	500			Vocational Training Institute
2			3					600										510		510	600	1000	1250			27B - 29B
3			4					800										680		680	800	1000	1250			41B - 44B
4			3					600										510		673	792	1000	1250			30B - 32B
									Masjid	1.2	43,200	1	60%	25,920	0.007	1	181		163					4570	4.57	Masjid
5			3					600										510		510	600	1000	1250			33B - 35B
6			3					600										510		510	600	1000	1250			36B, 39B, 40B
7			4					800										680		680	800	1000	1250			37B, 38B 49B, 50B
8			4					800										680		680	800	1000	1250			45B - 48B
1			4					800										680		680	800	1000	1250			51B - 54B
2			4					800										680		680	800	1000	1250			1C - 4C
3			4					800										680		680	800	1000	1250			5C - 8C
4			4					800										680		680	800	1000	1250	4590	4.59	9C - 12C
5			4					800										680		680	800	1000	1250			13C - 16C
6			4					800										680		680	800	1000	1250			17C - 20C
7			3					600										510		510	600	1000	1250			18D - 20D

Feeder # 09

Feeder # 10

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[redacted]FRASTRU[redacted]RE DEVELOPMENT OF BAHAWALPUR[redacted]STRIAL ESTATE
CHART FOR LOADING OF TRANSFORMER[redacted]

																									Total Diversified Load in Amps =				3575
		DEMAND							DETAIL OF COMMERCIAL/OTHER LOAD									Diversified Load		Total Diversified Load								
Sr. No.	Feeder #	Details of Industrial Plots							Name/ Description	Area of Plot	Area of Plot	No. of Floor	Max. Ground Covered Area	Total Covered Area	KW/ Sqft.	No. of Plot	Total Load	Inds. Plots P.F=0.85	Comm/ others			T/F loading on 80%	Proposed Capacity of T/F	Sub-Total	Total	Detail of Plots/Area to be fed from this T/F
		0.5 Acer 100 kVA	1 Acer 200 kVA	1.5 Acer 300 kVA	2 Acer 400 kVA	2.5 Acer 500 kVA	3 Acer 600 kVA	Total kVA									(KW)	(kW)	(kW)	(kW)	PF=0.85					
		No.	No.	No.	No.	No.	No.	A		Acer	Sqft.		(%)	Sqft.			B	C=Ax0.85	D=Bx0.9	E=C+D	F=E/0.85	G=Hx0.8	H	KW	MW= kW/1000	
1	Feeder #11		4					800										680		680	800	1000	1250	4760	4.76	23B - 26B
2			4					800										680		680	800	1000	1250			19B - 22B
3			4					800										680		680	800	1000	1250			15B - 18B
4			4					800										680		680	800	1000	1250			14B, 62B - 64B
5			3					600										510		510	600	1000	1250			55B - 57B
6			3					600										510		510	600	1000	1250			58B, 59B, 61B
7			3					600										510		510	600	1000	1250			60B, 71B, 72B
8			3					600										510		510	600	1000	1250			5D - 7D
1	Feeder #12		3					600										510		510	600	1000	1250	4590	4.59	11D - 13D
2			3					600										510		510	600	1000	1250			8D - 10D
3			4					800										680		680	800	1000	1250			14D - 17D
4			3					600										510		510	600	1000	1250			9E - 11E
5			3					600										510		510	600	1000	1250			12E, 13E, 61E
6			4					800										680		680	800	1000	1250			21D - 24D
7			4					800										680		680	800	1000	1250			25D - 28D
8			3					600										510		510	600	1000	1250			29D - 31D
1	Feeder #13								Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750	4577	4.58	117H - 124H
2									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			59H - 67H
3									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			50H - 58H
4									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			41H - 49H
5									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			32H - 40H
6									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			147H - 153H
7									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			154H - 161H
8									Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750			23H - 31H
9									Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750			162H - 169H
10									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			14H - 22H
11									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			170H - 177H
12									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			5H - 13H

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INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE
CHART FOR LOADING OF TRANSFORMERS

																									Total Diversified Load in Amps =			3575
		DEMAND							DETAIL OF COMMERCIAL/OTHER LOAD									Diversified Load		Total Diversified Load							
Sr. No.	Feeder #	Derails of Industrial Plots 0.5 Acer 100 kVA	1 Acer 200 kVA	1.5 Acer 300 kVA	2 Acer 400 kVA	2.5 Acer 500 kVA	3 Acer 600 kVA	Total kVA	Name/ Description	Area of Plot	Area of Plot	No. of Floor	Max. Ground Covered Area	Total Covered Area	KW/ Sqft.	No. of Plot	Total Load (KW)	Inds. Plots P.F=0.85 (kW)	Comm/ others (kW)	(kW)	PF=0.85	T/F loading on 80%	Proposed Capacity of T/F	Sub-Total	Total	Detail of Plots/Area to be fed from this T/F
		No.	No.	No.	No.	No.	No.	A		Acer	Sqft.		(%)	Sqft.			B	C=Ax0.85	D=Bx0.9	E=C+D	F=E/0.85	G=Hx0.8	H	KW	MW= kW/1000	
13									Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750			139H - 146H
1			3					600										510		510	600	1000	1250			1G - 3G
2									Petrol Pump	0.5	18,000	1	60%	10,800	0.007	1	76		68	68	80	200	250			Petrol Pump
3									Admin	0.82	29,520	2	60%	35,424	0.007	1	248		223	223	263	400	500			Admin
4									1122 Center	1.0	36,000	2	60%	43,200	0.007	1	302		272	272	320	400	500			1122
5			3					600	Gas SMS									510		510	600	1000	1250			1A - 3A
6									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			86H - 94H
7									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750	4297	4.30	77H - 85H
8									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			68H - 76H
9									Commercial		1,125	4	100%	4,500	0.010	6	270		243	243	286	600	750			125H - 130H
10									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			108H - 116H
11									Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750			131H - 138H
12									Commercial		1,125	4	100%	4,500	0.010	9	405		365	365	429	600	750			99H - 107H
13									Commercial		1,125	4	100%	4,500	0.010	8	360		324	324	381	600	750			95H - 98 H,1H - 4H
1			4					800										680		680	800	1000	1250			7G - 10G
2									Sports Complex	2.7	97,200	2	60%	116,640	0.007	1	816		735	735	865	1000	1250			Sports Complex
3			3					600										510		510	600	1000	1250			4G - 6G
4			3					600										510		510	600	1000	1250			36A - 38A
5			4					800										680		680	800	1000	1250	4985	4.98	32A - 35A
6			4					800										680		680	800	1000	1250			22A - 25A
7			4					800										680		680	800	1000	1250			18A - 21A
8			3					600										510		510	600	1000	1250			15A - 17A
									Tubewell	8								100		800	941			800	0.80	Tubewell
									Street Lighting									75		75	88			75	0.08	Street Lighting
TOTAL		44	281					60,600										54,435	12,949	68,118	80,139	107,000	133,750	68118	69.90	

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LOAD FLOW ANALYSIS

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W A T E R A N D P O W E R D E V E L O P M E N T A U T H O R I T Y

LOAD FLOW ANALYSIS FOR - BEZ01-OH (C:BEZ-01OH) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 277.0 AMPs TOTAL FEEDER DEMAND = 5278 KVA EXISTING PF = 85 %

BUS VOLTAGE = 11.0 Kv TOTAL SPOT LOAD DEMAND = 0 KVA PROPOSED PF = 85 %

FEEDER LOAD FACTOR = 60 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.143	0	8500	UGC		277.0	35%	0.1	2.963			277.0	35%	0.1	2.963
1.0	2.0	0.041	0	8500	OSP		277.0	42%	0.1	1.161			277.0	42%	0.1	1.161
2.0	3.0	0.091	1250	1250	UGC		40.7	5%	0.1	0.041			40.7	5%	0.1	0.041
2.0	4.0	0.041	750	7250	OSP		236.3	36%	0.1	0.845			236.3	36%	0.1	0.845
4.0	5.0	0.123	0	6500	OSP		211.8	32%	0.2	2.036			211.8	32%	0.2	2.036
5.0	6.0	0.061	0	2500	UGC		81.5	10%	0.2	0.109			81.5	10%	0.2	0.109
5.0	10.0	0.095	0	4000	UGC		130.4	16%	0.2	0.436			130.4	16%	0.2	0.436
6.0	7.0	0.110	1250	2500	OSP		81.5	12%	0.2	0.270			81.5	12%	0.2	0.270
7.0	8.0	0.063	1250	1250	UGC		40.7	5%	0.2	0.028			40.7	5%	0.2	0.028
8.0	9.0	0.110	0	0	OSP		0.0	0%	0.2	0.000			0.0	0%	0.2	0.000
10.0	11.0	0.073	750	4000	OSP		130.4	20%	0.2	0.458			130.4	20%	0.2	0.458
11.0	12.0	0.110	0	3250	OSP		105.9	16%	0.2	0.455			105.9	16%	0.2	0.455
12.0	13.0	0.053	0	2500	UGC		81.5	10%	0.2	0.095			81.5	10%	0.2	0.095
12.0	16.0	0.073	750	750	OSP		24.4	4%	0.2	0.016			24.4	4%	0.2	0.016
13.0	14.0	0.119	1250	2500	OSP		81.5	12%	0.2	0.292			81.5	12%	0.2	0.292
14.0	15.0	0.021	1250	1250	UGC		40.7	5%	0.2	0.009			40.7	5%	0.2	0.009
TOTAL		1.327	8500							9.214						9.214

S Y S T E M S U M M A R Y

	EXISTING	PROPOSED	BENEFIT
Line Losses =	9.2 KW	9.2 KW	0.0 KW
Transformation Losses =	0.0 KW	0.0 KW	0.0 KW
Total Power Losses =	9.2 KW	9.2 KW	0.0 KW
% Power Losses =	0 %	0 %	0 %
Annual Energy Loss =	34911.1 KWH	34911.1 KWH	0.0 KWH
% Annual Energy Loss =	0 %	0 %	0 %

UGC - 795A, OSP - 660A,

'S' Indicates Spot Load.

'**' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

WATER AND POWER DEVELOPMENT AUTHORITY

LOAD FLOW ANALYSIS FOR - BEZ-020H (C:BEZ-020H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 264.0 AMPs TOTAL FEEDER DEMAND = 5030 KVA EXISTING PF = 85 %

BUS VOLTAGE = 11.0 Kv TOTAL SPOT LOAD DEMAND = 0 KVA PROPOSED PF = 85 %

FEEDER LOAD FACTOR = 60 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.143	0	9000	UGC		264.0	33%	0.1	2.691			264.0	33%	0.1	2.691
1.0	2.0	0.204	0	9000	OSP		264.0	40%	0.3	5.246			264.0	40%	0.3	5.246
2.0	3.0	0.095	0	9000	UGC		264.0	33%	0.4	1.788			264.0	33%	0.4	1.788
3.0	4.0	0.366	750	9000	OSP		264.0	40%	0.8	9.413			264.0	40%	0.8	9.413
4.0	5.0	0.052	0	3750	UGC		110.0	14%	0.8	0.170			110.0	14%	0.8	0.170
4.0	9.0	0.037	0	4500	OSP		132.0	20%	0.8	0.238			132.0	20%	0.8	0.238
5.0	6.0	0.079	1250	3750	OSP		110.0	17%	0.8	0.353			110.0	17%	0.8	0.353
6.0	7.0	0.036	1250	1250	UGC		36.7	5%	0.8	0.013			36.7	5%	0.8	0.013
6.0	8.0	0.119	1250	1250	OSP		36.7	6%	0.8	0.059			36.7	6%	0.8	0.059
9.0	10.0	0.043	0	4500	UGC		132.0	17%	0.8	0.202			132.0	17%	0.8	0.202
10.0	11.0	0.102	750	4500	OSP		132.0	20%	0.9	0.656			132.0	20%	0.9	0.656
11.0	12.0	0.040	0	3750	UGC		110.0	14%	0.9	0.131			110.0	14%	0.9	0.131
12.0	13.0	0.073	1250	3750	OSP		110.0	17%	0.9	0.326			110.0	17%	0.9	0.326
13.0	14.0	0.033	0	2500	UGC		73.3	9%	0.9	0.048			73.3	9%	0.9	0.048
14.0	15.0	0.079	1250	2500	OSP		73.3	11%	0.9	0.157			73.3	11%	0.9	0.157
15.0	16.0	0.159	1250	1250	OSP		36.7	6%	0.9	0.079			36.7	6%	0.9	0.079
TOTAL		1.660	9000							21.570						21.570

SYSTEM SUMMARY

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	21.6 KW	21.6 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	21.6 KW	21.6 KW	0.0 KW
% Power Losses	=	1 %	1 %	0 %
Annual Energy Loss	=	81667.1 KWH	81667.1 KWH	0.0 KWH
% Annual Energy Loss	=	0 %	0 %	0 %

UGC - 795A, OSP - 660A,

'S' Indicates Spot Load.

'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

W A T E R A N D P O W E R D E V E L O P M E N T A U T H O R I T Y

LOAD FLOW ANALYSIS FOR - BEZ-030H (C:BEZ-030H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 255.0 AMPs
BUS VOLTAGE = 11.0 Kv
TOTAL FEEDER DEMAND = 4858 KVA
TOTAL SPOT LOAD DEMAND = 0 KVA
FEEDER LOAD FACTOR = 60 %
EXISTING PF = 85 %
PROPOSED PF = 85 %

SECTION			TRF.		EXISTING SYSTEM					PROPOSED SYSTEM				
FROM NODE	TO NODE	LENGTH KMTRS	SIZE KVA	CUM KVA	COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.337	0	7500	UGC		255.0	32%	0.3	5.917			255.0	32%	0.3	5.917
1.0	2.0	0.140	0	7500	OSP		255.0	39%	0.5	3.359			255.0	39%	0.5	3.359
2.0	3.0	0.062	0	7500	UGC		255.0	32%	0.5	1.089			255.0	32%	0.5	1.089
3.0	4.0	0.149	0	7500	OSP		255.0	39%	0.7	3.575			255.0	39%	0.7	3.575
4.0	5.0	0.076	0	7500	UGC		255.0	32%	0.8	1.334			255.0	32%	0.8	1.334
5.0	6.0	0.114	0	7500	OSP		255.0	39%	0.9	2.735			255.0	39%	0.9	2.735
6.0	7.0	0.083	0	7500	UGC		255.0	32%	1.0	1.457			255.0	32%	1.0	1.457
7.0	8.0	0.119	0	7500	OSP		255.0	39%	1.1	2.855			255.0	39%	1.1	2.855
8.0	9.0	0.075	0	7500	UGC		255.0	32%	1.2	1.317			255.0	32%	1.2	1.317
9.0	10.0	0.079	1250	2500	OSP		85.0	13%	1.2	0.211			85.0	13%	1.2	0.211
9.0	12.0	0.269	1250	5000	OSP		170.0	26%	1.4	2.869			170.0	26%	1.4	2.869
10.0	11.0	0.159	1250	1250	OSP		42.5	6%	1.2	0.106			42.5	6%	1.2	0.106
12.0	13.0	0.079	0	3750	OSP		127.5	19%	1.4	0.474			127.5	19%	1.4	0.474
13.0	14.0	0.032	0	1250	UGC		42.5	5%	1.4	0.016			42.5	5%	1.4	0.016
13.0	16.0	0.119	1250	2500	OSP		85.0	13%	1.4	0.317			85.0	13%	1.4	0.317
14.0	15.0	0.079	1250	1250	OSP		42.5	6%	1.4	0.053			42.5	6%	1.4	0.053
16.0	17.0	0.025	1250	1250	UGC		42.5	5%	1.4	0.012			42.5	5%	1.4	0.012
TOTAL		1.996	7500							27.696						27.696

S Y S T E M S U M M A R Y

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	27.7 KW	27.7 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	27.7 KW	27.7 KW	0.0 KW
% Power Losses	=	1 %	1 %	0 %
Annual Energy Loss	=	104842.3 KWH	104842.3 KWH	0.0 KWH
% Annual Energy Loss	=	0 %	0 %	0 %

UGC - 795A, OSP - 660A,
'S' Indicates Spot Load.
'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

WATER AND POWER DEVELOPMENT AUTHORITY

LOAD FLOW ANALYSIS FOR - BEZ-040H (C:BEZ-040H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 285.0 AMPs
BUS VOLTAGE = 11.0 Kv
TOTAL FEEDER DEMAND = 5430 KVA
TOTAL SPOT LOAD DEMAND = 0 KVA
FEEDER LOAD FACTOR = 60 %
EXISTING PF = 85 %
PROPOSED PF = 85 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.337	0	8750	UGC		285.0	36%	0.3	7.391			285.0	36%	0.3	7.391
1.0	2.0	0.140	0	8750	OSP		285.0	43%	0.5	4.196			285.0	43%	0.5	4.196
2.0	3.0	0.062	0	8750	UGC		285.0	36%	0.6	1.360			285.0	36%	0.6	1.360
3.0	4.0	0.149	0	8750	OSP		285.0	43%	0.8	4.466			285.0	43%	0.8	4.466
4.0	5.0	0.076	0	8750	UGC		285.0	36%	0.9	1.667			285.0	36%	0.9	1.667
5.0	6.0	0.114	0	8750	OSP		285.0	43%	1.0	3.417			285.0	43%	1.0	3.417
6.0	7.0	0.083	0	8750	UGC		285.0	36%	1.1	1.820			285.0	36%	1.1	1.820
7.0	8.0	0.119	0	8750	OSP		285.0	43%	1.2	3.567			285.0	43%	1.2	3.567
8.0	9.0	0.075	0	8750	UGC		285.0	36%	1.3	1.645			285.0	36%	1.3	1.645
9.0	10.0	0.625	1250	8750	OSP		285.0	43%	2.1	18.733			285.0	43%	2.1	18.733
10.0	11.0	0.040	0	7500	OSP		244.3	37%	2.1	0.881			244.3	37%	2.1	0.881
11.0	12.0	0.023	1250	7500	UGC		244.3	31%	2.1	0.371			244.3	31%	2.1	0.371
12.0	13.0	0.044	0	6250	UGC		203.6	26%	2.1	0.492			203.6	26%	2.1	0.492
13.0	14.0	0.119	1250	1250	OSP		40.7	6%	2.1	0.073			40.7	6%	2.1	0.073
13.0	15.0	0.079	1250	5000	OSP		162.9	25%	2.2	0.774			162.9	25%	2.2	0.774
15.0	16.0	0.040	0	3750	OSP		122.1	19%	2.2	0.220			122.1	19%	2.2	0.220
16.0	17.0	0.070	0	3750	UGC		122.1	15%	2.2	0.282			122.1	15%	2.2	0.282
17.0	18.0	0.040	1250	3750	OSP		122.1	19%	2.2	0.220			122.1	19%	2.2	0.220
18.0	19.0	0.079	0	2500	OSP		81.4	12%	2.2	0.193			81.4	12%	2.2	0.193
19.0	20.0	0.015	1250	1250	UGC		40.7	5%	2.2	0.007			40.7	5%	2.2	0.007
19.0	21.0	0.119	1250	1250	OSP		40.7	6%	2.2	0.073			40.7	6%	2.2	0.073
TOTAL		2.448	8750							51.848						51.848

SYSTEM SUMMARY

	EXISTING	PROPOSED	BENEFIT
Line Losses =	51.8 KW	51.8 KW	0.0 KW
Transformation Losses =	0.0 KW	0.0 KW	0.0 KW
Total Power Losses =	51.8 KW	51.8 KW	0.0 KW
% Power Losses =	1 %	1 %	0 %
Annual Energy Loss =	196246.5 KWH	196246.5 KWH	0.0 KWH
% Annual Energy Loss =	1 %	1 %	0 %

UGC - 795A, OSP - 660A,
'S' Indicates Spot Load.
'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

WATER AND POWER DEVELOPMENT AUTHORITY

LOAD FLOW ANALYSIS FOR - BEZ-050H (C:BEZ-050H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 246.0 AMPs
BUS VOLTAGE = 11.0 Kv
TOTAL FEEDER DEMAND = 4687 KVA
TOTAL SPOT LOAD DEMAND = 0 KVA
FEEDER LOAD FACTOR = 60 %
EXISTING PF = 85 %
PROPOSED PF = 85 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.206	0	7500	UGC		246.0	31%	0.2	3.366			246.0	31%	0.2	3.366
1.0	2.0	0.119	0	7500	OSP		246.0	37%	0.3	2.657			246.0	37%	0.3	2.657
2.0	3.0	0.084	0	7500	UGC		246.0	31%	0.4	1.373			246.0	31%	0.4	1.373
3.0	4.0	0.116	0	7500	OSP		246.0	37%	0.5	2.590			246.0	37%	0.5	2.590
4.0	5.0	0.088	0	7500	UGC		246.0	31%	0.6	1.438			246.0	31%	0.6	1.438
5.0	6.0	0.079	1250	7500	OSP		246.0	37%	0.7	1.764			246.0	37%	0.7	1.764
6.0	7.0	0.159	1250	6250	OSP		205.0	31%	0.8	2.466			205.0	31%	0.8	2.466
7.0	8.0	0.159	1250	5000	OSP		164.0	25%	0.9	1.578			164.0	25%	0.9	1.578
8.0	9.0	0.119	0	3750	OSP		123.0	19%	1.0	0.664			123.0	19%	1.0	0.664
9.0	10.0	0.041	0	3750	UGC		123.0	15%	1.0	0.167			123.0	15%	1.0	0.167
10.0	11.0	0.069	1250	1250	OSP		41.0	6%	1.0	0.043			41.0	6%	1.0	0.043
10.0	12.0	0.305	1250	2500	OSP		82.0	12%	1.1	0.757			82.0	12%	1.1	0.757
12.0	13.0	0.016	1250	1250	UGC		41.0	5%	1.1	0.007			41.0	5%	1.1	0.007
TOTAL		1.560	7500							18.870						18.870

SYSTEM SUMMARY

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	18.9 KW	18.9 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	18.9 KW	18.9 KW	0.0 KW
% Power Losses	=	0 %	0 %	0 %
Annual Energy Loss	=	71441.9 KWH	71441.9 KWH	0.0 KWH
% Annual Energy Loss	=	0 %	0 %	0 %

UGC - 795A, OSP - 660A,
'S' Indicates Spot Load.
'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

W A T E R A N D P O W E R D E V E L O P M E N T A U T H O R I T Y

LOAD FLOW ANALYSIS FOR - BEZ-060H (C:BEZ-060H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 276.0 AMPs TOTAL FEEDER DEMAND = 5259 KVA EXISTING PF = 85 %

BUS VOLTAGE = 11.0 Kv TOTAL SPOT LOAD DEMAND = 0 KVA PROPOSED PF = 85 %

FEEDER LOAD FACTOR = 60 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.125	0	9500	UGC		276.0	35%	0.1	2.571			276.0	35%	0.1	2.571
1.0	2.0	0.130	0	9500	OSP		276.0	42%	0.3	3.654			276.0	42%	0.3	3.654
2.0	3.0	0.101	0	9500	UGC		276.0	35%	0.4	2.077			276.0	35%	0.4	2.077
3.0	4.0	0.101	1250	9500	OSP		276.0	42%	0.5	2.839			276.0	42%	0.5	2.839
4.0	5.0	0.205	0	8250	OSP		239.7	36%	0.7	4.346			239.7	36%	0.7	4.346
5.0	6.0	0.104	0	8250	UGC		239.7	30%	0.8	1.613			239.7	30%	0.8	1.613
6.0	7.0	0.099	750	8250	OSP		239.7	36%	0.9	2.099			239.7	36%	0.9	2.099
7.0	8.0	0.119	750	7500	OSP		217.9	33%	1.0	2.085			217.9	33%	1.0	2.085
8.0	9.0	0.078	0	6750	OSP		196.1	30%	1.1	1.107			196.1	30%	1.1	1.107
9.0	10.0	0.107	0	6750	UGC		196.1	25%	1.2	1.111			196.1	25%	1.2	1.111
10.0	11.0	0.100	500	6750	OSP		196.1	30%	1.3	1.419			196.1	30%	1.3	1.419
11.0	12.0	0.040	1250	6250	OSP		181.6	28%	1.3	0.487			181.6	28%	1.3	0.487
12.0	13.0	0.119	1250	5000	OSP		145.3	22%	1.4	0.927			145.3	22%	1.4	0.927
13.0	14.0	0.030	0	3750	UGC		108.9	14%	1.4	0.096			108.9	14%	1.4	0.096
14.0	15.0	0.079	1250	3750	OSP		108.9	17%	1.4	0.346			108.9	17%	1.4	0.346
15.0	16.0	0.159	1250	2500	OSP		72.6	11%	1.4	0.309			72.6	11%	1.4	0.309
16.0	17.0	0.159	1250	1250	OSP		36.3	6%	1.4	0.077			36.3	6%	1.4	0.077
TOTAL		1.855	9500							27.163						27.163

S Y S T E M S U M M A R Y

	EXISTING	PROPOSED	BENEFIT
Line Losses =	27.2 KW	27.2 KW	0.0 KW
Transformation Losses =	0.0 KW	0.0 KW	0.0 KW
Total Power Losses =	27.2 KW	27.2 KW	0.0 KW
% Power Losses =	1 %	1 %	0 %
Annual Energy Loss =	102837.8 KWH	102837.8 KWH	0.0 KWH
% Annual Energy Loss =	0 %	0 %	0 %

UGC - 795A, OSP - 660A,

'S' Indicates Spot Load.

'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

WATER AND POWER DEVELOPMENT AUTHORITY

LOAD FLOW ANALYSIS FOR - BEZ-070H (C:BEZ-070H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 309.0 AMPs TOTAL FEEDER DEMAND = 5887 KVA EXISTING PF = 85 %

BUS VOLTAGE = 11.0 Kv TOTAL SPOT LOAD DEMAND = 0 KVA PROPOSED PF = 85 %

FEEDER LOAD FACTOR = 60 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.210	0	6750	UGC		309.0	39%	0.2	5.414			309.0	39%	0.2	5.414
1.0	2.0	0.058	0	2500	OSP		114.4	17%	0.2	0.280			114.4	17%	0.2	0.280
1.0	5.0	0.101	1250	4250	OSP		194.6	29%	0.3	1.411			194.6	29%	0.3	1.411
2.0	3.0	0.083	1250	2500	UGC		114.4	14%	0.2	0.293			114.4	14%	0.2	0.293
3.0	4.0	0.064	1250	1250	OSP		57.2	9%	0.2	0.077			57.2	9%	0.2	0.077
5.0	6.0	0.115	0	3000	OSP		137.3	21%	0.4	0.800			137.3	21%	0.4	0.800
6.0	7.0	0.079	750	1500	OSP		68.7	10%	0.4	0.138			68.7	10%	0.4	0.138
6.0	10.0	0.015	750	1500	UGC		68.7	9%	0.4	0.019			68.7	9%	0.4	0.019
7.0	8.0	0.040	0	750	OSP		34.3	5%	0.4	0.017			34.3	5%	0.4	0.017
8.0	9.0	0.023	750	750	UGC		34.3	4%	0.4	0.007			34.3	4%	0.4	0.007
10.0	11.0	0.040	0	750	UGC		34.3	4%	0.4	0.013			34.3	4%	0.4	0.013
11.0	12.0	0.055	750	750	OSP		34.3	5%	0.4	0.024			34.3	5%	0.4	0.024
TOTAL		0.883	6750							8.493						8.493

SYSTEM SUMMARY

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	8.5 KW	8.5 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	8.5 KW	8.5 KW	0.0 KW
% Power Losses	=	0 %	0 %	0 %
Annual Energy Loss	=	32187.9 KWH	32187.9 KWH	0.0 KWH
% Annual Energy Loss	=	0 %	0 %	0 %

UGC - 795A, OSP - 660A,

'S' Indicates Spot Load.

'**' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

W A T E R A N D P O W E R D E V E L O P M E N T A U T H O R I T Y

LOAD FLOW ANALYSIS FOR - BEZ-090H (C:BEZ-090H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 286.0 AMPs TOTAL FEEDER DEMAND = 5449 KVA EXISTING PF = 85 %

BUS VOLTAGE = 11.0 Kv TOTAL SPOT LOAD DEMAND = 0 KVA PROPOSED PF = 85 %

FEEDER LOAD FACTOR = 60 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LONG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LONG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.125	0	9250	UGC		286.0	36%	0.1	2.761			286.0	36%	0.1	2.761
1.0	2.0	0.130	0	9250	OSP		286.0	43%	0.3	3.924			286.0	43%	0.3	3.924
2.0	3.0	0.101	0	9250	UGC		286.0	36%	0.4	2.231			286.0	36%	0.4	2.231
3.0	4.0	0.174	0	9250	OSP		286.0	43%	0.6	5.252			286.0	43%	0.6	5.252
4.0	5.0	0.198	500	9250	UGC		286.0	36%	0.8	4.373			286.0	36%	0.8	4.373
5.0	6.0	0.143	1250	8750	OSP		270.5	41%	1.0	3.861			270.5	41%	1.0	3.861
6.0	7.0	0.108	0	7500	OSP		231.9	35%	1.1	2.143			231.9	35%	1.1	2.143
7.0	8.0	0.024	1250	1250	UGC		38.6	5%	1.1	0.010			38.6	5%	1.1	0.010
7.0	9.0	0.193	1250	6250	OSP		193.2	29%	1.3	2.658			193.2	29%	1.3	2.658
9.0	10.0	0.022	0	5000	UGC		154.6	19%	1.3	0.142			154.6	19%	1.3	0.142
10.0	11.0	0.076	1250	5000	OSP		154.6	23%	1.4	0.670			154.6	23%	1.4	0.670
11.0	12.0	0.041	1250	1250	UGC		38.6	5%	1.4	0.016			38.6	5%	1.4	0.016
11.0	13.0	0.040	0	2500	OSP		77.3	12%	1.4	0.088			77.3	12%	1.4	0.088
13.0	14.0	0.026	0	2500	UGC		77.3	10%	1.4	0.042			77.3	10%	1.4	0.042
14.0	15.0	0.218	1250	2500	OSP		77.3	12%	1.5	0.481			77.3	12%	1.5	0.481
15.0	16.0	0.195	1250	1250	OSP		38.6	6%	1.5	0.107			38.6	6%	1.5	0.107
TOTAL		1.814	9250							28.759						28.759

S Y S T E M S U M M A R Y

	EXISTING	PROPOSED	BENEFIT
Line Losses =	28.8 KW	28.8 KW	0.0 KW
Transformation Losses =	0.0 KW	0.0 KW	0.0 KW
Total Power Losses =	28.8 KW	28.8 KW	0.0 KW
% Power Losses =	1 %	1 %	0 %
Annual Energy Loss =	108872.6 KWH	108872.6 KWH	0.0 KWH
% Annual Energy Loss =	0 %	0 %	0 %

UGC - 795A, OSP - 660A,

'S' Indicates Spot Load.

'**' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

W A T E R A N D P O W E R D E V E L O P M E N T A U T H O R I T Y

LOAD FLOW ANALYSIS FOR - BEZ-100H (C:BEZ-100H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 287.0 AMPs TOTAL FEEDER DEMAND = 5468 KVA EXISTING PF = 85 %

BUS VOLTAGE = 11.0 Kv TOTAL SPOT LOAD DEMAND = 0 KVA PROPOSED PF = 85 %

FEEDER LOAD FACTOR = 60 %

SECTION			TRF.		E X I S T I N G S Y S T E M					P R O P O S E D S Y S T E M				
FROM NODE	TO NODE	LENGTH KMTRS	SIZE KVA	CUM KVA	COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.206	0	10000	UGC		287.0	36%	0.2	4.581			287.0	36%	0.2	4.581
1.0	2.0	0.119	0	10000	OSP		287.0	43%	0.3	3.617			287.0	43%	0.3	3.617
2.0	3.0	0.084	0	10000	UGC		287.0	36%	0.4	1.868			287.0	36%	0.4	1.868
3.0	4.0	0.116	0	10000	OSP		287.0	43%	0.5	3.526			287.0	43%	0.5	3.526
4.0	5.0	0.068	0	10000	UGC		287.0	36%	0.6	1.512			287.0	36%	0.6	1.512
5.0	6.0	0.592	0	10000	OSP		287.0	43%	1.3	17.993			287.0	43%	1.3	17.993
6.0	7.0	0.032	0	10000	UGC		287.0	36%	1.3	0.712			287.0	36%	1.3	0.712
7.0	8.0	0.040	1250	10000	OSP		287.0	43%	1.3	1.216			287.0	43%	1.3	1.216
8.0	9.0	0.069	0	8750	OSP		251.1	38%	1.4	1.605			251.1	38%	1.4	1.605
9.0	10.0	0.029	0	8750	UGC		251.1	32%	1.4	0.494			251.1	32%	1.4	0.494
10.0	11.0	0.071	1250	8750	OSP		251.1	38%	1.5	1.652			251.1	38%	1.5	1.652
11.0	12.0	0.159	1250	7500	OSP		215.3	33%	1.6	2.720			215.3	33%	1.6	2.720
12.0	13.0	0.198	1250	6250	OSP		179.4	27%	1.8	2.351			179.4	27%	1.8	2.351
13.0	14.0	0.159	1250	5000	OSP		143.5	22%	1.9	1.208			143.5	22%	1.9	1.208
14.0	15.0	0.079	0	3750	OSP		107.6	16%	1.9	0.338			107.6	16%	1.9	0.338
15.0	16.0	0.024	1250	1250	UGC		35.9	5%	1.9	0.008			35.9	5%	1.9	0.008
15.0	17.0	0.079	1250	2500	OSP		71.8	11%	1.9	0.150			71.8	11%	1.9	0.150
17.0	18.0	0.035	1250	1250	UGC		35.9	5%	1.9	0.012			35.9	5%	1.9	0.012
TOTAL		2.159	10000							45.563						45.563

S Y S T E M S U M M A R Y

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	45.6 KW	45.6 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	45.6 KW	45.6 KW	0.0 KW
% Power Losses	=	1 %	1 %	0 %
Annual Energy Loss	=	172464.3 KWH	172464.3 KWH	0.0 KWH
% Annual Energy Loss	=	1 %	1 %	0 %

UGC - 795A, OSP - 660A,

'S' Indicates Spot Load.

'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

WATER AND POWER DEVELOPMENT AUTHORITY

LOAD FLOW ANALYSIS FOR - BEZ-110H (C:BEZ-110H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 297.0 AMPs
BUS VOLTAGE = 11.0 Kv
TOTAL FEEDER DEMAND = 5659 KVA
TOTAL SPOT LOAD DEMAND = 0 KVA
FEEDER LOAD FACTOR = 60 %
EXISTING PF = 85 %
PROPOSED PF = 85 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.206	0	10000	UGC		297.0	37%	0.2	4.906			297.0	37%	0.2	4.906
1.0	2.0	0.119	0	10000	OSP		297.0	45%	0.4	3.873			297.0	45%	0.4	3.873
2.0	3.0	0.084	0	10000	UGC		297.0	37%	0.5	2.001			297.0	37%	0.5	2.001
3.0	4.0	0.116	0	10000	OSP		297.0	45%	0.6	3.776			297.0	45%	0.6	3.776
4.0	5.0	0.068	0	10000	UGC		297.0	37%	0.7	1.620			297.0	37%	0.7	1.620
5.0	6.0	0.157	0	10000	OSP		297.0	45%	0.9	5.110			297.0	45%	0.9	5.110
6.0	7.0	0.118	1250	10000	OSP		297.0	45%	1.0	3.841			297.0	45%	1.0	3.841
7.0	8.0	0.198	1250	8750	OSP		259.9	39%	1.2	4.935			259.9	39%	1.2	4.935
8.0	9.0	0.159	1250	7500	OSP		222.7	34%	1.4	2.910			222.7	34%	1.4	2.910
9.0	10.0	0.119	0	6250	OSP		185.6	28%	1.5	1.513			185.6	28%	1.5	1.513
10.0	11.0	0.059	1250	6250	UGC		185.6	23%	1.5	0.549			185.6	23%	1.5	0.549
11.0	12.0	0.027	0	5000	UGC		148.5	19%	1.5	0.161			148.5	19%	1.5	0.161
12.0	13.0	0.079	0	5000	OSP		148.5	23%	1.6	0.643			148.5	23%	1.6	0.643
13.0	14.0	0.042	1250	1250	UGC		37.1	5%	1.6	0.016			37.1	5%	1.6	0.016
13.0	15.0	0.140	1250	3750	OSP		111.4	17%	1.7	0.641			111.4	17%	1.7	0.641
15.0	16.0	0.119	0	2500	OSP		74.2	11%	1.7	0.242			74.2	11%	1.7	0.242
16.0	17.0	0.072	1250	1250	UGC		37.1	5%	1.7	0.027			37.1	5%	1.7	0.027
16.0	18.0	0.079	1250	1250	OSP		37.1	6%	1.7	0.040			37.1	6%	1.7	0.040
TOTAL		1.961	10000							36.804						36.804

SYSTEM SUMMARY

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	36.8 KW	36.8 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	36.8 KW	36.8 KW	0.0 KW
% Power Losses	=	1 %	1 %	0 %
Annual Energy Loss	=	139317.5 KWH	139317.5 KWH	0.0 KWH
% Annual Energy Loss	=	1 %	1 %	0 %

UGC - 795A, OSP - 660A,
'S' Indicates Spot Load.
'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

WATER AND POWER DEVELOPMENT AUTHORITY

LOAD FLOW ANALYSIS FOR - BEZ-120H (C:BEZ-120H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 287.0 AMPs
BUS VOLTAGE = 11.0 Kv
TOTAL FEEDER DEMAND = 5468 KVA
TOTAL SPOT LOAD DEMAND = 0 KVA
FEEDER LOAD FACTOR = 60 %
EXISTING PF = 85 %
PROPOSED PF = 85 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.206	0	10000	UGC		287.0	36%	0.2	4.581			287.0	36%	0.2	4.581
1.0	2.0	0.119	0	10000	OSP		287.0	43%	0.3	3.617			287.0	43%	0.3	3.617
2.0	3.0	0.084	0	10000	UGC		287.0	36%	0.4	1.868			287.0	36%	0.4	1.868
3.0	4.0	0.116	0	10000	OSP		287.0	43%	0.5	3.526			287.0	43%	0.5	3.526
4.0	5.0	0.088	0	10000	UGC		287.0	36%	0.6	1.957			287.0	36%	0.6	1.957
5.0	6.0	0.555	0	10000	OSP		287.0	43%	1.3	16.869			287.0	43%	1.3	16.869
6.0	7.0	0.041	0	10000	UGC		287.0	36%	1.3	0.912			287.0	36%	1.3	0.912
7.0	8.0	0.159	0	10000	OSP		287.0	43%	1.5	4.833			287.0	43%	1.5	4.833
8.0	9.0	0.047	0	10000	UGC		287.0	36%	1.5	1.045			287.0	36%	1.5	1.045
9.0	10.0	0.154	0	10000	OSP		287.0	43%	1.7	4.681			287.0	43%	1.7	4.681
10.0	11.0	0.107	1250	3750	OSP		107.6	16%	1.7	0.457			107.6	16%	1.7	0.457
10.0	14.0	0.063	0	2500	UGC		71.8	9%	1.7	0.088			71.8	9%	1.7	0.088
10.0	17.0	0.054	0	3750	UGC		107.6	14%	1.7	0.169			107.6	14%	1.7	0.169
11.0	12.0	0.016	1250	1250	UGC		35.9	5%	1.7	0.006			35.9	5%	1.7	0.006
11.0	13.0	0.119	1250	1250	OSP		35.9	5%	1.7	0.057			35.9	5%	1.7	0.057
14.0	15.0	0.040	1250	2500	OSP		71.8	11%	1.7	0.076			71.8	11%	1.7	0.076
15.0	16.0	0.119	1250	1250	OSP		35.9	5%	1.7	0.057			35.9	5%	1.7	0.057
17.0	18.0	0.171	0	3750	OSP		107.6	16%	1.8	0.731			107.6	16%	1.8	0.731
18.0	19.0	0.043	0	3750	UGC		107.6	14%	1.8	0.134			107.6	14%	1.8	0.134
19.0	20.0	0.123	1250	1250	OSP		35.9	5%	1.8	0.058			35.9	5%	1.8	0.058
19.0	21.0	0.079	1250	2500	OSP		71.8	11%	1.8	0.150			71.8	11%	1.8	0.150
21.0	22.0	0.159	1250	1250	OSP		35.9	5%	1.8	0.076			35.9	5%	1.8	0.076
TOTAL		2.662	10000							45.948						45.948

SYSTEM SUMMARY

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	45.9 KW	45.9 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	45.9 KW	45.9 KW	0.0 KW
% Power Losses	=	1 %	1 %	0 %
Annual Energy Loss	=	173921.3 KWH	173921.3 KWH	0.0 KWH
% Annual Energy Loss	=	1 %	1 %	0 %

UGC - 795A, OSP - 660A,
'S' Indicates Spot Load.
'**' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

WATER AND POWER DEVELOPMENT AUTHORITY

LOAD FLOW ANALYSIS FOR - BEZ-130H (C:BEZ-130H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 287.0 AMPs TOTAL FEEDER DEMAND = 5468 KVA EXISTING PF = 85 %

BUS VOLTAGE = 11.0 Kv TOTAL SPOT LOAD DEMAND = 0 KVA PROPOSED PF = 85 %

FEEDER LOAD FACTOR = 60 %

SECTION			TRF.		EXISTING SYSTEM					PROPOSED SYSTEM				
FROM NODE	TO NODE	LENGTH KMTRS	SIZE KVA	CUM KVA	COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.096	0	9750	UGC		287.0	36%	0.1	2.135			287.0	36%	0.1	2.135
1.0	2.0	0.198	0	9750	OSP		287.0	43%	0.3	6.018			287.0	43%	0.3	6.018
2.0	3.0	0.038	0	9750	UGC		287.0	36%	0.3	0.845			287.0	36%	0.3	0.845
3.0	4.0	0.348	0	9750	OSP		287.0	43%	0.7	10.577			287.0	43%	0.7	10.577
4.0	5.0	0.090	0	9750	UGC		287.0	36%	0.8	2.002			287.0	36%	0.8	2.002
5.0	6.0	0.123	0	5250	UGC		154.5	19%	0.9	0.793			154.5	19%	0.9	0.793
5.0	7.0	0.075	750	2250	UG4		66.2	20%	0.8	0.289			66.2	20%	0.8	0.289
5.0	10.0	0.173	750	2250	UG4		66.2	20%	0.9	0.666			66.2	20%	0.9	0.666
6.0	13.0	0.119	750	2250	UG4		66.2	20%	0.9	0.458			66.2	20%	0.9	0.458
6.0	16.0	0.020	750	3000	UG4		88.3	26%	0.9	0.137			88.3	26%	0.9	0.137
7.0	8.0	0.028	750	1500	UG4		44.2	13%	0.8	0.048			44.2	13%	0.8	0.048
8.0	9.0	0.050	750	750	UG4		22.1	7%	0.8	0.021			22.1	7%	0.8	0.021
10.0	11.0	0.038	750	1500	UG4		44.2	13%	0.9	0.065			44.2	13%	0.9	0.065
11.0	12.0	0.037	750	750	UG4		22.1	7%	0.9	0.016			22.1	7%	0.9	0.016
13.0	14.0	0.020	750	1500	UG4		44.2	13%	0.9	0.034			44.2	13%	0.9	0.034
14.0	15.0	0.026	750	750	UG4		22.1	7%	0.9	0.011			22.1	7%	0.9	0.011
16.0	17.0	0.157	750	2250	UG4		66.2	20%	1.0	0.605			66.2	20%	1.0	0.605
17.0	18.0	0.024	750	1500	UG4		44.2	13%	1.0	0.041			44.2	13%	1.0	0.041
18.0	19.0	0.034	750	750	UG4		22.1	7%	1.0	0.015			22.1	7%	1.0	0.015
TOTAL		1.694	9750							24.776						24.776

SYSTEM SUMMARY

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	24.8 KW	24.8 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	24.8 KW	24.8 KW	0.0 KW
% Power Losses	=	1 %	1 %	0 %
Annual Energy Loss	=	93824.3 KWH	93824.3 KWH	0.0 KWH
% Annual Energy Loss	=	0 %	0 %	0 %

UGC - 795A, OSP - 660A, UG4 - 335A,

'S' Indicates Spot Load.

'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

WATER AND POWER DEVELOPMENT AUTHORITY

LOAD FLOW ANALYSIS FOR - BEZ-140H (C:BEZ-140H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 268.0 AMPs
BUS VOLTAGE = 11.0 Kv

TOTAL FEEDER DEMAND = 5106 KVA
TOTAL SPOT LOAD DEMAND = 0 KVA
FEEDER LOAD FACTOR = 60 %

EXISTING PF = 85 %
PROPOSED PF = 85 %

FROM NODE	TO NODE	SECTION LENGTH KMTRS	TRF. SIZE KVA	CUM KVA	EXISTING SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	PROPOSED SYSTEM COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.096	0	9750	UGC		268.0	34%	0.1	1.862			268.0	34%	0.1	1.862
1.0	2.0	0.198	0	9750	OSP		268.0	41%	0.3	5.248			268.0	41%	0.3	5.248
2.0	3.0	0.038	0	9750	UGC		268.0	34%	0.3	0.737			268.0	34%	0.3	0.737
3.0	4.0	0.070	0	9750	OSP		268.0	41%	0.4	1.855			268.0	41%	0.4	1.855
4.0	5.0	0.022	0	9750	UGC		268.0	34%	0.4	0.427			268.0	34%	0.4	0.427
5.0	6.0	0.348	1250	9750	OSP		268.0	41%	0.8	9.223			268.0	41%	0.8	9.223
6.0	7.0	0.237	250	8500	OSP		233.6	35%	1.0	4.772			233.6	35%	1.0	4.772
7.0	8.0	0.058	500	8250	UGC		226.8	29%	1.0	0.806			226.8	29%	1.0	0.806
8.0	9.0	0.035	500	7750	OSP		213.0	32%	1.0	0.586			213.0	32%	1.0	0.586
9.0	10.0	0.152	1250	1250	OSP		34.4	5%	1.0	0.066			34.4	5%	1.0	0.066
9.0	11.0	0.057	0	6000	UGC		164.9	21%	1.0	0.418			164.9	21%	1.0	0.418
11.0	12.0	0.065	750	3000	UG4		82.5	25%	1.0	0.389			82.5	25%	1.0	0.389
11.0	16.0	0.019	750	3000	UG4		82.5	25%	1.0	0.114			82.5	25%	1.0	0.114
12.0	13.0	0.050	750	2250	UG4		61.8	18%	1.0	0.168			61.8	18%	1.0	0.168
13.0	14.0	0.044	750	1500	UG4		41.2	12%	1.0	0.066			41.2	12%	1.0	0.066
14.0	15.0	0.055	750	750	UG4		20.6	6%	1.0	0.021			20.6	6%	1.0	0.021
16.0	17.0	0.065	750	2250	UG4		61.8	18%	1.0	0.218			61.8	18%	1.0	0.218
17.0	18.0	0.041	750	1500	UG4		41.2	12%	1.0	0.061			41.2	12%	1.0	0.061
18.0	19.0	0.027	750	750	UG4		20.6	6%	1.0	0.010			20.6	6%	1.0	0.010
TOTAL		1.677	9750							27.047						27.047

SYSTEM SUMMARY

		EXISTING	PROPOSED	BENEFIT
Line Losses	=	27.0 KW	27.0 KW	0.0 KW
Transformation Losses	=	0.0 KW	0.0 KW	0.0 KW
Total Power Losses	=	27.0 KW	27.0 KW	0.0 KW
% Power Losses	=	1 %	1 %	0 %
Annual Energy Loss	=	102418.5 KWH	102418.5 KWH	0.0 KWH
% Annual Energy Loss	=	0 %	0 %	0 %

UGC - 795A, OSP - 660A, UG4 - 335A,
'S' Indicates Spot Load.
'*' Indicates Voltage Drop above 5 %

SAMD CONSULTANTS

W A T E R A N D P O W E R D E V E L O P M E N T A U T H O R I T Y

LOAD FLOW ANALYSIS FOR - BEZ-150H (C:BEZ-150H) (HIGH TENSION ANALYSIS - 2.8)

Date : 14/09/23

LOAD AMPS = 310.0 AMPs
BUS VOLTAGE = 11.0 Kv
TOTAL FEEDER DEMAND = 5906 KVA
TOTAL SPOT LOAD DEMAND = 0 KVA
FEEDER LOAD FACTOR = 60 %
EXISTING PF = 85 %
PROPOSED PF = 85 %

SECTION			TRF.		EXISTING SYSTEM					PROPOSED SYSTEM				
FROM NODE	TO NODE	LENGTH KMTRS	SIZE KVA	CUM KVA	COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS	COND	CAP. KVAR	CURRENT AMPs	% LDNG.	%VOLT DROP	LOSS KWATTS
0.0	1.0	0.096	0	10000	UGC		310.0	39%	0.1	2.491			310.0	39%	0.1	2.491
1.0	2.0	0.198	0	10000	OSP		310.0	47%	0.4	7.021			310.0	47%	0.4	7.021
2.0	3.0	0.038	0	10000	UGC		310.0	39%	0.4	0.986			310.0	39%	0.4	0.986
3.0	4.0	0.149	1250	10000	OSP		310.0	47%	0.6	5.284			310.0	47%	0.6	5.284
4.0	5.0	0.079	0	8750	OSP		271.3	41%	0.7	2.146			271.3	41%	0.7	2.146
5.0	6.0	0.023	1250	1250	UGC		38.8	5%	0.7	0.009			38.8	5%	0.7	0.009
5.0	7.0	0.040	1250	7500	OSP		232.5	35%	0.7	0.798			232.5	35%	0.7	0.798
7.0	8.0	0.079	0	6250	OSP		193.8	29%	0.8	1.095			193.8	29%	0.8	1.095
8.0	9.0	0.080	0	6250	UGC		193.8	24%	0.8	0.811			193.8	24%	0.8	0.811
9.0	10.0	0.113	1250	6250	OSP		193.8	29%	0.9	1.566			193.8	29%	0.9	1.566
10.0	11.0	0.159	1250	5000	OSP		155.0	23%	1.0	1.410			155.0	23%	1.0	1.410
11.0	12.0	0.303	1250	3750	OSP		116.3	18%	1.2	1.512			116.3	18%	1.2	1.512
12.0	13.0	0.198	1250	2500	OSP		77.5	12%	1.3	0.439			77.5	12%	1.3	0.439
13.0	14.0	0.119	1250	1250	OSP		38.8	6%	1.3	0.066			38.8	6%	1.3	0.066
TOTAL		1.674	10000							25.634						25.634

S Y S T E M S U M M A R Y

	EXISTING	PROPOSED	BENEFIT
Line Losses =	25.6 KW	25.6 KW	0.0 KW
Transformation Losses =	0.0 KW	0.0 KW	0.0 KW
Total Power Losses =	25.6 KW	25.6 KW	0.0 KW
% Power Losses =	1 %	1 %	0 %
Annual Energy Loss =	97046.6 KWH	97046.6 KWH	0.0 KWH
% Annual Energy Loss =	0 %	0 %	0 %

UGC - 795A, OSP - 660A,
'S' Indicates Spot Load.
'**' Indicates Voltage Drop above 5 %

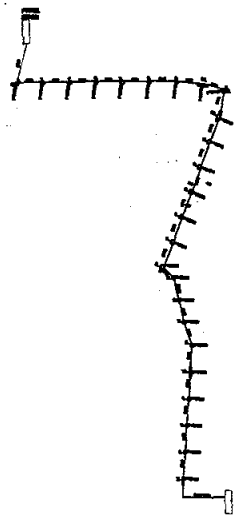
SAMD CONSULTANTS

DRAWINGS

SAMD
CONSULTANTS

11 KV NETWORK LAYOUT PLAN

SAMD CONSULTANTS



SAMD CONSULTANTS

11kV OVERHEAD TEMPORARY FEEDER

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

INFRASTRUCTURE DEVELOPMENT OF
BAHAWALPUR INDUSTRIAL ESTATE

11kV TEMPORARY FEEDER

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT) LTD LAHORE

	RECOMMENDED	VERIFIED	APPROVED
DRWN			
FILE			
CKD			
SUBM			

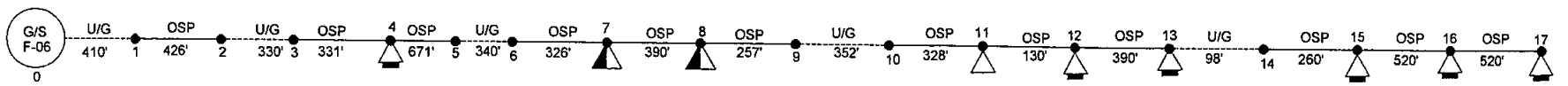
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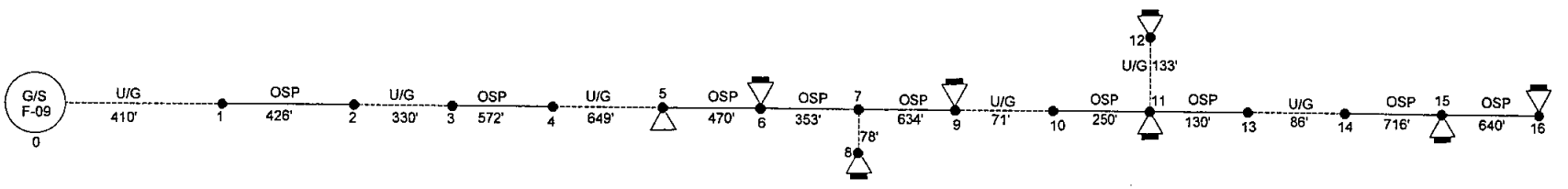
SINGLE LINE DIAGRAM

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LEGEND

S.NO.	DESCRIPTION	SYMBOL
1	250kVA PAD MOUTED TRANSFORMER	
2	500kVA PAD MOUTED TRANSFORMER	
3	750kVA PAD MOUTED TRANSFORMER	
4	1250kVA PAD MOUTED TRANSFORMER	
4	4 WAY RMU TYPE SF6 SWITCHES	
5	TRANSFORMER	XYZ
6	3 Nos. 1-CORE 800 Sq.mm AL/XLPE/AWA/PVC (6.7/15kV).	
7	3 CORE 120 Sq.mm AL/XLPE/SWA/PVC (6.7/15kV).	
8	TRANSFORMER IS ONLY FOR REFERENCE PURPOSE & NOT PART OF THIS CONTRACT.	





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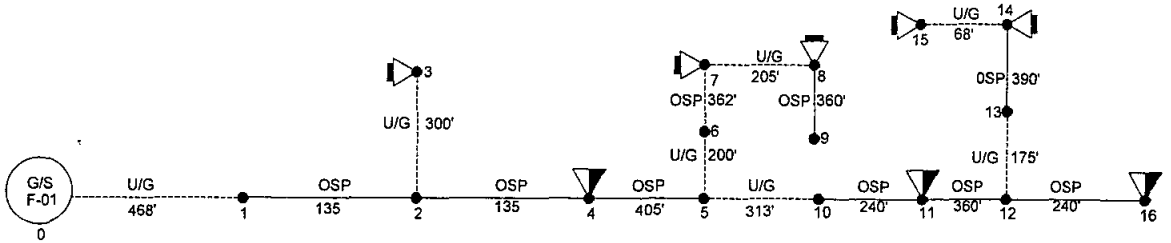
PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

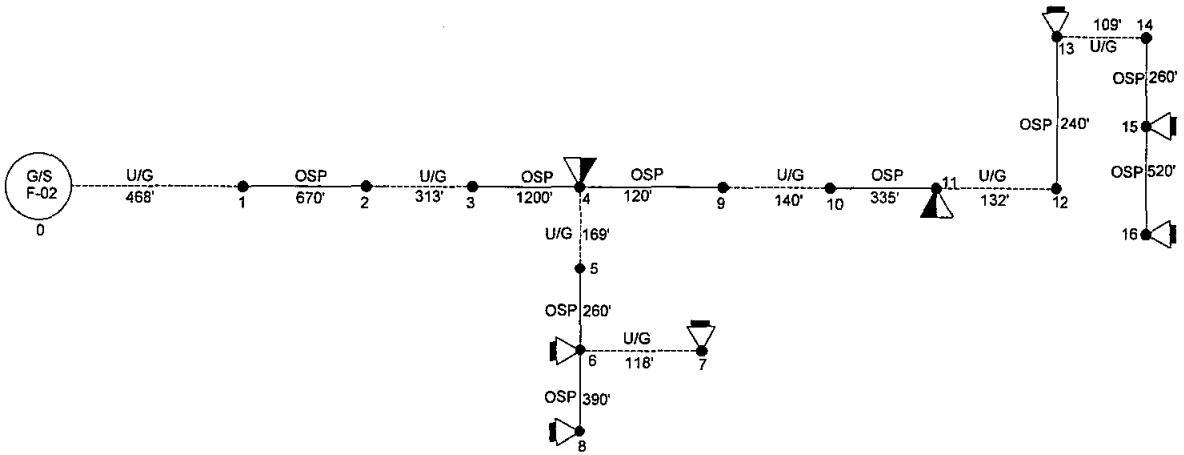
INFRASTRUCTURE DEVELOPMENT OF
BAHAWALPUR INDUSTRIAL ESTATE

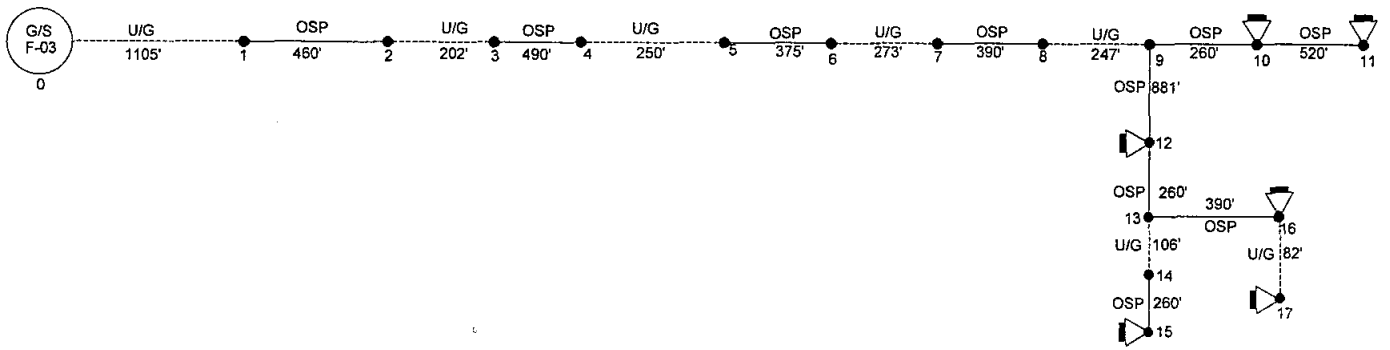
SINGLE LINE DIAGRAM
FEEDER NO. 06 & 09

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT) LTD LAHORE

DATE	DRAWING NO	REV.
SEP. 2023	3880/161/TD/5E003	0







LEGEND

S.NO.	DESCRIPTION	SYMBOL
1	250kVA PAD MOUTED TRANSFORMER	
2	500kVA PAD MOUTED TRANSFORMER	
3	750kVA PAD MOUTED TRANSFORMER	
4	1250kVA PAD MOUTED TRANSFORMER	
4	4 WAY RMU TYPE SF6 SWITCHES	
5	TRANSFORMER	XYZ
6	3 Nos. 1-CORE 400 Sq.mm AL/XLPE/AWA/PVC (8.7/15kV).	
7	3 CORE 120 Sq.mm AL/XLPE/SWA/PVC (8.7/15kV).	
8	TRANSFORMER IS ONLY FOR REFERENCE PURPOSE & NOT PART OF THIS CONTRACT.	

SAMD CONSULTANTS

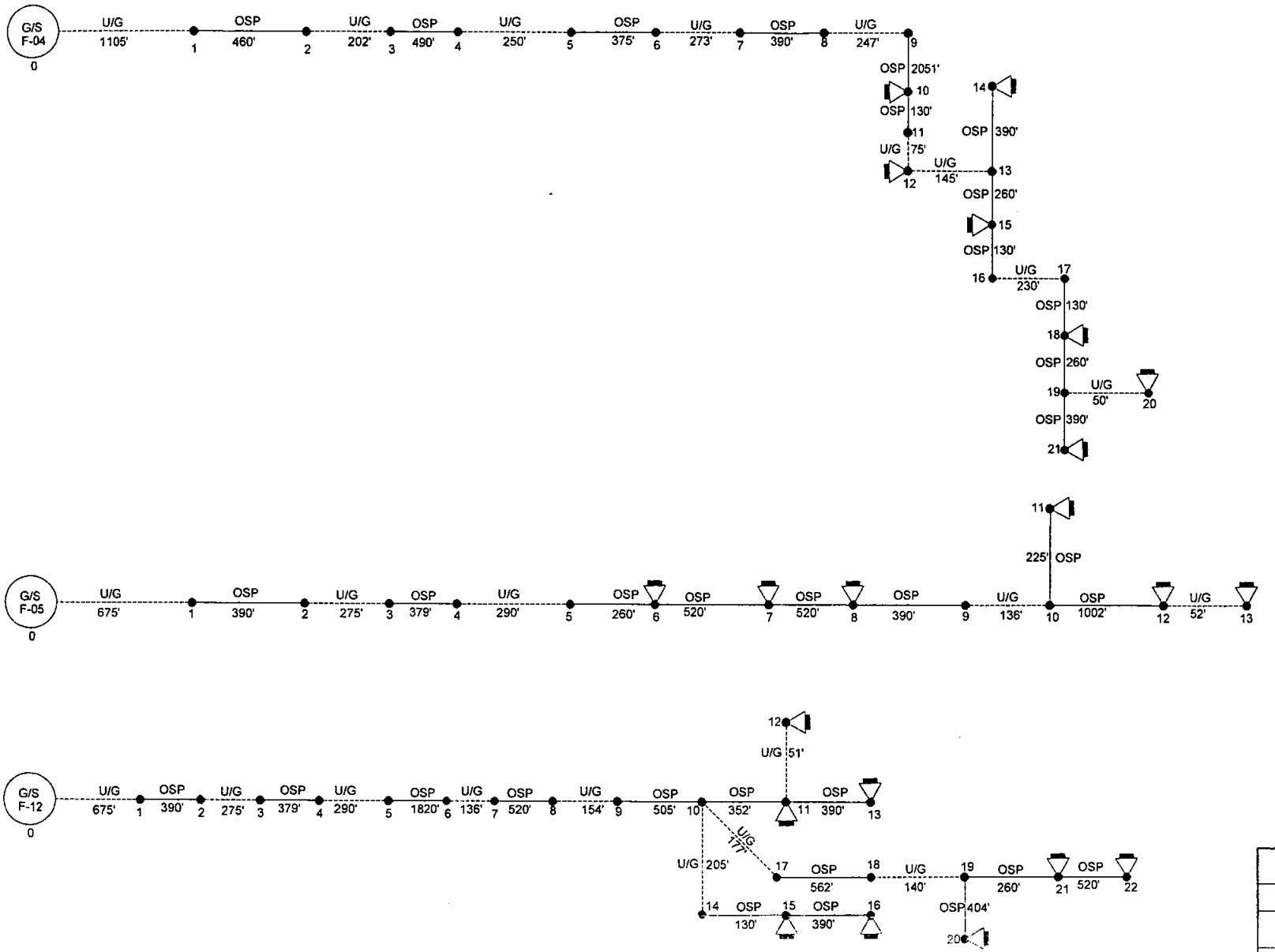
PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

INFRASTRUCTURE DEVELOPMENT OF
BAHAWALPUR INDUSTRIAL ESTATE

SINGLE LINE DIAGRAM
FEEDER NO. 01, 02 & 03

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT) LTD. LAHORE

DESIGN	RECOMMENDED	APPROVED
DWN. SA		
FILE	DATE	DRAWING NO.
CHD		



LEGEND

S.NO.	DESCRIPTION	SYMBOL
1	350kVA PAD MOUTED TRANSFORMER	
2	500kVA PAD MOUTED TRANSFORMER	
3	750kVA PAD MOUTED TRANSFORMER	
4	1250kVA PAD MOUTED TRANSFORMER	
4	4 WAY RMU TYPE SF6 SWITCHES	
5	TRANSFORMER	XYZ
6	3 Nos. 1-CORE 800 Sq.mm AL/XLPE/EWA/PVC (8.7/15kV).	
7	3 CORE 120 Sq.mm AL/XLPE/SWA/PVC (8.7/15kV).	
8	TRANSFORMER IS ONLY FOR REFERENCE PURPOSE & NOT PART OF THIS CONTRACT.	

SAMD CONSULTANTS

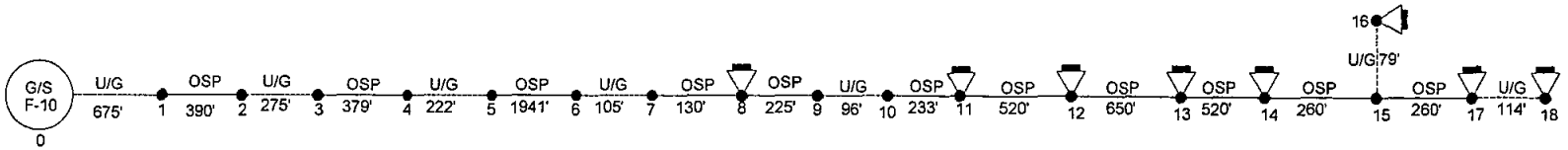
PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

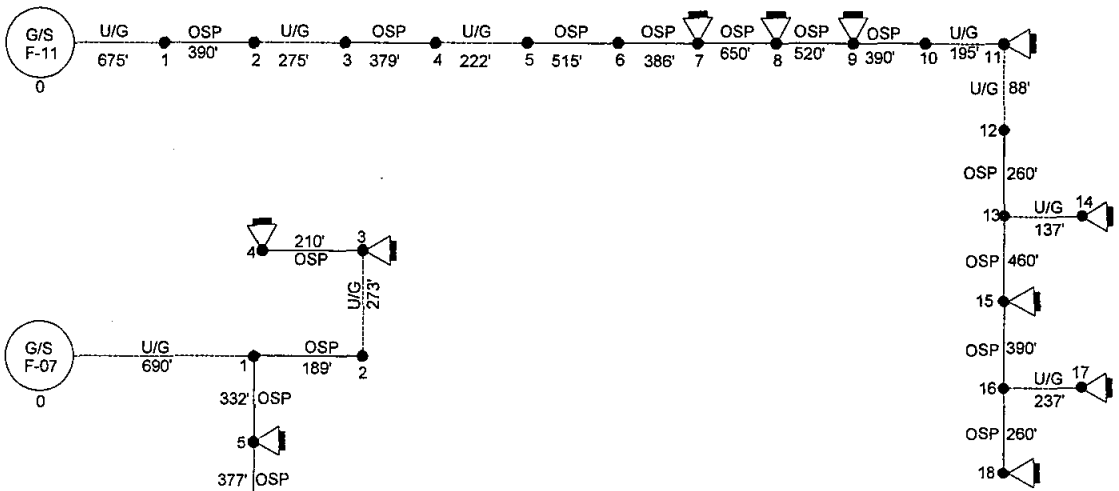
INFRASTRUCTURE DEVELOPMENT OF
BAHAWALPUR INDUSTRIAL ESTATE

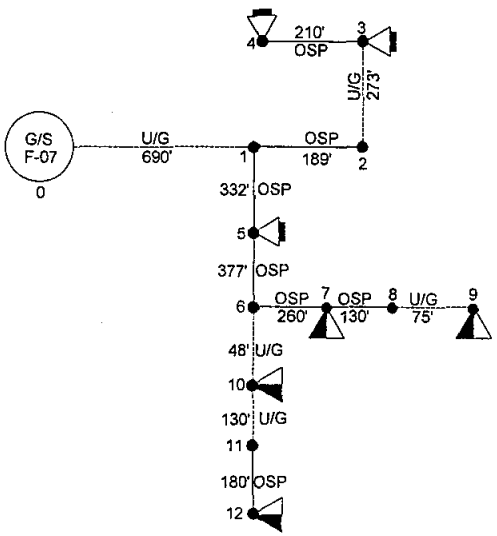
SINGLE LINE DIAGRAM
FEEDER NO. 04, 05 & 12

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. LAHORE

FILE		DRAWING NO.	REV
CKD.	DATE SEP. 2023	3880/161/TD/SE005	0
SUBM.			







LEGEND

S.NO.	DESCRIPTION	SYMBOL
1	2500kVA PAD MOUTED TRANSFORMER	
2	800kVA PAD MOUTED TRANSFORMER	
3	750kVA PAD MOUTED TRANSFORMER	
4	1250kVA PAD MOUTED TRANSFORMER	
4	4 WAY RMU TYPE SF6 SWITCHES	
5	TRANSFORMER	XY2
6	3 Nos. 1-CORE 300 Sq.mm AL/XLPE/AWA/PVC (6.7/11kV).	
7	3 CORE 120 Sq.mm AL/XLPE/BWA/PVC (6.7/11kV).	
8	TRANSFORMER IS ONLY FOR REFERENCE PURPOSE & NOT PART OF THIS CONTRACT.	

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

INFRASTRUCTURE DEVELOPMENT OF
BAHAWALPUR INDUSTRIAL ESTATE

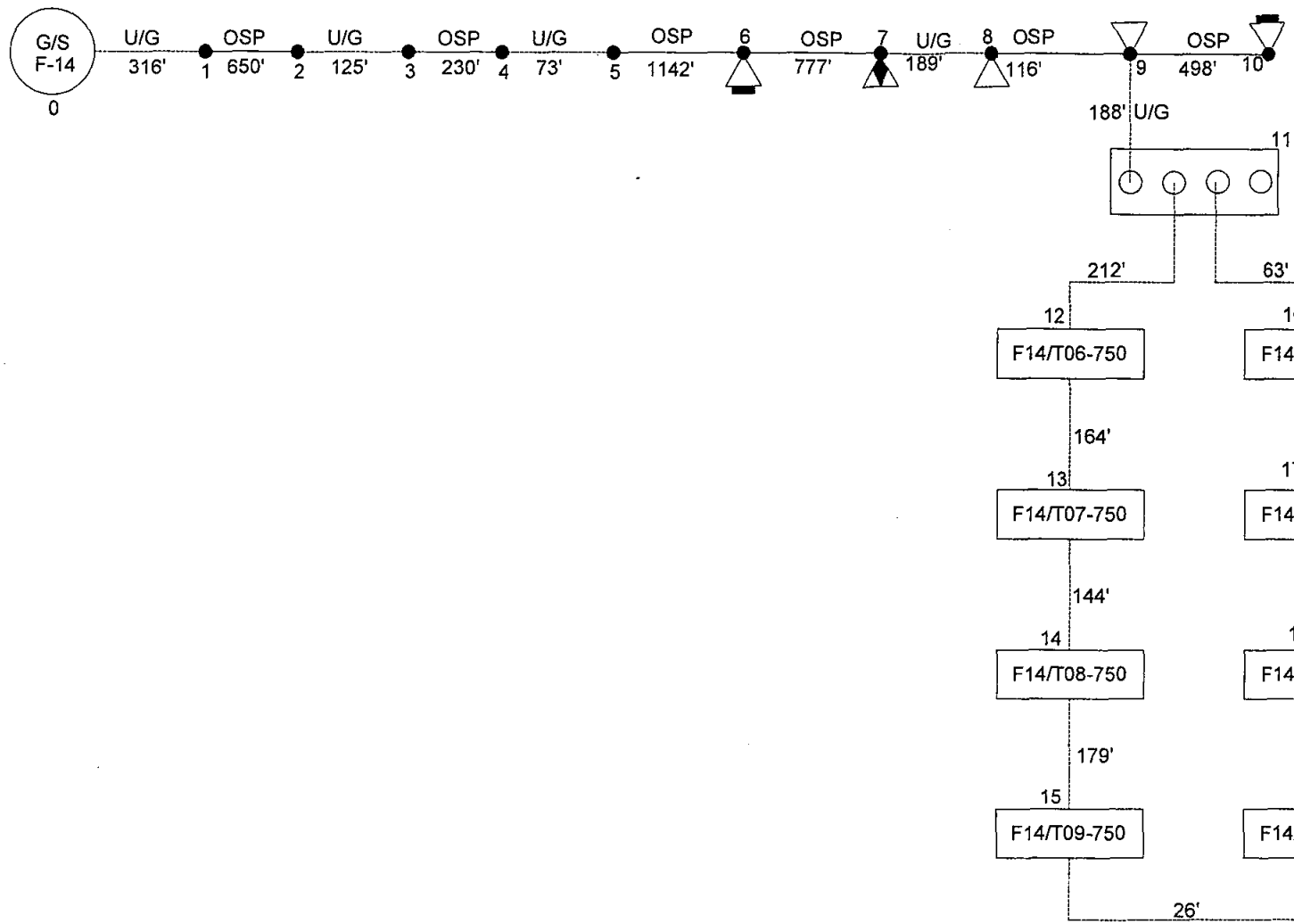
SINGLE LINE DIAGRAM
FEEDER NO. 10, 11 & 07

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT) LTD. LAHORE

DESIGNED	RECOMMENDED	VERIFIED	APPROVED
DRAWN			
CHK			
FILE	DATE	DRAWING NO.	REV.

SINGLE LINE DIAGRAM

SAMD
CONSULTANTS



LEGEND

S.NO.	DESCRIPTION	SYMBOL
1	250kVA PAD MOUTED TRANSFORMER	
2	500kVA PAD MOUTED TRANSFORMER	
3	750kVA PAD MOUTED TRANSFORMER	
4	1250kVA PAD MOUTED TRANSFORMER	
4	4 WAY RMU TYPE SF6 SWITCHES	
5	TRANSFORMER	XYZ
6	3 Nos. 1-CORE 800 Sq.mm Al./XLPE/AWA/PVC (8.7/15kV).	
7	3 CORE 120 Sq.mm Al./XLPE/SWA/PVC (8.7/15kV).	
8	TRANSFORMER IS ONLY FOR REFERENCE PURPOSE & NOT PART OF THIS CONTRACT.	

SAMD CONSULTANTS

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

INFRASTRUCTURE DEVELOPMENT OF
BAHAWALPUR INDUSTRIAL ESTATE

SINGLE LINE DIAGRAM
FEEDER NO. 14

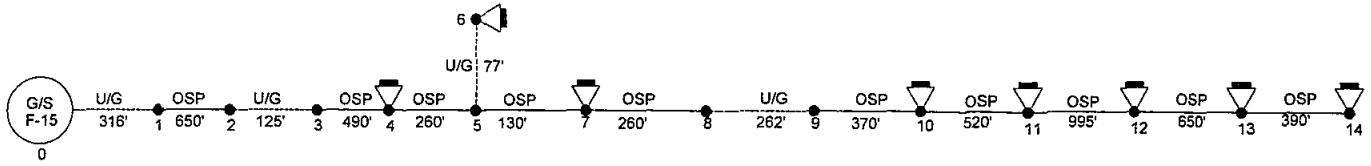
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT) LTD. LAHORE

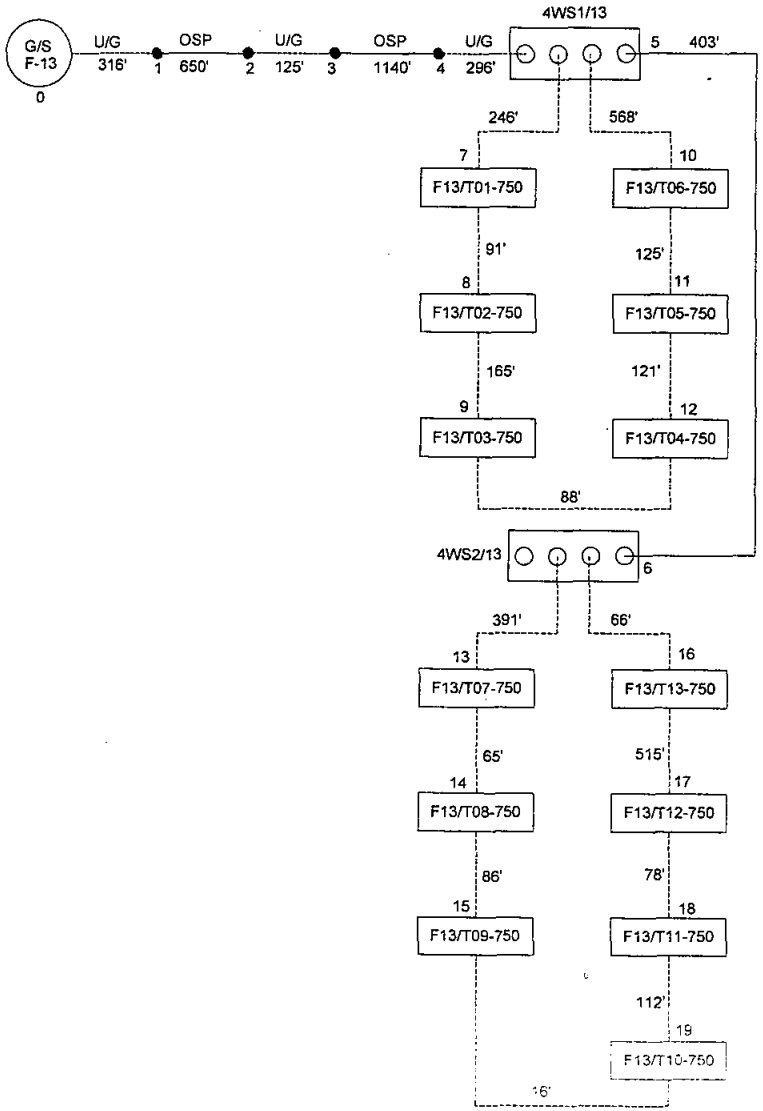
DESIGN	DRAWN	VERIFIED	APPROVED
DATE			
FILE			
CKD			
DWG			

DATE: SEP. 2023

DRAWING NO.: 3880/161/TD/5E007

REV: 0





LEGEND

S.NO.	DESCRIPTION	SYMBOL
1	250kVA PAD MOUTED TRANSFORMER	
2	500kVA PAD MOUTED TRANSFORMER	
3	750kVA PAD MOUTED TRANSFORMER	
4	1250kVA PAD MOUTED TRANSFORMER	
4	4 NOS 15kV TYPE SF6 SWITCHES	
5	TRANSFORMER	XYZ
6	3 Nos. 1-CORE 500 Sq.mm AL/XLPE/AWA/PVC (8.7/15kV)	
7	3 CORE 120 Sq.mm AL/XLPE/SWA/PVC (8.7/15kV).	
8	TRANSFORMER IS ONLY FOR REFERENCE PURPOSE & NOT PART OF THIS CONTRACT.	

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PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

INFRASTRUCTURE DEVELOPMENT OF
BAHAWALPUR INDUSTRIAL ESTATE

SINGLE LINE DIAGRAM
FEEDER NO. 15 &13

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT) LTD. LAHORE

	DESIGNED	PREPARED	CHECKED	APPROVED
DWN	SA			
TCD				
CKD		DATE	DRAWING NO.	REV.

ROAD/ STREET LIGHTING NETWORK

SAMD
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ENGINEER'S COST ESTIMATE

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INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE
ENGINEER'S COST ESTIMATE BASED (MRS ITEMS & N-MRS)
Electrical Works (Road Lighting Network based on LED Road Lighting Fixtures)

Sr. No.	M.R.S (Item/Chap)	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
		The Electrical Works include supply, transportation, storage, earthing, installation, Construction & preparation of foundation, testing and commissioning of the following items of works as mentioned (unless specifically stated otherwise) including all material, labour, tools, accessories, related civil works, etc., as required for proper completion of each item as per Specifications unless otherwise mentioned, for proper completion of each item as per Specifications, drawings and/or as directed by the Engineer according to standard/ specifications complete in all respect as per entire satisfaction of the Engineer. (Any necessary material not mentioned in specifications, electrical drawings and here in this Schedule of Prices required for proper installation, testing and commissioning of equipment and materials shall be included in Schedule of Prices rates. Bid price shall be final. No. Separate payment will be made for any such material. The Contractor shall be bound to provide any such material after award of this Contract for proper completion of the Electrical Installation Works.)				
		Road/ Street Lighting Poles				
801(a)	71(a-ii)/24, 89(a-i)/24	10m high single arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mmx4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter & one (01) no. 2A SP MCB 10kA breaker, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.	Each	30	152,019	4,560,570.0
801(b)	71(b-ii)/24, 89(a-i)/24	10m high double arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mm x4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter & two (02) nos. 2A SP MCB 10kA breaker, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.	Each	1	158,059	158,059.0
801(c)	71(a-iii)/24, 89(a-i)/24	12m high single arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mmx4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter & one (01) no. 2A SP MCB 10kA breaker, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.	Each	383	173,042	66,275,086.0

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Sr. No.	M.R.S (Item/Chap)	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
801(d)	71(b-iii)/24, 89(a-i)/24	12m high double arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mm x4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter & two (02) nos. 2A SP MCB 10kA breaker, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.	Each	-	179,282	-
801(e)	N-MRS	3m single bent arm tubular galvanized steel extension arm for installation of luminaire and clamping arrangement alongwith all the accessories like clamps with nuts & bolts (complete in all respect) for safe and mechanically sound installation on HT poles or as shown on drawing.	Each	165	26,340	4,346,100.0
801(f)	11(ii)/6, 8(a-ii)/6, 12/9, 3/10	Road Lighting Pole Foundation	Each	414	38,469	15,926,166.0
		Road Lights Accessories				
802(a)	72(c-v)/24	Road Lighting LED Cobra-head Luminaries of 90W and 120 lm/W conforming to IP 66 & IK 08 or above Philips/Osram/Thorn or equivalent with corrosion resistant die casted Aluminum housing, silicon gasket in special groove, UV stable & scratch resistant synthetic materials, thermally hardened glass complete with LED Chip (Philips Lumiled/Cree/Nichia/Osram make or equivalent), programmable LED driver (Harvard/TCI/Lumotech/Philips/ VOSSLOHSchwabe /Lightech make or equivalent), minimum 10kV surge protection rating i/c the cost of all accessories/ components required for proper operation, fully flexible for future upgradation and easy replacements for maintenance purposes, bucket elevator charges as approved and directed by the Engineer Incharge.	No.	30	72,334.10	2,170,023.0
802(b)	72(c-vi)/24	Road Lighting LED Cobra-head Luminaries of 120W and 120 lm/W conforming to IP 66 & IK 08 or above Philips/Osram/Thorn or equivalent with corrosion resistant die casted Aluminum housing, silicon gasket in special groove, UV stable & scratch resistant synthetic materials, thermally hardened glass complete with LED Chip (Philips Lumiled/Cree/Nichia/Osram make or equivalent), programmable LED driver (Harvard/TCI/Lumotech/Philips/ VOSSLOHSchwabe /Lightech make or equivalent), minimum 10kV surge protection rating i/c the cost of all accessories/ components required for proper operation, fully flexible for future upgradation and easy replacements for maintenance purposes, bucket elevator charges as approved and directed by the Engineer Incharge.	No.	438	77,302.10	33,858,319.8

SAMD CONSULTANTS

INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE
ENGINEER'S COST ESTIMATE BASED (MRS ITEMS & N-MRS)
Electrical Works (Road Lighting Network based on LED Road Lighting Fixtures)

Sr. No.	M.R.S (Item/Chap)	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
802(c)	72(c-viii)/24	Road Lighting LED Cobra-head Luminaries of 150W and 120 lm/W conforming to IP 66 & IK 08 or above Philips/Osram/Thorn or equivalent with corrosion resistant die casted Aluminum housing, silicon gasket in special groove, UV stable & scratch resistant synthetic materials, thermally hardened glass complete with LED Chip (Philips Lumiled/Cree/Nichia/Osram make or equivalent), programmable LED driver (Harvard/TCI/Lumotech/Philips/ VOSSLOHSchwabe /Lightech make or equivalent), minimum 10kV surge protection rating i/c the cost of all accessories/ components required for proper operation, fully flexible for future upgradation and easy replacements for maintenance purposes, bucket elevator charges as approved and directed by the Engineer Incharge.	No.	104	85,582.10	8,900,538.4
803(b)	28(c)/23, 6/3	PVC pipe/conduit Class-D 100 mm dia with accessories suitable for laying multi-core cables in trenches/directly burried on road crossings including excavation.	Rm	2,500	3,138.00	7,845,000.0
803(c)	27(b)/23	PVC pipe/conduit Class-B 100 mm dia with accessories suitable for laying multi-core cables in walls/barriers/structure.	Rm	200	1,800.70	360,140.0
		Low Voltage Power Cables				
804 (a)	N-MRS item	4 Core 50mm^2 Al./PVC/SWA/PVC 600/1000 Voltage grade Unarmored Cable (Tranformer to LCP) (Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)	Rm	1,000	2,580	2,580,000.0
804(b)	N-MRS item	4 Core 25mm^2 Al./PVC/SWAPVC 600/1000 Voltage grade Unarmored Cable (Tranformer to LCP) (Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)	Rm	32,500	1,879	61,067,500.0
(c)	N-MRS item	2 Core 25mm^2 Al./PVC/SWA/PVC 600/1000 Voltage grade Unarmored Cable (Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)	Rm	3,500	996	3,486,000.0
804 (d)	10(c-iii)/24	1 core 2.5 mm^2 Cu/PVC 450/750 (R+G+E) Voltage grade cable (stranded conductor) (Imported copper shall be used. Verified documentary evidence for source of copper & PVC shall be furnished prior to manufacturing) from junction box to the fitting through the hollow of pole.				
i		12 m cable is required for 10m single arm pole and the unit is taken as No. (For 10 m Single Arm Pole)	No.	31	6,576	203,856.0
ii		14 m cable is required for 12m single arm pole and the unit is taken as No. (For 12 m Single Arm Pole)	No.	383	7,672	2,938,376.0
iii		08 m cable is required for 3 m Extension arm and the unit is taken as No. (3m Extension Arm)	No.	165	4,384	723,360.0

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INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE
ENGINEER'S COST ESTIMATE BASED (MRS ITEMS & N-MRS)
Electrical Works (Road Lighting Network based on LED Road Lighting Fixtures)

Sr. No.	M.R.S (Item/Chap)	Description	Unit	Qty	Rate (Rs.)	Amount (Rs.)
		Road Lighting Control Panel				
805	91(a-i)/24, 97(xv-b)/24, 97(i)/24, 97(iv)/24, 97(iii)/24, 97(x)/24, 97(vi)/24	Road lighting control panel with angle iron frame cladded 14 SWG, sheet steel enclosure having high quality powder coated paint, color RAL 7032. The LCP shall be complete with incoming and outgoing MCCBs, Cu bus bars, magnetic contactors, photo-electric switches, meters, indication lights, construction with IP 54 protection class, door, locking arrangement etc. and all other accessories as required for quality work. **MATERIAL** 1 No. incoming 80 Amp.(adj.) TP, MCCB, 25 kA 4 No. outgoing 25 Amp. (adj.) TP MCCBs, 25 kA 2 No. outgoing 25 Amp. (adj.) TP MCCBs, 25 kA (Spare) 4 No. 32 Amp. magnetic contactor 2 No. 32 Amp. magnetic contactor (Spare) 3 No. photo-electric switches with timers and relays a) 1 No. ammeters 0-100 Amp, with selector switch (04 position) and CT of 100/5 Amp b) 3 No. indication lights c) 1 No. voltmeter with fuse and 7 position selector switch. d) 3 Ph, N & Earth copper bus bars internal wiring & line-up terminals etc. Brass cable glands/accessories e) 08 Nos. Auto-Manual-OFF (3 position switches for operation in auto (with photocell) and normal (manual mode-photocell override) f) 08 Nos.ON & 08 Nos. OFF push button switch's with indication lights g) Panel Light with limit Switch	Job	11	457,925	5,037,175.0
b)		Construction of the foundation for street lighting Control Panels conforming to requirements, standards, Drawings etc. Complete in all respect as per entire satisfaction of the Engineer. Contractor shall submit the detail foundation design for review before execution.	No.	11	32,500	357,500.0
		Earth point				
806	N-MRS item	Earthing system including ground conductor (10 mm standard G.I wire) Clamps, MS Galvanized earth rod 10'x5/8" and earth rod clamp etc. obtain the specified earth resistance up to 5.0 ohms, as per requirements, specification.	Each	616	17,553	10,812,648.0
		Distribution Transformer				
807 As per WAPDA Specs.		25 kVA, 11/0.415 kV pole mounted transformer, and all accessories, Installation including energy meter and Earthing etc. and Connection Charges with energy meter as per WAPDA standards and practice.	Job	11	754,668	8,301,348.0
		Total of Bill No. 8				**239,907,765.20**

Note:

- The cost of materials are inclusive of General Sales Tax (G.S.T)
- The above referred cost is for estimation purposes only and are based on budgetary quotations from the different manufacturers/suppliers. The final cost for the referred items shall be decided/finalized by the Client as per method of procurement i.e. open tendering, limited quotations from prequalified manufacturers/suppliers or any other.

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INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

UNIT RATE ANALYSIS FOR ELECTRIFICATION WORKS (WITH LED ROAD LIGHTING FIXTURE)

Item No.	M.R.S (Item/Chap)	Description		
801(a)	71(a-ii)/24, 89(a-i)/24	10m high single arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mmx4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter & one (01) no. 2A SP MCB 10kA breaker, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.		
			UNIT = EACH	
		MATERIAL		
	71(a-ii)/24	- 10m high single arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mmx4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter,i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.	= Rs.	151,019.25
	89(a-i)/24	- 01 No. MCB SP 2 Amps 10kA. & Connection	= Rs.	999.8
			Total: = Rs.	152,019.05
			SAY = Rs.	**152,019.00**
801(b)	71(b-ii)/24, 89(a-i)/24	10m high double arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mm x4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter & two (02) nos. 2A SP MCB 10kA breaker, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.		
			UNIT = EACH	
		MATERIAL		
	71(b-ii)/24	- 10m high double arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mm x4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter,i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.	= Rs.	156,059.50
	89(a-i)/24	- 2 Nos. MCB SP 2 Amps 10kA. & Connection	= Rs.	1,999.60
			Total: = Rs.	158,059.10
			SAY = Rs.	**158,059.00**

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UNIT RATE ANALYSIS

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801(c)	71(a-iii)/24, 89(a-i)/24	12m high single arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mmx4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter & one (01) no. 2A SP MCB 10kA breaker, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.			
					UNIT = EACH
		MATERIAL			
-	71(a-iii)/24	12m high single arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mmx4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter,i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.		= Rs.	172,041.70
-	89(a-i)/24	01 No. MCB SP 2 Amps 10kA. & Connection		= Rs.	999.80
			Total:	= Rs.	173,041.50
			SAY	= Rs.	**173,042.00**
801(d)	71(b-iii)/24, 89(a-i)/24	12m high double arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mm x4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter & two (02) nos. 2A SP MCB 10kA breaker, i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.			
					UNIT = EACH
		MATERIAL			
-	71(b-iii)/24	12m high double arm octagonal shape electric street light pole, made of hot dipped 4.5 mm thick (7 SWG) galvanized steel, tappered from 225 mm at bottom to 100 mm at top,with 1500 mmx60 mm x4mm thick dia. arm for luminaire installation, duly G.I.welded with 470x470x20 mm base plate with the help of 4 no triangular stiffeners 100x350x20 mm of GI sheet,with built in junction box with shutter,i/c the cost of nuts & J-rag bolts, duly fixed in prelaid concrete foundation, foundation will be paid additionally as approved and directed by the Engineer Incharge.		= Rs.	177,281.95
-	89(a-i)/24	2 Nos. MCB SP 2 Amps 10kA. & Connection		= Rs.	1,999.60
			Total:	= Rs.	179,281.55
			SAY	= Rs.	**179,282.00**

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801(e) N-MRS — 3m single bent arm tubular galvanized steel extension arm for installation of luminaire and clamping arrangement alongwith all the accessories like clamps 3 Nos. with nuts & bolts (complete in all respect) for safe and mechanically sound installation on existing Wapda poles as shown on drawing.

UNIT = Each

MATERIAL

3 m high single bent arm tubular galvanized steel extension		= Rs.	18,000.00
clamping arrangement alongwith all the accessories like clamps 3 Nos. with nuts & bolts (complete in all respect) for safe and mechanically sound installation			
	Sub-Total:	= Rs.	18,000.00

LABOUR

Carriage to site and unloading etc.		= Rs.	250.00
Installation including sundries		= Rs.	1,000.00
	Sub-Total:	= Rs.	19,250.00
Contractor's overheads @ 10% and profit @ 10% on Material		= Rs.	3,850.00
GST @ 18% on Material		= Rs.	3,240.00
	Grand Total:	= Rs.	26,340.00
Note:	***SAY***	= Rs.	**26,340.00**

The cost of materials are inclusive of General Sales Tax (G.S.T)
The above referred cost is for estimation purposes only and are based on budgetary quotations from the different manufacturers/suppliers. The final cost for the referred items shall be decided/finalized by the Client as per method of procurement i.e. open tendering, limited quotations from prequalified manufacturers/suppliers or any other.

801(f) **MRS item** — **Road Lighting Pole Foundation**

UNIT = EACH

MATERIAL

Steel Reinforcement

Main Bar 3/4" Dia 8 x 2.7 M = 21.6 M

Rings 3/8" Dia 13 x 2.2 M = 28.6 M

21.6 Mtr. 3/4 Dia @ 2.235Kg/M = 48.276

28.6 Mtr. 3/8 Dia @ 0.56Kg/M = 16.016

11 (ii)/6	Total = 64.292 @ 316.4435Kg	= Rs.	20,374.68
8 (a-ii)/6	Concrete Class A1 (0.894 CM) @ 20,160.45/-	= Rs.	17,365.82
12/9	Bitchmen Coating (1.38 Sqm x 518.65)	= Rs.	695.244
3/10	Sand Bed Under Foundation		
	0.686 x 0.686 x 0.05 = 0.023 CM @ Rs. 1425 C/M	= Rs.	32.78
	Sub-Total:	= Rs.	38,468.52
	SAY	= Rs.	**38,469.00**

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UNIT RATE ANALYSIS FOR ELECTRIFICATION WORKS (WITH LED ROAD LIGHTING FIXTURE)

803(b) Providing and installation of PVC pipe conduit Class-D 100 mm dia with accessories suitable for laying multi-core cables in trench.

UNIT = RUNNING METRE

MATERIAL

-	28(c)/23	PVC pipe conduit Class D 100 mm dia with accessories		= Rs.	3,094.40
-	6/3	labour including earth excavation 1x .6 x .3 mtr= .18x242.65		= Rs.	43.68
			Total:	= Rs.	3,138.08
			SAY	= *Rs.*	**3,138.00**

804(a) N-MRS item — 4 Core 50mm^2 Al./PVC/PVC 600/1000 Voltage grade Unarmored Cable (Tranformer to LCP) (Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)

UNIT = RUNNING METRE

MATERIAL

-	4 Core 50mm2 Al./PVC/PVC 600/1000 Voltage grade Unarmored Cable (Tranformer to LCP) (Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)		= Rs.	2,064.89
	LABOUR			
-	Carriage to site and unloading etc.		= Rs.	35.00
-	Installation including end connections, sundries, testing and commissioning.		= Rs.	50.00
		Total:	= Rs.	2,149.89
-	Contractor's overheads @ 10% and profit @ 10% on Material		= Rs.	429.98
-	GST @ 18% on Material		= Rs.	371.68
		Grand Total:	= Rs.	2,579.87
				2,580.00

Note:-

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INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

UNIT RATE ANALYSIS FOR ELECTRIFICATION WORKS (WITH LED ROAD LIGHTING FIXTURE)

804(b) N-MRS item — 4 Core 25mm^2 Al./PVC/SWA/PVC 600/1000 Voltage grade Unarmored Cable. Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)

UNIT = RUNNING METRE

MATERIAL

-	4 Core 25mm2 Al./PVC/SWA/PVC 600/1000 Voltage grade Unarmored Cable. Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)	= Rs.	1,480.94

LABOUR

-	Carriage to site and unloading etc.	= Rs.	35.00
-	Installation including end connections, sundries, testing and commissioning.	= Rs.	50.00
	Total:	= Rs.	1,565.94
-	Contractor's overheads @ 10% and profit @ 10% on Material	= Rs.	313.19
-	GST @ 18% on Material	= Rs.	266.57
	Grand Total:	= Rs.	1,879.13
	SAY	= Rs.	**1,879.00**

Note:-

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804(c) N-MRS item — 2 Core 25mm^2 Al./PVC/SWA/PVC 600/1000 Voltage grade Unarmored Cable. Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)

UNIT = RUNNING METRE

MATERIAL

2 Core 25mm2 Al./PVC/SWA/PVC 600/1000 Voltage grade Unarmored Cable. Verified documentary evidence for source of Aluminium & PVC shall be furnished prior to manufacturing)		= Rs.	785.27
LABOUR			
Carriage to site and unloading etc.		= Rs.	20.00
Installation including end connections, sundries, testing and commissioning.		= Rs.	25.00
	Total:	= Rs.	830.27
Contractor's overheads @ 10% and profit @ 10% on Material		= Rs.	166.05
GST @ 18% on Material		= Rs.	141.35
	Grand Total:	= Rs.	996.32
Note:-	*SAY*	= Rs.	**996.00**

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804(f) 10(c-iii)/24 — 3 Nos. 1 core 2.5 mm^2 Cu. PVC 450/750 Voltage grade copper cable (stranded conductor) (Imported copper shall be used. Verified documentary evidence for source of copper & PVC shall be furnished prior to manufacturing) from junction box to the fitting through the hollow of pole.

UNIT = Each

MATERIAL

1 Nos 1 core 2.5 mm^2 Cu. PVC 450/750 Voltage grade copper cable (stranded conductor) (Imported copper shall be used. Verified documentary evidence for source of copper & PVC shall be furnished prior to manufacturing) from junction box to the fitting through the hollow of pole.		= Rs.	548.40
	SAY	= Rs.	**548.00**

i) 12 m cable is required for 10m single arm pole and the unit is taken as No. (For 10 m Single Arm Pole)

- Price per No. — **6,576.0**

ii) 14 m cable is required for 12m single arm pole and the unit is taken as No. (For 12 m Single Arm Pole)

- Price per No. — **7,672.0**

iii) 08 m cable is required for 3 m Extension arm and the unit is taken as No. (3m Extension Arm)

- Price per No. — **4,384.0**

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INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

UNIT RATE ANALYSIS FOR ELECTRIFICATION WORKS (WITH LED ROAD LIGHTING FIXTURE)

805(a) Road lighting control panel with angle iron frame cladded 14 SWG, sheet steel enclosure having high quality powder coated paint, color RAL 7033. The LCP shall be complete with incoming and outgoing MCCBs, Cu bus bars, magnetic contactors, photo-electric switches, meters, indication lights, construction with IP 54 protection class, door, locking arrangement etc. and all other accessories as required for quality work

	MATERIAL	UNIT = Each		
MRS items				
91(a-i)/24	1 No. incoming 80 Amp.(adj.) TP, MCCB, 25 kA		= Rs.	27,166.95
91(a-i)/24	4 No. outgoing 25 Amp. (adj.) TP MCCBs, 25 kA		= Rs.	108,667.80
91(a-i)/24	2 No. outgoing 25 Amp. (adj.) TP MCCBs, 25 kA (Spare)		= Rs.	54,333.90
97(xv-b)/24	4 No. 40 Amp. magnetic contactor AC-3		= Rs.	87,054.20
97(xv-b)/24	2 No. 40 Amp. magnetic contactor (Spare) AC-3		= Rs.	43,527.10
97(i)/24, 97(iv)/24	a) 1 No. ammeters 0-100 Amp, with selector switch (04 position) and CT of 100/5 Amp		= Rs.	4,378.65
97(i)/24, 97(iii)/24	c) 1 No. voltmeter with 7 position selector switch.		= Rs.	2,172.25
97(x)/24	e) 06 Nos. Auto-Manual-OFF (3 position switches for operation in auto (with photocell) and normal (manual mode-photocell override)	job	= Rs.	11,781.30
97(vi)/24	f) 06 Nos.ON & 06 Nos. OFF push button switch's with indication lights	job	= Rs.	7,002.60
		Sub total:	= Rs.	346,084.75
N-MRS items				
	g) Panel Light with limit Switch	job	= Rs.	2,500.00
	3 No. photo-electric switches with timers and relays		= Rs.	24,000.00
	b) 3 No. indication lights		= Rs.	4,200.00
	d) 3 Ph, N & Earth copper bus bars Internal wiring & line-up terminals etc. Brass cable glands/accessories	job	= Rs.	10,500.00
	h) Panel with angle iron frame cladded 14 SWG, sheet steel enclosure having high quality powder coated paint, color RAL 7032	job	= Rs.	35,000.00
		Sub total:	= Rs.	76,200.00
	fabrication/painting of LCP and fixing of components in position.		= Rs.	7,000.00
	Carriage, installation, testing, commissioning at site & sundries etc.		= Rs.	10,000.00
		Total:	= Rs.	93,200.00
	Contractor's overheads and profit @ 20%		= Rs.	18,640.00
		Grand Total:	= Rs.	457,924.75
	Note:-	***SAY***	**= Rs.**	**457,925.00**

The cost of materials are inclusive of General Sales Tax (G.S.T)
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INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

UNIT RATE ANALYSIS FOR ELECTRIFICATION WORKS (WITH LED ROAD LIGHTING FIXTURE)

806 N-MRS item — Earthing system including ground conductor (10 mm standard G.I wire) Clamps, MS Galvanized earth rod 10'x5/8" and earth rod clamp etc. obtain the specified earth resistance up to 5.0 ohms, as per requirements, specification.

MATERIAL — UNIT = Each

- MS Galvanized earth rod 10'x5/8" and earth rod clamp etc obtain the specified earth resistance up to 5.0 ohms with 10 mm slandered G.I wire		= Rs.	9,850.00
- Civil work of earth point and R.C.C. cover.		= Rs.	2,000.00
	Sub-Total:	= Rs.	11,850.00

LABOUR

- Carriage to site, transportation and unloading etc.		= Rs.	250.00
- Installation including connections, sundries, testing and commissioning.		= Rs.	350.00
- Including earth excavation, laying of pipe, end connections, hand holes, backfilling etc. and sundries.		= Rs.	400.00
	Total:	= Rs.	12,850.00
- Contractor's overheads and profit @ 20%		= Rs.	2,570.00
- GST @ 18% on Material			2,133.00
	Grand Total:	= Rs.	17,553.00
	SAY	= Rs.	**17,553.00**

Note:-

- The cost of materials are inclusive of General Sales Tax (G.S.T)
- The above referred cost is for estimation purposes only and are based on budgetary quotations from the different manufacturers/suppliers. The final cost for the referred items shall be decided/finalized by the Client as per method of procurement i.e. open tendering, limited quotations from prequalified manufacturers/suppliers or any other.

As per WAPDA Specs. N-MRS item — 25 kVA, 11/0.415 kV pole mounted transformer, and all accessories, Installation including energy meter and Earthing etc. and Connection Charges with energy meter as per WAPDA standards and practice.

MATERIAL — UNIT = JOB

- 25 kVA, 11/0.415 kV pole mounted transformer.		= Rs.	477,178.00
- Accessories for installation of 25 kVA 11/0.415kV Pole Mounted transformer including energy meter and Earthing etc.		= Rs.	55,135.00

LABOUR

- Carriage, labour for installation and sundries.		= Rs.	25,000.00
	Total:	= Rs.	557,313.00
- Contractor's overheads @ 10% and profit @ 10%			111,462.60
- GST @ 18% on Material			85,892.04
	Grand Total:	= Rs.	754,667.64
	SAY	= Rs.	**754,668.00**

Note:

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- The above referred cost is for estimation purposes only and are based on budgetary quotations from the different manufacturers/suppliers. The final cost for the referred items shall be decided/finalized by the Client as per method of procurement i.e. open tendering, limited quotations from prequalified manufacturers/suppliers or any other.

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DRAWINGS

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NATIONAL TRANSMISSION & DESPATCH CO. LTD

General Manager (Power System Planning)

No. GMPSP/CETP/TRP-405/3536-40 Dated: 18-10-2023

Chief Engineer Electrical
Punjab Industrial Estates
Development and Management Company
Commercial Area (North) Sundar Industrial Estate
Sundar Raiwind Road, Lahore
Ph: 042-35297203-6

Subject: **Data permission to carry out Load Flow Study of 132/11 kV grid station at Bahawalpur Industrial Estate (BWPIE) by Punjab Industrial Estates Development and Management Company (PIEDMC)**

Ref: Your Office Letter No. PIE/CEE/BwpIE/2152 dated 13-10-2023

With reference to your letter above, the information required to conduct the grid interconnection of the subject industrial load is as follows:

1. The latest generation expansion plan and latest load projection of NTDC are hereby attached for the subject study.
2. The consultant M/s Power Planners International (PPI) may be advised to contact the O/o Chief Executive Office MEPCO to obtain the expansion plan of MEPCO and short circuit rating of 132 kV substations in the vicinity of the subject load.

A kick off meeting has already taken place on 03-10-2023 among project developer, the study consultant M/s PPI, MEPCO and NTDC Planning to decide the assumptions and scenarios before the initiation of the subject study. Please advise the study consultant to visit this office on 20-10-2023 to obtain system base cases (PSS/E data model) and updated transmission expansion plan for the subject study.

However, M/s PPI is advised not to use the system data/information for any other study nor it should be provided to any other company including the sponsor of the above power plant without the prior permission of the of Power System Planning (PSP) NTDC.

Furthermore, the data permission provided by this office is just for interconnection studies regarding interconnectivity aspect of the subject load.

18/X/2023

Chief Engineer (Transmission Planning)

Copy to:

1. Deputy Managing Director (P&E) NTDC
2. General Manager (PSP) NTDC
3. Director General MIRAD MEPCO, Multan
4. Power Planners International, 95-H/2, Wapda Town, Lahore
- Master File

Table 1-3 DISCO-Wise Demand- MW Forecast Summary												
Description	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**2030-31**	**ACGR**
LESCO	4,818	4,905	5,179	5,412	5,639	5,890	6,128	6,387	6,646	6,913	7,257	4.2
GEPCO	2,977	2,947	3,047	3,139	3,237	3,339	3,495	3,660	3,825	3,993	4,213	3.5
FESCO	3,380	3,434	3,731	3,942	4,131	4,356	4,575	4,796	5,059	5,336	5,687	5.3
IESCO	2,434	2,486	2,636	2,817	3,058	3,283	3,509	3,692	3,835	3,973	4,157	5.5
[illegible]EPCO	4,559	4,678	4,960	5,234	5,506	5,786	6,051	6,320	6,581	6,847	7,184	4.7
[illegible]ESCO	2,487	2,451	2,565	2,809	2,985	3,159	3,311	3,529	3,745	3,998	4,298	5.6
HESCO	1,187	1,238	1,281	1,337	1,394	1,463	1,525	1,604	1,680	1,770	1,879	4.7
QESCO	1,074	1,086	1,137	1,222	1,308	1,444	1,575	1,749	1,922	2,134	2,372	8.2
TESCO	471	476	497	534	597	649	714	742	807	886	976	7.6
SEPCO	1,033	1,007	1,034	1,086	1,139	1,219	1,295	1,397	1,497	1,622	1,765	5.5
DISCOs Demand (undiversified)	**24,420**	**24,708**	**26,069**	**27,530**	**28,993**	**30,588**	**32,177**	**33,876**	**35,598**	**37,472**	**39,787**	5.0
Coincidence Factor (%)	91.9	92.0	92.1	92.2	92.3	92.4	92.5	92.6	92.7	92.8	92.9	
DISCOs Demand (Diversified)	**22,430**	**22,719**	**23,997**	**25,370**	**26,747**	**28,249**	**29,748**	**31,352**	**32,982**	**34,756**	**36,943**	5.1
T & T Losses (500 & 220kV)	684	718	759	832	878	928	955	1,036	1,107	1,173	1,236	
% T & T Losses (500 & 220kV)	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	
NTDC Demand	**23,114**	**23,437**	**24,755**	**26,202**	**27,625**	**29,177**	**30,703**	**32,388**	**34,089**	**35,928**	**38,179**	5.1
Export to K-Electric (MW)	1,090	1,100	1,100	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	
Systmen Demand With Export to K-Electric	**24,204**	**24,537**	**25,855**	**28,252**	**29,675**	**31,227**	**32,753**	**34,438**	**36,139**	**37,978**	**40,229**	5.2

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#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	Schedule of Commissioning
2030-31							
1	Mahl	Hydro	640	640	PPIB	Optimized	Jul-30
2	Thakot-III	Hydro	1,490	1,490	WAPDA	Optimized	Jul-30
3	Net Meter	Solar	480	480	AEDB	Committed	Jul-30
4	KE_New_Solar	Solar	150	150	Yet to be determined	Optimized	Jul-30
5	KE_New_Wind	Wind	50	50	Yet to be determined	Optimized	Jul-30
6	Kohala (U #2)	Hydro	275	275	PPIB	LOS (Issued)	Aug-30
7	Kohala (U #3)	Hydro	275	275	PPIB	LOS (Issued)	Oct-30
8	Kohala (U #4)	Hydro	275	275	PPIB	LOS (Issued)	Dec-30
9	Kohala (U #5)	Hydro	12	12	PPIB	LOS (Issued)	Feb-31
10	Kohala (U #6)	Hydro	12	12	PPIB	LOS (Issued)	Mar-31
Generation Additions in 2030-31 (MW)			**3,659**	**3,659**			
Cumulative Addition up till 2031 (MW)			**36,291**	**35,967**			

**Solar values are in MW_p*

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	Schedule of Commissioning
8	Nila Da Katha	Hydro	31.3	31.3	PEDO	Optimized	Jul-28
9	Taunsa	Hydro	135	135	PPDB	Optimized	Jul-28
10	Azad Pattan (U #1)	Hydro	175	175	PPIB	LOS (Issued)	Dec-28
11	Azad Pattan (U #2)	Hydro	175	175	PPIB	LOS (Issued)	Mar-29
12	Azad Pattan (U #3)	Hydro	175	175	PPIB	LOS (Issued)	Jun-29
Generation Additions in 2028-29 (MW)			**2,232**	**2,232**			
Cumulative Addition up till 2029 (MW)			**30,439**	**30,115**			
2029-30							
1	Net Meter	Solar	480	480	AEDB	Committed	Jul-29
2	Arkari Gol	Hydro	99	99	PEDO	Optimized	Jul-29
3	Asrit Kedam	Hydro	215	215	PEDO	Optimized	Jul-29
4	Dowarian	Hydro	40	40	AJK-HEB	Optimized	Jul-29
5	Jagran-IV	Hydro	22	22	AJK-HEB	Optimized	Jul-29
6	Kalam Asrit	Hydro	238	238	PEDO	Optimized	Jul-29
7	KE_New_Solar	Solar	150	150	Yet to be determined	Optimized	Jul-29
8	KE_New_Wind	Wind	50	50	Yet to be determined	Optimized	Jul-29
9	Nagdar	Hydro	35	35	AJK-HEB	Optimized	Jul-29
10	Rajdhani	Hydro	132	132	PPIB	Optimized	Jul-29
11	Sharmai	Hydro	152.12	152.12	PEDO	Optimized	Jul-29
12	Shounter	Hydro	48	48	AJK-HEB	Optimized	Jul-29
13	Turtonas Uzghor	Hydro	82.25	82.25	KE	Optimized	Jul-29
14	Azad Pattan (U #4)	Hydro	175	175	PPIB	LOS (Issued)	Sep-29
15	Kohala (U #1)	Hydro	275	275	PPIB	LOS (Issued)	Jun-30
Generation Additions in 2029-30 (MW)			**2,194**	**2,194**			
Cumulative Addition up till 2030 (MW)			**32,632**	**32,308**			

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#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	Schedule of Commissioning
12	Mohmand Dam (U #4)	Hydro	200	200	WAPDA	PC-1 Approved	Nov-26
13	Dasu (U #5)	Hydro	360	360	WAPDA	PC-1 Approved	Feb-27
14	Keyal Khwar (U #1)	Hydro	64	64	WAPDA	PC-1 Approved	Feb-27
15	Dasu (U #6)	Hydro	360	360	WAPDA	PC-1 Approved	May-27
16	Keyal Khwar (U #2)	Hydro	64	64	WAPDA	PC-1 Approved	May-27
Generation Additions in 2026-27 (MW)			**5,108**	**5,030**			
Cumulative Addition up till 2027 (MW)			**24,079**	**23,755**			
2027-28							
1	Net Meter	Solar	480	480	AEDB	Committed	Jul-27
2	KE_New_Solar	Solar	150	150	Yet to be determined	Optimized	Jul-27
3	KE_New_Wind	Wind	50	50	Yet to be determined	Optimized	Jul-27
4	New_Wind	Wind	2,903	2,903	Yet to be determined	Optimized	Jul-27
5	Gabral Kalam	Hydro	88	88	GoKPK	PC-1 Approved	Nov-27
6	Madyan	Hydro	157	157	GoKPK	PC-1 Approved	Nov-27
7	Balakot	Hydro	300	300	GoKPK	PC-1 Approved	Dec-27
Generation Additions in 2027-28 (MW)			**4,128**	**4,128**			
Cumulative Addition up till 2028 (MW)			**28,207**	**27,883**			
2028-29							
1	Net Meter	Solar	480	480	AEDB	Committed	Jul-28
2	Bata Kundi	Hydro	99	99	GoKPK	Optimized	Jul-28
3	Chowkel Khwar	Hydro	60	60	PEDO	Optimized	Jul-28
4	CJ	Hydro	25	25	PPDB	Optimized	Jul-28
5	KE_New_Solar	Solar	150	150	Yet to be determined	Optimized	Jul-28
6	KE_New_Wind	Wind	50	50	Yet to be determined	Optimized	Jul-28
7	New_Wind	Wind	676	676	Yet to be determined	Optimized	Jul-28

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	Schedule of Commissioning
2025-26							
1	Net Meter	Solar	480	480	AEDB	Committed	Jul-25
2	KE_New_Solar	Solar	150	150	Yet to be determined	Optimized	Jul-25
3	KE_New_Wind	Wind	50	50	Yet to be determined	Optimized	Jul-25
4	New_Solar_DG	Solar	750	750	Yet to be determined	Optimized	Jul-25
5	New_Solar_Utility	Solar	1,300	1,300	Yet to be determined	Optimized	Jul-25
6	New_Wind	Wind	500	500	Yet to be determined	Optimized	Jul-25
7	Gwadar	Local Coal	300	273	PPIB	LOS (Issued)	Aug-25
8	Mangla (U #9-10)	Hydro	70	70	WAPDA	Mangla Refurbishment	Sep-25
9	Dasu (U #1)	Hydro	360	360	WAPDA	PC-1 Approved	May-26
10	Mohmand Dam (U #1)	Hydro	200	200	WAPDA	PC-1 Approved	May-26
Generation Additions in 2025-26 (MW)			**4,160**	**4,133**			
Cumulative Addition up till 2026 (MW)			**18,971**	**18,725**			
2026-27							
1	Net Meter	Solar	480	480	AEDB	Committed	Jul-26
2	KE_New_Local Coal	Local Coal	990	912	Yet to be determined	Optimized	Jul-26
3	KE_New_Solar	Solar	150	150	Yet to be determined	Optimized	Jul-26
4	KE_New_Wind	Wind	50	50	Yet to be determined	Optimized	Jul-26
5	New_Solar_Utility	Solar	880	880	Yet to be determined	Optimized	Jul-26
6	Dasu (U #2)	Hydro	360	360	WAPDA	PC-1 Approved	Jul-26
7	Mohmand Dam (U #2)	Hydro	200	200	WAPDA	PC-1 Approved	Jul-26
8	Dasu (U #3)	Hydro	360	360	WAPDA	PC-1 Approved	Aug-26
9	Mohmand Dam (U #3)	Hydro	200	200	WAPDA	PC-1 Approved	Sep-26
10	Mangla (U #7-8)	Hydro	30	30	WAPDA	Mangla Refurbishment	Nov-26
11	Dasu (U #4)	Hydro	360	360	WAPDA	PC-1 Approved	Nov-26

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#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	Schedule of Commissioning
7	Lawi	Hydro	69	69	GoKPK	PC-1 Approved	Apr-24
8	Suki Kinari (U #1)	Hydro	221	221	PPIB	LOS (Issued)	May-24
9	Trans_Atlantic	Wind	50	50	AEDB	Category-II Project	Jun-24
10	Western	Wind	50	50	AEDB	Category-II Project	Jun-24
Generation Additions in 2023-24 (MW)			**1,644**	**1,644**			
Cumulative Addition up till 2024 (MW)			**6,382**	**6,163**			
2024-25							
1	Net Meter	Solar	480	480	AEDB	Committed	Jul-24
2	Mangla (U #1-2)	Hydro	70	70	WAPDA	Mangla Refurbishment	Jul-24
3	KE_New_Solar	Solar	150	150	Yet to be determined	Optimized	Jul-24
4	KE_New_Wind	Wind	50	50	Yet to be determined	Optimized	Jul-24
5	New_Solar_DG	Solar	750	750	Yet to be determined	Optimized	Jul-24
6	New_Solar_Utility	Solar	3,120	3,120	Yet to be determined	Optimized	Jul-24
7	New_Wind	Wind	500	500	Yet to be determined	Optimized	Jul-24
8	Gorkin Matiltan	Hydro	84	84	GoKPK	PC-1 Approved	Jul-24
9	Tarbela Ext5 (U #1)	Hydro	510	510	WAPDA	PC-1 Approved	Jul-24
10	Suki Kinari (U #2)	Hydro	221	221	PPIB	LOS (Issued)	Jul-24
11	CASA	Cross Border Interconnection	1,000	1,000	NTDC	G2G	Aug-24
12	Tarbela Ext5 (U #2)	Hydro	510	510	WAPDA	PC-1 Approved	Aug-24
13	Shahtaj	Bagasse	32	32	AEDB	Category-I Project	Aug-24
14	Tarbela Ext5 (U #3)	Hydro	510	510	WAPDA	PC-1 Approved	Sep-24
15	Suki Kinari (U #3)	Hydro	221	221	PPIB	LOS (Issued)	Sep-24
16	Suki Kinari (U #4)	Hydro	221	221	PPIB	LOS (Issued)	Nov-24
Generation Additions in 2024-25 (MW)			**8,429**	**8,429**			
Cumulative Addition up till 2025 (MW)			**14,811**	**14,592**			

#	Name of Project	Fuel Type	Installed Capacity	Dependable Capacity	Agency	Status	Schedule of Commissioning
2022-23							
1	Thar TEL	Local Coal	330	300	PPIB	LOS (Issued)	Commissioned
2	Net Meter	Solar	480	480	AEDB	Committed	Dec-22
3	Trimmu	CCGT_RLNG	1,263	1,243	PPIB	LOS (Issued)	Dec-22
4	Mangla (U #5-6)	Hydro	70	70	WAPDA	Mangla Refurbishment	Dec-22
5	Koto	Hydro	40.8	40.8	GoKPK	PC-1 Approved	Dec-22
6	Jamshoro Coal (U #1)	Imported Coal	660	627	GENCO	PC-1 Approved	Dec-22
7	Thal Nova	Local Coal	330	300	PPIB	LOS (Issued)	Dec-22
8	Thar-I (SSRL)	Local Coal	1,320	1,214	PPIB	LOS (Issued)	Dec-22
9	Jagran-II (U #1)	Hydro	12	12	AJK-HEB	PC-1 Approved	Apr-23
10	Helios	Solar	50	50	AEDB	Category-II Project	Apr-23
11	HNDS	Solar	50	50	AEDB	Category-II Project	Apr-23
12	Meridian	Solar	50	50	AEDB	Category-II Project	Apr-23
13	Mangla (U #3-4)	Hydro	70	70	WAPDA	Mangla Refurbishment	May-23
14	Jagran-II (U #2)	Hydro	12	12	AJK-HEB	PC-1 Approved	May-23
Generation Additions in 2022-23 (MW)			**4,738**	**4,519**			
Cumulative Addition up till 2023 (MW)			**4,738**	**4,519**			
2023-24							
1	Net Meter	Solar	480	480	AEDB	Committed	Jul-23
2	New_Solar_DG	Solar	500	500	Yet to be determined	Optimized	Jul-23
3	Jagran-II (U #3-4)	Hydro	24	24	AJK-HEB	PC-1 Approved	Jul-23
4	Siachen	Solar	100	100	GoS	Category-II Project	Sep-23
5	Manjhand	Solar	50	50	GoS	PC-1 Approved	Sep-23
6	Zorlu	Solar	100	100	PPDB	Category-II Project	Dec-23

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Appendix - A

- NTDC Generation Plan
- Load Forecast
- Data Permission
- Data received from Client

APPENDICES

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Current Loadings (%) of 220/132kV Transformers			
Scenarios	**Bahawalpur New**		
	T-1	**T-2**	**T-3**
Peak Case Summer Year 2026 without BWPIE	**58**	**58**	**58**
Peak Case Year Summer 2026 with BWPIE	**59**	**59**	**59**
Off-Peak Case Year Summer 2026 with BWPIE	**50**	**50**	**50**
Peak Case Year Summer 2028 with BWPIE	**72**	**72**	**72**

- The maximum short circuit levels of Bahawalpur Industrial Estate 132 kV G/S with the proposed scheme are 20.15 kA and 12.25 kA for 3-phase and 1-phase faults respectively for the year 2028. Therefore, the industry standard switchgear of the short circuit rating of 40 kA would be fine at 132 kV switchyard of 132 kV Bahawalpur Industrial Estate G/S.
- The dynamic stability analysis for proposed load at Bahawalpur Industrial Estate has also been carried out for all the scenarios of peak load for the year2028.
- The Supply of 35 MW load causes no technical constraints or problems in term of Load flow, short circuit and dynamic stability and is therefore recommended to be adopted.

8. Conclusions

- The Final Report for Grid Interconnection Study for 132/11kV Grid Station at Bahawalpur Industrial Estate with MEPCO grid system is being submitted herewith.
- As per location of Bahawalpur Industrial State, the most feasible interconnection scheme would be looping in-out of 132kV Bahawalpur Industrial Estate G/S on 132kV single circuit between 220/132kV Bahawalpur-New and 132kV Bahawalpur-Cantt. The newly constructed 132kV double circuit will have looping in-out distance of 2 km. After interconnection, the length of 132kV single circuit between Bahawalpur-New and Bahawalpur Industrial Estate would be 2.7 km and that of 132kV single circuit between Bahawalpur Cantt. and Bahawalpur Industrial Estate would be 15.7km. The conductor used will be Rail. Following major equipment is required in switchyard of Bahawalpur Industrial Estate 132 kV Grid Station for the proposed scheme:
    - Two 132kV line bays for looping in-out connection
    - Two 132 kV transformer bays
    - Two 132/11 kV Transformers, rated 40 MVA each

    Initially, due to only 7MW load in year 2026 at 132kV Bahawalpur Industrial Estate G/S, only one 40MVA transformer and transformer bay would be required. Eventually, after increase in load in year 2028, two transformers would be required.
- The above proposed interconnection schemes have been tested for steady state conditions through detailed load flow studies for the load conditions of maximum power dispatches in the grid for the year 2026 and 2028.
- Due to the presence of 220kV Network in the vicinity of Bahawalpur Industrial Estate, the current loadings on the 220/132kV transformers of 220/132kV Bahawalpur New Grid Station are observed and tabulated below for every load flow analysis case.

7.2.5 Fault at 132 kV Lal Suhanra132

Fault Type: 3-Phase			
Fault Location: Lal Suhanra132 kV bus bar			
Fault Duration: 5 cycles (100 ms)			
Line Tripping: Lal Suhanra132to Crest-Energy 132 kV single circuit			
Variable	**Bus/Line**	**Response**	**Figure No.**
Voltage	1. Bahawalpur Industrial Estate 132 kV 2. Bahawalpur-New 132 kV 3. Bahawalpur Cantt 132kV 4. Samasata 132 kV 5. Mubarakpur 132 kV	The voltages of all the bus bars recover after fault clearance	5.1
Frequency	Bahawalpur Industrial Estate 132 kV	Recovers after fault clearance	5.2
Line Flows (MW/MVAR)	Lal Suhanra132 to Bahawalpur Cantt 132 kV single circuit	Attains steady state value after damping of oscillations	5.3
Rotor Angles	1. Fauji-K 132kV 2. Engro Energy 220kV 3. Fauji Foundation 220kV 4. KAPCO 220kV 5. Sahiwal U-1 6. Mangla 220kV (reference angle)	Damps down quickly and attain a steady state value	5.4

7.3. Conclusion of Dynamic Stability Analysis

The results of dynamic stability carried out for peak load condition of summer 2028 show that the system is strong and stable enough to damp the oscillations for the proposed scheme in case of severest possible faults of 132 kV systems near to and far of Bahawalpur Industrial Estate. Therefore, there is no problem of dynamic stability for interconnection of load at Bahawalpur Industrial Estate; it fulfills all the criteria of dynamic stability.

7.2.4. Fault at 132 kV Bahawalpur Cantt

Fault Type: 3-Phase			
Fault Location: Bahawalpur Cantt 132 kV bus bar			
Fault Duration: 5 cycles (100 ms)			
Line Tripping: B-Pur Cantt to Lal Suhanra132132 kV single circuit			
Variable	**Bus/Line**	**Response**	**Figure No.**
Voltage	1. Bahawalpur Industrial Estate 132 kV 2. Bahawalpur-New 132 kV 3. Bahawalpur Cantt 132kV 4. Samasata 132 kV 5. Mubarakpur 132 kV	The voltages of all the bus bars recover after fault clearance	4.1
Frequency	Bahawalpur Industrial Estate 132 kV	Recovers after fault clearance	4.2
Line Flows (MW/MVAR)	Bahawalpur Cantt to Bwp Ind Est 132 kV Intact single circuit	Attains steady state value after damping of oscillations	4.3
Rotor Angles	1. Fauji-K 132kV 2. Engro Energy 220kV 3. Fauji Foundation 220kV 4. KAPCO 220kV 5. Sahiwal U-1 6. Mangla 220kV (reference angle)	Damps down quickly and attain a steady state value	4.4

7.2.3. Fault at 132 kV Bahawalpur-New

Fault Type: 3-Phase			
Fault Location: Bahawalpur New132 kV bus bar			
Fault Duration: 5 cycles (100 ms)			
Line Tripping: Bahawalpur New to Bahawalpur 132 kV single circuit			
Variable	**Bus/Line**	**Response**	**Figure No.**
Voltage	1. Bahawalpur Industrial Estate 132 kV 2. Bahawalpur-New 132 kV 3. Bahawalpur Cantt 132kV 4. Samasata 132 kV 5. Mubarakpur 132 kV	The voltages of all the bus bars recover after fault clearance	3.1
Frequency	Bahawalpur Industrial Estate 132 kV	Recovers after fault clearance	3.2
Line Flows (MW/MVAR)	Bahawalpur New to Bahawalpur132 kV intact single circuit	Attains steady state value after damping of oscillations	3.3
Rotor Angles	1. Fauji-K 132kV 2. Engro Energy 220kV 3. Fauji Foundation 220kV 4. KAPCO 220kV 5. Sahiwal U-1 6. Mangla 220kV (reference angle)	Damps down quickly and attain a steady state value	3.4

7.2.2. Fault at 132 kV Bahawalpur Industrial Estate

Fault Type: 1-Phase			
Fault Location: Bahawalpur Industrial Estate 132 kV bus bar			
Fault Duration: 12.5 cycles (250 ms)			
Line Tripping: Bahawalpur New to Bahawalpur Industrial Estate 132 kV single			
Variable	**Bus/Line**	**Response**	**Figure No.**
Voltage	1. Bahawalpur Industrial Estate 132 kV 2. Bahawalpur-New 132 kV 3. Bahawalpur Cantt 132kV 4. Samasata 132 kV 5. Mubarakpur 132 kV	The voltages of all the bus bars recover after fault clearance	2.1
Frequency	Bahawalpur Industrial Estate 132 kV	Recovers after fault clearance	2.2
Line Flows (MW/MVAR)	Bahawalpur Industrial Estate to Bahawalpur Cantt 132 kV intact single circuit	Attains steady state value after damping of oscillations	2.3
Rotor Angles	1. Fauji-K 132kV 2. Engro Energy 220kV 3. Fauji Foundation 220kV 4. KAPCO 220kV 5. Sahiwal U-1 6. Mangla 220kV (reference angle)	Damps down quickly and attain a steady state value	2.4

Results of stability with load at Bahawalpur Industrial Estate has been plotted and discussed below:

7.2.1. Fault at 132 kV Bahawalpur Industrial Estate

Fault Type: 3-Phase			
Fault Location: Bahawalpur Industrial Estate 132 kV bus bar			
Fault Duration: 5 cycles (100 ms)			
Line Tripping: Bahawalpur New to Bahawalpur Industrial Estate 132 kV single			
Variable	**Bus/Line**	**Response**	**Figure No.**
Voltage	1. Bahawalpur Industrial Estate 132 kV 2. Bahawalpur-New 132 kV 3. Bahawalpur Cantt 132kV 4. Samasata 132 kV 5. Mubarakpur 132 kV	The voltages of all the bus bars recover after fault clearance	1.1
Frequency	Bahawalpur Industrial Estate 132 kV	Recovers after fault clearance	1.2
Line Flows (MW/MVAR)	Bahawalpur Industrial Estate to Bahawalpur Cantt 132 kV intact single circuit	Attains steady state value after damping of oscillations	1.3
Rotor Angles	1. Fauji-K 132kV 2. Engro Energy 220kV 3. Fauji Foundation 220kV 4. KAPCO 220kV 5. Sahiwal U-1 6. Mangla 220kV (reference angle)	Damps down quickly and attain a steady state value	1.4

7. Dynamic Stability Analysis

7.1. Assumptions & Methodology

7.1.1. Dynamic Models

The assumptions about the load and its parameters are the same as mentioned in Chapter.2 of this report.

We have used the dynamic data of generators of the overall system.

7.1.2. System Conditions

All the peak load scenarios of Summer 2028 have been tested for the study considering the changes in all these study scenarios.

All the power plants of WAPDA/NTDC from Tarbela to Hub have been dynamically represented in the simulation model.

7.1.3. Presentation of Results

The plotted results of the simulations runs are placed in Appendix-E. Each simulation is run for its first one second for the steady state conditions of the system prior to fault or disturbance. This is to establish the pre fault/disturbance conditions of the network under study were smooth and steady. Post fault recovery has been monitored for nine seconds. Usually, all the transients due to non-linearity die out within 2-3 seconds after disturbance is cleared in the system.

7.1.4. Worst Fault Cases

Three phase faults are considered as the worst disturbance in the system. We have considered 3-phase fault at Bahawalpur Industrial Estate 132 kV cleared in 5 cycles, i.e., 100 ms, followed by a permanent trip of a 132 kV circuit from Bahawalpur New to Bahawalpur Industrial Estate. For stuck breaker condition where fault clearing time is 250 ms, single phase faults have been considered. Other 3-Phase fault at Bahawalpur New 132kV and Bahawalpur Cantt 132kV and Lal Suhanra132132 kV separately, cleared in 5 cycles i.e., 100 ms followed by a permanent trip of 132 kV circuit is considered.

7.2. Dynamic Stability Simulations' Results – Summer2028

The transient stability analysis is carried out for peak load case of summer 2028 with the interconnection of load at Bahawalpur industrial Estate.

Table 6.1
Maximum 3-Phase and 1-Phase Short Circuit Currents with Bahawalpur Industrial Estate for year 2028

Substation	3-Phase fault current, kA	1-Phase fault current, kA
Bahawalpur Industrial Estate 132 kV	20.15	12.25
Bahawalpur New 132 kV	21.53	14.43
Bahawalpur Cantt. 132 kV	16.10	8.39
Samasata 132 kV	8.34	5.31
Lal Suhanra132 132 kV	17.81	11.68
Ahmedpur-East 132 kV	7.88	4.98
Lal Suhanra 132 kV	11.83	7.41

The tabular output of the short circuit calculations is also attached in Appendix – D for the 132 kV bus bars of our interest i.e., the substations connecting in the 132 kV circuits lying close to Bahawalpur Industrial Estate.

6.3. Conclusion of Short Circuit Analysis

The short circuit analysis results enable us to evaluate the rating of switchgear for the load at Bahawalpur Industrial Estate. The maximum short circuit levels of Bahawalpur Industrial Estate 132 kV G/S with the proposed scheme are 20.15 kA and 12.25 kA for 3-phase and 1-phase faults respectively for the year 2028. Therefore, the industry standard switchgear of the short circuit rating of 40 kA would be fine at 132 kV switchyard of 132 kV Bahawalpur Industrial Estate.

6. Short Circuit Analysis

The proposed schemes have been evaluated using Short Circuit Analysis for a comprehensive study.

6.1. Methodology and Assumptions

The methodology of IEC 909 has been applied in all short circuit analyses in this report for which provision is available in the PSS/E software used for these studies.

The maximum fault currents have been calculated with the following assumptions under IEC 909:

- Set tap ratios to unity
- Set line charging to zero
- Set shunts to zero in positive sequence
- Desired voltage magnitude at bus bars set equal to 1.10 P.U. i.e., 10 % higher than nominal, which is the maximum permissible voltage under contingency condition.

For evaluation of maximum short circuit levels, we have assumed contribution in the fault currents from all the installed generation capacity of hydel, thermal and nuclear plants in the system in the year 2031 i.e., all the generating units have been assumed on-bar in fault calculation's simulations.

The assumptions about the generator and the transformers data are the same as mentioned in Ch.2 of this report.

6.2. Fault Current Calculations with 132 kV Bahawalpur Industrial Estate – Year 2028

Short circuit analysis of the network with Bahawalpur Industrial Estate has been carried out to evaluate the fault levels for the year 2028.

The short circuit levels have been calculated and plotted on the bus bars of 132 kV of substations and are shown plotted in the Exhibit 4 attached in Appendix – D.

The tabular output of the short circuit calculations is stated below for the 132 kV bus bars of our interest including bus bar of Bahawalpur Industrial Estate. The total maximum fault currents for 3-phase and 1-phase short circuit at these substations are summarized in Table 6.1.

Current Loadings (%) of 220/132kV Transformers			
Scenarios	**Bahawalpur New**		
	T-1	**T-2**	**T-3**
Peak Case Summer Year 2026 without BWPIE	**58**	**58**	**58**
Peak Case Year Summer 2026 with BWPIE	**59**	**59**	**59**
Off-Peak Case Year Summer 2026 with BWPIE	**50**	**50**	**50**
Peak Case Year Summer 2028 with BWPIE	**72**	**72**	**72**

All the voltages are within the permissible limits and there are no capacity constraints in the MEPCO network with the addition of Bahawalpur Industrial Estate.

5.4 Peak Case Load Flow Summer 2028, With 132 kV Bahawalpur Industrial Estate

Load flow studies have been carried out for the peak load case of summer 2028 with 132kV Bahawalpur Industrial Estate as per Scheme described in Section 4.2.

Although the ultimate load is to be commissioned in year 2031 according to load forecast of MEPCO, but the PSS/E cases provided from MEPCO side are of years 2026 and 2028. Therefore, the ultimate load is being analyzed in year 2028.

The results of Normal case of Peak Summer 2028 are plotted in Exhibit 3.0 shown in Appendix-C. We find no capacity constraints on 132 kV circuits under normal conditions i.e., without any outages of circuits.

The power flows on the circuits are seen well within the rated capacities and the voltages on the bus bars are also within the permissible operating range of ±5 % off the nominal.

Exhibit 3.1	Bahawalpur-N 220kV to Bahawalpur-N 132kV Single Transformer Out
Exhibit 3.2	Bahawalpur-New to Bahawalpur Industrial Estate 132kV Single Circuit Out
Exhibit 3.3 Circuit Out	Bahawalpur Industrial Estate to Bahawalpur Cantt 132kV Single
Exhibit 3.4	Bahawalpur Cantt to Lal Suhanra132kV Single Circuit Out
Exhibit 3.5	Lal Suhanra 220 to Lal Suhanra132 Single Transformer Out
Exhibit 3.6	Lal Suhanra132 to Crest-Energy 132kV Single Circuit Out

We see that in all the contingency cases, in the event of outage of any circuit, the intact circuits remain within the rated capacity.

5.5 Conclusion of Load Flow Analysis

Load flow analysis indicates that with the proposed interconnection scheme the additional 65 MW load of Bahawalpur Industrial Estate can be accommodated in the system.

Due to the presence of 220kV Network in the vicinity of Bahawalpur Industrial Estate, the current loadings on the 220/132kV transformers of 220/132kV Bahawalpur Grid Station are observed and tabulated below for every load flow analysis case.

We see that in all the contingency cases, in the event of outage of any circuit, the intact circuits remain within the rated capacity.

Also, the bus bar voltages are well within the permissible limits in all the contingency events.

5.3 Off-Peak Case Load Flow Summer 2026, With 132 kV Bahawalpur Industrial Estate

Load flow studies have been carried out for the off-peak load case of Summer 2026, after the addition of 132 kV Bahawalpur Industrial Estate G/S with the MEPCO grid as per Scheme described in Section 4.2.

The results of Normal case of Off-Peak Summer 2026 are plotted in Exhibit 2.0 shown in Appendix-C. We find no capacity constraints on 132 kV circuits under normal conditions i.e., without any outages of circuits.

The power flows on the circuits are seen well within the rated capacities and the voltages on the bus bars are also within the permissible operating range of ±5 % off the nominal.

Exhibit 2.1	Bahawalpur-N 220kV to Bahawalpur-N 132kV Single Transformer Out
Exhibit 2.2	Bahawalpur-New to Bahawalpur Industrial Estate 132kV Single Circuit Out
Exhibit 2.3 Circuit Out	Bahawalpur Industrial Estate to Bahawalpur Cantt 132kV Single
Exhibit 2.4	BAHAWALPUR Cantt to Lal Suhanra132kV Single Circuit Out
Exhibit 2.5	Lal Suhanra220 to Lal Suhanra132Single Transformer Out
Exhibit 2.6	Lal Suhanra132to Crest-Energy 132kV Single Circuit Out

We see that in all the contingency cases, in the event of outage of any circuit, the intact circuits remain within the rated capacity.

Also, the bus bar voltages are well within the permissible limits in all the contingency events.

Exhibit 0.5	Lal Suhanra132 to Crest-Energy 132kV Single Circuit Out

We see that in all the contingency cases, in the event of outage of any circuit, the intact circuits remain within the rated capacity.

Also, the bus bar voltages are well within the permissible limits in all the contingency events.

5.2. Peak Case Load Flow Summer 2026, With 132 kV Bahawalpur Industrial Estate

Load flow studies have been carried out for the same Summer 2026 as in Section 5.1, after the addition of 132 kV Bahawalpur Industrial Estate G/S with the MEPCO grid as per Scheme described in Section 4.2.

The results of Normal case of Peak Summer 2026 are plotted in Exhibit 1.0 shown in Appendix-C. We find no capacity constraints on 132 kV circuits under normal conditions i.e., without any outages of circuits.

The power flows on the circuits are seen well within the rated capacities and the voltages on the bus bars are also within the permissible operating range of ±5 % off the nominal.

Exhibit 1.1	Bahawalpur-N 220kV to Bahawalpur-N 132kV Single Transformer Out
Exhibit 1.2	Bahawalpur-New to Bahawalpur Industrial Estate 132kV Single Circuit Out
Exhibit 1.3	Bahawalpur Industrial Estate to Bahawalpur Cantt 132kV Single Circuit Out
Exhibit 1.4	Bahawalpur Cantt to Lal Suhanra 132kV Single Circuit Out
Exhibit 1.5	Lal Suhanra 220 to Lal Suhanra132 Single Transformer Out
Exhibit 1.6	Lal Suhanra132 to Crest-Energy 132kV Single Circuit Out

5. Detailed Load Flow Studies

Load Flow Studies have been performed on base cases that have been developed for the peak loads of summer 2026 and 2028 using the network data of MEPCO after updating with latest load forecast and expansion plan of MEPCO/NTDC. Demand forecast of MEPCO /NTDC have been incorporated into the base case.

Load Projection at Bahawalpur Industrial Estate was provided by PIEDMC which is stated below.

Table 5.1

Load Projection of Proposed Bahawalpur Industrial Estate

Sr. No.	Year	Projected Load in MW
1	2026	7
2	2028	20
3	2031	35

5.1. Peak Case Load Flow Summer 2026, Without 132 kV Bahawalpur Industrial Estate

Power flow analysis has been performed without the load of Bahawalpur Industrial Estate to check the network strength prior to the load addition. The results of Normal case of Peak Summer 2026 are plotted in Exhibit 0.0. The power flows on the circuits are seen well within the rated capacities and the voltages on the bus bars are also within the permissible operating range of ±5 % off the nominal.

N-1 contingency analysis has been carried out and the plotted results are attached in Appendix – C as follows;

Exhibit 0.1	Bahawalpur-N 220kV to Bahawalpur-N 132kV Single Transformer Out
Exhibit 0.2	Bahawalpur-New to BAHAWALPUR Cantt 132kV Single Circuit Out
Exhibit 0.3	Bahawalpur Cantt to Lal Suhanra 132kV Single Circuit Out
Exhibit 0.4	Lal Suhanra 220 to Lal Suhanra132 Single Transformer Out

4. Development of Scheme of Interconnection

4.1. The Existing and Ongoing Network

The facility of Bahawalpur Industrial Estate is located around 1 km from 220/132kV Bahawalpur New Grid Station in the jurisdiction of MEPCO. The existing 220 kV and 132 kV network available around Bahawalpur Industrial Estate is shown in Sketch-1 in Appendix – B.

4.2. Schemes of Interconnection

A site visit was conducted by team of engineers from PPI on 07-06-2022 and the location of 220/132 kV Bahawalpur New Grid Station was finalized for single loop in-out connection of 132kV Bahawalpur Industrial Estate in the presence of concerned MEPCO Officials.

As per location of Bahawalpur Industrial Estate, the most feasible interconnection would be:

- Looping in-out of 132kV Bahawalpur Industrial Estate G/S on 132kV single circuit between 220/132kV Bahawalpur-New and 132kV Bahawalpur-Cantt. The newly constructed 132kv double circuit will have looping in-out distance of 2 km. After interconnection, the length of 132kV single circuit between Bahawalpur-New and Bahawalpur Industrial Estate would be 2.7 km and that of 132kV single circuit between Bahawalpur Cantt. and Bahawalpur Industrial Estate would be 15.7km. The conductor used will be Rail.
- Following major equipment is required in switchyard Bahawalpur Industrial Estate 132 kV Grid Station for the proposed scheme:
    - Two 132 kV line bays for the double circuit connection
    - Two 132 kV transformer bays
    - Two 132/11 kV Transformers, rated 40 MVA each

    Initially, due to only 7MW load in year 2026 at 132kV Bahawalpur Industrial Estate G/S, only one 40MVA transformer and transformer bay would be required. Eventually, after increase in load in year 2028, two transformers would be required.

3. Study Approach and Methodology

3.1. Understanding of Problem

PIEDMC plans to construct a 132 kV grid station for the supply of 35 MW load to its facility in Bahawalpur. This report intends to inspect the impact of this additional grid on the network of MEPCO and to propose any reinforcements required for the said interconnection.

3.2. Approach to the Problem

The consultant has applied the following approaches to the problem:

- A base case network model has been prepared for Summer 2026 and 2028 after the commissioning of Bahawalpur Industrial Estate, comprising all 132 kV, and 11 kV system, envisaging the load forecast, the generation additions and transmission expansions for that year. Although the ultimate load is to be commissioned in year 2031 according to load forecast of MEPCO, but the PSS/E cases provided from MEPCO side are of years 2026 and 2028. Therefore, the ultimate load is being analyzed in year 2028.
- Year 2026 has been selected for the study because the COD of Bahawalpur Industrial Estate is July 2026.
- It is assumed that the load will increase gradually from the year 2026 to 2031 as follows:
    - Year 2026: 7 MW
    - Year 2028: 20 MW
    - Year 2031: 35 MW
- It is intended to perform the technical system studies for peak load conditions to confirm technical feasibility of the interconnections. The scheme will be subjected to standard analysis such as load flow and short circuit study to check the adequacy of transmission network and strength of the machines for the proposed interconnection scheme under normal and disturbed conditions.

2. Assumptions of Data

The following assumptions have been made for the study as per the data provided by the client:

2.1. Bahawalpur Industrial Estate Load Project Data

Ultimate Load Demand	= 35 MW
Load Demand in 2026	= 7 MW
Load Demand in 2028	= 20 MW
Load Demand in 2031	= 35 MW
Number of Transformers	= 2
Transformer Rating	= 2 x 40 MVA
Voltage Ratio of Transformer	= 132/11 kV
Transformer Impedances	= 12.5 %

2.2. Network Data

- The 220/132 kV network in the area near Bahawalpur Industrial Estate is as shown in Sketches in Appendix – B. MEPCO provided the network data of their 132 kV network, both existing and planned by the year 2028 along with the latest load forecast and the updated PSSE software files vide letter no. CE/MEPCO/DG(MIRAD) 1800-01 dated 25-10-2023. NTDC has also provided the network data of their 220 kV and 500 kV network, both existing and planned by the year 2026 & 2028 along with the latest load forecast and the updated PSSE software files vide data permission letter no. GMPSP/CETP/TRP-405/3536-40 dated 18-10-2023.

transmission circuit, substation bus section, transformer or circuit breaker. It is assumed that such a fault shall be cleared by the associated circuit breaker action in 5cycles.

b) Failure of a circuit breaker to clear a fault ("Stuck Breaker" condition) in 12.5 cycles after fault initiation.

Introduction

1.1. Background

PIEDMC has multiple development projects throughout Pakistan and plans to install 132/11kV Grid station at Bahawalpur Industrial Estate in Bahawalpur. This report deals with the 132 kV grid Station planned by PIEDMC for the supply of load of Bahawalpur Industrial Estate which plans to commission the load of 35 MW by the second half of 2031. This industrial load will be referred to as the Bahawalpur Industrial Estate 132 kV G/S for the remainder of the report.

1.2. Objectives

The overall objective of the Study is to ascertain the impact of additional 35 MW load of Bahawalpur Industrial Estate on MEPCO Network. The specific objectives of this report are:

- To determine the performance of MEPCO Network during steady state conditions of system, through load-flow analysis.
- To evaluate the fault levels at the adjoining bus bars of the Bahawalpur Industrial Estate 132 kV to be within the rating of equipment of these substations upon addition of 132 kV Bahawalpur Industrial Estate G/S.

1.3. Planning Criteria

The planning criteria required to be fulfilled by the proposed load interconnection is as follows:

Steady State:

Voltage	± 5 %, Normal Operating Condition
	± 10 %, Contingency Conditions
Frequency	50 Hz Nominal
	49.8 Hz to 50.2 Hz variation in steady state
	49.3 - 50.5 Hz, Min/Max Contingency Freq. Band

Short Circuit:

Substation Equipment Rating for 132 kV should be 40 kA

Dynamic/Transient:

The system should revert to normal condition after transients die out with good damping, without losing synchronism. The system is tested under the following fault conditions:

a) Permanent three-phase fault on any primary transmission element; including:

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Appendices

Appendix – A:

- **NTDC Generation Plan**
- **Transmission Plan**
- **Load Forecast**
- **Data Permission**

Appendix – B:

- **Sketches for Chapter-4**

Appendix – C: Plotted Results of Load Flow for Chapter 5

Appendix – D: Results of Short Circuit Analysis for Chapter 6

Appendix –E: Plotted Results of Stability Analysis for Chapter

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- The maximum short circuit levels of Bahawalpur Industrial Estate 132 kV bus bar and the other bus bars of vicinity have been evaluated for the year 2028 to evaluate the maximum fault currents. Keeping in view the industry standard switchgear, the short circuit rating of 40 kA is fine, as per NTDC requirement taking care of any future generation additions and system reinforcements in its electrical vicinity.
- The dynamic stability analysis for proposed load at Bahawalpur Industrial Estate has also been carried out for the year 2028.
- The Supply of 35 MW load causes no technical constraints or problems in term of Load Flow Analysis, Short Circuit Analysis and Dynamic Stability Analysis and is therefore recommended to be adopted.

- Two 132 kV transformer bays
- Two 132/11 kV Transformers, rated 40 MVA each

Initially, due to only 7MW load in year 2026 at 132kV Bahawalpur Industrial Estate G/S, only one 40MVA transformer and transformer bay would be required. Eventually, after increase in load in year 2028, two transformers would be required.

- The above proposed interconnection schemes have been tested for steady state conditions through detailed load flow studies for the load conditions of maximum power dispatches in the grid for the year 2026 and 2028.
- The demand of Bahawalpur Industrial Estate according to latest load forecast of MEPCO is considered in the peak case years of 2026 and 2028 to analyze the impact of load projection on MEPCO network. Although the ultimate load is to be commissioned in year 2031 according to load forecast of MEPCO, but the PSS/E cases provided from MEPCO side are of year 2026 and 2028. Therefore, the ultimate load is being analyzed in year 2028.
- Steady state analysis by load flow reveals that proposed scheme is adequate to accommodate 35 MW load of Bahawalpur Industrial Estate by the year 2031.
- Due to the presence of 220kV Network in the vicinity of Bahawalpur Industrial Estate, the current loadings on the 220/132kV transformers of 220/132kV Bahawalpur New Grid Station are observed and tabulated below for every load flow analysis case.

Current Loadings (%) of 220/132kV Transformers			
Scenarios	**Bahawalpur New**		
	T-1	**T-2**	**T-3**
Peak Case Summer Year 2026 without BWPIE	**58**	**58**	**58**
Peak Case Year Summer 2026 with BWPIE	**59**	**59**	**59**
Off-Peak Case Year Summer 2026 with BWPIE	**50**	**50**	**50**
Peak Case Year Summer 2028 with BWPIE	**72**	**72**	**72**

Executive Summary

- The Draft Report for Grid Interconnection Study for 132/11kV Grid Station at Bahawalpur Industrial Estate with MEPCO grid system is being submitted herewith.
- Data permission for the said study was acquired from MEPCO vide data permission letter no. CE/MEPCO/DG(MIRAD) 1800-01 dated 25-10-2023 and from NTDC vide data permission letter no. GMPSP/CETP/TRP-405/3536-40 dated 18-10-2023.
- The study objective, approach and methodology have been described and the load's data received from the Client is validated.
- PIEDMC is planning to construct a Bahawalpur Industrial Estate 132 kV Grid for their own load which is of 35 MW.
- The Commercial Operation Date of Bahawalpur Industrial Estate is Summer 2026. The load of the Industrial State will increase gradually over the years as follows:
    - Year 2026: 7 MW
    - Year 2028: 20 MW
    - Year 2031: 35 MW
- A site visit was conducted by team of engineers from PPI on 07-06-2022 and the location of 220/132 kV Bahawalpur New Grid Station was finalized for single loop in-out connection of 132kV Bahawalpur Industrial Estate in the presence of concerned MEPCO Officials.
- As per location of Bahawalpur Industrial State, the most feasible interconnection scheme would be looping in-out of 132kV Bahawalpur Industrial Estate G/S on 132kV single circuit between 220/132kV Bahawalpur-New and 132kV Bahawalpur-Cantt. The newly constructed 132kV double circuit will have looping in-out distance of 2 km. After interconnection, the length of 132kV single circuit between Bahawalpur-New and Bahawalpur Industrial Estate would be 2.7 km and that of 132kV single circuit between Bahawalpur Cantt. and Bahawalpur Industrial Estate would be 15.7km. The conductor used will be Rail.
- Following major equipment is required in switchyard of Bahawalpur Industrial Estate 132 kV Grid Station for the proposed scheme:
    - Two 132kV line bays for looping in-out connection

Version	Date	Authors	Checked By	Comments	
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Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

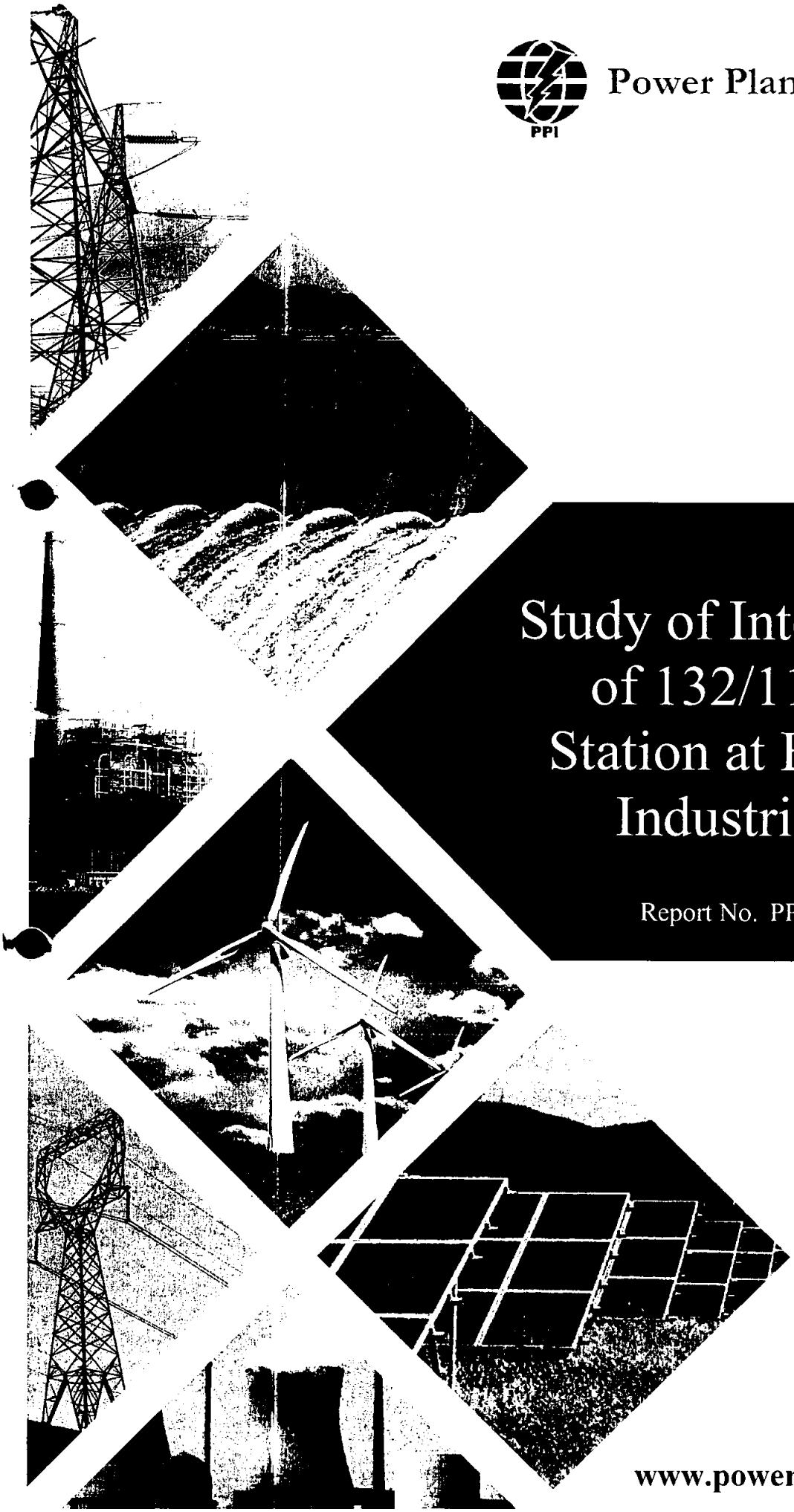
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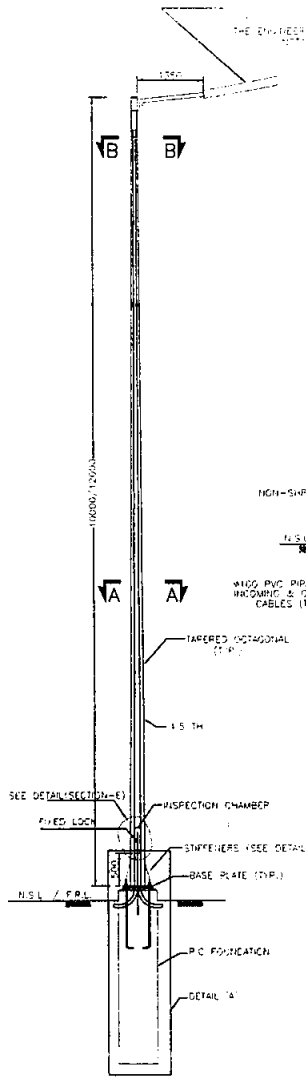
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Study of Interconnection of 132/11 kV Grid Station at Bahawalpur Industrial Estate

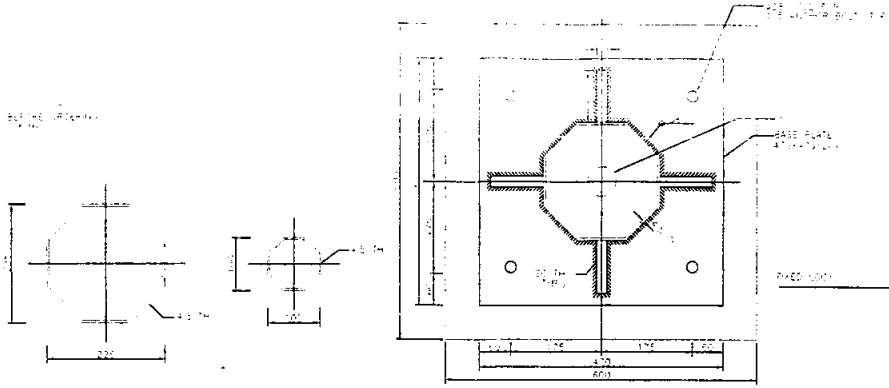
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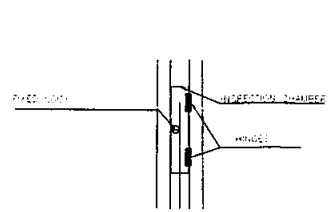
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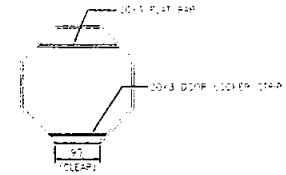
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SECTION B–B

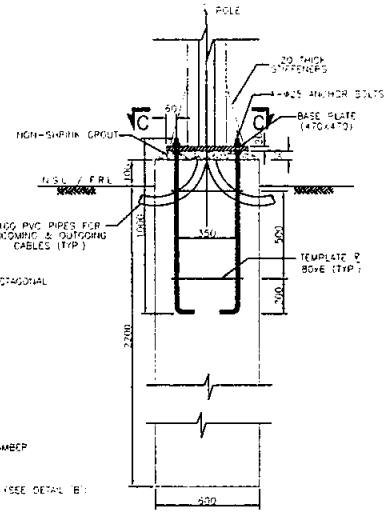
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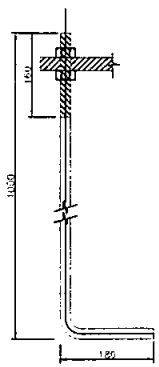
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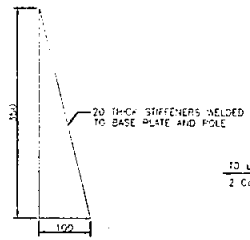
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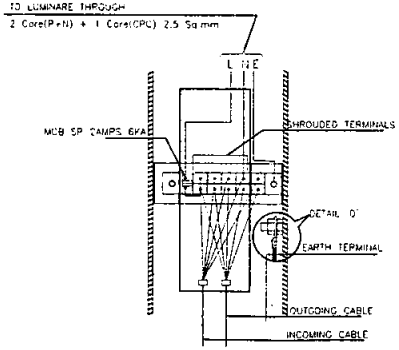
DETAIL–A
(CONCRETE OUTLINE)



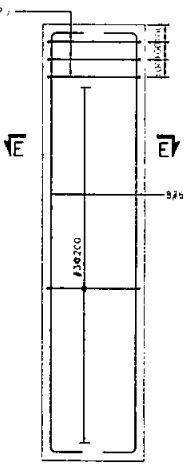
ANCHOR BOLT



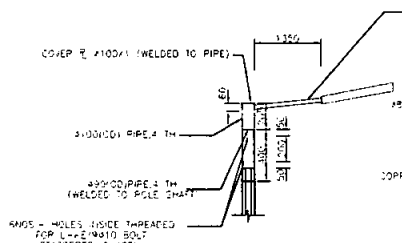
DETAIL–B



DETAIL OF INSPECTION CHAMBER

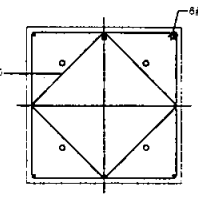


FOUNDATION
(REINFORCEMENT)



DETAIL–C

DETAIL–D



SECTION E–E

NOTES

1. FOR GENERAL NOTES REFER DRAWING NO. GS(L)
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED
3. UNLESS OTHERWISE NOTED, CONCRETE SHALL BE CLASSIFIED AS FOLLOWS
   CONCRETE CLASS 28 DAYS (15x30 CM) CYLINDER STRENGTH Kg/sq. Cm
   REINFORCED A 210 (3000 psi)
4. THE STEEL FOR POLE & BASE PLATE SHALL BE OF YIELD STRENGTH OF 350MPa(3500 kg/cm²)
   & SHALL CONFORM TO ASTM A36 STEEL
5. THE ANCHOR BOLTS SHALL CONFORM TO ASTM A307
6. ALL WELDING SHALL CONFORM TO THE APPLICABLE PROVISIONS OF A.W.S.
   UNLESS WITH WELDING CODE (BY) CODE
7. HOT DIP GALVANIZING SHALL CONFORM TO BS EN ISO 1461 AVG THICKNESS @ UNIT SIDE
   OF 11 IN ACCORDANCE WITH ASTM A123 AND A525

REFERENCE DRAWINGS	REVISION	DESCRIPTION

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

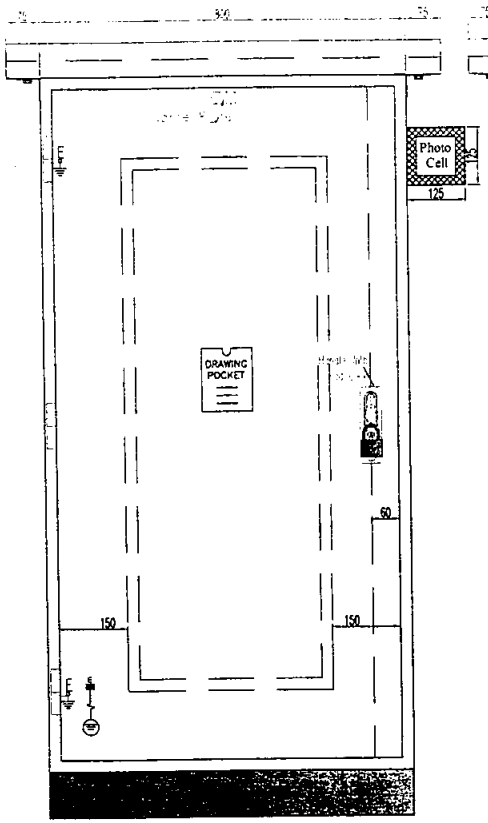
INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

DETAILS OF 12M &10M CONICAL OCTAGONAL LIGHTING POLE SINGLE ARM BRACKET

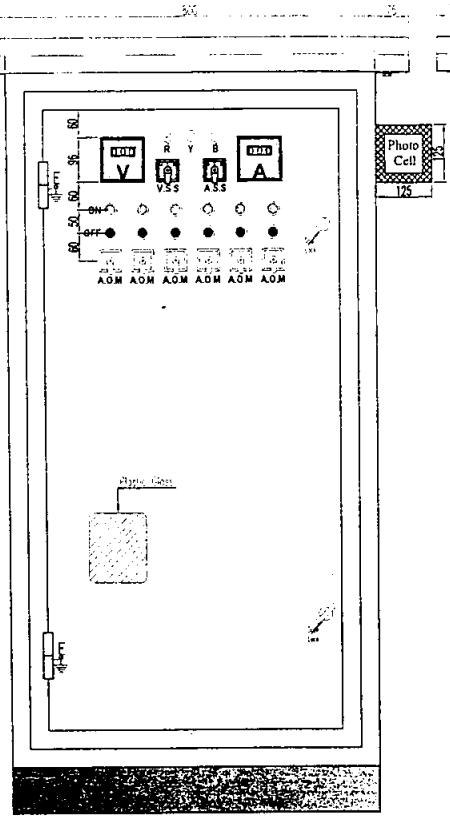
NESPAK / NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. LAHORE

SAMD CONSULTANTS

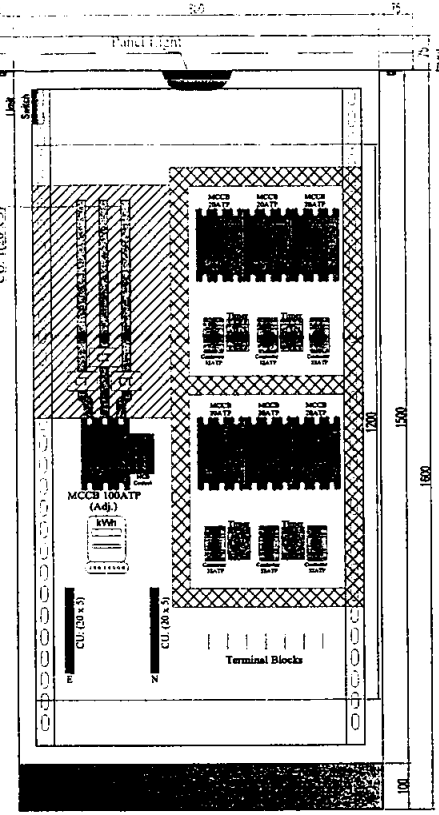
DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN SA			
FILE			
CKD	DATE	DRAWING NO.	REV.
SUBM	SEP. 2023	3880/161/TD/SE005	0



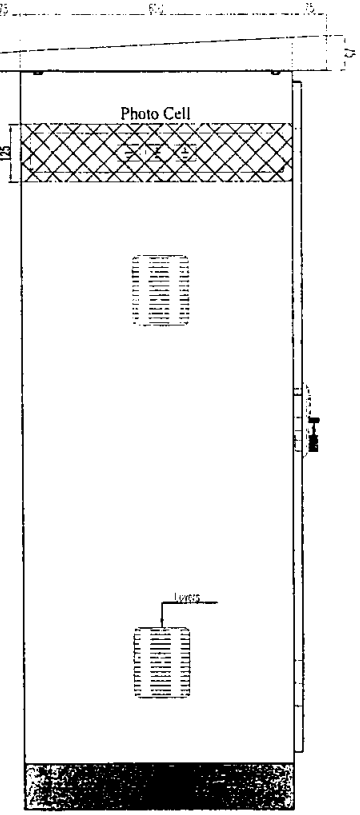
EXTERNAL FRONT VIEW



FRONT DOOR REMOVED



INTERNAL FRONT VIEW

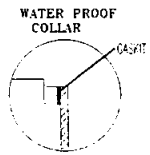


SIDE VIEW

NOTE:

1- 1.5mm² Cu. Pvc Cable For Control

2- Energy Meter (Kwh Meter) Adjustment In The Panel as Per Size of the Panel



ENCLOSURE: 14 SWG M.S SHEET
COLOUR: RAL 7032 (LIGHT GREY)
PROTECTION CLASS: IP54
INCOMING BOTTOM
OUTGOING: BOTTOM
OUTDOOR: FLOOR STANDINGTYPE
ALL DIMENSIONS IN mm.

SAMD CONSULTANTS

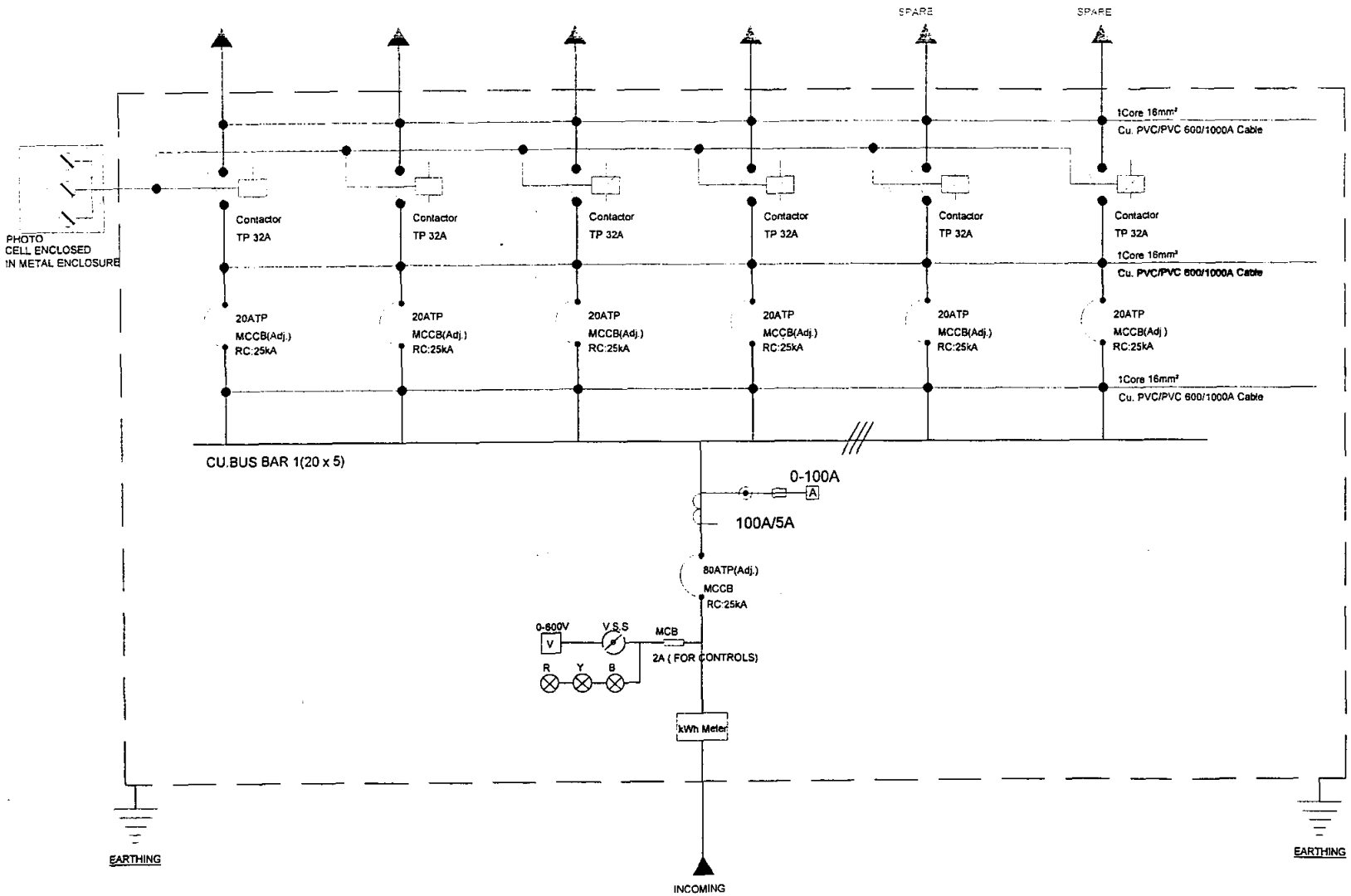
PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

LIGHTING CONTROL PANEL

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. LAHORE

DESN	NESPAK	RECOMMENDED	VER./CKD	APPROVED
DWN	SA			
FILE				
CKD		DATE	DRAWING NO.	REV
SUBM		SEP. 2022	3880/161/TD/5E004	0



SAMD CONSULTANTS

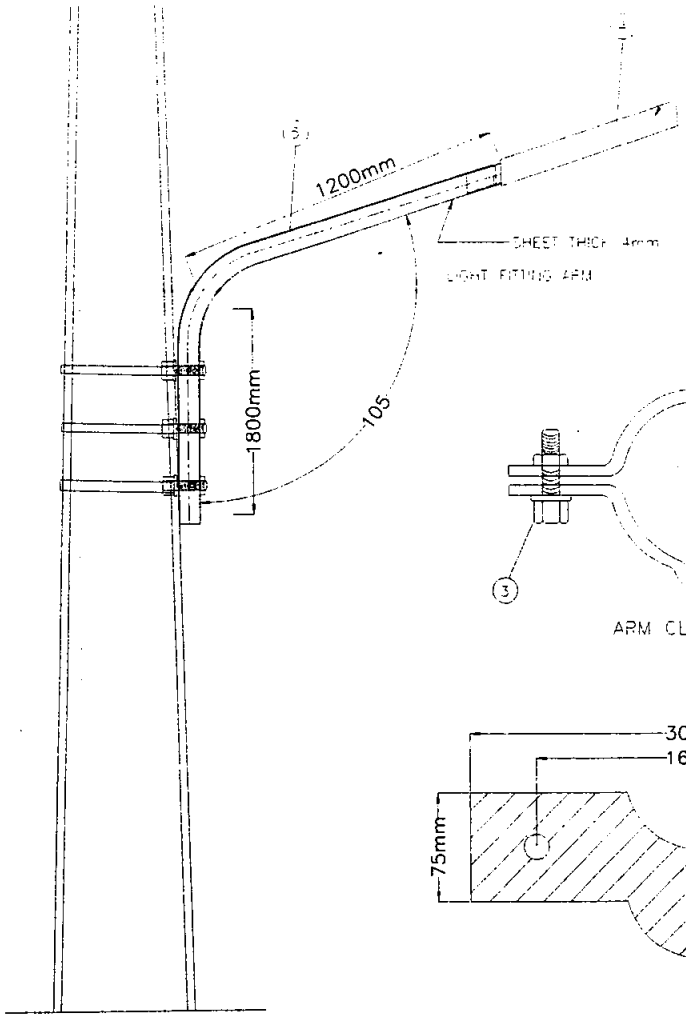
PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

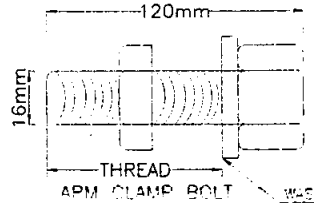
INFRASTRUCTURE DEVELOPMENT OF
BAHAWALPUR INDUSTRIAL ESTATE

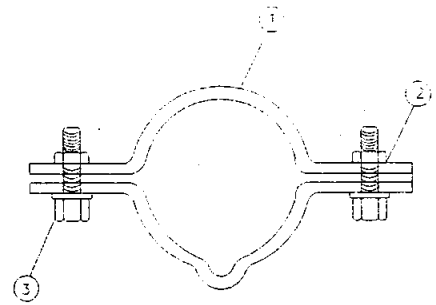
LIGHTING CONTROL PANEL
SINGLE LINE DIAGRAM

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT) LTD. LAHORE

DESN. NESPAK	RECOMMENDED	VER./CKD.	APPROVED
DWN. SA			
F&E			
CKD	DATE	DRAWING NO.	REV.
SUBM	SEP. 2023	3880/181/TD/5E003	0

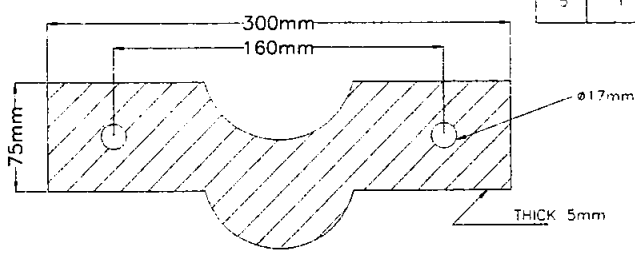






ARM CLAMP BOLT

ITEM	QTY	DESCRIPTION
1	3	ARM CLAMP AS PER REQUIREMENT
2	6	ROUND WASHER 1" DIA 7/16" HOLES
3	6	NUT WITH BOLT 4" LONG
4	1	STREET LED LIGHT
5	1	STREET LIGHT ARM



NOTES:-

1. THIS DRAWING INDICATES TYPICAL INSTALLATION OF LIGHT ARM CLAMPING ARRANGEMENT ON 11kV HT POLES.
2. CONTRACTOR SHALL SUBMIT THE SAMPLE FOR LIGHT FIXTURE, ARM & CLAMPING ARRANGEMENT FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION AT SITE.

SAMD CONSULTANTS

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY

INFRASTRUCTURE DEVELOPMENT OF BAHAWALPUR INDUSTRIAL ESTATE

LIGHT FIXTURE EXTENSION ARM ARRANGEMENT ON HT STRUCTURE POLE WITH ACCESSORIES

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. LAHORE

DESN. NESPAK	RECOMMENDED	VER./CKD	APPROVED
DWN. SA			
FILE			
CKD	DATE	DRAWING NO.	REV.
SUBM.	SEP. 2023	3880/161/TD/5E002	0

REFERENCE DRAWINGS	REV NO.	DATE	DESCRIPTION	BY	CKD	APPD

MULTAN ELECTRIC POWER COMPANY LTD.

Tel #. 9220120
E-mail. dgmiradmepco@gmail.com

Office of the
Director General (MIRAD)
MEPCO Ltd. Multan

Memo No. CE/MEPCO/DG(MIRAD) 12000-01 Dated 25-10-23

Chief Engineer Electrical (PIEDMC)
Commercial Area (North) Sundar Ind Estate,
Sundar Raiwind Road, Lahore.
Contact No. 042-35297203-6.

SUB: **DATA PERMISSION TO CARRY OUT LOAD FLOW STUDY OF 132/11 KV GRID STATION AT BAHAWALPUR INDUSTRIAL ESTATE (BWPIE) BY PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY (PIEDMC).**

REF: **Your office Letter No. PIE/CEE/BwpIE/2152 dated: 13-10-2023.**

With reference to the above cited letter, this office vide D.G MIRAD letter no. CE/MEPCO/DG (MIRAD)/1473-75 dated 24-08-2023 has already issued the approval of Grid Interconnection Study of Bahawalpur Industrial Estate. However, as per advice of NTDC conveyed in Zoom meeting dated 3-10-2023, M/S Power Planners International (PPI) is allowed to use the system model data sent via email for the subject study. However;

- M/s Power Planner International (PPI) Services is required to update the system data by incorporating the latest load projections and expansion plans of MEPCO as mentioned below, in order to carry out system studies. All of the load projections and plans should also be made part of the report.
- M/s Power Planner International (PPI) is advised not to use the system data / information for any other study nor should it be provided to any other company including the sponsor of the above mentioned Grid Station without the prior permission of MIRAD, MEPCO Ltd. Multan.
- The latest load projections and updated transmission expansion plan of MEPCO are attached.
- This data permission may not be considered as a Consent / Go Ahead for said project and also not as a token of finality at any stage.

Director General (MIRAD)
MEPCO H/Qs Multan

CC:

- M/s Power Planners International (PPI), 95-H/2, WAPDA Town Lahore.

TENTATIVE REVISED LOAD FORECAST FOR PIEDMC INDUSTRIAL ESTATES

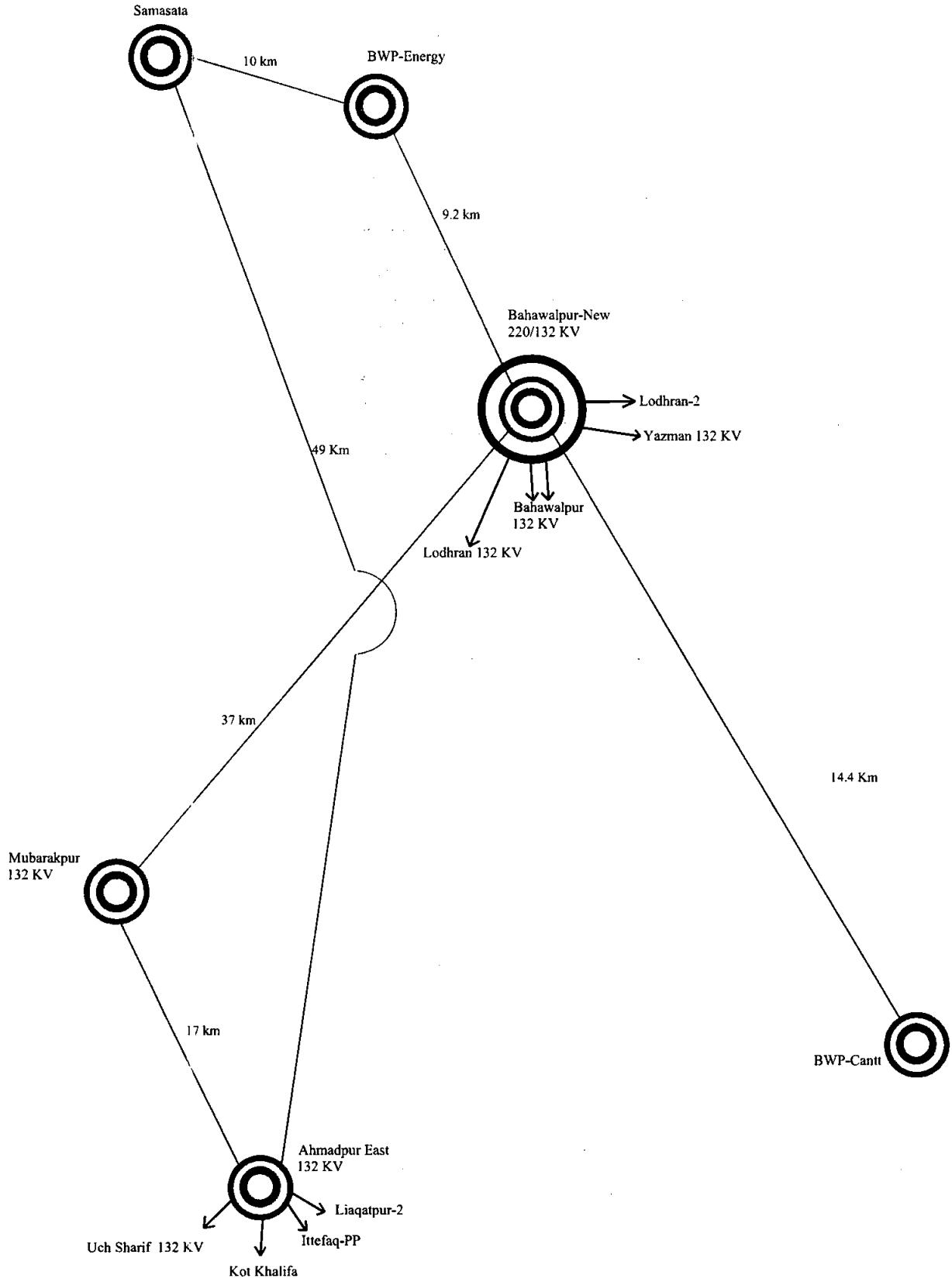
Name of Grid Station		Year Wise Load in MW (Tentative)									
	kV	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32
Vehari Industrial Estate	132	2	3	5	7	10	12	15	18	21	25
Bahawalpur Industrial Estate	132	1.5	1.5	2.5	4	7	10	20	25	30	35

Appendix - B

Map & Sketches

SAMD CONSULTANTS

Existing Network near Bahawalpur-New 220/132 Substation -2026 without Bahawalpur Industrial Estate



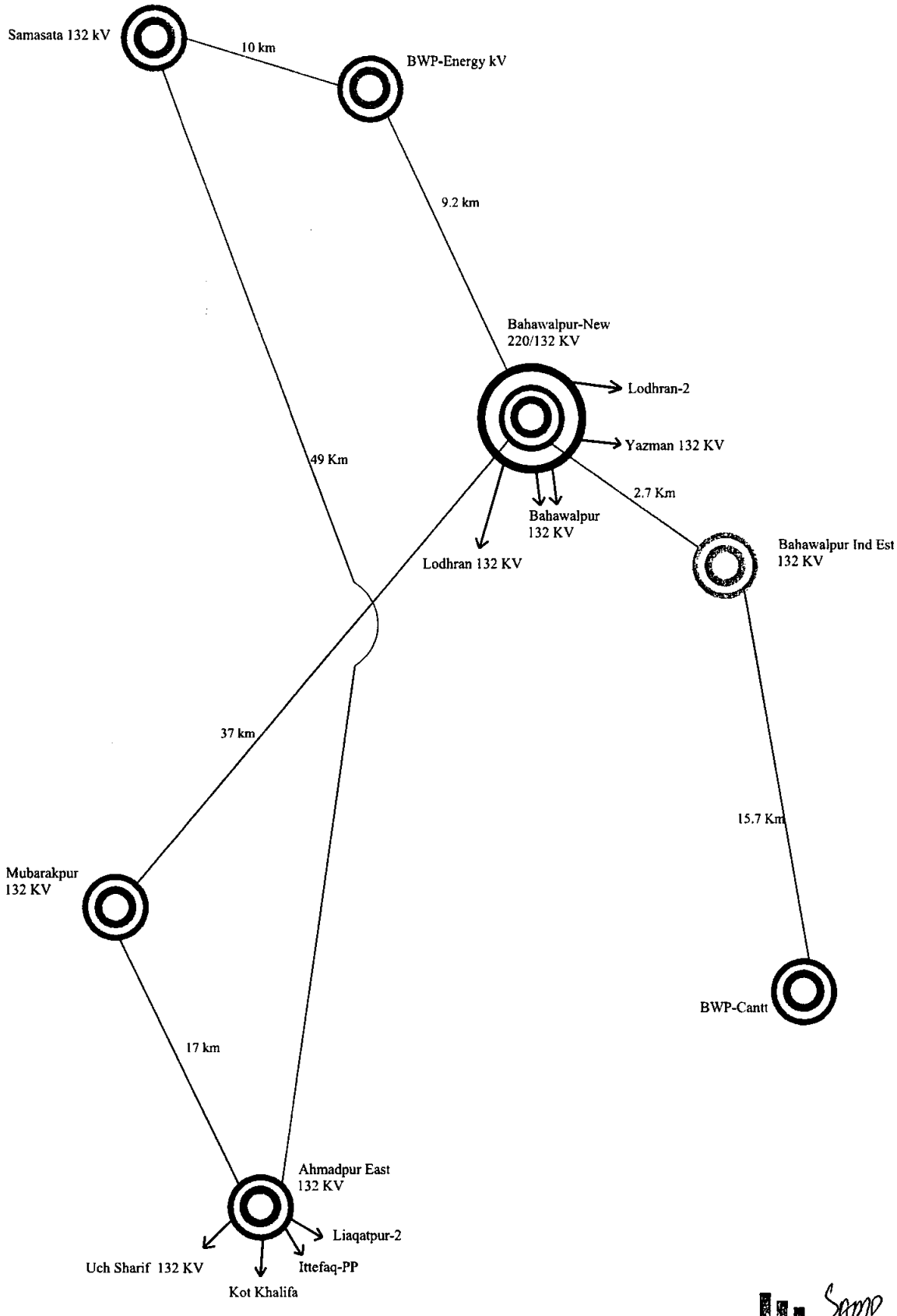
Legend

220 kV Conductor ————

132 kV Rail Conductor ————

Sketch-1
Study of Interconnection of 132kV G/S at Bhawalpur Industrial Estate
Power Planners International
2023

Existing Network near Bahawalpur-New 220/132 Substation -2026 with Bahawalpur Industrial Estate



SAMD CONSULTANTS

Legend

132 kV Twin bundle Rail Conductor ——————

132 kV Rail Conductor ——————

Sketch-1
Study of Interconnection of 132kV G/S at Bhawalpur Industrial Estate
Power Planners International
2023 | 1 |

Appendix - C

Plotted Results of Load Flow

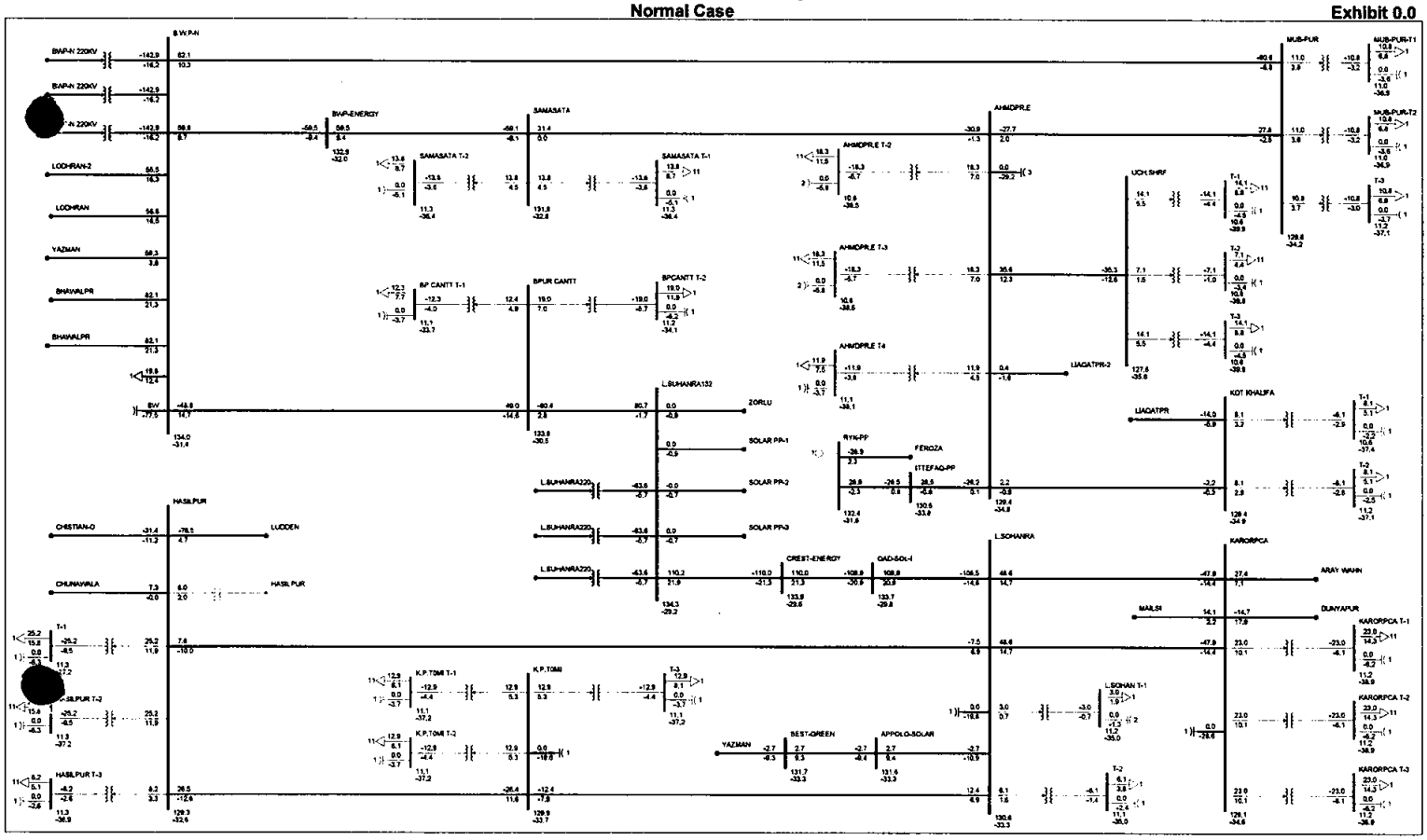
For Chapter-5

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - Without Bahawalpur Industrial Estate G/S

Normal Case

Exhibit 0.0



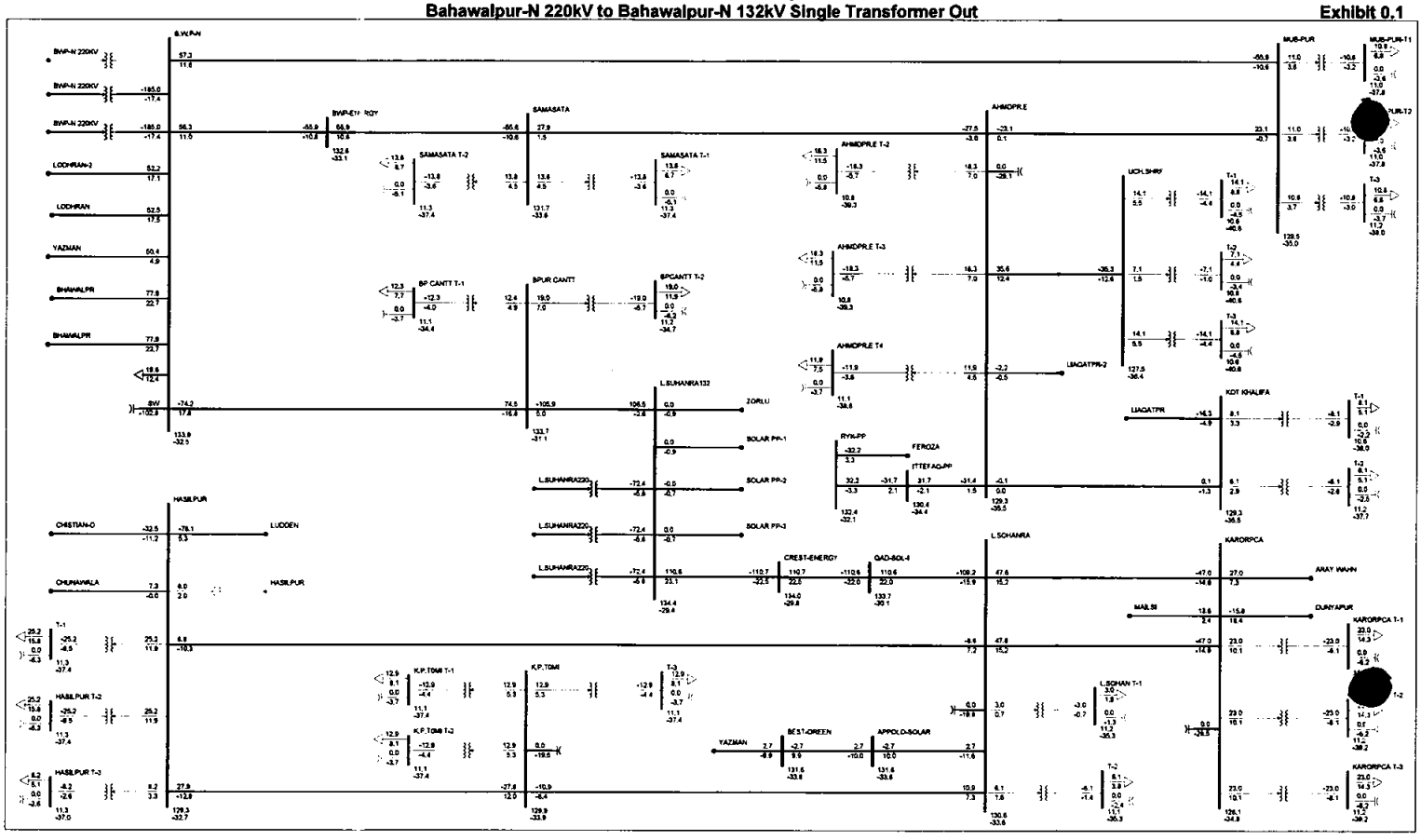
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - Without Bahawalpur Industrial Estate G/S

Bahawalpur-N 220kV to Bahawalpur-N 132kV Single Transformer Out

Exhibit 0.1

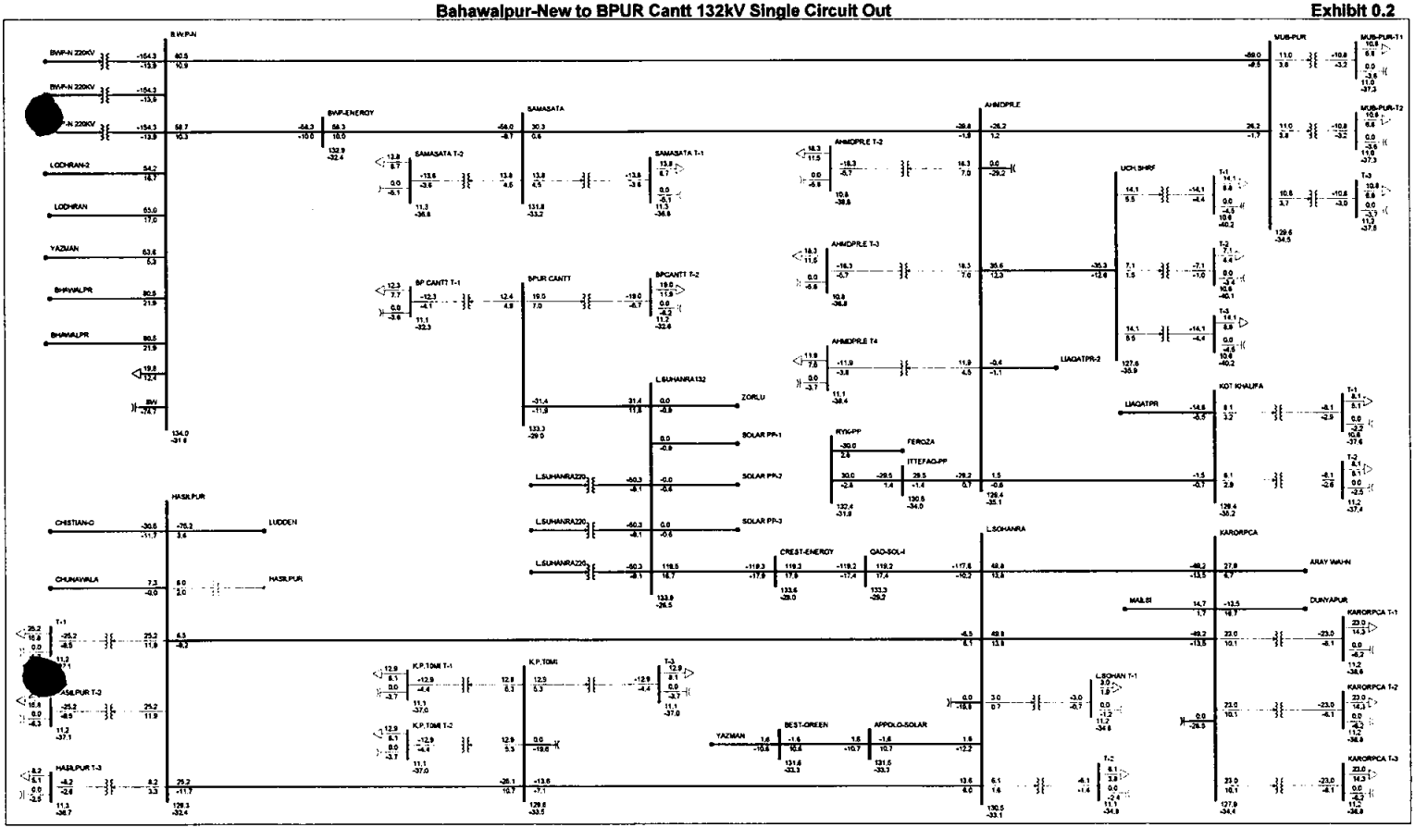


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - Without Bahawalpur Industrial Estate G/S

Bahawalpur-New to BPUR Cantt 132kV Single Circuit Out

Exhibit 0.2



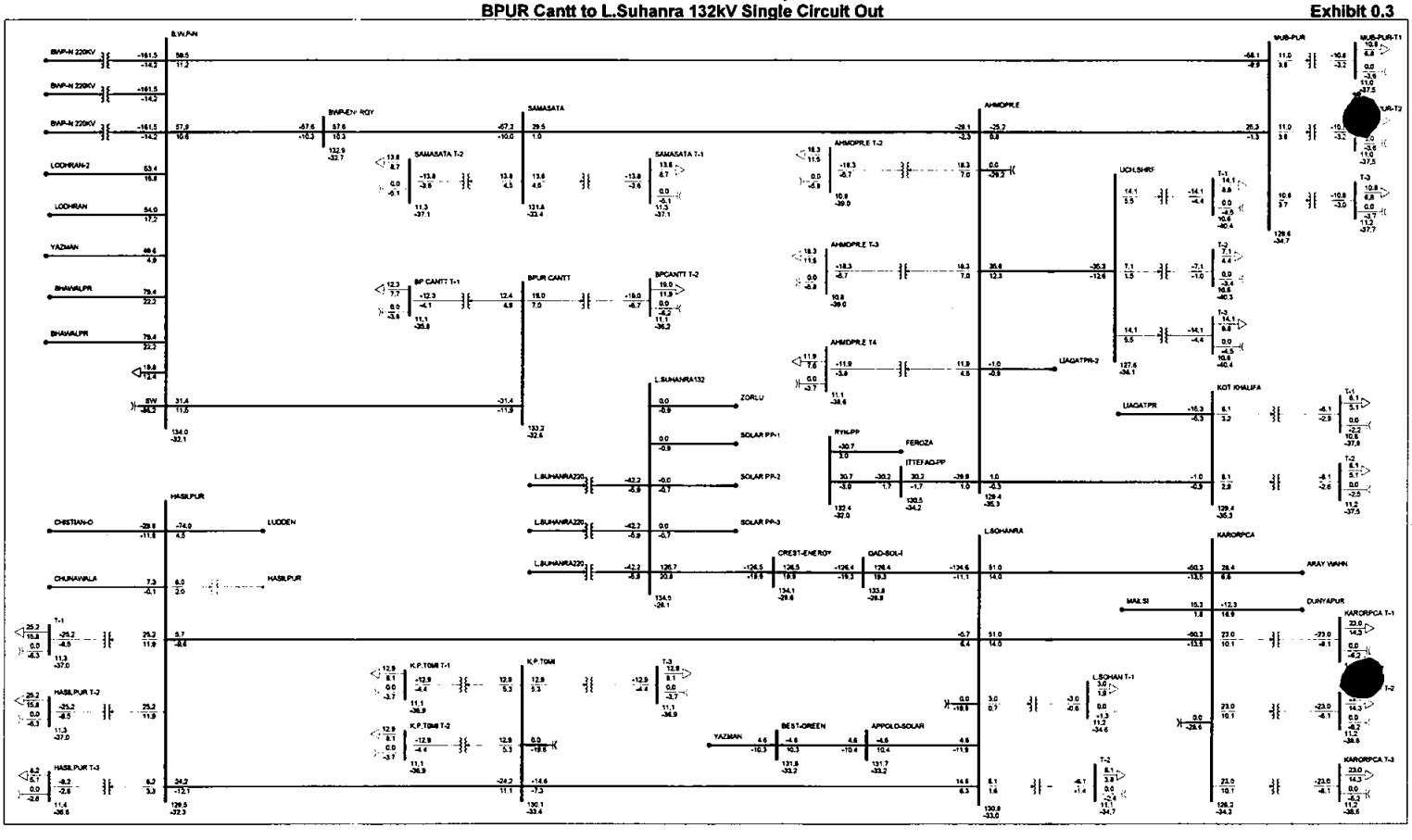
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - Without Bahawalpur Industrial Estate G/S

BPUR Cantt to L.Suhanra 132kV Single Circuit Out

Exhibit 0.3

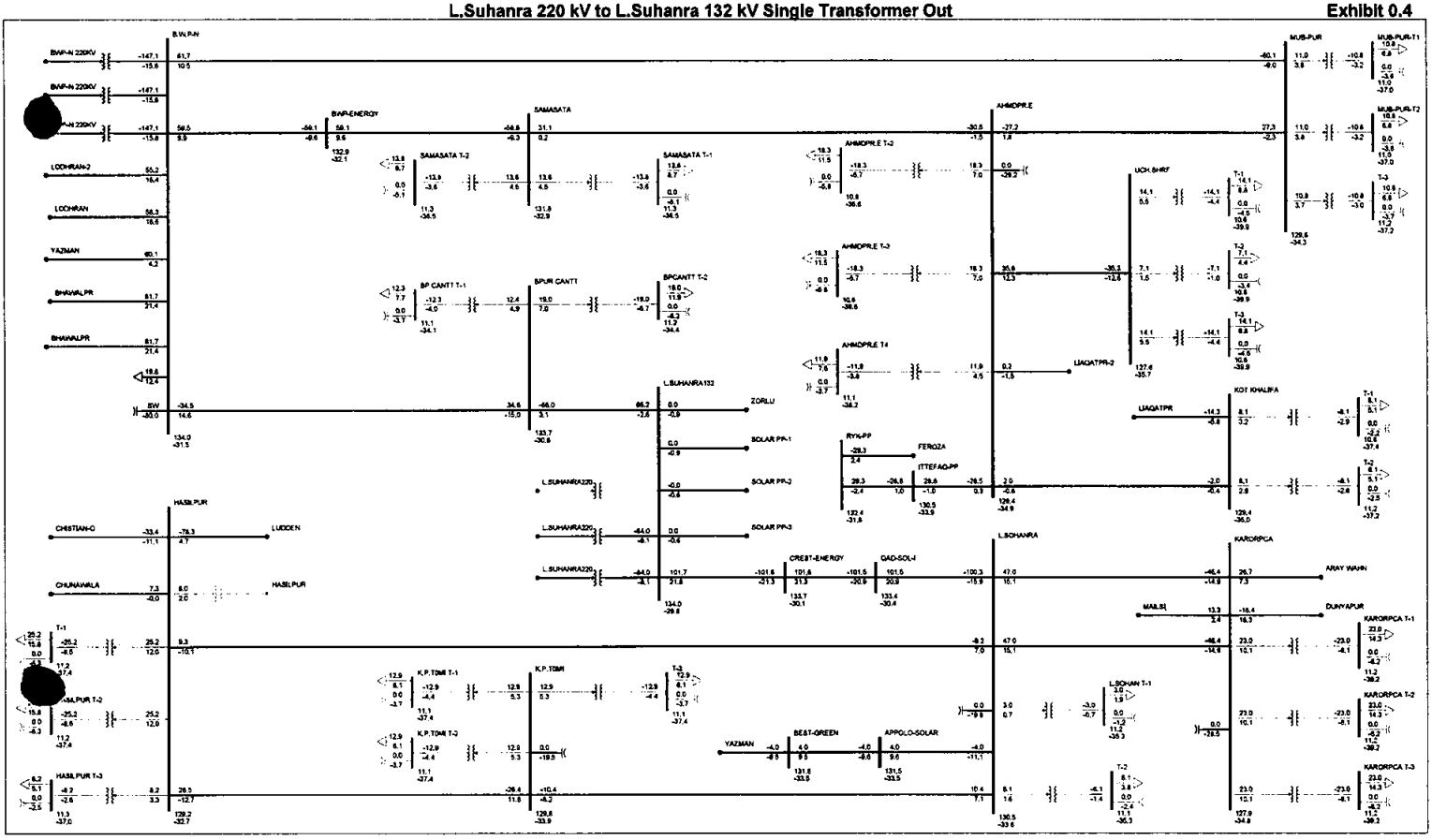


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - Without Bahawalpur Industrial Estate G/S

L.Suhanra 220 kV to L.Suhanra 132 kV Single Transformer Out

Exhibit 0.4



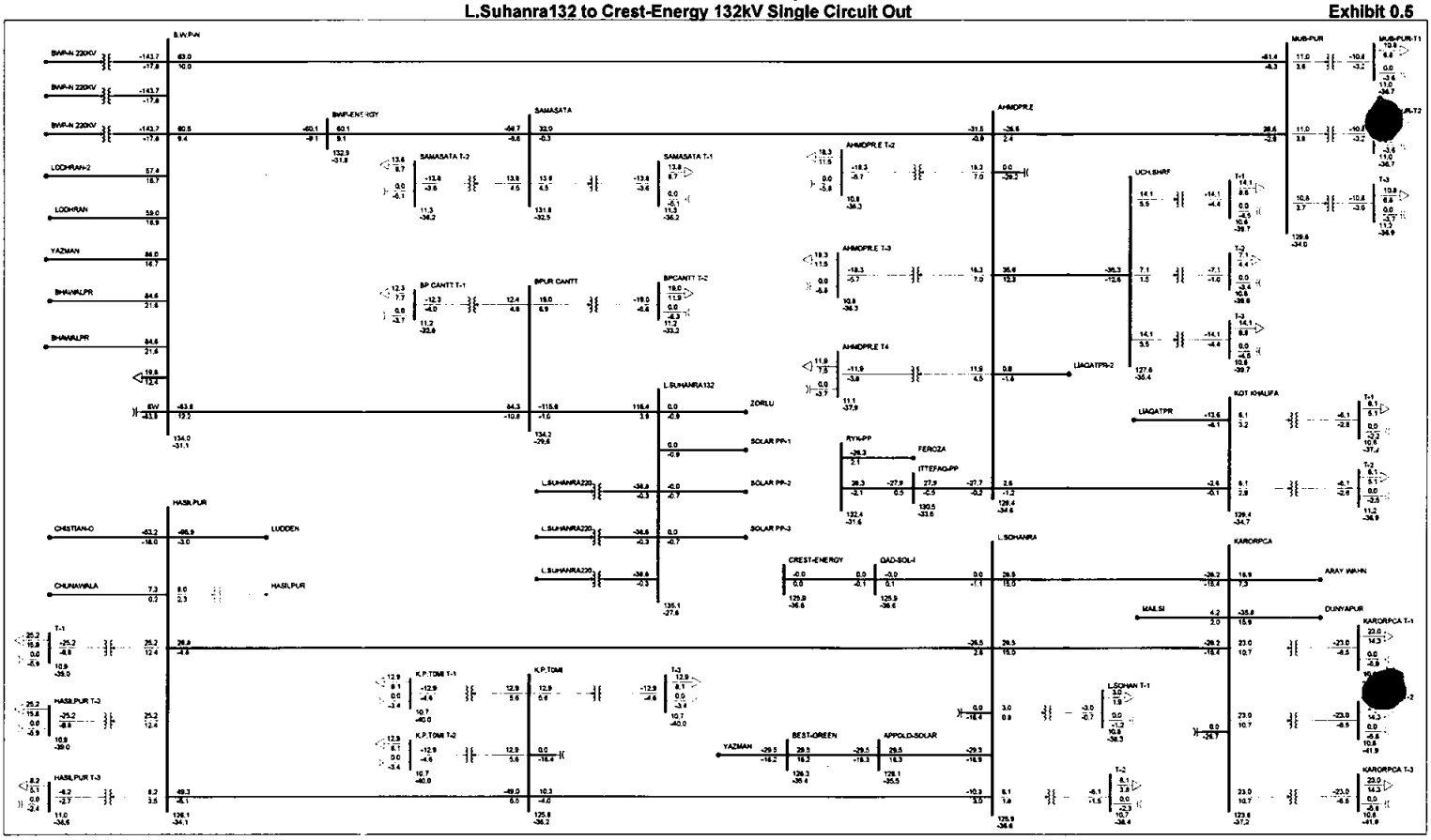
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - Without Bahawalpur Industrial Estate G/S

L.Suhanra132 to Crest-Energy 132kV Single Circuit Out

Exhibit 0.5

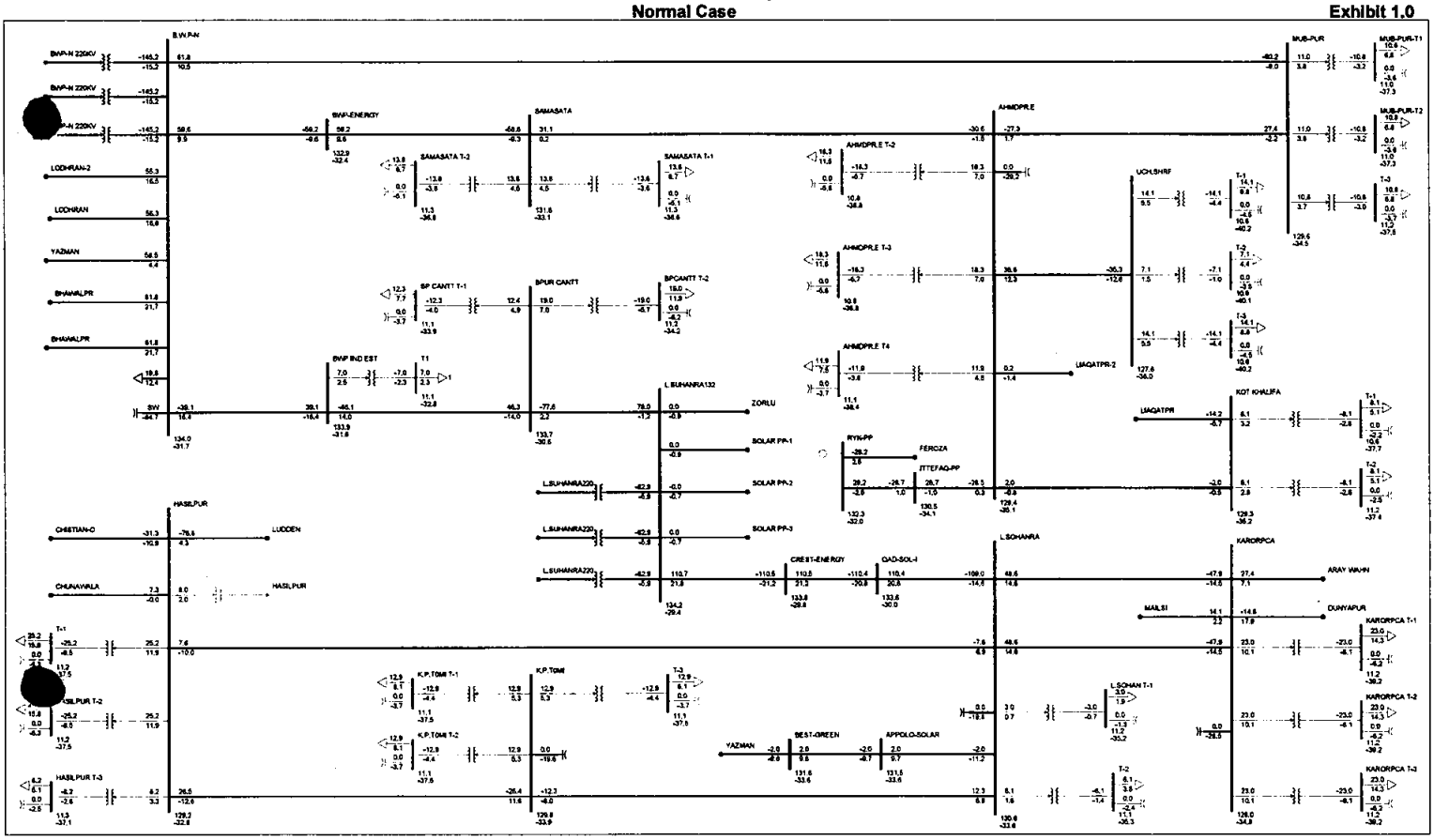


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

Normal Case

Exhibit 1.0



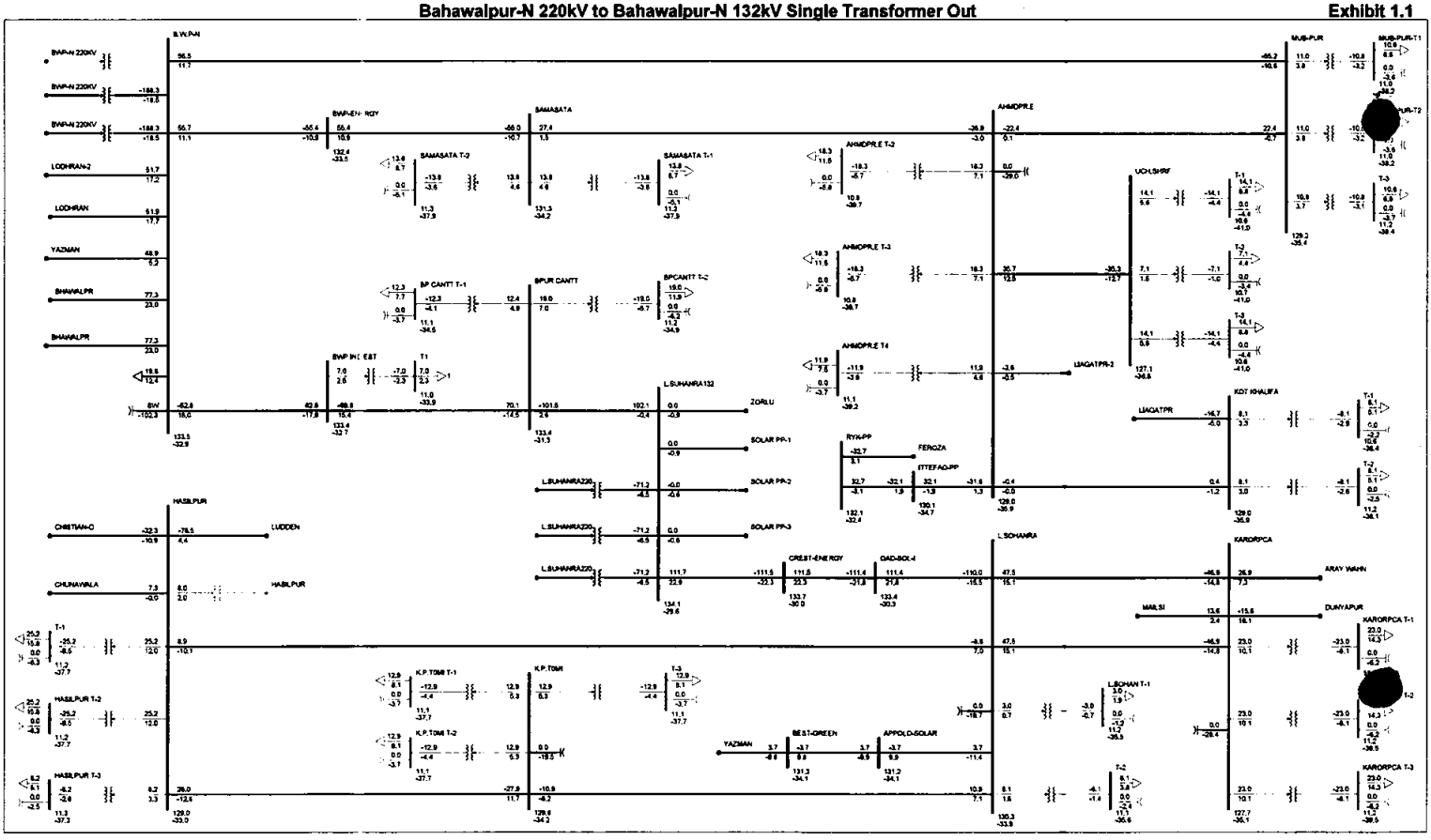
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

Bahawalpur-N 220kV to Bahawalpur-N 132kV Single Transformer Out

Exhibit 1.1

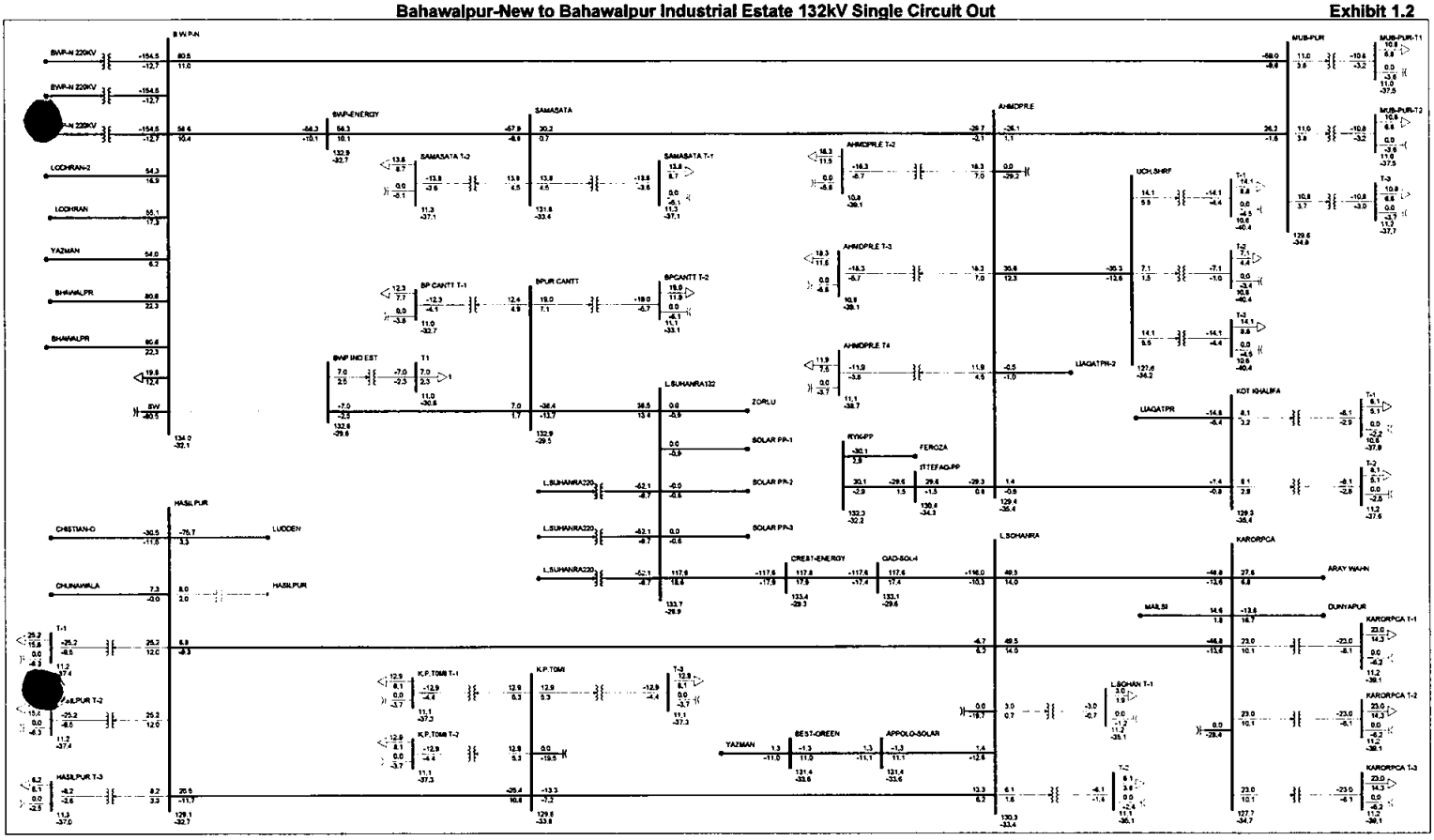


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

Bahawalpur-New to Bahawalpur Industrial Estate 132kV Single Circuit Out

Exhibit 1.2



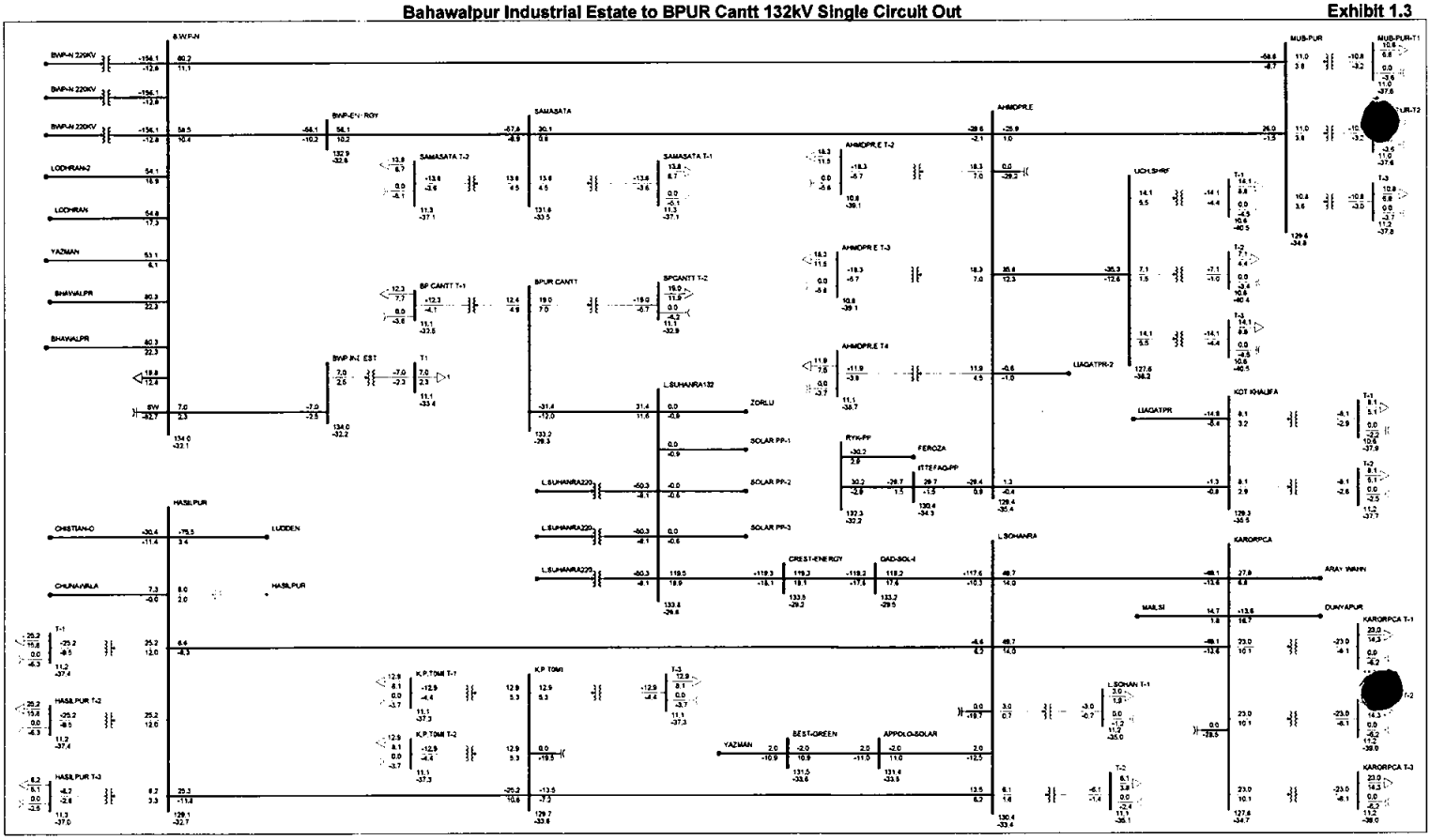
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

Bahawalpur Industrial Estate to BPUR Cantt 132kV Single Circuit Out

Exhibit 1.3

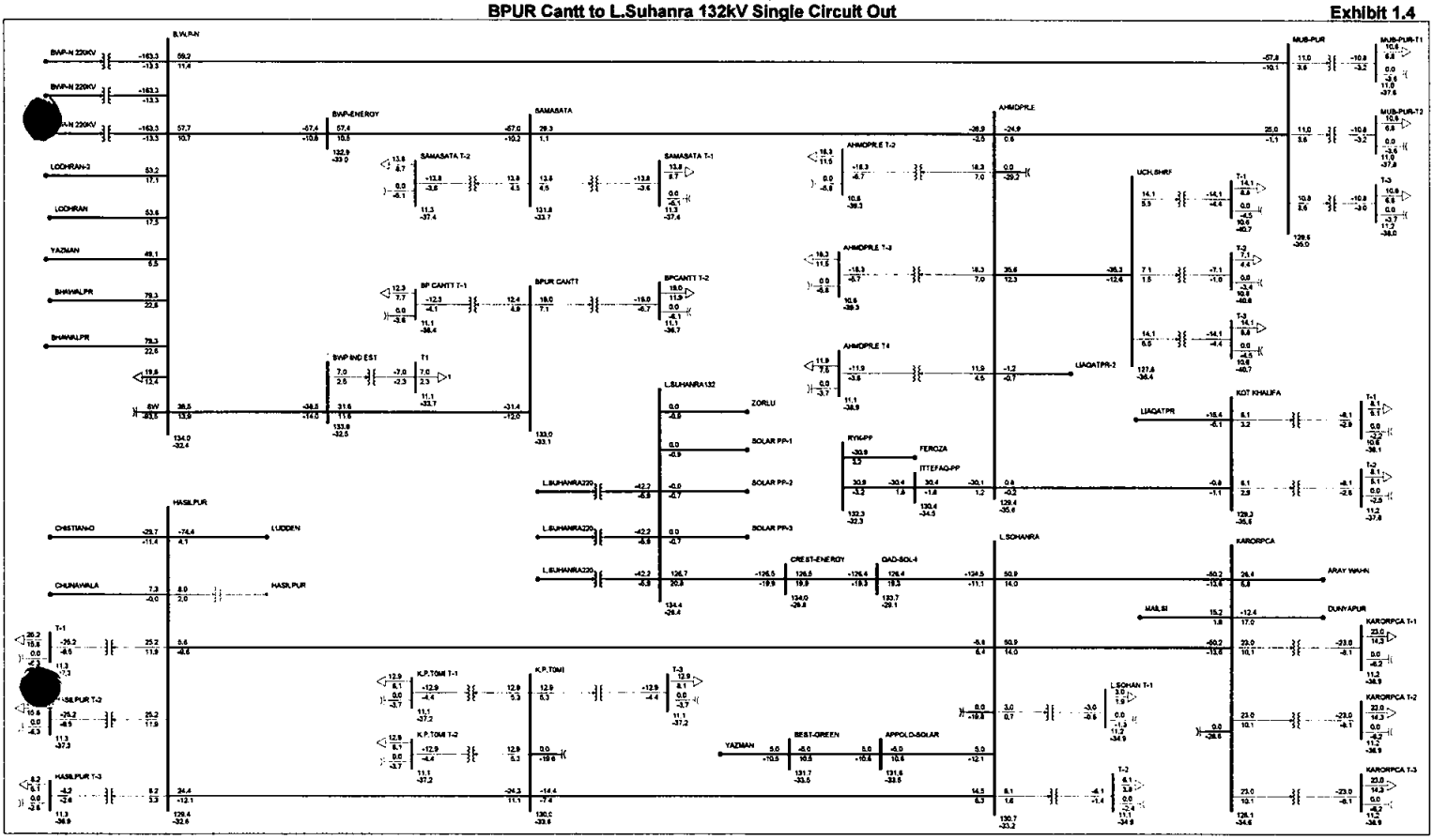


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

BPUR Cantt to L.Suhanra 132kV Single Circuit Out

Exhibit 1.4



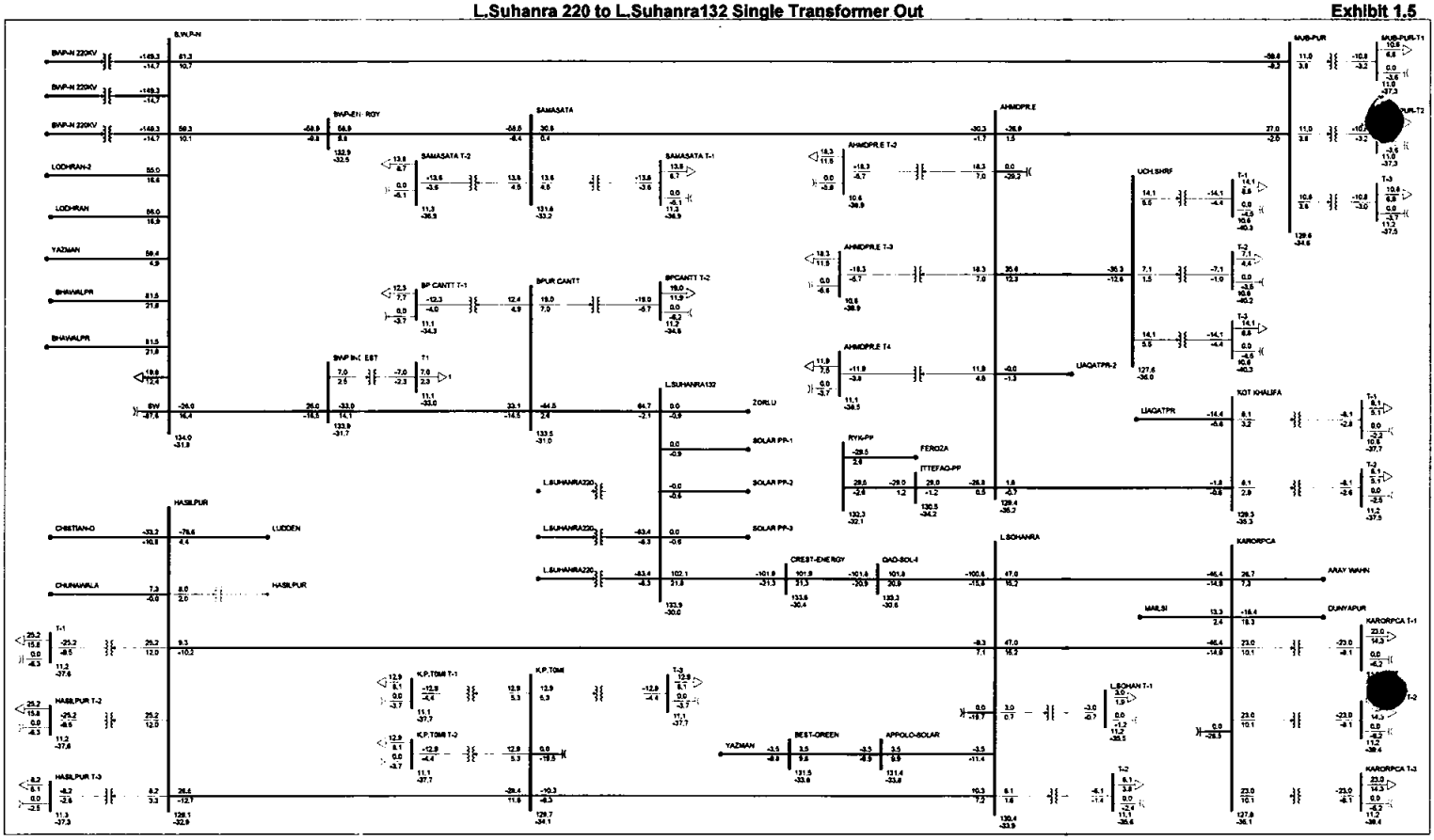
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

L.Suhanra 220 to L.Suhanra132 Single Transformer Out

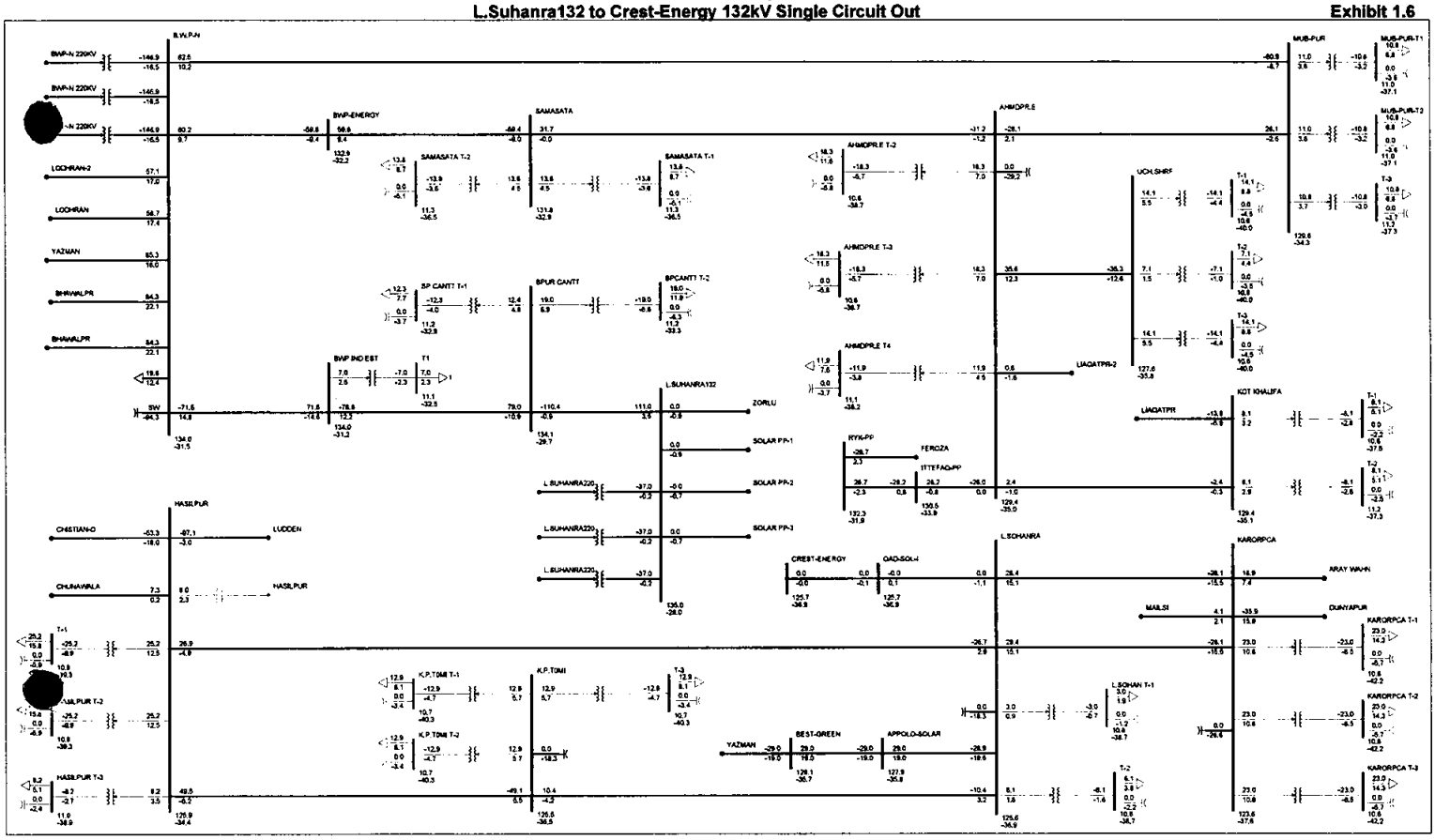
Exhibit 1.5



Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

L.Suhanra132 to Crest-Energy 132kV Single Circuit Out **Exhibit 1.6**



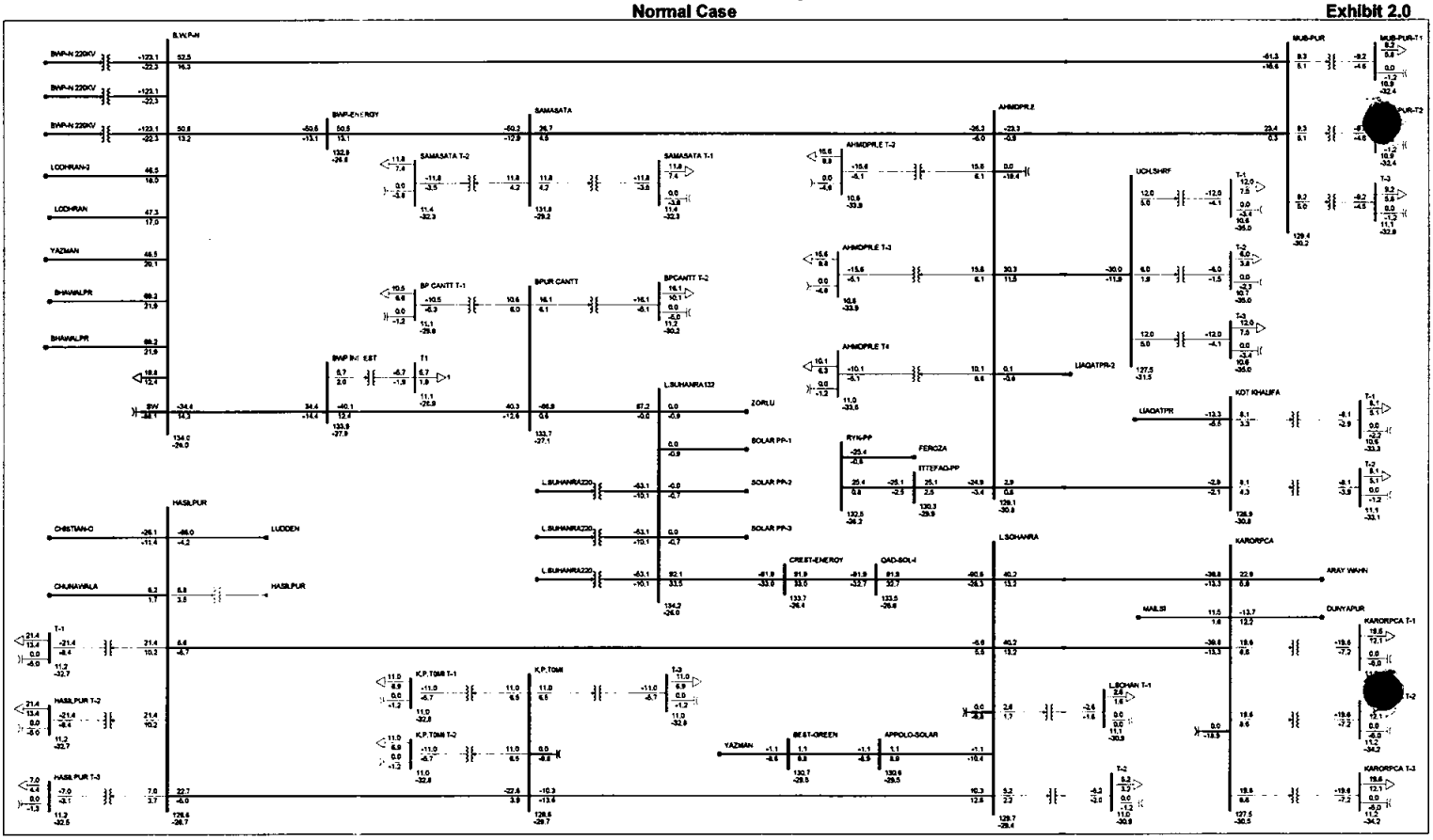
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Off-Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

Normal Case

Exhibit 2.0

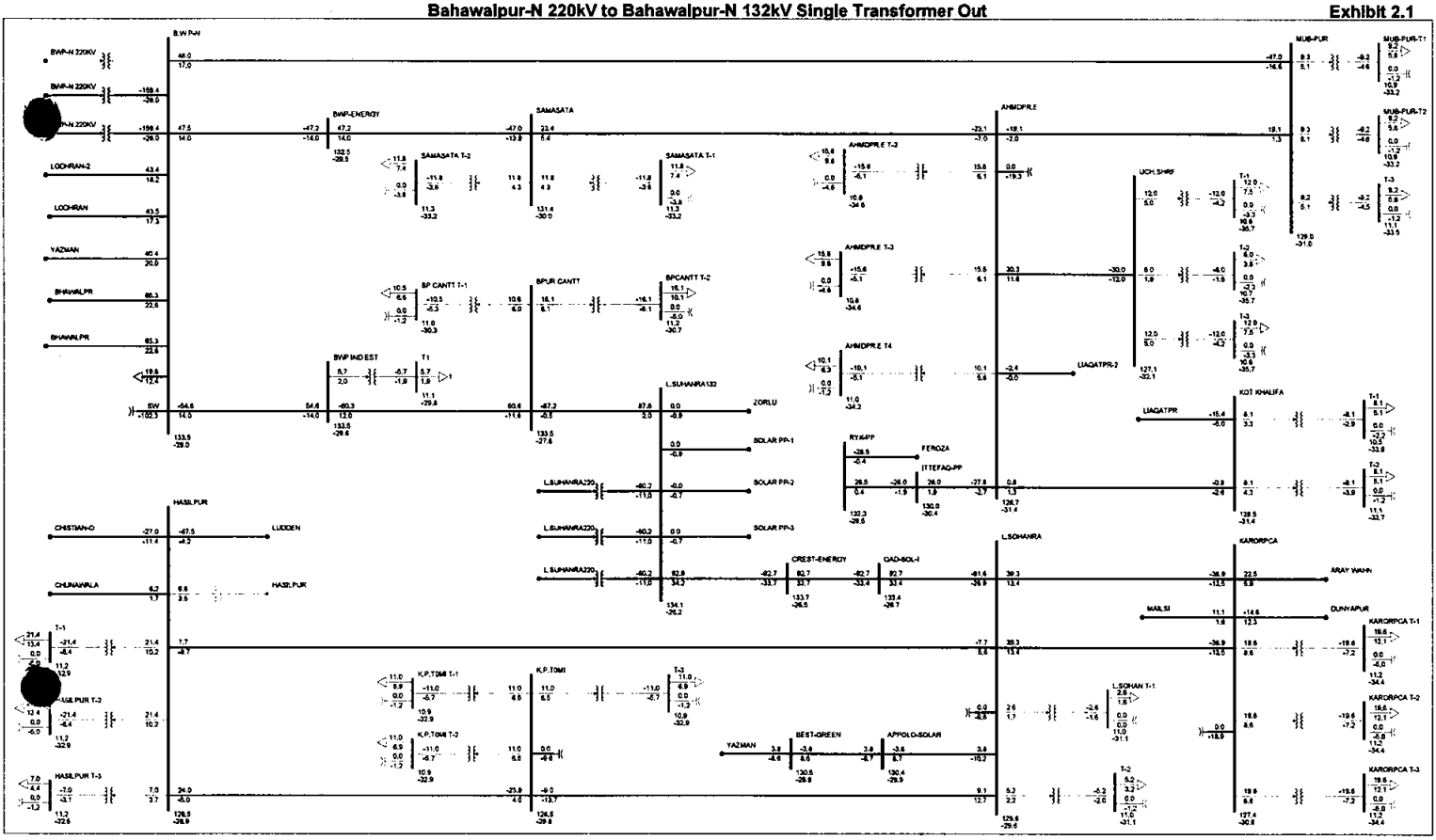


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Off-Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

Bahawalpur-N 220kV to Bahawalpur-N 132kV Single Transformer Out

Exhibit 2.1



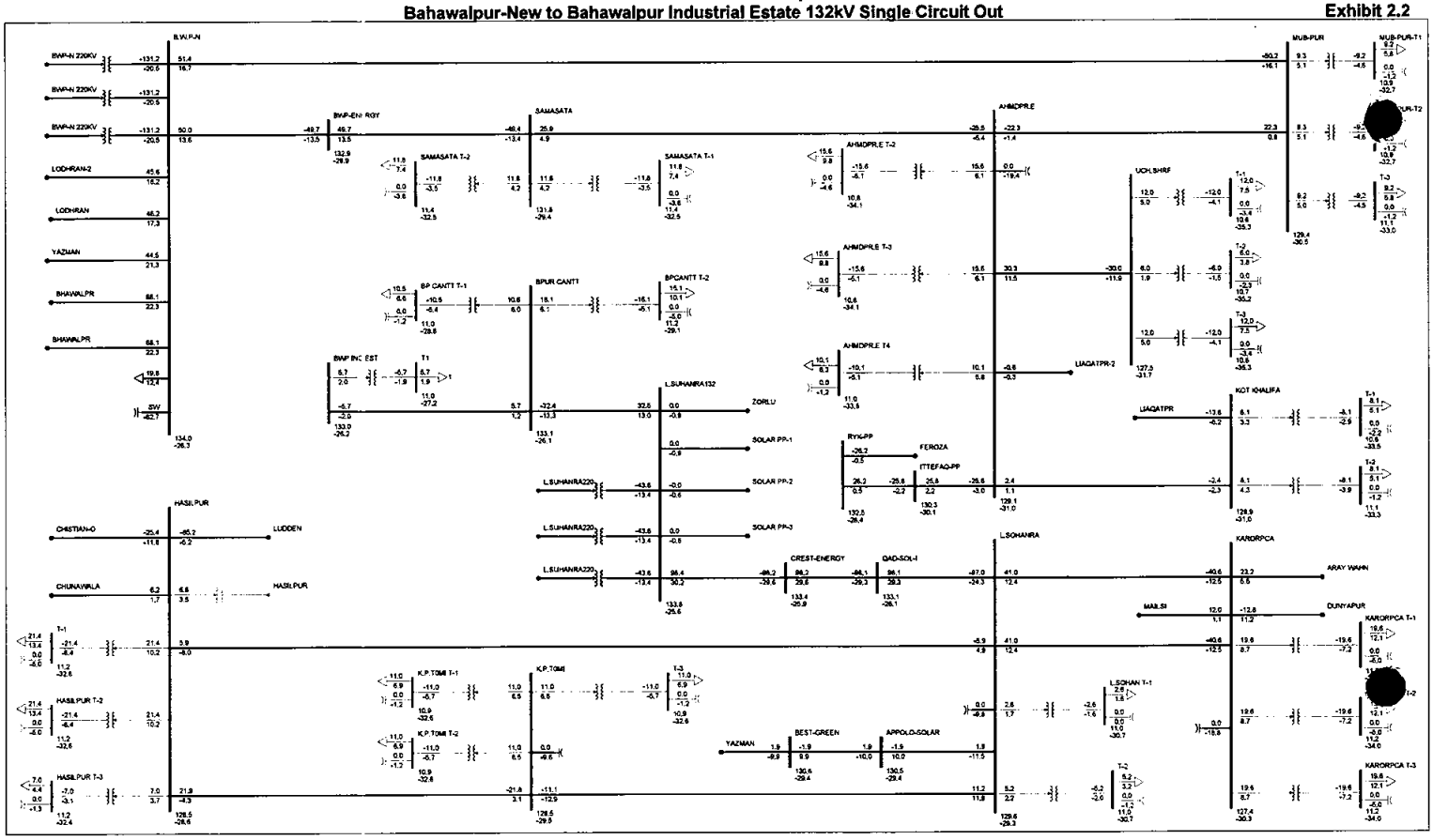
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Off-Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

Bahawalpur-New to Bahawalpur Industrial Estate 132kV Single Circuit Out

Exhibit 2.2

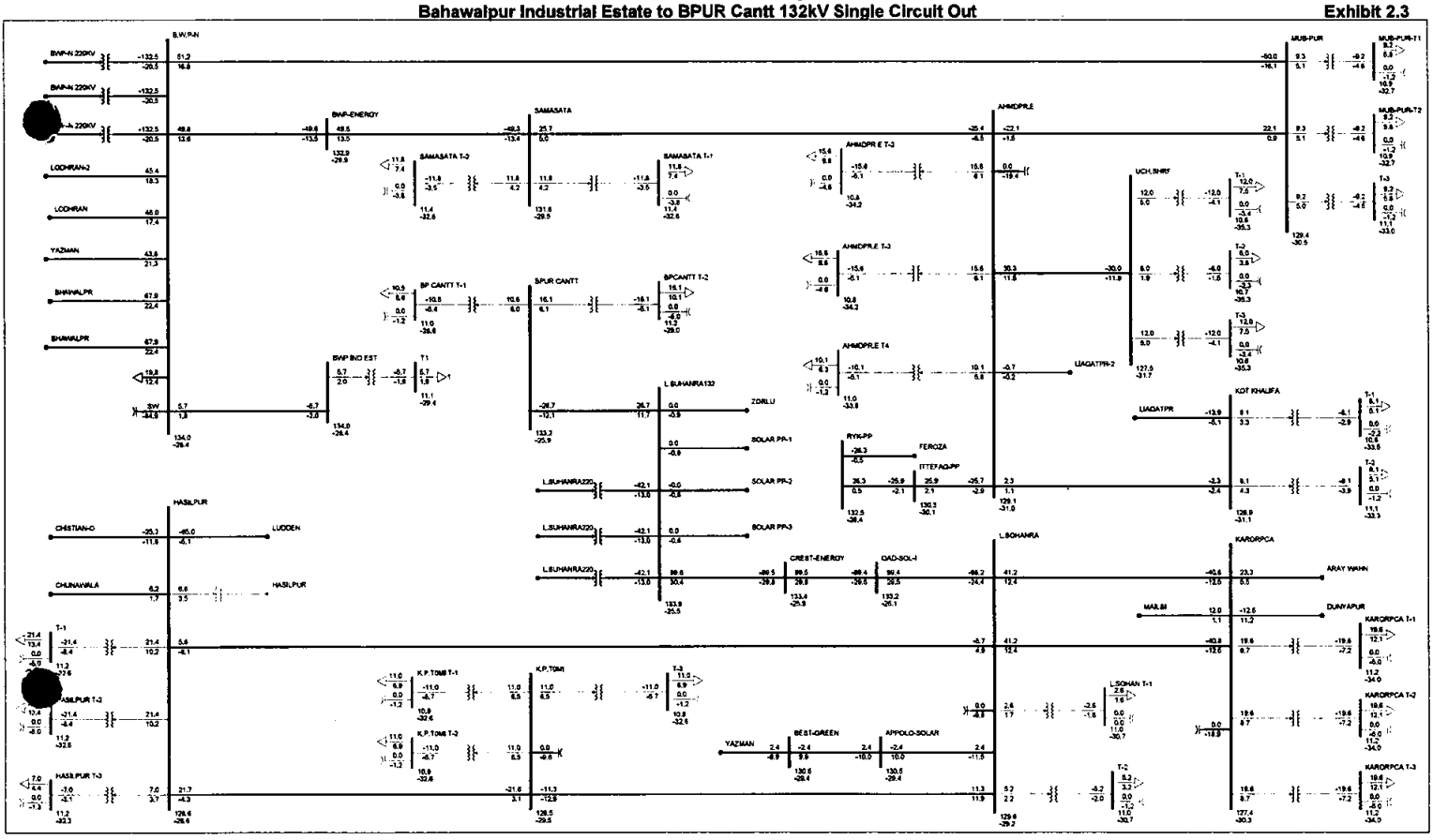


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Off-Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

Bahawalpur Industrial Estate to BPUR Cantt 132kV Single Circuit Out

Exhibit 2.3



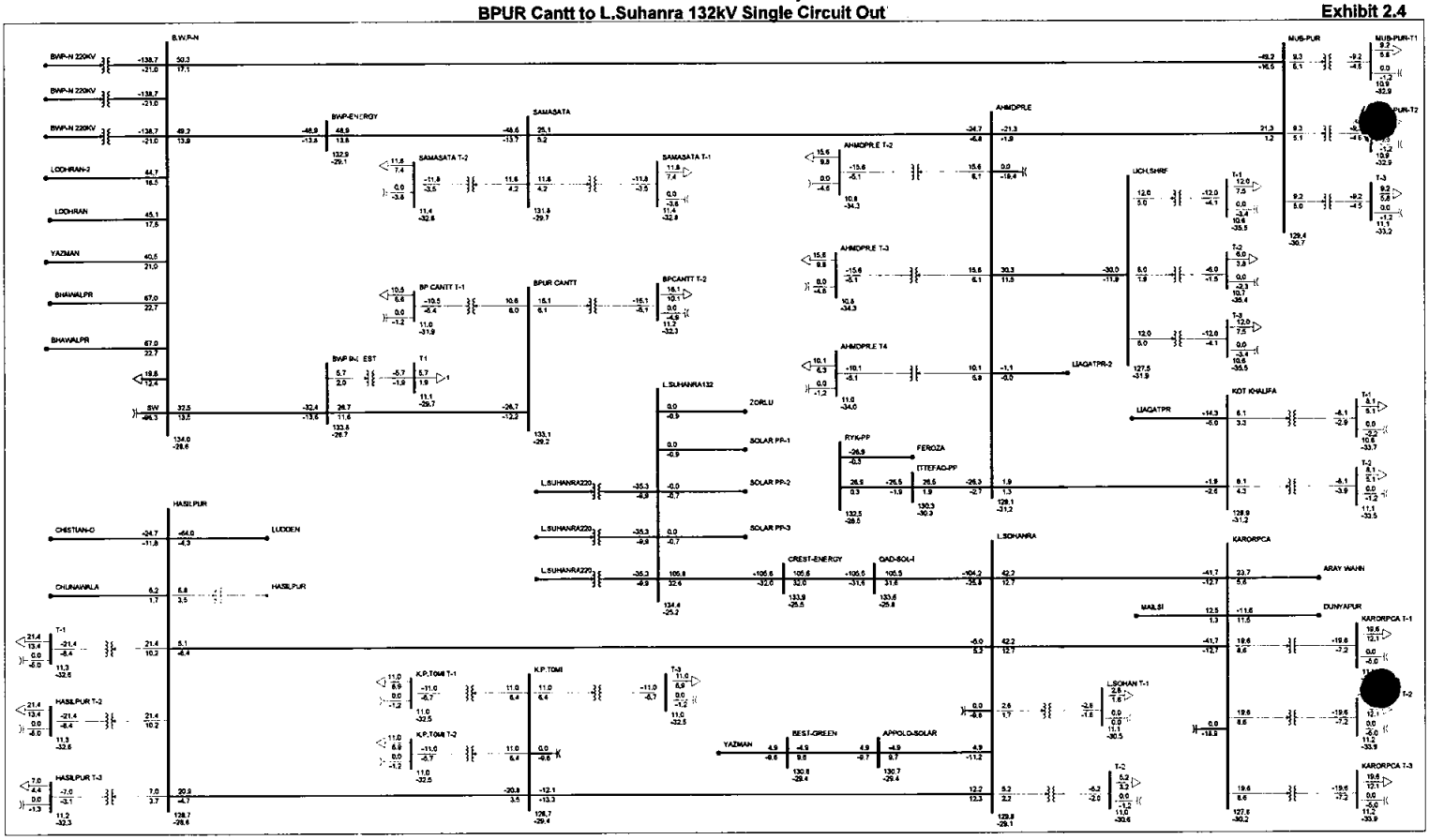
SAMD CONSULTANTS

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Off-Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

BPUR Cantt to L.Suhanra 132kV Single Circuit Out

Exhibit 2.4

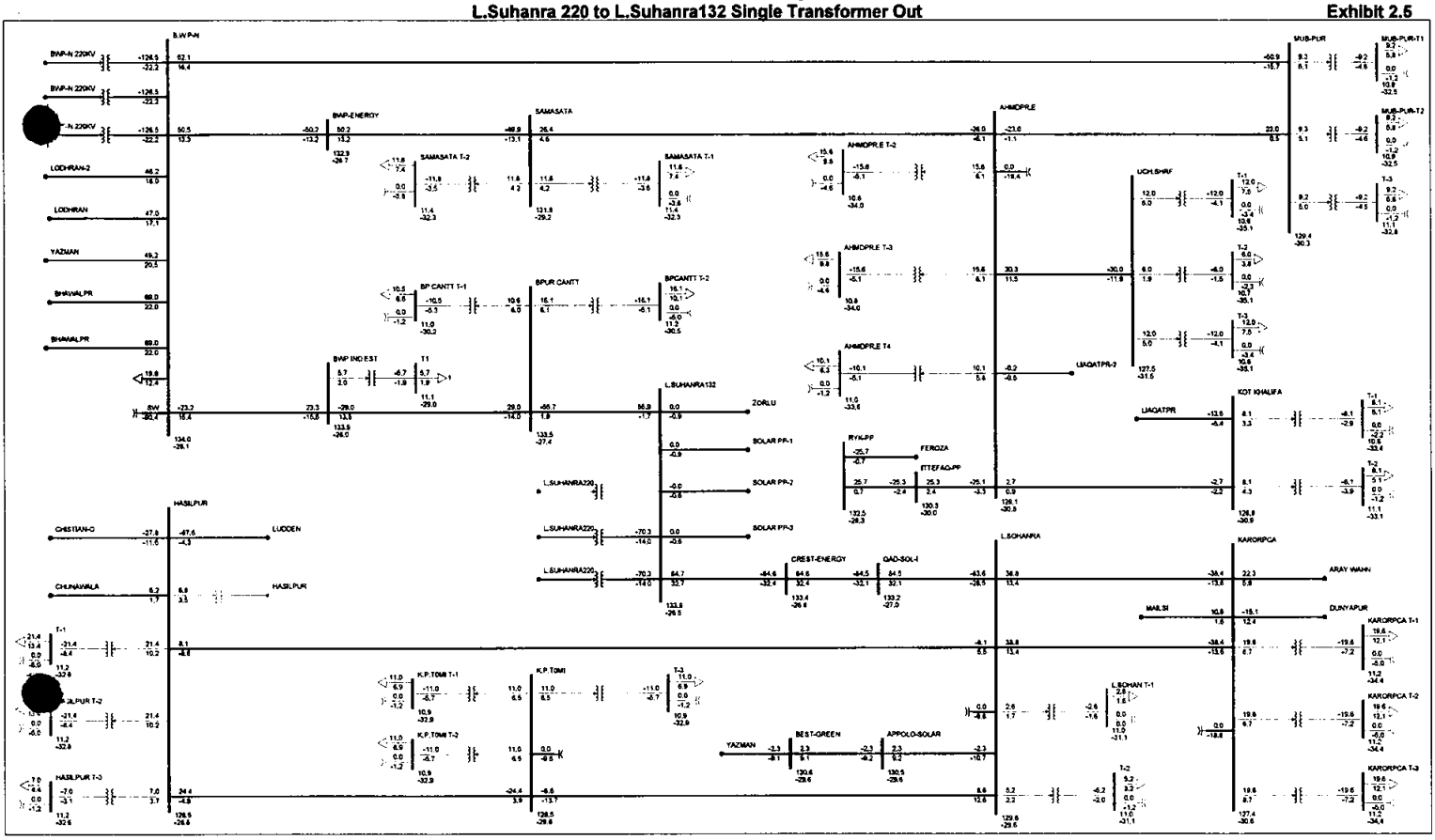


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Off-Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

L.Suhanra 220 to L.Suhanra132 Single Transformer Out

Exhibit 2.5



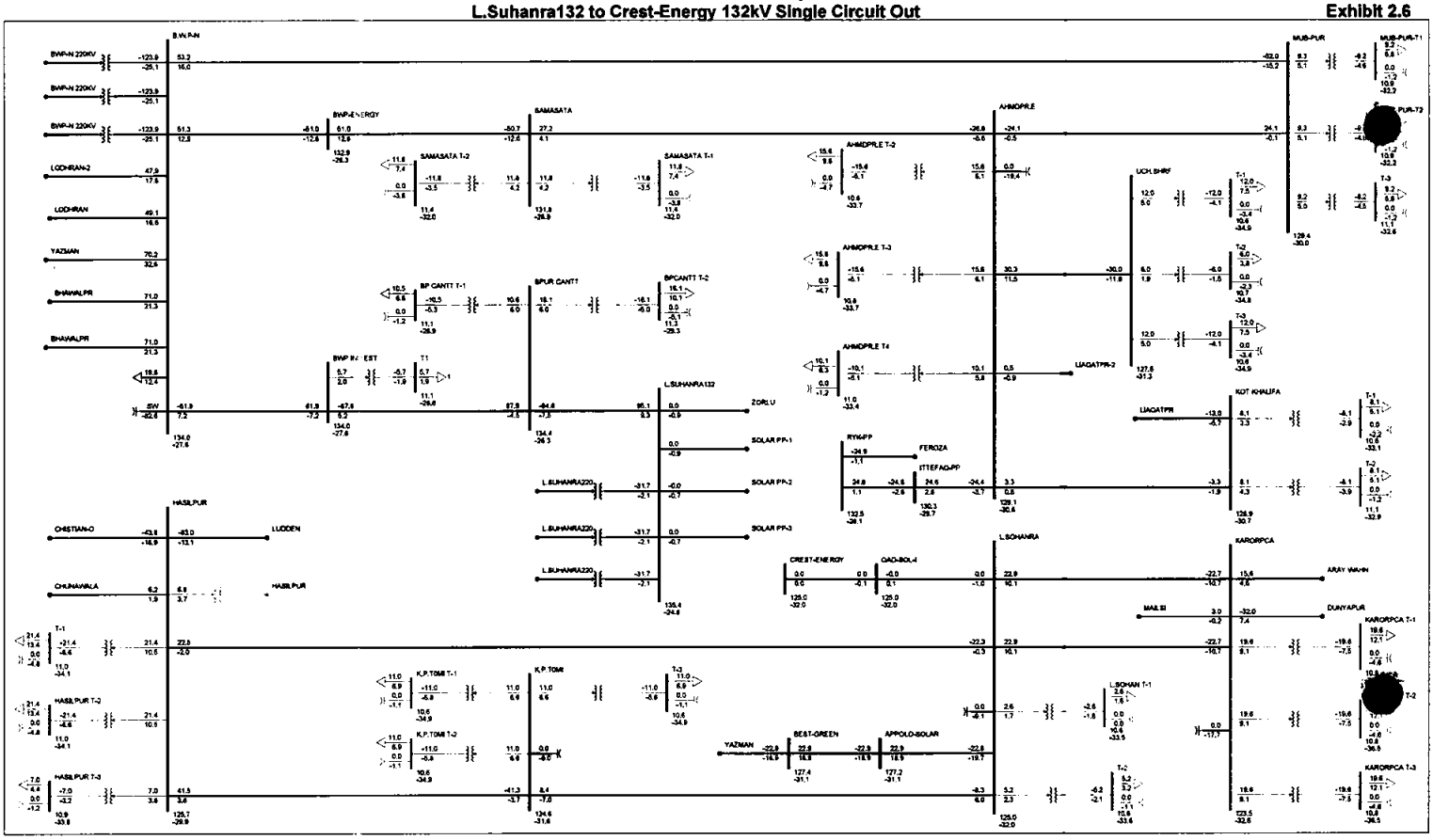
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Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Off-Peak Load Case 2026 - With Bahawalpur Industrial Estate G/S

L.Suhanra132 to Crest-Energy 132kV Single Circuit Out

Exhibit 2.6

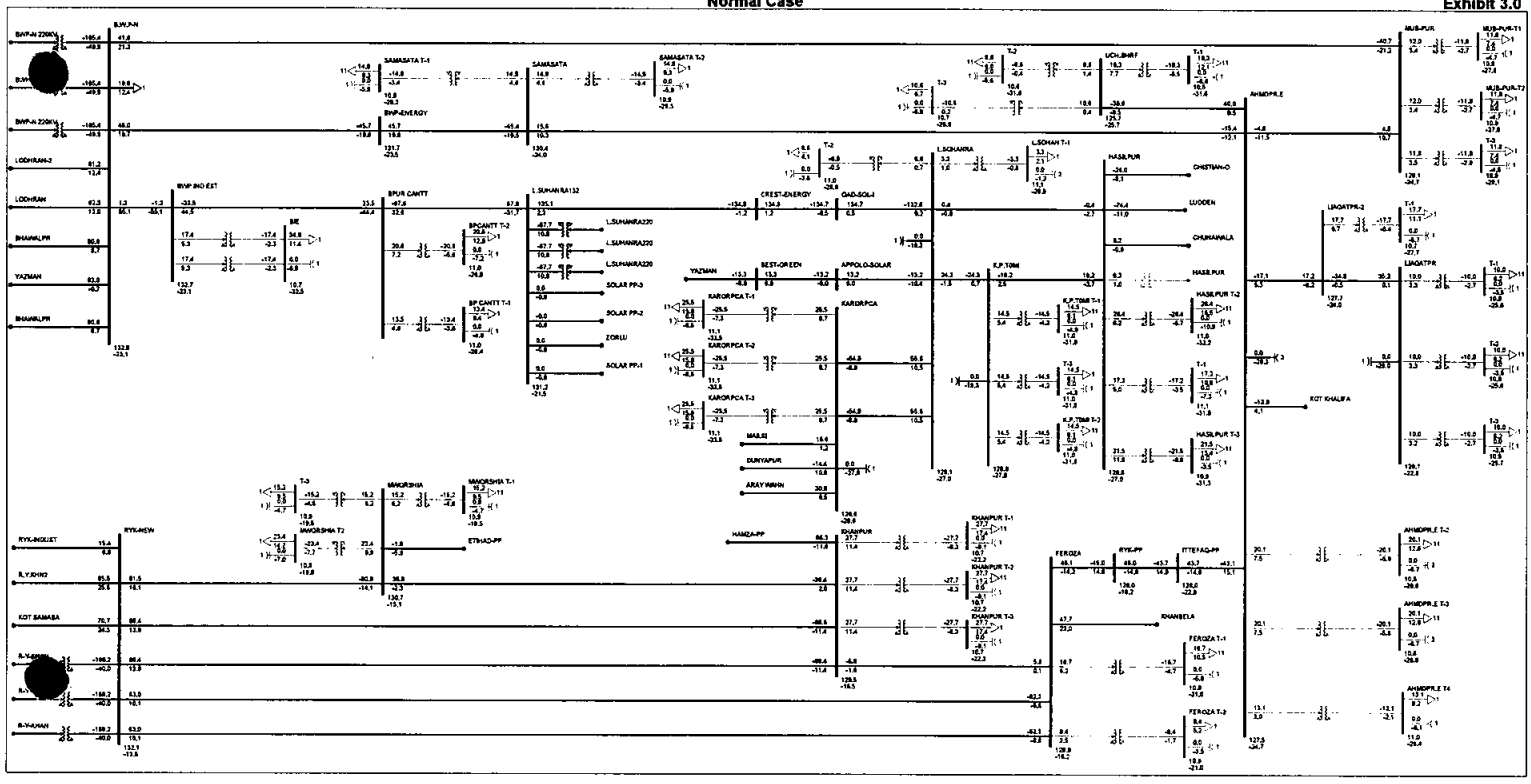


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2028 - With Bahawalpur Industrial Estate G/S

Normal Case

Exhibit 3.0



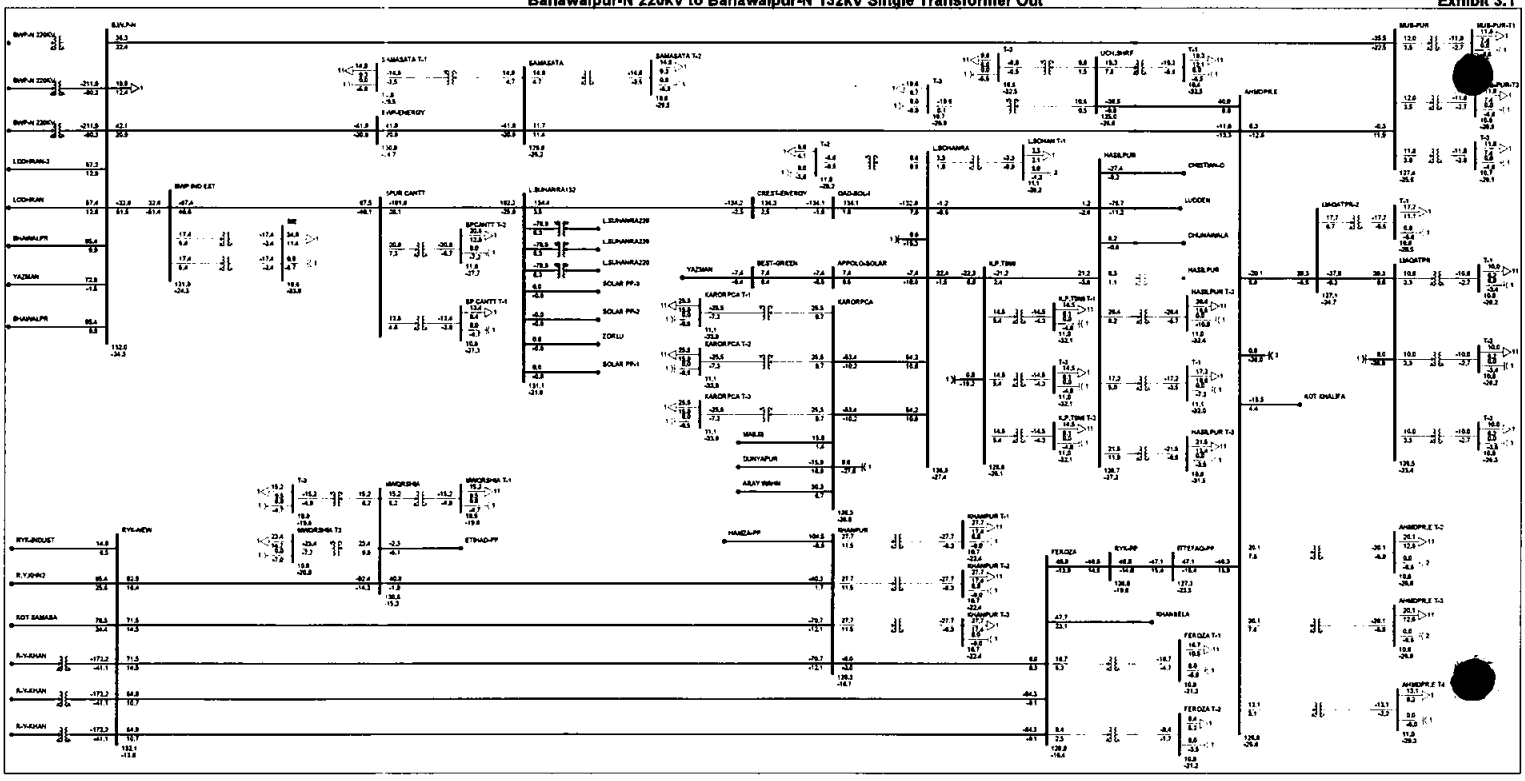
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Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2028 - With Bahawalpur Industrial Estate G/S

Bahawalpur-N 220kV to Bahawalpur-N 132kV Single Transformer Out

Exhibit 3.1

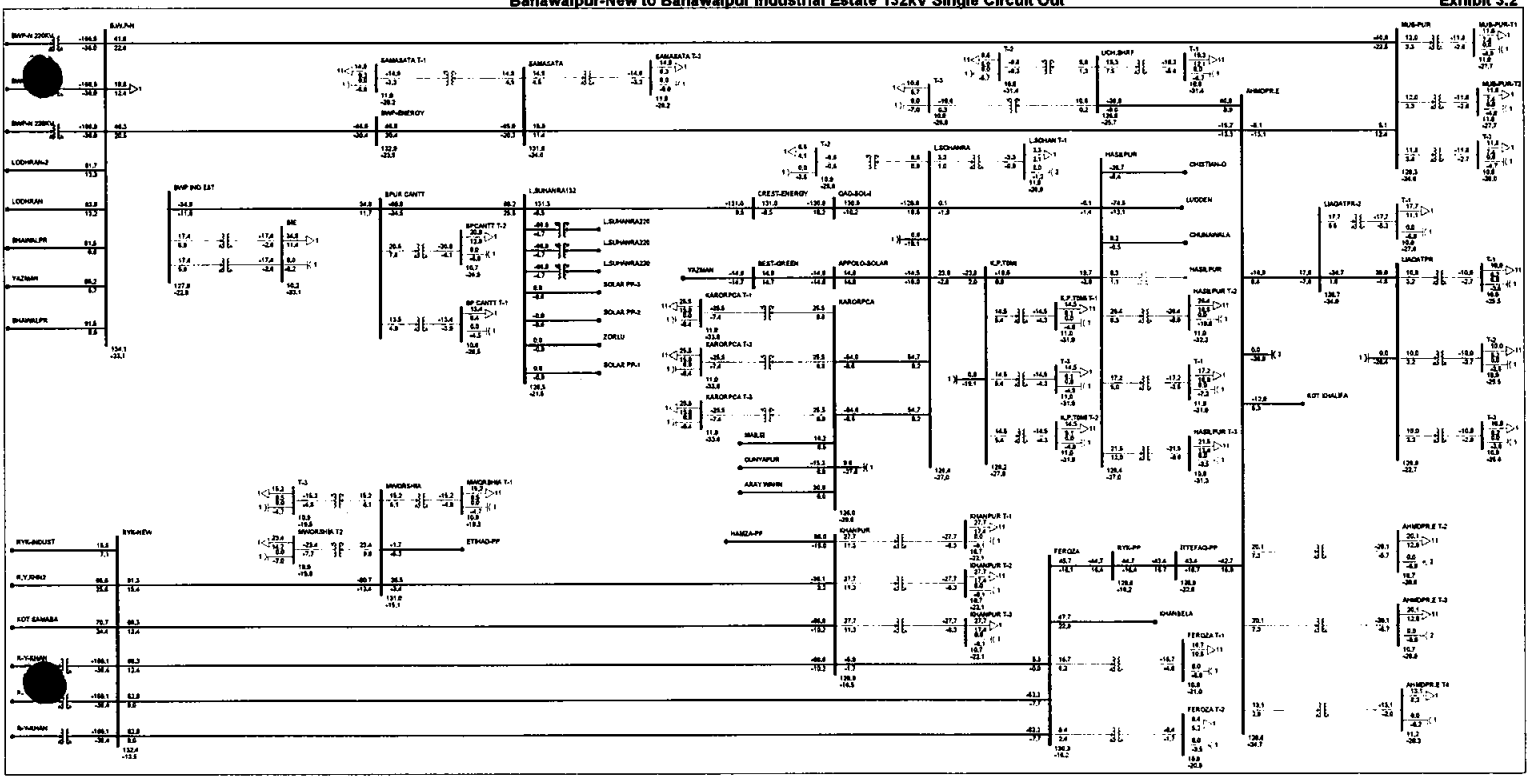


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2028 - With Bahawalpur Industrial Estate G/S

Bahawalpur-New to Bahawalpur Industrial Estate 132kV Single Circuit Out

Exhibit 3.2



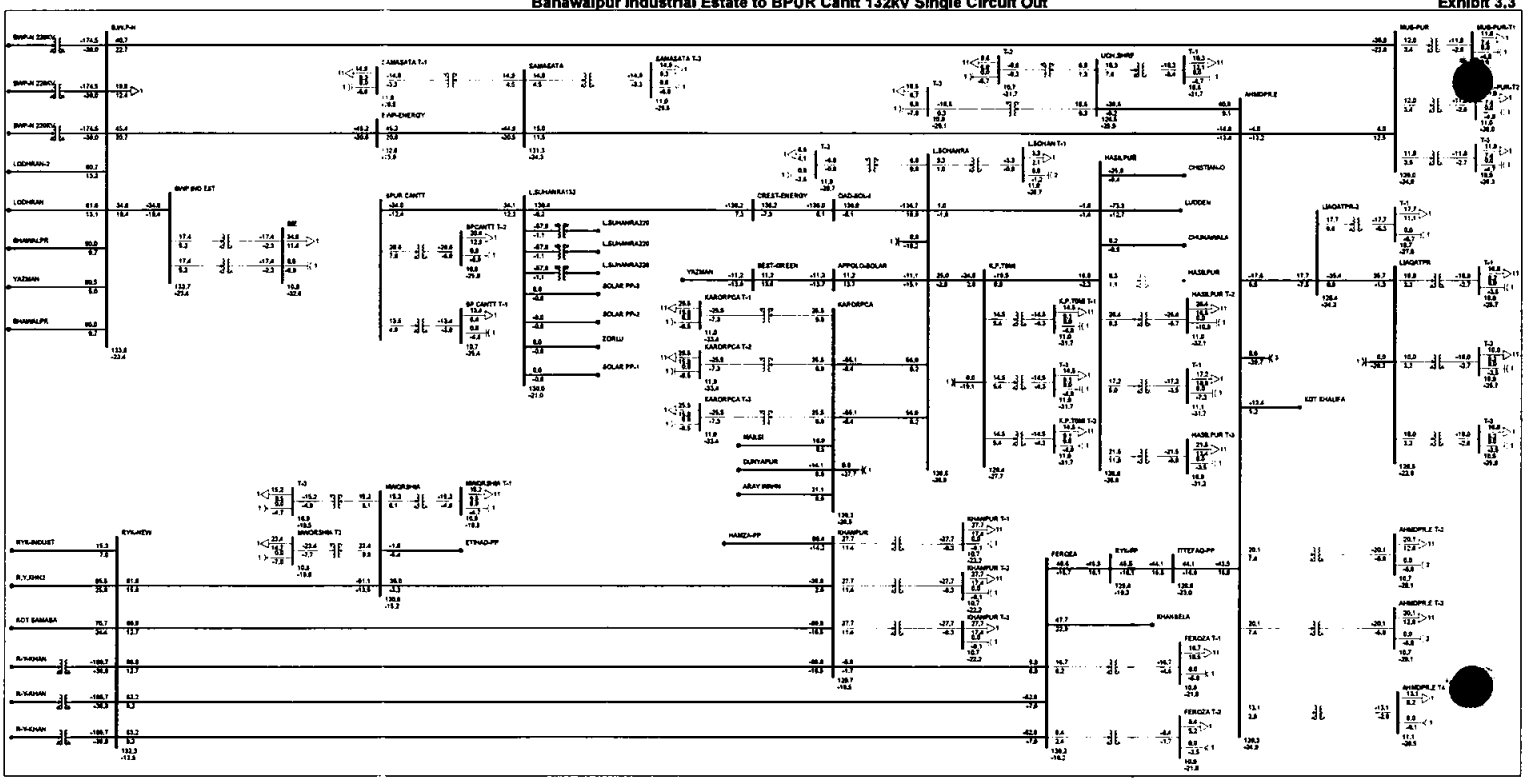
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Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2028 - With Bahawalpur Industrial Estate G/S

Bahawalpur Industrial Estate to BPUR Cantt 132kV Single Circuit Out

Exhibit 3.3

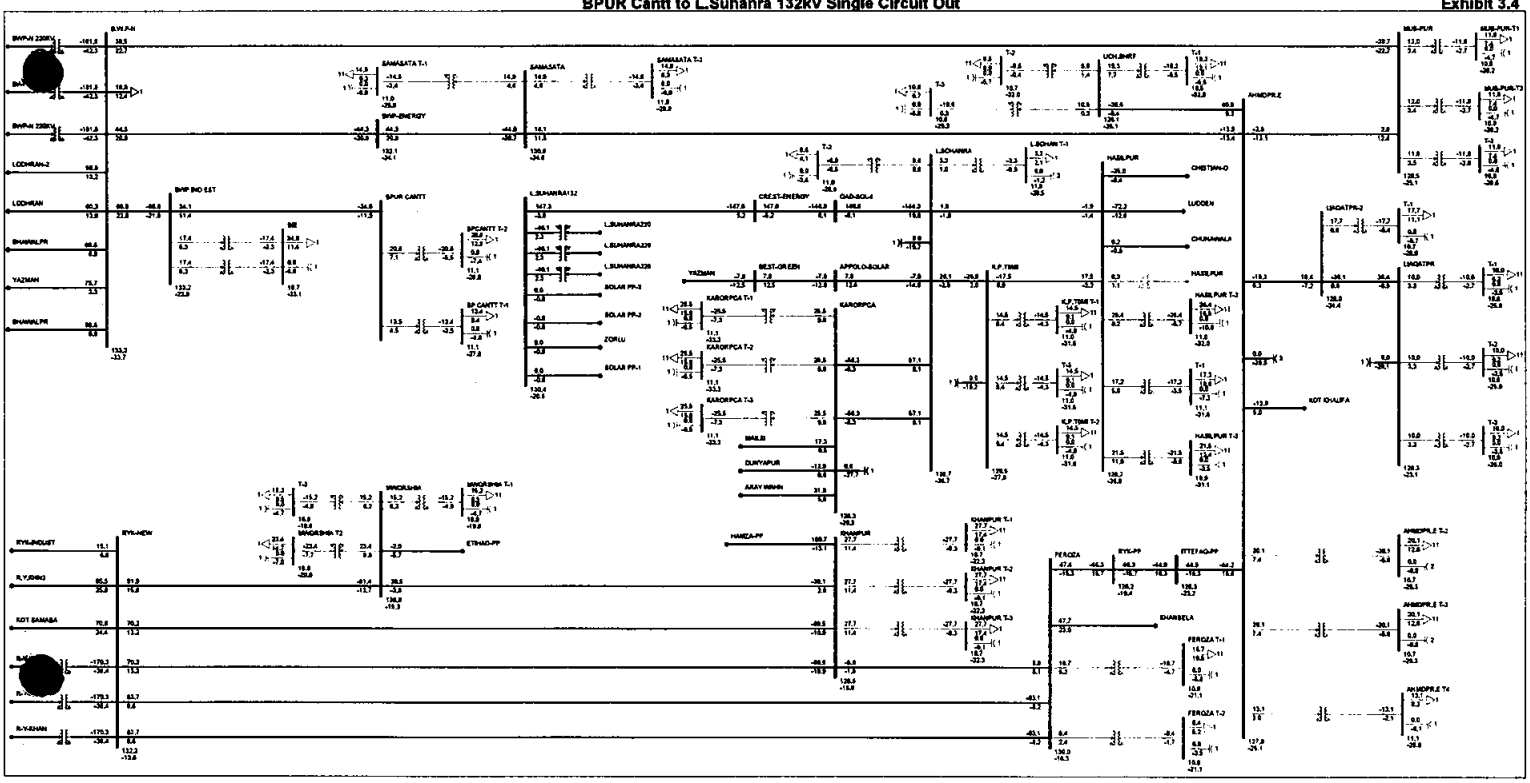


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2028 - With Bahawalpur Industrial Estate G/S

BPUR Cantt to L.Suhanra 132kV Single Circuit Out

Exhibit 3.4



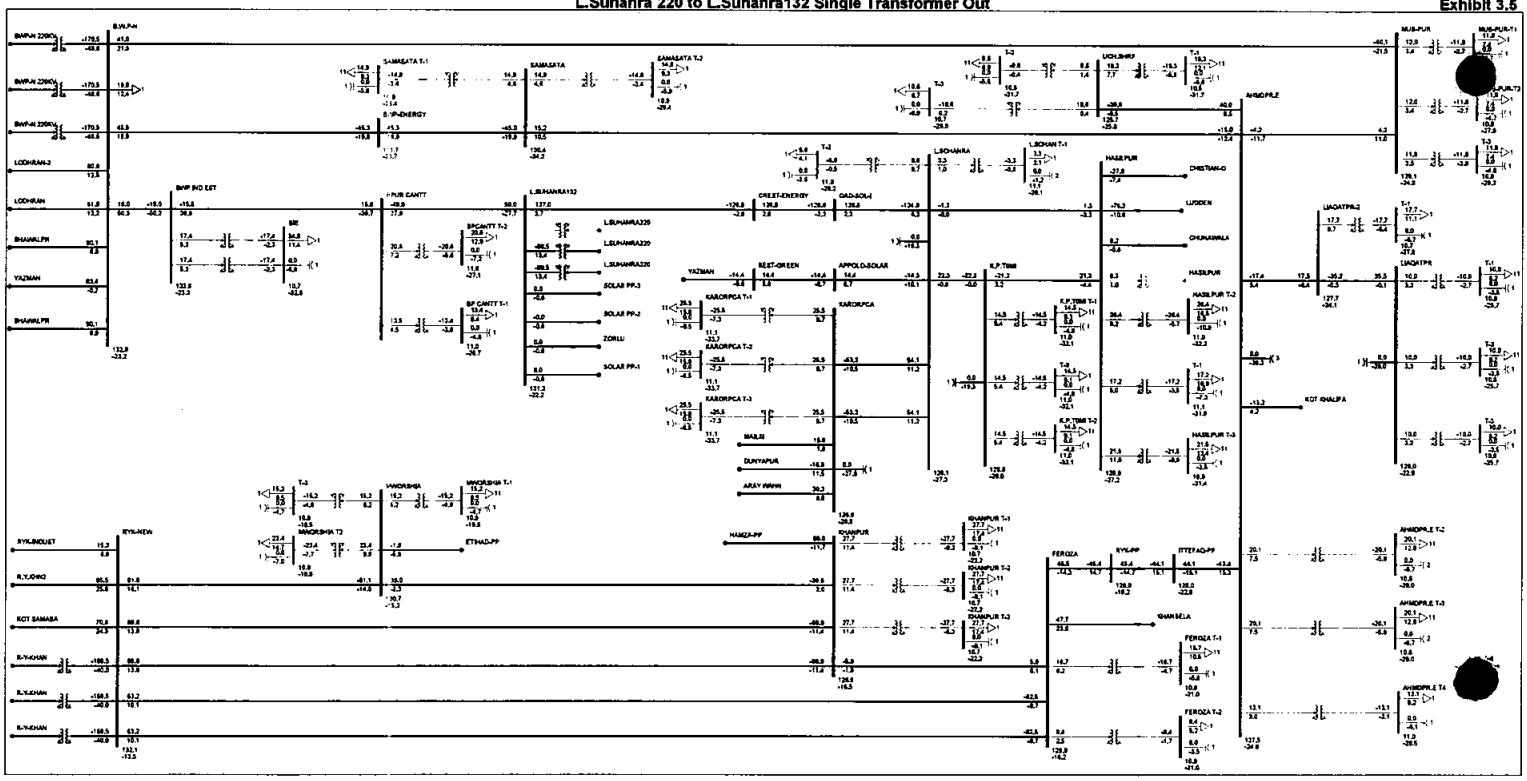
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Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2028 - With Bahawalpur Industrial Estate G/S

L.Suhanra 220 to L.Suhanra132 Single Transformer Out

Exhibit 3.5

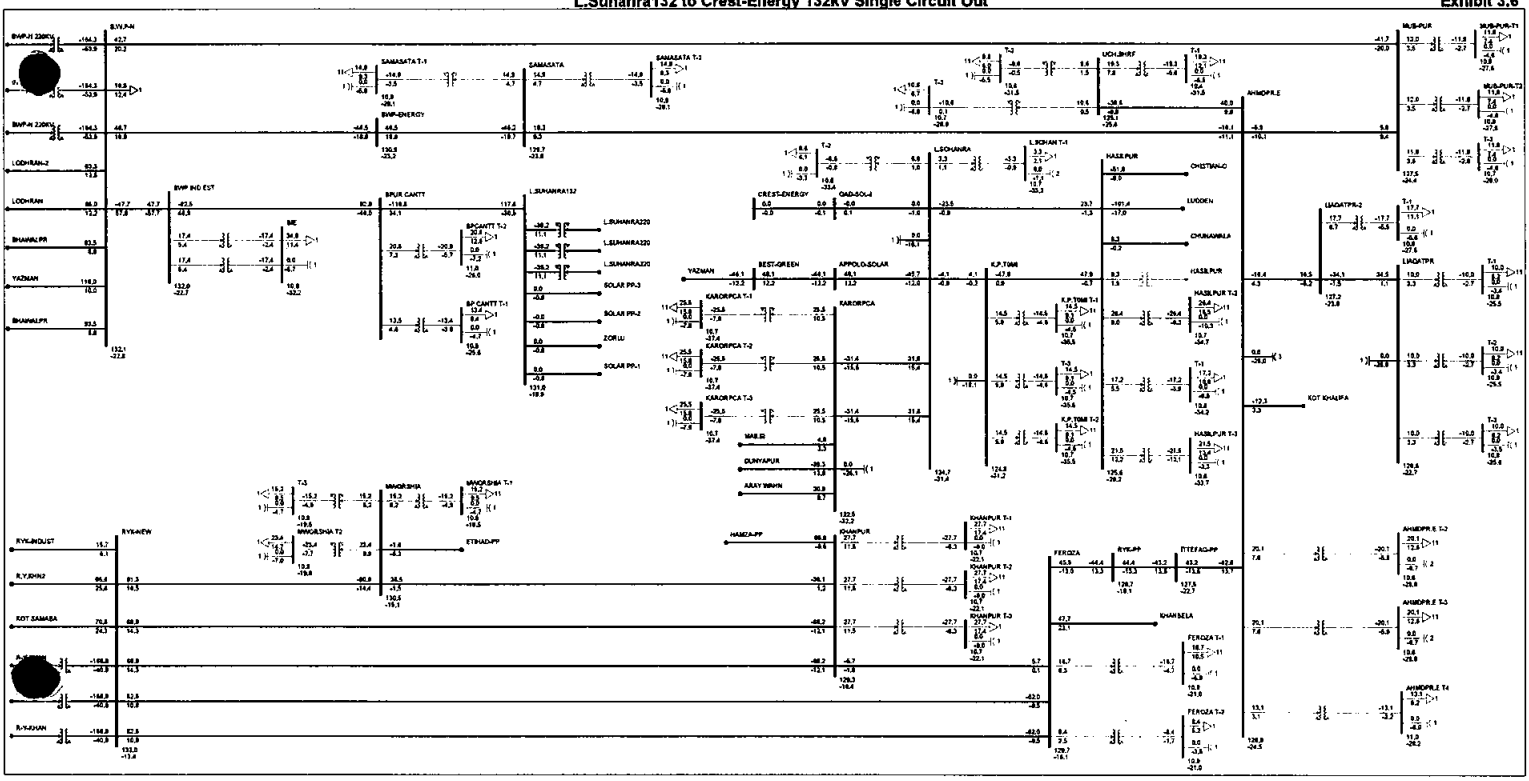


Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2028 - With Bahawalpur Industrial Estate G/S

L.Suhanra132 to Crest-Energy 132kV Single Circuit Out

Exhibit 3.6



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Appendix - D

Results of Short Circuit Analysis

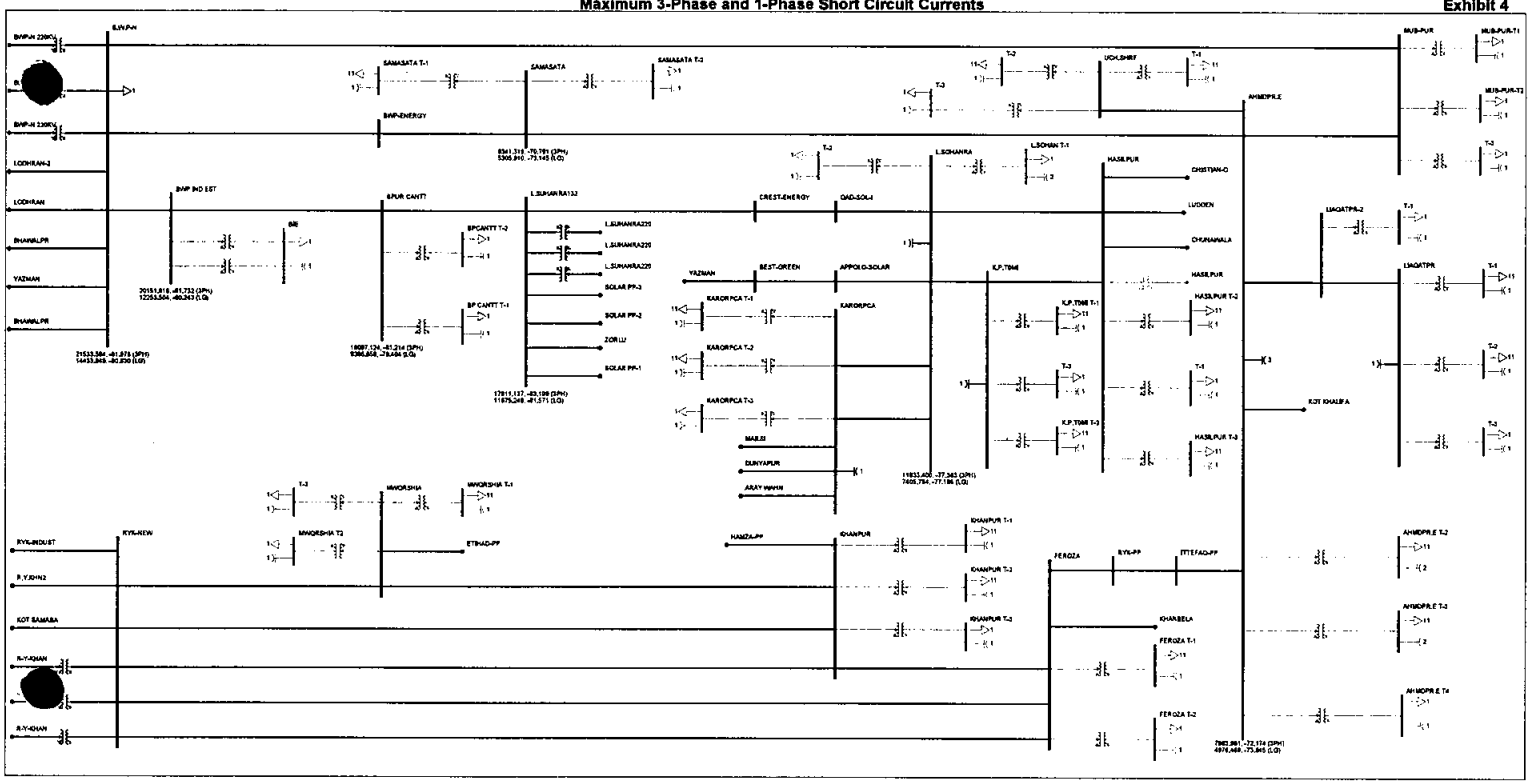
For Chapter-6

Study of Interconnection of 132/11kV Grid Station at Bahawalpur Industrial Estate

Peak Load Case 2028 - With Bahawalpur Industrial Estate G/S

Maximum 3-Phase and 1-Phase Short Circuit Currents

Exhibit 4



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PSS(R)E-33.12.2 ASCC SHORT CIRCUIT CURRENTS MON, NOV 06 2023 10:57
STUDY OF INTERCONNECTION OF 132/11KV GRID STATION AT BAHAWALPUR INDUSTRIAL ESTATE
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
MAXIMUM 3-PHASE SHORT CIRCUIT CURRENTS

AT BUS 6419 [L.SOHANRA 132.00] AREA 6 *** FAULTED BUS IS: 6419 [L.SOHANRA 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/0.00/0.00 VA:/0.00/0.00 VB:/0.00/0.00 VC:/0.00/0.00
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.040658/77.363, 4.46030
THEVENIN IMPEDANCE, X/R (OHM) Z+:/7.084/77.363, 4.46030

X--------- FROM ----------X	AREA	CKT	I/Z	/I+/	AN(I+)	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/Z+/	AN(Z+)	APP X/R
				THREE PHASE FAULT										
6220 [HASILPUR 132.00]	6	1	AMP/OHM	1441.7	-78.36	1441.7	-78.36	1441.7	161.64	1441.7	41.64	25.337	78.996	5.14286
6421 [K.P.T0MI 132.00]	6	1	AMP/OHM	1707.2	-78.32	1707.2	-78.32	1707.2	161.68	1707.2	41.68	9.704	78.902	5.09795
6422 [APPOLO-SOLAR132.00]	6	1	AMP/OHM	1512.8	-80.39	1512.8	-80.39	1512.8	159.61	1512.8	39.61	12.084	78.996	5.14286
7147 [KARORPCA 132.00]	6	1	AMP/OHM	1514.6	-69.19	1514.6	-69.19	1514.6	170.81	1514.6	50.81	9.846	64.609	2.10689
7147 [KARORPCA 132.00]	6	2	AMP/OHM	1514.6	-69.19	1514.6	-69.19	1514.6	170.81	1514.6	50.81	9.846	64.609	2.10689
7148 [QAD-SOL-I 132.00]	6	1	AMP/OHM	4186.4	-81.44	4186.4	-81.44	4186.4	158.56	4186.4	38.56	10.323	78.906	5.10000
64191 [L.SOHAN T-1 11.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
64192 [T-2 11.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
TO FIXED SHUNT		1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00			
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				11833.4	-77.36	11833.4	-77.36	11833.4	162.64	11833.4	42.64			

AT BUS 7139 [B.W.P-N 132.00] AREA 6 *** FAULTED BUS IS: 7139 [B.W.P-N 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/0.00/0.00 VA:/0.00/0.00 VB:/0.00/0.00 VC:/0.00/0.00
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.022343/81.976, 7.09374
THEVENIN IMPEDANCE, X/R (OHM) Z+:/3.893/81.976, 7.09374

X--------- FROM ----------X	AREA	CKT	I/Z	/I+/	AN(I+)	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/Z+/	AN(Z+)	APP X/R
				THREE PHASE FAULT										
550 [BWP-N 220KV 220.00]	15	1	AMP/OHM	3692.7	-88.07	3692.7	-88.07	3692.7	151.93	3692.7	31.93	29.040	90.000	9999.999
550 [BWP-N 220KV 220.00]	15	2	AMP/OHM	3692.7	-88.07	3692.7	-88.07	3692.7	151.93	3692.7	31.93	29.040	90.000	9999.999
550 [BWP-N 220KV 220.00]	15	3	AMP/OHM	3692.7	-88.07	3692.7	-88.07	3692.7	151.93	3692.7	31.93	29.040	90.000	9999.999
7120 [LODHRAN 132.00]	6	1	AMP/OHM	877.2	-75.39	877.2	-75.39	877.2	164.61	877.2	44.61	12.863	78.996	5.14286
7123 [LODHRAN-2 132.00]	6	1	AMP/OHM	706.0	-75.39	706.0	-75.39	706.0	164.61	706.0	44.61	8.576	78.996	5.14286
7140 [BHAWALPR 132.00]	6	2	AMP/OHM	931.1	-69.67	931.1	-69.67	931.1	170.33	931.1	50.33	5.067	78.996	5.14286
7140 [BHAWALPR 132.00]	6	3	AMP/OHM	931.1	-69.67	931.1	-69.67	931.1	170.33	931.1	50.33	5.067	78.996	5.14286
7141 [BWP-ENERGY 132.00]	6	1	AMP/OHM	805.6	-69.14	805.6	-69.14	805.6	170.87	805.6	50.87	4.127	64.660	2.11166
7151 [BWP IND EST 132.00]	6	1	AMP/OHM	3801.7	-80.31	3801.7	-80.31	3801.7	159.69	3801.7	39.69	0.433	78.996	5.14286
7159 [MUB-PUR 132.00]	6	3	AMP/OHM	1066.2	-73.33	1066.2	-73.33	1066.2	166.67	1066.2	46.67	16.599	64.659	2.11161
7781 [YAZMAN 132.00]	6	1	AMP/OHM	1493.7	-76.31	1493.7	-76.31	1493.7	163.69	1493.7	43.69	10.135	78.996	5.14286
TO LOAD		1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00			
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				21533.6	-81.98	21533.6	-81.98	21533.6	158.02	21533.6	38.02			

AT BUS 7145 [BPUR CANTT 132.00] AREA 6 *** FAULTED BUS IS: 7145 [BPUR CANTT 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/0.00/0.00 VA:/0.00/0.00 VB:/0.00/0.00 VC:/0.00/0.00
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.029889/81.214, 6.47001

THEVENIN IMPEDANCE, X/R (OHM) Z+:/5.208/81.214, 6.47001

FROM	AREA	CKT	I/Z	/I+/	AN(I+)	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/Z+/	AN(Z+)	APP X/R
7151 [BWP IND EST 132.00]	6	1	AMP/OHM	10019.1	-80.77	10019.1	-80.77	10019.1	159.23	10019.1	39.23	2.518	78.996	5.14286
7650 [L.SUHANRA132132.00]	6	1	AMP/OHM	6078.9	-81.95	6078.9	-81.95	6078.9	158.05	6078.9	38.05	5.067	78.996	5.14286
71451 [BP CANTT T-111.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71452 [BPCANTT T-2 11.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				16097.1	-81.21	16097.1	-81.21	16097.1	158.79	16097.1	38.79			

AT BUS 7150 [SAMASATA 132.00] AREA 6 *** FAULTED BUS IS: 7150 [SAMASATA 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/0.00/0.00 VA:/0.00/0.00 VB:/0.00/0.00 VC:/0.00/0.00
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.057680/70.791, 2.87021
THEVENIN IMPEDANCE, X/R (OHM) Z+:/10.050/70.791, 2.87021

FROM	AREA	CKT	I/Z	/I+/	AN(I+)	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/Z+/	AN(Z+)	APP X/R
7141 [BWP-ENERGY 132.00]	6	1	AMP/OHM	6382.0	-70.91	6382.0	-70.91	6382.0	169.09	6382.0	49.09	4.486	64.659	2.11162
7170 [AHMDPR.E 132.00]	6	1	AMP/OHM	1959.4	-70.41	1959.4	-70.41	1959.4	169.59	1959.4	49.59	21.930	64.604	2.10634
71501 [SAMASATA T-111.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71502 [SAMASATA T-211.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				8341.3	-70.79	8341.3	-70.79	8341.3	169.21	8341.3	49.21			

AT BUS 7151 [BWP IND EST 132.00] AREA 6 *** FAULTED BUS IS: 7151 [BWP IND EST 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/0.00/0.00 VA:/0.00/0.00 VB:/0.00/0.00 VC:/0.00/0.00
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.023875/81.732, 6.88163
THEVENIN IMPEDANCE, X/R (OHM) Z+:/4.160/81.732, 6.88163

FROM	AREA	CKT	I/Z	/I+/	AN(I+)	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/Z+/	AN(Z+)	APP X/R
7139 [B.W.P-N 132.00]	6	1	AMP/OHM	16001.0	-82.00	16001.0	-82.00	16001.0	158.00	16001.0	38.00	0.433	78.996	5.14286
7145 [BPUR CANTT 132.00]	6	1	AMP/OHM	4151.7	-80.71	4151.7	-80.71	4151.7	159.29	4151.7	39.29	2.518	78.996	5.14286
71511 [BIE 11.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71511 [BIE 11.000]	6	2	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				20151.8	-81.73	20151.8	-81.73	20151.8	158.27	20151.8	38.27			

AT BUS 7170 [AHMDPR.E 132.00] AREA 6 *** FAULTED BUS IS: 7170 [AHMDPR.E 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/0.00/0.00 VA:/0.00/0.00 VB:/0.00/0.00 VC:/0.00/0.00
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.061026/72.174, 3.10972
THEVENIN IMPEDANCE, X/R (OHM) Z+:/10.633/72.174, 3.10972

FROM	AREA	CKT	I/Z	/I+/	AN(I+)	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/Z+/	AN(Z+)	APP X/R
7150 [SAMASATA 132.00]	6	1	AMP/OHM	2053.2	-68.64	2053.2	-68.64	2053.2	171.36	2053.2	51.36	21.930	64.604	2.10634
7159 [MUB-PUR 132.00]	6	1	AMP/OHM	2717.3	-72.83	2717.3	-72.83	2717.3	167.17	2717.3	47.17	6.633	79.251	5.26761
7169 [KOT KHALIFA 132.00]	6	1	AMP/OHM	914.1	-76.81	914.1	-76.81	914.1	163.19	914.1	43.19	12.113	64.659	2.11162
7172 [ITTEFAQ-PP 132.00]	6	1	AMP/OHM	1151.5	-68.98	1151.5	-68.98	1151.5	171.02	1151.5	51.02	11.664	64.659	2.11162
7356 [LIAQATPR-2 132.00]	6	1	AMP/OHM	1060.3	-76.81	1060.3	-76.81	1060.3	163.19	1060.3	43.19	11.216	64.659	2.11162
7974 [UCH.SHRF 132.00]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000

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71702 [AHMDPR.E T-211.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71703 [AHMDPR.E T-311.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71704 [AHMDPR.E T4 11.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
TO FIXED SHUNT		3	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00			
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				7884.0	-72.17	7884.0	-72.17	7884.0	167.83	7884.0	47.83			

AT BUS 7650 [L.SUHANRA132132.00] AREA 6 *** FAULTED BUS IS: 7650 [L.SUHANRA132132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/0.00/0.00 VA:/0.00/0.00 VB:/0.00/0.00 VC:/0.00/0.00
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.027013/83.109, 8.27432
THEVENIN IMPEDANCE, X/R (OHM) Z+:/4.707/83.109, 8.27432

				THREE PHASE FAULT									
FROM	AREA	CKT	I/Z	/I+/	AN(I+)	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/Z+/	AN(Z+)	APP X/R
765 [L.SUHANRA220220.00]	15	1	AMP/OHM	3361.0	-87.22	3361.0	-87.22	3361.0	152.78	3361.0	32.78	30.976	90.000	9999.999
765 [L.SUHANRA220220.00]	15	2	AMP/OHM	3361.0	-87.22	3361.0	-87.22	3361.0	152.78	3361.0	32.78	30.976	90.000	9999.999
765 [L.SUHANRA220220.00]	15	3	AMP/OHM	3361.0	-87.22	3361.0	-87.22	3361.0	152.78	3361.0	32.78	30.976	90.000	9999.999
7145 [BPUR CANTT 132.00]	6	1	AMP/OHM	4950.7	-78.57	4950.7	-78.57	4950.7	161.43	4950.7	41.43	5.067	78.996	5.14286
7146 [CREST-ENERGY132.00]	6	1	AMP/OHM	2838.3	-76.42	2838.3	-76.42	2838.3	163.58	2838.3	43.58	1.169	78.996	5.14286
7667 [ZORLU 132.00]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
7668 [SOLAR PP-1 132.00]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
7669 [SOLAR PP-3 132.00]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
7670 [SOLAR PP-2 132.00]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				17811.1	-83.11	17811.1	-83.11	17811.1	156.89	17811.1	36.89			

PSS(R)E-33.12.2 ASCC SHORT CIRCUIT CURRENTS MON, NOV 06 2023 10:57

STUDY OF INTERCONNECTION OF 132/11KV GRID STATION AT BAHAWALPUR INDUSTRIAL ESTATE
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
MAXIMUM 1-PHASE SHORT CIRCUIT CURRENTS

AT BUS 6419 [L.SOHANRA 132.00] AREA 6 *** FAULTED BUS IS: 6419 [L.SOHANRA 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/66.34/-0.04 V-:/17.49/-179.83 V0:/48.86/179.88 VA:/0.00/0.00 VB:/103.05/-135.33 VC:/103.26/135.21
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.040658/77.363, 4.46030 Z-:/0.040658/77.363, 4.46030 Z0:/0.113583/77.075, 4.35759
THEVENIN IMPEDANCE, X/R (OHM) Z+:/7.084/77.363, 4.46030 Z-:/7.084/77.363, 4.46030 Z0:/19.791/77.075, 4.35759

					X-LINE TO GROUND (LG) FAULT-						
X- FROM -X	AREA	CKT	I/Z	/I+/ AN(I+)	/I-/ AN(I-)	/I0/ AN(I0)	/3I0/ AN(I0)	/Z0/ AN(Z0)		APP X/R	
6220 [HASILPUR 132.00]	6	1	AMP/OHM	300.8 -78.19	300.8 -78.19	299.6 -77.50	898.9 -77.50	84.670 -102.751		4.41900	
6421 [K.P.T0MI 132.00]	6	1	AMP/OHM	356.1 -78.15	356.1 -78.15	354.1 -77.50	1062.3 -77.50	107.818 -102.659		4.45232	
6422 [APPOLO-SOLAR132.00]	6	1	AMP/OHM	315.6 -80.22	315.6 -80.22	301.3 -78.10	904.0 -78.10	124.751 -101.889		4.74974	
7147 [KARORPCA 132.00]	6	1	AMP/OHM	316.0 -69.02	316.0 -69.02	335.3 -74.39	1006.0 -74.39	118.017 -105.314		3.65185	
7147 [KARORPCA 132.00]	6	2	AMP/OHM	316.0 -69.02	316.0 -69.02	335.3 -74.39	1006.0 -74.39	118.017 -105.314		3.65185	
7148 [QAD-SOL-I 132.00]	6	1	AMP/OHM	873.3 -81.27	873.3 -81.27	844.0 -78.86	2532.0 -78.86	25.826 -99.743		5.82376	
64191 [L.SOHAN T-1 11.000]	6	1	AMP/OHM	0.0 0.00	0.0 0.00	0.0 0.00	0.0 0.00	0.000 0.000		0.00000	
64192 [T-2 11.000]	6	1	AMP/OHM	0.0 0.00	0.0 0.00	0.0 0.00	0.0 0.00	0.000 0.000		0.00000	
TO FIXED SHUNT		1	AMP/OHM	0.0 0.00	0.0 0.00	0.0 0.00	0.0 0.00				
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				2468.6 -77.20	2468.6 -77.20	2468.6 -77.20	7405.8 -77.20				

X- FROM -X	AREA	CKT	I/Z	/IA/ AN(IA)	/IB/ AN(IB)	/IC/ AN(IC)	/ZA/ AN(ZA)	APP X/R
6220 [HASILPUR 132.00]	6	1	AMP/OHM	901.2 -77.96	3.8 29.46	3.8 29.46	42.973 78.293	4.82582
6421 [K.P.T0MI 132.00]	6	1	AMP/OHM	1066.4 -77.93	4.5 38.85	4.5 38.85	16.492 78.244	4.80510
6422 [APPOLO-SOLAR132.00]	6	1	AMP/OHM	932.4 -79.53	18.3 62.11	18.3 62.11	20.261 78.699	5.00404
7147 [KARORPCA 132.00]	6	1	AMP/OHM	966.3 -70.88	36.2 -129.33	36.2 -129.33	16.042 67.987	2.47342
7147 [KARORPCA 132.00]	6	2	AMP/OHM	966.3 -70.88	36.2 -129.33	36.2 -129.33	16.042 67.987	2.47342
7148 [QAD-SOL-I 132.00]	6	1	AMP/OHM	2590.2 -80.49	46.5 49.02	46.5 49.02	17.412 78.737	5.02159
64191 [L.SOHAN T-1 11.000]	6	1	AMP/OHM	0.0 0.00	0.0 0.00	0.0 0.00	0.000 0.000	0.00000
64192 [T-2 11.000]	6	1	AMP/OHM	0.0 0.00	0.0 0.00	0.0 0.00	0.000 0.000	0.00000
TO FIXED SHUNT		1	AMP/OHM	0.0 0.00	0.0 0.00	0.0 0.00		
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				7405.8 -77.20	0.0 0.00	0.0 0.00		

AT BUS 7139 [B.W.P-N 132.00] AREA 6 *** FAULTED BUS IS: 7139 [B.W.P-N 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/65.11/-0.33 V-:/18.73/-178.85 V0:/46.38/179.07 VA:/0.00/0.00 VB:/99.74/-134.22 VC:/101.36/133.34
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.022343/81.976, 7.09374 Z-:/0.022343/81.976, 7.09374 Z0:/0.055329/79.904, 5.61610
THEVENIN IMPEDANCE, X/R (OHM) Z+:/3.893/81.976, 7.09374 Z-:/3.893/81.976, 7.09374 Z0:/9.641/79.904, 5.61610

					X-LINE TO GROUND (LG) FAULT-						
X- FROM -X	AREA	CKT	I/Z	/I+/ AN(I+)	/I-/ AN(I-)	/I0/ AN(I0)	/3I0/ AN(I0)	/Z0/ AN(Z0)		APP X/R	
550 [BWP-N 220KV 220.00]	15	1	AMP/OHM	825.1 -86.92	825.1 -86.92	1026.3 -83.48	3079.0 -83.48	96.817 -99.675		5.86554	
550 [BWP-N 220KV 220.00]	15	2	AMP/OHM	825.1 -86.92	825.1 -86.92	1026.3 -83.48	3079.0 -83.48	96.817 -99.675		5.86554	

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   550 [BWP-N 220KV 220.00]   15 3   AMP/OHM    825.1   -86.92    825.1   -86.92   1026.3   -83.48   3079.0   -83.48   96.817  -99.675  5.86554
  7120 [LODHRAN     132.00]    6 1   AMP/OHM    196.0   -74.24    196.0   -74.24    181.2   -77.26    543.6   -77.26  216.181 -103.880  4.04699
  7123 [LODHRAN-2   132.00]    6 1   AMP/OHM    157.8   -74.24    157.8   -74.24    145.9   -77.26    437.6   -77.26  291.493 -103.769  4.08072
  7140 [BHAWALPR    132.00]    6 2   AMP/OHM    208.0   -68.52    208.0   -68.52    198.2   -75.35    594.7   -75.35  218.348 -105.801  3.53362
  7140 [BHAWALPR    132.00]    6 3   AMP/OHM    208.0   -68.52    208.0   -68.52    198.2   -75.35    594.7   -75.35  218.348 -105.801  3.53362
  7141 [BWP-ENERGY  132.00]    6 1   AMP/OHM    180.0   -67.99    180.0   -67.99    163.7   -74.75    491.2   -74.75  271.714 -106.125  3.45900
  7151 [BWP IND EST 132.00]    6 1   AMP/OHM    849.4   -79.16    849.4   -79.16    365.7   -76.05   1097.0   -76.05  123.589 -104.938  3.74821
  7159 [MUB-PUR     132.00]    6 3   AMP/OHM    238.2   -72.18    238.2   -72.18    209.7   -76.28    629.1   -76.28  174.692 -103.893  4.04290
  7781 [YAZMAN      132.00]    6 1   AMP/OHM    333.7   -75.16    333.7   -75.16    279.0   -76.79    836.9   -76.79  134.940 -104.515  3.86245
TO LOAD                        1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP      4811.3   -80.83   4811.3   -80.83   4811.3   -80.83  14433.8   -80.83

X--------- FROM ----------X AREA CKT I/Z        /IA/   AN(IA)     /IB/   AN(IB)     /IC/   AN(IC)                  /ZA/   AN(ZA)  APP X/R
   550 [BWP-N 220KV 220.00]   15 1   AMP/OHM   2675.3   -85.60    208.7   -69.74    208.7   -69.74                29.040   90.000 9999.999
   550 [BWP-N 220KV 220.00]   15 2   AMP/OHM   2675.3   -85.60    208.7   -69.74    208.7   -69.74                29.040   90.000 9999.999
   550 [BWP-N 220KV 220.00]   15 3   AMP/OHM   2675.3   -85.60    208.7   -69.74    208.7   -69.74                29.040   90.000 9999.999
  7120 [LODHRAN     132.00]    6 1   AMP/OHM    573.0   -75.20     17.8   138.20     17.8   138.20                21.367   77.306  4.43967
  7123 [LODHRAN-2   132.00]    6 1   AMP/OHM    461.2   -75.20     14.3   138.20     14.3   138.20                14.245   77.306  4.43967
  7140 [BHAWALPR    132.00]    6 2   AMP/OHM    613.4   -70.72     26.1   176.00     26.1   176.00                 8.482   76.253  4.08761
  7140 [BHAWALPR    132.00]    6 3   AMP/OHM    613.4   -70.72     26.1   176.00     26.1   176.00                 8.482   76.253  4.08761
  7141 [BWP-ENERGY  132.00]    6 1   AMP/OHM    522.9   -70.10     26.0   159.93     26.0   159.93                 6.466   67.386  2.40066
  7151 [BWP IND EST 132.00]    6 1   AMP/OHM   2064.1   -78.61    484.7    98.49    484.7    98.49                 0.933   79.459  5.37382
  7159 [MUB-PUR     132.00]    6 3   AMP/OHM    685.8   -73.43     32.7   135.11     32.7   135.11                25.756   67.987  2.47350
  7781 [YAZMAN      132.00]    6 1   AMP/OHM    946.3   -75.64     55.5   113.07     55.5   113.07                16.384   77.727  4.59697
TO LOAD                        1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP     14433.8   -80.83      0.0     0.00      0.0     0.00
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AT BUS   7145 [BPUR CANTT  132.00] AREA    6  *** FAULTED BUS IS:   7145 [BPUR CANTT  132.00] ***   0 LEVELS AWAY ***
PRE  FAULT (kV L-G)  VA:/83.83/0.00
POST FAULT (kV L-G)  V+:/69.28/-0.38  V-:/14.56/-178.19  V0:/54.74/179.04  VA:/0.00/0.00  VB:/108.68/-139.06  VC:/110.51/137.98
THEVENIN IMPEDANCE, X/R  (PU)   Z+:/0.029889/81.214, 6.47001  Z-:/0.029889/81.214, 6.47001  Z0:/0.112372/78.441, 4.88949
THEVENIN IMPEDANCE, X/R  (OHM)  Z+:/5.208/81.214, 6.47001  Z-:/5.208/81.214, 6.47001  Z0:/19.580/78.441, 4.88949
                                X-----------------------------------LINE TO GROUND (LG) FAULT-----------------------------------X
X--------- FROM ----------X AREA CKT I/Z        /I+/   AN(I+)     /I-/   AN(I-)     /I0/   AN(I0)     /3I0/   AN(I0)     /Z0/   AN(Z0)  APP X/R
  7151 [BWP IND EST 132.00]    6 1   AMP/OHM   1740.0   -78.96   1740.0   -78.96   1464.8   -79.14   4394.4   -79.14  18.439 -101.153  5.07245
  7650 [L.SUHANRA132132.00]    6 1   AMP/OHM   1055.7   -80.14   1055.7   -80.14   1330.8   -79.69   3992.4   -79.69  19.436  -99.919  5.71842
 71451 [BP CANTT T-111.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00   0.000    0.000  0.00000
 71452 [BPCANTT T-2 11.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00   0.000    0.000  0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP      2795.6   -79.40   2795.6   -79.40   2795.6   -79.40   8386.7   -79.40

X--------- FROM ----------X AREA CKT I/Z        /IA/   AN(IA)     /IB/   AN(IB)     /IC/   AN(IC)                  /ZA/   AN(ZA)  APP X/R
  7151 [BWP IND EST 132.00]    6 1   AMP/OHM   4944.8   -79.01    275.2   102.01    275.2   102.01                 7.380   77.793  4.62253
  7650 [L.SUHANRA132132.00]    6 1   AMP/OHM   3442.2   -79.97    275.2   -77.99    275.2   -77.99                11.499   78.075  4.73503
 71451 [BP CANTT T-111.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00                  0.000    0.000  0.00000
 71452 [BPCANTT T-2 11.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00                  0.000    0.000  0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP      8386.7   -79.40      0.0     0.00      0.0     0.00
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AT BUS   7150 [SAMASATA    132.00] AREA    6  *** FAULTED BUS IS:   7150 [SAMASATA    132.00] ***   0 LEVELS AWAY ***
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PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/66.08/0.63 V-:/17.78/177.65 V0:/48.33/-178.27 VA:/0.00/0.00 VB:/104.14/-134.10 VC:/101.04/135.82
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.057680/70.791, 2.87021 Z-:/0.057680/70.791, 2.87021 Z0:/0.156841/74.876, 3.70003
THEVENIN IMPEDANCE, X/R (OHM) Z+:/10.050/70.791, 2.87021 Z-:/10.050/70.791, 2.87021 Z0:/27.328/74.876, 3.70003

X--------- FROM ----------X	AREA	CKT	I/Z	/I+/	AN(I+)	/I-/	AN(I-)	/I0/	AN(I0)	/3I0/	AN(I0)	/Z0/	AN(Z0)	APP X/R
				X----------LINE TO GROUND (LG) FAULT----------										
7141 [BWP-ENERGY 132.00]	6	1	AMP/OHM	1353.2	-73.26	1353.2	-73.26	1358.8	-73.23	4076.5	-73.23	23.004	-103.706	4.10027
7170 [AHMDPR.E 132.00]	6	1	AMP/OHM	415.5	-72.76	415.5	-72.76	409.8	-72.88	1229.4	-72.88	56.372	-103.104	4.29598
71501 [SAMASATA T-111.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71502 [SAMASATA T-211.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				1768.6	-73.15	1768.6	-73.15	1768.6	-73.15	5305.9	-73.15			

X--------- FROM ----------X	AREA	CKT	I/Z	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/ZA/	AN(ZA)	APP X/R
7141 [BWP-ENERGY 132.00]	6	1	AMP/OHM	4065.2	-73.25	5.7	-64.42	5.7	-64.42	7.176	69.262	2.64117
7170 [AHMDPR.E 132.00]	6	1	AMP/OHM	1240.7	-72.80	5.7	115.58	5.7	115.58	34.973	69.171	2.62852
71501 [SAMASATA T-111.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71502 [SAMASATA T-211.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				5305.9	-73.15	0.0	0.00	0.0	0.00			

AT BUS 7151 [BWP IND EST 132.00] AREA 6 *** FAULTED BUS IS: 7151 [BWP IND EST 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/66.85/-0.38 V-:/16.99/-178.51 V0:/49.87/178.99 VA:/0.00/0.00 VB:/103.31/-136.38 VC:/105.16/135.33
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.023875/81.732, 6.88163 Z-:/0.023875/81.732, 6.88163 Z0:/0.070070/79.229, 5.25664
THEVENIN IMPEDANCE, X/R (OHM) Z+:/4.160/81.732, 6.88163 Z-:/4.160/81.732, 6.88163 Z0:/12.209/79.229, 5.25664

X--------- FROM ----------X	AREA	CKT	I/Z	/I+/	AN(I+)	/I-/	AN(I-)	/I0/	AN(I0)	/3I0/	AN(I0)	/Z0/	AN(Z0)	APP X/R
				X----------LINE TO GROUND (LG) FAULT----------										
7139 [B.W.P-N 132.00]	6	1	AMP/OHM	3243.2	-80.51	3243.2	-80.51	3535.3	-80.58	10605.8	-80.58	10.853	-99.825	5.77422
7145 [BPUR CANTT 132.00]	6	1	AMP/OHM	841.5	-79.22	841.5	-79.22	549.7	-78.09	1649.0	-78.09	71.793	-103.038	4.31833
71511 [BIE 11.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71511 [BIE 11.000]	6	2	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				4084.5	-80.24	4084.5	-80.24	4084.5	-80.24	12253.5	-80.24			

X--------- FROM ----------X	AREA	CKT	I/Z	/IA/	AN(IA)	/IB/	AN(IB)	/IC/	AN(IC)	/ZA/	AN(ZA)	APP X/R
7139 [B.W.P-N 132.00]	6	1	AMP/OHM	10021.6	-80.53	292.1	-81.35	292.1	-81.35	1.429	77.782	4.61807
7145 [BPUR CANTT 132.00]	6	1	AMP/OHM	2232.6	-78.94	292.1	98.65	292.1	98.65	6.559	78.474	4.90396
71511 [BIE 11.000]	6	1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
71511 [BIE 11.000]	6	2	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00	0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP				12253.5	-80.24	0.0	0.00	0.0	0.00			

AT BUS 7170 [AHMDPR.E 132.00] AREA 6 *** FAULTED BUS IS: 7170 [AHMDPR.E 132.00] *** 0 LEVELS AWAY ***
PRE FAULT (kV L-G) VA:/83.83/0.00
POST FAULT (kV L-G) V+:/66.20/0.47 V-:/17.64/178.23 V0:/48.58/-178.71 VA:/0.00/0.00 VB:/104.01/-134.46 VC:/101.71/135.75
THEVENIN IMPEDANCE, X/R (PU) Z+:/0.061026/72.174, 3.10972 Z-:/0.061026/72.174, 3.10972 Z0:/0.168090/75.230, 3.79301
THEVENIN IMPEDANCE, X/R (OHM) Z+:/10.633/72.174, 3.10972 Z-:/10.633/72.174, 3.10972 Z0:/29.288/75.230, 3.79301

X--------- FROM ----------X	AREA	CKT	I/Z	/I+/	AN(I+)	/I-/	AN(I-)	/I0/	AN(I0)	/3I0/	AN(I0)	/Z0/	AN(Z0)	APP X/R
				X----------LINE TO GROUND (LG) FAULT----------										
7150 [SAMASATA 132.00]	6	1	AMP/OHM	432.0	-70.41	432.0	-70.41	436.9	-72.78	1310.7	-72.78	49.591	-103.995	4.01233
7159 [MUB-PUR 132.00]	6	1	AMP/OHM	571.7	-74.60	571.7	-74.60	559.6	-74.32	1678.8	-74.32	66.334	-104.993	3.73386

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  7169 [KOT KHALIFA 132.00]    6 1   AMP/OHM    192.3   -78.58    192.3   -78.58    189.8   -75.47    569.3   -75.47  222.157 -102.592  4.47678
  7172 [ITTEFAQ-PP  132.00]    6 1   AMP/OHM    242.3   -70.75    242.3   -70.75    252.7   -72.65    758.2   -72.65  159.528 -105.772  3.54052
  7356 [LIAQATPR-2  132.00]    6 1   AMP/OHM    223.1   -78.58    223.1   -78.58    220.1   -75.47    660.4   -75.47  189.353 -102.536  4.49744
  7974 [UCH.SHRF    132.00]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00    0.000    0.000  0.00000
 71702 [AHMDPR.E T-211.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00    0.000    0.000  0.00000
 71703 [AHMDPR.E T-311.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00    0.000    0.000  0.00000
 71704 [AHMDPR.E T4 11.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00    0.000    0.000  0.00000
TO FIXED SHUNT                 3   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP       1658.8   -73.94   1658.8   -73.94   1658.8   -73.94   4976.5   -73.94
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X--------- FROM ----------X AREA CKT I/Z        /IA/    AN(IA)     /IB/    AN(IB)     /IC/    AN(IC)                    /ZA/    AN(ZA)  APP X/R
  7150 [SAMASATA    132.00]    6 1   AMP/OHM   1300.6   -71.21     18.7  -146.31     18.7  -146.31                  35.240    68.651  2.55840
  7159 [MUB-PUR     132.00]    6 1   AMP/OHM   1703.1   -74.51     12.4    92.43     12.4    92.43                  11.188    78.290  4.82443
  7169 [KOT KHALIFA 132.00]    6 1   AMP/OHM    574.2   -77.55     10.7    26.88     10.7    26.88                  19.255    69.998  2.74718
  7172 [ITTEFAQ-PP  132.00]    6 1   AMP/OHM    737.2   -71.40     13.3  -109.77     13.3  -109.77                  18.858    68.849  2.58467
  7356 [LIAQATPR-2  132.00]    6 1   AMP/OHM    666.1   -77.55     12.4    26.88     12.4    26.88                  17.829    69.998  2.74718
  7974 [UCH.SHRF    132.00]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00                   0.000    0.000  0.00000
 71702 [AHMDPR.E T-211.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00                   0.000    0.000  0.00000
 71703 [AHMDPR.E T-311.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00                   0.000    0.000  0.00000
 71704 [AHMDPR.E T4 11.000]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00                   0.000    0.000  0.00000
TO FIXED SHUNT                 3   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP       4976.5   -73.94      0.0     0.00      0.0     0.00
-------------------------------------------------------------------------------------------------------------------------------------

AT BUS   7650 [L.SUHANRA132132.00] AREA    6  *** FAULTED BUS IS:   7650 [L.SUHANRA132132.00] ***   0 LEVELS AWAY ***
PRE  FAULT (kV L-G)  VA:/83.83/0.00
POST FAULT (kV L-G)  V+:/65.52/-0.43  V-:/18.32/-178.46  V0:/47.22/178.81  VA:/0.00/0.00  VB:/100.37/-134.87  VC:/102.48/133.71
THEVENIN IMPEDANCE, X/R  (PU)   Z+:/0.027013/83.109, 8.27432  Z-:/0.027013/83.109, 8.27432  Z0:/0.069636/80.377, 5.89819
THEVENIN IMPEDANCE, X/R  (OHM)  Z+:/4.707/83.109, 8.27432  Z-:/4.707/83.109, 8.27432  Z0:/12.133/80.377, 5.89819
                                X-----------------------------------LINE TO GROUND (LG) FAULT-----------------------------------X
X--------- FROM ----------X AREA CKT I/Z       /I+/    AN(I+)     /I-/    AN(I-)     /I0/    AN(I0)    /3I0/    AN(I0)     /Z0/    AN(Z0)  APP X/R
   765 [L.SUHANRA220220.00]   15 1   AMP/OHM    734.4   -85.68    734.4   -85.68    943.7   -83.22   2831.2   -83.22  108.394 -100.245  5.53297
   765 [L.SUHANRA220220.00]   15 2   AMP/OHM    734.4   -85.68    734.4   -85.68    943.7   -83.22   2831.2   -83.22  108.394 -100.245  5.53297
   765 [L.SUHANRA220220.00]   15 3   AMP/OHM    734.4   -85.68    734.4   -85.68    943.7   -83.22   2831.2   -83.22  108.394 -100.245  5.53297
  7145 [BPUR CANTT  132.00]    6 1   AMP/OHM   1081.7   -77.03   1081.7   -77.03    517.0   -76.83   1550.9   -76.83   69.652 -104.948  3.74560
  7146 [CREST-ENERGY132.00]    6 1   AMP/OHM    620.2   -74.89    620.2   -74.89    547.9   -77.51   1643.6   -77.51   82.574 -103.737  4.09080
  7667 [ZORLU       132.00]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00    0.000    0.000  0.00000
  7668 [SOLAR PP-1  132.00]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00    0.000    0.000  0.00000
  7669 [SOLAR PP-3  132.00]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00    0.000    0.000  0.00000
  7670 [SOLAR PP-2  132.00]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00      0.0     0.00    0.000    0.000  0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS) AMP       3891.7   -81.57   3891.7   -81.57   3891.7   -81.57  11675.2   -81.57
-------------------------------------------------------------------------------------------------------------------------------------

X--------- FROM ----------X AREA CKT I/Z        /IA/    AN(IA)     /IB/    AN(IB)     /IC/    AN(IC)                    /ZA/    AN(ZA)  APP X/R
   765 [L.SUHANRA220220.00]   15 1   AMP/OHM   2412.0   -84.72    212.4   -74.69    212.4   -74.69                  30.976    90.000 9999.999
   765 [L.SUHANRA220220.00]   15 2   AMP/OHM   2412.0   -84.72    212.4   -74.69    212.4   -74.69                  30.976    90.000 9999.999
   765 [L.SUHANRA220220.00]   15 3   AMP/OHM   2412.0   -84.72    212.4   -74.69    212.4   -74.69                  30.976    90.000 9999.999
  7145 [BPUR CANTT  132.00]    6 1   AMP/OHM   2680.4   -76.99    564.8   102.79    564.8   102.79                   8.276    78.314  4.83486
  7146 [CREST-ENERGY132.00]    6 1   AMP/OHM   1787.8   -75.69     77.1   124.10     77.1   124.10                   1.919    77.435  4.48659
  7667 [ZORLU       132.00]    6 1   AMP/OHM      0.0     0.00      0.0     0.00      0.0     0.00                   0.000    0.000  0.00000
```

7668 [SOLAR PP-1	132.00]	6 1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00		0.000	0.000	0.00000
7669 [SOLAR PP-3	132.00]	6 1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00		0.000	0.000	0.00000
7670 [SOLAR PP-2	132.00]	6 1	AMP/OHM	0.0	0.00	0.0	0.00	0.0	0.00		0.000	0.000	0.00000
INITIAL SYM. S.C. CURRENT(I''k)(RMS)			AMP	11675.2	-81.57	0.0	0.00	0.0	0.00				

SAMD CONSULTANTS

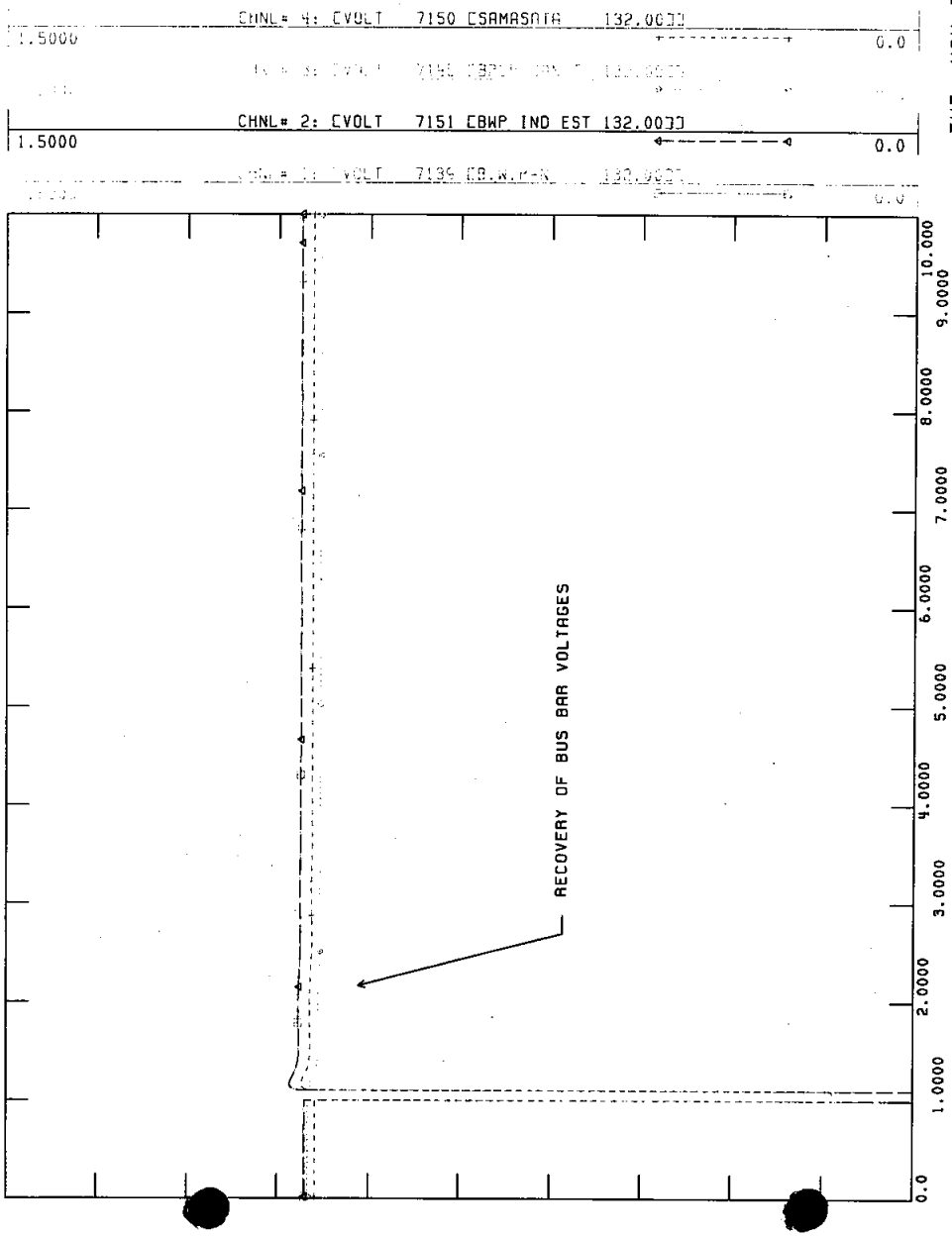
Appendix - E

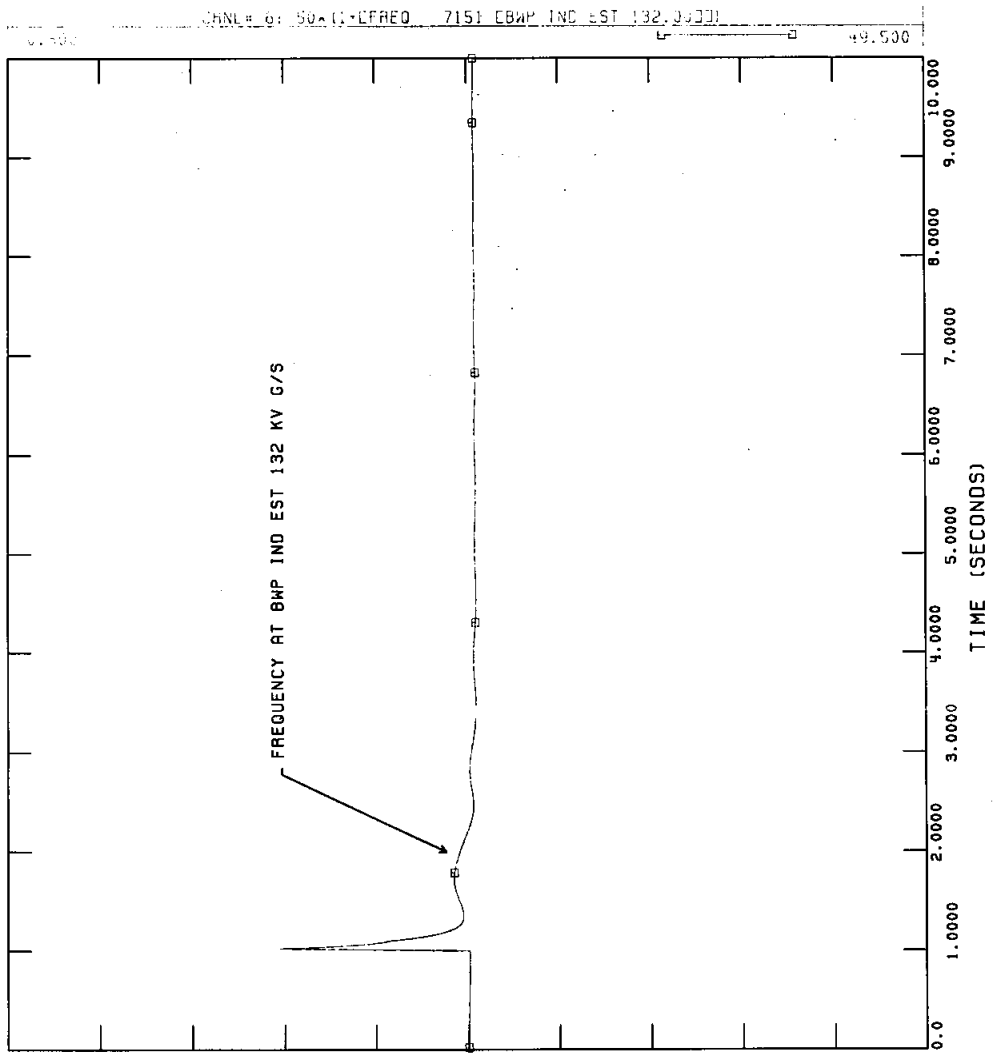
Results of Stability Analysis

For Chapter-7

INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BWP IND EST CLEARED IN 5 CYCLES
TRIP BPURR CANTT TO BWP IND EST 132KV S/C
FILE: ...\Stab 2028\3P Fault Bwp Ind Est - Trip BPurr Cantt- 5 cycle.out

TUE, NOV 07 2023 13:11




CHNL# 6: 50A(1)-EFREQ 7151 [BWP IND EST 132.0000]
49.500
FREQUENCY AT BWP IND EST 132 KV G/S
10.000
9.0000
8.0000
7.0000
6.0000
5.0000
4.0000
3.0000
2.0000
1.0000
0.0
TIME (SECONDS)

INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BWP IND EST CLEARED IN 5 CYCLES
TRIP BPURR CANTT TO BWP IND EST 132KV S/C
FILE: ...\Stab 2028\3P Fault Bwp Ind Est - Trip BPurr Cantt- 5 cycle.out

TUE, NOV 07 2023 13:16

INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BWP IND EST CLEARED IN 5 CYCLES
TRIP BPURR CANTT TO BWP IND EST 132KV S/C

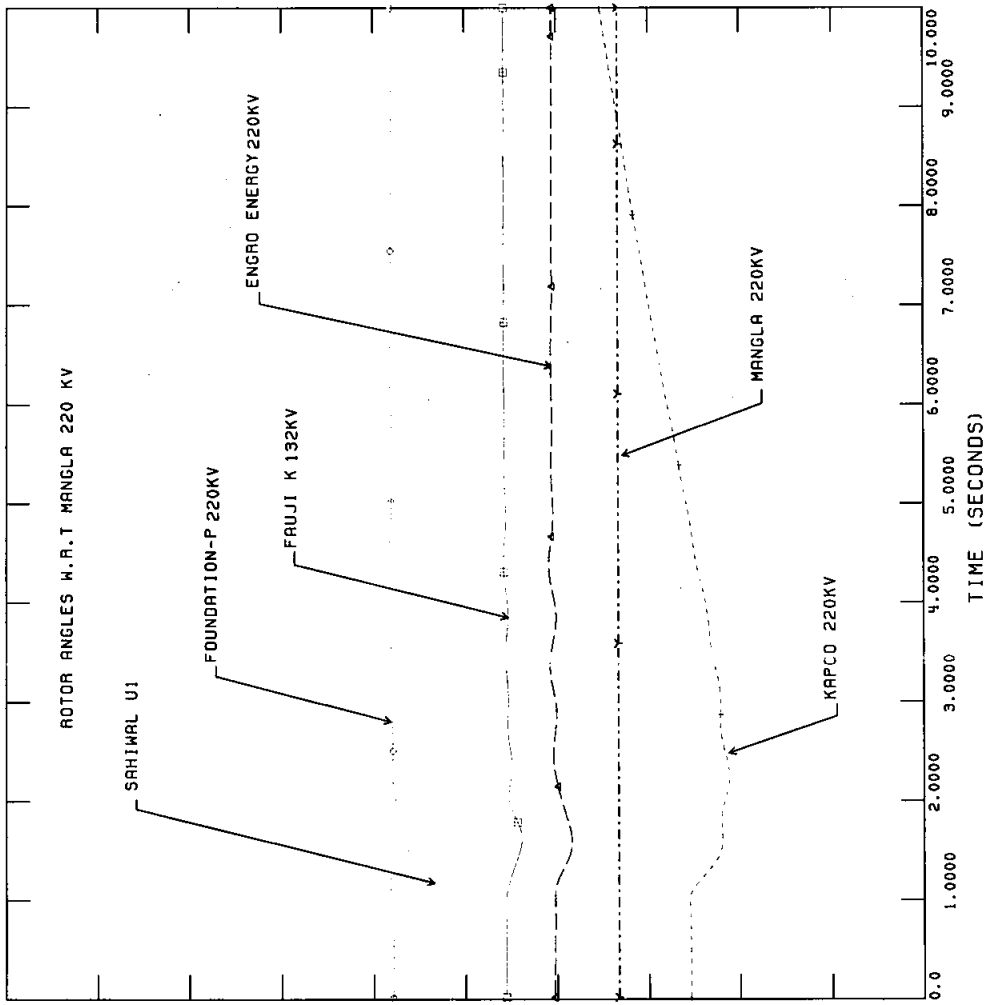
FILE: ...\Stab 2028\3P Fault Bwp Ind Est - Trip BPurr Cantt- 5 cycle.out

TUE, NOV 07 2023 13:23

CHNL#'S 20,20: CMANGLA 220 KVJ-CMANGLA 220 KVJ
100.00 -50.00

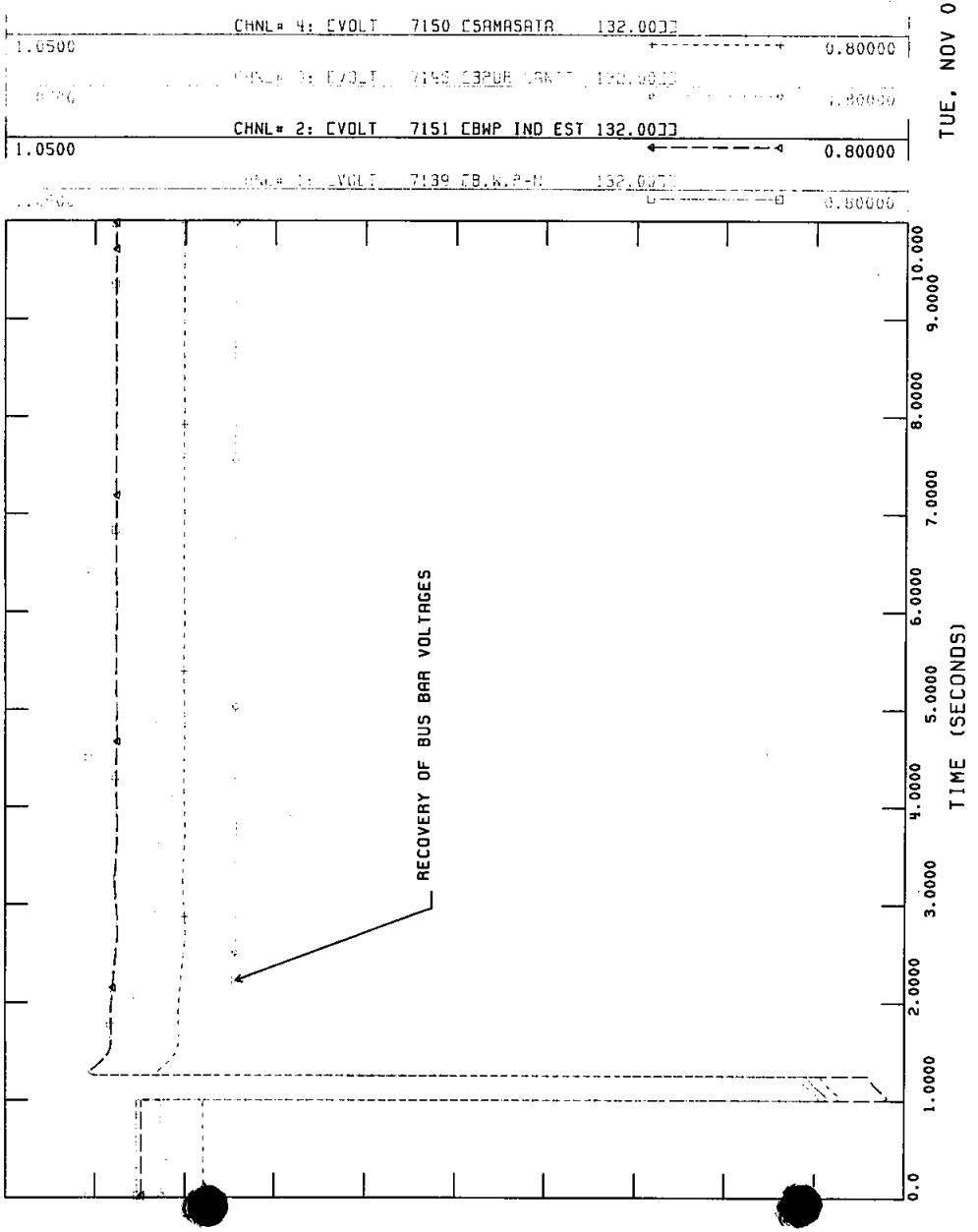
CHNL#'S 18,20: CKAPCO 220KVJ-CMANGLA 220 KVJ
100.00 -50.00

CHNL#'S 16,20: CENGRO ENERGY 220 KVJ-CMANGLA 220 KVJ
100.00 -50.00



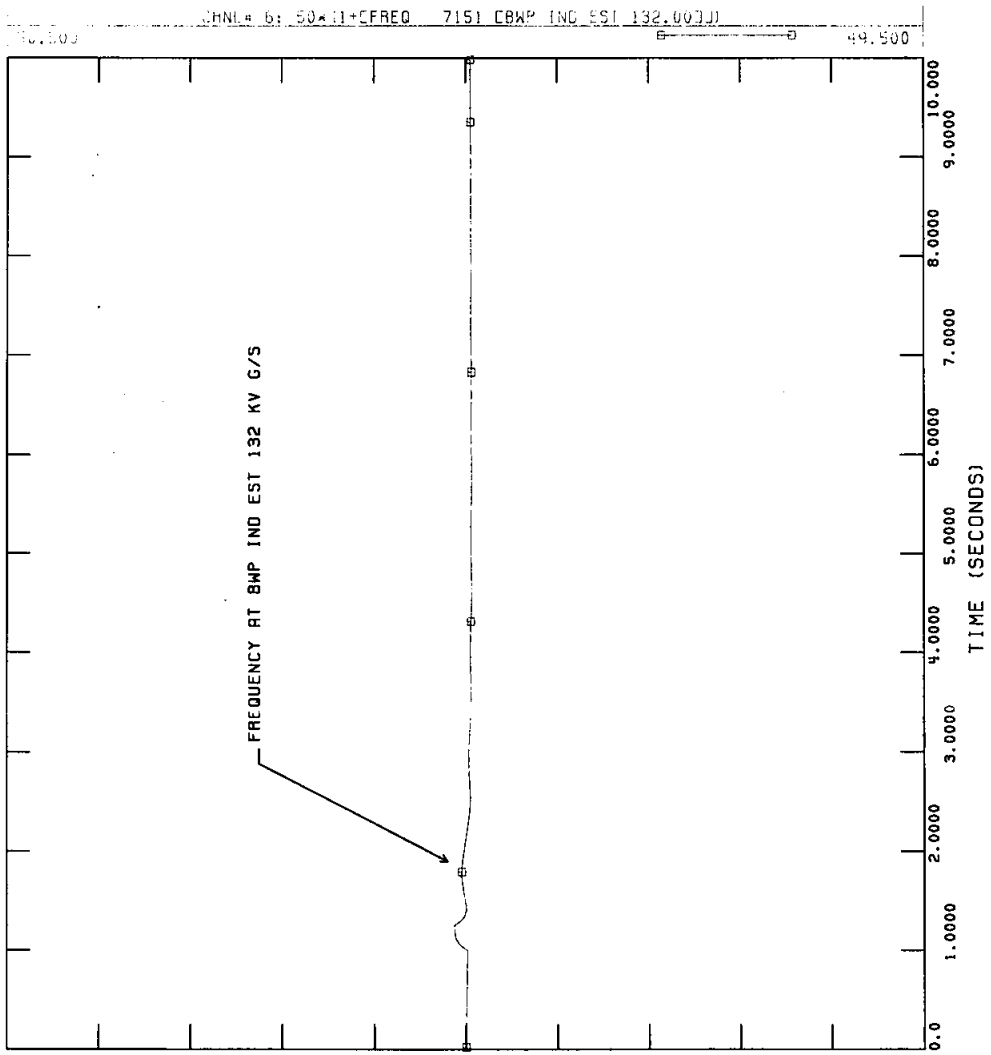
INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
1-PHASE FAULT AT BWP IND EST CLEARED IN 12.5 CYCLES
TRIP BPURR CANTT TO BWP IND EST 132KV S/C
FILE: 1P Fault Bwp Ind Est - Trip BPurr Cantt- Stuck Breaker.out

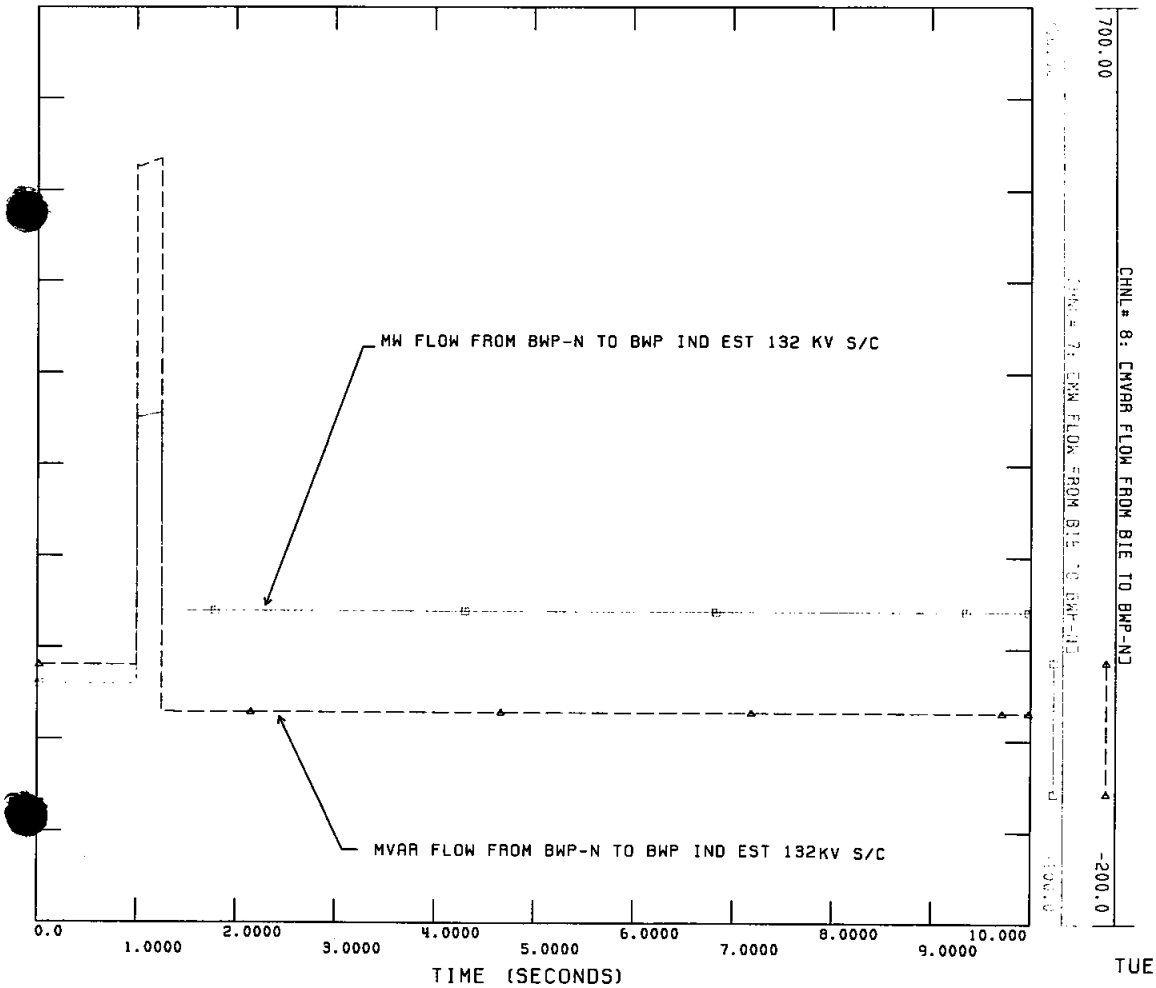
TUE, NOV 07 2023 15:54
FIG 2.1



INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
1-PHASE FAULT AT BWP IND EST CLEARED IN 12.5 CYCLES
TRIP BPURR CANTT TO BWP IND EST 132KV S/C
FILE: 1P Fault Bwp Ind Est - Trip BPurr Cantt- Stuck Breaker.out

TUE, NOV 07 2023 15:59
FIG 2.2





INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
1-PHASE FAULT AT BWP IND EST CLEARED IN 12.5 CYCLES
TRIP BPURR CANTT TO BWP IND EST 132KV S/C
FILE: 1P Fault Bwp Ind Est - Trip BPurr Cantt- Stuck Breaker.out

TUE, NOV 07 2023 15:56

SAMD CONSULTANTS

INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
1-PHASE FAULT AT BWP IND EST CLEARED IN 12.5 CYCLES
TRIP BPURR CANTT TO BWP IND EST 132KV S/C
FILE: 1P Fault Bwp Ind Est - Trip BPurr Cantt- Stuck Breaker.out

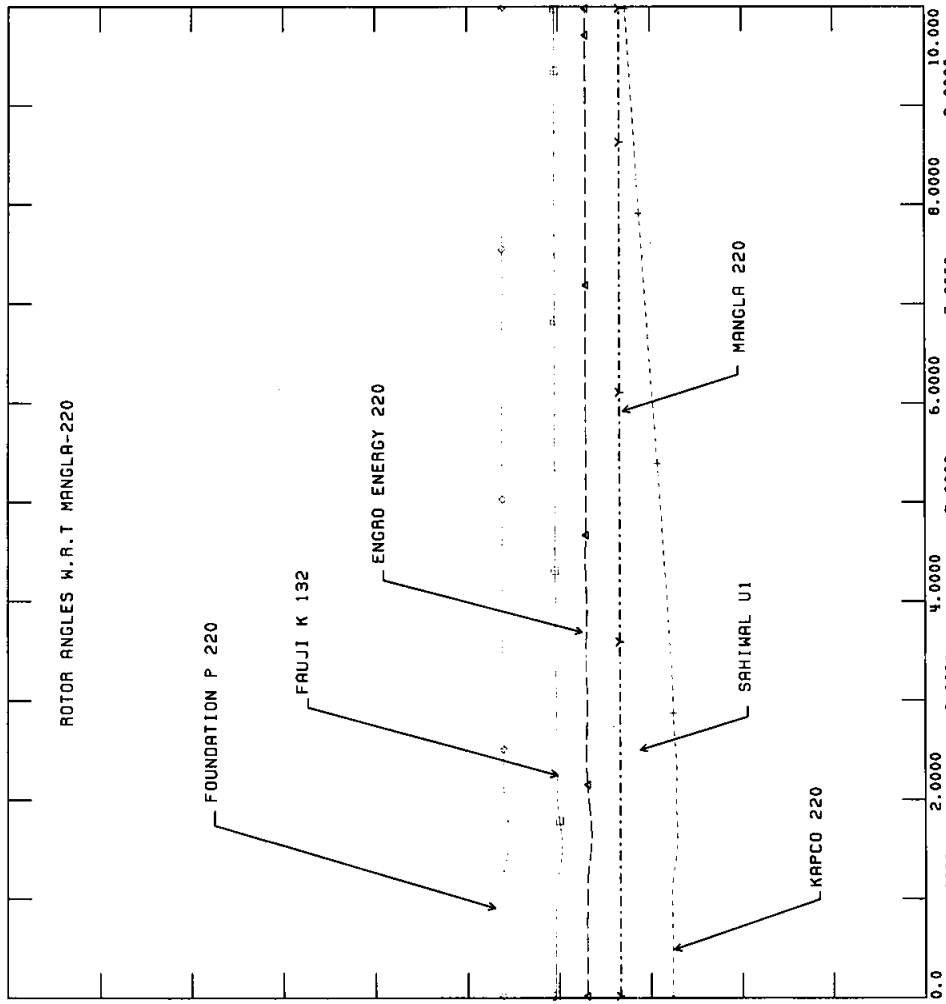
TUE, NOV 07 2023 16:02

CHNL#'S 20,20: CMANGLA 220 KVJ-CMANGLA 220 KVJ
200.00 -100.0

CHNL#'S 18,20: CKAPCO 220KVJ-CMANGLA 220 KVJ
200.00 -100.0

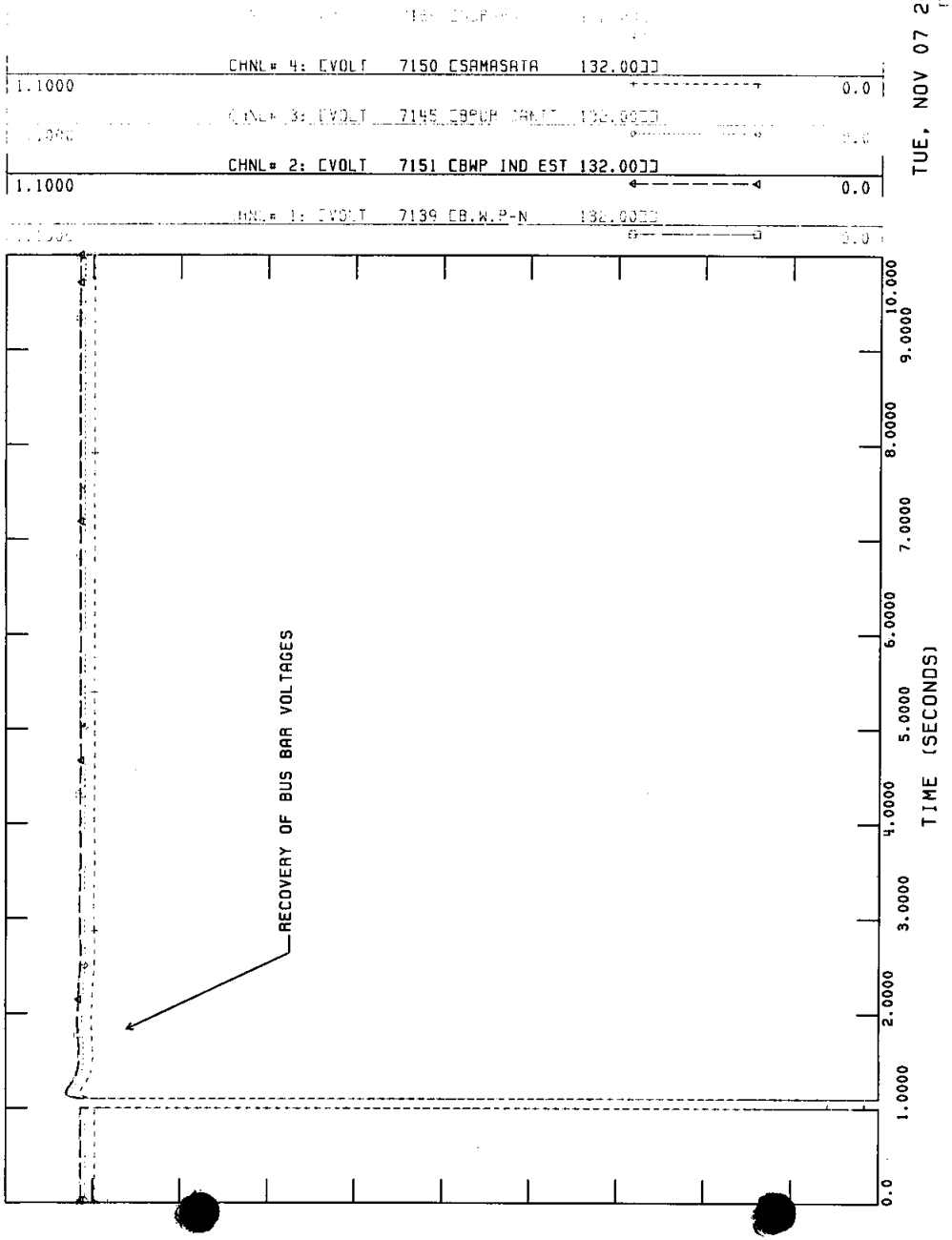
CHNL#'S 16,20: CENGRO ENERGY 220 KVJ-CMANGLA 220 KVJ
200.00 -100.0

CHNL#'S 15,20: CFAUJI KJ-CMANGLA 220 KV
-100.0



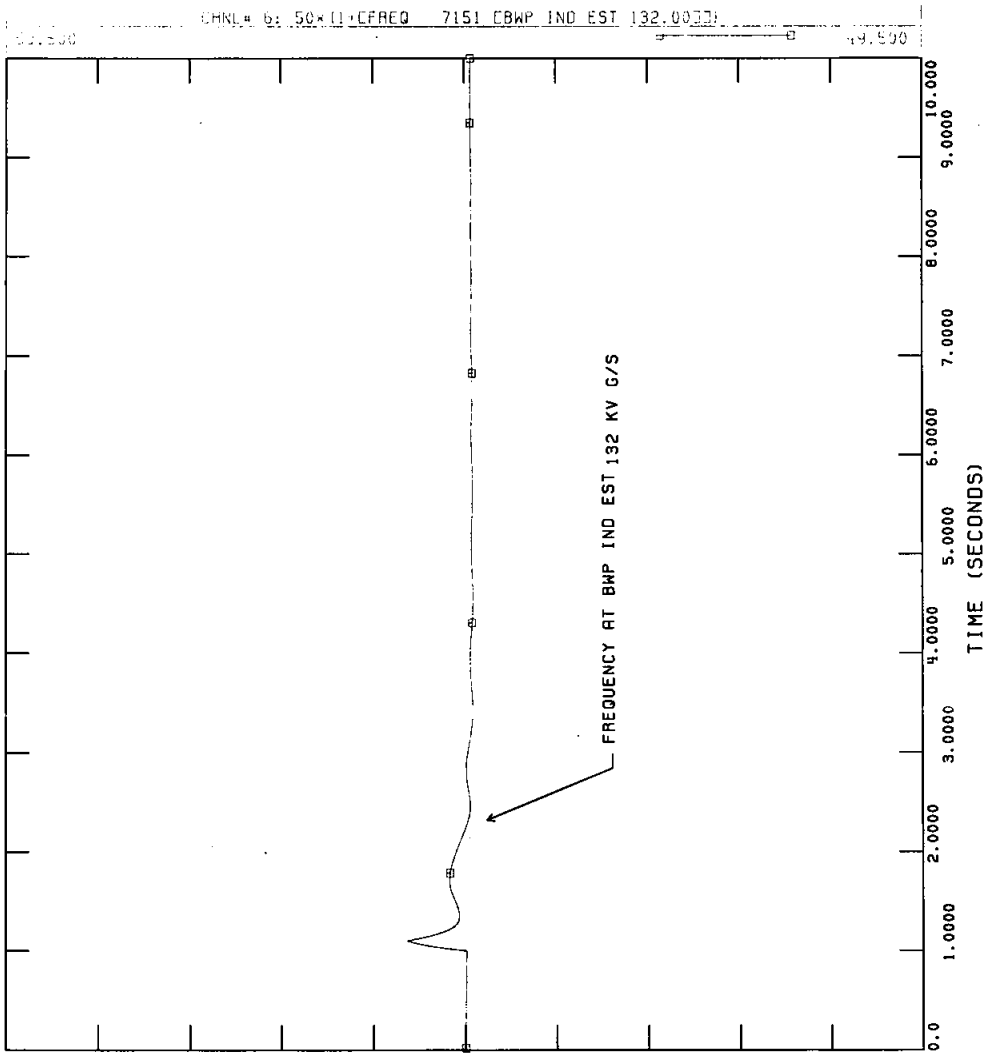
STUDY OF INTERCONNECTION OF 132/11KV GRID STATION AT BAHAWAL
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BWP-N CLEARED IN 5 CYCLES
TRIP BWP-N TO BAHAWALPUR 132KV S/C
FILE: ...\Stab 2028\3P Fault BWP-N - Trip Bahawalpur - 5 cycles.out

TUE, NOV 07 2023 14:22
FIG 3.1



STUDY OF INTERCONNECTION OF 132/11KV GRID STATION AT BAHAWAL
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BWP-N CLEARED IN 5 CYCLES
TRIP BWP-N TO BAHAWALPUR 132KV S/C
FILE: ...\Stab 2028\3P Fault BWP-N - Trip Bahawalpur - 5 cycles.out

TUE, NOV 07 2023 14:24

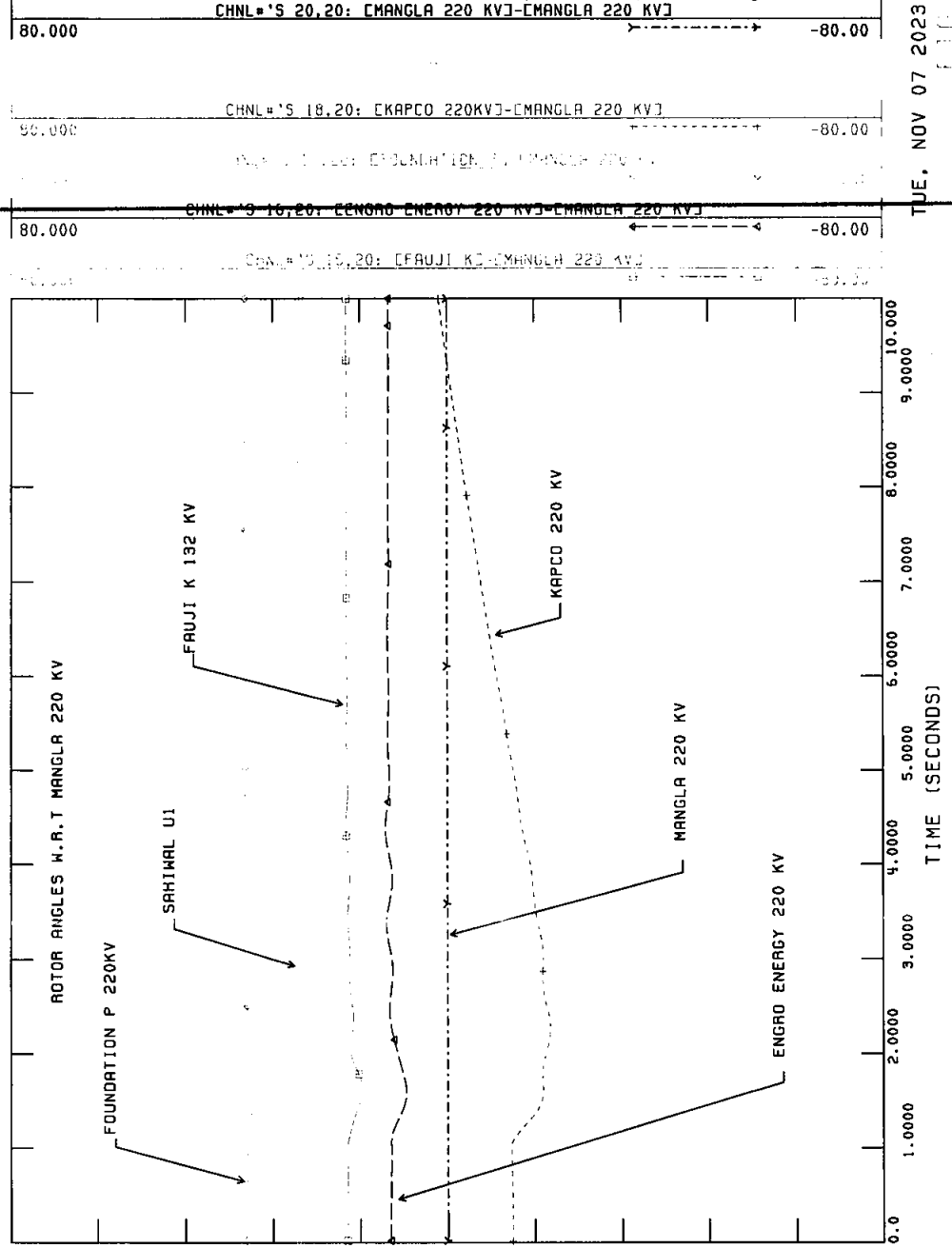


STUDY OF INTERCONNECTION OF 132/11KV GRID STATION AT BAHAWAL
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BWP-N CLEARED IN 5 CYCLES
TRIP BWP-N TO BAHAWALPUR 132KV S/C
FILE: ...\Stab 2028\3P Fault BWP-N - Trip Bahawalpur - 5 cycles.out

TUE, NOV 07 2023 14:25
FIG 3.3

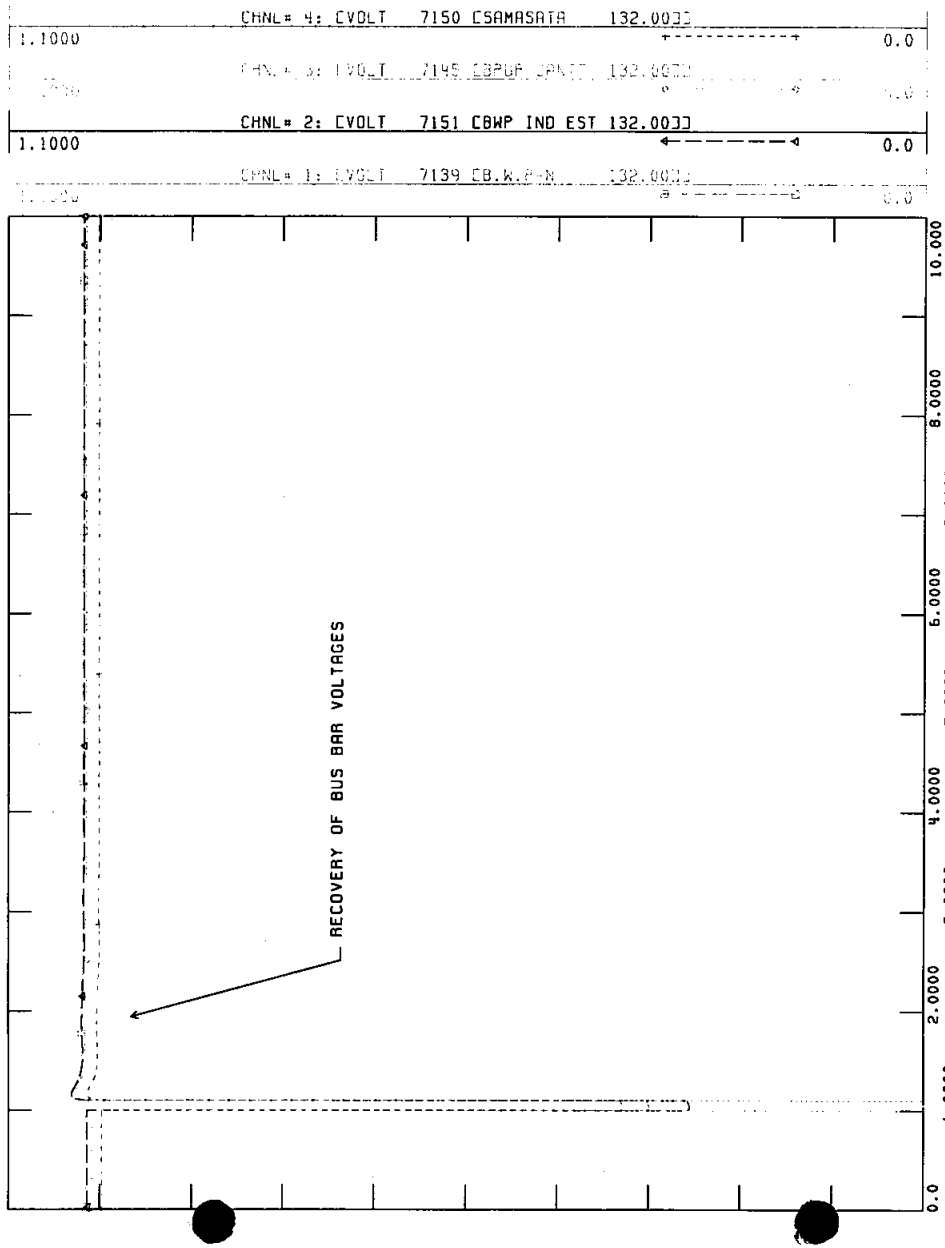
STUDY OF INTERCONNECTION OF 132/11KV GRID STATION AT BAHAWAL
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BWP-N CLEARED IN 5 CYCLES
TRIP BWP-N TO BAHAWALPUR 132KV S/C
FILE: ...\Stab 2028\3P Fault BWP-N - Trip Bahawalpur - 5 cycles.out

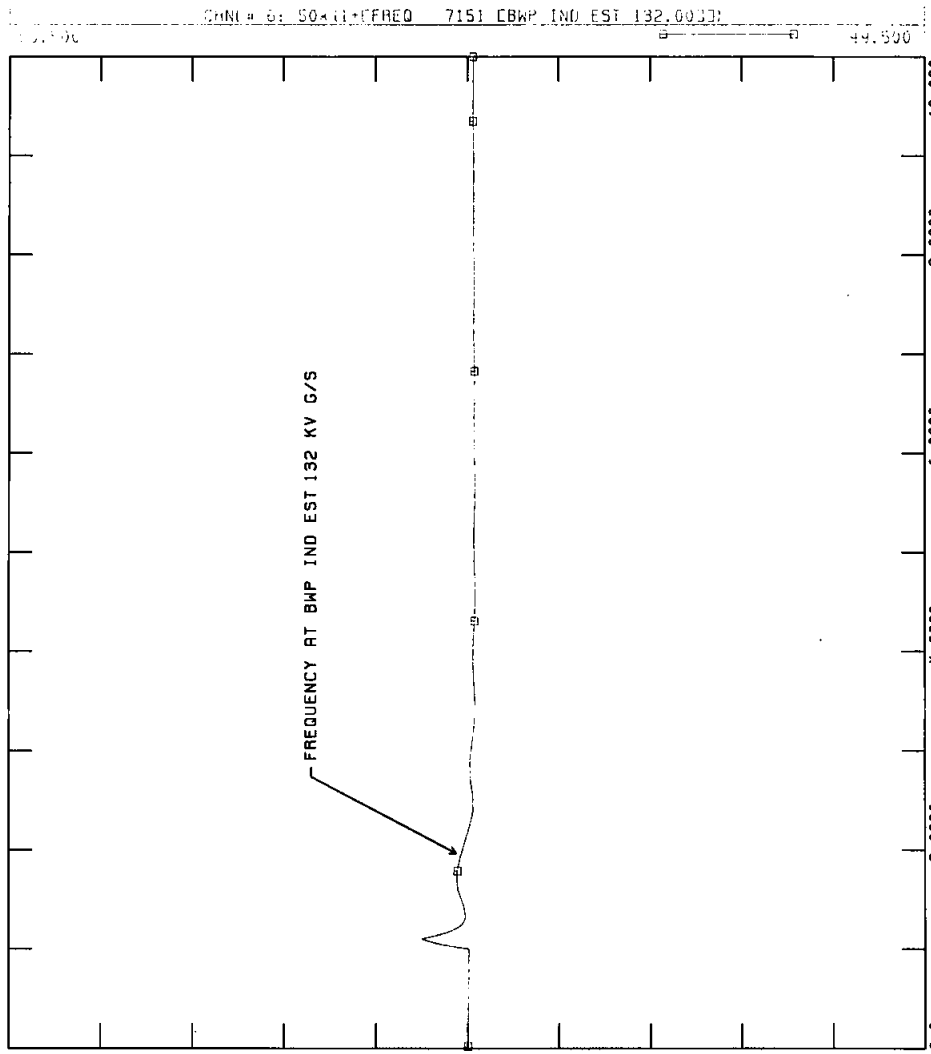
TUE, NOV 07 2023 14:31



INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BPURR CANTT CLEARED IN 5 CYCLES
TRIP BPUR CANTT TO L.SUHANRA 132KV S/C
FILE: ...\Stab 2028\3P Fault BPurr Cantt- Trip L.Suhanra - 5 cycles.out

TUE, NOV 07 2023 14:48




CHNL # 6: 50+(1*FREQ 7151 [BWP IND EST 132.0000]
44.500
FREQUENCY AT BWP IND EST 132 KV G/S
10.000
9.0000
8.0000
7.0000
6.0000
5.0000
4.0000
3.0000
2.0000
1.0000
0.0
TIME (SECONDS)

INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BPURR CANTT CLEARED IN 5 CYCLES
TRIP BPUR CANTT TO L.SUHANRA 132KV S/C
FILE: ...\Stab 2028\3P Fault BPurr Cantt- Trip L.Suhanra - 5 cycles.out

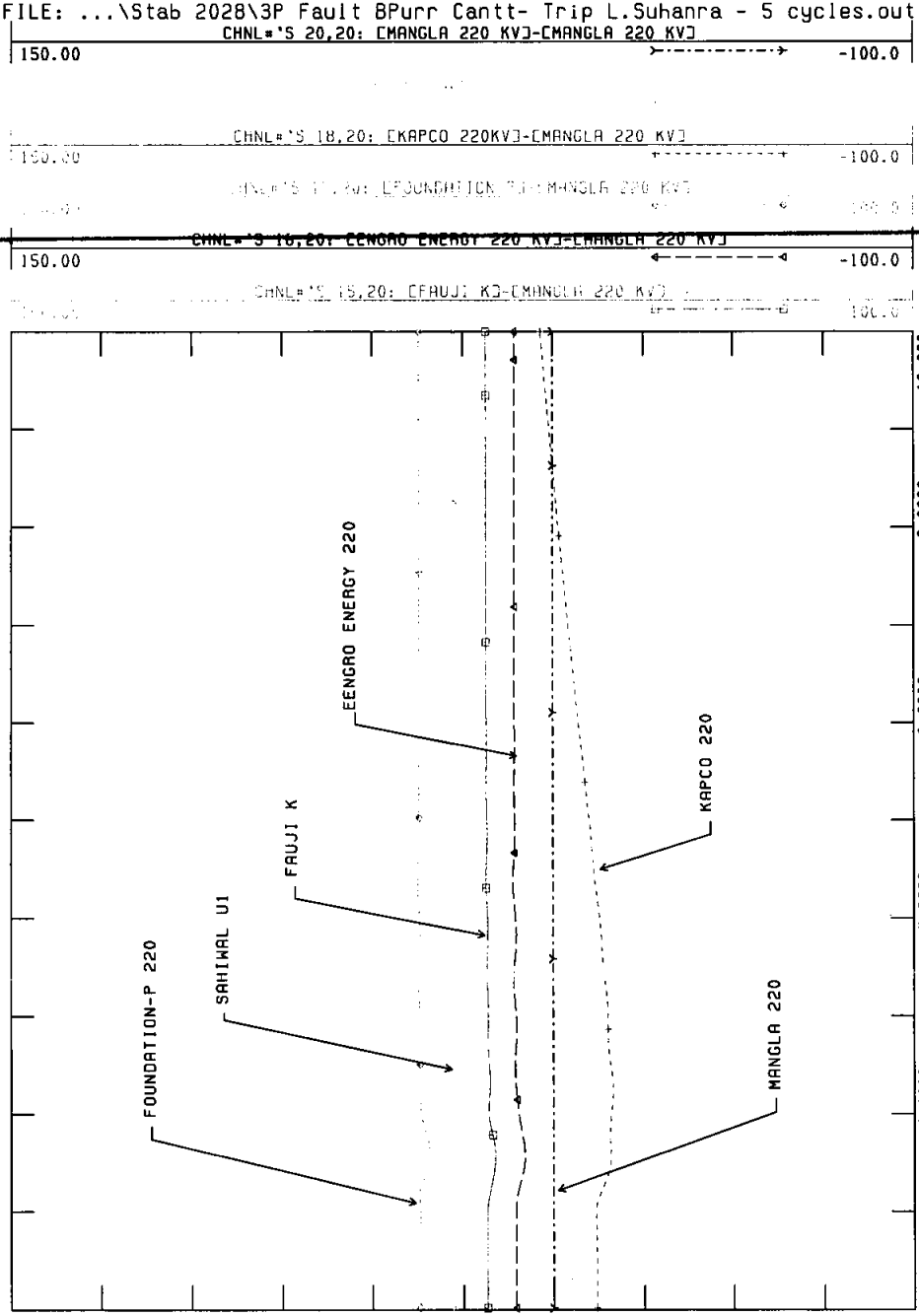
TUE, NOV 07 2023 14:50
FIG 4.3

SAMD CONSULTANTS

INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND. EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT BPURR CANTT CLEARED IN 5 CYCLES
TRIP BPUR CANTT TO L.SUHANRA 132KV S/C

FILE: ...\Stab 2028\3P Fault BPurr Cantt- Trip L.Suhanra - 5 cycles.out

TUE, NOV 07 2023 14:57



INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT L.SUHANRA132 CLEARED IN 5 CYCLES
TRIP L.SUHANRA TO CREST ENERGY 132KV S/C
FILE: ...\Stab 2028\3P Fault L.Suhara - Trip Crest Energy - 5 cycles.out

TUE, NOV 07 2023 15:01
FIG 5.1

CHNL# 4: CVOLT 7150 CSAMASATA 132.00]]
1.1000 0.0

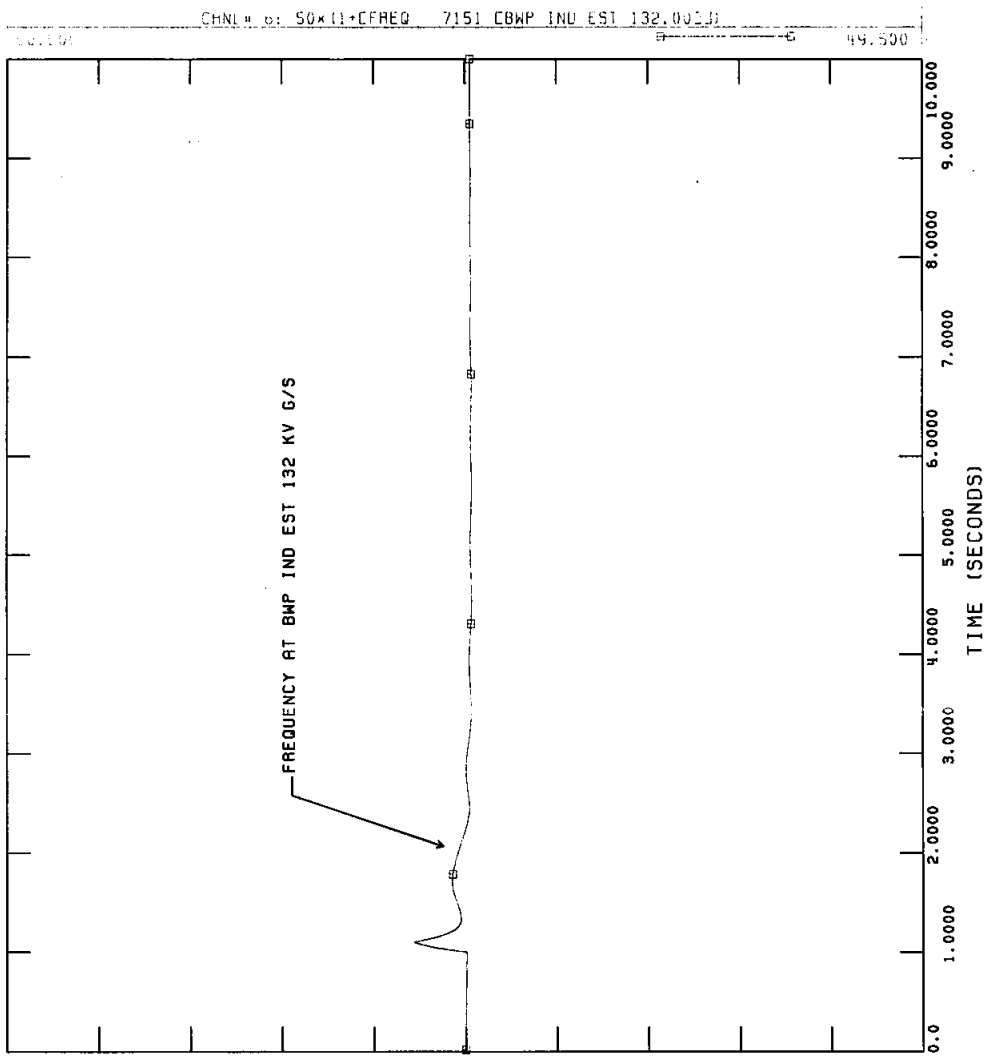
CHNL# 2: CVOLT 7151 CBWP IND EST 132.00]]
1.1000 0.0

RECOVERY OF BUS BAR VOLTAGES

TIME (SECONDS)
0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 10.000

INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT L.SUHANRA132 CLEARED IN 5 CYCLES
TRIP L.SUHANRA TO CREST ENERGY 132KV S/C
FILE: ...\Stab 2028\3P Fault L.Suhara - Trip Crest Energy - 5 cycles.out

TUE, NOV 07 2023 15:06



INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR IND EST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT L.SUHANRA132 CLEARED IN 5 CYCLES
TRIP L.SUHANRA TO CREST ENERGY 132KV S/C
FILE: ...\Stab 2028\3P Fault L.Suhara - Trip Crest Energy - 5 cycles.out

TUE, NOV 07 2023 15:03
FIG 5.3

INTERCONNECTION STUDY OF 132/11KV G/S AT BAHAWALPUR INTEREST
PEAK LOAD CASE 2028 - WITH BAHAWALPUR INDUSTRIAL ESTATE G/S
3-PHASE FAULT AT L.SUHANRA132 CLEARED IN 5 CYCLES
TRIP L.SUHANRA TO CREST ENERGY 132KV S/C

FILE: ...\Stab 2028\3P Fault L.Suhara - Trip Crest Energy - 5 cycles.out

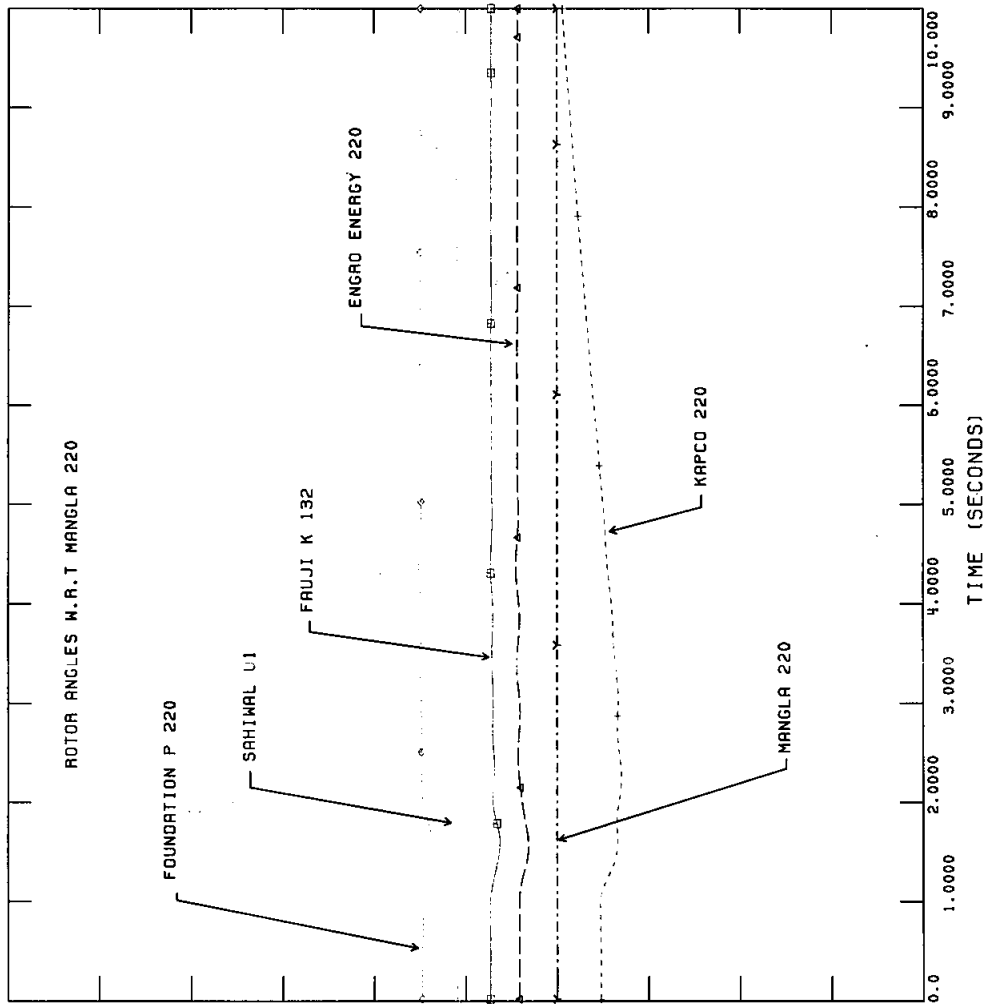
TUE, NOV 07 2023 15:08

CHNL#'S 20,20: [MANGLA 220 KV]-[MANGLA 220 KV]
150.00 -100.0

CHNL#'S 18,20: [KAPCO 220KV]-[MANGLA 220 KV]
150.00 -100.0

CHNL#'S 16,20: [ENGRO ENERGY 220 KV]-[MANGLA 220 KV]
150.00 -100.0

CHNL#'S 15,20: [FAUJI K]-[MANGLA 220 KV]
-100.0



GOVERNMENT OF THE PUNJAB
ENVIRONMENTAL PROTECTION AGENCY
National Hockey Stadium, Gate No. 10
Ferozepur Road, Lahore 000875

NO. AD(EIA)/F-49(EIA)/EPA/1302/2018/ 532
Dated: 16 / 11 / 2020

To,

Mr. Imran Bhanbhro,
GM (Technical),
M/S Bahawalpur Industrial Estate (Bwp-IE),
Punjab Industrial Estate Development and management Company,
Commercial area North , Sundar Indsutrial Estate Raiwind Road Lahore.

Subject: **DECISION OF EPA PUNJAB UNDER REGULATION 12 OF REVIEW OF IEE AND EIA REGULATIONS, 2000 READ WITH SECTION 12 OF PUNJAB ENVIRONMENT PROTECTION ACT, 1997 REGARDING PROJECT "ESTABLISHMENT OF BAHAWALPUR INDUSTRIAL ESTATE, AT 12 KM SOUTH WEST OF BAHAWALPUR CITY, DISTRICT BAHAWALPUR"**

1.	Description of Project:	Establishment of Bahawalpur Industrial Estate, over an area of 483 acres. .
2.	Location of Project:	12 Km South West Of Bahawalpur City, District Bahawalpur.
3.	Date of receiving of EIA	04.04.2018

4. After careful review of Environmental Impact Assessment (EIA) report, consideration of Site Inspection Report submitted by Deputy Director (Environment), Bahawalpur vide his letter No. BIE/2018/EPA/BWP/324 dated 30.05.2018 and in pursuance of the recommendation of the committee of Experts made in the meeting thereof held on 13-02-2020, perusal of other relevant record, Environmental Protection Agency, Punjab provisionally accords Environmental Approval under Regulation 12 of Review of IEE and EIA Regulations, 2000 read with Section 12 of Punjab Environmental Protection Act, 1997 for construction of your aforesaid project subject to the following conditions:

i. The Proponent shall ensure compliance with Punjab Environmental Quality Standards **(PEQS);**
ii. Mitigation Measures suggested in the Environmental report and Environmental Management Plan **(EMP)** shall be strictly adhered to for minimizing any negative impacts on soil, ground water, air and biological resources of the Project area;
iii. The Proponent shall maintain record of the auditable measures taken for implementation of Environmental Management Plan for periodical verification by EPA, Punjab;
iv. **Monitoring** shall be carried out during the entire period of the Project activities. Monitoring reports shall be submitted to EPA Field office on quarterly basis;
v. The Proponent shall ensure that energy consumption shall be **reduced** by incorporating green energy sources along with regular power supply;
vi. The Proponent shall **redress** the objection / concerns of neighbors / stakeholder on priority basis (if any at any stage);
vii. The Proponent shall obtain No Objection Certificates / Clearance of **all** other concerned departments before commencement of work and will not start operations without obtaining necessary NOCs/Approvals;
viii. The proponent shall **submit** copies of all necessary NOCs/Approval from other concerned departments along with application for operational phase under Regulation 14 of IEE and EIA regulation 2000;
ix. The Proponent shall plant **25000 trees** of 6-7 feet height of indigenous species in the district in consultation with Directorate of (EDH) / District Director (Environment), Bahawalpur, within six months. The Proponent shall also take measures for protection and upkeep of these trees and shall maintain their proper record for verification by EPA;
x. The proponent shall **follow** building by Laws and the construction plan approved by the competent authority including seismic, structural and geotechnical analysis;
xi. The proponent may install standby power generator, if required by adopting sound proofing techniques and it shall be equipped with chimney with proper height to discharge the hot gases/ smoke within **PEQS** limits;
xii. The proponent shall install Combined Effluent Treatment plant (CETP) with the capacity to bear load of all the Industrial Units wastewater to ensure compliance with PEQs;

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xiv. **This provisional Approval shall remain valid subject to grant of Approval by concerned Department, and shall automatically stand cancelled in case of non-grant of Approval(s) by any or all of the aforesaid / other related departments;**

xv. Arrangement shall be made for **disposal** of sanitary and solid waste. The solid waste shall be retained within the unit boundary/premises and will be disposed off in an environment friendly way at a suitable disposal facility. Toilet/washroom will be maintained in an orderly and hygienic manner for public use;

xvi. The proponent shall appoint Environmental Manager (having at least qualification of B.S Environment Sciences) for the project.

xvii. The proponent shall take measures to conserve water resources by incorporating rain water harvesting in the building design and ensuring provision of ground water recharge galleries. Furthermore proponent must not pollute or over use any surface water body in the vicinity of the project.

xviii. Energy consumption shall be reduced by incorporating green energy sources along with regular power supply.

xix. The proponent shall avoid the disturbance of the traffic flow during construction and operation phase.

xx. The proponent shall make proper parking arrangements and shall not convert the parking area to other use.

xxi. Camping sites by the contractor shall be located at suitable distance away from any settlement to avoid disturbance to the local people and he will ensure restoration of camping site to its original condition as well.

xxii. The proponent shall strictly ensure that techniques like soakage pits or underground injection wells are not used for disposal of wastewater in the Industrial Estate;

xxiii. Proper **disposal** of wastewater after treatment into existing nearest Sewerage system NOC issued by concerned Department;

xxiv. The proponent shall not place the construction material openly.

xxv. The proponent shall take all necessary measures for disposal of solid waste on scientific basis.

xxvi. The proponent shall install Ambient Air Quality Monitoring Station (USEPA complied) with online access to EPA Punjab.

xxvii. As stated in EIA Report, the proponent shall ensure that each industrial unit installs fully functional Waste Water Treatment Plant.

xxviii. The proponent shall install **online** effluent monitoring system with online access to EPA, Punjab; and

xxix. The Proponent shall follow the **SOPs** regarding dengue larvae eradication and shall ensure removal of stagnant water on daily basis.

5. The Proponent shall, before commencing construction of the Project, acknowledge acceptance of the stipulated conditions by executing an Undertaking in the form prescribed in Schedule VII of Review of IEE and EIA Regulations 2000.

6. The Proponent shall be liable for **correctness** and validity of information supplied to this department by Proponent / Environmental consultant. If any information/Document supplied is found incorrect/false, the approval will be deemed cancelled and strict Legal action will be taken against the proponent and consultant.

7. The Proponent shall be liable for compliance with Regulations 13, 14, 17 and 18 of IEE and EIA Regulations, 2000, regarding approval, confirmation of compliance, entry, inspections and monitoring.

8. This approval is **accorded** only for the construction phase of the Project. The Proponent shall obtain approval for operational phase of the Project in accordance with Regulation 13(2) (b) and Regulation 14 of the IEE and EIA Regulations, 2000.

9. Any change in the approved Project shall be **communicated** to EPA, Punjab and shall be initiated after obtaining the approval.

10. This approval shall be treated as **null and void** if any or all of the conditions mentioned above, is not complied with. This approval does not absolve the Proponent of the duty to obtain any other approval or consent that may be required under any law in force.

11. The proponent **shall apply** for confirmation of compliance with (Operational phase) as per Regulation 14 of IEE and EIA Regulations, 2000, only after complying with all conditions mention in this approval.

12. This approval shall be valid (for commencement of construction) for a period of **three years** from the date of issue under Regulation 16 of IEE and EIA Regulations, 2000.

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GOVERNMENT OF THE PUNJAB
ENVIRONMENTAL PROTECTION AGENCY
National Hockey Stadium, Gate No. 10
Ferozepur Road, Lahore

13. This approval can be **withdrawn** at any time without any prior notice if deemed necessary in the public / national interest.
14. This decision is issued with the approval of Director General, EPA Punjab.

ASSISTANT DIRECTOR (EIA)

NO. & DATE EVEN.

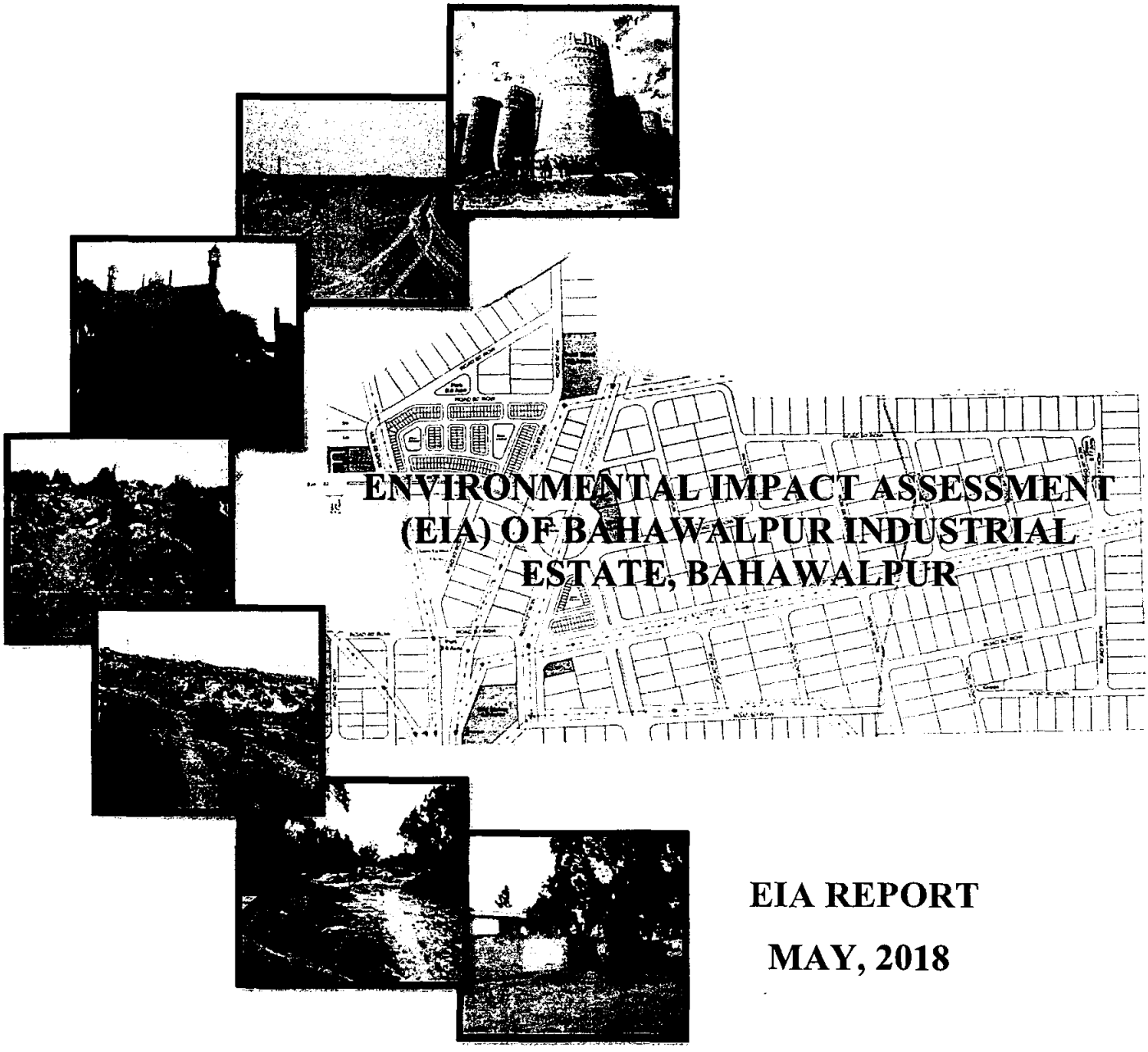
A copy is forwarded to from Deputy Director (Environment), Bahawalpur vide his letter No. BIE/2018/EPA/BWP/324 dated 30.05.2018. He is requested to:

i. Obtain undertaking from the Project Proponent mentioned at para 5 for the record of EPA Headquarter and Field Office.
ii. Ensure compliance with the conditions mentioned in the Environmental Approval and maintain the file / record of correspondence with the Project Proponent properly.
iii. Ensure monitoring of the project at every stage and inform any violations to the authority so that strict action can be taken as per law.

ASSISTANT DIRECTOR (EIA)

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PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY



ENVIRONMENTAL IMPACT ASSESSMENT (EIA) OF BAHAWALPUR INDUSTRIAL ESTATE, BAHAWALPUR

EIA REPORT

MAY, 2018

National Engineering Services Pakistan (Pvt.) LTD
Environmental and Public Health Engineering Division
1-C, Block N, Model Town Extension, Lahore Pakistan

TÜV AUSTRIA

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LIST OF ABBREVIATIONS

Abbreviation	***Description***
APHA	American Public Health Association
ASR	Air Sensitive Receivers
ASTM	American Society of Testing Materials
BDL	Below Detection Limit
BIE	Bahawalpur Industrial Estate
BOD	Bio-chemical Oxygen Demand
BWMC	Bahawalpur Waste Management Company
Ca	Calcium
CC	Construction Contractor
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
COI	Corridor of Impact
COP	Conference of Parties
dB (A)	Decibel
DC	Design Consultant
DCR	District Census Report
DO	Dissolved Oxygen
EC	Environmental Committee
EE	Environmental Engineer
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EPA	Environment Protection Agency
EPC	Engineering Procurement Construction
EPD	Environment Protection Department
EPHE	Environmental & Public Health Engineering
ERC	Emergency Resource Center
Fe	Iron
FGDs	Focused Group Discussion
gm	Gram
GoP	Government of Pakistan
IEE	Initial Environmental Examination
JICA	Japan International Cooperation Agency
LGO	Local Government Ordinance
MCCS	Manual Classified Count Survey
mg/l	Milligrams per lite
MSL	Mean Sea Level
NCS	National Conservation Strategy
NDMA	National Disaster Management Authority

NEQS	National Environmental Quality Standards
NESPAK	National Engineering Services Pakistan
NO_2	Nitrogen Dioxide
NSR	Noise Sensitive Receivers
NPZ	Noise perimeter zones
^oC	Degree Centigrade
OH & S	Occupational Health and Safety
OH & SAS	Occupational Health and Safety Assessment Series
PAPs	Project Affected Persons
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protection Council
PHA	Parks Horticulture Authority
PGA	Peak Ground Acceleration
PIEDMC	Punjab Industrial Estates Development and Management Company
PM	Particulate Matter
PPC	Pakistan Penal Code
PPP	Public Private Partnership
RAP	Resettlement Action Plan
RoW	Right of Way
SC	Supervision Consultant
SO_2	Sulfur Dioxide
SO4	Sulphate
SOP	Standard Operating Procedures
SPBUSP	Southern Punjab Basic Urban Services Project
STDs	Sexually-Transmitted Disease
SWM	Solid Waste Management
TA	Technical Assistance
TDS	Total Dissolved Solid
TMA	Tehsil Municipal Administration
TSS	Total Suspended Solids
UC	Union Council
UCP	University of Central Punjab
UfW	Unaccounted For Water
UNDP	United Nation Development Program
UNFCCC	United Nation Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
VEC	Valued Environmental Components
VSC	Valued Social Components
VPD	Vehicle per Day

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WASID	Water and Soil Investigation Division
WAPDA	Water and Power Development Authority
WHO	World Health Organization

Glossary

Aesthetic	Concerned with beauty or appreciation of beauty.
Agency	A business or organization providing a particular service on behalf of another business, person, or group.
Aquifer	An aquifer is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand or silt) from which groundwater can be extracted using a water well.
Climate	The weather conditions prevailing in an area in general or over a long period.
Conservation	Official supervision of rivers, forests, and other natural resources in order to preserve and protect them through prudent management.
Consultant	A person who provides professional advice or services to companies for fee.
Construction Waste	Waste generated from the buildings and construction industry and includes material like bricks, concrete, tiles, debris, ceramics and more.
Convention	An agreement between states covering particular matters, especially one less formal than a treaty.
Cultural Heritage	Valued objects and qualities such as historic buildings and cultural traditions that have passed from previous generations.
Demographic	A single vital or social statistic of a human population, as the number of births or deaths.
Drainage	Natural or artificial removal of surface and sub-surface water from an area.
Ecology	The branch of biology that deals with the relations of organisms to one another and to their physical surroundings.
Endangered species	A species of animal or plant that is seriously at risk of extinction.
Environment	Relationship of natural world (human beings, animals and plants) with physical surroundings (air, land, water).
Environmental Sustainability	Environmental Sustainability is the rates of renewable resource harvest, pollution creation and non-renewable resource depletion that can be continued indefinitely.
Impact	The action of one object coming forcibly into contact with another.
Municipal Waste	Municipal Solid Waste (MSW)—more commonly known as trash or garbage—consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. This comes from our homes, schools, hospitals, and businesses

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Ordinance	An ordinance is a law enacted by a municipal body, such as a city council or county commission (sometimes called county council or county board of supervisors). Ordinances govern matters not already covered by state or federal laws such as zoning, safety and building regulations.
Preservation	Preservation is the strict setting aside of natural resources to prevent the use or contact by humans or by human intervention. In terms of policy making this often means setting aside areas as nature reserves (otherwise known as wildlife reserves), parks, or other conservation areas.
Proponent	A person who advocates a theory, proposal, or course of action.
Rehabilitation Resettlement	To restore to a condition of good health, ability to work, or the like. The settlement of people in a different place.
Resource	A stock or supply of money, materials, staff, and other assets that can be drawn on by a person or organization in order to function effectively.
Sanctuary Sanitation	Conditions relating to public health, especially the provision of clean drinking water and adequate sewage disposal.
Seismic Hazards	A seismic hazard is the probability that an earthquake will occur in a given geographic area, within a given window of time, and with ground motion intensity exceeding a given threshold.
Stakeholder	A stakeholder is a party that has an interest in a company, and can either affect or be affected by the business. The primary stakeholders in a typical corporation are its investors, employees and customers.
Stage digging	Stage digging is a process by which portions of the root ball are dug over a period of time in order to allow the tree to acclimate to the stresses gradually.
Valued Environmental	Valued environmental components (VECs) are defined as fundamental elements of the physical, biological or socio-economic environment, including the air, water, soil, terrain, vegetation, wildlife, fish, birds and land use that may be affected by a proposed project.
Valued Social Components (VSCs)	Sociocultural factors are customs, lifestyles and values that characterize a society or group. Cultural aspects include concepts of beauty, education, language, law and politics, religion, social organizations, technology and material culture, values and attitudes. Social factors include reference groups, family, role and status in society, time and available resources. An understanding of sociocultural factors is crucial in developing marketing strategies for businesses or organizations seeking action from particular group.

Executive Summary

Title of the Project

This report presents the findings of "EIA of Construction Bahawalpur Industrial Estate, Bahawalpur.

Location of the Project

The proposed project site is administratively located in Bahawalpur District The proposed site spread over an area of 483 acres for BIE is located at a distance of 12 km south west of Bahawalpur City with geographical coordinates of $29^0$19'19.06"N and $71^0$35'9.97"E. National Highway N5 is passing in the North West of the project site, at a distance of 1.6 km. The project site is bounded by Rama village in the east, Mariwala Khu village in the west, Basti Yar Muhammad village in the south and Airport road in the north. Ahmed Pur East Canal is passing along Airport road at north of the project site. Sutlej River is flowing in the north west of the project site, at a distance of 10 km (approx.).

Name of the Proponent and Organization preparing EIA Report

To comply with IEE/EIA regulations 2000 as per Punjab Environmental Protection (Amendment) Act (PEPA) 2012, Punjab Industrial Estates Development and Management Company (PIEDMC) has entrusted National Engineering Services Pakistan (NESPAK) Pvt. Limited with the assignment of carrying out an Environmental Impact Assessment (EIA) study for "Construction of Bahawalpur Industrial Estate".

Brief Outline of the Project

The Punjab Government has established Punjab Industrial Estates Development and Management Company (PIEDMC) to achieve orderly, planned and rapid industrialization in Punjab by developing new industrial estates and managing the existing industrial estates in a dynamic and innovative manner with a view to provide turnkey solutions to the prospective entrepreneur's thereby generating economic activity and creating mass employment opportunities. The PIEDMC intends to establish "Bahawalpur Industrial Estate" on an area of 483 acres in District Bahawalpur.

The project will be promoting exports of value added manufactured items from different sectors. The project is likely to attract foreign as well as local manufacturers to invest in

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industrial sector of Pakistan and increase exports of value added products. It will also help in the economic uplift of the southern Punjab.

The overall objective of the proposed Project

- Structural platform to set up industries with availability of developed plots and infrastructure;
- Provision of support services at one location;
- Availability of skilled manpower;
- To provide secure environment; and
- To facilitate compliance with Environmental Regulation

Scope of EIA Study

The scope of this EIA Study aims at collection and scrutinization of data related to physical, biological and socio-economic environment of the project area and to prepare the baseline environmental profile. It also aims at the identification, prediction and evaluation of the possible environmental impacts of the proposed project on its immediate surroundings on both short and long-term basis. Based on the nature and levels of those impacts, appropriate mitigation measures are proposed in this EIA Report.

The submission of EIA and its approval from Environmental Protection Agency (EPA) is mandatory according to the Punjab Environmental Protection Act (Amended), 2012. Section 12 (1) of the Punjab PEPA (Amended), 2012 states that:

"No proponent of a project shall commence construction or operation unless he has filed with the Provisional 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 Provisional Agency approval in respect thereof."

Approach & Methodology

The study was conducted in accordance with Environmental Protection Agency (EPA), Government of Pakistan (GOP) Guidelines, 2000. The study was based on both primary and secondary data and information. Discussions were held with stakeholders including government officials, community representatives and a wide range of local residents. The

main purpose of this approach is to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

To accomplish the job in time and to produce a quality report, a proper methodology was established as follows:

- Meetings and discussions were held among the members of the EIA Consulting Team. This activity is aimed at achieving a common ground of understanding of various issues of the study.
- The plan included; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection; and indication of the logistics and other supporting needs for the execution of the data acquisition plan.
- Primary and secondary data was collected through field observations, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic conditions.
- The impacts of the proposed project on the physical, biological and socio-economic environment prevalent in the project area were visualized at the design, construction and operational phases.
- The adequate mitigation measures and implementation mechanisms were proposed so that the proponent could incorporate them beforehand in the design phase.

Legal and Administrative Frameworks for EIA

The Government of Pakistan (GoP) has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In our current studies the applicable environmental policies are National Environment Policy, 2005; National Climate Change Policy, 2012 and National Resettlement Policy, 2002. The relevant laws, regulations and acts to the proposed project are: Pakistan Environmental Protection Act, 1997; IEE/EIA Regulations, 2000; Pakistan Environmental Assessment Procedures, 1997; Punjab Environmental Quality Standard (PEQS) 2016; National Environmental Quality Standard (NEQS) 2010; Punjab Local Government Ordinance, 2001; Pakistan Penal Code, 1860; Guidelines for Solid Waste Management (2005); Canal and Drainage Act, 1873; Sectorial Guidelines (1997); The Punjab Wildlife Protection, Preservation, Conservation & Management Act (1974); Protection of Tress and Brushwood Act,1949; Cutting of Tress (Prohibition) Act 1975;

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Disaster Management Act, 2010; The Motor Vehicles Rules,2000; National Clean Air Act, 2000; Land Acquisition Act, 1894; Seismic Building Code of Pakistan, 2007; Toxic or Hazardous Waste and Preservation of Cultural Heritage.

The implementing agency of the proposed project is Punjab Industrial Estates Development and Management Company (PIEDMC). The management of PIEDMC will ensure that all the proposed measures are effectively implemented at the design, construction and operational stages of the project.

Project Description

The project is expected to be completed in (24) months. The estimated capital cost of the proposed project is Rs Four (04) Billion.

The Project envisages the development of a State of the Art Industrial Estate at Bahawalpur on a Land Area measuring 483. The proposed Industrial Estate comprises Industrial Plots 1.0 Acre and Amenities (Medical Center/ Emergency 1122 Station, Parks, Sports Facilities, Commercial Area, Vocational Training Center, Truck Stand and Petrol Pump, Jamia Masjid, Grid Station, PIEDMC Office and CETP/ Landfill Site/ Disposal Station etc.).

The materials used in construction of the proposed project would include reinforced cement concrete frame (RCC Frame), brick infill, brick cladding, textured paints and standard paints etc. The materials used in construction of the road for the proposed project would include coarse aggregates (crush), fine aggregates (sand), water, asphalt, reinforcement, cement etc. Estimated average water demand for the proposed project is 4.21 MGD (7.7 cusecs), for which 12 tube wells each of one (01) cusecs are proposed during the operation phase. During the construction phase, estimated average water demand for various project activities is one (01) cusecs. The estimated average wastewater produced during construction and operation phases is 0.8 cusecs and 6.2 cusecs respectively.

The municipal waste generation during construction phase will be 200[1] kg/day and during operation phase it will be estimated as 6000 kg/day. The man power requirement

[1] 0.4 kg/capita/day waste generation of Bahawalpur (Consultation with Manager Operations, Bahawalpur Waste Management Company)

is estimated 500 workers during construction phase and 15000 workers during operation phase of the industrial estate.

Description of the Environment

The existing environment in and around the project area has been studied with respect to the physical, biological and socio-economic conditions.

Physical Environment

The District Bahawalpur can be divided into three parts i.e. the riverain area, the plain area and the desert area. The project area has irregular topography. The sand dunes are deposited all over the project area, which are 1 to 5 meters (3 to 15 feet) high from adjacent agriculture land. The project area has bad land topography. The irregular sand dunes deposited all over the project area which are 1 to 5 meters (3 to 15 feet) high from adjacent agriculture land. The soil is sandy, while the soil of central Bahawalpur mostly consists of the plains of Indus basin,which is at the height of not more than 150 meters above sea level. But the southwestern desert, which is called Rohi or Cholistan, is mostly undulated due to the presence of sand dunes. The height of the sand dunes does not exceed 150 meters (according to Imperial Gazetteer of 1901 height of dunes was not more than 500 feet). Ahmad Pur Canal is the nearest surface water body in the project area.

The District has extremes of climate[2]. because, being adjacent to Rajputana desert, this area overall resembles the dry climate of an arid desert The summer season starts from the month of April and continues till October , while the weather is pleasant and cold from November to February The climate is mainly hot and dry. In the summer the temperature reaches the high 40 (forties Celsius) and 50 during the day and the nights are slightly cooler. Since the city is located in a desert environment there is little rainfall. Weather conditions reach extremes in both summer and winter. Temperature in Bahawalpur ranges from 5.85 to 42.2o C. Average monthly rainfall ranges from 3 to 168 mm. The average temperature in summer is 33°C (91oF) and 18°C (64oF) in winter. During winter it is between 5 and 15 degree centigrade and sometimes it falls below the freezing point, which ruins the crops.

[2]**Source**: *District Census Report, Bahawalpur, 1998*

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The environmental parameters like air quality, noise level and ground water were monitored at the proposed project site from January 12, 2018 to January 16, 2018 for analyzing the quality of air, ground water and level of noise at the proposed site, for establishing the baseline profile of the area. The environmental monitoring for ambient air, noise and ground water was conducted at the proposed project site in January, 2018 for establishing the baseline profile of the project area. The results of ambient air monitoring indicate that all parameters are well within the permissible limits of Punjab Environmental Quality Standards (PEQS) while the results of drinking water quality are awaited.

Ecological Environment

The ecological survey of the project site revealed that few trees (45) existing in the median of the existing proposed project and will be affected. Tree cutting will be involved due to construction of the proposed project.

Common mammals found in the area are the hog deer, ravine deer, black buck and blue bull. Fox, jackals, hares, wild boars, porcupines, mongoose, arks, owls and hawks are also found in large numbers. The terrestrial mammals include Cat, Dog, Horse and Donkey Amphibians frequently seen in and around the project area, especially during rainy season include Frogs (Daddos) are found in great number. Bird species known to occur in the area are: Caracal, Chinkra, Houbara Bustard, Great Indian Bustard, Sand, Groud, Desert Costal, Grey Baridrige, Doves, Raptors, Vultures, Diversified song birds, different types of shrikes, Black and Grey partridges (*Francolinus francolinus* and *F. pondicerianus*),Jackal and Jungle cat. Bashin, Tamtari, Crow and Parrot. Snakes such as cobra, kraits etc. were once common in the tract, Kala Mushki, Sangchoor (Yellowish), Dhoi, Lundi Kharpa and Jalebi are also found. Lizards are of numerous and of various species, such as Sanda (the oil of which has restorative power), Spiny tailed lizard (Uromastixhardwickii) and fringed toed lizard (Acanthodactylus cantoris), are also reported in the project area. The Indus contains a variety of fish. In the winter months when the river recedes, fish are caught in greater quantity.

Socioeconomic Environment

The total population of Bahawalpur District was 2,433,091as enumerated in March 1998 with an intercensal percentage increase of 67.4 since March 1981 when it was 1,453,438

souls. The average annual growth rate of population in the district during intercensal period 1998-2017 was 3.07 percent. The total area of the district is 24,830 square kilometers which gives population density of 98 persons per square kilometer as against 59 persons observed in 1981 indicating a fast growth rate of the district.Later on 1998, the massive efforts are made to count the population and census bureau carried out latest census and released the latest statistics of 2017 at the national, provincial and district level. According to the results, the total population of Pakistan is measured as 207,774,520 persons with annual growth rate of 2.40% and the population of Punjab is 110,012,442 persons with annual growth rate of 2.13%. By the annual growth rate of 2.18%, the population of District Bahawalpur is estimated as 3,668,106 persons out of which 1,879,311were male and 1,788,578were female. Sex ratio is measured as 105.07 percent.

The mother tongue refers to the language used for communication between parents and their children in any household. Siraiki is the predominant language being spoken by majority (64.3 percent) of the population of the district followed by Urdu, Pushto and Punjabi being spoken by 5.5, 0.6, and 28.4 percent.

A socio-economic survey was carried out in the project area to get the response about the perceived impacts and preferences towards the project implementation. A sample of 100 respondents was taken on the basis of random sampling technique, which includes shop owners, shop keepers (renters), customers, local residents, pedestrians, road users and students etc.

Impacts and Mitigation Measures

To get one sight overview of the nature of the impacts, their scale and significance; an Environmental Impact Matrix have also been developed for construction and operation phases.

The construction of the proposed project will have both positive and negative impacts during the construction and operational phases, for which proper mitigation measures are prepared. During the field survey, significant efforts were made to identify the main social, cultural and environmental issues related to the construction of the proposed project. Following is the list of main issues and concerns which have been considered in the study report:

Construction Phase

- No land acquisition is involved for the construction of proposed Project;
- Excavation of earth/cutting operations, clearing of vegetation and land levelling activities can destabilize the surrounding land surface;
- Wastewater would be generated from the workforce during the construction phase.
- Air quality will be affected by various construction activities. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. In certain climatic condition such as hot summer, airborne dust can become a major nuisance if control techniques are not properly employed. The air emissions may cause health impacts such as dryness and roughness of the throat; eyes, nose, etc. to the workers and staff of the contractor. These emissions may also affect the bio-physical environment. Major air sensitive receivers identified in the project area are Mosque Muhammadia, Noor Masjid, Govt. Girls Primary School, Mari Sheikh Shujra;
- Main sources of noise will be heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills and other equipment. Noise generated by construction machinery is likely to affect sensitive receptors located within 500 meters of the project area Major noise sensitive receivers identified in the project area are Masjid Muhammadia, Noor Masjid, Govt. Girls Primary School, Mari Sheikh Shujra and residential area around project site;
- Due to construction activities municipal and construction waste will be generated from construction activities and contractors' camps. Improper dumping of waste may generate odor and attract mosquitoes and other disease vectors. Empty containers containing the toxic, flammable and corrosive materials may pose hazard to the workers. This may result in health risk to work force and public;
- Trees are vital ecosystem, which perform variety of functions for the improvement of environment such as reduction in air pollution, noise abatement, cooling effect on earth and supply of oxygen;
- Nearly 45 trees of different species mostly young trees exist in the project area. These trees are likely to be effected, during construction stage;
- The trees provide nesting and resting places to the fauna. The cutting of these trees will have a negative impact on the fauna as well. During the construction phase, there

will be negative impacts on the mammals and reptiles of the area, due to construction activities involving excavation, access roads, movement of labor, carriage of goods and machinery to various sites along the project corridor. Mammals, such as dogs, cats, jackals etc. will avoid these areas for fear of being persecuted. Same will be the case with reptiles; some reptiles might be killed during the digging and piling operations;

- Due to construction activities, waste will be generated at construction and contractors camp site. The construction waste will include wastewater, oil spillage from machinery, domestic waste and solid waste etc. As the project deals with the construction of the proposed Industrial Estate, so no hazardous waste will be generated during the construction waste. But the handling and storage of oil, asphalt/bitumen may be a source of environmental pollution as a hazardous waste. This will result in unhygienic conditions, health risk to work force and public at the camp site;
- Health risks associated with exposure to continuous noise levels includes increase in blood pressure, hypertension, annoyance and sleep disturbance. temporary threshold shift etc.;
- Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating groundwater. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater and channels carrying water;
- Large quantities of industrial and hazardous waste along with municipal solid waste will be produced at the different stages of the project. Without a proper solid waste management system and engineered land filling practices, solid waste may result in odor, breeding ground for disease vector, and aesthetic concerns;
- The groundwater quality and quantity may significantly be affected by the project activities. The minimum depth of water table in project area is about 30 to 40 feet below ground surface (9m-12m); therefore it is more likely to be contaminated due to seepage, infiltration and inflows;
- Wastewater of the proposed industrial estate is planned to be disposed of in River Sutlaj which flows in the North West side of the proposed project site at a distance of 10 km. It will significantly affect the nearby settlements due to foul odor and may serve as breeding ground for disease vectors;
- A total number of forty five (45) trees of varying species and sizes will be cut;

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- Air Pollution could be a major concern of the nearby settlements from the proposed Industrial Estate. The gaseous emissions and fugitive dust emissions may deteriorate the air quality of project area during pre-construction (site clearing) and construction phase of the proposed project due to construction activities (operation of construction machinery, dust emissions, vehicular movement, etc.) which results in increase in both air and noise pollution along with the associated health risks to the nearby residents. During the operation phase various primary and secondary air pollutants would be emitted. The gaseous emissions in the form of plumes will create an air-shed of pollutants within 15 – 20 Km distance and affect the recipients in the downwind direction of the industries and may cause chronic or acute respiratory diseases like asthma and nausea and will also have effect on the faunal and floral species;
- Disruption of existing public utilities during construction phase;
- Oil spillages from construction machinery, resulting in soil and drinking/spring water contamination;
- Health and safety problems of the workers may also arise during the construction and operational phases of the proposed project; and

- Health risks and work safety problems may result at the workplace/camps if the working conditions provide unsafe and/or unfavourable working environment due to storage, handling and transport of construction materials and malfunctioning in operation of construction machinery and equipments;

Operation Phase

- Wastewater from industrial, commercial and residential zone of the industrial estate will contain high concentrations of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS) and Pathogens etc. Wastewater from other industrial and commercial sectors may contain hazardous metals and compounds. If all this wastewater is not treated properly, it will be a continuous hazard for the aquatic system and downstream uses of canal and rive;
- The operation of industries will result in generation of large quantities of primary and secondary air pollutants including SO_x, NO_x, CO, CO_2, PM_{10}, $PM_{2.5}$, H_2S, and CH_4 etc. The gaseous emissions in form of plumes will create an air-shed of pollutants within 15 – 20 Km distance and affect the recipients in the downwind

direction of the industries and may cause chronic or acute respiratory diseases like asthma and nausea and will also have effect on the faunal and floral species;

- Disposal of hazardous waste of industries, medical facility and commercial areas is one of the major concerns during operation phase of the project. Therefore, its improper handling and disposal will pose serious threat to the physical and biological environment. This will also adversely impact the future use of the land where hazardous waste will be disposed of;
- Movement of traffic in the area shall increase, causing noise and air pollution, which will be a permanent source of disturbance to fauna of the area and especially the birds, which shall avoid this area on account of noise and fear of being harassed or killed. Most of the industries set up in the estate will cause toxic air emissions, resulting in deterioration of ambient air quality and ultimately affecting not only human health, but also it has negative impact on the surrounding flora and fauna. These emissions may be carried over long distances, depending on wind speed and direction, which generally varies with seasons; and
- Large quantities of municipal and hazardous waste will be generated in the operation phase of the project. Without a proper solid waste management system and engineered land filling practices, many environmental risks remain problematic for the workers and visitors.
- Industrial occupational safety of the workers will be of significant concern during operation phase. Industrial processes involve several hazards from minor to major injuries for the workers which need to be addressed during policy making for the operational phase.

Mitigation Measures

- All spoils should be disposed of at designated site and the site should be restored back to its original conditions;
- Protection of groundwater reserves from any source of contamination such as the construction and oily waste;
- Careful planning of the works to avoid soil excavation works during rainy seasons;
- Open burning of solid waste from the contractor's camps should be strictly banned;

- All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition, properly tuned and maintained in order to minimize the exhaust emissions;
- Provide construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use;
- Selection of up-to-date and well maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices;
- The waste generated from the camp site will be disposed of at approved sites;
- Burning of waste shall be prohibited;
- Flowering and fruiting shrubs should be planted along the project boundary to beautify the landscape. Plantation would however be done keeping in view the principles of landscape designing;
- Exhaust of noxious gases from movement of heavy machinery will pollute air which will adversely affect health and vigor of plants
- Trees should be properly preserved and no trees should be unnecessarily removed;
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g. fire-fighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;
- Ensure strict use of wearing these protective clothing during work activities;
- Compensatory plantation of trees shall be undertaken along the boundary of the Industrial Estate, along the main and minor roads and in green areas; and
- HSE protocols should be strictly followed and implemented to avoid any incident/accident.
- Providing basic medical training to specified work staff and basic medical service and supplies to workers;

All the adverse impacts of the proposed project have properly been addressed and appropriate mitigation measures have been proposed and a comprehensive Environmental Management and Mitigation Plan (EMMP) have been formulated. The implementation of EMP will help to reduce the adverse impacts of the proposed project.

Environmental Mitigation and Monitoring Plan

The Environmental Mitigation and Monitoring Plan (EMMP) describe the management and mitigation measures to address the environmental issues during design, construction and operational phases of the proposed project. Results of the EIA Study have shown that overall the project is environmentally feasible.

During design phase, the proposed mitigation measures will be implemented by Design Consultant (DC), Parks and Horticultural Authority (PHA) and Forest Department, whereas Punjab Industrial Estates Development and Management Company (PIEDMC), Construction Constructer (CC), Supervision Consultant (SC), Environmental Committee (EC) and Parks and Horticultural Authority (PHA) will properly mitigated the identified impact of construction phase. The implementing agency for the operation phase of the project will be PIEDMC, Forest Department, BWMC and EPA. The Environmental Mitigation, Monitoring, training and tree plantation cost will be Rs. **28,286,250** or **Rs. 28.286 million.**

Proposed Monitoring

The EC will be responsible for environmental monitoring and reporting throughout the construction and operational phases. During construction phase, one (1) environmental monitoring report will be prepared on monthly basis and one (1) comprehensive report will be prepared at the end of the construction phase and will be submitted to each of the following authorities and institutions: (i) PIEDMC and (ii) EPA-Punjab.

Whereas monthly and quarterly monitoring of ambient air, drinking water and noise level will be carried out by PIEDMC and EPA, During construction phase, one (1) environmental monitoring report will be prepared on quarterly basis and one (1) comprehensive report will be prepared at the end of the construction phase and will be submitted to each of the following authorities and institutions: (i) PIEDMC and (ii) EPA-Punjab. One (1) environmental monitoring report will be prepared bi-annually and one (1) comprehensive report will be prepared annually and submitted to the EPA-Punjab for first year of the project operation. Contents of the final report will include results of environmental monitoring in comparison to the standards for the various parameters, location and sampling time along with recommendations for the future projects.

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Conclusion and Recommendations

The implementation of the proposed project will have many beneficial impacts on population residing in the project area and the daily road user/ travellers using this intersection. Major beneficial impacts of the proposed project are:

- Structural platform to set up industries with availability of developed plots and infrastructure;
- Provision of support services at one location;
- Availability of skilled manpower;
- Job opportunities for locals during construction and operation phase; and
- Economic uplift of the District

Apart from the beneficial impacts of the project, the proposed project has potential adverse environmental and social impacts during all phases. Most of the adverse impacts during construction are of a temporary nature. These potential impacts can be avoided or mitigated by adopting suitable mitigation or remedial measures as mentioned in this EIA Report. Following conclusions are based on the findings of detailed EIA study.

Following are the recommendations on the basis of the EIA Study:

- The protected site i.e. Jamia Masjid Al-Sadiq which is declared as Protected Site by the Government of Punjab under Punjab Special Premises Ordinance 1985 is located at an aerial distance of 11.75 km from the proposed site. NOC will be needed from the Archaeology Department prior to execution of the proposed project;
- The proposed forcemain from the disposal station will cross the Ahmadpur East canal and its branches. In this regard, for obtaining NOC from Irrigation department the case must be taken up on priority basis. Also, it is to be mentioned that in case of dry season, the treated effluent may be discharged into the canal for which NOC will be needed for Irrigation Department. NOC for discharge of effluent into river Sutlej may be taken from the concerned department;
- Along the proposed route of outfall sewer (42" i/d), the sewer line will cross one branch and one main railway track for which obtaining NOC and estimate from concerned authorities of Pakistan Railways may be taken up on priority basis;

- The proposed forcemain (800mm outer diameter) will also cross N5 through thrust boring method. In this regard, NOC must be taken from National Highway Authority prior to execution of the work;
- In order to fulfill the requirement of safe disposal of collected wastewater as per Punjab Environmental Protection Act (PEPA) (Amended), 2012 a Combined Effluent Treatment Plant (CETP) is proposed. The CETP shall be designed to provide at least secondary level treatment. The process design of proposed CETP shall be designed for average wastewater flow generated in the Bahawalpur Industrial Estate;
- Individual industries must install their Wastewater Treatment Plant to treat their wastewater as per Punjab Environmental Quality Standards, 2016 for Municipal and Liquid Industrial Effluents;
- In case of any constraints regarding the site location, effective environmental measures should be considered during the design phase of the proposed project. These measures must address the impacts of air, water, noise, waste and social parameters to make the project environmentally sustainable and socially acceptable. These measures may include but not limited to creating buffer zones (green belts) around the perimeter of the industrial estate, waste management plan, treatment of wastewater and installing air pollution control devices;
- The project structures should be designed to cater the requirements of Zone 2A of seismic provisions (2007) of Building Code of Pakistan after giving due consideration to the soil profile at site;
- A proper traffic diversion plan must be formulated prior to construction and conveyed to the road users;
- Health and safety plan for the workers must be followed during construction phase;
- During tree plantation, plants should be selected in accordance to their ability to absorb emissions;
- PIEDMC must formulate such a policy to ensure all the industries that will operate in the proposed Industrial Estate to register with Self-Monitoring And Reporting Tool (SMART) by Pak-EPA; and
- Proper implementation of EMMP should be ensured during all three phases of the proposed project. All personnel staff, employees and contractors/s should undertake appropriate training prior to construction to ensure they are aware of the on-site

responsibilities in respect of all environmental and social issues. In addition, EMMP should be a part of contract document of Contractor/s. Moreover, the cost for environmental mitigation and monitoring has been estimated which should be included in the PC-I or overall Project Cost.

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SECTION - 1
INTRODUCTION

1.1 General

The Government of Punjab has established Punjab Industrial Estates Development and Management Company (PIEDMC) to achieve orderly, planned and rapid industrialization in Punjab by developing new industrial estates and managing the existing industrial estates in a dynamic and innovative manner with a view to provide turnkey solutions to the prospective entrepreneurs thereby generating economic activity and creating mass employment opportunities. Its key objective is to provide quality infrastructure, ensure efficient, cost effective and sustainable management of industrial estates, and to endorse "One Window Operation" by providing utilities and services at industrial estates.

PIEDMC intends to develop an industrial estate in Bahawalpur spread over an area of 483 acres and has engaged NESPAK to carry out the master planning and detailed engineering designing for development of the Industrial Estate. Environmental Impact Assessment (EIA) Study is mandatory requirement of the BIE as a planning stage document. The EIA will ensure that environmental consequences are considered at all stages of the project. In addition, the EIA will assist the proponent to minimize the potential adverse impacts of the project. The EIA methodology promotes a practical and dynamic process of environmental protection that allows significant adverse impacts to be avoided or mitigated throughout the entire planning and design process.

1.2 Background and Need of Project

Bahawalpur is a city located in the Punjab province of Pakistan. Bahawalpur is the 12th largest city in Pakistan with an estimated population of around 0.8 million. It was recognized as the capital of a princely state after the Durrani Empire declined. This princely state was founded by Nawab Muhammad Bahawal Khan-II in the early nineteenth century. Bahawalpur city has been historically the hometown and hub of various different Nawabs and rulers of their times. In the United India, Bahawalpur was called the Rajputana State which is now Rajhistan in India.

Bahawalpur lies at the junction of trade routes from the east, south-east, and south. It is a center for trade for wheat, cotton, millet, and rice grown in the surrounding region. District Bahawalpur spreads over an area of 24,830 square kilometers, comprising the five tehsils of: Bahawalpur, Hasilpur, Khairpur Tamewali, Ahmadpur East and Yazman

Being an expanding industrial city, the government has revolutionized and libertized various markets, allowing the caustic soda, cotton ginning and pressing, flour mills, fruit juices, general engineering, iron and steel re-rolling mills, looms, oil mills, poultry feed, sugar, textile spinning, textile weaving, vegetable ghee and cooking oil industries to flourish. The fragmented industries are difficult to manage environmentally, as their environmental impact is widespread. Hence, the concept of clustered industries i.e. Industrial Estates was evolved to manage the industrial impacts.

1.3 Scope of EIA Study

The scope of the EIA Study aims at collecting and scrutinizing of data related to physical, biological and socio-economic environment of the project area and to prepare the baseline environmental profile. It also aims at the identification, prediction and evaluation of the possible environmental impacts of the proposed project on its immediate surroundings on both short and long-term basis. Based on the nature and levels of those impacts, appropriate mitigation measures have been incorporated in this EIA Report.

1.4 Study Objectives

The overall objective of EIA is to assess the environmental impacts arising from the project. The specific objectives of the EIA Study for construction of BIE include the following:

- Collection and scrutinization of data related to physical, biological and socio-economic environments of the project area and to prepare baseline environmental profile;
- Identification, prediction and evaluation of environmental impacts of the proposed

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Project;

- Implementation plan of mitigation measures to minimize the adverse impacts; and
- Preparation of an Environmental Management Plan (EMP).

1.5 Need for EIA Study of the Proposed Project

EIA is mandatory according to the Punjab Environmental Protection Act (PEPA-2012) amended. Section 12 (1) of the PEPA-2012, which states that:

"No proponent of a project shall commence construction or operation unless he has filed with the Provincial 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 Provincial Agency approval in respect thereof."

1.6 The Proponent and Consultant

The proponent of the project is Punjab Industrial Estates Development and Management Company (PIEDMC) while the Consultant is NESPAK; the details are given as under:

a) Proponent Contact Address

Punjab Industrial Estates Development and Management Company (PIEDMC)
Head Office PIEDMC, Commercial Area (North) Sundar Industrial Estate,
Sundar-Raiwind Road, Lahore
Tel: 042-35297203-6

b) Consultant Contact Address

National Engineering Services Pakistan Private Limited (NESPAK)
EPHE Division, NESPAK House
1-C, Block – N, Model Town Extension, Lahore
Tel: 042-99090000

1.7 Nature, Size and Location of the Project

The proposed site spread over an area of 483 acres for BIE is located at a distance of 12 km south west of Bahawalpur City with geographical coordinates of $29^0$19'19.06"N and $71^0$35'9.97"E. National Highway N5 is passing in the North West of the project site, at a distance of 1.6 km. The project site is bounded by Rama village in the east, Mariwala Khu village in the west, Basti Yar Muhammad village in the south and Airport road in the north. Ahmed Pur East Canal is passing along Airport road at north of the project site. Sutlej River is flowing in the north west of the project site, at a distance of 10 km (approx.).

1.8 Study Team

A multidisciplinary team was formulated to conduct the study. List of names, qualifications and role of team members carrying out EIA is attached as **Annexure-I**. The team comprises the following professionals:

Hammad Qamar	:	Team Leader/ Sr. Environmental Engineer
Saeed Hussain	:	Senior Sociologist
Ahsan Akhlaq	:	Senior Environmentalist
Raheela Hakim	:	Environmentalist
Nida Batool	:	Environmental Engineer
Adeera Nasar	:	Sociologist
Kinza Farrukh	:	Junior Sociologist

1.9 Study Approach & Methodology

1.9.1 Study Approach

The study has been conducted in accordance with Environmental Protection Agency (EPA), Government of Pakistan (GOP) Guidelines, 2000 and the sectoral guidelines for environmental reports (industrial estates) by Pakistan Environmental Protection Agency, 1997. The study is based on both primary and secondary data and information. Discussions were held with stakeholders including government officials, community representatives and

general public. The main purpose of this approach was to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

1.9.2 Methodology

The following methodology was adopted for carrying out the EIA study of the proposed Project:

a) Orientation

Meetings and discussions were held among the members of the EIA Consulting Team. This activity was aimed at achieving a common ground of understanding of various issues of the study.

b) Planning for Data Collection

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 EIA Consulting Team. The plan included identification of specific data requirements and their sources; determined time schedules and responsibilities for their collection; and indicated the logistics and other supporting needs for the execution of the data acquisition plan.

c) Data Collection

In this step, primary and secondary data were collected through field observations, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic environmental conditions. This includes:

- Site Reconnaissance
- Analysis of Maps and Plans
- Literature Review
- Desk Research
- Public Consultations
- Field Observations & Studies

- Laboratory Analyses

Physical Environment

Information was gathered on the existing physical environment, particularly as related to geology, topography, soils, hydrology and drainage, water quality, air quality and noise.

Geology, Topography, Soils

A review was conducted of relevant literature on the geology, topography and soils in the Project Area.

Hydrology and Drainage

A literature review was conducted to identify the components of the hydrological cycle that are likely to impact on the project and the possible impacts that the project could have on the hydrologic regime. Field assessments included a determination and verification of all the existing water bodies, assessment of drainage issues, interviews with local community members, and round-table discussions with stakeholders.

Air Quality

Ambient air quality measurements are essential to provide a description of the existing conditions, to provide a baseline against which changes can be measured and to assist in the determination of potential impacts of the proposed construction on air quality conditions. Ambient air quality was continuously monitored for Carbon Monoxide (CO), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), and Particulate Matter (PM_{10}), for 24 hours by a certified testing laboratory.

Noise

Noise level readings were monitored for 24 hours on continuous basis by a certified environmental lab.

Water Quality

The objective of the water quality monitoring is to determine water quality situation before construction phase. It has been observed that the surface water and ground water

quality are the most important environmental variables to be affected in this project. The extent of groundwater contamination in the project area was assessed based on the test results of chemical and microbiological parameters of groundwater. Sampling and analyses were performed by a certified environmental laboratory.

Biological Environment

The status of the flora and fauna of the study area were determined by an ecological survey, a review of literature relevant to the area, and an assessment of terrestrial environments.

Flora

The vegetative communities were identified and classified into community types. Identification was carried out of dominant tree species, assessment of stage of growth (mature or sapling) and assessment of canopy cover.

Fauna

Information on fauna was gathered from existing literature on reported species as well as observations in the field.

Socio-Cultural Environment

The consultants utilized a combination of desk research, field investigations, census data, structured interviews, maps, reports to generate the data required for description of the existing social environment and assessment of the potential impact of the construction of the proposed project. Data was gathered on the following aspects of the social environment:

- Land use and Municipal Status
- Traffic, Transportation and Access Roads
- Demographics
- Livelihoods
- Poverty

- Education
- Health
- Social Setup
- Community Facilities
- Solid Waste Management
- Proposed Developments
- Recreational Activities
- Archaeological and Cultural Heritage

d) Identification and Evaluation of Environmental Impacts

The impacts of the project on the physical, biological and socio-economic environment prevalent in the Project Area were visualized at the design, construction and operational phases.

e) Mitigation Measures and Implementation Arrangements

The adequate mitigation measures and implementation mechanisms were proposed so that the Proponent could incorporate them beforehand in the design phase.

1.10 Structure of the Report

Section 1 **"Introduction"** briefly presents the project background, objectives, methodology and need of the EIA study.

Section 2 **"Policy, Legal and Administrative Framework"** comprises policy guidelines, statutory obligations and roles of institutions concerning EIA study of the proposed Project.

Section 3 **"Description of the Project"** furnishes information about the location of the proposed Project, cost and size of the project, its major components and alternatives considered for the proposed project to select at the preferred alternative for detailed environmental assessment.

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Section 4 **"Environmental Baseline Profile"** establishes baseline conditions for physical, biological and socio-economic conditions prevalent in the project area.

Section 5 **"Public Consultation"** identifies the main stakeholders and their concerns raised through scoping sessions, and deals with the measures to mitigate the social impacts.

Section 6 **"Anticipated Environmental Impacts and Mitigation Measures"** identifies, predicts and evaluates impacts of the project activities during the construction and operation stages and deals with the measures (including mitigation cost) proposed to mitigate potential environmental impacts of the proposed project.

Section 7 **"Environmental Management and Monitoring Plan"** outlines institutional arrangements for the implementation of the proposed mitigation measures, training needs of the staff for implementation of the mitigation measures, monitoring requirements, monitoring cost etc.

Section 8: **Conclusions and Recommendations** provide the outcome of the study and major observations of EIA and suggestions for environmental management and pollution control.

Section 9: **References.**

SECTION – 2
POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.0 General

This section deals with the current environmental policy as well as legal and administrative framework related to carrying out the Environmental Impact Assessment of "Construction of Bahawalpur Industrial Estate". All the relevant Environmental policies and Guidelines of Pak-EPA and legal frameworks have been duly discussed in this section. In addition, the roles and responsibilities of the proponent as well as the Environmental Protection Agency (EPA) Punjab have been covered in this section.

The proposed project, like other development projects, requires an EIA in accordance with the Punjab Environmental Protection (Amendment) Act (PEPA), 2012 and IEE/EIA Regulations, 2000.

2.1 Policy Framework

The ministry of Climate Change is the responsible authority for policy making on environmental protection in Pakistan.

2.1.1 National Environment Policy, 2005

In March 2005, Government of Pakistan (GoP) presented its National Environmental Policy, which compromises a predominant framework for addressing the environmental issues. Section 5 of the policy obligates for amalgamation of environment into development planning as instrument for succeeding the objectives of National Environmental Policy. It further states in clause (b) of subsection 5.1 that EIA related provisions of Punjab Environmental Protection Act, 1997, will be conscientiously enforced for all development projects. It also provides wide-ranging guidelines to the federal government, provincial governments, federally administered territories and local governments to address their environmental concerns and to ensure effective management of their environmental assets.

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2.1.2 National Climate Change Policy, 2012

The National Climate Change Policy was approved by the Federal Cabinet on 26 September 2012[1]. With an overall goal, 'to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development', the Policy puts forward comprehensive policy objectives of sustained economic growth, integration of climate change into inter-related national policies, pro-poor gender sensitive adaptation and cost-effective mitigation, water, food and energy security, disaster risk reduction (DRR), effective decision making and coordination, creating awareness, building capacities, and conservation of natural resources and long term sustainability. It also seeks effective use of financial opportunities, and public and private sector investment in adaptation measures.

2.1.3 National Resettlement Policy, 2002

In March, 2002 Pakistan Environmental Protection Agency (Pak-EPA), GOP has issued its National Resettlement Policy, which explains the basis for compensation, rehabilitation and relocation of the affectees. It also explains the requirements and implementation of Resettlement Action Plan (RAP).

2.2 Legal Framework

GOP has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In addition to this, they have also developed environmental assessment procedures governing development projects. Following are the excerpts of these laws and procedures relevant to the proposed project.

2.2.1 Punjab Environmental Protection Act, 2012 (Amended)

The Act was enacted on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance, 1983. It provides the framework for implementation of the PNCS, 1992, establishment of provincial sustainable development funds, protection and conservation of species, conservation of renewable resources, establishment of Environmental Tribunals, appointment of Environmental Magistrates, Initial

[1] ministry of climate change.org.pk

Environmental Examinations (IEE), and Environmental Impact Assessments (EIA). Section 12 of the Act stresses the need to carry out EIA/IEE study prior to construction or operation of a project. PEPA, 1997 is available at official website of EPD, Punjab.

After the passing of the 18th Amendment to the Constitution of Pakistan, Pakistan's Federal Ministry of Environment was devolved to the provincial level on June 30, 2011. Thus, a recent amendment in Pakistan Environmental Protection Act, 1997 was presented and published in Punjab Gazette on April 18, 2012 as an Act of Provincial Assembly of Punjab.

Twenty three amendments have been made in the Punjab Environmental Protection (Amendment) Act, 2012. The amendments can be categorized as follows:

- Amendments in Short Title and commencement as Punjab Environmental Protection Act and it extends to the whole of Punjab only;
- Amendments in administrative jurisdiction (Transfer of powers and control from Federal to Provincial Government);
- Definitions and reference to the territorial waters, exclusive economic zone and historic waters shall be omitted based on the devolution of powers from Federal to provincial Levels; and
- Amendments in penalties.

2.2.2 Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000

These regulations provide lists of the projects requiring IEE and EIA. They also briefly describe the preparation and review of environmental reports. These regulations are also accessible at official website of EPD, Punjab.

2.2.3 Pakistan Environmental Assessment Procedures, 1997

Pakistan Environmental Assessment Procedures (1997) is, in fact, a compendium, which contains the following sets of statistics and information significant to the proposed project.

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a) Policy and Procedures for Filing, Review and Approval of Environmental Assessment Reports

It refers to environmental policy and administrative procedures to be followed for filing of environmental examination/assessment reports by the proponents and their review and authorization by the concerned environmental protection agencies.

b) Guidelines for the Preparation and Review of Environmental Reports

These guidelines are developed to facilitate both the proponents and decision makers to prepare reports (inclusive of all the information contained therein) and carry out their review so as to take cognizant decisions.

2.2.4 National Environmental Quality Standards (NEQS), 2010

Pakistan Environmental Protection Council (PEPC) first approved these standards in 1993. They were later revised in 1995, 2000 and 2010. They endow information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to regulate environmental pollution. Results of environmental monitoring (ambient air, water and noise) conceded out at different locations in study area are compared with NEQS values and are conversed in later chapter of the report. The NEQS, 2010 are openly available at official website of EPD, Punjab.

2.2.5 Punjab Environmental Quality Standards (PEQS), 2016

In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the Punjab Environmental Quality Standards (PEQS), 2016. They endow information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to regulate environmental pollution. Results of environmental monitoring (ambient air, water and noise) conceded out at different locations in study area are compared with PEQS values and are conversed in later chapter of the report. The Punjab Environmental Quality Standards (NEQS), 2016 are available at official website of EPD, Punjab.

2.2.6 Other Relevant Laws

a) Punjab Local Government Ordinance, 2001

Environmental protection is federalized subject under Punjab Local Government Ordinance (LGO), 2001. Despite any specific provisions, every local government may execute functions conferred by or under the Punjab LGO, 2001 and in performance of such functions may implement such powers, which are necessary and appropriate. Until different provisions, rules, regulations or byelaws are made, the local governments may exercise such powers as are specified in the Sixth Schedule of Punjab LGO, 2001. Environmental protection is sequential at 48 of the Sixth Schedule.

b) Guidelines for Solid Waste Management (2005)

Guidelines for Solid Waste Management have been issued as a draft by the Pakistan Environmental Protection Agency in coordination with JICA and UNDP. These guidelines explain the waste generation, discharge and composition.

c) Canal and Drainage Act, 1873

This Act entails provisions for the prevention of pollution of natural or man-made water bodies.

d) Sectoral Guidelines (1997)

Pakistan Environmental Assessment procedure deals with general guidelines as well as the sectoral guideline for the Environmental Assessment Studies. The sectoral guidelines have been given for different categories of the projects and deals with the procedure requirements of Environmental Assessment.

e) Pakistan Penal Code, 1860

This states the penalties for violations concerning pollution of air, water bodies and land.

f) The Punjab Wildlife (Protection, Preservation, Conservation & Management) Act, 1974

This Act provides for the protection, preservation, conservation and management of wildlife in the Province of Punjab. This act defines the wildlife sanctuary, game

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reserves, protected areas and national parks. It also defines the rules and responsibilities of the relevant authorities and the relevant personnel to protect the ecological resources. It also describes the penalties and punishments on offenses against the sections given in the act.

g) Protection of Trees and Brushwood Act, 1949

This Act prohibits cutting or chopping of trees and brushwood without permission of the Forest Department.

h) Cutting of Trees (Prohibition) Act, 1975

This act forbids cutting of trees without acquiescence of the Forest Department.

i) Disaster Management Act, 2010

The Disaster Management Act, 2010 to offer an effective National Disaster Management System and for matters associated therewith or incidental thereto and to overawed unforeseen situations. The act is administered by federal government which provides guidelines for the provision of disaster management plans, offer necessary technical assistance to the Provincial Governments and Provincial Authorities as well for preparing their disaster management plans in case of any mishap. This Act is valid to the subject project in case of any unseen situation.

j) The Motor Vehicles Rules, 2000

Subject to the provisions of this Act, and the rules and regulations, 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 customary under clause (g) of sub-section (I) of section 6.

k) Land Acquisition Act, 1894

This act deals with the procurement of private land for public purposes. There are 55 sections in this act mainly dealing with area notifications, surveys, acquisition, compensation, appointment awards, dispute resolution, penalties and exemptions.

l) Seismic Building Code of Pakistan 2007

This code stipulates the minimum requirements for seismic safety of building and structures and the provisions of the Building Code of Pakistan (Seismic Provisions-2007) shall apply for engineering design of buildings, like structures and related components.

Construction of buildings in defilement of the Building Code shall be considered as violation of professional engineering work specified under clause (XXV) of section 2 of the Act. This Code is applicable to the subject project as it includes the formation of structures.

2.3 Occupational Health & Safety

Construction and operational activities can distress the occupational health of the workers. Quantitative national standards with respect to the above aspect are yet to be developed in Pakistan. However, guidance in qualitative terms can be obtained from the Labor Laws (Amended) Ordinance, 1972 and Pakistan Factories Act (1934).

2.4 ISO 18001 Occupation Health and Safety Assessment Series (OHSAS)

OHSAS 18001 is an Occupation Health and Safety Assessment Series for health and safety management systems to help organizations to control occupational health and safety risks. The OHSAS specifications are applicable to any institute that desires to establish an OH&S management system to eradicate or reduce risk to employees and other interested parties who may be exposed to the risks allied with the project activities. As the subject project is a construction of Industrial Estate at Bahawalpur and involves various health and safety issues to construction labor, therefore these ISO 18001 guidelines will be applicable and pertinent.

2.5 Labor and Health and Safety Legislation

The Constitution of Pakistan contains a range of provisions with regards to labor rights, in particular:

- Article 11 of the Constitution prohibits all forms of slavery, forced labor and child labor;

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- Article 17 provides for a fundamental right to exercise the freedom of association and the right to form unions;
- Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone; and
- Article 37(e) makes provision for securing just and humane conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment.

Labor law is controlled at both provincial and national levels with compulsory employment agreements containing the terms set out by the labor laws. There are various laws containing health and safety requirements including: Mines Act 1923; Factories Act 1934; Factories Rules; Hazardous Occupations Rules 1963; Provincial Employees Social Security Ordinance 1965; and Workmen's Compensation Act 1923. No single comprehensive piece of legislation deals with occupational or community safety and health.

2.6 Toxic or Hazardous Waste

Protection of the environment with regards to toxic and hazardous waste is covered by the Pakistan Penal Code (PPC), 1860. Environment Protection Department (EPD), Punjab, is mandated to monitor the transportation of hazardous materials within the Provincial limits.

2.7 Preservation of Cultural Heritage

The Antiquities Act, 1975, administered by the Provincial Government, is aimed at safeguarding the preservation of cultural heritage, destruction, damage or defacement of antiquities is an offence under the act.

2.8 Administrative Framework

2.8.1 Punjab Industrial Estates Development & Management Company (PIEDMC)

The implementing agency of the proposed project is PIEDMC who will execute the proposed project at Bahawalpur. The management of PIEDMC will ensure that all the proposed measures are effectively implemented at the operational stages.

2.8.2 Environmental Protection Agency, Punjab

Pakistan Environmental Protection Council is the apex inter-ministerial and multi-stakeholders decision-making body, which is headed by Prime Minister. While Pakistan Environmental Protection Agency is meant for the enforcement of environmental laws in Pakistan. They have delegated powers to provincial environmental protection agencies for review, approval and monitoring of environmental examination/assessment of projects. As regards the proposed Project, EPA Punjab will be responsible for issuing environmental approval and overall/broad based monitoring of the proposed Project activities.

2.8.3 Rules of Business for District Environment Office under Punjab LGO, 2001

National Reconstruction Bureau has formulated the following rules of business for District environment offices:

- To regulate motor vehicles subject to the provisions of the Pakistan Environmental Protection Act, 1997 and the rules and regulations made there-under;
- To ensure, guide and assist the proponents of new projects in submission of Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA) to Director General, EPA for approval;
- To ensure implementation of environmental protection and preservation measures in all development projects at the District level and to sensitize government agencies on environmental issues;
- To identify the needs for legislation in various sectors of the environmental matters;
- To provide information and guidance to the public on environment;
- To encourage the formation and working of non-governmental organizations, to prevent and combat pollution and promote sustainable development; and
- To undertake regular monitoring of projects and to submit progress reports to Director General, EPA for publication in the annual report.

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SECTION 3
PROJECT DESCRIPTION

3.1 Rationale of the Project

The Punjab Government has established Punjab Industrial Estates Development and Management Company (PIEDMC) to achieve orderly, planned and rapid industrialization in Punjab by developing new industrial estates and managing the existing industrial estates in a dynamic and innovative manner with a view to provide turnkey solutions to the prospective entrepreneur's thereby generating economic activity and creating mass employment opportunities. The PIEDMC intends to establish "Bahawalpur Industrial Estate" on an area of 483 acres in District Bahawalpur.

The project will be promoting exports of value added manufactured items from different sectors. The project is likely to attract foreign as well as local manufacturers to invest in industrial sector of Pakistan and increase exports of value added products. It will also help in the economic uplift of the southern Punjab.

3.2 Type and Category of the Project

According to the Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations 2000 (see **Annexure-II**), the proposed project falls under category B (Manufacturing & Processing) of Schedule II, which requires an EIA before commencement of construction.

3.3 Project Objectives

The main objectives of this project are:

- Structural platform to set up industries with availability of developed plots and infrastructure;
- Provision of support services at one location;
- Availability of skilled manpower;
- To provide secure environment; and
- To facilitate compliance with Environmental Regulation

3.4 Project Alternatives

Based on the conceptual Master Plan for Bahawalpur Industrial Estate, four (04) alternatives have been prepared keeping in view the planning principles, sustainability concepts and on ideology of best utilization of available land.

3.4.1 Alternative-I

a) Landuse Distribution

Total land of the project area has been divided into different zones/land uses. **Table 3.1(a)** presents the land distribution for different zones in the project area.

Table 3.1(a): Landuse Distribution

Sr. No.	Land use	Area (Acres)	Percentage
1	Industrial	288.38	65.88
2	Commercial	22.90	05.23
3	Amenities	34.80	0 7.94
4	Roads (198, 180, 80' & 60' ROW)	91.72	20.95
	Total	**437.80**	**100**

b) Industrial Plots Composition

Two plot sizes have been planned i.e. 1 acre and 0.5 acres. **Table 3.1(b)** presents the dimensions and numbers of different sizes of plots.

Table 3.1(b): Industrial Plots Composition

Sr. No.	Size of Plots	Dimensions	Nos.
1	1.0 Acre	145.2' x 300'	238
2	0.5 Acre	109' x 200'	61
		Total	**299**

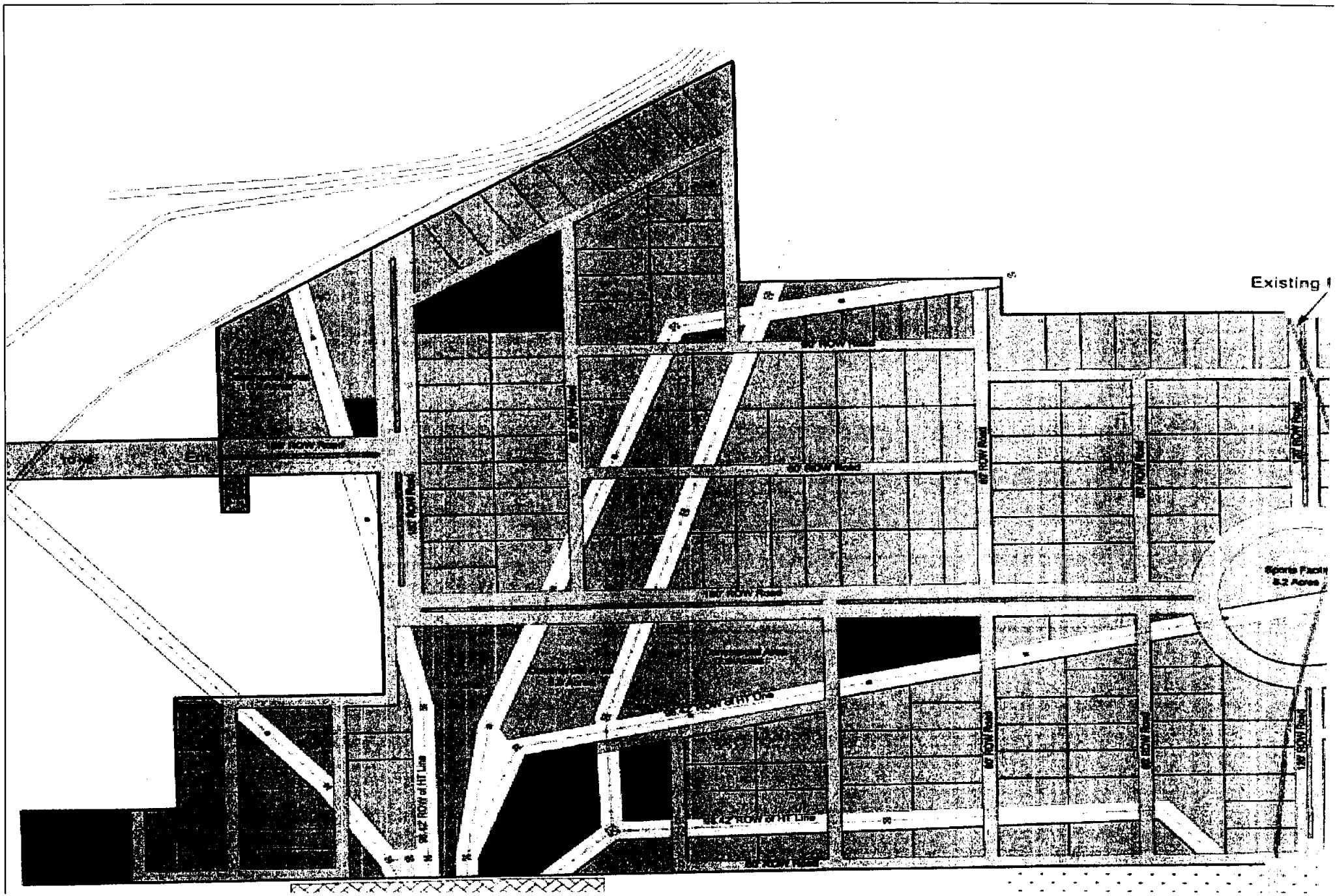
c) Detail of Amenities and their Plot Areas

Provision has been made for the commercial and social amenities in the proposed industrial estate. **Table 3.1(c)** shows the detail of social amenities.

Table 3.1(c): Amenity Plots

Sr. No.	Amenity	Area (Acres)
1	Medical Center/ 1122 Center	1.50
2	Jamia Masjid	2.00
3	Site Office	0.50
4	Vocational Training Center	2.30
5	Grid Station	5.30
6	CETP/ Disposal Station/ Landfill Site	4.20
7	Truck Stand	4.80
8	Parks and Sports Facilities	14.20
	Total	**34.80**

Figure 3.1(a) shows the conceptual master plan of Alternate-I.



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3.4.2 Alternate-II

a) Landuse Distribution

Total land of the project area has been divided into different zones/land uses. **Table 3.2 (a)** presents the land distribution for different zones in the project area.

Table 3.2 (a): Landuse Distribution

Sr. No.	Land use	Area (Acres)	Percentage
1	Industrial	297.62	67.98
2	Commercial	15.50	3.54
3	Amenities	38.10	8.70
4	Roads (198', 180', 80' & 60' ROW)	86.58	19.78
	Total	**437.80**	**100.00**

b) Industrial Plots Composition

Two plot sizes have been planned i.e. 1 acre and 0.5 acres. **Table 3.2 (b)** presents the dimensions and numbers of different sizes of plots.

Table 3.2 (b): Industrial Plots Composition

Sr. No.	Size of Plots	Dimensions	Nos.
1	1.0 Acre	145.2' x 300'	260
2	0.5 Acre	109' x 200'	48
		Total	**308**

c) Detail of Amenities and their Plot Areas

Provision has been made for the commercial and social amenities in the proposed industrial estate. **Table 3.2 (c)** shows the detail of social amenities.

Table 3.2 (c): Amenity Plots

Sr. No.	Amenity	Area (Acres)
1	Medical Center/ 1122 Center	2.00
2	Jamia Masjid	3.00

3	Site Office	0.50
4	Vocational Training Center	2.40
5	Grid Station	5.30
6	CETP/ Disposal Station	4.20
7	Truck Stand	5.20
8	Parks& Sports Facilities	15.50
	Total	**38.10**

Figure 3.1 (b) shows the conceptual master plan of Alternate-II.

3.4.3 Alternate-III

a) Landuse Distribution

Total land of the project area has been divided into different zones/land uses. **Table 3.3(a)** presents the land distribution for different zones in the project area.

Table 3.3(a): Landuse Distribution

Sr. No.	Land use	Area (Acres)	Percentage
1	Industrial	282.47	64.52
2	Commercial	21.50	4.91
3	Amenities	37.03	8.46
4	Roads (198, 120', 80' & 60' ROW)	96.80	22.11
	Total	**437.80**	**100.00**

b) Industrial Plots Composition

Two plot sizes have been planned i.e. 1 acre and 0.5 acres. **Table 3.3 (b)** presents the dimensions and numbers of different sizes of plots.

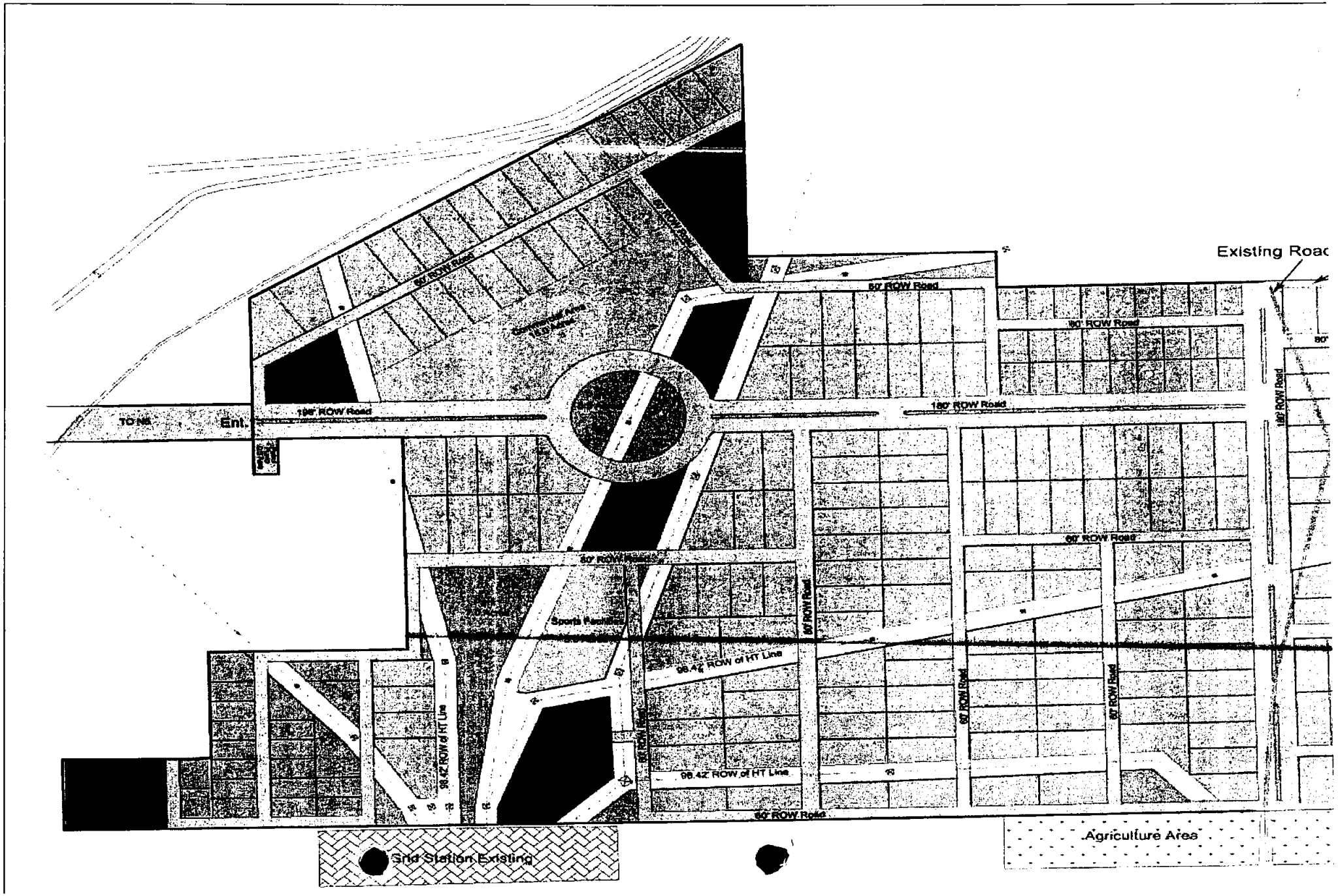

Existing Road
60' ROW Road
150' ROW Road
TO N5
Ent.
Commercial Area
11.0 Acres
Sports Facilities
98.42' ROW of HT Line
Grid Station Existing
Agriculture Area

Table 3.3(b): Industrial Plots Composition

Sr. No.	Size of Plots	Dimensions	Nos.
1	1.0 Acre	145.2' x 300'	237
2	0.5 Acre	109' x 200'	50
		Total	287

c) Detail of Amenities and their Plot Areas

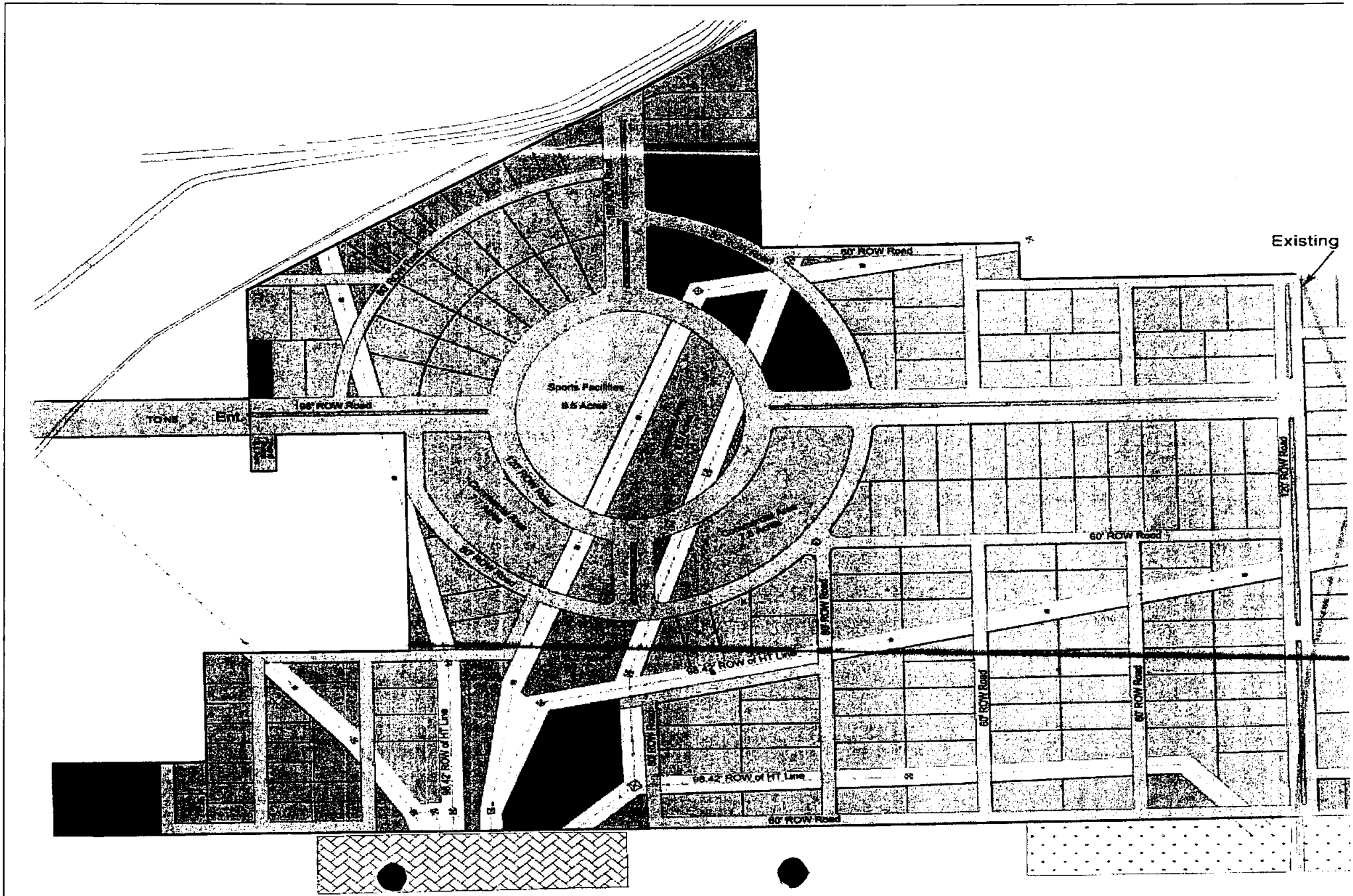
Provision has been made for the commercial and social amenities in the proposed industrial estate. **Table 3.3(c)** shows the detail of social amenities.

Table 3.3(c): Amenity Plots

Sr. No.	Amenity	Area (Acres)
1	Medical Center/ 1122 Center	1.00
2	Jamia Masjid	3.00
3	Site Office	0.50
4	Vocational Training Center	2.63
5	Grid Station	5.30
6	CETP/ Disposal Station	4.20
7	Truck Stand	5.00
8	Parks	15.40
	Total	**37.03**

Figure 3.1(c) shows the conceptual master plan of Alternate-III.

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Existing
60' ROW Road
Sports Facilities
8.5 Acres
132' ROW Road
60' ROW Road
98.42' ROW of HT Line
60' ROW Road
60' ROW Road
60' ROW Road
98.42' ROW of HT Line
98.42' ROW of HT Line
60' ROW Road
60' ROW Road
60' ROW Road

3.4.4 Alternate-IV

a) Landuse Distribution

Total land of the project area has been divided into different zones/land uses. **Table 3.4(a)** presents the land distribution for different zones in the project area.

Table 3.4(a): Landuse Distribution

Sr. No.	Land use	Area (Acres)	Percentage
1	Industrial	294.20	67.21
2	Commercial	20.00	4.57
3	Amenities	32.20	7.35
4	Roads (198, 120'& 60' ROW)	91.40	20.87
	Total	**437.80**	**100.00**

b) Industrial Plots Composition

Two plot sizes have been planned i.e. 1 acre and 0.5 acres. **Table 3.4(b)** presents the dimensions and numbers of different sizes of plots.

Table 3.4(b): Industrial Plots Composition

Sr. No.	Size of Plots	Dimensions	Nos.
1	1.0 Acre	145.2' x 300'	255
2	0.5 Acre	109'x 200'	46
		Total	301

c) Detail of Amenities and their Plot Areas

Provision has been made for the commercial and social amenities in the proposed industrial estate. **Table 3.4(c)** shows the detail of social amenities.

Table 3.4(c): Amenity Plots

Sr. No.	Amenity	Area (Acres)
1	Medical Center/ 1122 Center	1.20
2	Jamia Masjid	2.80
3	Site Office	0.50
4	Vocational Training Center	2.80

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Sr. No.	Amenity	Area (Acres)
5	Grid Station	5.00
6	CETP/ Disposal Station	4.20
7	Truck Stand	4.00
8	Parks	11.70
	Total	**32.20**

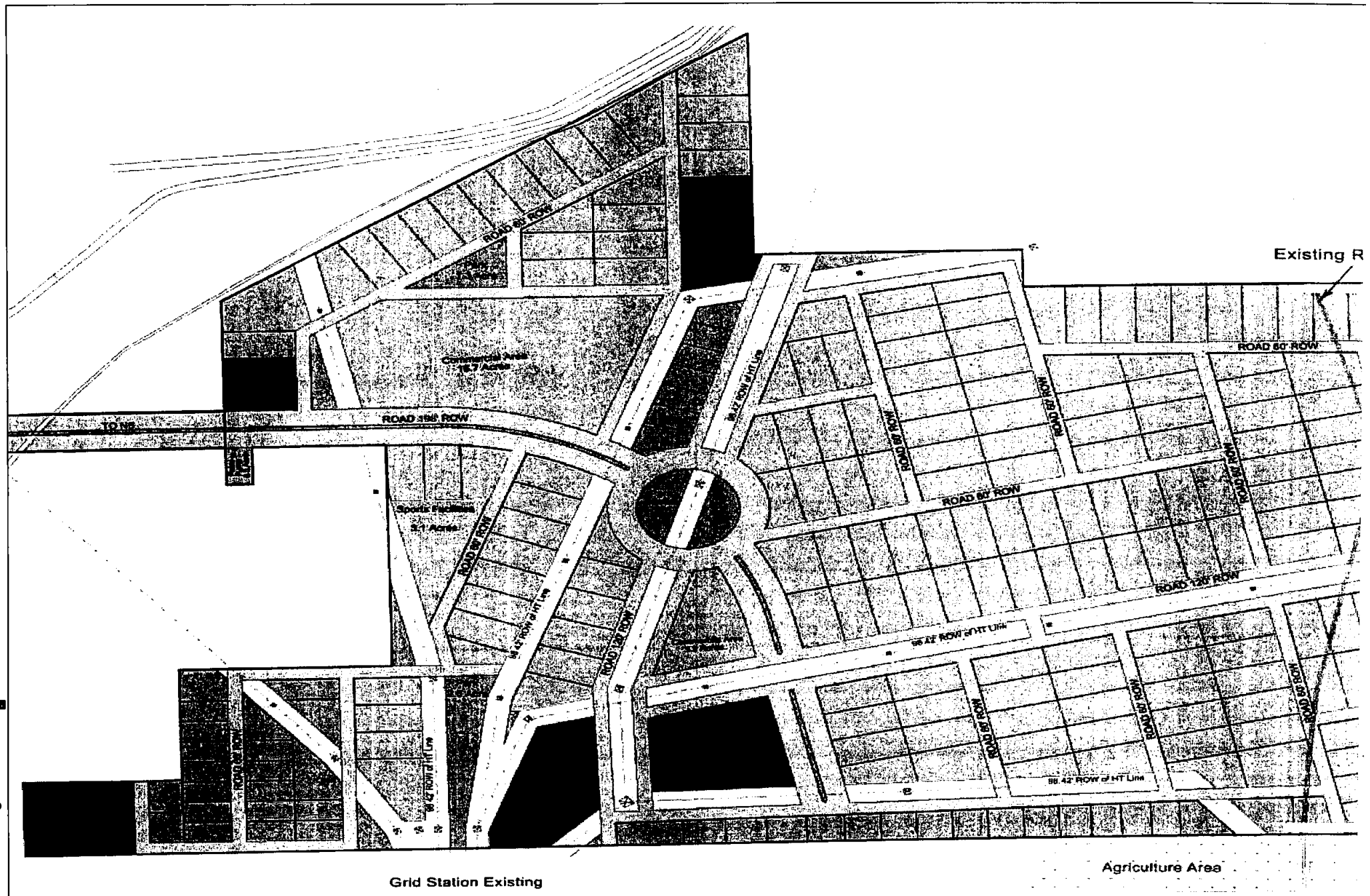
Figure 3.1(d) shows the conceptual master plan of Alternate-IV.

3.4.5 Comparison of Master Plan Alternates 1, 2, 3 & 4

Table 3.5 shows the comparison of different master plan alternates.

Table 3.5: Comparison of Different Master Plan Alternates

Sr. No.	Alternate-1	Alternate-2	Alternate-3	Alternate-4
Landuse				
1	Industrial Area is **65.88%**	Industrial Area is **67.98%**	Industrial Area is **64.52%**	Industrial Area is **67.21%**
2	Commercial area is **5.23%**	Commercial area is **3.54%**	Commercial area is **4.91%**	Commercial area is **4.57%**
3	Area reserved for amenities is **7.94%**	Area reserved for amenities is **8.70%**	Area reserved for amenities is **8.46%**	Area reserved for amenities is **7.35%**
4	Area under roads is **20.95%**	Area under roads is **19.78%**	Area under roads is **22.11%**	Area under roads is **20.87%**
Number of Industrial Plots				
5	Number of Plots measuring 1.0 Acre are **238**	Number of Plots measuring 1.0 Acre are **260**	Number of Plots measuring 1.0 Acre are **237**	Number of Plots measuring 1.0 Acre are **255**
6	Number of Plots measuring 0.5 Acre are **61**	Number of Plots measuring 0.5 Acre are **48**	Number of Plots measuring 0.5 Acre are **50**	Number of Plots measuring 0.5 Acre are **46**
Roads Pattern				
7	Grid iron pattern with circular Sports Facilities in the center of industrial estate	Grid iron pattern with circular Park in the front of Main Entrance	Mix of Grid iron and Circular Roads with semicircular public buildings, sports facilities and commercial areas	Grid iron pattern with circular Park


Existing R
ROAD 60' ROW
ROAD 60' ROW
TO NB
ROAD 60' ROW
ROAD 60' ROW
ROAD 60' ROW
ROAD 60' ROW
ROAD 120' ROW
ROAD 120' ROW
ROAD 60' ROW
ROAD 60' ROW
ROAD 60' ROW
ROAD 60' ROW
Grid Station Existing
Agriculture Area

PIEDMC in a meeting of BOD PIEDMC held in its city Office Lahore dated December 07, 2017 accorded approval for Alternate-4 of Conceptual Master Plan of Bahawalpur Industrial Estate and advised that some 60' ROW roads may be replaced with 80' ROW roads. The same is duly incorporated in the Approved Master Plan of the Bahawalpur Industrial Estate as shown in **Figure 3.2.**

3.5 Selected Option (Approved Master Plan)

a) Landuse Distribution

Total land of the project area has been divided into different zones/land uses. **Table 3.6(a)** presents the land distribution for different zones in the project area.

Table 3.6 (a): Landuse Distribution (Selected Option)

Sr. No.	Land use	Area (Acres)	Percentage
1	Industrial	294.49	67.26
2	Commercial	19.43	4.44
3	Amenities	27.58	6.30
4	Roads (198, 120', 80' & 60' ROW)	96.30	22.00
	Total	**437.80**	**100.00**

b) Industrial Plots Composition

Two plot sizes have been planned i.e. 1 acre and 0.5 acres. **Table 3.6(b)** presents the dimensions and numbers of different sizes of plots.

Table 3.6 (b): Industrial Plots Composition (Selected Option)

Sr. No.	Size of Plots	Dimensions	Nos.
1	1.0 Acre	145.2' x 300'	262
2	0.5 Acre	109'x 200'	47
		Total	**309**

c) Detail of Amenities and their Plot Areas

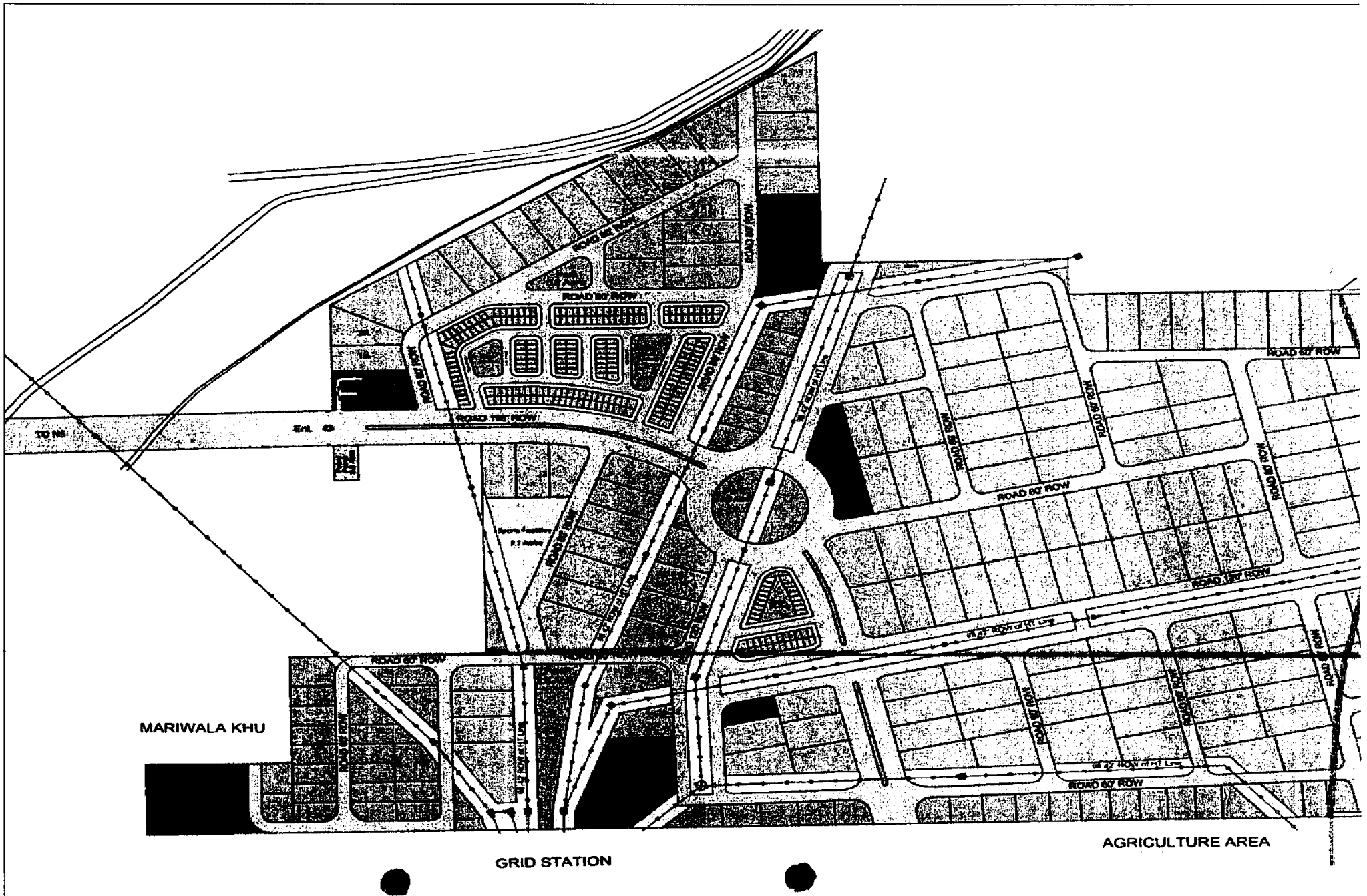
Provision has been made for the commercial and social amenities in the proposed industrial estate. **Table 3.6(c)** shows the detail of social amenities.

Table 3.6 (c): Amenity Plots (Selected Option)

Sr. No.	Amenity	Area (Acres)
1	Medical Center/ 1122 Center	1.03
2	Jamia Masjid	1.16
3	Site Office	0.82
4	Vocational Training Center	1.18
5	Grid Station	4.07
6	CETP/ Disposal Station	4.22
7	Truck Stand	3.62
8	Overhead Water Tank	0.64
9	Parks	10.84
	Total	**27.58**

Figure 3.2 shows the conceptual master plan of the selected option.

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ROAD 80' ROW
ROAD 100' ROW
MARIWALA KHU
GRID STATION
AGRICULTURE AREA

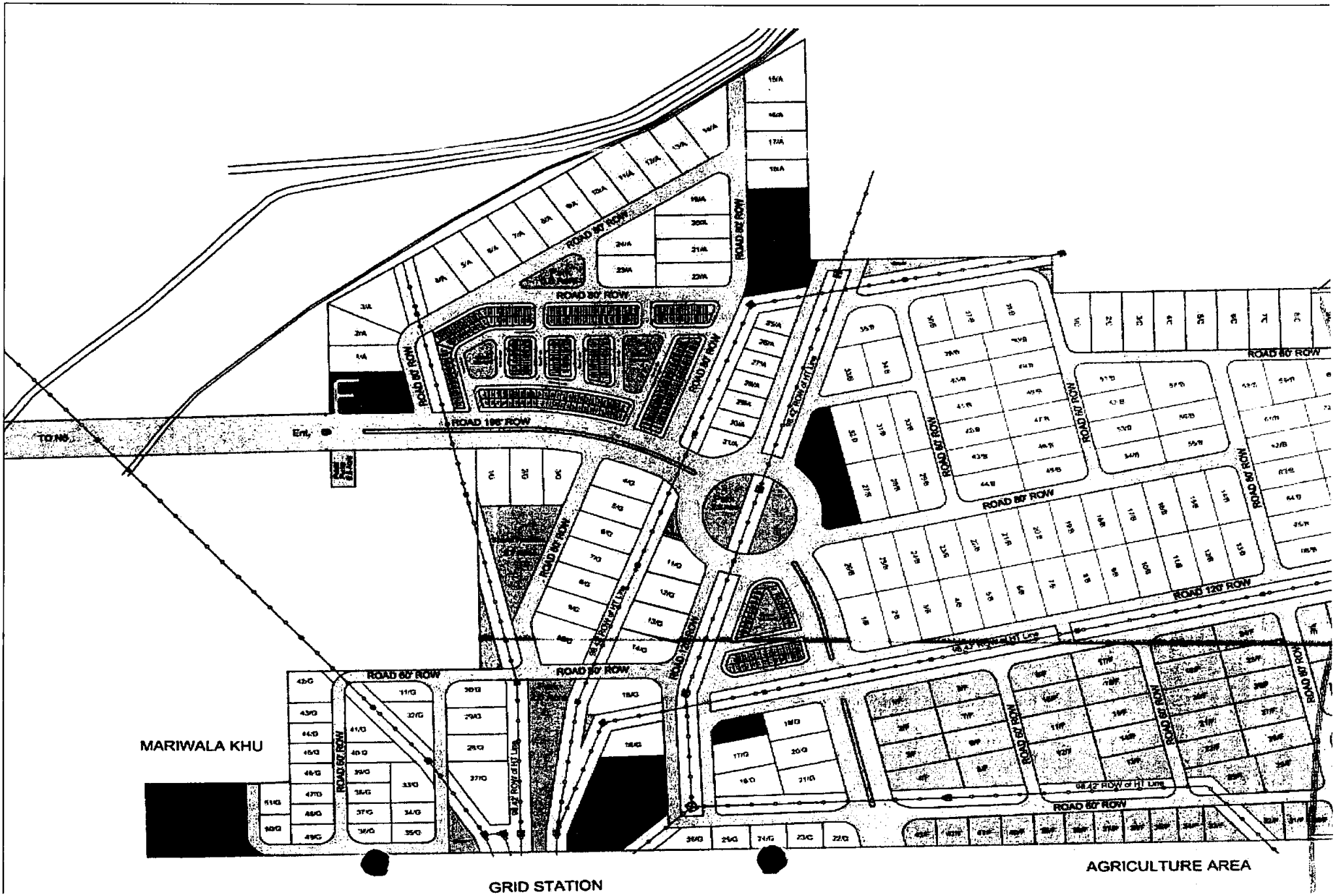
3.6 Type of Industries- Zoning Plan

Different types of industries are planned in different plots of the proposed industrial estate. **Table 3.7** summarizes the types of industries for proposed industrial estate. Zoning plan for type of industries is given as **Figure 3.3.**

Table 3.7: Type of Industries

Block No.	Type of Industry	Size of Plots	Nos.	Area (Acres)	%age
A	Food	1.0 Acre	24	25.96	10.04
		0.5 Acre	7	3.62	
		Total (A)	**31**	**29.58**	
B	Oil	1.0 Acre	72	73.51	24.96
C	Ice Factory	1.0 Acre	20	20.47	6.95
D	Cotton	1.0 Acre	31	31.33	10.64
E	Flour & Rice	1.0 Acre	61	61.59	20.90
F	Pesticides, Agri & Chemical	1.0 Acre	29	30.27	12.73
		0.5 Acre	14	7.20	
		Total (F)	**43**	**37.47**	
G	Miscellaneous Industries	1.0 Acre	25	26.12	13.78
		0.5 Acre	26	14.42	
		Total (G)	**51**	**40.54**	
Total			**309**	**294.49**	**100**

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ROAD 80' ROW
ROAD 100' ROW
TO NS
E/L
MARIWALA KHU
GRID STATION
AGRICULTURE AREA

3.7 Project Description

3.7.1 Project Location

The proposed site spread over an area of 483 acres for BIE is located at a distance of 12 km south west of Bahawalpur City with geographical coordinates of 29019'19.06"N and 71035'9.97"E. National Highway N5 is passing in the North West of the project site, at a distance of 1.6 km. Project location is shown below in **Figure 3.4.**

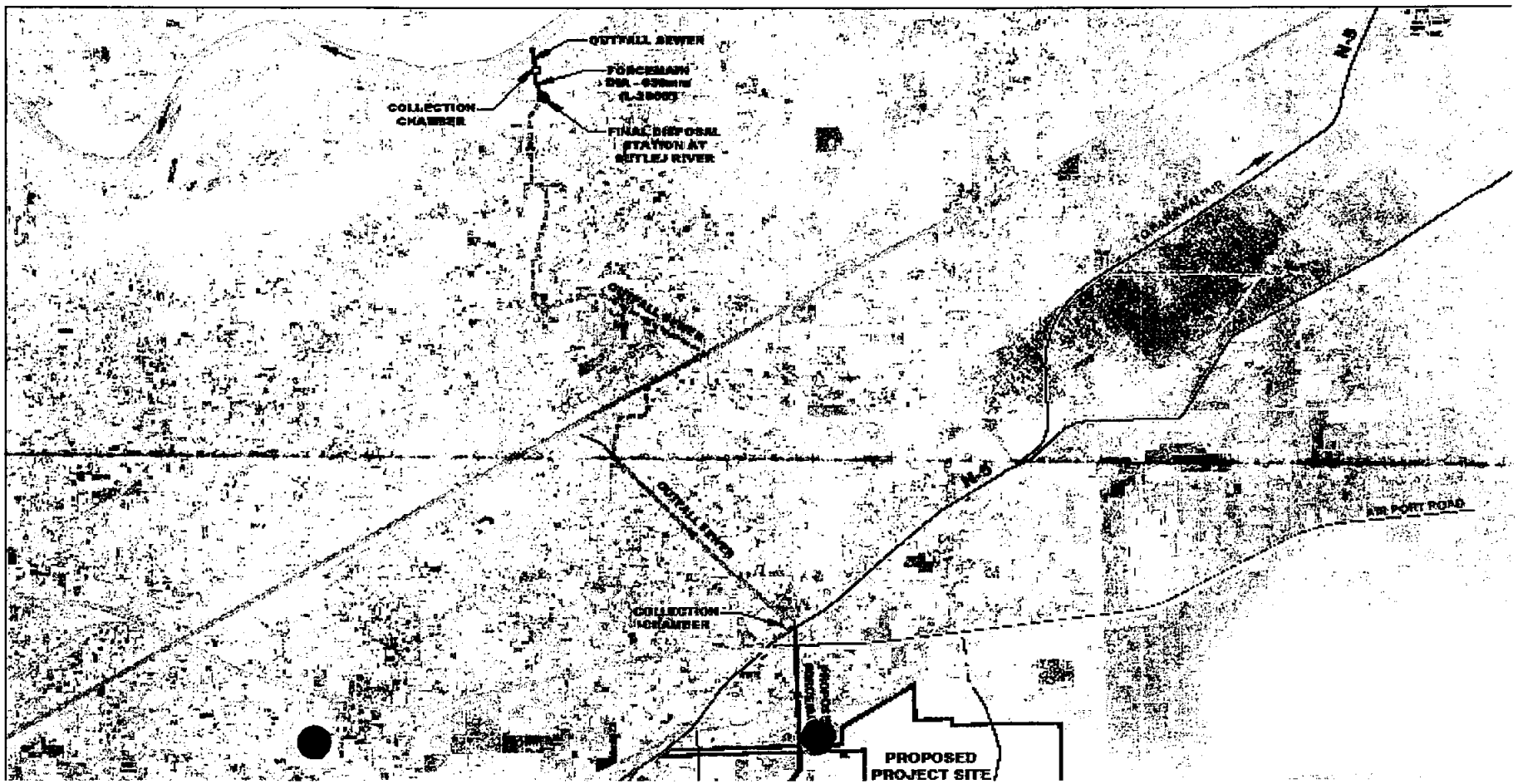
3.7.2 Access Road

The proposed project site can be accessed through National Highway (N-5) from Bahawalpur to Ahmadpur East Section at a distance of 12 km after crossing Bahawalpur City. The site is located on eastern side of National Highway (N5) at a distance of 1.6 km and can be approached from Dera Masti stop on Ahmad Pur East Canal on the main Highway.

3.7.3 Land use Pattern

Land use of the proposed project site is barren with sand dunes and some residential structures located in Agha Pur (near existing Grid Station). The surrounding land use consists of agricultural land and settlements. There is a Grid Station along the south-west boundary of proposed Project site terminating six (06) 132 kV & 220 kV Transmission Line which are passing through the Project site. **Plate 3.1 is** showing the current land use pattern of the project area.

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BAHAWALP
OUTFALL SEWER
COLLECTION CHAMBER
FINAL DISPOSAL STATION AT SUTLEJ RIVER
N-5
BWP PORT ROAD
PROPOSED PROJECT SITE

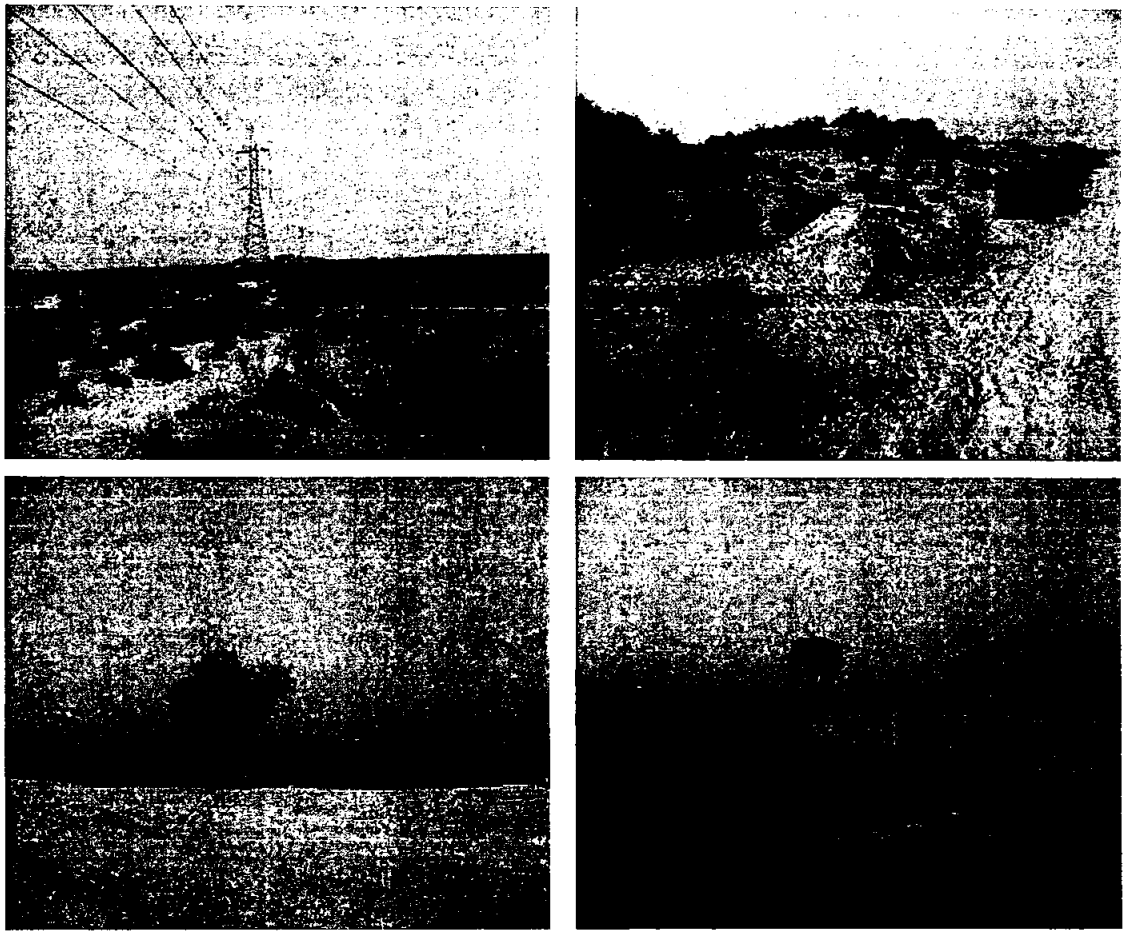


Plate 3.1: Current Land Use of the Project Area

3.7.4 Vegetation Features of the Project Site

The project is surrounded by agricultural land and trees. Amongst trees the most important are Kikar (Acacia Nilotica), Frash (Tamasix Aphylla), Pillu (Salvadora Oleoides), Jand (Prosopis Spicigera), Bhos (Calliginus Polygonic Des), Khar, Grasses, Shrubs, Herbs etc. are present in the area.

3.7.5 Components of the Project

The Project envisages the development of a State of the Art Industrial Estate at Bahawalpur on a Land Area measuring 483 Acres.

Features of the proposed Industrial Estate are:

- Industrial Plots 1.0 Acre
- Amenities include:

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- Medical Center/ Emergency 1122 Station
- Parks, Sports Facilities
- Commercial Area
- Vocational Training Center
- Truck Stand
- Petrol Pump
- Jamia Masjid
- Grid Station
- PIEDMC Office
- CETP/ Landfill Site/ Disposal Station
- Pumping station include
  - Wet Well (01) 30" Dia
  - No. of Pumps (04), 03 working for which one is 10 cusecs and two are 0.5 cusecs capacity.
- Force main (7400ft or 2300m length with Dia 8") on 0.82 Acer
- Pumping Station at N5
- Gravity Sewer (27300ft length with Dia 42" RCC)
- Collection chamber at Sutlej river

3.7.6 Sewerage and Disposal System

Safe collection and disposal of industrial and commercial wastewater are vital infrastructure components of the Bahawalpur Industrial Estate (BIE). The primary purpose of providing wastewater collection system is to efficiently and safely collects contaminated water, thereby preventing disease transmission and nuisance, and transmits it to treatment works and final disposal point without loss or contamination of the surrounding environment.

Wastewater Flows

Based on the estimated water demand of BIE, average wastewater flows are calculated and given in the **Table 3.8**.

Table 3.8: Estimated Average Wastewater Flows to be Generated from the Bahawalpur Industrial Estate

Sr. No.	Description	Area	Water demand	Average Wastewater Generation (80% of Water Demand)	
		(Acre)	(Cusec)	(Cusec)	(m^3/s)
1	Industrial Area	294.5	7.26	5.80	0.164
2	Commercial Area	19.43	0.11	0.088	0.0025
3	Amenities	16.6	0.07	0.056	0.0016
4	Parks	11.48	0.38	0.304	0.0086
5	**Total**	**342**	**7.82**	**6.248**	**0.1767**

Topographic survey of the project area reveals that level difference is in the range of 364 ft to 415 ft with natural slope from North-East to South West. Highway engineers of NESPAK designed the slopes of the road network from North-East to South West so that wastewater and storm water can be collected under gravity through sub-mains and laterals which will add-up to trunk sewers.

Wastewater Collection Systems

After considering merits and de-merits of different types of wastewater collection systems, a separate system has been proposed for the collection of wastewater and storm water.

Keeping in view the economy and limited budget available with the client, it is proposed that storm water collection system will be designed as a part of this project, however its construction may be taken up in next phase upon colonization of the industrial area. Till that period, a part of storm water on roads will be catered through wastewater pipes (partially combined system) and infiltration in empty industrial plots. Therefore, the wastewater collection system will work as partially combined system till construction of storm water drains.

Components of Wastewater Collection Systems

Following are the main components of a proposed wastewater collection system:

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- Interception Works
- Conveyance Network
- Inspection Chambers/Manholes
- Disposal Station
- Outfall Sewer and Receiving Water Body

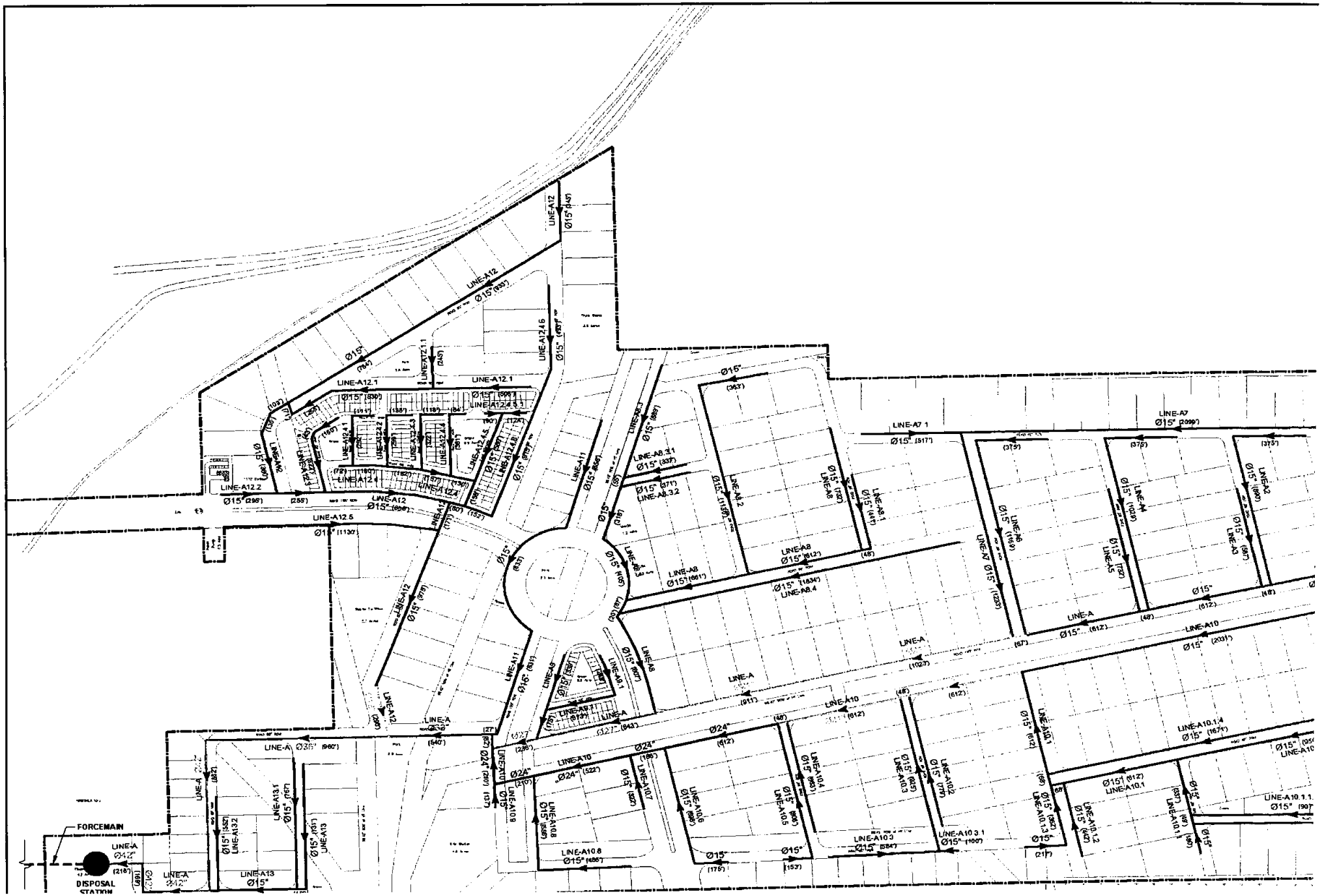
Separate wastewater collection system is proposed for the industrial estate spreading over net area of 437.8 acres. Wastewater will be collected by lateral sewers proposed on both sides of roads covering every single plot of project area as shown in the **Figure 3.5**. These lateral sewers will join trunk sewer and convey the wastewater to pumping station proposed at Industrial Estate (**Figure 3.6**).

Options for Disposal of Wastewater

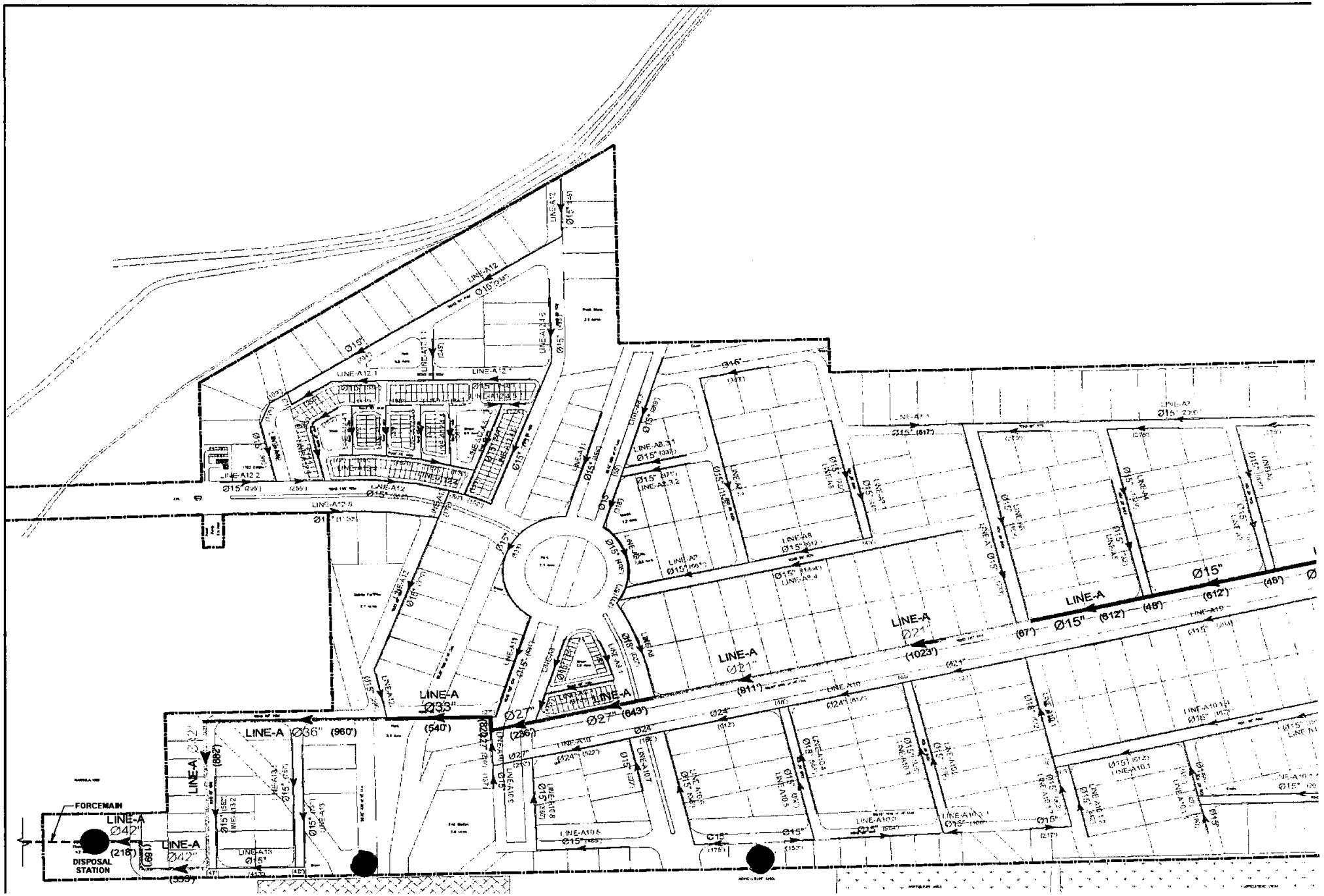
Three (03) options have been considered for the disposal of wastewater generated within the industrial estate.

1. Option - I: Disposal of wastewater from the entire Industrial Estate directly into River Sutlej through force mains.
2. Option - II: Pumping of wastewater from Bahawalpur Industrial Estate and its disposal into Outfall Sewer for ultimate disposal into River Sutlej through final effluent disposal station near the river.
3. Option-III: No pumping station within the industrial estate and deep gravity sewer up to river and final disposal station near river.

Considering technical & financial evaluation, **option-II** i.e. Pumping of wastewater from Bahawalpur Industrial Estate and its disposal into Outfall Sewer for ultimate disposal into River Sutlej through final effluent disposal station near the river has been recommended for disposal system of BIE.



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FORCEMAIN
DISPOSAL STATION
LINE-A Ø42" (216')
LINE-A Ø42" (699')
(599')
LINE-A Ø36" (960')
(540')
LINE-A Ø33"
LINE-A Ø27" (643')
(236')
LINE-A Ø24" (911')
LINE-A Ø21" (1023')
LINE-A Ø21"
LINE-A Ø15" (612') (48') (67')
Ø15" (612') (48')
Ø15"

All the wastewater from the pumping station within the industrial estate will be pumped through forcemain of 32''diameter and 7,400 ft in length to outfall sewer starting from N-5. Outfall sewer of 42'' diameter and 27,300 ft in length will convey the treated effluent to final disposal station proposed near bank of River Sutlej. Wastewater from this disposal station will be pumped through forcemain of 24'' diameter and 2,000 ft in length to Sutlej River. Layout plan and cross section of these disposal stations are shown in **Figure 3.7** & **Figure 3.8** below.

Figure 3.9 depicts the conceptual plan of proposed collection and disposal system of Bahawalpur Industrial Estate.

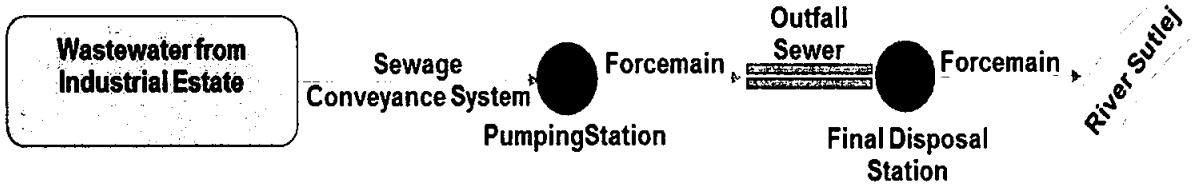


Figure 3.9: Conceptual Plan of Proposed Collection and Disposal System

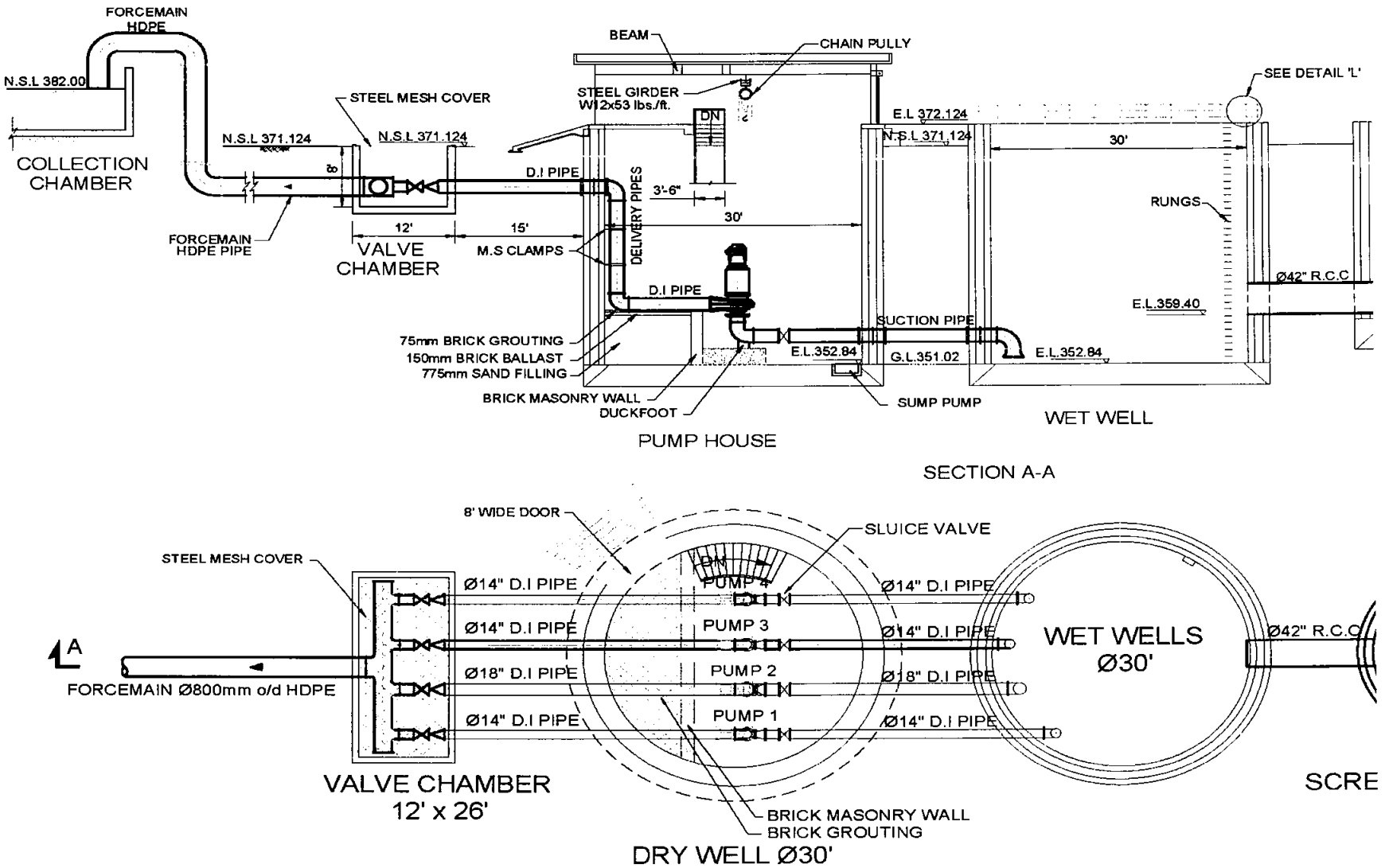
3.7.7 Storm Water Drainage System

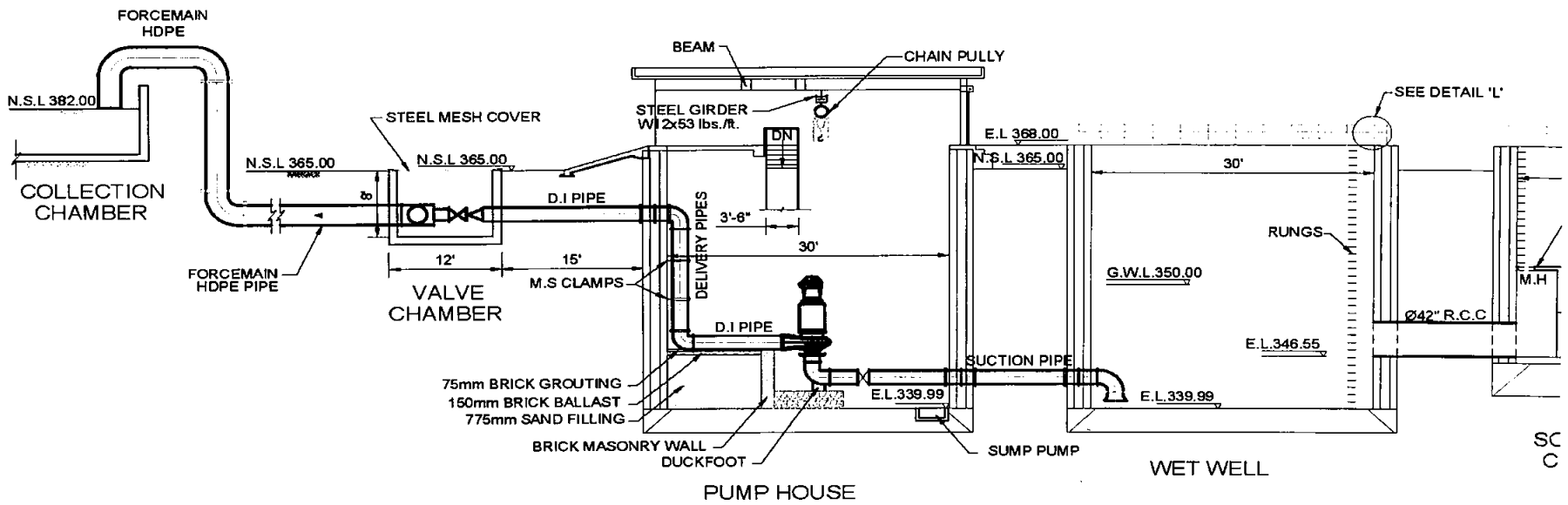
The topography of the project area is uneven therefore, whole area is liable to ponding of rain water at several areas. In order to avoid this situation, a separate storm water drainage system has been proposed. Storm water allowance has also been taken in sewerage system according to the PDSSP criteria. Hence in the design of storm water collection system the flow is calculated by excluding the storm water allowance already taken in wastewater collection system.

Components of Storm Water Drainage System

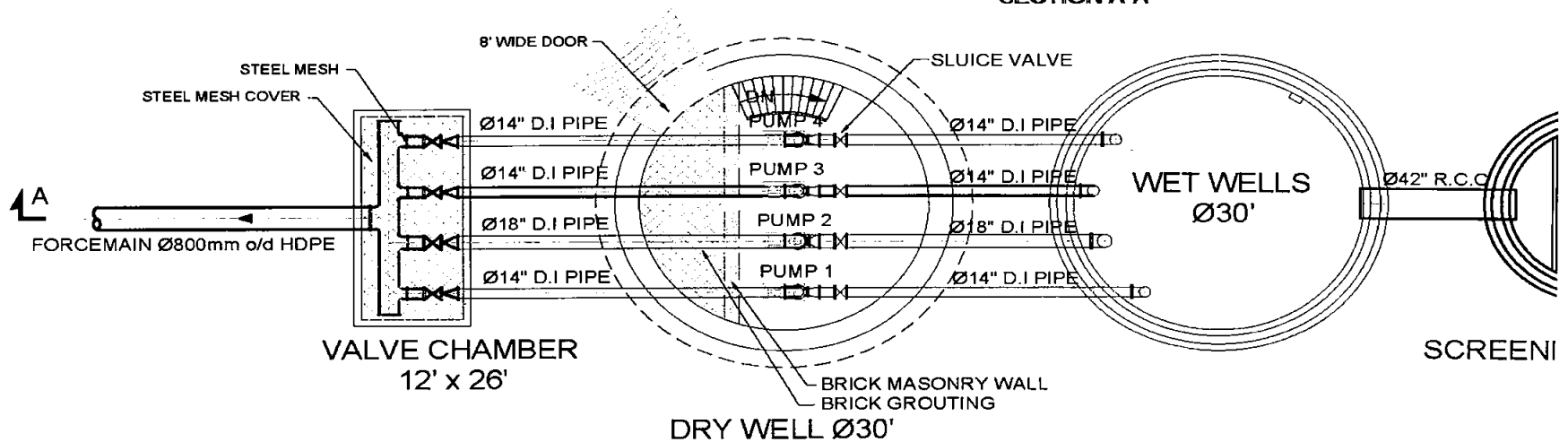
- Interception works comprises
  - Inlets to collect runoff and discharge it to storm water drainage system;
  - Gratings of required length at the inlets to avoid entry of sediment load in rain water;

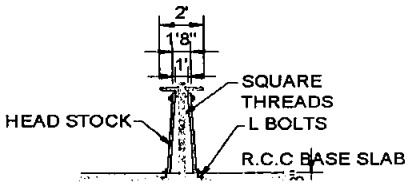
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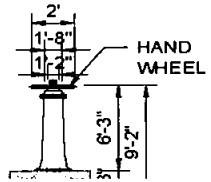

FORCEMAIN HDPE
N.S.L 382.00
COLLECTION CHAMBER
STEEL MESH COVER
N.S.L 371.124
N.S.L 371.124
FORCEMAIN HDPE PIPE
12'
15'
VALVE CHAMBER
M.S CLAMPS
D.I PIPE
DELIVERY PIPES
BEAM
CHAIN PULLY
STEEL GIRDER W12x53 lbs./ft.
DN
3'-6"
30'
D.I PIPE
75mm BRICK GROUTING
150mm BRICK BALLAST
775mm SAND FILLING
BRICK MASONRY WALL
DUCKFOOT
PUMP HOUSE
E.L 372.124
N.S.L 371.124
30'
SEE DETAIL 'L'
RUNGS
Ø42" R.C.C
E.L.359.40
SUCTION PIPE
E.L.352.84
G.L.351.02
E.L.352.84
SUMP PUMP
WET WELL
SECTION A-A
8' WIDE DOOR
SLUICE VALVE
STEEL MESH COVER
DN
PUMP 4
PUMP 3
PUMP 2
PUMP 1
Ø14" D.I PIPE
Ø14" D.I PIPE
Ø18" D.I PIPE
Ø14" D.I PIPE
Ø14" D.I PIPE
Ø14" D.I PIPE
Ø18" D.I PIPE
Ø14" D.I PIPE
A
FORCEMAIN Ø800mm o/d HDPE
VALVE CHAMBER
12' x 26'
WET WELLS
Ø30'
Ø42" R.C.C
BRICK MASONRY WALL
BRICK GROUTING
DRY WELL Ø30'
SCRE
2'
1'8"
1'
SQUARE THREADS
HEAD STOCK
L BOLTS
R.C.C BASE SLAB
2'
1'-8"
1'-2"
HAND WHEEL
6'-3"
9'-2"
Ø1½"(INTERNAL) G.I.PIPE
3'
C
3'
1'
1'
Ø1½" G.I.PIPE

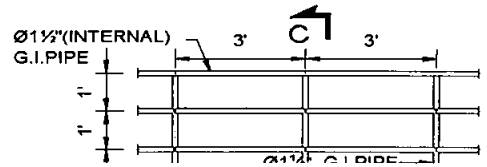


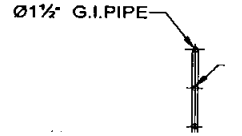
SECTION A-A











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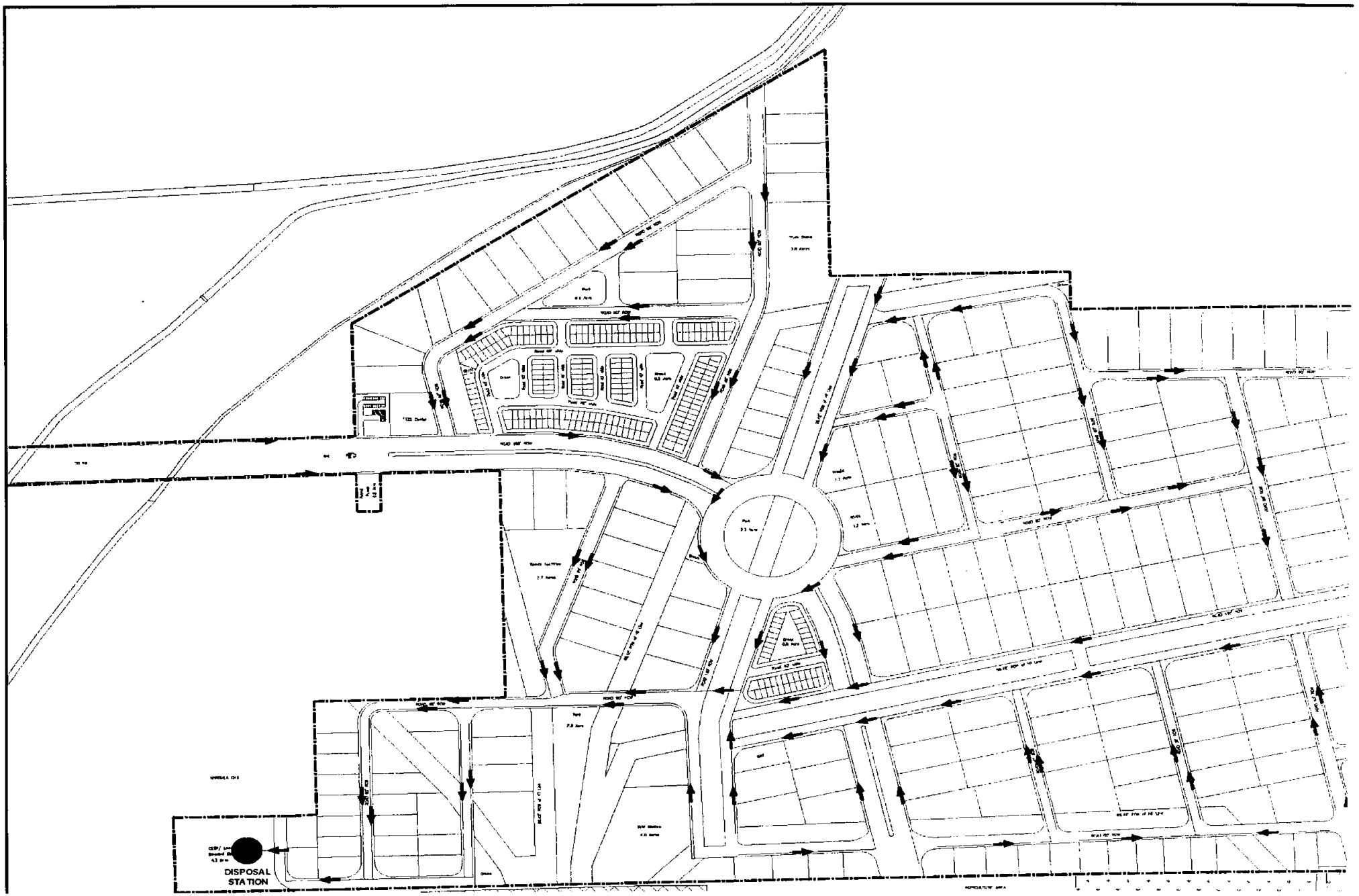
- Conveyance Network includes lateral drains/sewers, sub-main, main/trunk lines and conduits. The drains/sewers are sloped towards disposal station;
- Culverts;
- Disposal Station contains screening chamber, collection wells, dry wells and pumps with suction and delivery pipe lines; and
- Force main.

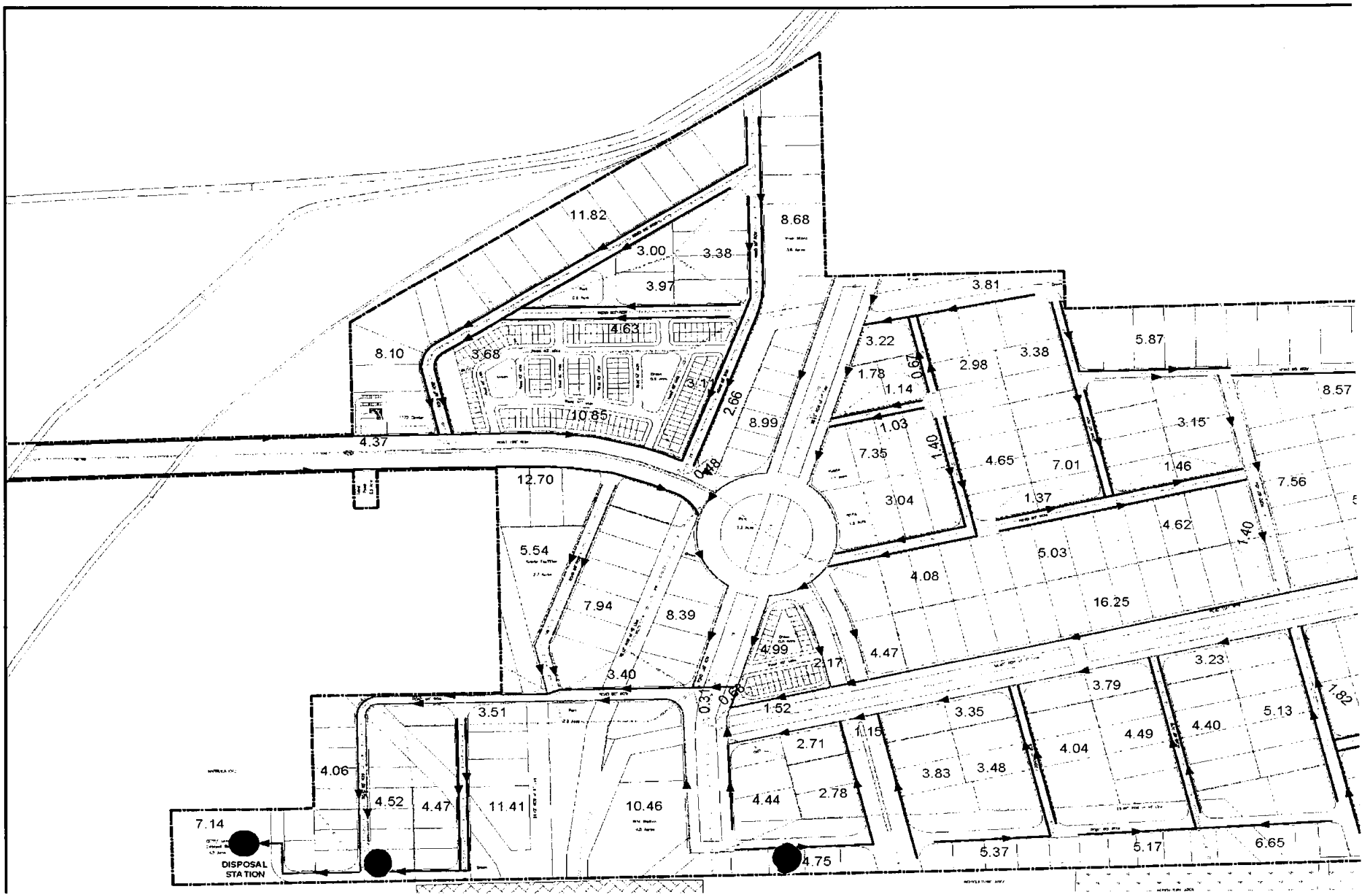
Selection of Appropriate Option for Storm Water Collection and Disposal

After technical and financial comparison of different types of storm water collection systems, pipe drainage system has been recommended as the most feasible option.

Drains/pipes have been provided on both sides of the roads. Main/trunk line is passing along the central road ROW 120' of the Industrial Estate. The lateral pipe/drains will discharge their flow into trunk line. This trunk will carry the collected storm water into the disposal station. In disposal station, pumps will dispose of the water into final disposal point through force main. Different options for the route of force main have also been evaluated and most feasible option has been recommended.

The flow direction of drainage for project area is shown in **Figure 3.9** while the catchment areas are shown in **Figure 3.10**.


DISPOSAL STATION


11.82
3.00
3.38
3.97
8.68
4.63
8.10
3.68
3.11
10.85
2.66
8.99
4.37
0.48
12.70
3.81
3.22
1.78
1.14
0.67
2.98
3.38
5.87
8.57
3.15
1.03
7.35
1.40
4.65
7.01
1.46
7.56
3.04
1.37
4.62
1.40
5.03
4.08
16.25
5.54
7.94
8.39
4.99
2.17
4.47
3.40
3.23
3.79
1.82
0.31
0.68
1.52
3.51
3.35
5.13
2.71
1.15
4.49
4.40
4.04
4.06
3.83
3.48
4.52
4.47
11.41
10.46
4.44
2.78
7.14
DISPOSAL STATION
4.75
5.37
5.17
6.65

3.8 Project Administrative Jurisdiction

The proposed project lies in the city of Bahawalpur in District Bahawalpur. The district is under the general charge of Deputy Commissioner (DC).

3.9 Project Implementation Schedule

The project is expected to be completed in 24 months.

3.10 Land Acquisition

The project will be constructed on the land already being owned by the PIEDMC.

3.11 Cost of the Project

The total project investment costs are estimated to be Rs. Four (04) Billion.

3.12 Workforce Requirements during Construction Phase

The man power requirement is estimated 500 workers during construction phase and 15000 workers during operation phase of the industrial estate.

3.13 Water Requirement during Construction and Operation Phase

During the construction phase, estimated average water demand for various project activities is one (01) cusecs. During the operation phase, the water in BIE will be supplied by installing twelve (12) number of tube wells / pumps each of 1.0 cusec capacity and four (4) Overhead Reservoirs (OHRs) each of 100,000 gallons capacity. The estimated water demand for BIE during the operation phase is given in the **Table 3.9**.

Table 3.9: Summary of Estimated Water Demand for Bahawalpur Industrial Estate

Sr. No.	Description	Area (acre)	Water demand	Unit
1	Industrial Area	294.49	3,463,051	Gallons/day
2	Worker/ Employees	-do-	441,735	Gallons/day
3	Amenities and Commercial Area	132.47	93,790	Gallons/day
4	Horticulture Area	10.84	206,695	Gallons/day
5	**Total Water Demand for BIE**	**437.80**	**4,205,271**	**Gallons/day**
			4.21	**Million Gallons/day**

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3.14 Fire Demands

The optimum water demand for firefighting is 1.44 MGD calculated by National Guidance Document on the Provision of Water for Fire Fighting (U.K). The locations of Fire Hydrants are given in the **Figure 3.11**.

3.15 Power Requirements

The electrical load has been estimated to be 77.10 MW. To meet these requirements an independent (132/11.5 kV) Grid Station will be established and will be connected to national grid.

3.16 Wastewater / Surface Water

The wastewater/ storm water of the proposed industrial estate is planned to be disposed of in River Sutlej through Pumping station without treatment, however it is planned that waste water treatment plant will be installed later on for the industrial estate. The estimated average wastewater produced during construction and operation phases is 0.8 cusecs and 6.2 cusecs respectively.

3.17 Solid Waste

Estimated municipal waste generation during construction phase will be 200[1] kg/day and during operation phase it will be estimated as 6000 kg/day.

3.18 Construction Materials

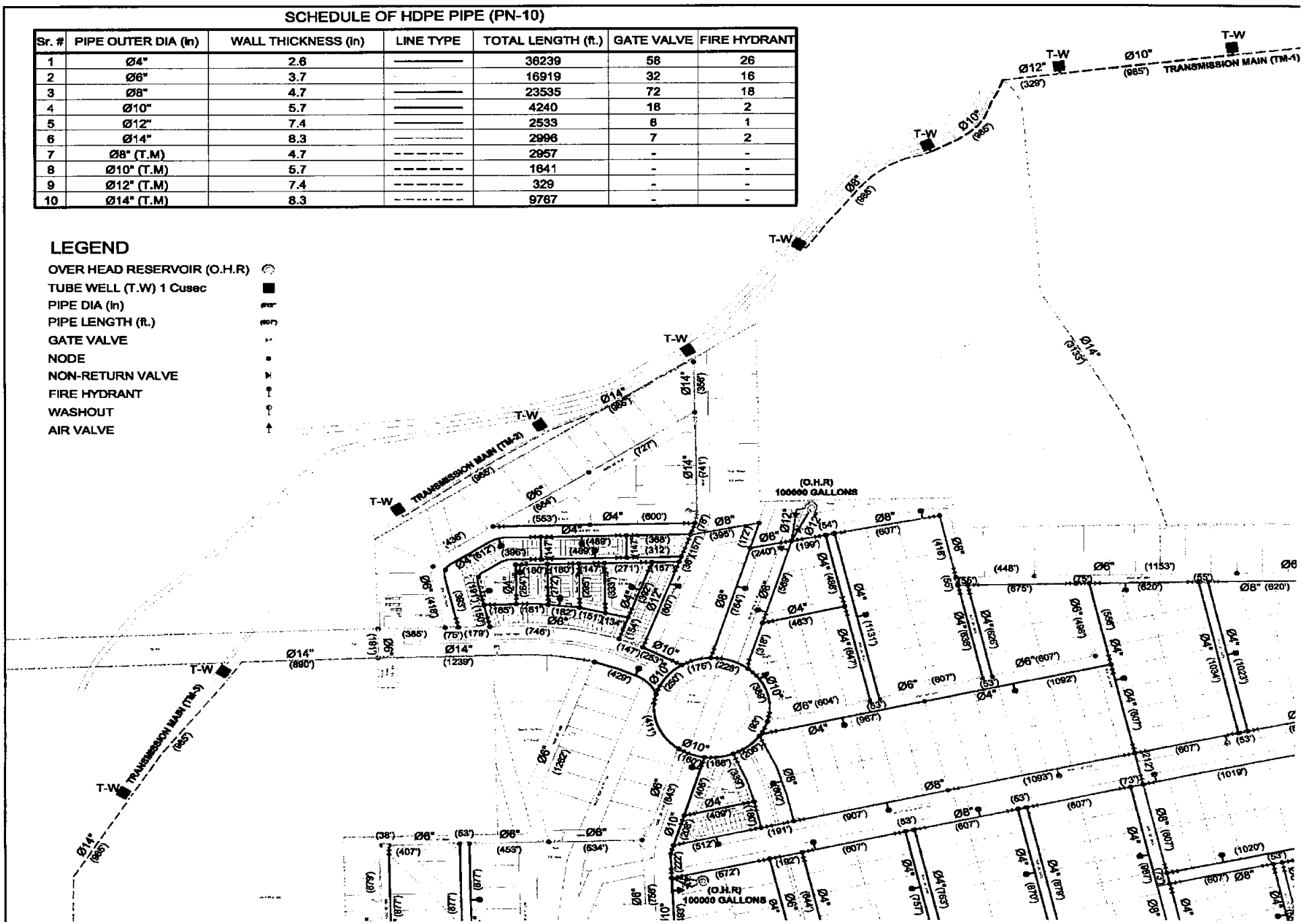
The materials used in construction of the proposed project would include reinforced cement concrete frame (RCC Frame), brick infill, brick cladding, textured paints and standard paints etc. The materials used in construction of the road for the proposed project would include coarse aggregates (crush), fine aggregates (sand), water, asphalt, reinforcement, cement etc.

Coarse and fine aggregate for concrete can be obtained from Sakhi Sarwar quarries and Lawerencepur quarries respectively.

[1] 0.4 kg/capita/day waste generation of Bahawalpur (Consultation with Manager Operations, Bahawalpur Waste Management Company)

SCHEDULE OF HDPE PIPE (PN-10)

Sr. #	PIPE OUTER DIA (In)	WALL THICKNESS (In)	LINE TYPE	TOTAL LENGTH (ft.)	GATE VALVE	FIRE HYDRANT
1	Ø4"	2.6	———	36239	58	26
2	Ø6"	3.7	———	16919	32	16
3	Ø8"	4.7	———	23535	72	18
4	Ø10"	5.7	———	4240	16	2
5	Ø12"	7.4	———	2533	8	1
6	Ø14"	8.3	———	2996	7	2
7	Ø8" (T.M)	4.7	- - - - -	2957	-	-
8	Ø10" (T.M)	5.7	- - - - -	1641	-	-
9	Ø12" (T.M)	7.4	- - - - -	329	-	-
10	Ø14" (T.M)	8.3	- - - - -	9767	-	-



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3.19 Construction Camps

Camp sites will be selected keeping in view the availability of adequate area for establishing camp sites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity. Final locations will be selected by the contractor in consent with Supervision Consultant after approval from PIEDMC.

3.20 Expected Equipment for Construction

The list of the machinery and the equipment required for the proposed project is provided in **Table 3.10**.

Table 3.10: Machinery and Equipment Requirement for the Proposed Project

Machinery and Equipment Requirement for the Proposed Project	
Concrete batching plant	Transformers for construction
Transit mixer	Excavators
Formwork	Cranes
Pneumatic rollers	Dumper trucks
Concrete pump (mobile and stationary)	Compactor
Loaders and drilling rigs	Graders
Cutting/bending machine	Tractor trolleys
Generator set	Carriage vehicles
Total station with level machine	Water boozers
Concrete vibrators (external and internal)	Steel bending machines

3.21 Restoration and Rehabilitation Plan

There may be areas that could be affected by construction activities which may require rehabilitation such as stockpile sites, campsites and side tracks. The sites for stockpile area, construction camps and side tracks have not been identified at the planning stage of the proposed project. Hence, a restoration and rehabilitation plan has been proposed and presented as **Annexure-III**.

SECTION-4

ENVIRONMENTAL BASELINE PROFILE

4.1 General

For any development project, the prevailing environmental conditions need to be assessed prior to the preliminary stages of planning, designing and execution of the project. Identification of physical, ecological and social aspects of environment and collection of relevant data is essentially important for the evaluation of impacts as well as for the suggestion of adequate mitigation measures which forms the basis of the Environmental Impact Assessment (EIA).

The existing environmental conditions of the proposed project have been considered with respect to physical, biological and socio-economic aspects. Information has been collected from variety of sources, including published literature, field observations and surveys conducted specifically for this project have been analyzed for this study.

4.2 Methodology

For baseline data collection, following sequences of various techniques has been adopted. These techniques were chosen because of their pragmatic application in very short span of time.

1. Reconnaissance survey;
2. Field investigations/ Surveys;
3. Meteorological analysis;
4. Environmental analysis (air, noise and water quality surveys);
5. Collection and review of secondary environmental and social data; and
6. Basic parameters collection from published sources.

4.3 Reconnaissance Survey

Reconnaissance survey of the proposed project site was conducted from January 12, 2018 to January 12, 2018 for the collection of preliminary information about the flora, fauna and existing human intervention along with ecological characteristics. Reconnaissance survey helped us to delineate the ecological habitats and to explore the diversified ecological rich environment.

This information has become the baseline information for the detailed survey that specifically targets those areas which are going to be affected by the implementation of

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the proposed project. As a result of this survey, basic plants and animals families were identified that actually prevailing in the associated habitats.

4.4 Field Investigations/ Surveys

Various field surveys were conducted details of which are presented in **Section 4.12.2.**

4.5 Meteorological Analysis

4.5.1 Climate and Temperature

Seasonal climatic conditions must be considered for the design and execution of the project. The climate including air, temperature and precipitation is an influencing factor, affecting the construction and other engineering structures. However, to determine the overall effect of the climatic stresses, daily and seasonal temperature changes and precipitation must be considered.

The District has extremes of climate[1]. because, being adjacent to Rajputana desert, this area overall resembles the dry climate of an arid desert The summer season starts from the month of April and continues till October , while the weather is pleasant and cold from November to February. **Table 4.1** presents month-wise mean temperature and precipitation. **Figure 4.1 & 4.2** shows the graphical presentation of Temperatue and rainfall of the project area.

The climate is mainly hot and dry. In the summer the temperature reaches the high 40 (forties Celsius) and 50 during the day and the nights are slightly cooler. Since the city is located in a desert environment there is little rainfall. Weather conditions reach extremes in both summer and winter. Temperature in Bahawalpur ranges from 5.85 to 42.2o C. Average monthly rainfall ranges from 3 to 168 mm. The average temperature in summer is 33°C (91oF) and 18°C (64oF) in winter. During winter it is between 5 and 15 degree centigrade and sometimes it falls below the freezing point, which ruins the crops. Before the launching of canal system, when the Bahawalpur region mostly comprised of sand dunes, the temperature of Fort Abbas and Khanpur sometimes used to match that of Jacobabad and became the cause of sand storms. (Rehman, 1899).

These days Bahawalpur receives more rainfall all over the year even in summer, which shows that even Bahawalpur is also not immune to the effects of global

[1]**Source**: *District Census Report, Bahawalpur, 1998*

warming. The months of July and August constitute the months of rainy season (commonly known as Sawan). The remaining monsoon winds of Northern Punjab occasionally cause heavy rainfall in this area which makes the weather pleasant. Cholistan consists of 10,399 square miles. There are some places, which do not receive rain years at a time. During winter sometimes the western winds coming from Persian Gulf would move towards this desert, creating conditions of thunderstorms, which last for over a week or so. Rainfall is comparatively very low due to the fact that most of the area comprises of desolate and barren desert. Cholistan,The average rainfall is 200 to 250 mm annually.

Table 4.1: Average Monthly Temperature and Precipitation (1998)

Month	Mean Temperature		Precipitation (millimeters mm)
	Maximum	Minimum	
January	21.6	05.6	06.0
February	24.1	08.6	11.5
March	29.5	13.8	09.4
April	36.1	19.6	7.2
May	40.8	24.5	6.1
June	42.2	28.4	16.9
July	39.5	28.5	52.6
August	38.3	27.9	43.2
September	37.1	24.8	12.1
October	34.8	18.3	0.6
November	29.3	11.7	4.0
December	23.5	06.6	3.0
Annual	**33**	**18.2**	**169.8**

Source: *District Census Report, Bahawalpur, 1998*

The above table depicts that May, June and July are the hottest months with mean temperature usually ranging from 40.8 to 42.2 degree centigrade. The winter season begins from the month of November and continues till March. January is the coldest month with a mean minimum temperature of 05.6 degree centigrade. Most of the rain falls in July and August during summer months and in January and sometimes in February during the winter months

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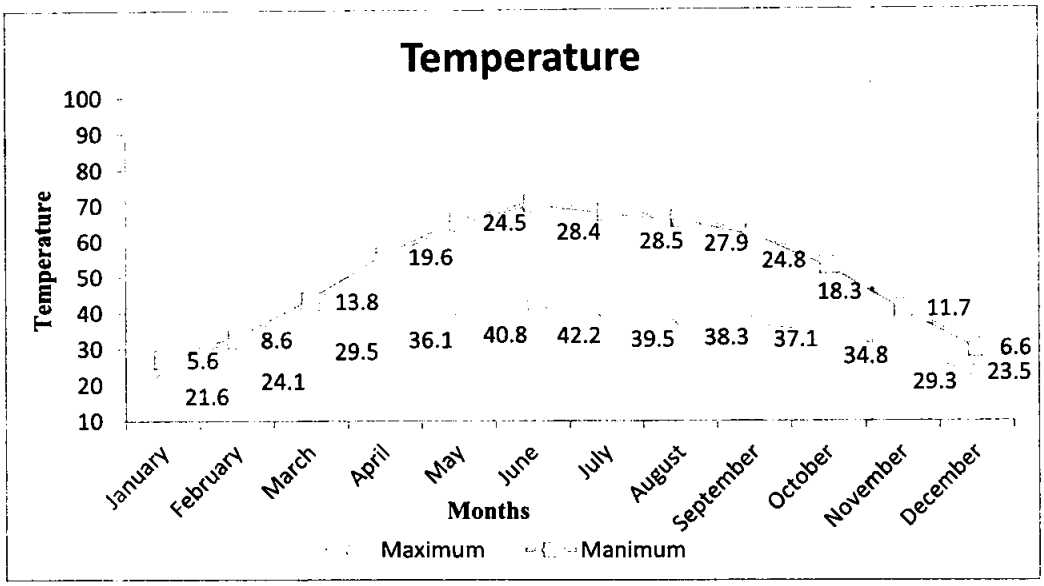


Figure 4.1: Maximum and Minimum Temperature in the project area (1998)

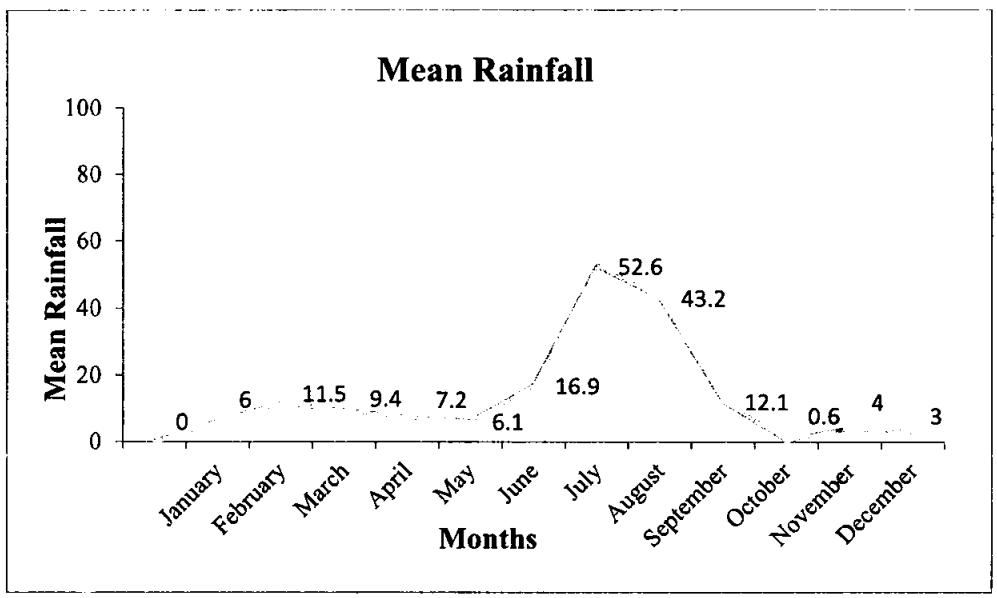


Figure 4.2: Mean Rainfall in the project area (1998).

4.5.2 Wind Speed and Wind Direction

Figures 4.3 (a) and **(b)** show that dominant wind direction of Bahawalpur is from North to South with an average speed of 6 km/hr.

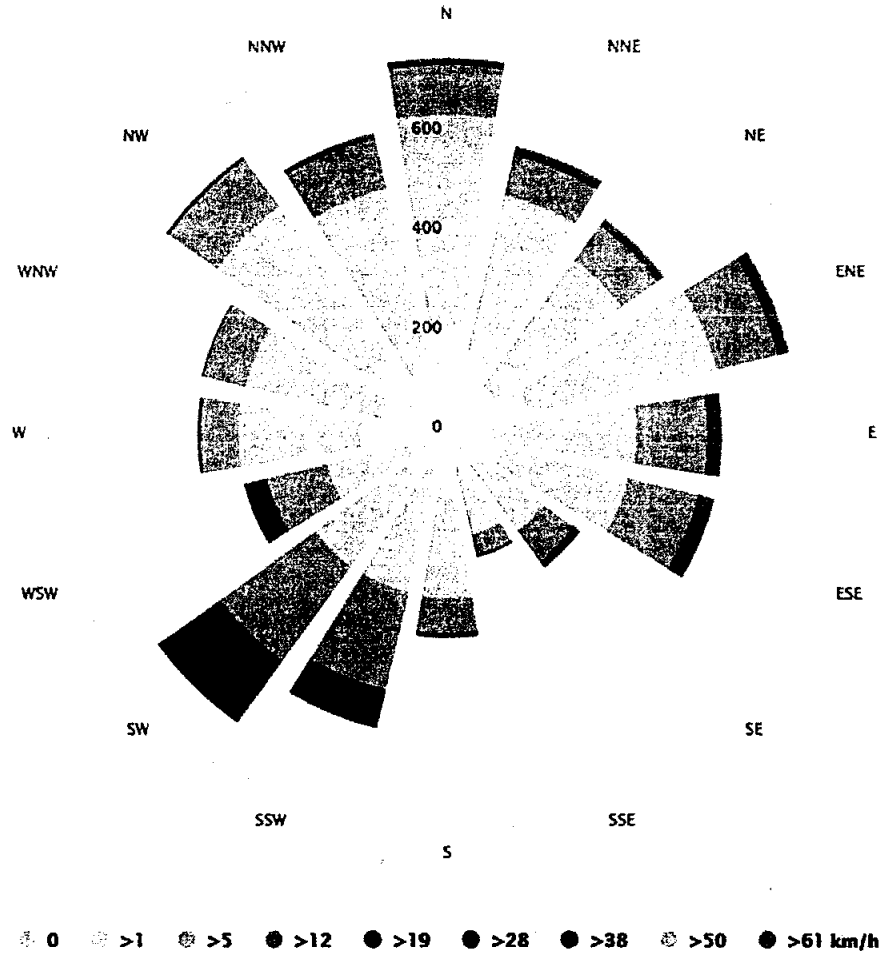


Figure 4.3 (a): Wind Rose for the Bahawalpur[2]

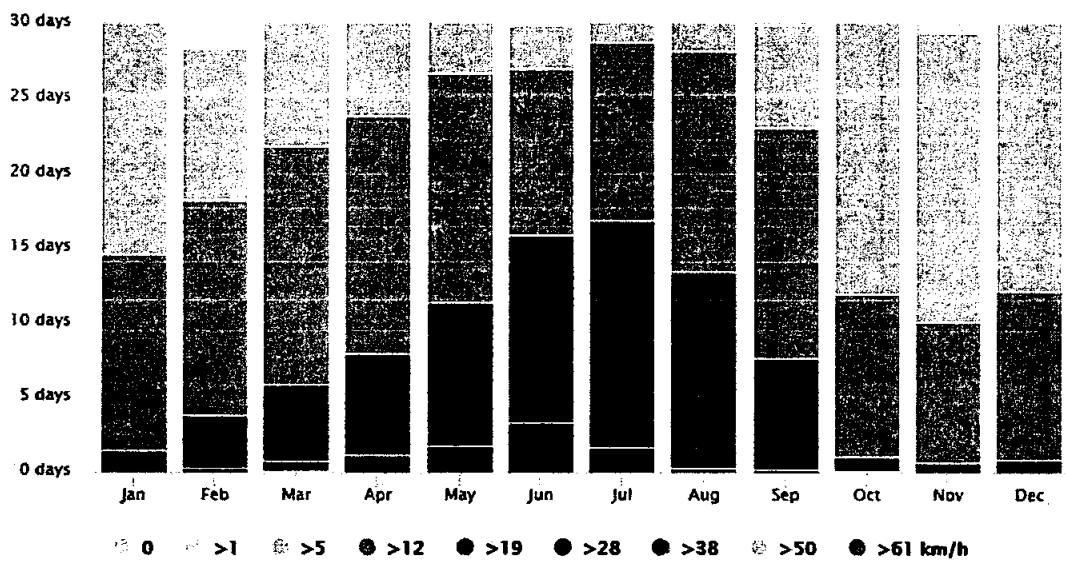


Figure 4.3 (b): Wind Direction for the Bahawalpur[2]

[2] ***Source:*** *https://www.meteoblue.com/en/weather/forecast/modelclimate/bahawalpur_pakistan_1183883*

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4.6 Field Investigation/ Survey

Bahawalpur City

The city, lying just south of the Adamwahan Empress Bridge on Sutlej River, is situated 17 km from Lodhran, 90 km from Multan, 420 km from Lahore, 122 km from Burewala, 90 km from Vehari, 270 km from Faisalabad and about 700 km from the national capital, Islamabad[3]. It is a fertile alluvial tract in the Sutlej River valley. East of Bahawalpur is the Pat, or Bar, a tract of land considerably higher than the adjoining valley. It is chiefly desert. Farther east, the Cholistan, is a barren desert tract, bounded on the north and west by the Hakra depression with mound ruins of old settlements along its high banks; it is still inhabited by nomads.



Figure 4.4: Location of Bahawalpur Industrial Area on Pakistan Map

4.6.1 Topography

The District Bahawalpur can be divided into three parts i.e. the riverain area, the plain area and the desert area. The riverain area lies close to the River Sutlej, which flows in the north along its boundary with Lodhran and Vehari Districts. The area is inundated during floods. The irrigated track is higher than the riverain area. Most of the land has been brought under cultivation. The desert area is known as the Cholistan. It runs along

[3] **Source:***Master Planning and Detailed Designing for Development of Bahawalpur Industrial Estate*

the entire eastern boundary of Bahawalpur District in the north and Rahimyar Khan District in the south. The surface of the desert consists of a succession of sand dunes rising in some places to a height of 150 meters. Ahmad Pur Canal is the nearest surface water body in the project area. **Figure 4.5** represents the topography of the project area.

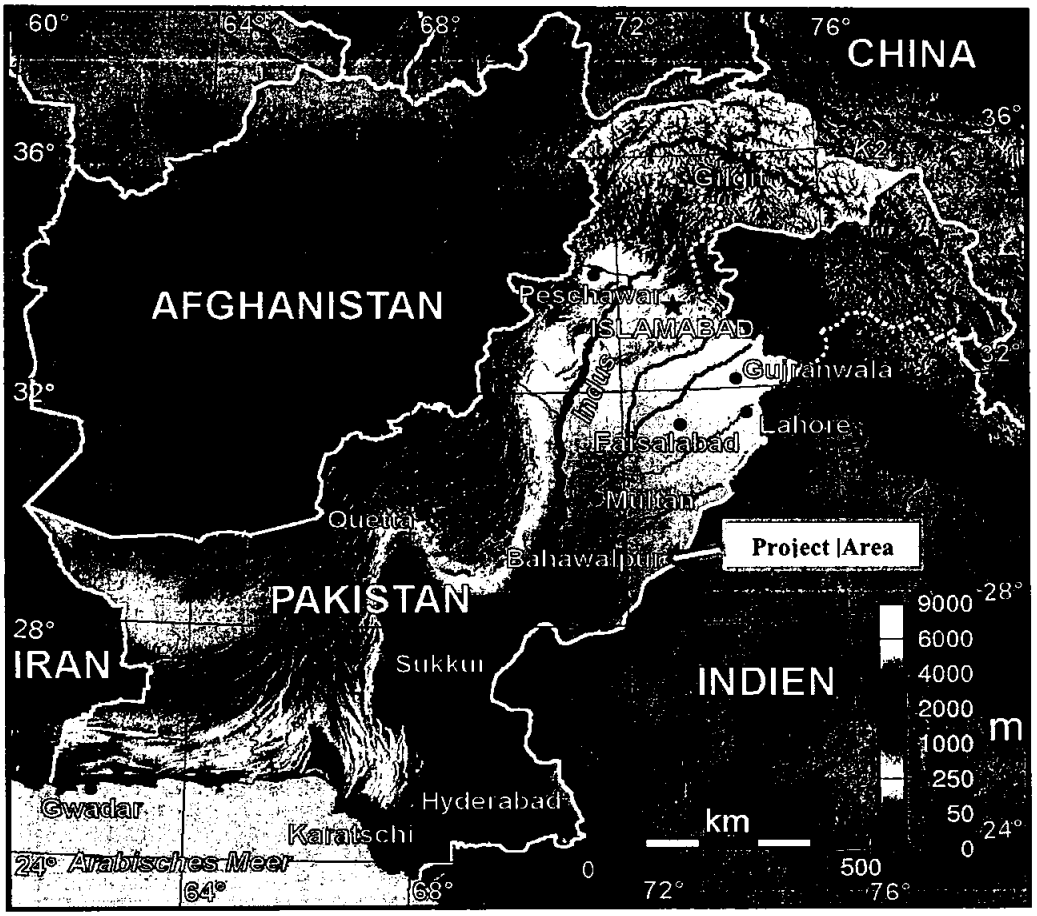


Figure 4.5: Topography of the Study Area

The project area has irregular topography. The sand dunes are deposited all over the project area, which are 1 to 5 meters (3 to 15 feet) high from adjacent agriculture land. The project area has bad land topography. The irregular sand dunes deposited all over the project area which are 1 to 5 meters (3 to 15 feet) high from adjacent agriculture land. The surface is irregular throughout the project area as shown in **Plate 4.1.**

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Plate 4.1: Topography of The Project Area

The project area comprises of small sand dunes amidst of Bahawalpur Agricultural areas located at airport road near villages Mari Sheikh Shujra and Mariwala Khu. In the North, the project area is bounded by a metal road connecting Grand Trunk road to Bahawalpur airport. In the South, the project area is bounded by Grid station. Total area of the project is 483 acres and its coordinates are 29°19'11'' N, 71o34'49'' to 29° 19'09'' N, 71o 35'51'' E[4].

4.6.2 Geology

In the Punjab Plains, Quaternary alluvium has been deposited on semi-consolidated Tertiary rocks or on a basement of metamorphic and igneous rocks of Precambrian age. The distribution of Tertiary rocks in the project area is unknown, except in the Pabbi Hills area, in northeastern Chaj Doab, where rocks of the Siwalik system are exposed. In the area of -the buried bedrock ridge, in Chaj, Rechna, and Bari Doabs, exploratory drilling has revealed that the Precambrian basement rocks are overlain directly by Quaternary alluvium. The northeast and southwest of the bedrock ridge, test holes drilled to a maximum depth of about 1,500 feet bottomed in alluvium. Hence, no information is available concerning the total thickness of the alluvial deposits, the southward extension of Tertiary or older sedimentary rocks from the Salt Range and the Pabbi Hills, and the depth to the basement complex in most of the area.

[4] **Source:***Master Planning and Detailed Designing for Development of Bahawalpur Industrial Estate*

Ground-water reservoir of the area is contained almost exclusively in the alluvial deposits. The alluvium of the Punjab Plains, derived from the mountain ranges to the north, has been deposited by the present and ancestral tributaries of the Indus River. The alluvial complex of Pleistocene and Recent age represents the latest phase of sedimentation in an environment that had its beginnings in mid-Tertiary time: the deposition of predominantly fluviatile sediments in a subsiding trough a fore-deep adjacent to the rising Himalayan ranges.

The alluvial complex consists principally of fine to medium sand, silt, and clay. Beds of gravel or very coarse sand are uncommon. Pebbles of siltstone or mudstone may be found embedded in silty or clayey sand in many places. Also associated with fine-grained strata are concretionary zones or nodules of kankar, a calcium carbonate deposit of secondary origin. The study of drill cuttings and electric logs has shown the absence of thick horizons of pure clay within the alluvium. Except for local clay lenses, a few feet thick, the finer parts of the alluvium consist generally of sandy, gravelly, or silty clay. Although there are local concentrations of fine-grained sediments of considerable thickness, individual strata are generally lenticular and have little horizontal or vertical continuity. The random distribution of coarse and fine-grained sediment within the alluvial complex is entirely consonant with its mode of deposition by large constantly shifting streams.

Regional Geology

The project area is positioned in the southern part of the Punjab Plain which is a vast plain of the alluvial material deposited by the five main rivers of the Indus River System crossing the Punjab Plain. The alluvial deposits at the site are deposited by the old course of one of these rivers, the river Sutlej. The alluvial deposits around the site comprise stream bed, meander-belt deposits and flood plain deposits, deposited by the shifting of river course. The alluvial plain at the site mainly consists of silty clay/clayey silt, sandy silt and sand layers of varying thickness.

Site Specific Investigation

In order to evaluate the subsurface conditions at site field investigations was entrusted to M/s HA Engineers, Lahore. These investigations were carried out under the full-time supervision of experienced geotechnical engineers of NESPAK from November 11 to

23, 2017, while selected soil and water samples collected during the field investigations were tested at SOILCON Geotechnical Testing Laboratory, Lahore.

Objectives of Geotechnical Investigations

The following geotechnical investigation plan was developed to fulfill the above mentioned objectives:

- Execution of twelve (12) boreholes of depth ranging from 10 to 20 m below natural surface level (NSL) by straight rotary drilling method at designated locations within the site area.
- Execution of sixteen (16) augerholes of depth ranging from 10 to 12 m below natural surface level (NSL) by hand auger boring method at designated locations within the site area.
- Excavation of four (4) testpits up to a maximum depth of 3 m below NSL and fifteen (15) testpits up to a maximum depth of 1.5 m within the project area.
- Excavation of three (3) testpits up to a maximum depth of 2 m below NSL in borrow areas.
- Carrying out Standard Penetration Tests (SPTs) in the boreholes/augerholes, generally at 1.0 m depth interval, where possible.
- Collection and preservation of disturbed/undisturbed soil samples from the boreholes and augerholes.
- Collection and preservation of bulk & block soil samples from onsite testpits.
- Collection and preservation of bulk soil samples from borrow areas.
- Carrying out Field Density Tests (FDTs) in testpits.
- Carrying out five (5) field permeability tests at selected horizons (using constant head/ variable head) in selected boreholes.
- Laboratory testing of selected soil samples for the evaluation of classification, moisture content, density, strength, compressibility and chemical characteristics.
- Analyses of field and laboratory data and determination of foundation design parameters including soil parameters, foundation type, foundation depth, foundation size versus net allowable bearing pressure relationships and foundation settlements.
- Study of the geotechnical considerations for the construction of foundations of infrastructure and embankments for road network.

- Compilation of Geotechnical Investigations report on the basis of the above studies.

Geotechnical Studies

- Twelve (12) boreholes of depth ranging from 10 to 20 m were drilled below natural surface level (NSL).
- Sixteen (16) augerholes of depth ranging from 10 to 12 m were executed below natural surface level (NSL). The diameter of augerholes was 125 mm.
- Field borehole & augerhole logs were developed on the basis of the materials encountered at the site and were later confirmed on the basis of the laboratory test results.
- Four (4) testpits were excavated up to 3 m depth and fifteen (15) testpits were excavated up to 1.5 m depth below NSL within the project area. The testpits were excavated using conventional hand digging tools like pick-axe and hand shovel.
- Standard Penetration Tests (SPTs) were performed in the boreholes and augerholes according to the latest ASTM D 1586, generally at 1 m depth interval, where possible.

Results

The results show that the onsite overburden soils mostly comprise Lean Clay/ Lean Clay with Sand (CL), Sandy Silty Clay/Silty Clay with Sand (CL-ML), Silt/Sandy Silt (ML), Silty Sand (SM) and poorly graded Sand with Silt (SP-SM) groups as per Unified Soil Classification System (USCS).

4.6.3 Soil

The soil is sandy, while the soil of central Bahawalpur mostly consists of the plains of Indus basin,which is at the height of not more than 150 meters above sea level. But the southwestern desert, which is called Rohi or Cholistan, is mostly undulated due to the presence of sand dunes. The height of the sand dunes does not exceed 150 meters (according to Imperial Gazetteer of 1901 height of dunes was not more than 500 feet). Before the construction of Sutlej valley Project's Canal system, the irrigation was carried out with the flood water of Sutlej. This area is called "Otarh." The second major area in terms of topography, extending between the railway line andthe passage of Hakra, comprises of clay. The special ingredients are silt and sand dunes. Locally this is

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known as "Hitarh" and this is the prosperous and fertile area of the dwellings and markets of the colonies of Sutlej valley Project. Imperial Gazetteer concluded had divided this area lengthwise into three great strips: Rohi or Cholistan (desert); the central tract was Bar or Pat (upland); and the third was fertile alluvial tract in river valley called Sind. (Ahmed, 1998).

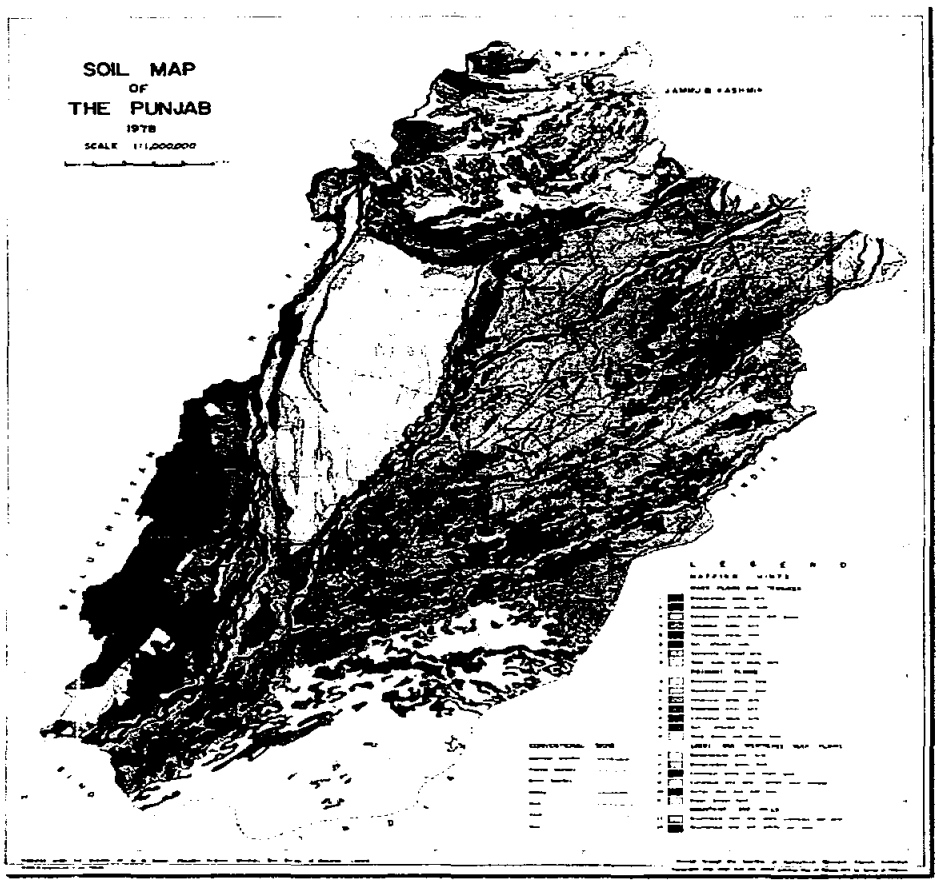


Figure 4.6: Soil Map of the Study Area

4.6.4 Hydrology

During regional groundwater investigations in Punjab, between 1954 and 1963, by Water and Soil Investigation Division (WASID), WAPDA and U.S Agency for International Development, Bari Doab was also investigated in detail. Total 69 test holes were drilled to depth 600 to 900 feet and 21 long duration pump out tests carried out to find out aquifer parameters of the Doab area. Detail of test holes in forms of geological cross-sections are given in "Water Supply Paper 1608-H, Plate-6 and pump out test data is given relevant document. An aquifer test was carried out near Lodhran (in Bari Doab), located 17 km from Bahawalpur on the northern side of River Sutlej

and may represent the project area. Salient features of the test results are:

Well Number	B-20
Depth of bore:	215 ft
Screen length:	135 ft
Discharge:	2.5 cusec
Drawdown	13.6 ft
Specific capacity:	0.184 cusec/ft
Permeability:	0.0013 ft/sec

Irrigation is largely dependent on the canals, but tube wells have also been sunk in the areas where water is fit for irrigation. The chemical quality of ground water in the district varies in different areas and at different depths. The water table is not seasonal and dug wells do not generally run dry. Groundwater sources exist in the area. Piped water supply is available in 23,569 housing units of Bahawalpur.

Irrigation and Link Canals

Following are the irrigation canals and link canals near Bhawalpur district.

i) Qasim Canal
ii) Bahawal Canal (U)
iii) Bahawal Canal (L)
iv) Pajnad Canal
v) Abbasia Canal

The major purpose of the canals is irrigation supplies.

WATER SOURCES

Groundwater Sources

Around the project area prominent facilities or settlements are Bahawalpur Grid station, Musharraf Agriculture Farm and rural settlements along Canal Head and Mari Sheikh Shujra. In all these areas groundwater is being pumped by installing private tubewells for agriculture and domestic uses. Depth to water table, in these areas, varies from 30 to 40 feet below ground surface.

Surface water Source

A non-perennial irrigation canal Ahmedpur East Branch canal flows along the

boundary of the project area. The canal is operated from April to September (Kharif Season). The project area is bounded by Distributaries 1L and 2L of Ahmedpur East Branch canal.[5]

4.6.5 Water Resources

Water well drilling industry is well developed in Bahawalpur. As reported by the local drillers, sub-surface formations, up to 400 feet depth, are mostly sands with intermittent thin layers of clay. Groundwater is reported to be generally of good to marginal quality.

Most of the town is served with water supply system whereas rest of the area is without it and people have their own sources of water mostly hand pumps / power pumps. Some areas are partly served with this facility Existing Condition. The present main source of water in Bahawalpur is ground water. Water table is 40-50[6] feet below the ground level. Theunderground water of the district is mostly brackish. Drinking water supply situation of Bahawalpur is much below as compared to all other cities; the service coverage is about 3% of population. The city faces similar issues related to drinking water supplies i.e, Low coverage ratio, Poor water quality delivered to users, Illegal connections, not enough trained and qualified staff, the water quality is reported to be poor. PCRWR carried out a survey of major cities in the Punjab among which was Bahawalpur. The results of the survey indicated that around 24% of the sampled water was polluted with E.Coli, 52% samples were found to be contaminated with Coliform bacterium, and 76% possessed excess Arsenic (As) - most of the samples contained more than 50 ppb which is 5 times more than the limits set by the WHO. The water supply network covers 10% of the town and serves 3% of the total population. Ground water in the Municipal area is generally saline except along the irrigation canals and the river. Presently PHED is executing rehabilitation and augmentation of Urban Water Supply Scheme for Bahawalpur City. This would help in drinking water supply needs and increase in service coverage. Southern Punjab Basic Urban Services Project (SPBUSP) also helping in water supply service provision and expenditure has been made of PKR 414.203 million and physical progress is 93%. Main Components of the existing system include tube wells, overhead reservoir and distribution network. The maintenance level of pumping machinery is not so reasonable. Privately installed hand

[5] **Source:***Master Planning and Detailed Designing for Development of Bahawalpur Industrial Estate*

[6] **Source:** IEE of 100 MW Solar PV Power Project in Bahawalpur Punjab - Pakistan

pumps / power pumps have been installed. Evidently, during post irrigation phase, the water table has been raised, thereby improving the sub soil water quality. The project is located on the south of the Sutlej River and lies in the Cholistan region near the Thar Desert, where effect of recharge is significant. As such, the sub soil water quality has improved over the period. The Aerial distance from project site to the River Indus is approximately 20 km away as shown in **Figure 4.7.**

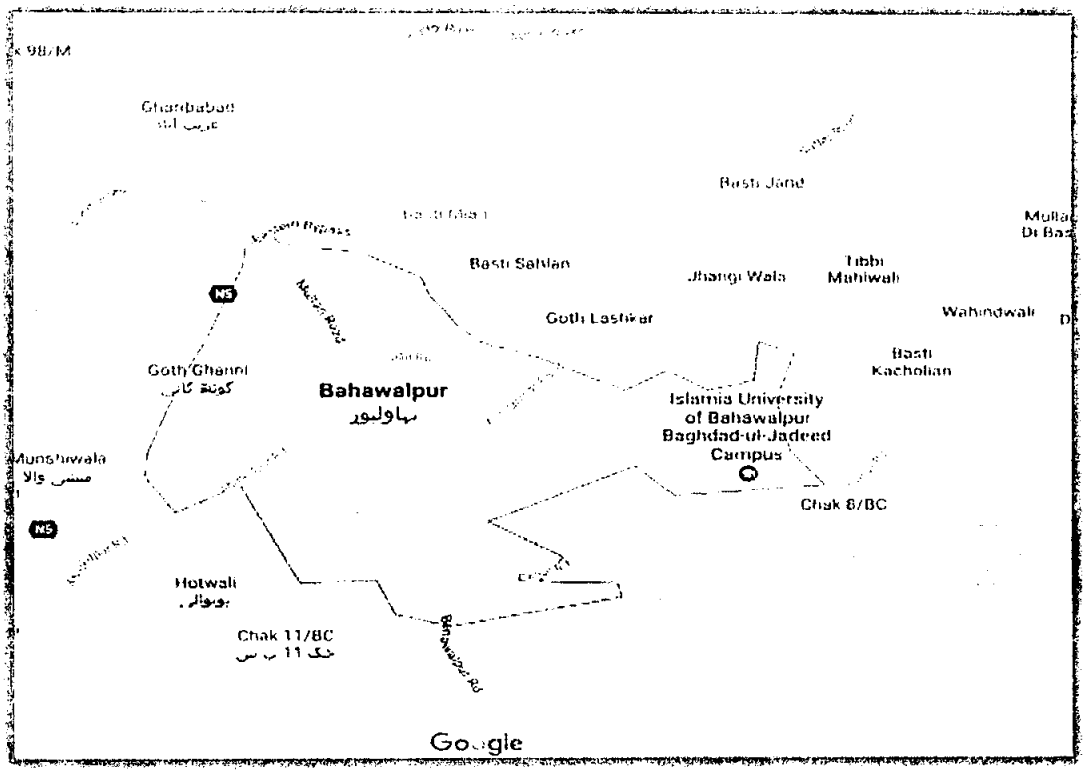


Figure 4.7: Overview Map of the Bahawalpur and Sutlej River

Ground Water Hydrology

In general, subsurface stratigraphy at the site consists of three basic litho logical units as given below:

a) Lean Clay/Silty Clay

b) Sandy Silt/Silt

c) Silty fine Sand/fine Sand

The soil is alluvial with sandy textured sand dunes covering 50 to 60 percent of the area. These soils are the alluvial deposits of the recent geologic times. The soil of central Bahawalpur mostly consists of the plains of Indus basin, which is at the height of not more than 150 meters above sea level. But the southwestern desert, which is

called Rohi or Cholistan, is mostly undulated due to the presence of sand dunes. The height of the sand dunes does not exceed 150 meters Main soil types of Cholistan desert are sand dunes (44%), sandy soils (37%), loamy soils (2%) and saline-sodic clayey soils (17%). The average water table in Chak 40 DB is 40-50 feet. The water of shallow wells present in the expansion areas contains higher values of TDS and therefore is not suitable for human consumption.The depth of water table is also depleting over the period. Due to increased number of private tube wells being installed in the location of sub project, the ground water is depleting. Recharge from surface /rain water is helping in reduction of depth of sub soil water table. During dry periods, the situation sometimes becomes quite serious.

Water Supply in the Area

The water supply network covers 10% of the town and serves 3% of the total population.Ground water in the Municipal area is generally saline except along the irrigation canals and the river. The depth of water table varies from 5.5 to 10 meters. Recharge from the canal and river is balancing the extraction presently. The river Sutlej is the main stream of the area, which flows from Northeast to the Southwest. It is the main sources of water supplies and recharge of the groundwater body (in addition to precipitation). The alluvial plain of Upper Indus Basin is also fed by an extensive canal irrigation system. Unconsolidated deposits are widely distributed in the form of alluvial fans. The alluvium is mainly composed of clay, well assorted sand and silt. Near Bahawalpur, the Thar Desert with its finger-like projections of desert and alluvial plain adjoins. In such areas the alluvial projection has sweet water in so-called sweet water pockets. Sand is fine to medium grained. Recent hydrological studies have shown that highly permeable material serves as an aquifer, which is suitable for installation of more than one cusec capacity tube wells; however, water is saline at greater distances from the rivers. Presently there are two types of suitable sources for drinking water supply:

- Seepage along the Bahawalpur canal
- Sweet water tube wells along the river (between the river and the railway line).

Hydrological maps show that there is enough water for the future. Seepage or recharge along the canal is also 0.46 million acre feet (maf) per year (0.567 mill m^3/yr).[7] It is

[7] **Source**: Urban Water Supply and Sewerage Reform Strategy World Bank – Government of Punjab report 2006

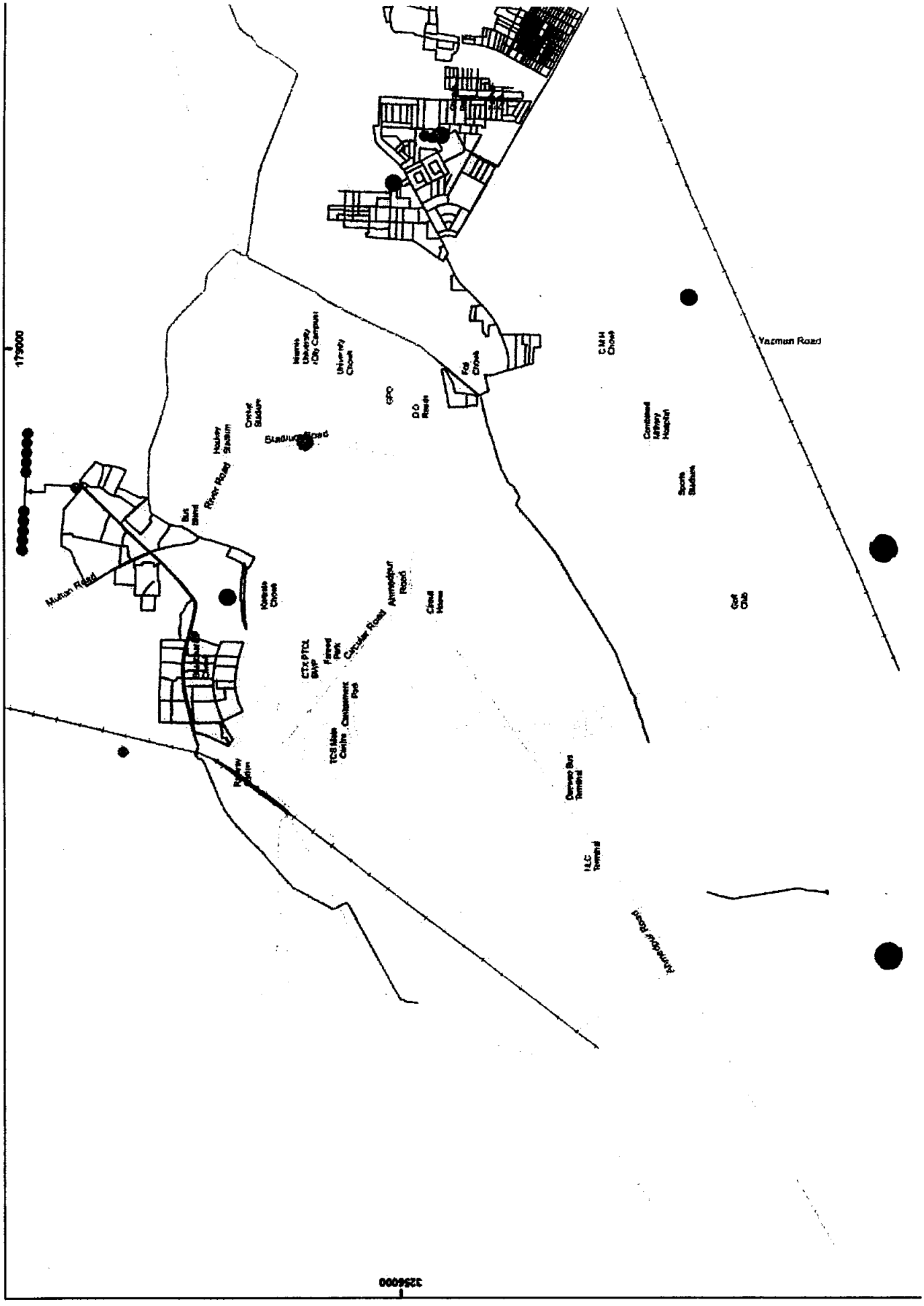
also a permanent source. In addition to the 1 cusec tube wells now operating in the area, additional tubewells can be installed to meet demand. A second option is direct supply from the canal and treatment of the water. Surface water could be available from the canal in quantities to be negotiated with the Irrigation department, if need arises. The TMA estimates 40% unaccounted for water (UfW). However since there are no water meters, this figure has to be treated as approximate.

Neither raw water nor drinking water quality is monitored on a regular basis in Bahawalpur. Water is contaminated in the distribution network through contact with sewage and other pollutants. Water quality at the tap is not monitored regularly. The pollution with agricultural chemicals or heavy metals is not monitored. Therefore, information on water quality at point of use is mainly anecdotal. PCRWR carried out a survey of major cities in the Punjab among which was Bahawalpur. The results of the survey indicated serious contamination problems. The reported situation in Bahawalpur is as follows:

- "The water samples were collected from 25 locations covering the whole city and all possible sources i.e. Tube well (13) and Hand Pump (12). Out of the 25 locations none of the sources is supplying safe drinking water to the people living in the city. After processing the analytical data it was estimated that 24% were polluted with E.Coli: 52% samples were found contaminated with Coliform bacterium:
- 76% possessing excess Arsenic (As) most of the samples containing more than 50 ppb which is 5 times more than WHO set limits:
- 4% having more Lead (Pb), 4% samples with more Nitrate (NO3) and K 12% with high Total Dissolved Solids(TDS), 32% water samples possessing excess level of Turbidity and the tube wells water of Commercial Area, Satellite Town has extreme levels of Turbidity may be due to damaged strainer pipes. 60% samples have higher concentration of Calcium (Ca) and the tube well Commercial Area, Satellite Town is pumping the water with more soluble ions of Ca (188 mg/l) be due to underground more calcareous mineral rocks, the hardness was observed beyond permissible limits in 16% water samples;
- The Sodium (Na) ions are high in 8% water samples but the hand pump water is highly brackish possessing high levels of both cautions and anions as wellas Arsenic. The hand pump is located at Govt. High School, Hamatian:

- While 4% were found with more Potassium (K) level;
- The anions like Sulphate (SO4) are also found beyond acceptable limits in 20% water samples:
- The micro element i.e. Iron (Fe) was on higher side in 64% samples, 4% samples were found contaminated with Al and Mo. The data was compared with WHO guideline values."1 According to Executive Engineering Public Health Engineering Department Bahawalpur, originally water supply scheme for Bahawalpur City approved in 1973-74 for Rs 4.966 million. And after that in 1981 the comprehensive water supply approved for Rs 13.684 million. In 1997-98 an extension of water supply scheme was approved under big city programme for Maqbool Colony Basti Rinddan & Basti Maseetan. Presently PHED is executing rehabilitation and Augmentation of Urban Water Supply Scheme Bahawalpur City. This scheme was approved in 29-11-2006 with a cost of 199.976 million. In current financial year 2010-11 an amount Rs 43.44 million is allocated. As reported by PHED about 80% works is completed, The Scope of Scheme includes;
  - Replacement265,000 Rft outlived water supply pipeline-3 inch dia to 24 inch dia.
  - Replacement 6200 defective house connection
  - Construction 2 tube wells of 1 cusec and 6 tube wells of 0.5 cusec
  - Construction 8 ground storage tanks and one overhead reservoir
  - Construction of 24 Pump house2x2feet
  - Provision and installation of 25 sets of Pumping machinery
  - External Electrification 22 Job
  - Laying of Rising main 61,520 Rft
  - Establishment of One water testing Laboratory.

Existing water supply services are shown below in **Figure 4.8.**



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Rivers

Only Satluj rivers flows in the north side of this district. Its length is 176 kmfrom Head Islam to Head Panjnad. The major source of irrigation was the water of Hakra River but with the drying of the river the area was desiccated and left with only grazing lands. The river supplied water regularly to this region until 1200 BC but near 600 BC it became irregular in flow and subsequently vanished.

Floods

Bahawalpur is situated on the south of Sutlej River. History is evidenced that Bahawalpur is seldom faced flood hazard. First mentionable flood came in 1945 when the city was the part of Bahawalpur state (abolished in 1954) and affected the areas nearby river Sutlej i.e. Khanwah Khander, Goth Laskder, Jhangiwala, Dera Bakha etc. The next devastating flood was witnessed in 1988 and at that time much more damages have been occurred on both sides of the river Sutlej and people homes, installed tube wells, standing crops, model colonies and small industrial estate badly flooded. In 2013, a flood likes 2010 damages many districts of Punjab including Bahawalpur, Vihari, Dera Ghazi Khan, Rajanpur, Narowal, Multan, Sahiwal, Muzaffargarh etc. Early estimates have shown that 25 districts in Pakistan have been affected by floods according to WHO Report of 2013 where 207 people have been died and 1,122 had injured in flood. More than 13,33,066 people have been affected in country due to flooding and over 12,48,644 acres of standing agricultural crops have been damaged.

Among all provinces and territories in Pakistan, Punjab has been severely affected by flood in all sectors (National Disaster Management Authority (NDMA), 2013). Later, on the basis of updates from different sources it is found that about 46 districts in Pakistan have been flooded in 2013 flood where 25 were located in Punjab province After passing 25 years in 2013, heavy monsoon rains in upper parts of the country and huge volume of water released by India in river Sutlej (that is almost abandon from many years) caused flood in nearby areas of Goth Laskder, Jhangiwala, Dera Bakha etc. in Bahawalpur city.

Due to high flood in river Sutlej, erosion had been inundated several villages and destroyed thousands of acres of crops from Minchinabad to Ahmadpur East in Bahawalpur. In the consequence of a high tide in river Sutlej, several villages have been submerged due to breaches in embankments in different areas as hundreds of acres

were submerged due to flood in river Sutlej and Chenab at Mauza Kachi Shikrani near Uch Sharif, Ahmedpur East due to a breach in an embankment. Thus, Ahmedpur East is one of the flood prone area in Bahawalpur that is regularly been facing severe flood damages since 2010. Flood 2013 also brought similar destruction in Ahmedpur East's many Union Councils (UCs) and Mouzas. Therefore, damages assessment of flood is essential to saving these financially backward and flood prone areas to formulate a comprehensive flood prevention plan and preparedness strategy to cope up the flood risks. Bahawalpur is considered as not flood prone districts of Pakistan according to the map released by Emergency Resource Center (ERC). Below maps in **Figure 4.9** shows Flood Prone districts of Pakistan developed by World Food Programme.

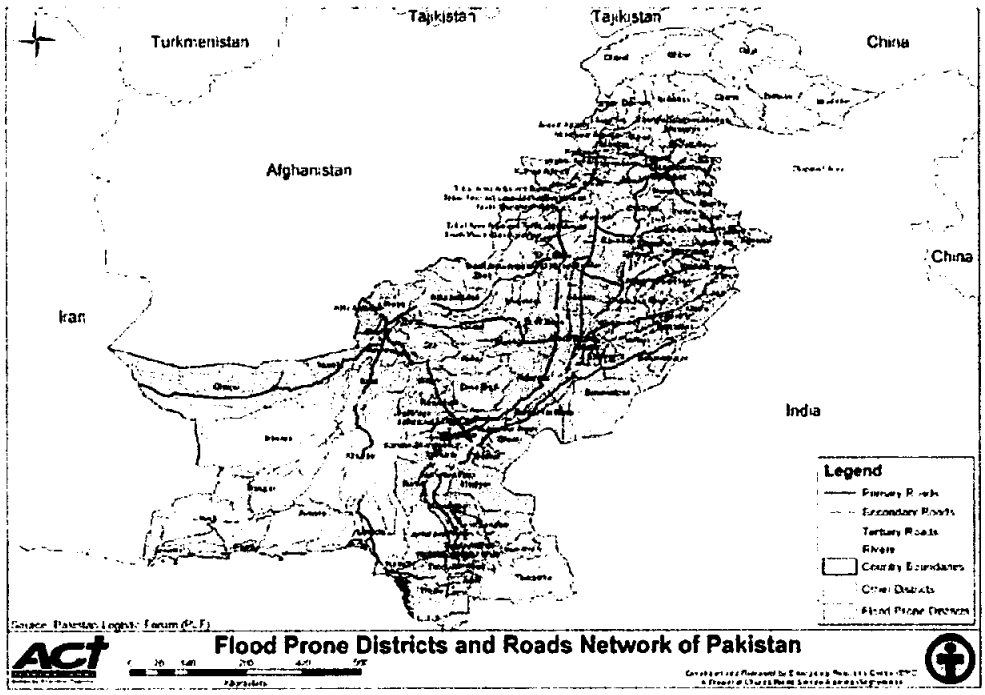


Figure 4.9: River Flood Prone Districts of Pakistan

Punjnnand Headworks is a very active and trouble some Headworks during the flood season. There was super flood of 9.62.000 cusees at this headworks during 1975 which caused serious damges in Bahawalpurand Rahimyar Khan district to some branchesin left Marginal Bund. The beds at this Headworks have been raised with a free board about 2 meters above H.L.F of 1973.

The reach RD. 38 to 52 Right Marginal Bund the first defense in 1985. A double bund was constructed in 1988 in setback position to protect valuable land,. The tendency of river persisted in 1990-1991 too. Now it has been proposed to construct a spur to divert

river on left side for reduction of its action on Right Marginal Bund.

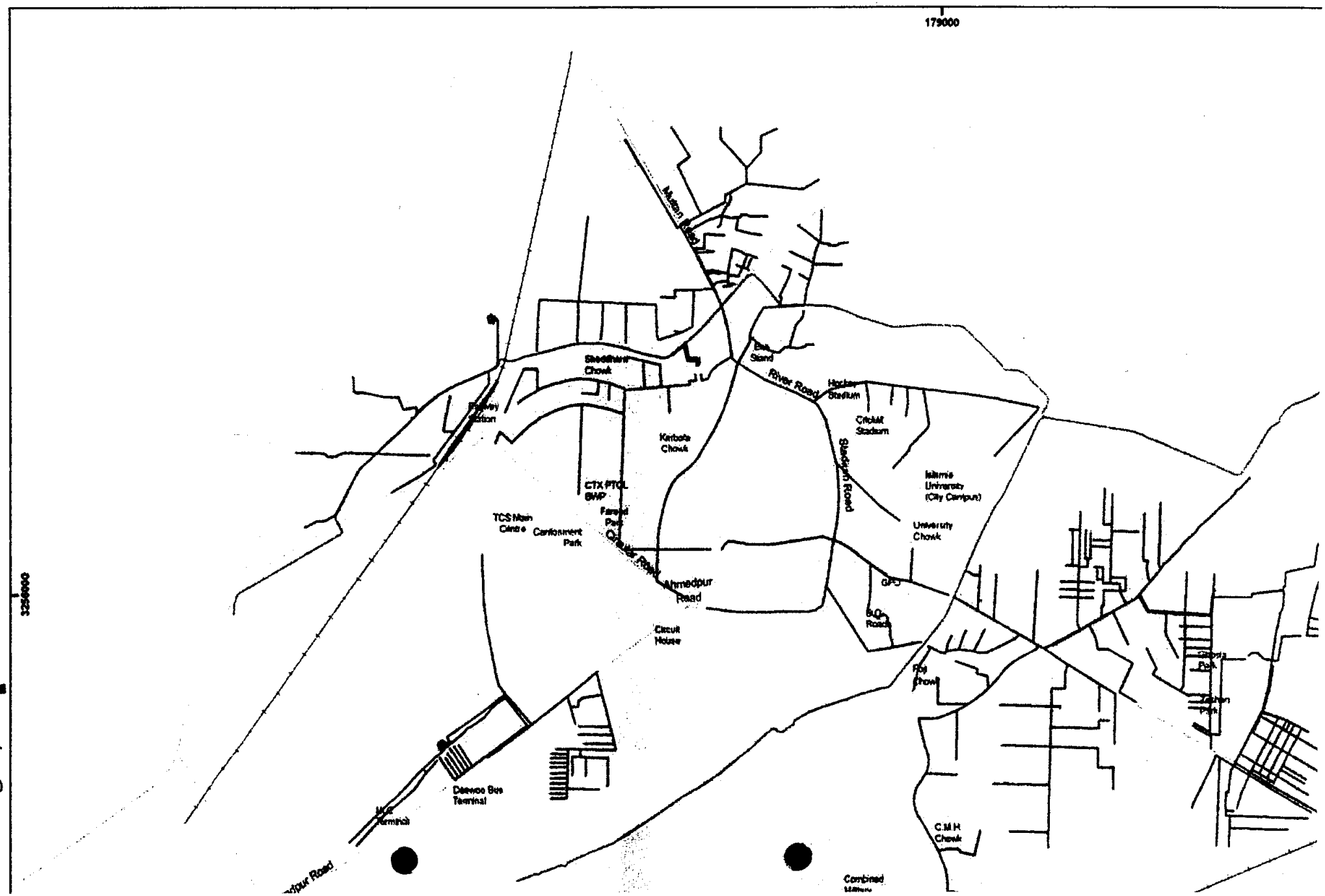
Lakes and Marshes

There are many small lakes at different places in Cholistan where the rain water remain stored. The people use this water for drinking , bathing and washing etc. these lakes are known as "Tobas" in local language. In many villages the cemented ponds or lakes have been constructed which are filled with canal water is supplied to the population of village.

Sewerage and Drainage:

The coverage of the sewerage facility is approximately 70%.There is currently no sewerage treatment. No plan is being developed to address this issue. Sanitation Services in Bahawalpur are provided by the Tehsil Municipal Administration (TMA).The major problem of the town is the inadequate network of sewers, open drains and lack of facilities for disposal of effluent. The existing Sewerage System (including the open drains) covers only 70% of the built area and serves 82% of the population.. The piped sewers have only been provided on the main roads, and most of the streets are provided with open drains only, which are connected to sewers. The total length of piped sewers is 175 km. The sewerage system has approximately 24,000 connections according to TMA information. There are 5 existing wastewater disposal (pumping) stations, which are periodically out of order. At present there is no facility for treatment of the waste water. The wastewater pumped from disposal stations is utilized without any treatment by farmers for irrigation, presenting a potential health hazard. The excess wastewater from the disposal stations is pumped either into the Sutlej River or into canals.

The major component of the Southern Punjab Basic Urban Services Project SPBUSPfor TMA Bahawalpur City is the construction of new sewerage system. However, a proper sanitation plan has still not been developed. The city has been divided into four Zonesan estimate for sewerage system, the Katchi Abadies have been included like Islami Colony, Banga Basti, Dilawer Basti, Dilawer Colony The sewerage of these low income areas will be catered of linking in the main sewer line, the main sewer line will pass along the Dr. Rafi Qammar Road, Satellite Town and up to the disposal station. Existing sewerage and drainage system is shown below in **Figure 4.10.**



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Mines & Minerals

There are no mines or minerals (except Sand) found in the district of Bahawalpur.

4.6.6 Environmental Monitoring

The environmental parameters like ambient air quality, noise level and ground water were monitored at the proposed project site from January 12, 2018 to January 16, 2018 for analyzing the quality of ambient air, ground water and level of noise at the proposed site, for establishing the baseline profile of the area. **Table 4.2** represents the coordinates and monitoring points of environmental parameters taken at the proposed project site.

Table 4.2: Monitoring Points of Environmental Parameters at the Proposed project Site

Sr. No.	Location/Description	Coordinates	
		Northing	Easting
Ambient Air Quality			
1	West Side Near Mariwala Khu	29°18'85.28"	071°34'44.65"
2	South Side Near Mushraf Khu	29°18'49.28"	071°35'35.93"
3	East Side Of Sangla Basti	29°19'16.52"	071°36'3.32"
4	Basti Sangla North Side Of The Project	29°18'34.51"	071°35'6.43"
Surface Water Quality			
1	Fateh Wah Canal	29°31'60.26"	071°57'25.17"
Drinking Water Quality			
1	Basti Sangha Jhak Ramzan	29°32'29.24"	071°59'44.65"
2	Maliwale Khu	29°31'61.91"	071°57'91.91"
3	Mouza Nauabad Raqba Pervaiz Mushharaf	29°31'12.57"	071°60'09.50"
4	North Side Near School	-	-
Noise Level			
1	West Side Near Mariwala Khu	29°18'85.28"	071°34'44.65"

Sr. No.	Location/Description	Coordinates	
		Northing	Easting
2	South Side Near Mushraf Khu	29°18'49.28"	071°35'35.93"
3	East Side Of Sangla Basti	29°19'16.52"	071°36'3.32"
4	Basti Sangla North Side Of The Project	29°18'34.51"	071°35'6.43"

4.6.6.1 Air Quality

The ambient air quality monitoring for Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Nitrogen Oxide (NO) and Particulate Matter (PM_{10}) was carried out at the proposed project site. The sampling was conducted for 24 hours period.

The detailed air pollutant and noise data has been given in **Annexure-IV**, while the average concentration of ambient air pollutants are given in **Table 4.3.**

Table 4.3: Average Concentration of Ambient Air Pollutants

Parameter	Unit	Monitoring Duration	Average Concentration of Pollutants				Limits As Per NEQS
			Point 1	Point 2	Point 3	Point 4	
Carbon Monoxide (CO)	mg/m^3	24 Hours	0.47	0.50	0.50	0.50	05.0 ($\mu g/m^3$) for 8 Hours
Sulfur Dioxide (SO_2)	$\mu g/m^3$	24 Hours	3.78	3.78	3.84	3.48	120 ($\mu g/m^3$) for 24 Hours
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	24 Hours	10.25	12.73	13.53	13.94	80 ($\mu g/m^3$) for 24 Hours
Nitric Oxide (NO)	$\mu g/m^3$	24 Hours	3.72	3.72	3.77	03.90	40 ($\mu g/m^3$) for 24 Hours
Oxides of Nitrogen (NOx)	$\mu g/m^3$	24 Hours	13.97	16.45	17.30	17.84	150 ($\mu g/m^3$) for 24 Hours
Particulate Matter(PM_{10})	$\mu g/m^3$	24 Hours	20.32	31.32	26.40	27.24	150 ($\mu g/m^3$) for 24 Hours

Parameter	Unit	Monitoring Duration	Average Concentration of Pollutants				Limits As Per NEQS
Particulate Matter($PM_{2.5}$)	$\mu g/m^3$	24 Hours	11.88	15.38	12.71	13.72	35 ($\mu g/m^3$) for 24 Hours
Suspended Particulates Matter(SPM)	$\mu g/m^3$	24 Hours	198	178	184	184	500 ($\mu g/m^3$) for 24 Hours
Lead	$\mu g/m^3$	24 Hours	0.02	0.02	0.02	0.02	1.5 ($\mu g/m^3$) for 24 Hours
Ozone	$\mu g/m^3$	1Hours	95.05	97.21	96.97	96.24	130 ($\mu g/m^3$) for 1 Hours

$\mu g/m^3$: micrograms per cubic meter mg/m^3:milligram per cubic meter

NEQS: National Environmental Quality Standards

Table 4.3 indicates that all parameters are well within the permissible limits of National Environmental Quality Standards (PEQS) at the project site. **Plate 4.2** shows a view of Ambient air quality and noise level monitoring at West Side Near Mariwala Khu, South Side Near Mushraf Khu, East Side Of Sangla Basti and Basti Sangla North Side Of The Project.







Plate 4.2: A view of Ambient Air and Noise Level Monitoring

4.6.6.2 Noise Monitoring

Noise level monitoring was carried out at the same location where ambient air quality was monitored. Noise levels were monitored with the help of a potable digital sound meter at the project site for twenty four (24) hours. The detailed noise level monitored results are attached as **Annexure–IV** respectively. Average monitored values of noise are given in **Table 4.4.**

Table 4.4: Average Monitored Values of Noise

Sr. No.	Sampling Locations	Leq. Hourly Maximum dB (A)		Punjab Environmental Quality Standards (PEQS) 2016	
		Day Time (0600-2200 hrs.)	Night Time (2200-0600 hrs.)	Day Time (0600-2200 hrs.)	Night Time (2200-0600 hrs.)
1	Point 1	44.2	40.3	65	55
2	Point 2	48.5	44.2	65	55
3	Point 3	51.6	37.8	65	55
4	Point 4	45.6	39.3	65	55

Table 4.4 indicates that all parameters are well within the permissible limits of Punjab Environmental Quality Standards (PEQS) at the project site.

4.6.6.3 Surface Water Quality

Surface water sample was taken on January 22,2018 from Fateh wah Canal and was analyzed. The analysis results of surface water samples are compared with Punjab Environment Quality Standards (PEQS) for Surface Water Quality. **Plate 4.3** shows a

view of surface water sample collection while **Table 4.5** shows the results of surface water analysis.

Table 4.5: Surface Water Analysis of the Project Area

Sr. No.	PARAMETER	Unit	Results	NEQS for Drinking Water Quality
			FatehWah Canal	
1	pH@25°C	-	7.4	6.0-9.0
2	Temperature	oC	12.7	-
3	Total Dissolved Solids	(TDS) mg/l	1240	3500
4	Chlorides Cl^{-1}	mg/l	43.4	1000
5	TSS	mg/l	198	200
6	BOD_5	mg/l	20	80
7	COD	mg/l	37	150
8	Boron	mg/l	1.2	6
9	Oil & Grease	mg/l	4	10
10	Cadium	mg/l	0.01	0.1
11	Mercury	mg/l	BDL	0.01
12	Arsenic	mg/l	0.05	1
13	Ammonia	mg/l	0.14	40
14	Phenolic Compound	mg/l	BDL	0.1
15	Selenium	mg/l	BDL	0.5
16	Chromium	mg/l	1.69	1
17	Copper	mg/l	BDL	1
18	Cyanide	mg/l	0.01	1
19	Fluoride	mg/l	3.1	10
20	Lead	mg/l	BDL	0.5
21	Manganese	mg/l	0.1	1.5
22	Sulphate	mg/l	121	600
23	Nickel	mg/l	BDL	1
24	Sulfide	mg/l	BDL	1
25	Ionic Detergenta as MBAs	mg/l	ND	20
26	Zinc	mg/l	BDL	5.0

Sr. No.	PARAMETER	Unit	Results	NEQS for Drinking Water Quality
			FatehWah Canal	
27	Pesticide	mg/l	ND	0.15
28	Barium	mg/l	ND	1.5
29	Silver	mg/l	BDL	1
30	Iron	mg/l	BDL	8
31	Total Toxic Metals	mg/l	BDL	2
32	Chorine	mg/l	BDL	1

Key: BDL = Below Detection Limit **ND** = Not Detectable

PEQS= Punjab Environmental Quality Standards

The above table illustrates that all parameters are well within permissible limits of PEQS 2016 of surface water except the concentration of chromium which is slightly higher than the standard values may be due to the contamination of industrial effluents.



Plate 4.3: A View Of Surface Water Sample Collection

4.6.6.4 Drinking Water Quality

Drinking water sample was taken from Hand Pump of Basti Sangha Jhak Ramzan, Maliwale Khu, Mouza Nauabad Raqba Pervaiz Mushharaf and North Side Near School near project site and was analyzed for physical, chemical and microbiological parameters. The monitored results are compared with Drinking Water Quality Standards (DWQS), 2016. Plate 4.4 shows a view of ground water sampling and Table 4.6 shows the results of analysis.

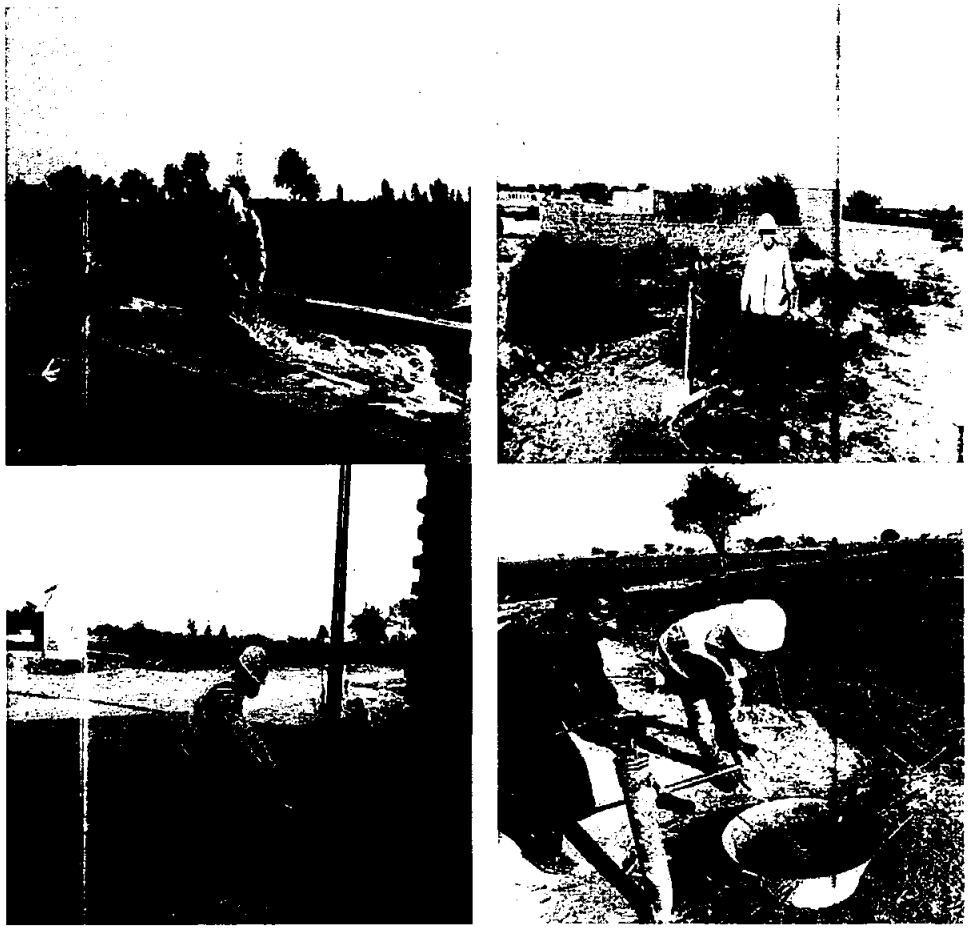


Plate 4.4: A View of Drinking Water Sample Collection

Table 4.6: Drinking Water Analysis of the Project Area

Sr. No.	Parameter	Unit	Results				Dwqs Limiting Values
			Basti Sangha Jhak Ramzan	Maliwale Khu	Mouza Nauabad Raqba Pervaiz Mushharaf	North Side Near School	
1	pH@25°C	pH unit	7.4	7.2	7.2	7.3	6.5-8.5
2	Temperature	oC	15.2	15.1	13.4	13.9	-
3	Total Dissolved Solids	(TDS) mg/l	814	1065	1830	757	<1000
4	Chlorides Cl^{-1}	mg/l	144	120	132	123	<250
5	Escherichia Coli	E.Coli (Count/100ml)	0	0	0	0	0/100ml
6	Fecal Coliforms (E.coli)	F.Coli (Count/100ml)	0	0	0	0	-
7	Total Coliforms Bacteria	TC(Count/100 ml)	0	0	0	0	0/100ml
8	Boron	mg/l	1	1	3	1	-
9	Total Hardness as $CaCO_3$	(mg/L)	172	174	185	150	<500
10	Cadium	mg/l	ND	ND	ND	ND	0.01
11	Mercury	mg/l	ND	ND	ND	ND	<0.001
12	Arsenic	mg/l	ND	ND	ND	ND	<0.05
13	Alminium	mg/l	BDL	BDL	BDL	BDL	<0.2
14	Tubidity	NTU	2	2.4	3.7	2.7	<5
15	Selenium	mg/l	BDL	BDL	BDL	BDL	0.01
16	Chromium	mg/l	1.31	1.55	1.19	0.85	-

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Sr. No.	Parameter	Unit	Results				Dwqs Limiting Values
			Basti Sangha Jhak Ramzan	Maliwale Khu	Mouza Nauabad Raqba Pervaiz Mushharaf	North Side Near School	
17	Copper	mg/l	BDL	BDL	BDL	BDL	2
18	Cyanide	mg/l	ND	ND	ND	ND	<0.05
19	Fluoride	mg/l	0.6	0.6	0.5	0.3	<1.5
20	Lead	mg/l	BDL	ND	ND	ND	<0.05
21	Manganese	mg/l	0.1	0.2	0.09	0.2	<0.5
22	Phenolic Compund	mg/l	BDL	BDL	BDL	BDL	-
23	Nickel	mg/l	BDL	BDL	BDL	BDL	<0.02
24	Nitrate		12.7	11.4	2.9	BDL	<50
25	Nitrite	mg/l	0.35	0.29	0.01	BDL	<3
26	Zinc	mg/l	0.19	0.32	0.23	0.1	5
27	Pesticide	mg/l	ND	ND	ND	ND	-
28	Barium	mg/l	ND	ND	ND	ND	0.7
29	Residual Chlorine	mg/l	ND	ND	ND	ND	0.2-0.5
30	Colour	TCU	4	7	6	7	<13
31	Odour	Odour	NO	NO	NO	NO	Objectionable/ Non-Objectionable
32	Taste	Taste	NO	NO	NO	NO	Objectionable/ Non-Objectionable

Key: **BDL** = Below Detection Limit **ND** = Not Detectable

PEQS= Punjab Environmental Quality Standards **NO**=Non-Objectionable

Table 4.6 shows that all the parameters are within the permissible limits of DWQS except for Total Dissolved Solid (TDS) which is high at Maliwale Khu and Mouza Nauabad Raqba Pervaiz Mushharaf as ground water may contain mineral ions dissolved from soil particles, sediments, and rocks as the water travels along mineral surfaces in the pores or fractures of the unsaturated zone and the aquifer. The increase in the value of TDS may also be due to the higher concentration of chloride. **Plate 4.4** shows collection of ground water near project site for physio-chemical and biological analysis.

4.6.7 Seismology

According to Seismic Zoning Map of Pakistan included in the Pakistan Building Code Seismic Provisions (2007), Bahawalpur falls in Zone 2A (Lower limit of moderate damage). The project site falls in southern part of Punjab plain which shows very low to moderate level of seismicity. The project region has also been subjected to shaking in the past due to earthquakes in the Suleiman Range located about 140 km northwest to the site. The basement rocks underlying the southern part of the Punjab Plain show very low seismicity indicating stable basement region. So the main source of shaking at the project site is related to moderate to large earthquakes in the seismically active Suleiman Range.

Probabilistic seismic hazard assessment carried out as part of the revision of the Building Code of Pakistan Seismic Provisions (2007) shows that the project area falls in Zone-2A with peak horizontal ground acceleration of 0.10g i.e. negligible damage as given in **Figure 4.11.** (ground motion with return period of about 500 years) for soft rock foundation condition.

It is therefore recommended that the project structures should be designed to cater the requirements of Zone 2A of seismic provisions (2007) of Building Code of Pakistan after giving due consideration to the soil profile at site. **Figure 4.11** shows seismic zoning map of Punjab indicating location of the proposed project.

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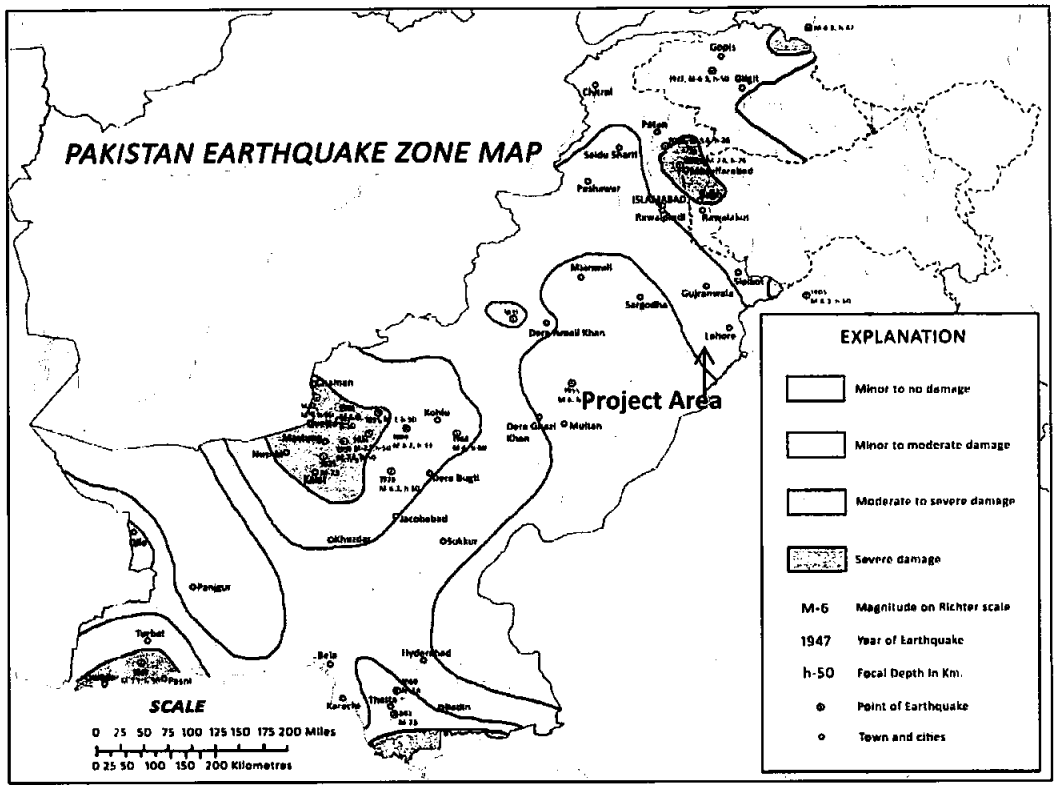


Figure 4.11: Seismic Hazard Zones of Pakistan

4.6.8 Solid Waste

The city of Bahawalpur generates approximately 280 tons of MSW every day. The existing solid waste management system (SWMS) of Bahawalpur is being managed by the Tehsil Municipal Administration (TMA). The existing solid waste collection is divided into primary and secondary collection system[8].However, Currentl y there is not any properly designed sanitary landfill site for waste disposal in the town. No proper solid waste plan has been developed. 60% of the waste generated is being collected and disposed off. This situation will worsen with the increasing population. There is no proper solid waste management system in Town that places waste in sanitary landfills. Sanitary sweepers carry solid waste by means of wheel barrow and donkey carts to secondary collection points. From here, the waste is transported to open dumping sites at different five places. These places are being used by TMA since many years Management of Solid Waste and Liquid Waste services coverage in Bahawalpur City are almost same like in other cities i.e Sargodha, Sahiwal, Rahim Yar Khan and Jhang, but far better from cities like Chiniot, Kasur, Sheikhupura, Okara, Gujrat, Dera

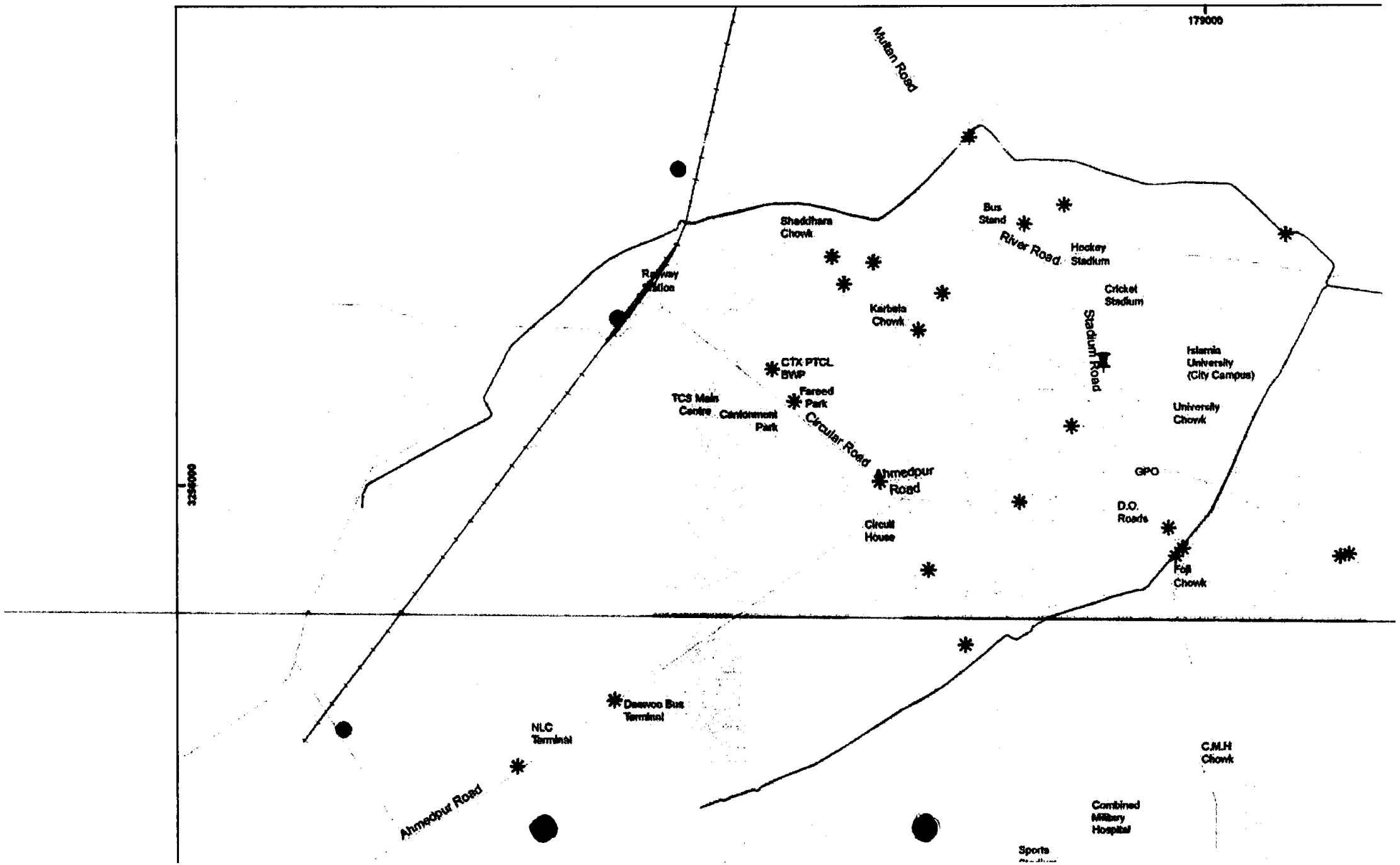
[8] **Source:** Punjab Cities Improvement Investment Program "Bahawalpur City Profile"

Ghazi Khan and Sialkot. There is no difference of ultimate disposal of both the wastes (Solid Waste and Liquid Waste) are being disposed as untreated to nearby outlets and dumping of Solid Waste near city areas. The only official site available for Waste disposal at Badar Sher is being operated without following basic principles of landfilling. This disposal site accepts only 200 tons of solid Waste every day. The Remaining chunk of MSW is being dumped in depressions, open plots and along roadside which result in serious health and environmental impacts.

BWMC envisions improvement in Solid Waste Management (SWM) and overall environment in Bahawalpur by providing scientifically designed sanitary landfill at Bhinda Dakhli. The proposed facility shall comprise of waste reception facility, weigh bridge, fencing, internal roads, surface water drainage system, leachate & landfill gas collection and treatment systems, offices, parking areas, garage and service stations etc. The KOICA World Bank study 2007 revealed that Bahawalpur Solid waste composed as:

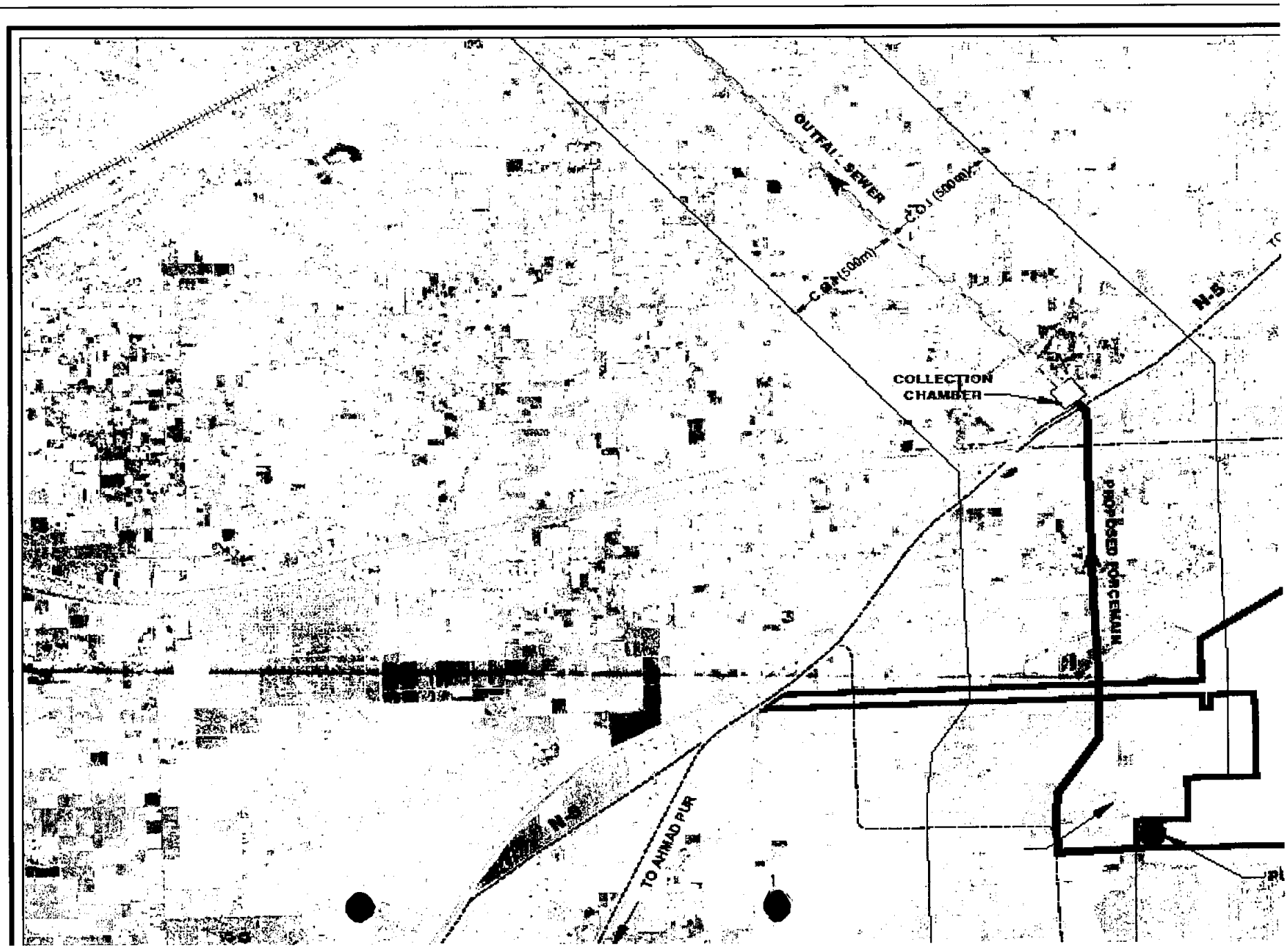
- Vegetable / Putrescible 19%
- Paper & Cardboard %6
- Glass, Ceramics 10%
- Shopper Bags 6%
- PET Bottles 2%
- Plastics & Rubber 10%
- Wood, Bones, Straw 8%
- Metals 3%
- Textiles, Rags 6%
- Batteries, Syringes, etc -.
- Miscellaneous Inerts, Debris 32%

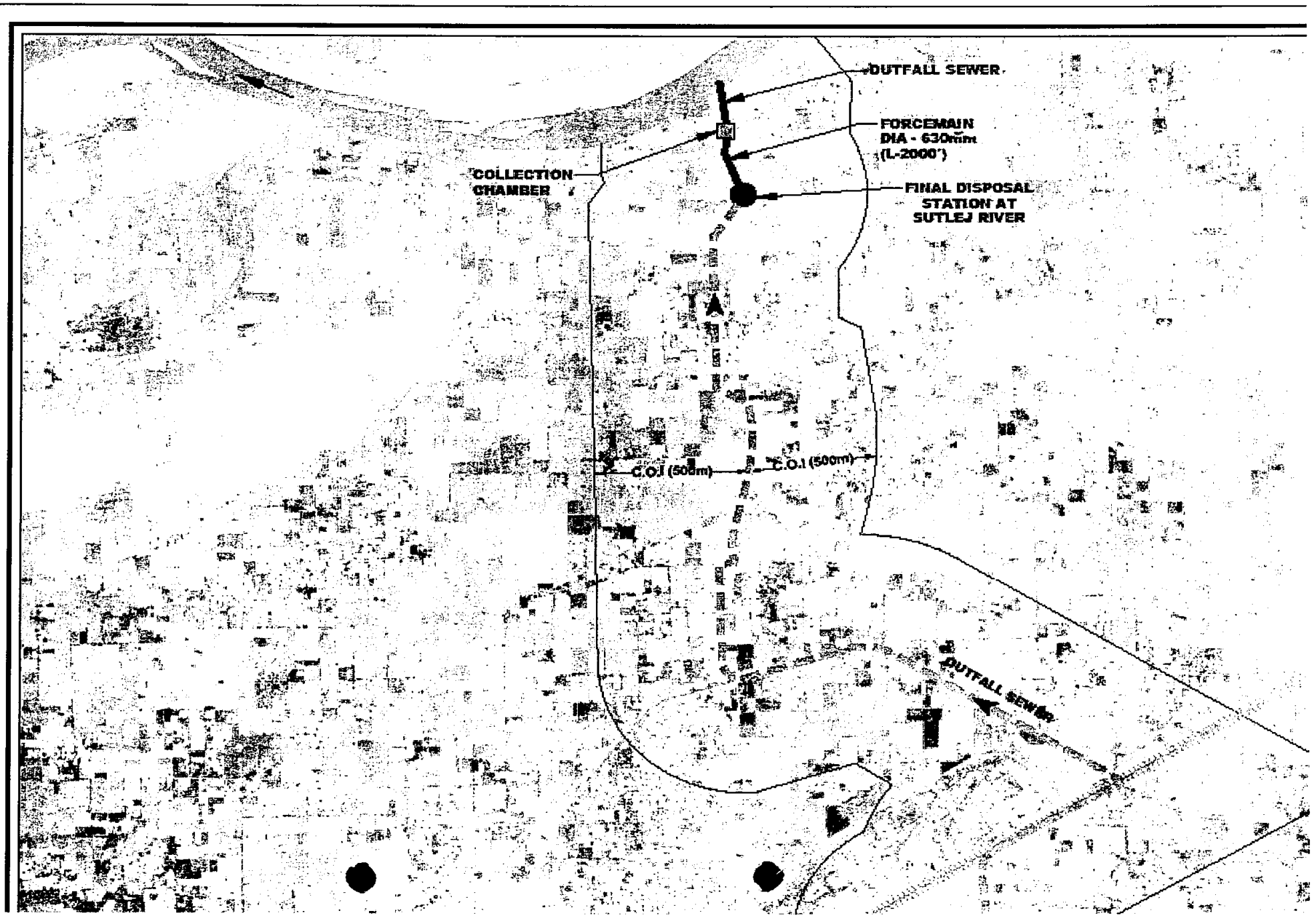
Existing solid waste management system is shown in **Figure 4.12** below.


179000
Multan Road
Shadbhara Chowk
Bus Stand
River Road
Hockey Stadium
Cricket Stadium
Stadium Road
Karbala Chowk
CTX PTCL BWP
Farooq Park
TCS Main Centre
Cantonment Park
Circular Road
Ahmedpur Road
Islamia University (City Campus)
University Chowk
GPO
D.O. Roads
Circuit House
Faiz Chowk
Daewoo Bus Terminal
NLC Terminal
Ahmedpur Road
C.M.H Chowk
Combined Military Hospital
Sports

4.6.9 Land Use

The land use in the project area comprises of agricultural fields and sand dunes. The proposed site is also inhabited with residential settlements around it i.e Mariwala Khu, Rama and Sheikh Shajra villages etc. land use map of the project area is shown below in **Figure 4.13 (a)**, **Figure 4.13 (b)** respectivley.


OUTFALL SEWER
C.D.J (500m)
C.D.P (500m)
N-5
COLLECTION CHAMBER
PROPOSED FORCEMAIN
TO AHMAD PUR



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4.6.10 Sensitive Receptors

Sensitive receptors within 1Km radius of the Proposed Project area were identified during the site visit. Mosques, educational institutes, graveyard and health care facilities were the sensitive receptors present within the Corridor of Impact (COI) i.e. 1Km from the Project site, whereas other sensitive receptors were present at great distances from the Project site.

A Corridor of Impact (COI) is a limit which identifies the area where direct or indirect impact of the proposed project on physical and social environment are envisaged like removal or relocation of trees, structures, utilities, and other private and public infrastructure (e.g. poles, pipes, water channels etc.) present around the Corridor of the Project.

4.6.11 Ecological Resources[9]

4.6.11.1 Flora

Flora of the district has been greatly modified by the old open forests of small trees and shrubs; there remains only a few or portions of forest which are kept as gazing ground for cattle in some area. Amongst trees the most important are Kikar (Acacia Nilotica), Frash (Tamasix Aphylla), Pillu (Salvadora Oleoides), Jand (Prosopis Spicigera), Kareer (main diet of Houbara Bustard), Phog, Khar, Grasses, Shrubs, Hurbs etc are present in the area. The main crops for which Bahawalpur is recognized are cotton, sugarcane, wheat, sunflower seeds, rape/mustard seed and rice. Bahawalpur mangoes, citrus, dates and guavas are some of the fruits exported out of the country. Vegetables include onions, tomatoes, cauliflower, potatoes and carrots. There is wild growth of mesquite bushes, and some Sirin and Kikar trees in the areas near the works, but natural forest cover in the district has been significantly reduced in the past due to clearance for cultivation. The project area has no plantation except some trees, shrubs and hurbs so there is no or minor impact on the species. The detail flora of the district ia as under:

Table 4.7: Detail Flora Of The District

Sr. No.	Trees Name	Scietific Name
1	Jand	Prosopis Spicigera

[9]District Census Report Bahwalpur, 1998

Sr. No.	Trees Name	Scietific Name
2	Karir	Capparis Aphylla
3	Farash	Tamarix Articulata
4	Pilchi	Tamarix Gallion
5	Bhos	Calliginus Polygonic Des
6	Lana	Suds Ruiteesa
7	Lani	Salsola Fostida
8	Khar	Haloxylon Recurum
9	Jawan	Alhagai Camelorum
10	Ak	Calotropis Hamiltonit
11	Lamb	Aristida Depressa
12	Chimber	Cenchrus Claria
13	Caram	Penicus Antidotale

Protected Areas/National Sanctuaries

In Pakistan there are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. One national park Lal Sunhara 30 km from the project site. This provides excellent feeding, breeding and resting habitats to numerous migratory as well as resident birds. The national park is located on one of the major bird migration routes of the world[10].

Lal Suhanra National Park is located in the southeastern Punjab of Pakistan with altitudes ranging from 125 to 140 meters. The flora of Park consists of 212 species belonging to 162 genera and 50 families. The Dicots having 41 families, 118 genera and 158 species, were the most diverse and dominating group of plants in this area followed by Monocots with 5 families, 40 genera and 50 species, Pteridophytes with 3 families, 3 genera and 3 species and Bryophytes represented by monotypic species. Poaceae was the leading family that contributed 43 grasses, followed by Fabaceae (16 spp.), Asteraceae (15 spp.), Chenopodiaceae (10 spp.), Euphorbiaceae (9 spp.), Boraginaceae (8 spp.), Amaranthaceae (7 spp.), Aizoaceae, Cucurbitaceae, Mimosaceae and Solanaceae (6 spp. each), Capparaceae, Caryophyllaceae and Scrophulariaceae (5

[10]Source: IEE of *Power Distribution Enhancement Multi-tranche Financing Facility– Tranche-III MEPCO New 132KV Chunawala DGS and associated Transmission Line*

spp. each), whereas, the largest genera were Chenopodium (5 spp.), Cenchrus (4 spp.) and Amaranthus (3 spp.)

a. Trees Affected by the Project

45 number of trees will be cut during construction phase of the project.

4.6.11.2 Fauna

There are no areas of wildlife significance near the project area The most common animals in the city include the hog deer, ravine deer, black buck and blue bull. Fox, jackals, hares, wild boars, porcupines, mongoose, arks, owls and hawks are also found in large numbers. Pig and hog deer are found in woodland near the river and hares are fairly common. The Bahawalpur Zoo, one of the few zoos in Pakistan, is located in Bahawalpur. Spread over an area of several acres inside the city, it contains a variety of animal species, including Asiatic lions, Bengal tigers, hyenas, leopards, and peacocks. The zoo has a collection of 130 animals and 700 birds from tropical regions, particularly those found in the Cholistan region. The zoo occasionally breeds and supply animals to other zoos in the country. It also has an aquarium and zoological museum with stuffed rare birds and animals. Located 30 kilometres east of the city is the Lal Suhanra National Park, one of the few safari parks in the country housing large animals including lions and rhinoceros.

a. Mammals

The terrestrial mammals include Cat,Dog, Horse and Donkey **(Table 4.8).**

Table 4.8: Mammals of the Project Area

Sr. No.	Scientific Name	Common Name
1.	Canis lupus familiaris	Dog
2.	Equusferus	Domestic Horse
3.	Equusafricanus	Donkey

b. Amphibians

Amphibians frequently seen in and around the project area, especially during rainy season include Frogs (Daddos) are found in great number throughout the district. Alligators (Sansars) are also found.

c. birds

Migratory birds use the Indus valley and in cold weather many varieties of duck and teal visit the district Because of intensive agriculture pesticide use is a common practice. This has impacted the bird populations adversely. Black and Grey partridges *(Francolinus francolinus and F. pondicerianus),* are the worst hit as they are also hunted and captured to be kept as pets. They need to be protected since they are affected by the spraying of pesticides. Bird species known to occur in the area are: Caracal, Chinkra, Houbara Bustard, Great Indian Bustard, Sand, Groud, Desert Costal, Grey Baridrige, Doves, Raptors, Vultures, Diversified song birds, different types of shrikes, Jackal and Jungle cat. Bashin, Tamtari, Crow and Parrot.

a. Reptiles

Snakes such as cobra, kraits etc. were once common in the tract, Kala Mushki, Sangchoor (Yellowish), Dhoi, Lundi Kharpa and Jalebi are also found. In cholistan area a very particular type of snake called Sahi Pina (breath Drinking) is also found. Lizards are of numerous and of various species, such as Sanda (the oil of which has restorative power), Spiny tailed lizard (Uromastixhardwickii) and fringed toed lizard (Acanthodactylus cantoris), are also reported in the project area. The lizards include three poisonous species called Kirla, Gohiri and Sanaha. One of these called Khanrh. **(Table 4.9).**

Table 4.9: Reptiles of the Project Area

Sr. No.	Scientific Name	Common Name
1	Najanaja	Cobra
2	Podarcis	House Lizard

b. Fisheries

The Indus contains a variety of fish. In the winter months when the river recedes, fish are caught in greater quantity.

4.6.11.3 Wetlands

There are no wetlands in the project study area.

4.6.11.4 Endangered Species

There is no such threatening or endangers species of flora and fauna exist as indicated by IUCN red list of the species in the project study area.

4.6.11.5 Wildlife Sanctuaries and Game Reserves

No wildlife sanctuary or game reserves are located in the vicinity of the project area.

Environmentally Sensitive Area

There is not any environmentally sensitive area located in or near to the buffer zore of the project, Lal- Sohanra National Park is located approximately 30 km away from the project boundary. There is no impact of project activity on environmental sensitive area.

4.6.11.6 Critical Habitats

No wild life sanctuary or game reserve (Critical Habitats) exists in project study area and therefore it can be quantified that proposed project does not affect any critical habitat.

4.6.11.7 Cultural Heritage and Community S tructure

There are no of historical, religious or archeologically important sites in the bahwalpur district Archaeologically, and spiritually, some immensely distinguished Sufis shrines existing at Uch include those of Hazrat Jalaluddin Surkh Bukhari , Hazrat Bahawal/ Baha'al Haleem, Hazrat Syed Jalauddin Bukhari commonly known as Makhdoom Jahanian Jahangasht, and Bibi Jawanadi and Shaikh Saifuddin Ghazrooni .like Mausolleum of Syed Jalaluddin Bukhari and his family were joined by a series of domed tombs[11]. The first is said to have been built for Baha' al-Halim/ Haleem by his pupil, while the second is Jahaniyan Jahangasht's tomb is next to Bibi Jawindi Mausoleum. Channan Pir Shrine is located an hour's drive away from Bahawalpur City and 45 km from Derawar Fort. Channan Pir was a disciple of Makhdoom Jahanian Jahangasht of Uch Sharif. The city is also renowned for its many famous palaces which include Noor Mahal, Darbar Mahal, Sadiq Ghar Palace, as well as some more ancient fort of Derawar located in the Cholistan Desert and bordering India.

There are no officially protected heritage sites or historic, religious or archeologically important sites located in the project works areas. There is a major historic or archaeological feature (Masjid Al Saddiq)present within the project site 11.75Km away from the project site.

[11] *Pakistaniaat: A Journal of Pakistan Studies* Vol. 2, No. 2 (2010)

4.7 Socio-economic Baseline Structure

This section deals with the existing social conditions of the proposed project area. During the desk/ office study, available reports/ documents were comprehensively reviewed. Detailed site visits were conducted by the Consultants' EIA team (Sociologists and Environmentalists) to appraise the prevailing socio economic conditions and to assess the impacts of Construction of Bahawalpur Industrial Estate during construction on the local settlements To achieve the project objectives, it is imperative to study the prevailing socio-economic conditions of the local community. During the field survey, interviews and meetings were conducted with the local residents of the project area, shop owners, shop keepers (renters), customers, pedestrians, farmers and road users etc. Observations were made after giving consideration to the desk/ office study results. The survey tool used for the socio-economic survey is attached as an **Annexure – V.**

4.7.1 Political and Administrative Setup

The project area falls in the administrative jurisdiction of District Bahawalpur, which is under general charge of the Deputy Commissioner, followed by five Assistant Commissioners and ten Magistrates responsible for the coordination of function of all the nation building departments in the district. The judicial administration of the district is under the charge of district and session judge along with five additional district judges.

4.7.2 Study Area

The study area falls in Bahawalpur City and Saddar Tehsil. According to DCR Bahawalpur 2017, it has a population of 1,256.646 persons of which 681.696 population is of City Tehsil while 574.950 population is of Saddar Tehsil.

4.7.3 Population and Communities

Along the project area, village Mari Sheikh Shujra, Sangal Wali Pull Village, Noabad and Dera Ramazan Village were located. Brief description about each village is presented below.

Mari Sheikh Shujra Village:

Mari sheikh shujra is situated at a distance of 100 m from the proposed project site. It consists of 110 households having a total population of approximately 900 persons. Electricity facility is available in the village. Hand Pumps/Ground Water is the

available source for drinking water. Basic Heathcare Units (BHU) and dispensaries are available in the village. Educational facility is available for both boys and girls. There is no post office and commercial bamk located at Mari Sheikh Shujra Village.

Sangal Wali Pull Village:

Sangal Wali Pull Village is situated at a distance of 360 m approximately from the proposed project site. It consists of 200 households having a total population of approximately 3500 persons. Electricity facility is available in the village. People use drinking water from filtration plants installed by the government departments. are the available sources for drinking water. No Medical and Educational facility is available in the village.

Noabad Village:

Noabad Village is situated at a distance of 1770 m approximately from the proposed project site. It consists of 800 households having a total population of approximately 5000 persons. Electricity facility is available in the village. Hand Pumps/Ground Water is the available sources for drinking water. No Medical facility is available in the village. Educational facility is available for both boys and girls.

Dera Ramazan Village:

Dera Ramazan Village is situated at a distance of approximately 400 m from the proposed project site. It consists of 30 households having a total population of approximately 200 persons. Electricity facility is available in the village. Hand Pumps are the available sources for drinking water.Government Hospital facility is available in the village. Educational facility is available for both boys and girls.

4.7.4 Demographic Characteristics of Bahawalpur District

The total population of Bahawalpur District was 2,433,091as enumerated in March 1998 with an intercensal percentage increase of 67.4 since March 1981 when it was 1,453,438 souls. The average annual growth rate of population in the district during intercensal period 1998-2017 was 3.07 percent. The total area of the district is 24,830 square kilometers which gives population density of 98 persons per square kilometer as against 59 persons observed in 1981 indicating a fast growth rate of the district. **Table 4.10** gives population, its intercensal increase and average annual growth rate since 1951 of Bahawalpur district. Later on 1998, the massive efforts are made to count the population and census bureau carried out latest census and released the latest statistics

of 2017 at the national, provincial and district level. According to the results, the total population of Pakistan is measured as 207,774,520 persons with annual growth rate of 2.40% and the population of Punjab is 110,012,442 persons with annual growth rate of 2.13%. By the annual growth rate of 2.18%, the population of District Bahawalpur is estimated as 3,668,106 persons out of which 1,879,311were male and 1,788,578were female. Sex ratio is measured as 105.07 percent.

Table 4.10 Households, Population Increase, Sex Ratio and Growth Rates

Sr. No	Area	Households	Population-2017				Population 1998	Sex Ratio 2017	1998-2017 Average Annual Growth Rate
			Male	Female	Trans-gender	All Sexes			
1	Bahawalpur	584,864	1,879,311	1,788,578	217	3,668,106	2,433,091	105.07	2.18
2	Punjab	17,103,835	55,958,974	54,046,759	6,709	110,012,442	73,621,290	103.54	2.13
3	Pakistan	32,205,111	106,449,322	101,314,780	10,418	207,774,520	132,352,279	105.07	2.40

Source: Pakistan Bureau of Statistics (Census 2017)

A) Rural and Urban Distributions

The urban population was 665,304 or 27.3 percent of the total population of the Bahawalpur district, which grew at an average rate of 4.21 percent during 1981-98. The growth decreased from 4.65 percent, which was observed during 1972-81. There are one Metropolitan Corporation, two Municipal Committees, one Cantonment and four Town Committees in the District.

There were 1,216 Mauzas (a smallest revenue unit) in 1998. Of these 71 had population over 5 thousand, another 265 had 2 to 5 thousand, 232 had one to two thousand, and 389 had under one thousand persons while 259 were un-inhibited.

B) Religion

The population of the district is predominantly Muslims i.e. 98.1 percent. The next higher percentage is of Hindu with 0.9 points followed by Christian 0.6 percent. While other minorities like Ahmadis, Schedule Castes etc. are very small in number as shown in the **Table 4.11** given below:

Table 4.11: Percentage of Population by Religion and Rural/ Urban Areas

Religion	Bahawalpur District		
	All Areas (%)	Rural (%)	Urban (%)
Muslims	98.1	98.1	98.0
Christians	0.6	0.3	1.4
Hindu	0.9	1.1	0.3
Ahmadis	0.1	0.1	0.1
Scheduled Castes	*	*	*
Others	0.3	0.3	0.1

**** Refers to a very small number***
Source: DCR Bahawalpur District, 1998

C) Ethnic Structure

The main castes and groups of the Bahawalpur district are Arain, Jatt, Rajput, Pathan, Gujjar, Baloch, Qureshi and Syed. These casts have been further sub-divided in various sub- caste and sub-tribes.

D) Mother Tongue

The mother tongue refers to the language used for communication between parents and their children in any household. Siraiki is the predominant language being spoken by majority (64.3 percent) of the population of the district followed by Urdu, Pushto and Punjabi being spoken by 5.5, 0.6, and 28.4 percent.

E) Sex Ratio

Number of males for every 100 females was 111 percent recorded in 1998 Census in the district, which had decreased from 113 in 1981. The ratio was 109 percent in rural areas and it was 115 in urban areas. According to census 2017, Sex ratio is measured as 105.07 percent.

F) Marital Status

The population above 15 years was classified into never married, married, widowed and divorced. 28.0 percent of the total population was never married, 66.2 percent married, 5.5 percent widowed and 0.4 percent divorced. The percentage share of never married male was higher than that of females, being 33.2 percent and 22.1 percent respectively. The percentage of never married females was higher in urban than in rural

areas. **Table 4.12** gives details about percentage of population 15 years and above by marital status, sex and rural and urban residence.

Table 4.12: Population Percentage Distribution by Marital Status, Sex and Rural/Urban Areas

Marital Status		Bahawalpur District		
		All Areas (%)	Rural (%)	Urban (%)
Never Married	Both Sexes	28.0	26.2	32.5
	Male	3.23	31.8	36.7
	Female	22.1	20.1	27.4
Married	Both Sexes	66.2	67.9	62.0
	Male	63.0	64.2	60.3
	Female	69.7	71.8	64.0
Widowed	Both Sexes	5.5	5.6	5.2
	Male	3.5	3.8	2.8
	Female	7.7	7.5	8.1
Divorced	Both Sexes	0.4	0.4	0.3
	Male	0.2	0.3	0.2
	Female	0.6	0.6	0.5

Source: DCR of Bahawalpur District, 1998

G) Migration

The total number of life time in-migrants in Bahawalpur district was 150,785 or 6.2 percent of the population of the district. Of total life time in-migrants 59,823 persons settled in the towns. Of total district migrants 77.2 percent came from other districts of the Punjab, 4.3 percent were from Sindh, NWFP and Baluchistan while remaining 18.5 percent were Pakistanis who repatriated from other countries. There is no case of migrants whose birth place was not reported. **Table 4.13** throws light on life time in-migrants with their decomposition by place of origin and settlement in rural and urban areas of the district.

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Table 4.13: Life Time Migrants in the District by Rural/ Urban Areas, 1998

Description	Migrants by Residence		
	All Areas (%)	Rural (%)	Urban (%)
Total in-migrants	100	100	100
Migrants from the same province	77.2	80.5	72.1
Migrants from other provinces	4.3	4.5	4.1
Migrants from AK/ NA	**	**	**
Migrants from other countries	18.5	15.0	23.8
Migrants from places not reported	0	0	0

Source: DCR of Bahawalpur District, 1998
*** Including FATA and Islamabad Capital Territory**
**** refers to very small number**

4.8 Economic Conditions

A) Economically Active Population of the Bahawalpur District

The economically active population is defined here as the persons working most of the time during the year preceding the census date i.e. 5th March 1998, looking for work, lay off and un-paid family helpers assisting their family. The economically active population as enumerated in the last census was 26.4 percent of the total population or 38.4 percent of the 10 years and over i.e. the population exposed to the risk of entering the economically active life at any time. The formal percentage is known as Crude Activity Rate (CAR), while the latter is known as Refined Activity Rate (RAR). Of the total male population 49.3 were economically active, while 50.7 percent were inactive, 30.8 percent children under 10 years, 10.1 percent students, 1.6 percent domestic workers, while 8.2 percent were landlords, property owners, retired persons, disabled etc. Further details can be seen in **Table 4.14.**

Table 4.14: Percentage (%) of Population by Economic Categories, Sex and Rural/Urban Areas, 1998

Economic Category	All Areas (%)			Rural (%)			Urban (%)		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
Economically Active	26.4	49.3	1.0	26.2	49.5	0.7	26.9	48.7	1.4
Economically Inactive	73.6	50.7	99.0	73.8	50.5	99.3	73.1	51.3	98.4
Children under 10	31.4	30.8	32.0	32.4	32.1	32.8	28.6	27.5	29.9

Economic Category	All Areas (%)			Rural (%)			Urban (%)		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
Students	5.6	10.1	0.5	4.5	8.2	0.4	8.4	14.9	0.9
Domestic Workers	32.3	1.6	66.4	32.5	1.8	66.0	32.0	1.2	67.5
Others	4.4	8.2	0.1	4.4	8.4	0.1	4.1	7.7	0.1
Unemployment Rate	19.8	20.0	6.1	19.3	19.4	8.7	21.1	21.6	2.9

Source: DCR of Bahawalpur District, 1998

B) Unemployment

Unemployment rate is measured as ratio of looking for work and laid off in total economically active population comprising employed, looking for work, laid off and unpaid family workers, generally representing in percentage. The unemployment rate was 19.8 percent, which was mainly due to unemployment amongst males representing 20.0 percent, while female unemployment rate was just 6.1 percent. This is because of their small proportion in total economically active population. The detail is given in above in **Table 4.19.**

C) Employed Population by Occupations

In 1998 of the total employed persons, 34.8 percent had elementary occupations, followed by service workers, and shop and market sale workers, 9.2 percent and professional 3.5 percent. In rural areas people having elementary occupations, were again in majority followed by skilled agricultural and fishery works and service workers and shop and market sale workers represented 56.3, 31.7, and 5.3 percent respectively. The highest percentage in urban area is of elementary occupations too, followed by service workers and shop and market sales workers having 43.1and 19.4 percent respectively. Further details are given in **Table 4.15.**

Table 4.15: Percentage of Employed Population by Occupation & Rural/Urban Areas, 1998

Occupation		All Areas (%)	Rural (%)	Urban (%)
Sr No.	Description			
1	Legislators, Senior Officials and Managers	0.3	0.4	0.2
2	Professional	2.3	1.1	5.5
3	Technicians and Associate Professionals	2.6	1.3	5.9
4	Clerks	0.9	0.5	2.1
5	Services Workers and Shop and Market Sales	9.2	5.3	19.4

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Occupation		All Areas (%)	Rural (%)	Urban (%)
Sr No.	Description			
	Workers			
6	Skilled Agricultural and Fishery Workers	44.7	56.3	14.0
7	Craft and Related Trade Workers	3.5	2.2	6.9
8	Plant and Machine Operators and Assemblers	1.6	1.1	2.9
9	Elementary Occupations	34.8	31.7	43.1
10	Others	0.2	0.1	0.2

Source: DCR of Bahawalpur District, 1998

D) Industry, Trade and Trade Centers

The Most famous industries lying in Bahawalpur area include Fertilizer, Sugar, Cotton, and Textile, Beverages, flour & Cottage Industries. Fuji Fertilizer Company , Unilever , Jamal Din wali Sugar Mill, Hamza Sugar mill, Itehad Sugar Mills are the most important industries playing fundamental role in the economy of the area. Being an industrial expanding city the government has revolutionized and libertised various markets allowing the Caustic Soda, Cotton Ginning & Pressing, Flour Mills, Fruit Juices, General Engineering, Iron & Steel Re-rolling Mills, Looms, Oil Mills, Poultry Feed, Sugar, Textile Spinning, Textile Weaving and Vegetable Ghee & Cooking Oil industries to flourish.

4.9 Educational Facilities

The district has literacy rate of 35% (1998 census) with male literacy rate at 44.9% and female at 24%. Looking across regions, 57% of urban population (Male: 52.9%; Female: 47.1%) and 26.3% rural population (Male: 36.4%; Female: 15.1%) of Bahawalpur are literate. However, according to (Multiple Indicator Cluster Surveys) MICS 2007-08 survey, the literacy rate above 10 years is 45% (Male 51.66%; Female: 48.34 %). Similarly, urban rural distribution shows 65% urban population (Male: 52.5 %; Female: 47.5%) and 37% rural population (Male: 51.3 %; Female: 48.7%) is literate. There are over 1600 government primary schools- 45% of which are for girls. Middle schools are 226, over 60% are for girls, and 39% for boys, while high schools are 125 and 62% are for boys. As level of education increases, percentage of boys schools increases in the district. However, higher secondary schools are the same in the district, 14 each. Total number of arts and science degree colleges are 18 having enrolment of almost 20,000 students and teaching strength of 543. The higher education institutions in Bahawalpur district include; Islamia University of Bahawalpur, Asian

college of Technology Hasilpur Road Bahawalpur, Rise School of Accountancy, Tebiya College, Four Elementary colleges for teaching training, Quaid-e-Azam Medical College (QAMC), Government Sadiq Egertin College (SE College), Government Sadiq Degree College for Girls, Millat College and Post Graduate College Baghdad Road. Number of educational institutions by sex and type is given in the **Table 4.16** below.

Table 4.16: Educational Institutions by Sex and Type

Sr. No.	Name of Institutions	Institute		
		Male	Female	Private
1	Primary	797	756	138
2	Middle	80	85	120
3	High/Secondary	04	03	-
4	Intermediate Colleges	03	02	-
5	Degree Colleges	02	03	-
6	Vocational Institute	02	01	-
Total		**888**	**850**	**258**

Source: DCR of Bahawalpur District, 1998

Project Area

In the project area, government educational system is found named as government girls primary school in Mari Sheikh Shujra village.

4.10 Health Facilities

Health conditions are one of the major determinants of a society's social development and quality of life. Healthy manpower is imperative for advancement and economic growth. The major health facilities available in the district are District Headquarter Hospital, Tehsil head quarters Hospital at each Tehsil along with M.C. Health Centre, Primary Rural Health Centers, Primary Dispensaries, Basic Health Units, TB Centers and 72 Dispensaries. The Zila Council is also running dispensaries, MC Centers and Veterinary Hospitals.

Project Area

The proposed project area includes Basic health unit (BHU) in Mari Sheikh Shujra village.

4.11 Socioeconomic Baseline Survey

The information regarding socioeconomic baseline survey is based on the primary data collected from the project area. Baseline survey was carried out to identify the socioeconomic conditions and their impacts & magnitudes on the affected population. A sample of 100 respondents was selected on the basis of simple random sampling technique, which includes farmers, shop keepers (renters), customers, local residents, pedestrians, road users and students etc. During the survey, both males and females were included in the sample.

Efforts were made to include the different types of stakeholders according to their stakes in the sample and contact the maximum population during the survey. The survey tool used for the socio-economic survey is attached as an **Annexure – V.**

4.12 Methodology

Data Source

Data collection for socioeconomic study of the proposed project involved socio-economic baseline survey of the proposed project area.

i) Primary Data

Primary data was collected through socio-economic baseline survey. For the selection of respondents simple random sampling technique was adopted and 100 households residing within the project area and in the vicinity of proposed project were selected. After determining sample size, an interview schedule was developed for the collection of baseline data. That includes demographic characteristics, livelihoods, economic conditions, family patterns, household sizes, quality of life and land acquisition and settlement patterns etc.

The collected data was analyzed by a software called "Statistical Package for Social Sciences" (SPSS), because it has an easier and quicker access to basic functions and also useful to get the actual and accurate results of baseline data.

Spread sheet format was created in SPSS in the form of quantitative data. After entering, checking, sorting, and transforming the data, the basic operation, data analysis was taken place through descriptive analysis by finding out the percentages and the frequencies of the respondent's views in the form of tables and charts/graphs. These

percentages, frequencies and charts/graphs of baseline data were automatically generated by this software.

ii) Secondary Data

Secondary data was collected from District Census Report (DCR) Bahawalpur, 1998, Pakistan Bureau of Statistics (Census 2017) for socio economic baseline survey.

4.12.1 Field Survey

A site visit of the proposed project was carried out during the month of January, 2018. This included the collection of demographic and socio-economic baseline information. During the survey major focus was to collect information about educational levels, economic resources and dependencies, family patterns, household sizes, quality of life, availability of facilities, water resources and its use & satisfaction, perceived impacts of the project, their protective measures, basic needs, the means to safeguard their interests during project implementation. Along the project area, village Mari Sheikh Shujra, Sangal Wali Pull Village, Noabad Village and Dera Ramazan Village were included in the sample survey. A Written feed back from the respondents in the project area attached as an **Annexure –VI.**

4.12.2 Survey Results

1. Demographic Characteristics of the Respondents

Demography is defined as statistical analysis of data about the characteristics of a population, such as the age, sex / gender, religion, ethnic structures, mother tongue, marital status of the people within the population. According to survey, demographic characteristics of sampled population are described hereunder;

a) Sex Ratio of the Respondents

The sex ratio is proportional distribution of the sexes in a population aggregate, expressed as the number of males per 100 females. During the baseline survey, 100 respondents were interviewed, comprising 100% males and no females. **Table 4.17** shows sex ratio of the respondents.

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Table 4.17: Sex Ratio of the Respondents

Sex Ratio of the Respondents			
Sr. No.	**Sex Ratio**	**Number**	**Percentage (%)**
1	Male	100	100
2	Female	00	00
Total		**100**	**100**

Sex ratio of the respondents is shown in the following pie chart **(Figure 4.14)**.

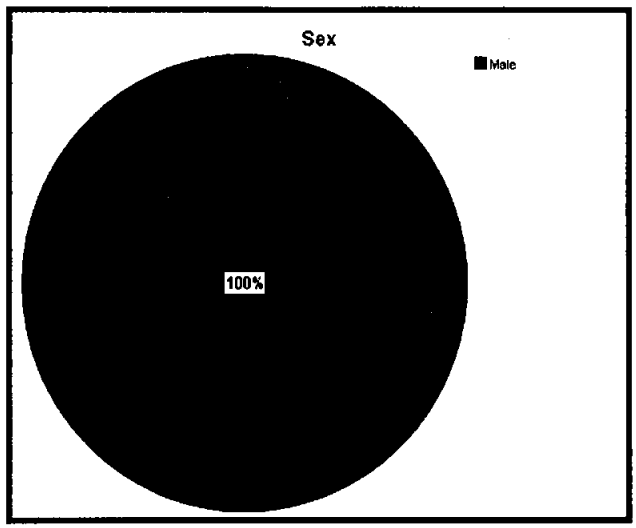


Figure 4.14: Sex Ratio of the Respondent

b) Age Composition of the Respondents

The demographic characteristics of the sample survey (**Table 4.18**) showing that 20% of the respondents were up to 25 years of age, 18% of the respondents were aged between 26 – 35 years while, 28% were 36 – 45 years and 34% respondents were more than 45 years of age. These figures show that sampled respondents were mature enough to give their opinion about the proposed project and have envisioned of its impacts.

Table 4.18: Age Composition of the Respondents

Age Composition of Respondents			
Sr. No.	**Frequency Distribution**	**Number**	**Percentage (%)**
1	15-25	20	20
2	26-35	18	18
3	36-45	28	28
4	Above 45	34	34
Total		**100**	**100**

The pie chart **(Figure 4.15),** given below shows the age composition of the respondents.

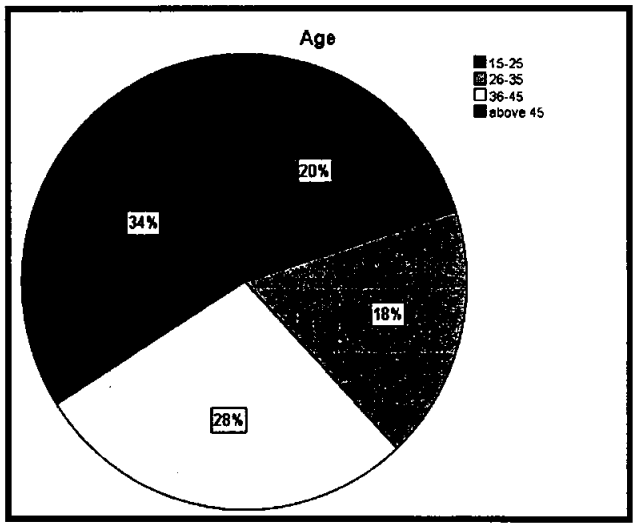


Figure 4.15: Age Composition of the Respondents

c) Religion

According to baseline survey results 100 respondents, 100% of the respondents interviewed were Muslims **(Table 4.19).**

Table 4.19: Religion of the Respondents

Religion			
Sr. No.	**Religion**	**Number**	**Percentage (%)**
1	Islam	100	100
Total		**100**	**100**

The pie chart **(Figure 4.16),** given below shows the religion of the respondents.

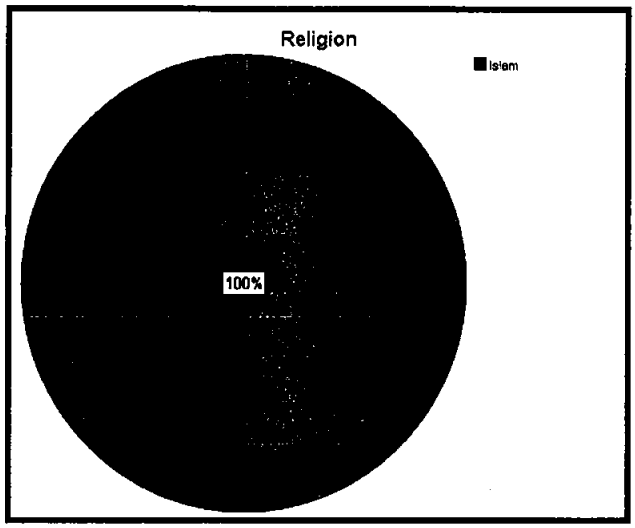


Figure 4.16: Religion of the Respondents

d) Marital Status

In sampled respondents, the percentage share of the married respondents was higher than that of the unmarried. Majority of the respondents i.e. 90% were married while 10% were unmarried **(Table 4.20).**

Table 4.20: Marital Status of the Respondents

Marital Status			
Sr. No.	**Marital Status**	**Number**	**Percentage (%)**
1	Married	90	90
2	Unmarried	10	10
Total		**100**	**100**

The pie chart **(Figure 4.17)** given below shows the marital status of the respondents.

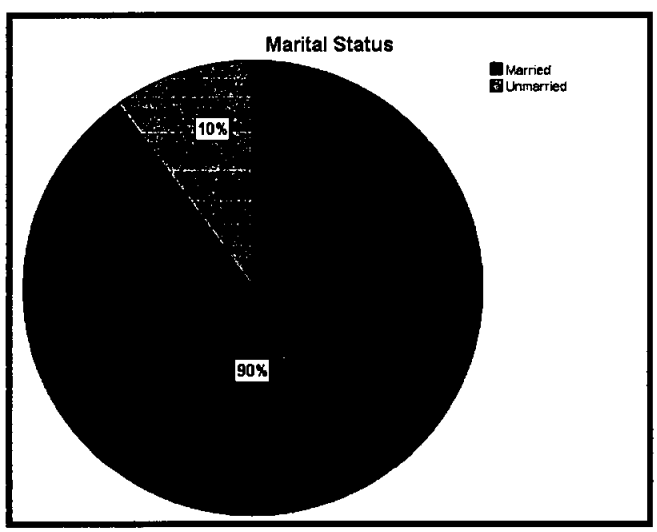


Figure 4.17: Marital Status of the Respondents

e) Mother Tongue

When respondents were asked about their mother tongue then it was observed that Siraiki language is the predominate language being spoken in the project area. (100% respondents) **Table 4.21** shows the language being spoken by the respondents.

Table 4.21: Mother Tongue of the Respondents

Mother Tongue			
Sr. No.	**Mother Tongue**	**Number**	**Percentage (%)**
1	Siraiki	100	100
Total		**100**	**100**

The mother tongue used by the respondents is illustrated in the following pie chart **(Figure 4.18)**.

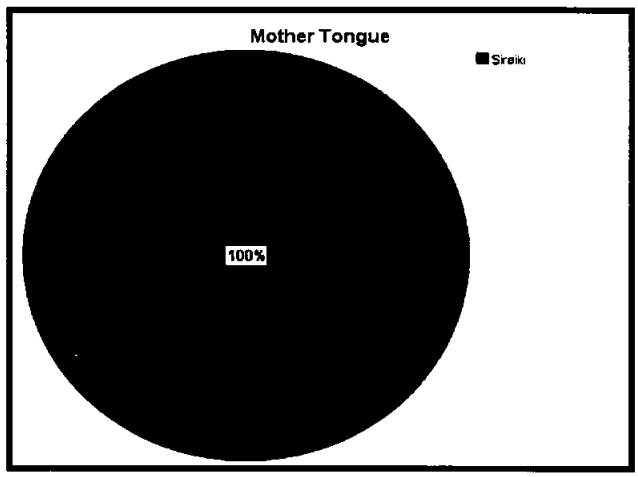


Figure 4.18: Mother Tongue of the Respondents

f) Caste / Ethnic Group

According to baseline survey, it was found that the largest part of the respondents i.e. 38% were Larah, 24% were Jutt, 14% were Lashari, 08% were Qureshi, and 06% were Bhutta. While 04% were Syed and Khokar each and 02% were Chohan. The castes of the sampled respondents are given in **Table 4.22.**

Table 4.22: Caste / Ethnic Group of the Respondents

Caste / Ethnic Group			
Sr. No.	**Caste / Ethnic Group**	**Number**	**Percentage (%)**
1	Larah	38	38
2	Jutt	24	24
3	Lashari	14	14

Caste / Ethnic Group			
Sr. No.	**Caste / Ethnic Group**	**Number**	**Percentage (%)**
4	Qureshi	08	08
5	Bhutta	06	06
6	Syed	04	04
7	Khokar	04	04
8	Chohan	02	02
Total		**100**	**100**

The pie chart below **(Figure 4.19)** shows the caste distribution of the respondents

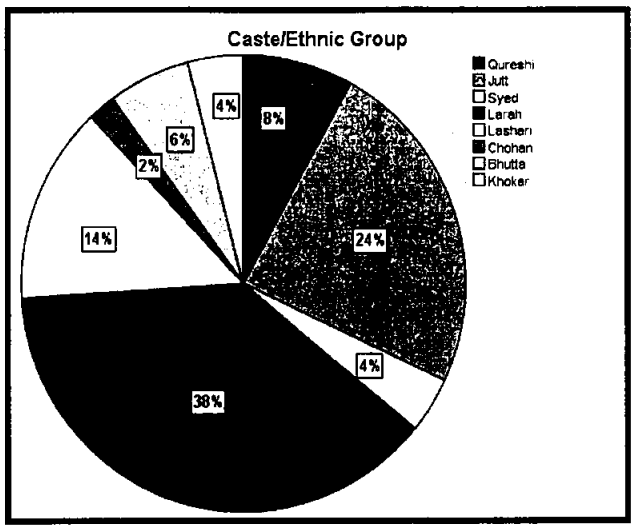


Figure 4.19: Caste/Ethnic Group of the Respondents

2. Quality of Life

a) Educational Status of the Respondents

From survey results **(Table 4.23)** it was found that educational attainment for sampled population of project area is very low because out of 100 respondents, 48% were illiterate. 24% respondents were educated up to primary level, 12% were up to middle level, 08% respondents were up to metric level, 06% respondents were up to intermediate level whereas only 02% respondents were above intermediate level.

Table 4.23: Educational Status of the Respondents

Educational Status of the Respondents			
Sr. No.	**Educational Status**	**Number**	**Percentage (%)**
1	Illiterate	48	48
2	Primary	24	24
3	Middle	12	12
4	Metric	08	08

Educational Status of the Respondents			
Sr. No.	**Educational Status**	**Number**	**Percentage (%)**
5	Intermediate	06	06
6	Above Intermediate	02	02
Total		**100**	**100**

The pie chart given below in **(Figure 4.20)** shows the educational status of the respondents.

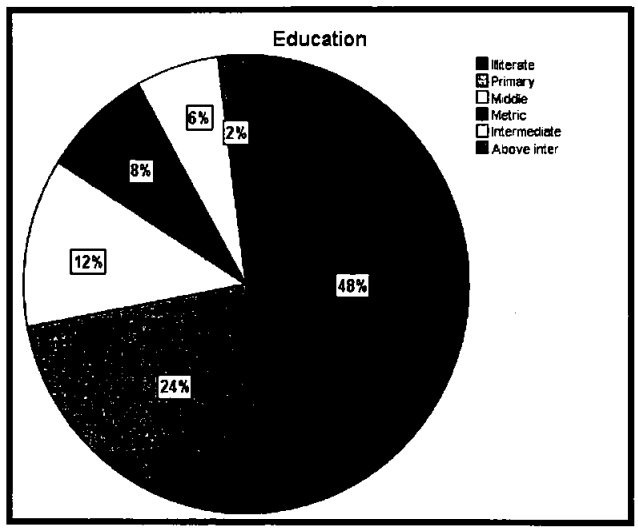


Figure 4.20: Educational Status of the Respondents

b) Professional Status of the Respondents

According to socioeconomic survey findings, it was witnessed that out of 100 respondents, 02% are doing government and private jobs each, 04% are doing their own businesses and working on their shops, majority i.e. 44% respondents are working as labor, 32% of the respondents were involved in agriculture / farming on their lands and 04% are doing livestock business while 12% belong to other categories.

During survey, efforts were made to amalgamate with people from all walks of life. The detailed statistics based on sample survey, regarding professional status of the respondents are shown in **Table 4.24**

Table 4.24: Professional Status of the Respondents

Professional Status of Respondents			
Sr1. No.	**Professional Status**	**Number**	**Percentage (%)**
1	Labor	44	44
2	Agriculture	32	32

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Professional Status of Respondents			
Sr1. No.	**Professional Status**	**Number**	**Percentage (%)**
3	Business/Shop	04	04
4	Livestock	04	04
5	Govt. Job	02	02
6	Private Job	02	02
7	Any Other	12	12
Total		**100**	**100**

Pie chart **(Figure 4.21)** shows the professional status of the respondents is given below.

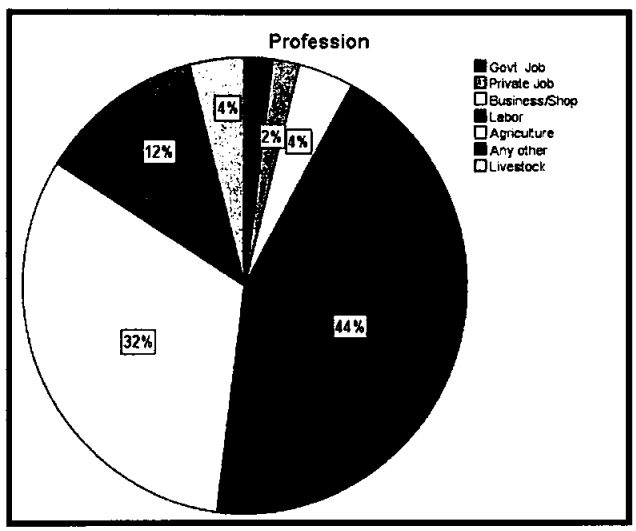


Figure 4.21: Professional Status of the Respondents

c) Source of Income

Socioeconomic survey findings depicted that out of 100 respondents, majorities i.e. 46% are doing labor, 36% of the respondents are working as farmers in agricultural fields, 08% are doing their own businesses, 04% of the respondents are doing services and livestock and 02% belongs to some other source of income which they do not want to mention here. Source of income of the respondents are shown in **Table 4.25.**

Table 4.25: Source of Income of Respondents

Sr. No.	Source of Income	Number	Percentage (%)
1	Business/shop	08	08
2	Labor	46	46
3	Agriculture	36	36
4	Livestock	04	04
5	Service	04	04

Sr. No.	Source of Income	Number	Percentage (%)
6	Any Other	02	02
Total		**100**	**100**

Pie chart **(Figure 4.22)** which shows the source of income of the respondents is given below.

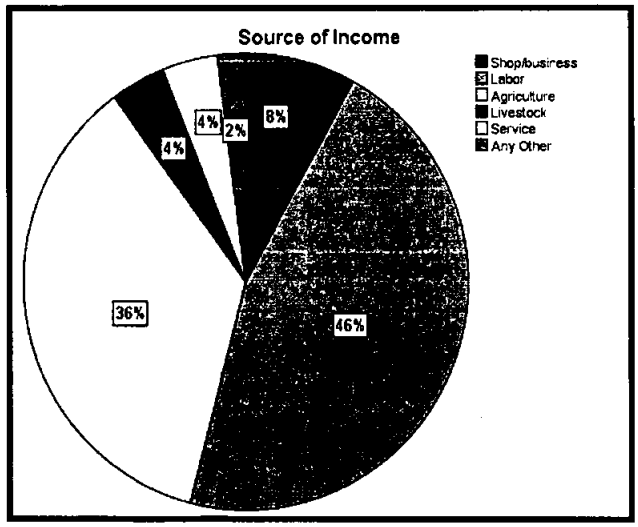


Figure 4.22: Source of Income of the Respondents

d) Average Monthly Income

The income status of the respondents was evaluated by dividing the respondents into different income categories. During field survey, it was observed that out of 100 respondents, 02% respondents earn up to Rs.13,000, 92% respondents fall within the income range of Rs.13,000 to 26,000, 04% of the respondents are earning up to Rs.26,001-39,000 and 02% earn above Rs.39,000. **Table 4.26** shows income status of the respondents.

Table 4.26: Average Monthly Income of the Respondents

Average Monthly Income of the Respondents			
Sr. No.	**Distribution**	**Number**	**Percentage (%)**
1	Rs.Up to 13,000	02	02
2	Rs.13,000 to 26,000	92	92
3	Rs.26,001 to 39,000	04	04
4	Rs.above 39,000	02	02
Total		**100**	**100**

In the Pie chart **(Figure 4.23),** the income groups of various respondents are shown below.

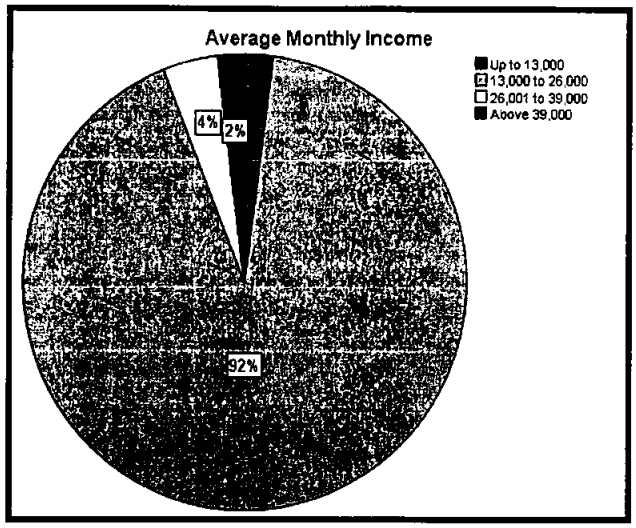


Figure 4.23: Average Monthly Income of Respondents

e) Average Monthly Expenditures

Table 4.27 shows expenditure distribution of the respondents. Out of 100 respondents, majority of 94% respondents fall in average monthly expenditure range of Rs.13,000 to 26,000, while 04% respondents fall within the expenditure range of Rs.26,001 to 39,000 and only 02% respondents have the expenditure range of above 39,000 rupees.

Table 4.27: Average Monthly Expenditures of the Respondents

Average Monthly Expenditures of the Respondents			
Sr. No.	**Distribution**	**Number**	**Percentage (%)**
1	Rs.13,000 to 26,000	94	94
2	Rs.26,001 to 39,000	04	04
3	Rs.above 39,000	02	02
Total		**100**	**100**

In pie chart **(Figure 4.24),** the average monthly expenditures of various respondents are shown below.

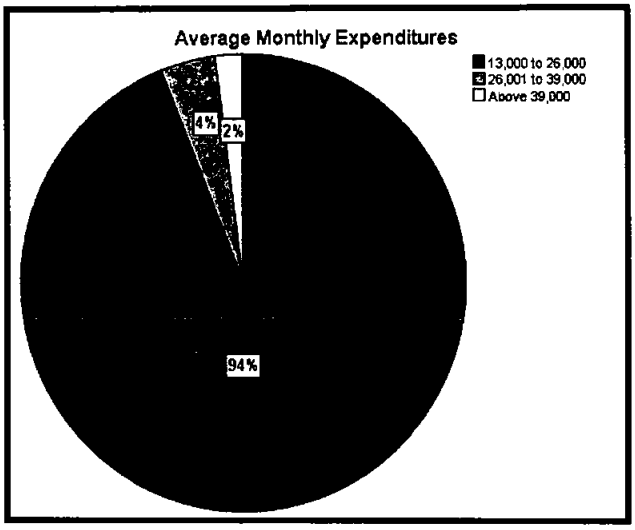


Figure 4.24: Average Monthly Expenditures of Respondents

4. Family Pattern and Household Size

a) Family System

Survey result shows that majority of the respondents i.e. 86% are living in the joint family system in which parents and children live with other combinations of family members while 14% are living in the nuclear family system **(Table 4.28)**.

Table 4.28: Family System of the Respondents

Family System			
Sr. No.	**Type**	**Number**	**Percentage (%)**
1	Joint	86	86
2	Nuclear	14	14
Total		**100**	**100**

Pie chart given below **(Figure 4.25)** shows the family system of the respondents.

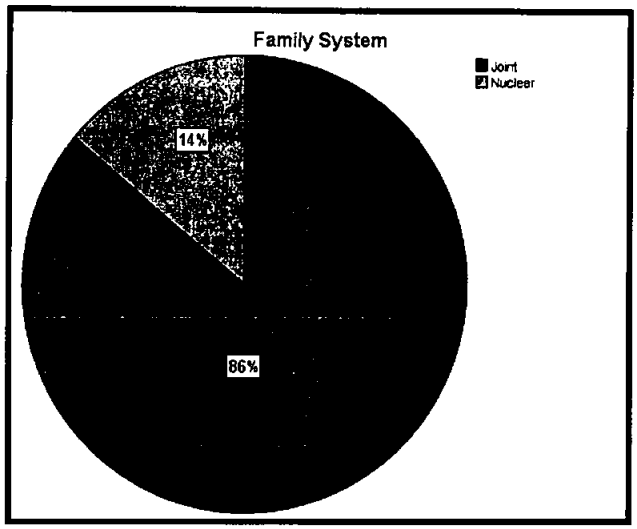


Figure 4.25: Family System of the Respondents

b) Average Household Size

It is clear from data presented in the **Table 4.29** that the majority of the respondents 48% reported their household size ranging from 6-8 persons, 34% respondents have the household size ranging from 3-5 persons whereas 18% families had household size of above 8 family members.

Table 4.29: Average Household Size of Respondents

Average Household Size			
Sr. No.	**Distribution**	**Number**	**Percentage (%)**
1	3 to 5	34	34
2	6 to 8	48	48
3	Above 8	18	18
Total		**100**	**100**

The pie chart given **(Figure 4.26)** shows the average household size of the respondents.

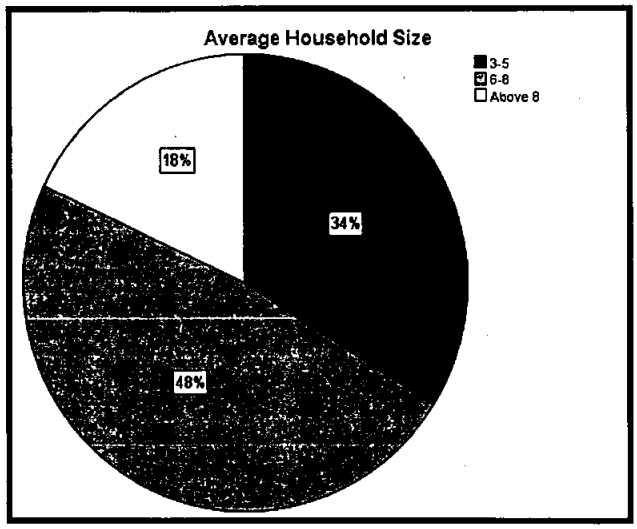


Figure 4.26: Average Household Size of Respondents

5. Housing & Settlement Pattern

a) Ownership Status of the Houses/Shops

Ownership status of the house depict that how much respondents belong to self owned or rented structures (houses and shops). During field survey it was observed that out of 100 respondents, majority of the respondents i.e. 90% have self owned houses/shops and remaining 10% of the respondents are the renters. Following **Table 4.30** shows the ownership status of the respondents.

Table 4.30: Ownership Status of the Houses

Ownership Status of Houses			
Sr. No.	**Status**	**Number**	**Percentage (%)**
1	Self-Owned	90	90
2	Rented	10	10
Total		**100**	**100**

The pie chart given below **(Figure 4.27)** shows the ownership status of the respondents.

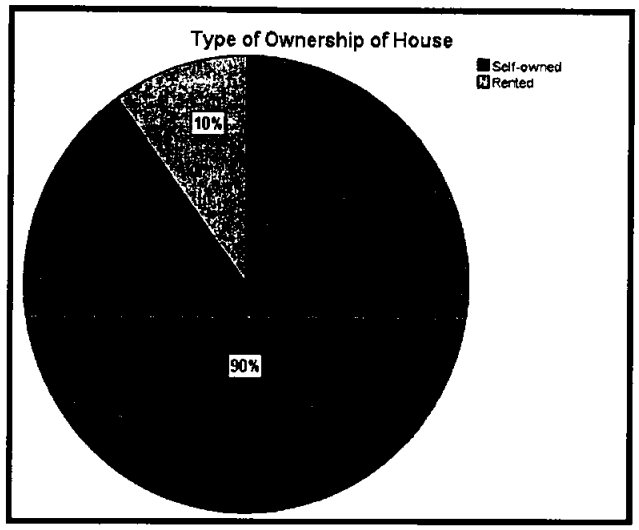


Figure 4.27: Ownership Status of the Houses

b) Type of Construction of the Houses

Out of 100 respondents, 08% of them live in the pacca houses made up of bricks and concrete whereas 16% live in the semi-pacca houses. While majority i.e. 76% respondents live in the kaccha houses. **Table 4.31** shows the type of construction of the houses.

Table 4.31: Type of Construction of the Houses

Type of Construction of the Houses			
Sr. No.	**Type**	**Number**	**Percentage (%)**
1	Pacca	08	08
2	Semi-Pacca	16	16
3	Kaccha	76	76
Total		**100**	**100**

The pie chart below **(Figure 4.28)** shows the type of construction of houses.

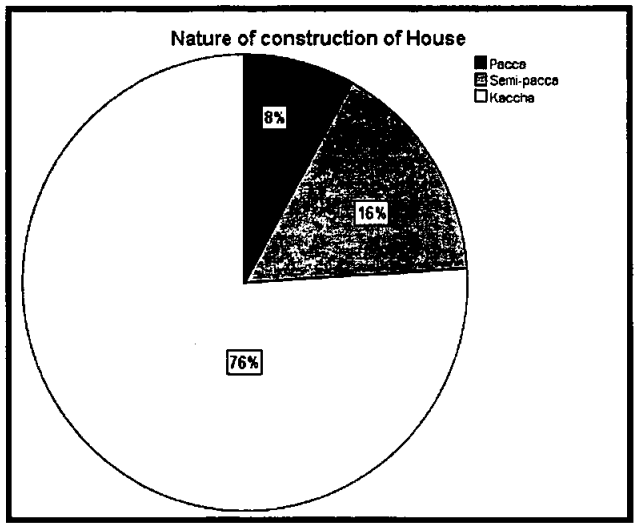


Figure 4.28: Type of Construction of Houses

c) Cropping Pattern in the Project Area

The major crops grown in project area are Wheat and Cotton. Out of 100 respondents, 10% of the respondents were growing wheat and cotton in their cropping pattern, 44% were growing Wheat, Cotton and Sugarcane in the vicinity of the project area whereas 46% of the respondents did not give their response regarding the cropping pattern of their agricultural land in the project area. **(Table 4.32)**

Table 4.32: Cropping Pattern

Cropping Pattern			
Sr. No.	**Pattern**	**Number**	**Percentage (%)**
1	Wheat, Cotton	10	10
2	Wheat, Cotton, Sugarcane	44	44
3	No Response	46	46
Total		**100**	**100**

The pie chart below **(Figure 4.29)** shows the cropping pattern of the project area.

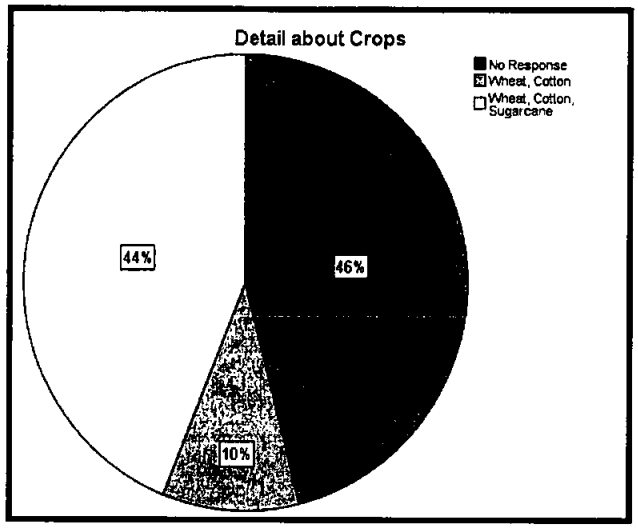


Figure 4.29: Cropping Pattern

d) Source of irrigation

Out of 100 respondents, 39% of the respondents' uses canal water for their agriculture lands whereas 61% of the respondents depend upon tube well water for farm and irrigation purposes. **(Table 4.33)**

Table 4.33: Source of irrigation

Source of irrigation			
Sr. No.	**Status**	**Number**	**Percentage (%)**
1	Canal	39	39
2	Tube well	61	61
Total		**100**	**100**

The pie chart below **(Figure 4.30)** shows the source of irrigation of the respondents.

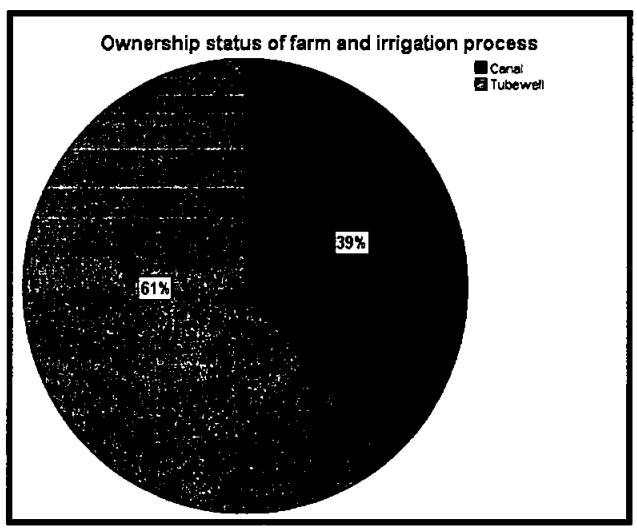


Figure 4.30: Source of irrigation

6. Basic Amenities

a) Availability of Electricity

The availability of facilities and development of this community is noticed by visiting the proposed project area. **Table 4.34** shows that 100% of the respondents have access to Electricity in their area.

Table 4.34: Availability of Electricity

Availability of Facilities			
Sr. No.	**Facilities**	**Number**	**Percentage (%)**
1	Electricity,	100	100
Total		**100**	**100**

In the pie chart **(Figure 4.31),** the availability of Electricity for various respondents is shown below.

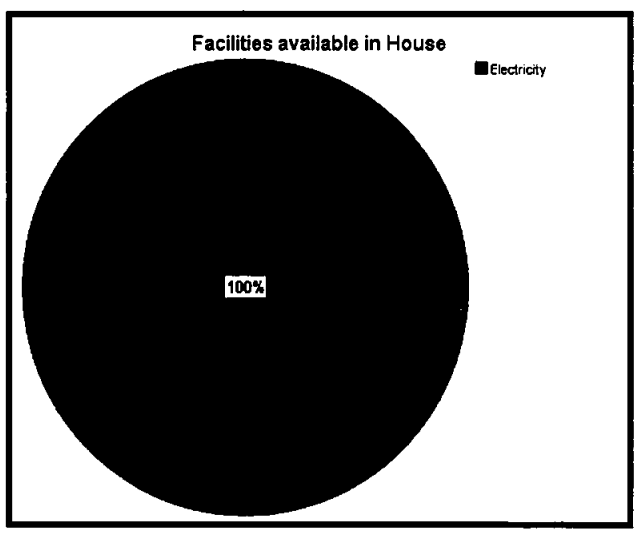


Figure 4.31: Availability of Electricity

7. Source of Water and its Satisfaction Level

a) Source of Water for Domestic Use

Sampled respondents are depending upon a number of sources of water for domestic use which is shown in **Table 4.35.** Hand pumps/Electric motor is the main source of water for domestic use in the proposed project area (93%) respondents get water from this source and remaining 07% respondents use Filtration plants as the source of water for domestic purpose.

Table 4.35: Source of Water for Domestic use

Source of Water in Project Area			
Sr. No.	**Source of Water**	**Number**	**Percentage (%)**
1	Hand pumps/Electric motor	93	93
2	Filtration plant	07	07
Total		**100**	**100**

In the pie chart **(Figure 4.32),** source of household water for domestic use is shown below.

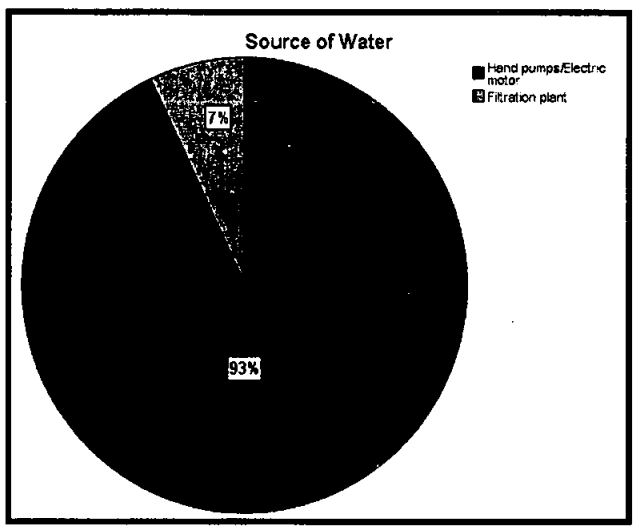


Figure 4.32: Source of Water for Domestic use

b) Satisfaction Level with Water Quality

The quality of water is directly linked to the quality of health. **Table 4.36** depicts the perception of people about water quality in the proposed project area. It was noticed during the baseline survey that the quality of water is satisfactory. 60% of the respondents are satisfied with the water quality while 40% respondents are not satisfied with the quality of water.

Table 4.36: Satisfaction Level with Water Quality

Satisfaction Level with Water Quality			
Sr. No.	**Opinion**	**Number**	**Percentage (%)**
1	Satisfied	60	60
2	Not Satisfied	40	40
Total		**100**	**100**

In the pie chart **(Figure 4.33),** satisfaction level with quality of water is shown below.

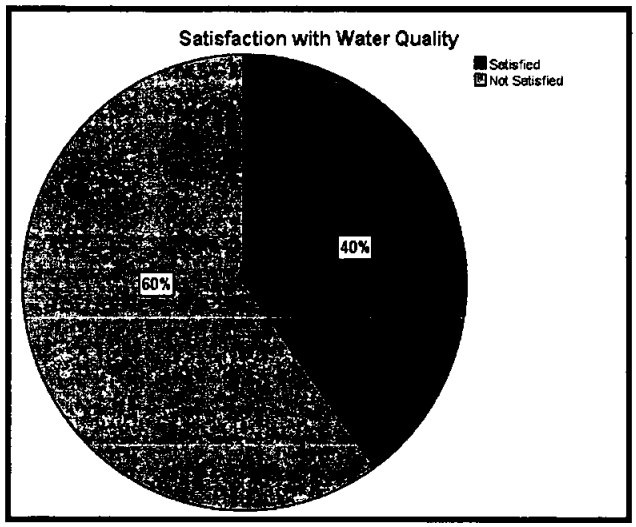


Figure 4.33: Satisfaction Level with Water Quality

8. Awareness & Implementation of Proposed Project

a) Awareness about the Project

The analysis of the socio economic baseline survey shows the awareness level about the proposed project in **Table 4.37**. Majority of respondents i.e. 98% had awareness about the proposed project while remaining 02% respondents had no knowingness about the proposed project.

Table 4.37: Awareness about the Proposed Project

Awareness about the Proposed Project			
Sr. No.	**Response**	**Number**	**Percentage (%)**
1	Yes	98	98
2	No	02	02
Total		**100**	**100**

In the pie chart **(Figure 4.34)**, awareness about proposed project is shown below.

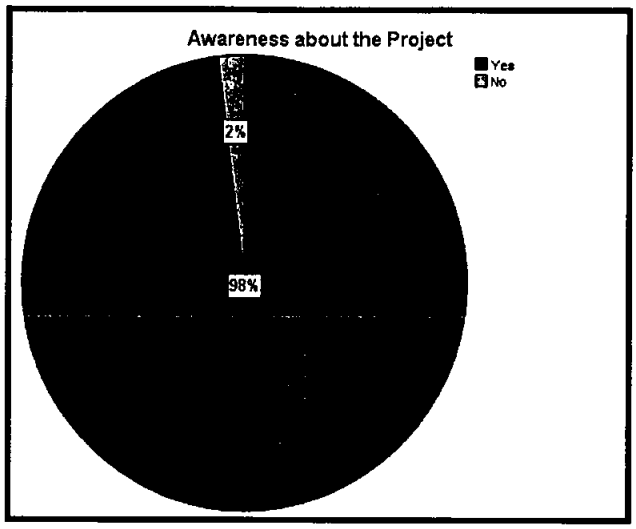


Figure 4.34: Awareness about the Proposed Project

b) Implementation of the Proposed Project

Table 4.38 shows the willingness of the respondents about implementation of the proposed project. 70% were in favor of the construction of proposed project while 30% respondents were against the proposed project.

Table 4.38: Implementation of the Proposed Project

Project Implementation			
Sr. No.	**Opinion**	**Number**	**Percentage (%)**
1	Yes	70	70
2	No	30	30
Total		**100**	**100**

In the pie chart **(Figure 4.35),** the perception of various respondents about the proposed project is shown below.

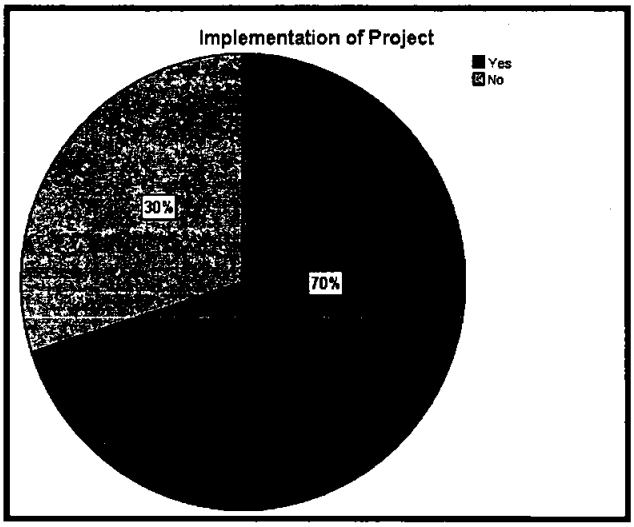


Figure 4.35: Implementation of Proposed Project

c) Reasons of Acceptance of the Proposed Project

Out of 70% respondents (who are in favor of this project), 27% believed that it will be a good project in all aspects, 13% were of the opinion that income generating activities will increase, 17% results in better standard of living, 40% said that value enhancement of the area will increase while 03% were of the view that infrastructural development of the project area will occur. **(Table 4.39)**

Table 4.39: Reasons of Acceptance of the Project

Reasons of Acceptance			
Sr. No.	**Reasons**	**Number**	**Percentage (%)**
1	Good project	19	27
2	Increase in income generating activities	09	13
3	Increase in standard of living	12	17
4	Value enhancement of the project area	28	40
5	Infrastructural development of the project area	02	03
Total		**70**	**100**

In the pie chart **(Figure 4.36),** the reasons of acceptability of various respondents are shown below;

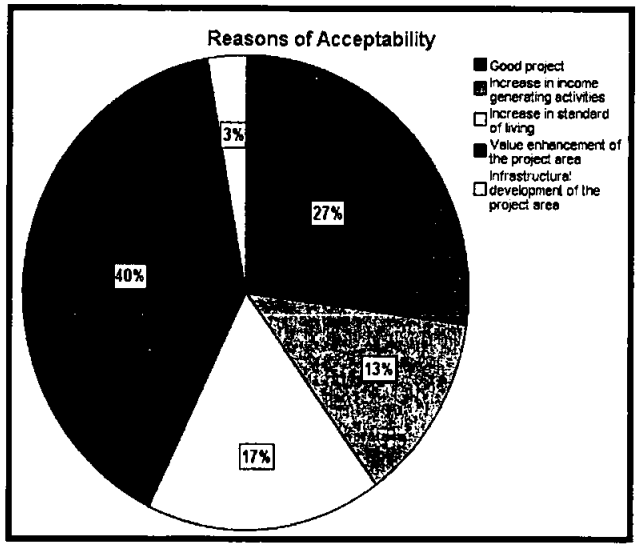


Figure 4.36: Reasons of Acceptance of Project

a) Reasons of Rejection of the Proposed Project

Out of 100 respondents, 80% said that land acquisition will occur due to this project, 13% respondents said that dust and noise pollution generate during the construction phase of the proposed project, While 07% respondent's have traffic issues regarding the project area. **(Table 4.40)**

Table 4.40: Reasons of Rejection of the Project

Reasons of Rejection			
Sr. No.	**Reasons**	**Number**	**Percentage (%)**
1	Land Acquisition	24	80
2	Dust & Noise pollution	04	13
3	Traffic Issues	02	07
Total		**30**	**100**

In the pie chart **(Figure 4.37),** the reasons of rejections of various respondents are shown;

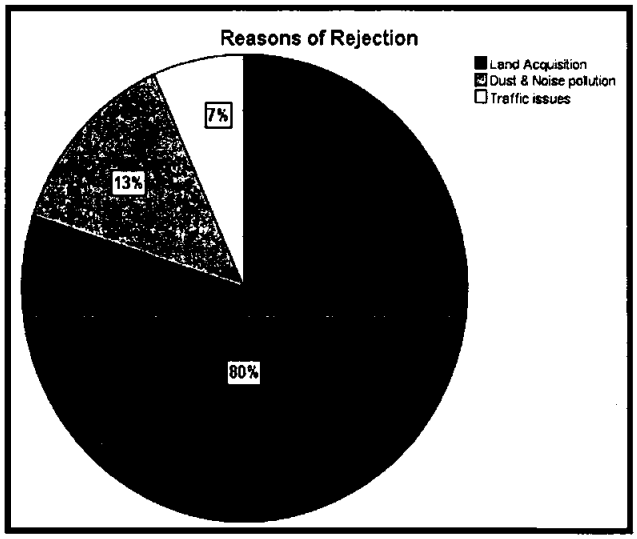


Figure 4.37: Reasons of Rejection of Project

15. Perceived Impacts during and after Construction

Table 4.41 & **Table 4.42** provide us the various impacts perceived by the respondent during and after construction of Bahawalpur Industrial Estate.

Perceived Impacts of the Project during Construction

The big trepidation of the respondents i.e. 38% was about noise and dust issues during the construction phase of the proposed project, 20% have traffic issues during the construction phase of the proposed project, 24% said that land acquisition will occur due to this project, 14% of the respondents have safety hazards due to the construction of the proposed project while 04% of the respondents have privacy issues due to the construction of the project.

Table 4.41: Perceived Impacts (During Construction)

Perceived Impacts of the Project (during construction)			
Sr. No.	**Impacts**	**Number**	**Percentage (%)**
1	Dust & Noise Issues	38	38
2	Land Acquisition	24	24
3	Traffic Issues	20	20
4	Safety Hazards Due To Construction	14	14
5	Privacy Issues	04	04
Total		**100**	**100**

The perceived impacts of the respondents during construction are shown below in pie chart **(Figure 4.38)**

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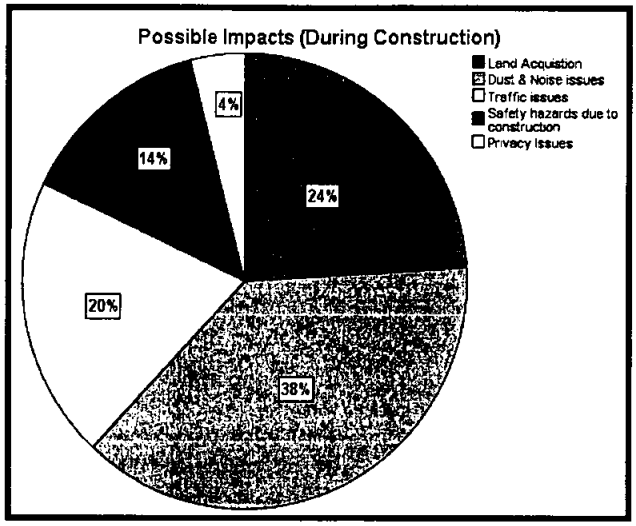


Figure 4.38: Impacts Perceived by Respondents

a) Perceived Impacts of the Project after Construction

When respondents were asked about impacts which they can perceived after construction phase, majority of respondents i.e.36% said that the area will be developed and it is good for people of the project area, 22% said that value enhancement of the area will increase, 12% said that Employment Opportunities will increase due to the construction of this industrial estate, 04% said that they have access to better facilities, 02% said that will it will save mobility time for the road users and 24% respondents have some other impacts regarding the project area.

Table 4.42: Perceived Impacts (After Construction)

Perceived Impacts of the Project (after construction)			
Sr. No.	**Impacts**	**Number**	**Percentage (%)**
1	Time saving	02	02
2	Employment Opportunities	12	12
3	Value enhancement of the area	22	22
4	Development of the area and good for people	36	36
5	Easy access to better Facilities	04	04
6	Any Other	24	24
Total		**100**	**100**

The perceived impacts of the respondents after construction are shown below in pie chart **(Figure 4.39)**.

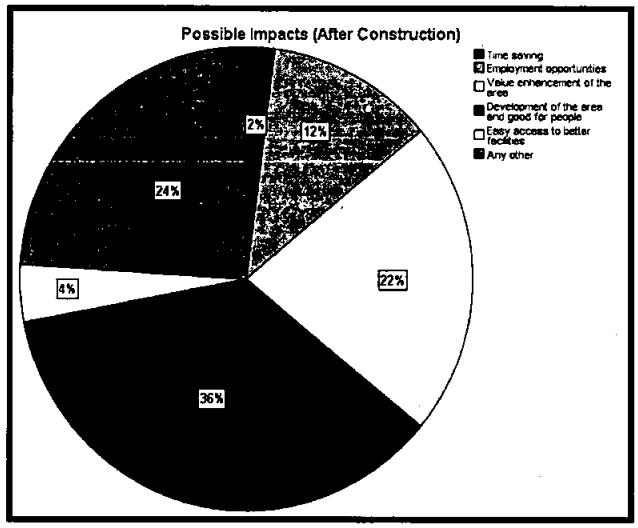


Figure 4.39: Impacts Perceived by Respondents

16. Pressing Needs of the Project Area

Survey Results are shown in **Table 4.43**, which depict that out of 100 respondents, 35% of them revealed that provision of basic facilities is the dire need of the people. 09% respondents said that the proper medical facilities should be provided to the local residents and this institution should also be upgraded with the passage of time. 56% do not show any response regarding this project.

Table 4.43: Pressing Needs

Pressing Needs of the Project Area			
Sr. No.	**Pressing Needs**	**Number**	**Percentage (%)**
1	Provision and up gradation of basic facilities	44	44
2	Provision and up gradation of medical facilities	02	02
3	Provision and up gradation of proper waste management system	02	02
4	Project layout should be in such a way to avoid land acquisition	28	28
5	Any Other	24	24

Pressing Needs of the Project Area			
Sr. No.	**Pressing Needs**	**Number**	**Percentage (%)**
Total		**100**	**100**

In the pie chart below **(Figure 4.40)** the pressing needs suggested by the respondents are shown.

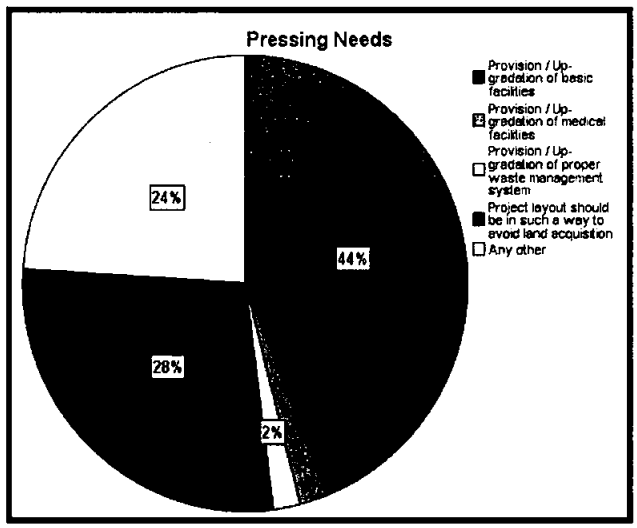


Figure 4.40: Pressing Needs of Project Area Suggested by Respondents

17. Suggested Measures and Needs

a) Protective Measures

From the data given in **Table 4.44**, majority of respondent's i.e.57% respondents highlighted that the construction activities should be completed without any delay, 43% respondents suggested that Proper diversion plan should be given to avoid traffic movement for the local residents.

Table 4.44: Protective Measures

Protective Measures			
Sr. No.	**Protective Measures**	**Number**	**Percentage (%)**
1	Project should complete well in time	57	57
2	Proper diversion plan should be given to avoid traffic movement problem	43	43
Total		**100**	**100**

In the pie chart below **(Figure 4.41)** the protective measures suggested by the respondents are shown.

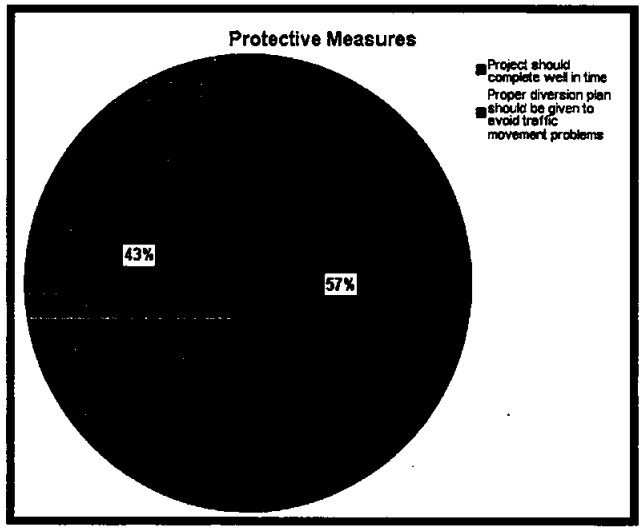


Figure 4.41: Protective Measures Suggested by Respondents

SECTION - 5
PUBLIC CONSULTATION

5.1 General

This section describes the outcome of the public consultation sessions held with different stakeholders that may be directly or indirectly affected by the proposed project. Public Consultation is a mandatory part of the EIA process for development projects. The adequacy of the public consultation and information disclosure is one of the basic criteria used to determine the project compliance with the national / international safeguard policies.

The consultation process was carried out in accordance with the requirements of Pakistan Environmental Procedures. The objectives of this process were to:

- Informing the public about the proposed project.
- Identify and involve all stakeholders, especially local residents, in the consultative and participation process;
- Share information with stakeholders on the design and construction of the proposed project and anticipated impacts on the physical, biological and socio-economic environment of the project area;
- Understand stakeholders' concerns regarding various aspects of the project, including the existing available facilities and problems, construction of the project and the likely impacts (positive & negative) of construction and operation related activities;
- Understand the perceptions, assessment of social impacts and concerns of the communities in the vicinity of the proposed project;
- Provide an opportunity to the public in the public consultation session to provide valuable suggestions for the project design in a positive manner; and
- Reduce the chances of conflict through the early identification of controversial issues, and consult them to find acceptable solutions.

5.2 Consultation and Participation Process

For ascertainin the perceptions of different stakeholders about the project (during construction/operation) consultation meetings were held with them. These meetings were carried out in the vicinity areas of proposed project. The meetings with

stakeholders were carried out from 12 to 15 January, 2018.

5.3 Methods of Public Consultation

Public Consultation was carried out in order to establish stakeholder's opinion regarding project implementation. The following methods were used for public consultation with project stakeholders:

- Scoping Sessions
- Formal Meetings
- Informal Meetings
- Individual Interview

5.4 Identification of Stakeholders

Stakeholders are those who have a direct or indirect interest in the project development, and who will be involved in the consultationon process. During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. The stakeholders identified during field survey were the Forest Department (District Forest Officer), Archaeology Department (Sub-Divisional Officer), Bahawalpur Waste Management Company (BWMC) (Manger Operations), Wildlife and Fisheries Department (Wildlife Inspector), Office of the Deputy Director Environment (Deputy Director), Office of the Punjab Industrial Estate Development and Management Company (PIEDMC) and local residents. All the stakeholders had different type of stakes according to their professions which are listed down along with their apprehensions. Informal group discussions were also held as an additional tool for the assessment of the perceptions of the stakeholders.

5.5 Categories of Stakeholders Contacted

The stakeholders contacted, are given in the **Table 5.1.**

Table 5.1: Stakeholders Contacted in the Project Area

Sr. No.	Stakeholder Category
1	Forest Department
2	Archaeology Department
3	Bahawalpur Waste Management Company (BWMC)
4	Wildlife and Fisheries Department

Sr. No.	Stakeholder Category
5	Office of the Deputy Director Environment
6	Local residents

5.6 Major Stakeholders and their Apprehensions

Among all stakeholders some major stakeholders were identified in the proposed project area. **Plate 5.1** shows the pictorial view of Interviews and consultation meetings held with the stakeholders. **Table 5.2** contains the list of major stakeholders and their apprehensions.

Table 5.2: Major Stakeholders and their Apprehensions in the Project Area

Sr. No.	Stakeholders	Apprehensions
1	Forest Department	Tree cutting and harm to existing plantation.
2	Archaeology Department	No Harm to archaeological/historical sites
3	Bahawalpur Waste Management Company (BWMC)	Concerned about environmental pollution and solid waste
4	Office of the Deputy Director Environment	Site selection criteria should be considered
5	Local Residents	Movement problem for local residents, dust and noise problem, privacy / safety issues



Consultation Meeting with Sub Divisional Officer in Archaeology Department



Consultation Meeting with Sub Divisional Officer in Irrigation Department



Consultation Meeting with Manager Operations BWMC



Consultation Meeting with District Forest Officer



Consultation Meeting with Inspector Wildlife



Consultation Meeting with Deputy Director Environment

Plate 5.1: Interviews and Group Discussions with Different Stakeholders

5.7 Consultation Meetings and Formal & Informal Group Discussions

Consultation meetings regarding project impacts, their magnitude and mitigation measures were held with the Forest Department, Archaeology Department, Bahawalpur Waste Management Company (BWMC), Wildlife and Fisheries Department, Office of the Deputy Director Environment, Office of the Punjab

Industrial Estate Development and Management Company (PIEDMC) and local residents to know their concerns regarding proposed project.

Scoping sessions were conducted with the local residents. These sessions were carried out in and around the vicinity area of Industrial estate in Bahawalpur.

Generally, it was found that people were aware of the proposed project. After the meetings, 70% respondents including local residents and other stakeholders showed their full support for the proposed project without any delay for the industrial estate. This project will be beneficial in terms of good infrastructure development, not only for the local residents but also good for the development of the area.

5.8 Concerns / Suggestions of the Stakeholders

The most commonly raised concerns during the meetings are listed below:

- Industry should be made in time without any delay.
- Exposure of noise and dust pollution will cause disturbance and health & safety issues to the local residents and other stakeholders throughout the construction stage due to the movement of construction machinery and transportation of construction materials. The effects of noise and dust pollution on the local residents should be minimized by making necessary arrangements. Dust pollution should be controlled by water sprinkling on regular basis;
- During construction period local residents will face difficulties while moving to places in the vicinity of proposed project area. Appropriate diversion plan should be developed to avoid the disruption of all the people due to use of heavy machinery in day timings and should avoid disturbance for the local residents living in the project vicinity;
- Local residents should be given priority for jobs during the construction phase;
- Tree cutting should be avoided as much as possible;
- Solid waste produced during construction period should be disposed of timely; and
- Construction material and asphalt plant should be located outside the residential area.

5.9 Mitigation Measures Proposed by EIA Consultants for Addressing the Stakeholder's Concerns

The contractors and design consultants may include the following environmental and safety provisions in the project design in order to protect the surrounding communities from the anticipated impacts of pre and post construction activities:

- Significant efforts including change in design should be adopted to minimize the physical and economical disturbance of the local residents.
- Local residents should be given priority while hiring during construction phase of the proposed project;
- Construction machinery should be placed at adequate locations away from the sensitive areas to minimize the impacts related to the noise;
- Project facilities should be located outside the existing residential areas. In order to avoid restricting the daily movement of the local stakeholders, construction vehicles should remain confined within their designated areas of movement;
- Solid waste generated during construction at site should be disposed of safely at the waste disposal sites approved by the BWMC; and
- All necessary measures should be taken to ensure the safety of traffic during construction, including barricades (including signs boards, pavement markings, flags, and lights). All such barricades will be set up to facilitate the local traffic.

5.10 Details of Meetings with the Stakeholders

The detailed schedule of meetings at site with the stakeholders and the issues raised by the respondents are given below in **Table 5.3.**

Table 5.3: Schedule of Meetings with Stakeholders and their Apprehensions and Suggestions

Sr. No.	Agency / Department / Stakeholder	Date	Time	Representative	Apprehensions Raised	Suggestions
1.	**Proponent PIEDMC**	12-01-18	2.30 pm	**Mr. Sarfraz**	• During consultation, it was concluded that structures present in Mauza Aghapur have an illegal status of their land and structures.	• No provision of cost has been made in the total cost of the project for compensation of land and structures.
2.	**Responsible Authority-** (Office of the Deputy Director Environment)	15-01-18	9.30 am	**Mr. Zafar Iqbal (Deputy Director)**	• Site selection criteria should be considered as mentioned in guidelines. • Access road should be widened and away from the settlements. • Location of industrial plots in layout should be away from the existing settlements.	• Army should be consulted for site selection and National Highway Authority should be consulted for site selection. • Project layout should be changed in such a way to avoid any land acquisition.

Sr. No.	Agency / Department / Stakeholder	Date	Time	Representative	Apprehensions Raised	Suggestions
3.	**Forest Department**	13-01-18	12:30 pm	**Mr. Tajjamul** (District Forest Officer)	• Site should be selected / planned in such a way to avoid minimum tree cutting.	• Significant efforts should be made to minimize the tree cutting in the project area. • A comprehensive tree plantation plan should be formulated (if tree cutting is unavoidable). • Appropriate mitigation measures should be adopted to minimize the harmful effects on the existing plantation.
4.	**Archaeology Department**	15-01-18	2:30 pm	**Mr. Muhammad Sajjad** (Sub-Divisional Officer)	• After thorough review of project layout and location of project site, no heritage site and monument fall within the radius of 10km of the proposed project site.	• In case of discovery of any artefact during construction; the contractor shall immediately report Directorate General (DG) of Archaeology to take further suitable actions to preserve those antiques or sensitive remains.

Sr. No.	Agency / Department / Stakeholder	Date	Time	Representative	Apprehensions Raised	Suggestions
6.	**Wildlife and Fisheries Department**	13-01-18	11.30 am	**Mr. Kaleem Sarfraz** (Wildlife Inspector)	• No apprehension raised regarding the proposed project as no threatened species exist in the project area.	• Nil
7.	**BWMC** (Bahawalpur Waste Management Company)	13-01-18	9.00 am	**Mr. Imtiaz Ullah** (Manager Operations)	• The environmental pollution due to dumping of solid and construction waste should be avoided.	• Solid and construction waste should be disposed of in an environment friendly manner. • Waste management plan should be formulated in liaison with BWMC.

Sr. No.	Agency / Department / Stakeholder	Date	Time	Representative	Apprehensions Raised	Suggestions
8.	**Wider Community**	12-15/01/2018	–	**Local Residents (Mari sheikh Shujra Village, Sangal Wali Pull Village, Noabad Village, Dera Ramzan Village)**	• In village, (Mari Sheikh Shujra) local residents raise their concern about the project layout that it should be changed to avoid land acquisition. • Exposure of noise and dust particles will cause disturbance and health issues to the local residents throughout the construction phase due to the movement of construction machinery and transportation of construction materials. • Privacy issues were raised by local residents during the construction phase due to the working of labourers in the project area. • Traffic will be congested on the access road and on main road	• Project layout should be changed in such a way to avoid any land acquisition. • Proper compensation should be given to affectees of land and structures. • The effects of noise and dust pollution on the local residents should be minimized by making necessary arrangements. Dust pollution should be controlled by water sprinkling on regular basis. • Labour should bound to work and stay in the designated area or camp sites. • Provision of diversion route to minimize the traffic problems during construction phase.

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Sr. No.	Agency / Department / Stakeholder	Date	Time	Representative	Apprehensions Raised	Suggestions
					during the construction phase of the proposed project. It will be difficult for all local residents to reach their destination and more time will be consumed. • During construction phase pedestrians will face difficulties while walking to nearby places in the vicinity of proposed project area. • The project is a good step for the development of the project area. • Increase in traffic and safety hazards will create problems to local population and surrounding communities. • The operation of the industries will cause air emissions and will cause	. • Appropriate detour plan should be developed to avoid the disruption of pedestrians. • Efforts should make to complete the construction as soon as possible. • A detailed health and safety plan may be develop and implement to mitigate the construction and operation risks of the proposed project on the local residents and surrounding communities.

Sr. No.	Agency / Department / Stakeholder	Date	Time	Representative	Apprehensions Raised	Suggestions
					health issues for the nearby communities.	• It should be ensured that all the industries should install air pollution control equipment and comply with the NEQS.

SECTION 6
ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.0 General

This section provides the analysis of the potential impacts during pre-construction/design, construction and operational phases of the proposed project on the physical, biological and socio-economic environment of the project area. In addition, it also describes the measures that will mitigate the project's potential environmental impacts. Environmental sensitivity of the project area is described through a sensitivity map and evaluation of significance of impacts is carried out through environmental impact matrices.

6.1 Evaluation of Identified Impacts

Methodology adopted for the identification, evaluation and analysis of environmental impacts by the proposed project is "Matrix Method and Significance Rating of Impacts".

6.1.1 Environmental Impact Matrices

The environmental impact matrices have been developed to evaluate magnitude of the impacts of various project activities on different environmental settings for construction and operation phases and are shown in **Table 6.1** and **Table 6.2** respectively.

A Matrix method helps in identifying the potential temporal & spatial impact and screens the project for environmental and social soundness. Each project activity is screened separately with regard to its construction and operation phases according to the various physical, ecological and social parameters. These impacts are characterized on the basis of extent, timing, magnitude, reversibility, probability, nature and duration. **Table 6.3** shows the characterization of impacts.

Table 6.1: Environmental Impacts Evaluation Matrix During Construction Phase

Components	Valued Ecological Components VEC's	VEC's Rating	Activities							Impact Score
			Establishment & functioning of construction camps, workshops etc.	Excavation operations of burrow & quarry areas	Transportation of construction materials and equipment's	Open storage of construction materials, fuel etc.	Operation of concrete batching/ asphalt plants	Functioning of Power generators	Solid & liquid waste management	
Biophysical Environment	Air Quality & Dust	0.10	-3	-3	-2	-2	-3	-2	-2	
	Soil erosion and Contamination	0.05	-2	-2	-2	-2	-3	-1	-3	**-0.8**
	Ground water quality	0.10	-2	-2	-1	-2	-2	-1	-2	**-1.2**
	Noise	0.10	-3	-4	-2	0	-3	-3	-1	
	Flora	0.12	-1	-2	-2	0	-1	0	-1	**-0.8**
	Fauna	0.06	-2	-2	-2	-1	-2	-2	-2	**-0.8**
Socio-Economic Environment	Traffic Management	0.20	-3	-3	-4	-3	-3	-1	-2	
	Social and Cultural Conflicts	0.07	-3	-1	-1	-1	-1	-1	-2	**-0.7**
	Health and Safety of workers and community	0.10	-3	-3	-3	-2	-3	-2	-3	
	Employment/ Economic Activity	0.10	3	3	2	0	1	1	3	**1.3**

Legend	+ positive	0	no impact	2	minor impact	4	severe impact
	- negative	1	negligible impact	3	moderate impact		

Note: The above table reveals that in biophysical environment air and noise pollution are considered to be significant (adverse) impact while in socio-economic environment traffic management and health & safety of workers and community are considered to be significant (adverse) impact during construction phase.

Table 6.2: Environmental Impacts Evaluation Matrix During Operation Phase

Components	Valued Ecological Components (VECs)	VECs Rating	Activities			Impact Score
			Movement of Industrial Vehicles	Industrial Emissions	Disposal of wastewater	
Biophysical Environment	Air Quality & Dust	0.15	-3	-4	0	
	Flora	0.025	-1	-2	0	-0.075
	Fauna	0.025	-1	-1	0	-0.05
	Noise & vibration	0.05	-3	-2	0	-0.25
	Drainage	0.2	-2	-3	-3	
Socio-Economic Environment	Road safety	0.15	-4	0	0	-0.6
	Economic Activity	0.2	3	0	3	1.2
	Health of workers and nearby residents	0.2	-4	-4	-4	
			1.00			

Legend							
	+ positive	**0**	no impact	**2**	minor impact	**4**	severe impact
	- negative	**1**	negligible impact	**3**	moderate impact		

Note: The above table reveals that in biophysical environment impact on air quality & dust and drainage are considered to be significant (adverse) impact while in socio-economic environment health of workers and nearby residents is considered to be significant (adverse) impact and economic activity is considered to be significant (beneficial) impact during the operation phase

Table 6.3: Characterization of Impacts

Extent	Timing	Magnitude	Reversibility	Probability	Nature	Duration
Site specific	Short term	Negligible	No change	Very unlikely	Indirect	Temporary
Local impact	Medium term	Low	Reversible	Unlikely	Direct	Permanent
Area impact	Long term	Medium	Slowly reversible	Likely		
Regional impact	Multi-year and permanent impact	High	Irreversible	Certain		

In addition to assigning the numerical values to each marked box in the Matrix, plus (+) or minus (-) sign are used to show whether an impact is beneficial or adverse.

The weighted matrix was applied to the environmental components listed on the y-axis against the activities of the proposed project listed on the x-axis prior to mitigation measures. In this process, numerical values were assigned from 0 to 1 for biophysical environment and socio-economic environment to indicate the significance of the affected environmental and social components. These numerical values were than multiplied with the individual project activity rating/values and all added to get an overall impact score. This impact score gives the relative significance of impacts for a specific component. The highest impact score gives the level of significance of that impact.

6.1.1.1 Identification of VECs

Valued Environmental Components (VECs) are defined as broad components of the biophysical and human environments that, if altered by the project, would be of concern to regulatory agencies, indigenous community, resource managers, scientists, stakeholders, and/or the general public. VECs are typically selected for assessment on the basis of regulatory issues, guidelines, and requirements; consultation with regulatory agencies, the public, stakeholder groups; field reconnaissance; and the professional judgment of the Study Team.

6.1.2 Significance Rating of Impacts

The overall significance of the impacts was defined based on the result of a combination of the ratings. Each identified impact was analyzed individually according to a number of criteria including descriptions of their extent, timing, magnitude, reversibility, probability, nature and duration. Taking into account these criteria, potential significance was classified as either:

- Low: The impact which has a slight influence on the natural and socio-economic environment;
- Medium: The impact which can be eliminated/ mitigated after applying the appropriate mitigation measures; and
- High: an impact, which, if not mitigated, could stop the project from proceeding.

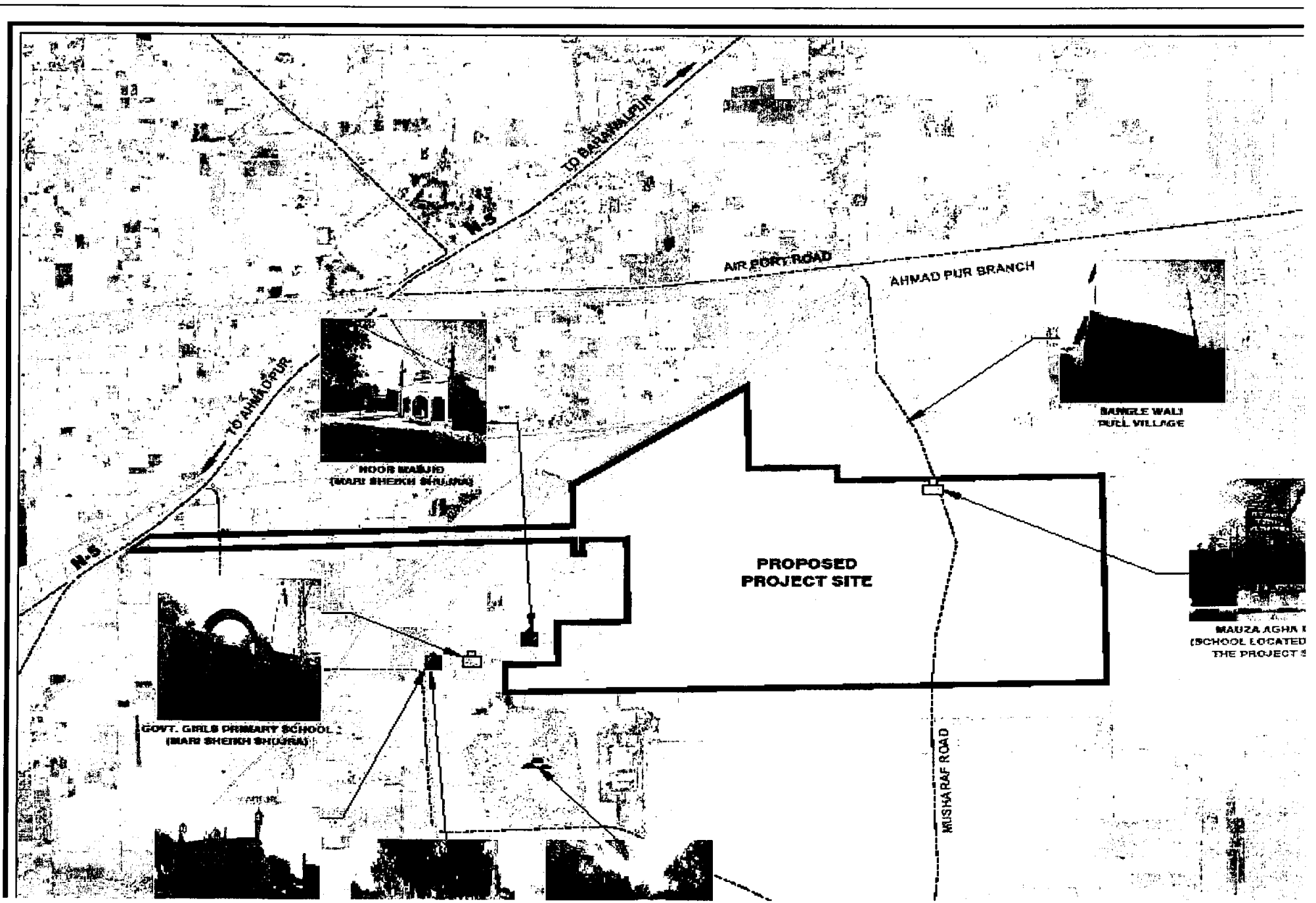
6.2 Delineation of Project Corridor of Impact (COI)

COI is a limit which identifies the area where direct and indirect impacts of the project activities are envisaged like existence of forests, game reserves, wetlands, archaeological sites etc. The limit for COI for the proposed project was taken as One (1) kilometer radius for collection of baseline information, impacts assessment and mitigation measures of physical, ecological as well as social resources.

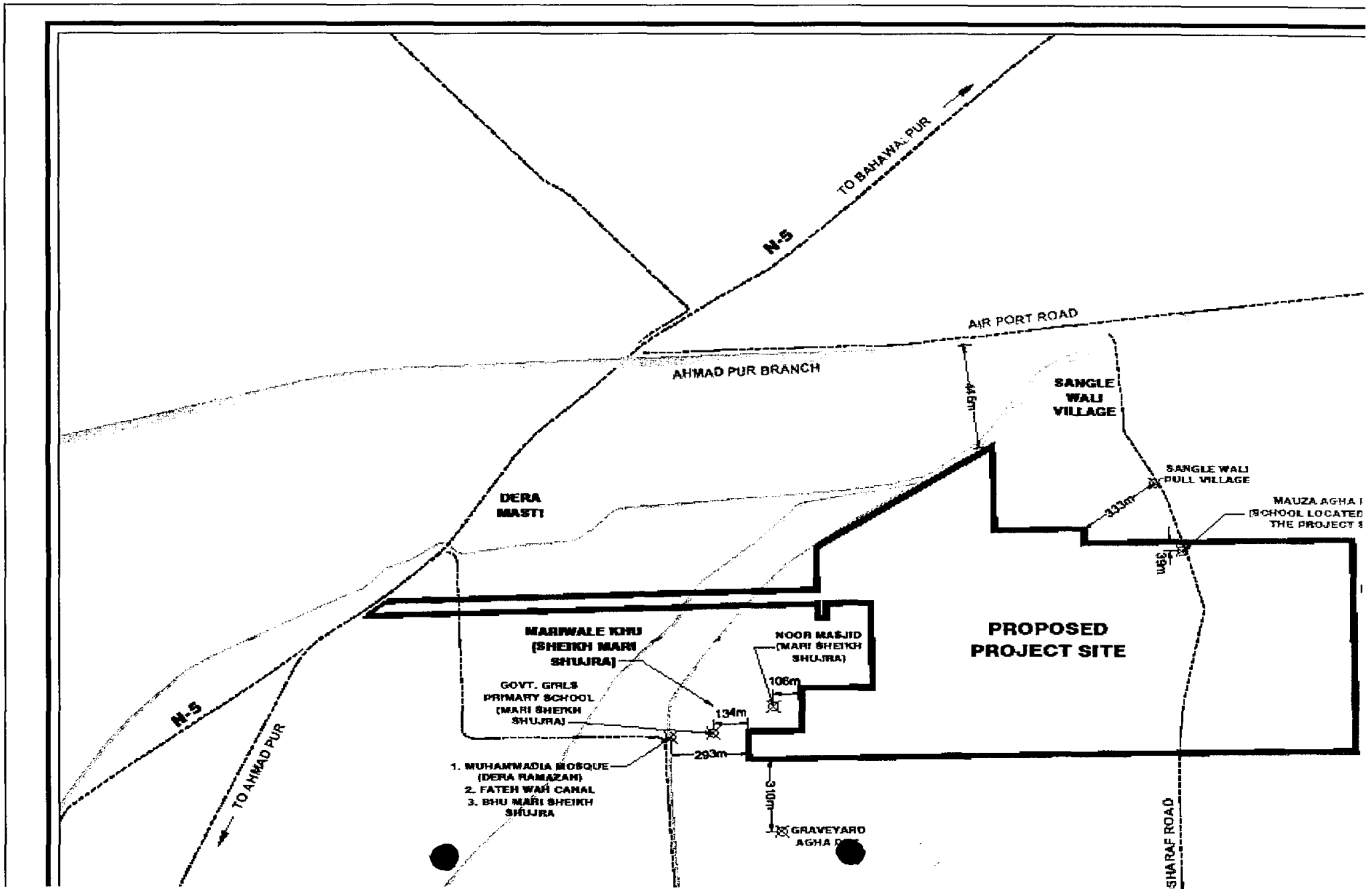
As the location of construction/contractor camps, vehicles, equipment yard, material quarry areas and access tracks have not been identified yet, so impacts evaluated due to these facilities in this section will be of generic nature.

6.3 Environmental Sensitivity

A comprehensive sensitivity map showing sensitive receptors of the project area such as educational institutes, health care facilities, commercial area, open area, green belt religious and residential area and is presented in **Figure 6.1** and map showing distances of sensitive receptors is shown in **Figure 6.2.** The list of sensitive receptors along their coordinates is attached as **Annexure-VII.**



SAMD CONSULTANTS


TO BAHAWAL PUR
N-5
AIR PORT ROAD
AHMAD PUR BRANCH
SANGLE WALI VILLAGE
SANGLE WALI PULL VILLAGE
DERA MASTI
MARIWALE KHU (SHEIKH MARI SHUJRA)
NOOR MASJID (MARI SHEIKH SHUJRA)
PROPOSED PROJECT SITE
GOVT. GIRLS PRIMARY SCHOOL (MARI SHEIKH SHUJRA)
1. MUHAMMADIA MOSQUE (DERA RAMAZAN)
2. FATEH WAH CANAL
3. BHU MARI SHEIKH SHUJRA
GRAVEYARD
TO AHMAD PUR
N-5
SHARAF ROAD
106m
134m
293m
310m
332m
39m

6.4 Anticipated Impacts during Planning/Design Phase

Following are the impacts envisaged during planning stage and mitigation measures for this are also suggested.

6.4.1 Site Identification

According to site selection criteria outlined in Sectoral Guidelines for Environmental Reports – Industrial Estates (Pakistan Environmental Protection Act, 1997), an industrial site shall be identified at least at following distances from the features listed:

- 25 Km from ecological or otherwise sensitive areas
- 25 Km from projected growth boundary of major settlements (population of 3 million or larger)
- 0.5 Km from high tide line in coastal areas
- 0.5 Km from natural or modified flood plain boundary
- No conversion of prime agricultural land to industrial use

The site selection shall also consider the following as per afore-mentioned guidelines are:

- No conversion of forest land to non-forest activity to sustain the industry
- Sufficient space on-site to provide for storage of solid waste and appropriate treatment and reuse of wastewater
- Provision for a 0.5 Km wide "greenbelt" around the site perimeter.
- Adaptability of the proposed facilities to the landscape, so that scenic features is not altered by the development.

The project site is located within 12 km from major settlements (Bahawalpur City). The protected site i.e. Jamia Masjid Al-Sadiq which is declared as Protected Site by the Government of Punjab under Punjab Special Premises Ordinance 1985 is located at an aerial distance of 11.75 km from the proposed site. Ecologically sensitive area, Lal Sunhara, a land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries is located approx. 30 km from the Bhawalpur City which is the largest manmade forest listed with IUCN as wildlife sanctuary. It provides excellent feeding, breeding and resting habitats to numerous

	Transmission Lines	To minimize health & safety risks	▪ Single-pole structures placing the existing road ▪ Longer spans as far as practically possible can be used to span them. ▪ Effects of windbreak removal can be mitigated by trimming the windbreak vegetation selectively, replanting lower-growing trees and brushes beneath the line, or creating a new windbreak elsewhere. ▪ A common method to reduce EMF is to bring the lines closer together. This causes the fields created by each of the three conductors to interfere with each other and produce a reduced total magnetic field. Magnetic fields generated by double-circuit lines are less than those generated by single-circuit lines because the magnetic fields interact and produce a lower total magnetic field. In addition, double circuit poles are often taller resulting in less of a magnetic field at ground level. ▪ Provision of keeping the distance of 15m ROW of either side of the transmission lines as per National Transmission and Dispatch Company (NTDC) should be considered before finalizing the Master Plan of the industrial estate.	DC and PIEDMC

B. CONSTRUCTION STAGE				
Sr. No	***Project Component or Impact***	***Target***	***Mitigation***	***Responsibility***
1.	Soil	To minimize soil erosion and contamination.	▪ All spoils will be disposed of at designated site and the site will be restored back to its original conditions; ▪ Avoid use of heavy machinery on wet soil to prevent damage to soil structure; ▪ Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dump sites; ▪ As applicable and needed, plantation of grasses and shrubs will be done at appropriate place where required; ▪ Excavations would be kept confined to the specified foundation spots as per the approved engineering drawings. Unnecessary excavations should be avoided; ▪ Quarry Management Plan should be adhered; ▪ Site camps for the resident labor should not be setup on the land earmarked for developing green belts and lawns; ▪ Oils, lubricants, chemicals, and other listed hazardous	CC , SC, EC

			materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire and Hazardous Substance Rule 2003 should be followed; ▪ Septic tanks of adequate capacities should be constructed for receiving and treating wastewater from all temporary worksite toilets and at the temporary container offices, if any. The toilet wastewater should not be discharged untreated onto the adjacent lands; ▪ Vehicles should be parked and repaired at designated site containing oil collection & sumps arrangement; and ▪ All the unspent and left over materials be completely removed offsite upon completion of construction and the site be restored to original or near to original condition; and washout from washing of equipment and gadgets should be drained into either a septic tank or a sand-gravel bed for removal of the grit and contaminants.	
2.	Surface Water/Groundwater	To avoid surface and ground water contamination	▪ Protection of groundwater reserves from any source of contamination such as the construction and oily waste;	CC , SC, EC

	Quality		▪ Water required for construction may be obtained in a sustainable way that the water availability and supply to nearby communities remain unaffected; ▪ Stockpiles of cement and other construction materials should be kept covered when not being used; ▪ Avoid fuel and other chemicals being stored at numerous locations around the site; ▪ Maintenance of vehicles and plant should be carried out only on impermeable areas where any oil spillages can be contained; ▪ Oils, fuel and chemicals should be stored at fuel stores; ▪ Careful planning of the works to avoid soil excavation works during rainy seasons; ▪ All kinds of waste shall be stored in covered containers and disposed of safely as soon as possible; ▪ Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A licensed contractor should be hired for appropriate disposal and maintenance of these facilities; and ▪ Sand/silt removal facilities such as sand traps, silt traps and sediment basins will be provided to remove the sand/silt particles from run-off. These facilities will be	

			properly and regularly maintained. These facilities will be carefully planned to ensure that they would be installed at appropriate locations to capture all surface water generated on site.	
3.	Air Quality	To minimize the impact on air quality	▪ All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition, properly tuned and maintained in order to minimize the exhaust emissions; ▪ Open burning of solid waste from the contractor's camps should be strictly banned; ▪ Use of fuel with substantially lower sulphur content; ▪ Proper maintenance and repair of power generators and construction machinery is needed to minimize the hazardous emissions; ▪ Personal Protective Equipment (PPE) like masks, goggles and gloves etc. shall be provided to workers; and ▪ NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during construction works. ▪ Regular water sprinkling on the site and access roads	CC , SC, EC

			should be carried out to suppress excessive dust emission(s); ▪ Construction workers should be provided with masks for protection against the inhalation of dust; ▪ The vehicles carrying construction materials and the construction material storage areas should be covered with tarpaulin; ▪ Vehicle speed in the project area should be prescribed not more than 20 km/ hr and controlled accordingly; ▪ Tires of all the vehicles leaving the site should be washed. No earth, mud and dust shall be deposited on the public road; and ▪ Any material dropped on the paved roads will need to be cleaned up immediately to prevent dust nuisance.	
5.	Noise and vibration	To minimize the impact on workers and nearby residents	▪ Provide construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use; ▪ Preferably, restrict construction vehicles movement during night time near the residential areas and camp sites; ▪ Locate the concrete mixing, and materials shipment yards at least 2km from residential areas,	CC , SC, EC

			particularly schools and health centers; ▪ Selection of up-to-date and well maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices; ▪ Heavy machinery like percussion hammers and pneumatic drills should not be used during the night. ▪ Residents should be notified earlier before commencement of excavation operations, if any; and ▪ Earth retaining walls should be constructed to contain the vibrations.	
6.	Solid Waste	To minimize the impact on soil and water	▪ The waste generated from the camp site will be disposed of at approved sites; ▪ Burning of waste shall be prohibited; ▪ Containers with covers shall be provided on site to store waste; ▪ General and hazardous waste shall be labelled and segregated; ▪ Solid Waste shall be safely stored in demarcated waste disposal sites; and ▪ The contractor shall ensure implementation of waste management plan.	CC , SC, EC

7.	Flora	To minimize the impact on plants	▪ The affected/uprooted ornamental trees should be re-planted; ▪ Flowering and fruiting shrubs should be planted along the project boundary to beautify the landscape. Plantation would however be done keeping in view the principles of landscape designing; ▪ The contractor's staff and labour should be strictly directed not to damage any vegetation such as trees or bushes. They should use the paths and tracks for movement; ▪ Construction vehicles, equipments and machinery should remain confined within their designated areas of movement; ▪ Contractor should supply gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel should not be allowed; and ▪ Camp sites and asphalt plants should be established on waste/barren land rather than on forested or agriculturally productive land. However if such type of land is not available, it should be ensured that minimum clearing of the vegetation is carried out and	CC , SC, EC

			minimum damage is caused to the trees. ▪ Establishment of Contractor's camp and warehouses for storage of equipment, material etc. shall involve clearing of grassy vegetation, mostly Dab and Kana vegetation from the area causing a negative impact; ▪ During the entire construction period dust laden polluted air will form a dust film on leaves thus blocking sunshine and stomata consequently hindering photosynthesis processes causing detrimental effect on the plant health; ▪ Exhaust of noxious gases from movement of heavy machinery will pollute air which will adversely affect health and vigor of plants; ▪ During construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camps requirements). ▪ Trees should be properly preserved and no trees should be unnecessarily removed; ▪ Trees that are suitable for and worthy of preservation are identified in the planning or feasibility stage and should be properly preserved through careful and	

			proper planning, design, implementation and post construction maintenance; ▪ Removal, i.e. transplanting or felling should be considered only if preservation is impractical; ▪ Tree transplanting should be properly planned by PHA implemented to ensure that sufficient space to accommodate the existing tree and its future growth, and adequate time for preparation of transplanting are available; ▪ For situations where retaining the trees at their existing locations are not practicable, priority should be given to transplant the affected trees to other permanent locations within the project site where appropriate, so as to increase the trees' survival rate after transplanting and minimize the loss of greenery in the local environs; and if not practicable, transplant the affected trees to a suitable permanent location ex-situ. Location of the receptor site should preferably be in proximity to the project site for retention of amenity effect in the vicinity; and ▪ A larger root ball is recommendable for more mature trees to enhance better recovery after transplanting.	

8.	Fauna	To minimize the impacts on fauna of the project area	▪ Noise control measures should be enforced during the construction phase such as provision of silencers on heavy construction vehicles. It is further recommended that activities, which are expected to generate more noise should be executed during the daytime only; ▪ Moreover, over speeding shall be prohibited and construction machinery, vehicles and equipment will remain confined within their designated areas of movement to avoid and minimize any accidental killing of Fauna; ▪ The camps will be properly fenced and gated to check the entry of wild animals in search of eatable goods. Similarly wastes of the camps will be properly disposed of to prevent the chances of its eating by wild animals, which may prove hazardous for them; and ▪ Hunting, poaching and harassing of animals and birds will be strictly prohibited and contractor shall be held responsible for any such act of his men; ▪ Hunting of the species must be restricted through existing regulations and if necessary, more stringent laws should be enacted for preservation of this	CC , SC, EC

			valuable species; ▪ Local People and construction workers should be given awareness for protection of wildlife as wildlife has also right to live and it makes the surroundings more attractive and colorful. Promotion of awareness to individuals shall accelerate the process of wildlife preservation; ▪ All construction activities must be in coherence with the behavior and habits of threatened species in the area; and ▪ Contractor should make close liaison with the Wildlife Department and Game inspectors to develop strategies for protection and conservation of Species. ▪ During construction, fencing of area is mandatory to confine and protect the species. ▪ During the hunting season, a framework should be developed in order to record the number of birds killed in a specific area. This is an essential component because it helps in generating necessary information in order to show not only the number of birds killed in each year from a specific area but the annual	

			population estimates can also support the sustainable use concept; ▪ Rats in the area must be curtailed as it is suspected that they eat eggs and chicks (Houbara Bustard); and ▪ Turtle hatcheries should be established and protection of nesting sites should be ensured. Surveys should be conducted to identify suitable places for establishing hatcheries for freshwater turtles. Protection of nesting sites of turtles is necessary for their survival. Nest protection during breeding season can be promoted;	
9.	Resource Conservation	Sustainable use of energy resources	▪ Diesel and fuels with low sulphur content will be used to operate construction machinery and equipment's. ▪ The efficient and well maintained equipment's and machinery shall be used; ▪ The equipment's and machinery shall be turned off when not in use; and ▪ Regular maintenance of machinery to avoid fuel leakages.	CC , SC, EC
11.	Health and Safety of Workers and Public	To minimize health risks	▪ Providing basic medical training to specified work staff and basic medical service and supplies to workers; ▪ Obligatory insurance against accidents for	CC , SC, EC

			labourers/workers; ▪ Layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents; ▪ Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers; ▪ Protection devices (ear muffs) should be provided to the workers doing job in the vicinity of high noise generating machines; ▪ Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction; ▪ Provision of protective clothing for labourers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc; ▪ Ensure strict use of wearing these protective clothing during work activities; ▪ Elaboration of a contingency planning in case of major	

			accidents; ▪ Ensure that the site is restricted for the entry of irrelevant people particularly children; and ▪ Adequate lightning devices, barriers, yellow tape and safety signage shall be posted. ▪ There should be proper control on construction activities and Oil spillage of vehicles; ▪ The labourers with different transmittable diseases should be restricted within the construction site; ▪ Efforts will be made to create awareness about road safety among the drivers operating construction vehicles; ▪ Timely public notification on planned construction works; ▪ Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity & social links; ▪ Provision of proper safety signage, particularly at sensitive/accident-prone spots; ▪ If identified, consider guard rails at accident-prone stretches and sensitive locations;	

			▪ The communicable disease of most concern during construction phase, like Sexually-Transmitted Diseases (STDs) such as HIV/AIDS, should be prevented by successful initiative typically involving health awareness; education initiatives; training heath workers in disease treatment; immunization program and providing health service; ▪ Reducing the impacts of vector borne diseases on long-term health effect of workers should be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease, which includes: Prevention of larval and adult propagation of vectors through sanitary improvements and elimination of breeding habitat close to human settlements and by eliminating any unusable impounding of water; ▪ Fencing around the camps should be strong enough so that it can not be broken easily by local people for making passages; and ▪ Use of water should not disturb public water availability and source of water should be selected	

			carefully.	
12.	Emergency Response	To avoid the accidents	▪ Implementation of emergency response plan shall be ensured by the contractor; ▪ Training of the staff/employees regarding the emergency procedures/plans shall be regularly conducted; and ▪ Minor incidents and near misses shall be reported and preventive measures shall be formulated accordingly.	CC , SC, EC
13.	Traffic disruption	To avoid the nuisance due to traffic disruption	▪ Devising a traffic management plan in coordination with traffic police and PIEDMC.	CC , SC, EC
14.	Social Issues	To avoid socio-cultural conflicts	▪ Preparation and implementation of traffic management plan for the entire construction phase; and ▪ Public should be notified before the commencement of the project and be educated about the traffic management plan.	CC , SC, EC
15.	Borrow/ Open Pits	To minimize the issues of borrow areas	▪ Borrow areas must not be selected on agricultural land; ▪ Necessary permits must be obtained for any borrow pits from the concerned authorities; ▪ In borrow pits, the slope must not be steeper than 1:4; ▪ Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent	CC , SC, EC

			lands; ▪ In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-breeding sites; and ▪ Borrow pits may be utilized for aqua culture.	
16.	Construction Waste and Hazardous Waste	To minimize the impact on soil and water resources.	▪ Wastewater effluent from contractor's workshop and equipment washing yards would be passed through gravel/ sand beds to remove oil/ grease contaminants before discharging it into natural streams; ▪ Training of working force in the storage and handling of materials and chemicals that can potentially cause soil contamination; ▪ Solid waste generated during construction and camp sites should be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan; ▪ Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.;	CC , SC, EC

			▪ Training employees involved in the transportation of hazardous material regarding emergency procedures; ▪ The sewage system for camps will be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters; ▪ Lined wash areas will be constructed within the camp site or at site, for the receipt of wash waters from construction machinery; ▪ Use of pesticides in nurseries should be done deemed necessary and suggested by the experts; ▪ Use of less toxic pesticide should be preferred; ▪ Those insecticides should be used which are less toxic to human health. ▪ No refuelling, storage, servicing or maintenance of equipment should take place within 150 feet of drainages or other sensitive environmental resources; ▪ Any fluids drained from the machinery during servicing will be collected in leak proof container and	

			taken to an appropriate disposal or recycling facility.	
17.	Groundwater	To avoid contamination of groundwater	▪ Protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality; ▪ The solid waste should be disposed of in designated landfill sites to sustain the water quality for domestic requirements; ▪ Water required for construction is obtained in such a way that the water availability and supply to nearby communities remain unaffected; ▪ Regular water quality monitoring according to determined sampling schedule; and ▪ Prohibit washing of machinery and vehicles outside washing yard, provide sealed washing basins and collect wastewater in sedimentation/retention pond.	CC , SC, EC
18.	Disposal of Mucking Material	To minimize the scars on the land in the Project Area.	▪ The excavated materials that are unsuitable for use will need to be stored, transported and disposed of appropriately at designated sites by PIEDMC.	CC , SC, EC
19.	Disturbance to People	To minimize the disturbance (hindrance in free movement) to people in the Project Area	▪ Ensurance of timely completion of the construction works according to the agreed schedule by PIEDMC and provision of alternate routes for the project site where the construction is being carried out.	CC , SC, EC

C. OPERATIONAL STAGE				
Sr. No	***Project Component or Impact***	***Target***	***Mitigation***	***Responsibility***
1	Flora	Proper maintenance of saplings planted.	▪ The saplings planted in the project area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients by Parks and Horticulture Authority (PHA).	PIEDMC
2	Surface/ Ground Water	To minimize impact on water quality of the project area	▪ PIEDMC should ensure the installation of tube wells as per proposed design; ▪ PIEDMC should ensure that no industry shall install a tube well within its own premises; ▪ Combined Effluent Treatment plant (CETP) shall be operated as per Standard Operating Procedures (SOPs) to follow NEQS. Special concentrations shall be paid to sludge treatment and handling; ▪ Implementation of bylaws of individual treatment plants at industrial level shall be ensured; ▪ Industries shall be bound to submit monitoring reports of their effluents regularly; ▪ Monitoring plans for water quality analysis of the	PIEDMC, EPA

			CETP effluent and groundwater shall be prepared; and ▪ Best management Practices (BMPs) shall be maintained to ensure their effective function to treat nonpoint source water pollution.	
3	Air Quality	To minimize ambient air pollution.	▪ Installation of Air Pollution Control Equipment in respective industries; ▪ Capture CH4 and H2S that can be used commercially; ▪ Plan massive tree plantation along the industrial estate; ▪ Management should ensure Compliance of PEQS, 2016; and ▪ SMART Rules must be followed.	PIEDMC, EPA
4	Soil	To avoid soil contamination	▪ Each industry shall be bound to submit the inventory of use of hazardous chemicals, their use and final disposal including measures to control special waste; and ▪ Signage shall be carried out to regulate the routes of especial waste disposal to avoid the risks of spillages.	PIEDMC
5	Ecology	To protect the ecology of the area	▪ Compensatory plantation of trees shall be undertaken along the boundary of the Industrial Estate, along the main and minor roads and in green areas; and ▪ A tree plantation program will be implemented by the Divisional Forest Officer, Bahawalpur, in and around the Industrial Estate. For this purpose, requisite funds	PIEDMC and Forest Department

			should be placed at the disposal of D.F.O. by the proponent.	
6	Solid Waste	Proper handling of the Solid waste to avoid the odor.	▪ Solid Waste management (SWM) system should be operated as per SOPs and improved with time to time; ▪ Primary collection and storage of solid waste should be performed in the closed containers; ▪ Secondary collection should be done in the compactor trucks; ▪ Only unusable trash material should be disposed of into the landfill site and all the reusable material shall be separated, processed and sold accordingly; and ▪ People should be educated to waste lesser.	PIEDMC and BWMC
7	Occupational Health and Safety	To avoid risks to health of consumers/workers/communities	▪ Obligatory insurance against accidents for laborers/workers; ▪ Providing basic medical training to specified work staff and basic medical service and supplies to workers; ▪ Layout plan for camp site, indicating safety measures taken by the contractor, e.g. fire-fighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of	PIEDMC

			accidents; ▪ Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for laborers; ▪ Protection devices (ear muffs) should be provided to the workers doing job in the vicinity of high noise generating machines; ▪ Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction; ▪ Proper maintenance of facilities for workers will be monitored; ▪ Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.; ▪ Ensure strict use of wearing these protective clothing during work activities; ▪ Elaboration of a contingency planning in case of major accidents; ▪ Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work	

			sites; and ▪ Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads.	
8	Emergency Response	To deal with the emergency situations	▪ An Emergency Response Plan for earthquakes and manmade disasters will be developed; ▪ Emergency Response Plan will be implemented in close consultation with the Rescue 1122 Service, Fire Fighting Department, bomb disposal squad and paramedics; ▪ Also evacuation plan will be developed in order to tackle with any emergency; and ▪ In addition, training of the staff/employees regarding the emergency procedures/plans will be regularly conducted.	PIEDMC
9	Drainage	To avoid surface runoff	▪ PIEDMC should ensure regular maintenance of drainage system especially before the rainy season to avoid chocking and flooding.	PIEDMC

KEY

DC Design Consultant

CC Construction Contractor

SC	Supervision Consultant	EC	Environmental Committee
PIEDMC	Punjab Industrial Estate Development and Management Company	EPA	Environmental Protection Agency
PHA	Parks & Horticulture Authority	BWMC	Bahawalpur Waste Management Company

7.3 Environmental Monitoring

Environmental Monitoring is undertaken during both the construction and operation phases to ensure the effectiveness of the proposed mitigation measures. Certain environmental parameters are selected and quantitative analysis is carried out. The results of analysis are compared with the guidelines; standards and pre-project condition to investigate whether the EMP and its implementation are effective for the mitigation of impacts or not. Parameters to be analyzed during construction and operation of the proposed project and responsibilities for monitoring and reporting have been discussed below. A cost estimate for this measurement of parameters is given in **Table 7.2**.

7.3.1 Construction Phase

a) Air Quality

Air quality monitoring will be carried out on quarterly basis during the construction phase for the parameters CO, NO_2, SO_2 and PM_{10} and will be in accordance to Punjab Environmental Quality Standards (PEQS) for ambient air.

b) Ground Water Quality

Ground water quality monitoring will be done quarterly during the construction phase and will be in accordance to PEQS for drinking water.

c) Noise Level

The noise level monitoring will be carried out quarterly during the whole construction period for the proposed project and will be in accordance to PEQS for noise.

7.3.2 Operational Phase

a) Air Quality

Air quality monitoring will be done will be done bi-annually during the operational phase of the proposed project. The parameters will be monitored are CO, NO_2, SO_2 and PM_{10}.

b) Ground Water Quality

Ground water quality monitoring will be done bi-annually during the operational phase and will be in accordance to PEQS for drinking water.

c) Noise Level

The noise level monitoring will be carried out bi-annually during the operational phase and will be in accordance to PEQS for noise.

d) Wastewater

Wastewater quality monitoring will be done bi-annually during the operation phase and will be in accordance to PEQS for industrial waste.

7.3.3 Responsibilities for Monitoring and Reporting

The EC will be responsible for environmental monitoring and reporting throughout the construction and operation phases. During construction phase, one (1) environmental monitoring report will be prepared on quarterly basis and one (1) comprehensive report will be prepared at the end of the construction phase and will be submitted to each of the following authorities and institutions: (i) PIEDMC and (ii) EPA-Punjab. One (1) environmental monitoring report will be prepared bi-annually and one (1) comprehensive report will be prepared annually and submitted to the EPA-Punjab for first year of the project operation. Contents of the final report will include results of environmental monitoring in comparison to the standards for the various parameters, location and sampling time along with recommendations for the future projects.

Table 7.2: Budget Estimate for Environmental Monitoring During Construction and Operational Phases

Components	Parameters	Quantity (No. of samples x No. of locations x Frequency)	Frequency	Responsibility	Duration	Cost (Rs.)
Construction Phase (Estimation for 24 Months)						
Air Quality	CO, NO_2, SO_2, PM_{10} and according to PEQS for ambient air	1x4x8 = 32	Monthly @ Rs. 30,000/ sample	CC & SC	24 hours	960,000/-
Drinking Water Quality	According to PEQS for drinking water	1x2x8 = 16	Monthly @ Rs. 25,000/sample	CC & SC	---	400,000/-
Noise Level	---	1x4x8 = 32	Monthly @ Rs. 6,000/point	CC & SC	24 hours	192,000/-
					TOTAL	**1,552,000/-**
Operational Phase (Estimation for the first Year)						
Air Quality	CO, NO_2, SO_2, PM_{10} and according to PEQS for ambient air	1x4x2 = 8	Quarterly @ Rs. 30,000/ sample	PIEDMC and EPA-Punjab	24 hours	240,000/-
Drinking Water Quality	According to PEQS for drinking water	1x2x2 = 4	Quarterly @ Rs. 25,000/point	PIEDMC and EPA-Punjab	---	100,000/-
Noise Level	---	1x4x2 = 8	Quarterly @ Rs. 6,000/point	PIEDMC and EPA-Punjab	24 hours	48,000/-

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Components	Parameters	Quantity (No. of samples x No. of locations x Frequency)	Frequency	Responsibility	Duration	Cost (Rs.)
Wastewater Quality	According to PEQS for wastewater	1x2x2 = 4	Quarterly @ Rs. 25,000/point	PIEDMC and EPA-Punjab	---	100,000/-
					TOTAL	**488,000/-**
					GRAND TOTAL	**643,200/-**

KEY

CC	Construction Contractor	PIEDMC	Punjab Industrial Estate Development and Management Company
SC	Supervision Consultant	EPA	Environmental Protection Agency

Note: Provision must be given in annual budget of operational phase for environmental monitoring. For this, the cost of operation phase monitoring (i.e.Rs.488,000/-) must be considered with an annual increment of 10%.

6.4.3 Solid Waste

Large quantities of industrial and hazardous waste along with municipal solid waste will be produced at the different stages of the project. Without a proper solid waste management system and engineered land filling practices, solid waste may result in odor, breeding ground for disease vector, and aesthetic concerns. No area has been allocated for disposal of hazardous waste within the proposed industrial estate. Solid waste may result in leachate production and percolation in groundwater. *Hazardous Substance Rules, 2003* must be followed for the handling of hazardous waste.

Mitigation measures will include:

- Planning for disposal sites with reasonable distance from the human settlements following the siting criteria for landfill site;
- Disallow siting for work camps, including waste dump sites, in a distance closer than one (1) kilometer to any inhabited areas;
- Incorporate technical design features for refuse collection containers at sites that would minimize burning impacts;
- Devise sustainable plans for the reuse and recycling of waste materials produced in the industrial estate by different industries;
- Devise plan(s) for safe handling, storage and disposal of harmful materials; and
- Burning of waste within and surrounding of the industrial estate should not be allowed in any case.

6.4.4 Groundwater

The groundwater quality and quantity may significantly be affected by the project activities. The minimum depth of water table in project area is about 30 to 40 feet below ground surface (9m-12m); therefore it is more likely to be contaminated due to seepage, infiltration and inflows.

The quality of water is good along Ahmadpur Branch Canal while deteriorates going away from canal. The number of tube wells required to meet the estimated water requirement of the Industrial zone will depend upon the discharges of the proposed new tube wells at recommended sites. Excess/Illegal use of groundwater may lead to decrease in groundwater table of the project area.

serve as breeding ground for disease vectors. The situation may exacerbate in the rainy seasons. Since the depth of ground water table is shallow in the area, therefore, the seepage of wastewater at the bottom of the receiving water body may also contaminate the ground water. Throwing the industrial effluent in River Sutlej without treatment is not an eco-friendly option.

The proposed mitigation measures will include:

- CETP should be designed for the proposed Industrial Estate in order to avoid contamination of the receiving water body;
- A policy should be devised to ensure that all the industries in the industrial estate should install a wastewater treatment plant;
- Plan to restrict the solid waste dumping into gravity sewer and force main;
- Provision should be made in the design to cover the gravity sewer and force main; and
- Alternative options should be considered such as using treated water for agriculture purpose by meeting the standards for irrigation and prior consultation with farmers of the nearby villages to take the views regarding willingness to use this water.

6.4.7 Flora

A total number of forty five (45) trees of varying species and sizes will be cut.

The proposed mitigation measures will include:

- Incorporate technical design measures to minimize removal of these trees, as far as possible;
- Provision for a 0.5 Km wide "greenbelt" around the site perimeter;
- A Tree Plantation Plan is formulated in compensation of trees affected by the establishment of the proposed Industrial Estate and attached as **Annexure VIII.** This plan may be considered during the operation phase;
- A plan for transplantation of trees may be considered;
- Compensatory planting of ten (10) trees against each fallen tree of similar floral function should be planned; and
- PHA should ensure that there should be no exotic species in the plantation plan with known environmental setbacks (Eucalyptus, etc.).

6.4.8 Seismic Hazard

The project area is located in Seismic Zone 2A, where 2A (lower limit of moderate damage) represents peak horizontal ground acceleration from 0.08 to 0.16 g. In this Zone, designing of various types of structures should be done on the basis of Peak Ground Acceleration (PGA). A low to moderate intensity earthquake impacting the project site can adversely impact the development. This factor requires special consideration of the designers keeping in view the recent earthquake of October 08, 2005 and September 25, 2013 and recent tremors within past few months. The proposed project shall be designed and constructed to withstand low to moderate earthquakes.

Mitigation measures will include:

- The structures of the proposed project should be designed and constructed keeping in view low to moderate earthquakes. For seismic hazard analysis, updated structural and seismic evaluations should be conducted by the design engineer/consultant;
- Seismic Building Code of Pakistan 2007 (SBC-07) should be adopted for designing of buildings. This code specifies minimum requirements for seismic safety of buildings and has to be applied and used by engineers in conjunction with the necessary understanding of the concepts of structural, geotechnical and earthquake engineering; and
- The structure of the proposed project should also be studied by the proponent (PIEDMC) to evaluate its durability/strength to withstand moderate to high intensity earthquake.

6.4.9 Air Pollution, Noise and Vibration

Air Pollution could be a major concern of the nearby settlements from the proposed Industrial Estate. The gaseous emissions and fugitive dust emissions may deteriorate the air quality of project area during pre-construction (site clearing) and construction phase of the proposed project due to construction activities (operation of construction machinery, dust emissions, vehicular movement, etc.) which results in increase in both air and noise pollution along with the associated health risks to the nearby residents.

During the operation phase various primary and secondary air pollutants would be emitted. The gaseous emissions in the form of plumes will create an air-shed of pollutants within 15 – 20 Km distance and affect the recipients in the downwind direction of the industries and may cause chronic or acute respiratory diseases like asthma and nausea and will also have effect on the faunal and floral species.

Mitigation measures will include:

- A policy should be devised at the planning stage for the strict enforcement of PEQS, 2016 for industrial gaseous emissions by all the industries during the operation phase;
- Provision of air pollution control equipment's must be considered for respective industries;
- Each industry would submit its separate IEE/EIA as stated in PEPA Act, 1997.
- Plan for using other options of dust controlling/suppressing techniques;
- Scheduling of water sprinkling by the construction contractor prior to construction activities;
- Plan and budgeting for provision for noise barriers for the construction site, particularly for the sensitive receptors;
- Plan for scheduling the noisy construction work during night time;
- Consultations of the proponent at the pre-construction phase with the traffic police and contractor to devise a traffic management plan for smooth flow of traffic during the construction phase in order to reduce dust and noise pollution; and
- Selection/budgeting of air and noise emission control devices by the contractor prior to construction activities.

6.4.10 Emergency Management

Disasters such as earthquakes, floods, fire events, explosions, spills, terrorist activities and accidents due to operational failures may occur. The losses may vary from minor injuries to mortalities and financial losses in the form of reduced man hours and/or equipment damage.

Mitigation measures will include:

- A comprehensive Emergency Response Plan should be devised which should be implemented in close consultation with the Rescue 1122 Service, Fire Fighting Department, bomb disposal squad and paramedics;

- Provision of regular training of the staff/employees regarding the emergency procedures/plans;
- Provision of medical facility should be provided in the industrial estate; and
- Provision of firefighting and emergency exits should be given in the design.

The Emergency Response Plan is attached as **Annexure IX**.

6.4.11 Physical Cultural Resources

The Physical Cultural Resources situated in the project area are; mosques (Noor Masjid, Mari Sheikh Shujra, Muhammad Mosque, Dera Ramzan) and graveyard (Agha Pur). These places are visited by local people regularly (mosques) and occasionally (Graveyard). No relocation is involved in the project. Thus, no impact will occur on the physical and cultural resources due to the establishment of the industrial estate.

6.4.12 Public Utilities

Due to the proposed project, public utilities like power transmission lines and poles will not be affected and will not create disruption of public services and economics.

6.4.13 Transmission Lines

There is a grid station along the south- west boundary of Project site terminating six (06) 132 kV & 220 kV transmission lines which are passing through the Project site. Following are the main environmental and social issues which are specifically related to the construction and operation of a transmission line:

A. Aesthetics

The overall aesthetic effect of a transmission line is likely to be negative to most people, especially where proposed lines would cross natural landscapes. The tall steel or wide "H-frame" structures may seem out of proportion and not compatible with agricultural landscapes. Some people however, do not notice transmission lines or do not find them objectionable from an aesthetic perspective. To some, the lines or other utilities may be viewed as part of the infrastructure necessary to sustain our everyday lives and activities. To others, new transmission lines may be viewed in a positive light because it represents economic development. Aesthetic impacts depend on:

- The physical relationship of the viewer and the transmission line (distance and sight line);
- The activity of the viewer (living in the area, driving through or sightseeing); and
- The background, or context, of the transmission line, such as whether the line stands out or blends in.

A transmission line can affect aesthetics by:

- Degrading the surrounding environment (intruding on the view of a landscape); and
- Enhancing a resource (evoking an image of economic strength in a developing business or industrial area).

Mitigation of Aesthetic Impacts:

Electric transmission lines can be routed to avoid areas considered scenic. Routes can be chosen that pass through commercial/industrial areas or along land use boundaries. The form, color, or texture of a line can be modified to minimize aesthetic impacts. The color and construction material of poles can be chosen to blend with or complement the landscape around them. Lines constructed using H-frame poles may blend in better with natural surroundings. Stronger conductors can minimize line sag. ROW management can mitigate aesthetic impacts by planting vegetative screens to block views of the line leaving the ROW in a natural state along the road. In the end, aesthetics are, to great extent, based on individual perceptions.

B. Agricultural Land

Transmission lines can affect farm operations and increase costs for the farm operator. Potential impacts depend on the transmission line design and the type of farming. Transmission lines can affect field operations, irrigation, and wind breaks.

Mitigation of Agricultural Impacts:

- Single-pole structures placing the existing road
- Longer spans as far as practically possible can be used to span them.

- Effects of windbreak removal can be mitigated by trimming the windbreak vegetation selectively, replanting lower-growing trees and brushes beneath the line, or creating a new windbreak elsewhere.

C. Electric and Magnetic Fields (EMF)

Health concerns over exposure to EMF are often raised when a new transmission line is proposed. Exposure to electric and magnetic fields caused by transmission lines has been studied since the late 1970s. These fields occur whenever electricity is used. The magnetic field is created when electric current flows through any device including the electric wiring in a home. Every day we are exposed to many common sources of EMF from vacuum cleaners, microwaves, computers, and fluorescent lights.

The research to date has uncovered only weak and inconsistent associations between exposures and human health. To date the research has not been able to establish a cause and effect relationship between exposure to magnetic fields and human disease, nor a plausible biological mechanism by which exposure to EMF could cause disease. The magnetic fields produced by electricity do not have the energy necessary to break chemical bonds and cause DNA mutations.

Reducing EMF Levels of Transmission Lines

Magnetic fields can be measured with a gauss meter. The size of the magnetic field cannot be predicted from the line voltage but is related to the current flow. A 69 kV line can have a higher magnetic field than a 115 kV line. Magnetic fields quickly dissipate with distance from the transmission line.

Mitigation:

A common method to reduce EMF is to bring the lines closer together. This causes the fields created by each of the three conductors to interfere with each other and produce a reduced total magnetic field. Magnetic fields generated by double-circuit lines are less than those generated by single-circuit lines because the magnetic fields interact and produce a lower total magnetic field. In addition, double circuit poles are often taller resulting in less of a magnetic field at ground level.

D. Noise

Vibrations or humming noise is noticeable most often on older lines. It is usually the result of conductor mounting hardware that has loosened slightly over the years and can be easily repaired by the utility.

The other types of noise are sizzles, crackles, or hissing noises that occur during periods of high humidity and are usually associated with high-voltage transmission lines (500 kV lines). These noises are very weather dependent. They are caused by the ionization of electricity in the moist air near the wires. Though, this noise is audible to those very close to the transmission lines, it quickly dissipates with distance and is easily overshadowed by typical background noises.

E. Radio and Television Reception

Transmission lines do not usually interfere with normal television and radio reception. In some cases, interference is possible at a location close to the ROW (especially along the road) due to weak broadcast signals or poor receiving equipment. If interference occurs because of the transmission line, the electric utility is required to remedy problems so that reception is restored to its original quality.

F. Fallen Lines

Transmission lines are designed to trip out of service (turn off), if they fall or have contact with trees. Transmission lines are not likely to fall unless hit by a tornado or truck.

G. Lightning

Power poles, trees and other tall objects are more likely to intercept lightning strikes. Transmission lines are therefore usually built with a grounded shield wire at the top of the poles. This protects the transmission line from lightning. Lightning is not more likely to strike houses or cars near the transmission line. Shorter objects under or very near a line may actually receive some protection from lightning.

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H. Induced Voltage

People or animals can receive a shock by touching a metal object located near a transmission line. The shock is similar to that received by touching a television after walking across a carpet. The magnitude and the strength of a charge are directly related to the mass of the ungrounded metal object and its orientation to the transmission line.

Induced current can be prevented or corrected by grounding metal objects near the transmission line. Grounding chains can be installed on tractors. Metal fences can be connected to a simple ground rod with an insulated lead and wire clamp. Electric fences with proper grounding should continue functioning properly even when subject to induced voltage.

Overall Mitigation measures will include:

- Provision of keeping the distance of 15m ROW of either side of the transmission lines as per National Transmission and Dispatch Company (NTDC) should be considered before finalizing the Master Plan of the industrial estate.

6.4.14 Drainage

For the proposed Industrial Estate, a separate system has been proposed for the collection of wastewater and storm water. Keeping in view the economy and limited budget available with the client, it is proposed that storm water collection system will be designed as a part of this project, however its construction may be taken up in next phase upon colonization of the industrial area. Till that period, a part of storm water along the roads will be catered through wastewater pipes (partially combined system) and infiltration in empty industrial plots. Therefore, the wastewater collection system will work as partially combined system till construction of storm water drains. No impact is envisaged of the drainage of proposed Industrial Estate.

6.5 Potential Impacts during the Construction Phase

6.5.1 Topography

The project area has bad land topography. The irregular sand dunes deposited all over the project area which are 1 to 5 meters (3 to 15 feet) high from adjacent agriculture land. The surface is irregular throughout the project area and a large scale excavation is

involved. The establishment of the industries, associated infrastructure and road network will change the natural topography of the project site permanently.

6.5.2 Soil

Following impacts on soil quality are envisaged due to construction activities and construction camps:

- Excavation of earth/cutting operations, clearing of vegetation and land levelling activities can destabilize the surrounding land surface;
- In case any artifact, antiques and sensitive remains are discovered, Chance Find Procedures (**Annexure X**) should be adopted;
- The unspent materials and debris produced from consumed up materials, if left as such and allowed to mix with soil underneath, can degrade the quality of soils;
- Leakages of oils, lubricants, chemicals and other similar substances from their storage sites and from engines of the generators, machines, equipment and vehicles can spoil the receiving soils and may undermine ability of the spoiled soils to support growth of vegetation and plants;
- Non-provision of septic tanks with the temporary worksite toilets, constructed for the labour and others, can contaminate the effluent receiving soils because of raw nature of the effluents; and
- Washing of the gadgets, machinery and equipment without proper drainage of the washout water can adversely affect the soil quality.

The impact is considered to be moderate adverse in nature.

Mitigation measures will include:

- All spoils will be disposed of at designated site and the site will be restored back to its original conditions;
- Avoid use of heavy machinery on wet soil to prevent damage to soil structure;
- Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dump sites;
- As applicable and needed, plantation of grasses and shrubs will be done at appropriate place where required;
- Excavations would be kept confined to the specified foundation spots as per the approved engineering drawings. Unnecessary excavations should be avoided;
- Quarry Management Plan (attached as **Annexure XI**) should be adhered;

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- Site camps for the resident labor should not be setup on the land earmarked for developing green belts and lawns;
- Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire and Hazardous Substance Rule 2003 should be followed;
- Septic tanks of adequate capacities should be constructed for receiving and treating wastewater from all temporary worksite toilets and at the temporary container offices, if any. The toilet wastewater should not be discharged untreated onto the adjacent lands;
- Vehicles should be parked and repaired at designated site containing oil collection & sumps arrangement; and
- All the unspent and left over materials be completely removed offsite upon completion of construction and the site be restored to original or near to original condition; and washout from washing of equipment and gadgets should be drained into either a septic tank or a sand-gravel bed for removal of the grit and contaminants.

6.5.3 Surface Water/Groundwater Quality

The potential sources of water pollution associated with the construction of proposed project are:

Runoff from the construction works site may contain increased load of sediments, suspended solids and other contaminants. Potential sources of pollution from the site include:

- Runoff and erosion from exposed soil surfaces, earth work areas and stockpiles e.g. grouting and cement material with the rain;
- Wash water from dust suppression sprays;
- Fuel and lubricants from maintenance of construction vehicles and mechanical equipment;
- Spillage of liquids stored on-site such as oil, diesel, and solvents etc. are likely to result in water pollution; and
- Uncontrolled discharge of debris and garbage such as packaging, construction material and refuse.

Wastewater would be generated from the workforce during the construction phase. However, wastewater can be adequately treated by interim sewage facilities, such as portable toilets, which can be installed within the construction site.

Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating groundwater. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater and channels carrying water.

Mitigation measures will include;

- Protection of groundwater reserves from any source of contamination such as the construction and oily waste;
- Water required for construction may be obtained in a sustainable way that the water availability and supply to nearby communities remain unaffected;
- Stockpiles of cement and other construction materials should be kept covered when not being used;
- Avoid fuel and other chemicals being stored at numerous locations around the site;
- Maintenance of vehicles and plant should be carried out only on impermeable areas where any oil spillages can be contained;
- Oils, fuel and chemicals should be stored at fuel stores;
- Careful planning of the works to avoid soil excavation works during rainy seasons;
- All kinds of waste shall be stored in covered containers and disposed of safely as soon as possible;
- Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A licensed contractor should be hired for appropriate disposal and maintenance of these facilities; and
- Sand/silt removal facilities such as sand traps, silt traps and sediment basins will be provided to remove the sand/silt particles from run-off. These facilities will be properly and regularly maintained. These facilities will be carefully planned to ensure that they would be installed at appropriate locations to capture all surface water generated on site.

6.5.4 Air Quality

Air quality will be affected by various construction activities. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. In certain climatic condition such as hot summer, airborne dust can become a major nuisance if control techniques are not properly employed. The critical sources of air pollution during the construction phase will be:

- Unpaved road surface;
- Transportation of materials;
- Excavation operations
- Construction equipments;
- Vehicular exhaust; and
- Burning of fuel for cooking by workers.

The air emissions may cause health impacts such as dryness and roughness of the throat; eyes, nose, etc. to the workers and staff of the contractor. These emissions may also affect the bio-physical environment. Major air sensitive receivers identified in the project area are Mosque Muhammadia, Noor Masjid, Govt. Girls Primay School, Mari Sheikh Shujra. The impact is major adverse and temporary in nature.

Mitigation measures for emissions include the following:

- All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition, properly tuned and maintained in order to minimize the exhaust emissions;
- Open burning of solid waste from the contractor's camps should be strictly banned;
- Use of fuel with substantially lower sulphur content;
- Proper maintenance and repair of power generators and construction machinery is needed to minimize the hazardous emissions;
- Personal Protective Equipment (PPE) like masks, goggles and gloves etc. shall be provided to workers; and
- NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during construction works.

Dust problems caused during the construction phase of the project could be effectively mitigated by the implementation of simple procedures by the contractor including but not limited to the following:

- Regular water sprinkling on the site and access roads should be carried out to suppress excessive dust emission(s);
- Construction workers should be provided with masks for protection against the inhalation of dust;
- The vehicles carrying construction materials and the construction material storage areas should be covered with tarpaulin;
- Vehicle speed in the project area should be prescribed not more than 20 km/ hr and controlled accordingly;
- Tires of all the vehicles leaving the site should be washed. No earth, mud and dust shall be deposited on the public road; and
- Any material dropped on the paved roads will need to be cleaned up immediately to prevent dust nuisance.

6.5.5 Noise and vibration

Main sources of noise will be heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills and other equipment. Noise generated by construction machinery is likely to affect sensitive receptors located within 500 meters of the project area.

Health risks associated with exposure to continuous noise levels includes increase in blood pressure, hypertension, annoyance and sleep disturbance. temporary threshold shift etc. Major noise sensitive receivers identified in the project area are Masjid Muhammadia, Noor Masjid, Govt. Girls Primay School, Mari Sheikh Shujra and residential area around project site. The impacts of noise would be temporary and highly adverse in nature.

The likely impacts due to noise are:

- Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels; and

- Noisy settings and higher background levels can cause temporary threshold shift and the consequent habit of speaking loud, which may cause damage to vocal cords in the persons exposed.

This impact is temporary and moderate adverse in nature.

Mitigations:

There are a variety of ways by which construction equipment and worksite noise can be controlled. The following is a list of ways to control noise level at the worksite of the proposed Project:

- ***Quieter Equipment***

A cost-effective way to reduce noise at a construction worksite is to buy quiet equipment. In addition, equipment in use should be the most suitable for the job. Avoid using equipment that is over-powered and, conversely, avoid using under powered equipment. Whenever possible the quietest equipment alternative should be used. In general, electronic powered equipment is quieter than diesel powered equipment and hydraulically powered equipment is quieter than pneumatic power.

- ***Modifying Existing Old Equipment***

The most common way to reduce the noise levels of common construction equipment is through worksite modifications. Some common worksite modifications consist of retro-fitting existing equipment with damping materials and mufflers.

- ***Barrier Protection***

An effective way of reducing noise is to locate noisy equipment behind purpose-built barriers. The barriers can be constructed on the work site from common construction building material (plywood, block, stacks or spoils) or the barriers can be constructed from commercial panels which are lined with sound absorbing material to achieve the maximum shielding effect possible. To be effective, the length of the barrier should be greater than its height. The noise source should not be visible and barrier should be located as close as possible to either the noise source or the receiver.

- ***Work Activity Scheduling***

Work activity scheduling are administrative means to control noise exposure. Planning how noise sources are sited and organized on a work site can reduce noise hazards.

Jobs can be rotated so that exposure time is limited. Transferring workers from a high exposure task to a lower exposure task could make the employee's daily noise exposure acceptable. Administrative controls include activity planning, for example, scheduling pavement breaking operations so as to reduce the number of work site workers exposed. In addition noisy equipment should not be run for periods longer than necessary and should be switched off when not in use.

- ***Maintenance***

Increased attention to maintenance of tools and equipment will reduce worksite noise levels. Maintaining plant and equipment in good order not only increases its life, but makes it safer to use and quieter. Loose and worn parts should be fixed as soon as possible. Ideally, the worksite should have a system in place for checking and servicing the various machines and power tools.

- ***Noise Perimeter Zones***

Noise perimeter zones (NPZ) are another administrative control to limit exposure to noisy processes or equipment to as few workers as possible. NPZ are areas where noise levels of 90 dB (A) or more are roped off and marked to keep out all workers who don't have to be there.

NPZ can be set up using a sound level meter to find the safe distance from the source (90 dB (A)) and the NPZ can be set up at that distance. Noise does not radiate from the source at the same level in all directions. Noise from machinery can be higher in one direction than another because the noise can also be either absorbed or reflected from surfaces it contacts, such as the ground or a wall. Therefore, measurements should be taken at several points in an area where people might be working. Once noise levels that are 90 dB (A) or more are determined, rope off this area as the Noise Perimeter Zone. Exclude all workers who do not need to be in that zone. All workers who need to work within the zone must wear hearing protection.

Following are the general mitigation measures to minimize the impacts of noise:

- Provide construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use;
- Preferably, restrict construction vehicles movement during night time near the residential areas and camp sites;

- Locate the concrete mixing, and materials shipment yards at least 2km from residential areas, particularly schools and health centers;
- Selection of up-to-date and well maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices; and
- Heavy machinery like percussion hammers and pneumatic drills should not be used during the night.

Vibrations will be caused due to operation of heavy machinery. No structural damage, even for older or heritage buildings, will be expected as a result of construction activities.

All mitigation measures mentioned below should be taken in order to minimize the impacts of vibrations in the project area. These measures include, but are not limited to the following:

- Residents should be notified earlier before commencement of excavation operations, if any;
- Earth retaining walls should be constructed to contain the vibrations; and

6.5.6 Solid Waste

Due to construction activities municipal and construction waste will be generated from construction activities and contractors' camps. Improper dumping of waste may generate odor and attract mosquitoes and other disease vectors. Empty containers containing the toxic, flammable and corrosive materials may pose hazard to the workers. This may result in health risk to work force and public, if disposal site is improperly selected. This impact is temporary and minor negative in nature.

Mitigation measures will include:

- The waste generated from the camp site will be disposed of at approved sites;
- Burning of waste shall be prohibited;
- Containers with covers shall be provided on site to store waste;
- General and hazardous waste shall be labelled and segregated;
- Solid Waste shall be safely stored in demarcated waste disposal sites; and
- The contractor shall ensure implementation of waste management plan.

6.5.7 Flora

Trees are vital ecosystem, which perform variety of functions for the improvement of environment such as reduction in air pollution, noise abatement, cooling effect on earth and supply of oxygen.

Nearly 45 trees of different species mostly young trees exist in the project area. These trees are likely to be effected, during construction stage. Construction of various industrial units in the estate, shall involve cutting and removing of these trees, which shall have a negative effect on the flora of the tract.

Following impacts are expected on the flora of the project area:

- Trees act as a binding force as their roots are spread in the soil, which helps to keep the soil intact. With the removal of trees, however less, this binding force will be vanished and the soil will be liable to increased erosion;
- Exhaust of noxious gases from movement of heavy machinery will further pollute air which will adversely affect health of plants;
- Establishment of Contractors camps and warehouses for storage of equipment, material etc. will involve clearing of vegetation from the area, causing an adverse impact; and
- During construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camps requirements).

This impact will be permanent and moderate negative in nature.

Mitigations measure will include:

- The affected/uprooted ornamental trees should be re-planted;
- Flowering and fruiting shrubs should be planted along the project boundary to beautify the landscape. Plantation would however be done keeping in view the principles of landscape designing;
- The contractor's staff and labour should be strictly directed not to damage any vegetation such as trees or bushes. They should use the paths and tracks for movement;

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- Construction vehicles, equipments and machinery should remain confined within their designated areas of movement;
- Contractor should supply gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel should not be allowed; and
- Camp sites and asphalt plants should be established on waste/barren land rather than on forested or agriculturally productive land. However if such type of land is not available, it should be ensured that minimum clearing of the vegetation is carried out and minimum damage is caused to the trees.
- Establishment of Contractor's camp and warehouses for storage of equipment, material etc. shall involve clearing of grassy vegetation, mostly Dab and Kana vegetation from the area causing a negative impact;
- During the entire construction period dust laden polluted air will form a dust film on leaves thus blocking sunshine and stomata consequently hindering photosynthesis processes causing detrimental effect on the plant health;
- Exhaust of noxious gases from movement of heavy machinery will pollute air which will adversely affect health and vigor of plants; and
- During construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camps requirements).

Tree Transplantation

Maximum efforts should be made by the PHA to transplant all the uprooted trees to be affected due to construction of proposed flyover.

A decision to transplant a tree should be based on a balancing consideration of its conditions (e.g. form, health and structure), size, species, conservation status, amenity value, suitability for transplanting, environmental and cultural factors, functional and engineering considerations and cost effectiveness. **Figure 6.3** shows the basic work flow with key considerations of tree transplanting for a typical construction project.

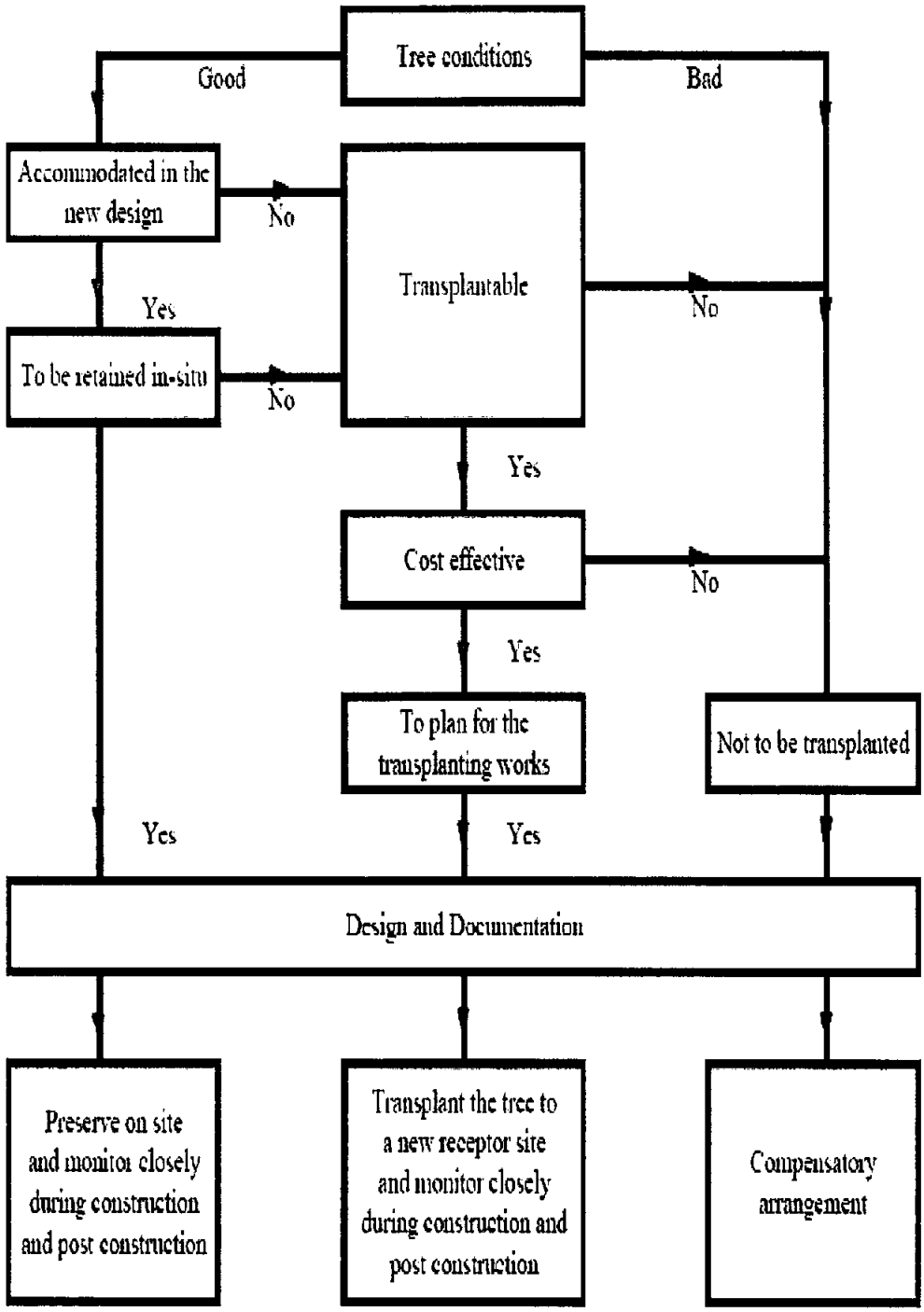


Figure 6.3: Basic Work Flow With Key Considerations of Tree Transplanting[1]

Improper technique, design and documentation of transplantation may lead to death of trees. The impact is considered to be permanent and moderate adverse in nature.

[1] *Guidelines on Tree Transplanting, Greening, Landscape and Tree Management Section, Development Bureau, The Government of the Hong Kong Special Administrative Region, September 2014*

Mitigations:

- Trees should be properly preserved and no trees should be unnecessarily removed;
- Trees that are suitable for and worthy of preservation are identified in the planning or feasibility stage and should be properly preserved through careful and proper planning, design, implementation and post construction maintenance;
- Removal, i.e. transplanting or felling should be considered only if preservation is impractical;
- Tree transplanting should be properly planned by PHA implemented to ensure that sufficient space to accommodate the existing tree and its future growth, and adequate time for preparation of transplanting are available;
- For situations where retaining the trees at their existing locations are not practicable, priority should be given to transplant the affected trees to other permanent locations within the project site where appropriate, so as to increase the trees' survival rate after transplanting and minimize the loss of greenery in the local environs; and if not practicable, transplant the affected trees to a suitable permanent location ex-situ. Location of the receptor site should preferably be in proximity to the project site for retention of amenity effect in the vicinity; and
- A larger root ball is recommendable for more mature trees to enhance better recovery after transplanting.

6.5.8 Fauna

The trees provide nesting and resting places to the fauna. The cutting of these trees will have a negative impact on the fauna as well. During the construction phase, there will be negative impacts on the mammals and reptiles of the area, due to construction activities involving excavation, access roads, movement of labor, carriage of goods and machinery to various sites along the project corridor. Mammals, such as dogs, cats, jackals etc. will avoid these areas for fear of being persecuted. Same will be the case with reptiles; some reptiles might be killed during the digging and piling operations. Following are the major impacts envisaged on the fauna during the construction activities:

- Eatable and refuse goods of the Contractor's camps may attract wildlife that might be hunted by the workers;
- Due to establishment of labor camp, food storage, setting up of kitchens production of sewage and waste water may result in multiplication of rodents like rats, mice and shrew etc. and vectors like mosquitoes, bugs and flies which will have a negative impact;
- Birds will try to find shelter and food somewhere else and will tend to move away from the Project Area due to the activities mentioned above for fear of being hunted/caught; and
- The constructing activates might affect the threatened and vulnerable species around the Study Area.

Following measures will be adopted during construction stages:

- Noise control measures should be enforced during the construction phase such as provision of silencers on heavy construction vehicles. It is further recommended that activities, which are expected to generate more noise should be executed during the daytime only;
- Moreover, over speeding shall be prohibited and construction machinery, vehicles and equipment will remain confined within their designated areas of movement to avoid and minimize any accidental killing of Fauna;
- The camps will be properly fenced and gated to check the entry of wild animals in search of eatable goods. Similarly wastes of the camps will be properly disposed of to prevent the chances of its eating by wild animals, which may prove hazardous for them; and
- Hunting, poaching and harassing of animals and birds will be strictly prohibited and contractor shall be held responsible for any such act of his men;
- Hunting of the species must be restricted through existing regulations and if necessary, more stringent laws should be enacted for preservation of this valuable species;
- Local People and construction workers should be given awareness for protection of wildlife as wildlife has also right to live and it makes the surroundings more attractive and colorful. Promotion of awareness to individuals shall accelerate the process of wildlife preservation;

- All construction activities must be in coherence with the behavior and habits of threatened species in the area; and
- Contractor should make close liaison with the Wildlife Department and Game inspectors to develop strategies for protection and conservation of Species.
- During construction, fencing of area is mandatory to confine and protect the species.
- During the hunting season, a framework should be developed in order to record the number of birds killed in a specific area. This is an essential component because it helps in generating necessary information in order to show not only the number of birds killed in each year from a specific area but the annual population estimates can also support the sustainable use concept; and
- Rats in the area must be curtailed as it is suspected that they eat eggs and chicks (Houbara Bustard).
- Turtle hatcheries should be established and protection of nesting sites should be ensured. Surveys should be conducted to identify suitable places for establishing hatcheries for freshwater turtles. Protection of nesting sites of turtles is necessary for their survival. Nest protection during breeding season can be promoted;

6.5.9 Resource Conservation

The materials used in construction of proposed project would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt and cement etc. Almost all the materials to be used in the construction of proposed project are non-renewable and therefore their sustainable use is necessary for the future use.

Fuel will be used to operate construction machinery and asphalt and batching plants. Sustainable use of energy resources is very important not only to continue future use but also to help to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes is very important. The impact is minor negative but is important as these fuels are nonrenewable resources of energy.

Following practices should be adopted to conserve these natural resources.

- Diesel and fuels with low sulphur content will be used to operate construction machinery and equipment's.

- The efficient and well maintained equipment's and machinery should be used;
- The equipment's and machinery should be turned off when not in use;
- Recycling practices of waste should be adopted wherever possible;
- Reuse of construction waste wherever possible; and
- Regular maintenance of machinery to avoid fuel leakages.

6.5.10 Construction Camps/Camp Sites

The construction camps may lead to environmental and social impacts in the project area specially arising from camp sites. However, these impacts will be temporary and minor negative in nature. **Table 6.4** summarizes potential impacts and proposed avoidance and mitigation measures associated with construction camps.

Table 6.4: Summary of Worker Camp Impacts & Mitigation Measures

Potential Impact	**Proposed Avoidance and Mitigation Measures**
Environmental • Temporary habitat loss or disturbance • Temporary visual intrusion • Noise emissions at a single location • Waste generation • Discharge of sanitary effluents and rainwater run-off.	***Environmental*** • Reinstate any temporary facilities to pre-existing conditions in ecologically sensitive areas. • Implement landscaping plan for all facilities in areas where high landscape value and visual vulnerability to the proposed activities warrants site-specific landscape restoration measures. • Operate equipment in a manner sympathetic to the ambient noise environment. Do not leave equipment idling unnecessary. • Provide adequate warnings of impeding works to all potential receptors within a 1 km corridor surrounding the right-of-way via public notices and local news.
Social • Worker camp site: consultation	***Social*** Employment policies which aim to maximize

surrounding potential construction camp sites revealed concerns regarding the location of proposed sites for worker camps.	job opportunities for local people will help to minimize tensions caused by different socio-cultural values. Training will be provided to all staff on camp management rules and overall discipline and cultural awareness. This will include, in appropriate languages: • A briefing on camp rules • A community relations orientation to increase awareness about the local area, cultural sensitivities and the project Code of Conduct • Awareness-raising on health considerations, including STDs. The construction contractor is required to develop a Construction Camp Management Plan to address: • Discipline • Community liaison • Ethnic tensions and • Communicable diseases. A Code of Conduct and Camp Rules will be required within the Construction Camp Management Plan, which provides policies and a disciplinary framework with respect to worker behavior.

6.5.11 Health and Safety of Workers and Public

a) Occupational Health and Safety

Workers may be exposed to unsafe and/or unfavorable working environment due to storage, handling and transport of hazardous construction material. Workers should be provided with safe and healthy working environment taking into account the following mitigation measures:

- Providing basic medical training to specified work staff and basic medical service and supplies to workers;
- Obligatory insurance against accidents for labourers/workers;
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;
- Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers;
- Protection devices (ear muffs) should be provided to the workers doing job in the vicinity of high noise generating machines;
- Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction;
- Provision of protective clothing for labourers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc;
- Ensure strict use of wearing these protective clothing during work activities;
- Elaboration of a contingency planning in case of major accidents;
- Ensure that the site is restricted for the entry of irrelevant people particularly children; and
- Adequate lightning devices, barriers, yellow tape and safety signage shall be posted.

b) Community Health and Safety

The construction activities and vehicular movement at construction sites and access service roads may also result in road side accidents particularly inflicting local communities who are not familiar with presence of heavy equipment and machinery. This is a temporary and minor negative impact. Quality of ground water and surface water resources available in the nearby local communities may get contaminated due

to the construction activities, oil spillage and leakage, roadside accidents etc. The labourers work with different transmittable diseases may cause spread out of those diseases in the local residents.

Mitigation measures will include:

- There should be proper control on construction activities and Oil spillage of vehicles;
- The labourers with different transmittable diseases should be restricted within the construction site;
- Efforts will be made to create awareness about road safety among the drivers operating construction vehicles;
- Timely public notification on planned construction works;
- Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity & social links;
- Provision of proper safety signage, particularly at sensitive/accident-prone spots;
- If identified, consider guard rails at accident-prone stretches and sensitive locations;
- The communicable disease of most concern during construction phase, like Sexually-Transmitted Diseases (STDs) such as HIV/AIDS, should be prevented by successful initiative typically involving health awareness; education initiatives; training heath workers in disease treatment; immunization program and providing health service;
- Reducing the impacts of vector borne diseases on long-term health effect of workers should be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease, which includes: Prevention of larval and adult propagation of vectors through sanitary improvements and elimination of breeding habitat close to human settlements and by eliminating any unusable impounding of water;
- Fencing around the camps should be strong enough so that it cannot be broken easily by local people for making passages; and
- Use of water should not disturb public water availability and source of water should be selected carefully.

6.5.12 Emergency Response

Natural disasters and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths. The workers shall be trained and facilitated to cope with such emergencies.

Mitigation measures include the following:

- Implementation of emergency response plan shall be ensured by the contractor;
- Training of the staff/employees regarding the emergency procedures/plans shall be regularly conducted; and
- Minor incidents and near misses shall be reported and preventive measures shall be formulated accordingly.

6.5.13 Traffic disruption

Traffic load on N5, Air Port Road and connecting access roads would be increased due to the project activities and movement of heavy machinery, but this will not be a significant concern as the construction will be carried in different packages and traffic can be diverted easily using proper traffic management plan. Thus, the impact is temporary and minor negative in nature.

The mitigation will include devising a traffic management plan in coordination with traffic police and PIEDMC.

6.5.14 Social Issues

Due to the proposed project, residents and farmers may face inconvenience in their daily activities. People will have problem of access to mosques (Masjid Muhammdia, Noor Masjid), educational institutes (Govt. girls Primary School Mari Sheikh Shujra), and graveyard. Residential area adjacent to the proposed industrial estate boundary, may have access issue in the future.

Existing road network is not sufficient for proposed intervention. It will lead to disturbance for daily commuters and congestion of traffic volume during project construction phase.

A traffic management plan or some alternate routes in order to minimize traffic hazardous and polluted environment. Widening of roads will also be necessary in the execution of the project.

The utmost benefit of implementation of industrial estate is socioeconomic development of area. It will enhance employment opportunities for locals and promotion of trade corridor on large scale by empowering them economically to live improved life ahead.

Mitigation measures will include:

- Preparation and implementation of traffic management plan for the entire construction phase; and
- Public should be notified before the commencement of the project and be educated about the traffic management plan.

6.5.15 Borrow/ Open Pits

The site for borrow pits/ quarry areas has not been identified at this stage of the project. Hence, the impacts discussed for borrow pits/ quarry areas are of generic nature. Borrow/ open pits and its excavation activities may result in land disputes, soil erosion, loss of vegetation, landscape degradation, and damage to road embankments. Since the project site has bad land. The irregular sand dunes deposited all over the project area which are 1 to 5 meters (3 to 15 feet) high from adjacent agriculture land. The surface is irregular throughout the project area, fill material will be required to increase the ground level of the site with respect to its surroundings. Fill material Borrow/ open pits and its excavation activities may result in land disputes, soil erosion, loss of potential cropland, loss of vegetation, landscape degradation, and damage to road embankments.

Borrow/ Open pits may also result in potential sources of mosquito breeding and may prove hazardous to human beings. This will also degrade hygienic condition of the project area. Quarry Management Plan is attached as Annexure-XI. This impact is permanent and moderate adverse in nature.

Mitigation measures will include:

- Borrow areas must not be selected on agricultural land;
- Necessary permits must be obtained for any borrow pits from the concerned authorities;
- In borrow pits, the slope must not be steeper than 1:4;
- Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands;
- In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-breeding sites; and
- Borrow pits may be utilized for aqua culture.

6.5.16 Employment

Employment opportunities for skilled and unskilled labour will be generated during all the activities related to construction. This is major positive impact in nature.

6.5.17 Construction Waste and Hazardous Waste

Due to construction activities, waste will be generated at construction and contractors camp site. The construction waste will include wastewater, oil spillage from machinery, domestic waste and solid waste etc. As the project deals with the construction of the proposed Industrial Estate, so no hazardous waste will be generated during the construction waste. But the handling and storage of oil, asphalt/bitumen may be a source of environmental pollution as a hazardous waste. This will result in unhygienic conditions, health risk to work force and public at the camp site. This impact is temporary and minor negative in nature. Pesticides may be used while raising plants for planting on both sides of road. Most of the pesticides are hazardous for human. Insecticides may also be used at the camp sites and there use also needs to be regulated.

_Mitigation measures will include:

- Wastewater effluent from contractor's workshop and equipment washing yards would be passed through gravel/ sand beds to remove oil/ grease contaminants before discharging it into natural streams;
- Training of working force in the storage and handling of materials and chemicals that can potentially cause soil contamination;

- Solid waste generated during construction and camp sites should be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan;
- Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.;
- Training employees involved in the transportation of hazardous material regarding emergency procedures;
- The sewage system for camps will be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters;
- Lined wash areas will be constructed within the camp site or at site, for the receipt of wash waters from construction machinery;
- Use of pesticides in nurseries should be done deemed necessary and suggested by the experts;
- Use of less toxic pesticide should be preferred;
- Those insecticides should be used which are less toxic to human health.

- No refuelling, storage, servicing or maintenance of equipment should take place within 150 feet of drainages or other sensitive environmental resources;
- Any fluids drained from the machinery during servicing will be collected in leak proof container and taken to an appropriate disposal or recycling facility; and
- A comprehensive plan for construction waste management (Flow chart of Construction Waste Management Plan is shown in **Figure 6.4** and attached as (**Annexure-XII**) may be adopted.

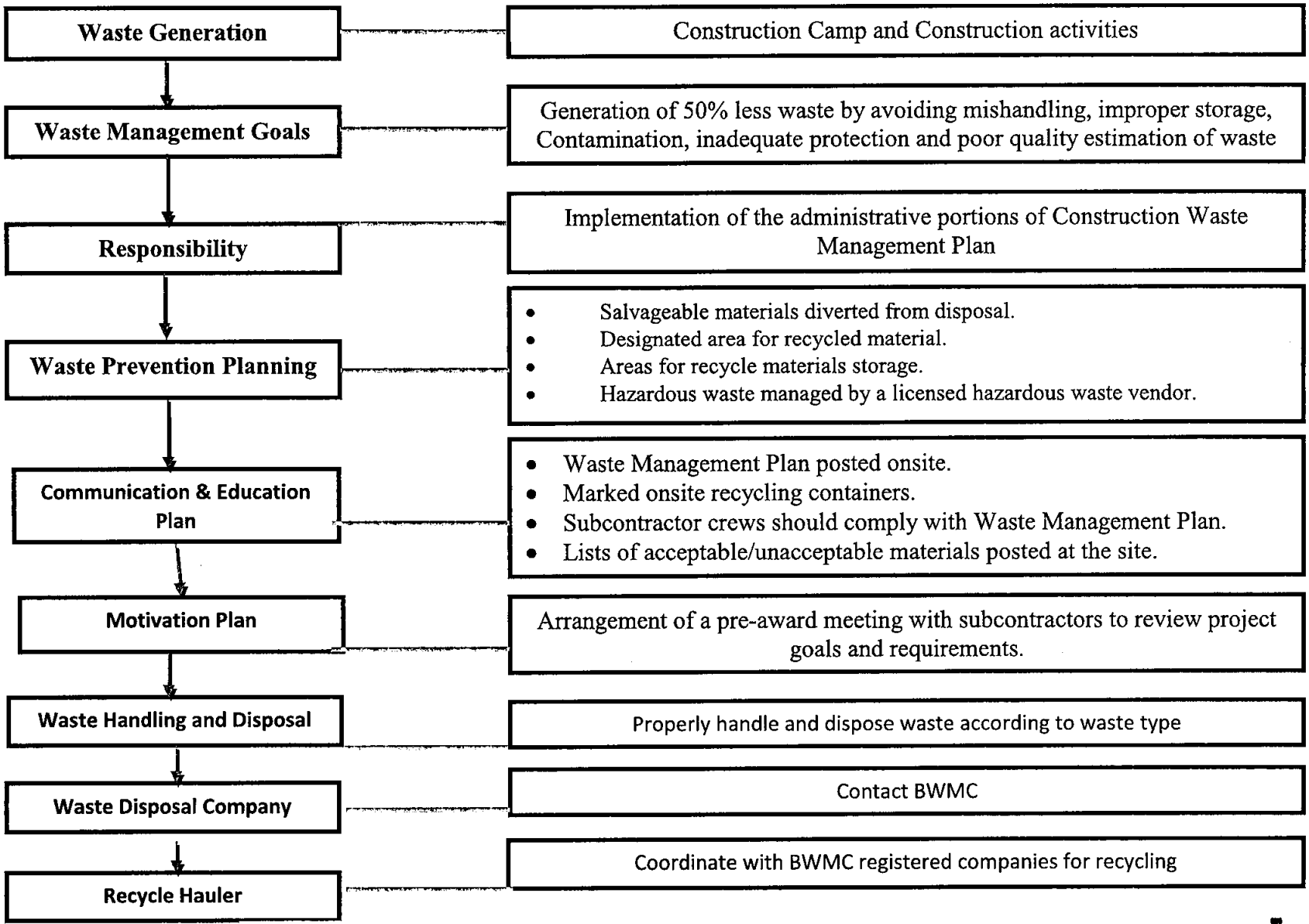


Figure 6.4: Flow Chart of Construction Waste Management Plan

6.5.18 Groundwater

There is a possibility that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater, if they are not handled properly. During the construction phase, the sanitary wastewater will be generated at the workers' camp(s). If this wastewater is allowed to stagnate in water ponds on the site, it can percolate into the soil, thereby, contaminating groundwater. This impact is temporary and minor negative in nature.

Mitigation measures will include:

- Protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality;
- The solid waste should be disposed of in designated landfill sites to sustain the water quality for domestic requirements;
- Water required for construction is obtained in such a way that the water availability and supply to nearby communities remain unaffected;
- Regular water quality monitoring according to determined sampling schedule; and
- Prohibit washing of machinery and vehicles outside washing yard, provide sealed washing basins and collect wastewater in sedimentation/retention pond.

6.5.19 Disposal of Mucking Material

Inevitable cut and fill earthwork operations will open up scars on the land around the project area. This impact is temporary and minor adverse in nature.

Mitigation measures will include:

- The excavated materials that are unsuitable for use will need to be stored, transported and disposed of appropriately at designated sites by PIEDMC.

6.5.20 Disturbance to People

Approach/ hindrance problems for the residents, students movement of the daily commuters will be disturbed around the nearby villages of the proposed industrial estate due to construction activities. This impact is temporary and minor adverse in nature.

Mitigation measures will include:

- Ensurance of timely completion of the construction works according to the agreed schedule by PIEDMC and provision of alternate routes for the project site where the construction is being carried out.

6.5.21 Economic Activity

Due to the construction of the proposed project, economic activity will be generated in the project area as the laborers and semi-skilled staff will have an opportunity to work for the construction of the proposed project. This will help in developing their skills and capacities. This is a moderate beneficial impact.

6.6 Anticipated Impacts during Operation Phase

The anticipated impacts related to the proposed project have been studied for the operation phase and discussed hereunder.

6.6.1 Flora

During the operation phase, new saplings of different plants and trees would be planted. Raising of new plants/trees at available spaces in the project area will have a positive impact of permanent nature. No negative impacts are envisaged on the flora during the operation phase. The presence of adequate flora and the green belt around the perimeter of the proposed industrial estate will absorb flue gases, emitting from a large number of vehicles and public transport passing through the project area, which shall improve the air quality.

Mitigation measures will include:

- The saplings planted in the project area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients by Parks and Horticulture Authority (PHA).

6.6.2 Surface/ Ground Water

Wastewater from industrial, commercial and residential zone of the industrial estate will contain high concentrations of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS) and Pathogens etc. Wastewater from other industrial and commercial sectors may contain hazardous metals and compounds.

If all this wastewater is not treated properly, it will be a continuous hazard for the aquatic system and downstream uses of canal and river. Moreover, illegal installation of tube wells by the operating industries may lead to decrease in the ground water level of the project area. The impact is considered to be temporary (in case of installation of CETP) and moderate adverse in nature.

Mitigation measures will include:

- PIEDMC should ensure the installation of tube wells as per proposed design;
- PIEDMC should ensure that no industry shall install a tube well within its own premises;
- Combined Effluent Treatment plant (CETP) shall be operated as per Standard Operating Procedures (SOPs) to follow NEQS. Special concentrations shall be paid to sludge treatment and handling;
- Implementation of bylaws of individual treatment plants at industrial level shall be ensured;
- Industries shall be bound to submit monitoring reports of their effluents regularly;
- Monitoring plans for water quality analysis of the CETP effluent and groundwater shall be prepared; and
- Best management Practices (BMPs) shall be maintained to ensure their effective function to treat nonpoint source water pollution.

6.6.3 Air Quality

The operation of industries will result in generation of large quantities of primary and secondary air pollutants including SO_x, NO_x, CO, CO_2, PM_{10}, $PM_{2.5}$, H_2S, and CH_4 etc. The gaseous emissions in form of plumes will create an air-shed of pollutants within 15 – 20 Km distance and affect the recipients in the downwind direction of the industries and may cause chronic or acute respiratory diseases like asthma and nausea and will also have effect on the faunal and floral species.

SO_x, NO_x, PM_{10} and $PM_{2.5}$ will cause breathing problems, irritation in eyes, throat and nose. CO and H_2S are foul smell poisonous gases, CO_2 and CH_4 are referred to as a greenhouse gases. Pakistan is signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and adopted Kyoto protocol in 1997. Under the Kyoto

Protocol, Pakistan is committed to reduce GHG emissions into the environment to prevent interference with climate change. The continuous emissions of GHGs for the proposed project are a concern in the operational phase. This impact is high adverse and permanent in nature.

Mitigation measures will include:

- Installation of Air Pollution Control Equipment in respective industries;
- Capture CH4 and H2S that can be used commercially;
- Plan massive tree plantation along the industrial estate;
- Management should ensure Compliance of PEQS, 2016; and
- SMART Rules must be followed.

6.6.4 Soil

Disposal of hazardous waste of industries, medical facility and commercial areas is one of the major concerns during operation phase of the project. Therefore, its improper handling and disposal will pose serious threat to the physical and biological environment. This will also adversely impact the future use of the land where hazardous waste will be disposed of. This impact is high adverse permanent in nature.

Mitigation measures will include:

- Each industry shall be bound to submit the inventory of use of hazardous chemicals, their use and final disposal including measures to control special waste; and
- Signage shall be carried out to regulate the routes of especial waste disposal to avoid the risks of spillages.

6.6.5 Ecology

Movement of traffic in the area shall increase, causing noise and air pollution, which will be a permanent source of disturbance to fauna of the area and especially the birds, which shall avoid this area on account of noise and fear of being harassed or killed.

Most of the industries set up in the estate will cause toxic air emissions, resulting in deterioration of ambient air quality and ultimately affecting not only human health, but also it has negative impact on the surrounding flora and fauna. These emissions

may be carried over long distances, depending on wind speed and direction, which generally varies with seasons.

As the requisite numbers of trees to be felled are already removed, ground vegetation is already disturbed; there will be no further damage to the flora of the Project Site during operation stage. Maximum possible number of trees of suitable species should be raised during the operation stage, which shall result in a healthy impact on the flora of the area.

Both the flora and fauna are an integral part of the eco-system. In many ways fauna of a tract is dependent upon flora for its resting, nesting and roosting activities. With the plantation of 10 times more plants than the number of plants removed, the negative impact due to cutting of trees shall be mitigated to a reasonable extent, due to raising of additional plants in the area. The fauna and specially the avi-fauna shall be attracted to the area, adding to the environmental rehabilitation.

The birds which scared away due to noise and degradation of their habitat will return or start visiting the area again. So there will be a positive impact on the fauna.

Mitigation measures will include:

- Compensatory plantation of trees shall be undertaken along the boundary of the Industrial Estate, along the main and minor roads and in green areas; and
- A tree plantation program will be implemented by the Divisional Forest Officer, Bahawalpur, in and around the Industrial Estate. For this purpose, requisite funds should be placed at the disposal of D.F.O. by the proponent.

6.6.6 Solid Waste

Large quantities of municipal and hazardous waste will be generated in the operation phase of the project. Without a proper solid waste management system and engineered land filling practices, many environmental risks remain problematic for the workers and visitors. Such impacts should be minimized through following general mitigation measures:

- Solid Waste management (SWM) system should be operated as per SOPs and

improved with time to time;

- Primary collection and storage of solid waste should be performed in the closed containers;
- Secondary collection should be done in the compactor trucks;
- Only unusable trash material should be disposed of into the landfill site and all the reusable material shall be separated, processed and sold accordingly; and
- People should be educated to waste lesser.

6.6.7 Landscape

At present, the landscape of the project area is dominated by barren land. However, after the construction of proposed industrial estate, the landscape of the project area will be changed in terms of road infrastructure, grid stations, CETP, administration area, medical facility, amenities/commercial area, parks, green belts and roads etc. This will permanently change the landscape of the project area but at the same time will have a positive impact in terms of socio-economic development of the project area.

6.6.8 Increased Land value

Due to establishment of industrial estate, the land value of the project area may increase. Improved communication and infrastructure will be developed to promote new business opportunities. This impact will be permanent and major positive in nature.

6.6.9 Occupational Health and Safety

Industrial occupational safety of the workers will be of significant concern during operation phase. Industrial processes involve several hazards from minor to major injuries for the workers which need to be addressed during policy making for the operational phase.

Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment and due to storage, handling and transport of hazardous construction material. Workers should be

provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in project area.

Mitigation measures will include:

- Obligatory insurance against accidents for laborers/workers;
- Providing basic medical training to specified work staff and basic medical service and supplies to workers;
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g. fire-fighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;
- Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for laborers;
- Protection devices (ear muffs) should be provided to the workers doing job in the vicinity of high noise generating machines;
- Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction;
- Proper maintenance of facilities for workers will be monitored;
- Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.;
- Ensure strict use of wearing these protective clothing during work activities;
- Elaboration of a contingency planning in case of major accidents;
- Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites; and
- Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads.

6.6.10 Emergency Response

Disasters such as earthquakes, flooding and other disasters such as fires may occur, and that must be considered for minimizing their impacts.

Mitigation measures will include:

- An Emergency Response Plan for earthquakes and manmade disasters will be developed;
- Emergency Response Plan will be implemented in close consultation with the Rescue 1122 Service, Fire Fighting Department, bomb disposal squad and paramedics;
- Also evacuation plan will be developed in order to tackle with any emergency; and
- In addition, training of the staff/employees regarding the emergency procedures/plans will be regularly conducted.

6.6.11 Drainage

Chocking of drainage due to improper maintenance and increased surface runoff during heavy rainfalls may accumulate on the project site and can cause problems such as foul smell and unhygienic waterlogged conditions.

Mitigation measures will include:

- PIEDMC should ensure regular maintenance of drainage system especially before the rainy season to avoid chocking and flooding.

6.6.12 Employment Opportunities

The project will provide job opportunities to a large number of people during operation phase. Proposed project will help to alleviate the economic condition of the area. Local people will get enhanced chances of dependable livelihood. Furthermore, communication system of the area will improve and new corridors for growth of local markets will open. Project will tend to attract more urban development with improved living facilities.

6.7 Potential Enhancement Measures

Specific measures will be undertaken by the PIEDMC which will help in enhancing the environmental quality of both the project and the project area. These are in the form of installation of a Combined Effluent Treatment Plant (CETP), properly design sewerage and drainage system and provision of green area comprising 10.84 acres. However, in addition to the aforementioned enhancement measures, following steps

may be adopted during the operation phase of the project.

- Installation of solar panels at the roof top may be planned to supplement the supply of electricity from the national grid which in result may reduce the electricity bills and load on electricity demand from grid station;
- Rain water harvesting may be considered through collection of water from rivers or roofs and its proper usage for irrigate green areas and domestic use with proper treatment; and
- Treated effluent from CETP may be used for irrigation purposes.

SECTION - 7
ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

7.0 General

This Section provides an overall approach for managing and monitoring the potential environmental and social impacts and describes the institutional framework and resource allocations to implement these measures. The main objectives of the Environmental Monitoring and Management Plan (EMMP) are:

- Provide the details of the Project impacts along with the proposed mitigation measures and the corresponding implementation activities;
- Define the role and responsibilities of the Project Proponent, Contractor, Supervisory Consultants and other role players and effectively communicate environmental issues among them;
- Define a monitoring mechanism, reporting frequency and identify monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented; and
- Identify the resources required to implement the EMMP and outline the corresponding financing arrangements.

For effective environmental management, the Client should assign the necessary responsibilities to an Environmental Committee (EC) through Project Director PIEDMC, who will be responsible for implementation of the EMMP. The Project Director will be assisted by an Environmental Expert and a Social Expert in implementing the mitigation measures proposed in EMP.

7.1 Environmental Committee and its Responsibilities

PIEDMC will form up an Environmental Committee (EC), which will be responsible for the environmental management and supervisory affairs during the construction phase of the proposed project. EC will consist of Environmental Expert by the Contractor, Supervision Consultant (SC) and PIEDMC. The responsibilities of the EC are as follows:

- To ensure implementation of all the proposed mitigation measures proposed in EMMP during the construction of the Project;

- To organize routine monitoring of air quality, traffic, noise and vibration; etc. In case, the noise and emission levels exceed the acceptable levels; a penalty or ban must be enforced;
- To develop operational guidelines and implementation schedule;
- Receiving complaints from residents and institutions and assisting the local environmental authority including liaison with EPA Punjab; and
- To ensure that the proposed project is implemented in an environment friendly manner, causing least harm to the existing environment.

7.2 Environmental Management and Monitoring Plan (EMMP)

The EMMP provides the framework for the implementation of the mitigating measures and environmental management and monitoring during the construction and operational phases of the proposed project. **Table 7.1** portrays impacts, targets, mitigations and the responsible organizations for the implementation of the mitigation measures during the construction and the operation phases.

Table 7.1: Environmental Management Plan

Sr. No	*Project Component or Impact*	*Target*	*Mitigation*	*Responsibility*
A. PRE-CONSTRUCTION/ DESIGN PHASE				
1	Site Identification	To minimize the impact on environment	▪ Keeping in view the Sectoral Guidelines for Industrial Estates regarding the site location, effective environmental measures should be considered during the design phase of the proposed project. These measures must address the impacts of air, water, noise, waste and social parameters to make the project environmentally sustainable and socially acceptable. These measures may include but not limited to creating buffer zones (green belts) around the perimeter of the industrial estate, waste management plan, treatment of wastewater and installing air pollution control devices.	DC, PIEDMC
5	Solid waste	To minimize odour, spreading of diseases and clogging of canal and drain.	▪ Planning for disposal sites with reasonable distance from the human settlements following the siting criteria for landfill site; ▪ Disallow siting for work camps, including waste dump sites, in a distance closer than one (1) kilometer to any inhabited areas;	DC and PIEDMC

			▪ Incorporate technical design features for refuse collection containers at sites that would minimize burning impacts; ▪ Devise sustainable plans for the reuse and recycling of waste materials produced in the industrial estate by different industries; ▪ Devise plan(s) for safe handling, storage and disposal of harmful materials; and ▪ Burning of waste within and surrounding of the industrial estate should not be allowed in any case.	
	Groundwater	To minimize the effect on ground water quality	▪ Planning for protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality during construction phase; ▪ Planning to disallow/prohibit use of excess water during construction and operation phase; and ▪ Sustainable policy should be devised by the PIEDMC for the efficient use of groundwater.	DC and PIEDMC
	Surface Water	To avoid surface water contamination	▪ PIEDMC should ensure that the water requirement of the Industrial Estate should be met in the proposed design; ▪ Permission must be sought out from the Irrigation	DC and PIEDMC

			Department Punjab for disposal of wastewater in Canal/River; and ▪ Storm water should be treated for removal of TSS, TDS, oil and grease.	
	Wastewater	To minimize the effect on surface water and to reduce foul smell m	▪ CETP should be designed for the proposed Industrial Estate in order to avoid contamination of the receiving water body; ▪ A policy should be devised to ensure that all the industries in the industrial estate should install a wastewater treatment plant; ▪ Plan to restrict the solid waste dumping into gravity sewer and force main; ▪ Provision should be made in the design to cover the gravity sewer and force main; and ▪ Alternative options should be considered such as using treated water for agriculture purpose by meeting the standards for irrigation and prior consultation with farmers of the nearby villages to take the views regarding willingness to use this water.	DC and PIEDMC
	Flora	To minimize the impact on ecology	▪ Incorporate technical design measures to minimize removal of these trees, as far as possible; ▪ Provision for a 0.5 Km wide "greenbelt" around the	DC, PIEDMC and PHA/Forest Department

			site perimeter; ▪ A Tree Plantation Plan is formulated in compensation of trees affected by the establishment of the proposed Industrial Estate and attached as Annexure - VIII. This plan may be considered during the operation phase; ▪ A plan for transplantation of trees may be considered; ▪ Compensatory planting of ten (10) trees against each fallen tree of similar floral function should be planned; and ▪ PHA should ensure that there should be no exotic species in the plantation plan with known environmental setbacks (Eucalyptus, etc.).	
	Seismicity	To minimize the impact on structure stability	▪ The structures of the proposed project should be designed and constructed keeping in view low to moderate earthquakes. For seismic hazard analysis, updated structural and seismic evaluations should be conducted by the design engineer/consultant; ▪ Seismic Building Code of Pakistan 2007 (SBC-07) should be adopted for designing of buildings. This code specifies minimum requirements for seismic safety of buildings and has to be applied and used by engineers in conjunction with the necessary	DC and PIEDMC

			understanding of the concepts of structural, geotechnical and earthquake engineering; and ▪ The structure of the proposed project should also be studied by the proponent (PIEDMC) to evaluate its durability/strength to withstand moderate to high intensity earthquake.	
	Air Pollution, Noise and Vibration	To minimize the impact on surrounding environment	▪ A policy should be devised at the planning stage for the strict enforcement of PEQS, 2016 for industrial gaseous emissions by all the industries during the operation phase; ▪ Provision of air pollution control equipment's must be considered for respective industries; ▪ Each industry would submit its separate IEE/EIA as stated in PEPA Act, 1997. ▪ Plan for using other options of dust controlling/suppressing techniques; ▪ Scheduling of water sprinkling by the construction contractor prior to construction activities; ▪ Plan and budgeting for provision for noise barriers for the construction site, particularly for the sensitive receptors; ▪ Plan for scheduling the noisy construction work	DC and PIEDMC

			during night time; ▪ Consultations of the proponent at the pre-construction phase with the traffic police and contractor to devise a traffic management plan for smooth flow of traffic during the construction phase in order to reduce dust and noise pollution; and ▪ Selection/budgeting of air and noise emission control devices by the contractor prior to construction activities.	
	Emergency Management	To minimize health & safety risks	▪ A comprehensive Emergency Response Plan should be devised which should be implemented in close consultation with the Rescue 1122 Service, Fire Fighting Department, bomb disposal squad and paramedics; ▪ Provision of regular training of the staff/employees regarding the emergency procedures/plans; ▪ Provision of medical facility should be provided in the industrial estate; and ▪ Provision of firefighting and emergency exits should be given in the design.	DC and PIEDMC

7.4 Environmental Technical Assistance and Training Plan

An environmental and social training and Technical Assistance (TA) program is to be carried out before the implementation of the project. Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures.

PIEDMC will engage TA consultant to manage the environmental training program. The objective of the TA will be, to help in establishment of appropriate systems and to train senior PIEDMC staff and EC responsible for managing environment, operations, and planning, who can then impart training at a broader level within and outside the PIEDMC (i.e., the training of trainers). The TA consultant will organize training courses for PIEDMC and the contractor staff to train them in specialized areas such as air and noise pollution monitoring; develop environment operation manuals in consultation with the EPA Punjab. The details of this training program are presented in **Table 7.3**.

Table 7.3: Personnel Training Program

Provided by	Contents	Trainees	Duration
TA consultants/ organizations specializing in environmental management and monitoring	Short seminars and courses on: Environmental laws and regulations, daily monitoring and supervision	Contractor and PIEDMC	10 days
TA consultants/ organizations specializing in social management and monitoring	Short seminars and courses on: Social awareness	Contractor and PIEDMC	
TA consultants/ organizations specializing in	Short lectures relating to Occupational Safety and Health	Contractor and PIEDMC	

Provided by	Contents	Trainees	Duration
Occupational, health and safety issues			

7.5 Environmental Monitoring, Mitigation and Training Cost

The cost required to effectively implement the mitigation measures is important for the sustainability of the project both in the construction and operation phases. These costs are summarized in **Table 7.4** and the break-up for Health Safety & Environment cost is attached as **Annexure-XIII**.

Table 7.4: Environmental Mitigation, Monitoring and Training Cost

Sr. No.	Activity	Description	Cost (Rs.)	Rationale
1	Medical screening for workers	Rs. 3000 for 500 employees	3,000,000	Medical screening of the workers is proposed twice during the construction phase.
3	Material Storage, handling and use	Four (4) No. of tarpaulins of Rs. 20,000 each	80,000	Four (4) tarpaulins are proposed during the whole construction phase.
4	Handling/ transportation of hazardous material	Rs. 12,000/month for a period of 24 months will be required for transportation of material	288,000	One trip of one truck per month is proposed for transportation/disposal of empty/used oil drums from construction sites/camps.
5	Handling of solid waste	Includes the cost of collection, transportation and disposal to the designated site	7,200,000	One (1) dumper @ Rs. 100,000/- per month is proposed for 24 months to collect construction waste from all the active sites on daily basis.
6	Health & Safety of Workers	For 200 employees for the provision of dust masks, safety shoes, gloves, first aid box, ear plugs, safety helmets and safety jackets (Hi Vis) And Provision of dust bins, warning tap, safety cones and safety sign boards	8,922,000	For detail, please refer to **Annexure - XIII**

7	Environmental Monitoring Cost	Air, water, noise	643,200	For detailed schedule of environmental monitoring, please refer to Table 7.2 of Section-7 of EIA Report
8	Cost for hiring of staff (Environment Health & Safety Specialist and Social Expert)	i. Rs. 150,000/- per month for 3 months for hiring Environment Health & Safety Specialist ii. Rs. 150,000/- per month for 24 months for hiring Social Expert	7,200,000	Contractor is proposed to hire one HSE Specialist and Social Expert for the whole construction period.
9	Tree Plantation Cost	For raising 450 new saplings in lieu of cutting of 45 trees	353,050	
10	Cost of environmental training	For the whole construction period	600,000	Contractor will provide training to his staff/workers on monthly basis for ten days (2 hours/day) involving maximum participants (50/day) on HSE related issues through a hired professional @ Rs. 2500/day
		Grand Total	**28,286,250**	

The Environmental Mitigation, Monitoring and training cost will be Rs. **28,286,250** or **Rs. 28.286 million.**

SECTION-8

CONCLUSION AND RECOMMENDATIONS

8.1 General

This section presents conclusion of the EIA study of the proposed project. The overall objective of this EIA is to carry out a detailed environmental assessment to assess impacts caused by the different project activities and to address measures to mitigate adverse environmental impacts that may arise from the execution of the proposed project.

The conclusions mentioned below are based on the findings of detailed environmental assessment, which has been carried out as per requirement of Provincial EPA-Punjab.

8.2 Conclusions

The implementation of the proposed project will have many beneficial impacts on population residing in and around the project area. Major beneficial impacts of the proposed project are:

- Structural platform to set up industries with availability of developed plots and infrastructure;
- Provision of support services at one location;
- Availability of skilled manpower;
- Job opportunities for locals during construction and operation phase; and
- Economic uplift of the District.

Apart from the beneficial impacts of the project, the proposed project has some adverse environmental and social impacts. Most of the adverse impacts during construction are of temporary nature. These impacts can be avoided or mitigated by adopting suitable mitigation or remedial measures as mentioned in this EIA Report. Following conclusions are based on the findings of detailed EIA study.

Conclusion during Pre-Construction/Design Phase

- Site for the proposed Industrial Estate has already been selected by the PIEDMC, therefore no alternatives were studied for EIA study;
- Local residents may have issues of access, noise and air pollution during the construction activities of the industrial estate;
- For the proposed Industrial Estate, a separate system has been proposed for the collection of wastewater and stormwater. Keeping in view the economy and limited budget available with the client, it is proposed that storm water collection system will be designed as a part of this project, however its construction may be taken up in next phase upon colonization of the industrial area. Till that period, a part of storm water along the roads will be catered through wastewater pipes (partially combined system) and infiltration in empty industrial plots. Therefore, the wastewater collection system will work as partially combined system till construction of storm water drains;
- During planning and survey of wastewater disposal system, it has been revealed that in the nearby surrounding of acquired site of industrial estate there is no permanent water recipient body which can serve during dry and wet seasons. The nearest water recipient body is River Sutlej which exists at an aerial distance of about 10 km from the proposed industrial estate. Disposal of treated effluent into River Sutlej will be a costly proposition, but has to be selected being the only permanent solution;
- This is concluded during the design of sewerage system of the proposed Industrial Estate that the River Sutlej mostly remains dry due to diversion of its water to India according to Indus Water treaty. River can serve as final water recipient body during dry and rainy (wet) seasons. During dry season the option of discharging the treated effluent into the nearby Ahmadpur East canal and its distributaries can be taken up with Irrigation Department by PIEDMC;
- Wastewater of the proposed industrial estate is planned to be disposed of in River Sutlaj which flows in the North West side of the proposed project site at a distance of 10 km. It will significantly affect the nearby

settlements due to foul odor and may serve as breeding ground for disease vectors during the initial phase of the project;

- The gaseous emissions and fugitive dust emissions may deteriorate the air quality of project area during pre-construction (site clearing) and construction phase of the proposed project due to construction activities (operation of construction machinery, dust emissions, vehicular movement, etc.) which results in increase in both air and noise pollution along with the associated health risks to the nearby residents;
- Improper formulation of traffic management plan may result in traffic jams and can cause inconvenience to the road users.

Conclusion during Construction Phase

- Various liquids like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater;
- Construction camp location and mismanagement of construction camp activities may lead to various social and environmental impacts such as: loss of vegetation, indiscriminate generation of solid waste, discharge of sanitary effluent, water pollution and social & cultural conflicts;
- Health risks and work safety problems may result at the workplace/camps if the working conditions provide unsafe and/or unfavourable working environment due to storage, handling and transport of construction materials and malfunctioning in operation of construction machinery and equipment;
- Construction activities may pose a challenge to the traffic management in the project area such as vehicles carrying construction materials to the project site may result in traffic jams and problems to the people passing through the project area; and
- The air quality of the project area will be affected by the exhaust emissions (PM_{10}) produced from operation of construction machinery and equipment. All earthworks construction and hauling of materials will generate dust and may deteriorate the air quality.

Conclusion during Operation Phase

- Chocking of drainage and increased surface runoff during heavy rainfalls may accumulate on the project site and can cause problems such as foul smell and unhygienic waterlogged conditions;
- The ground water may be contaminated due to improper maintenance activities of pumping station, force main and gravity sewer;
- Emissions from different types of industries may affect the recipients in the downwind direction of the industries and may cause chronic or acute respiratory diseases like asthma and nausea and will also have effect on the faunal and floral species;
- Improper handling and disposal of waste from industries, medical facility and commercial areas will pose serious threat to the physical and biological environment;
- Improper implementation of EMMP may lead to incidents/ accidents which may cause serious health, safety and environmental risks.

8.3 Recommendations

Following recommendations must be taken care prior to any of the decision about the proposed project:

- The protected site i.e. Jamia Masjid Al-Sadiq which is declared as Protected Site by the Government of Punjab under Punjab Special Premises Ordinance 1985 is located at an aerial distance of 11.75 km from the proposed site. NOC will be needed from the Archaeology Department prior to execution of the proposed project;
- The proposed forcemain from the disposal station will cross the Ahmadpur East canal and its branches. In this regard, for obtaining NOC from Irrigation department the case must be taken up on priority basis. Also, it is to be mentioned that in case of dry season, the treated effluent may be discharged into the canal for which NOC will be needed for Irrigation Department. NOC for discharge of effluent into river Sutlej may be taken from the concerned department;
- Along the proposed route of outfall sewer (42" i/d), the sewer line will cross one branch and one main railway track for which obtaining NOC and

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estimate from concerned authorities of Pakistan Railways may be taken up on priority basis;

- The proposed forcemain (800mm outer diameter) will also cross N5 through thrust boring method. In this regard, NOC must be taken from National Highway Authority prior to execution of the work;
- In order to fulfill the requirement of safe disposal of collected wastewater as per Punjab Environmental Protection Act (PEPA) (Amended), 2012 a Combined Effluent Treatment Plant (CETP) is proposed. The CETP shall be designed to provide at least secondary level treatment. The process design of proposed CETP shall be designed for average wastewater flow generated in the Bahawalpur Industrial Estate;
- Individual industries must install their Wastewater Treatment Plant to treat their wastewater as per Punjab Environmental Quality Standards, 2016 for Municipal and Liquid Industrial Effluents;
- In case of any constraints regarding the site location, effective environmental measures should be considered during the design phase of the proposed project. These measures must address the impacts of air, water, noise, waste and social parameters to make the project environmentally sustainable and socially acceptable. These measures may include but not limited to creating buffer zones (green belts) around the perimeter of the industrial estate, waste management plan, treatment of wastewater and installing air pollution control devices;
- The project structures should be designed to cater the requirements of Zone 2A of seismic provisions (2007) of Building Code of Pakistan after giving due consideration to the soil profile at site;
- A proper traffic diversion plan must be formulated prior to construction and conveyed to the road users;
- Health and safety plan for the workers must be followed during construction phase;
- During tree plantation, plants should be selected in accordance to their ability to absorb emissions;
- PIEDMC must formulate such a policy to ensure all the industries that will operate in the proposed Industrial Estate to register with Self-Monitoring And Reporting Tool (SMART) by Pak-EPA; and

- Proper implementation of EMMP should be ensured during all three phases of the proposed project. All personnel staff, employees and contractors/s should undertake appropriate training prior to construction to ensure they are aware of the on-site responsibilities in respect of all environmental and social issues. In addition, EMMP should be a part of contract document of Contractor/s. Moreover, the cost for environmental mitigation and monitoring has been estimated which should be included in the PC-I or overall Project Cost.

SECTION – 9
REFERENCES

9.1 REFERENCES

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ANNEXURE

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Annexure-I
Study Team

Name, Qualification and Roles of EIA Team Member		
Study Team	**Roles**	**Responsibilities**
Hammad Qamar	Team Leader/ Environmental Expert	Major responsibilities involve reconnaissance survey/site visit of the project area reviewed procedures, guidelines, legal and policy framework and applicable standards, collection of baseline data identification and evaluation of potential significant impacts of the projects, developed mitigation measure both structural and non-structural and EMP preparation of EIA Report as per Pak-EPA guidelines, prepared environmental compliance report. Involve liaison/meeting with the client and other stakeholders and presenting the EIA findings as required. Over all supervision and technical guidance to team and preparation of IEE/EIA reports.
Saeed Hussain	Senior Sociologist/ Environmental Expert	The responsibilities includes conducting meetings with the client, designing of data collection tools for conducting social impact assessments survey, women situation survey etc and supervising the whole social Study team. Liaison with the concerned stakeholders and government officials. Arranging scoping sessions/meetings with the affected communities and presented the data both in qualitative and quantitative forms.
Ahsan Akhlaq	Senior Environmentalist	The responsibilities include meeting with the client, site visit, and collection of baseline data, identification of impacts, addressing mitigation of adverse impacts, preparation of environmental management plan and preparation of EIA report as per Pak-EPA guidelines.
Raheela Hakim	Environmentalist	The responsibilities are providing assistance in collection of baseline data, identification of impacts, addressing mitigation of adverse impacts, preparation of environmental management plan and help in report writing.
Nida Batool	Environmental Engineer	The responsibilities are providing assistance in collection of baseline data, identification of impacts, addressing mitigation of adverse impacts, preparation of environmental management plan and report writing.
Adeera Nasar	Junior Sociologist	The responsibilities are providing assistance in field level data collection and report writing.

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Annexure-II
Pakistan Environmental Protection Agency (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.

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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.

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(6) The Federal Agency may issue guidelines indicating the basic techniques and measures to be adopted to ensure effective public consultation, involvement and participation in EIA assessment.

11. Review

(1) The Federal Agency shall make every effort to carry out its review of the IEE within 45 days, and of the EIA within 90 days, of issue of confirmation of completeness under Regulation 9.

(2) In reviewing the IEE or EIA, the Federal Agency shall consult such Committee of Experts as may be constituted for the purpose by the Director-General, and may also solicit views of the sectoral Advisory Committee, if any, constituted by the Federal Government under sub-section (6) of section 5.

(3) The Director-General may, where he considers it necessary, constitute a committee to inspect the site of the project and submit its report on such matters as may be specified.

(4) The review of the IEE or EIA by the Federal Agency shall be based on quantitative and qualitative assessment of the documents and data furnished by the proponent, comments from the public and Government Agencies received under Regulation 10, and views of the committees mentioned in sub-regulations (2) and (3) above.

12. Decision

On completion of the review, the decision of the Federal Agency shall be communicated to the proponent in the form prescribed in Schedule V in the case of an IEE, and in the form prescribed in Schedule VI in the case of an EIA.

13. Conditions of approval

(1) Every approval of an IEE or EIA shall, in addition to such conditions as may be imposed by the Federal Agency, be subject to the condition that the project shall be designed and constructed, and mitigatory and other measures adopted, strictly in accordance with the IEE/EIA, unless any variation thereto have been specified in the approval by the Federal Agency.

(2) Where the Federal Agency accords its approval subject to certain conditions, the proponent shall –

(a) before commencing construction of the project, acknowledge acceptance of the stipulated conditions by executing an undertaking in the form prescribed in Schedule VII;

(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.

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(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

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(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.

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

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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

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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

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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)	<u>Available</u>	<u>Measured</u>
		Meterology (including rainfall)	Yes/No	Yes/No
		Ambient air quality	Yes/No	Yes/No
		Ambient water quality	Yes/No	Yes/No
		Ground water quality	Yes/No	Yes/No
9.	Have estimates of the following been reported?		<u>Estimated</u>	<u>Reported</u>
		Water balance	Yes/No	Yes/No
		Solid waste disposal	Yes/No	Yes/No
		Liquid waste treatment	Yes/No	Yes/No
10.	Source of power		Power requirement	
11.	Labour force (number)	Construction: Operation:		

<u>Verification.</u> 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 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)

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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.___

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-III
Restoration and Rehabilitation Plan

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Restoration and Rehabilitation Plan

1.0 Introduction

After the completion of construction phase of the proposed project, it is the responsibility of the Contractor to restore the site that has been disturbed due to construction activities. It is accepted that restoration may take many years to achieve. However, PIEDMC has a stewardship responsibility to ensure that the environmental value of the project area is maintained for future generations to appreciate.

2.0 General Quarry Planning and Progressive Rehabilitation

A well-considered quarry development plan prior to starting work, or when opening up new areas will greatly reduce the effort required to achieve appropriate leading practice environmental and safety outcomes for quarry rehabilitation and closure.

The selection of a site, sequencing of quarrying and rehabilitation, and final land-use should all be carefully planned prior to commencement of work at a quarry or borrow pit.

2.1 Progressive Rehabilitation

Progressive rehabilitation refers to the rehabilitation of completed parts of a quarry while extractive operations continue in other parts of the quarry. As new quarry sections are opened, worked out areas should be progressively rehabilitated to avoid increasing the total disturbed area of a quarry. Overburden and topsoil can be stripped from areas being opened up and placed directly onto worked out areas which are being rehabilitated. This will avoid double handling of materials and prevent degradation of the topsoil.

Progressive rehabilitation helps to minimize the visual impact of a quarry, control dust and erosion. It also assists in fostering good landowner and community relations.

Recommended progressive rehabilitation practices are:

- Agree on the final land form and use of a site with the relevant landowner.
- Rehabilitate in accordance with the intended final use of the land.
- Final faces of shallow borrow pits should be battered to a 1:3 (vertical: horizontal) or shallower.
- Plan and develop the quarry in stages towards terminal areas so that progressive rehabilitation works can commence as soon as possible (As shown in **Figure 1**).
- Once the final landform is established, re-vegetate areas to stabilize the landform and to give the vegetation maximum time to establish while the quarry is still in operation.

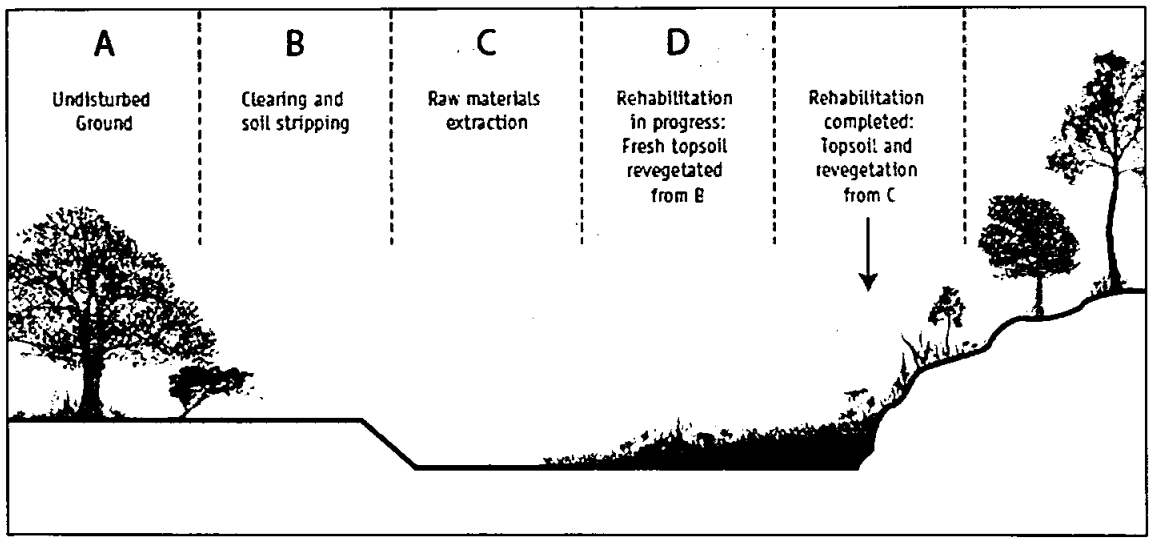


Figure 1: Progressive rehabilitation to manage potential impact on visual amenity

2.2 Re-vegetation

Establishing a self-sustaining cover of vegetation is the best way to stabilize disturbed sites in the long term. Re-vegetation also minimizes the visual impact of quarries. Generally, the vegetation type which existed before the disturbance, or a similar vegetation type will regenerate most successfully.

Prior to the commencement of a quarrying activity the type of re-vegetation should be agreed with the landowner, and should be consistent with the proposed final land-use.

Some indigenous plant species may not thrive in areas where soil conditions are substantially different after quarrying. If this is the case, and the objective is to re-establish vegetation, which fulfils the function of the original native vegetation, then some species from outside the quarry area, may have to be introduced. Care must be taken to avoid introducing a species, which could become an unacceptable fire hazard, invade surrounding areas of native vegetation or become agricultural weeds.

Where agriculture is the planned land-use then the species planted should be those commonly used for pasture or crops known to be successful on soils of similar texture, drainage status, pH and fertility. Suitable legumes should always be considered for their ability to improve soil fertility.

3.0 Rehabilitation of Affected Areas

Rehabilitation will be done in accordance with the Environmental Management and Monitoring Plan (EMMP) of the proposed project site. There are many areas affected by construction and maintenance activities that require rehabilitation such as borrow pits, stockpile sites, campsites and sidetracks.

3.1 Borrow Pits

Borrow pits are areas either in a road reserve or adjacent land holdings that have been used to extract materials such as gravels and soils. They can vary considerably in size, depending on the quantity of material taken and the borrow pits' reserve body of remaining material. The variable size, shape and nature of borrow pits preclude very specific recommendations; however the following general conditions apply:

- Before extraction commences, licenses and permits should be checked and limits of disturbance and/or clearing must be clearly marked out on the site before any ground disturbing activity takes place; and
- At the completion of extraction, the former borrow pit must be made stable and safe. This usually requires the sides of the pit to be reshaped with gentle safe grades. All disturbed areas associated with borrow pits must be retopsoiled, seeded, fertilized and mulched (if appropriate) as part of the restoration plan. Main Roads has been discouraging the conversion of borrow pits to stock watering points.

3.2 Stockpile Areas and Construction Camp Sites

Stockpile areas and construction campsites should be developed in a similar fashion to borrow pits. Limits of disturbance and/or clearing must be clearly marked out on the site using posts or flagging tape before any ground disturbing activity takes place.

Vehicle wash-down areas should be constructed as a separate area to ensure contaminants are contained and removed at the close of the site.

3.3 Sidetracks

Sidetracks may create a much greater impact than the actual construction site itself. If sidetracks are justified, limits of disturbance must be clearly marked out on the site before any ground disturbing activity takes place.

Rehabilitation of sidetracks requires removal and disposal of fill materials used for temporary approaches, abutments, crossings or embankments. All remaining areas must be reshaped to blend back in with preexisting landforms.

4.0 Monitoring

To achieve continuous improvement and ensure the activities specified in contracts are being adhered to, regular monitoring will be undertaken with emphasis placed on the continuity between site characteristics and the adjacent landscapes.

Restoration of sites disturbed by construction activities is unlikely to ever mimic the original landscape. Performance of the contractor can usually be gauged by comparing adjacent landscapes. Low continuity between these landscapes usually indicates that no attention has been given to site stability.

Annexure-IV
Monitoring Results

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Ambient Air Quality Monitoring

National Engineering Services Pakistan (NESPAK)
Bahawalpur Industrial Estate
(Ambient Air Quality Data Report)

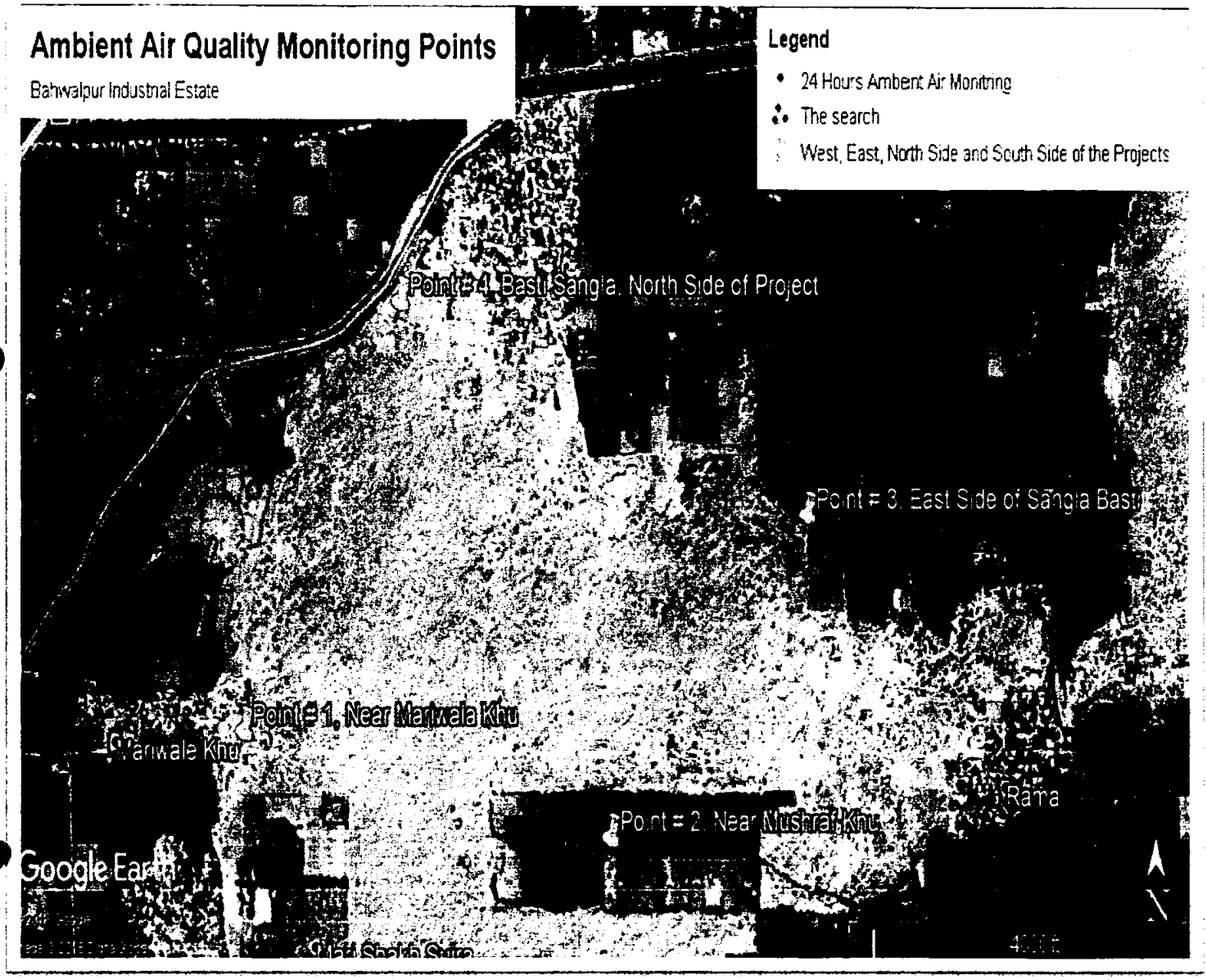
Prepared By:

PAK EPA Certified Labs

HSE SERVICES
Email: info@hse.com.pk
www.hse.com.pk

Ambient Air Monitoring Reports

Site Map : Location



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Air Quality Monitoring Assessment

Location Coordinates:

Point Number: west side near Mariwale khu

GPS Coordinates: Latitude: 29.31618889

Longitude: 71.57888889

Nearby Area: Mariwale khu

Type: Landmark

Meteorological Data at Monitoring Site: Dated: January 16, 2018

Parameters	Units	Results
Air Temperature – 24 Hours Average	°C	21
Air Humidity – 24 Hours Average	% rH	37.5

Air Pollutants and Noise Data at Monitoring Site:

Parameter	Averaging Time		NEQS	Unit	*Avg. Conc.	Methodology
Carbon Monoxide (CO)	8 h		**5**	mg/m^3	0.47	Non-Dispersive Infrared Spectrophotometry (NDIR)
Sulfur Dioxide (SO_2)	24 h		**120**	µg/m^3	3.78	UV Fluorescent
Nitrogen Dioxide (NO_2)	24 h		**80**	µg/m^3	10.25	Chemiluminescence
Nitric Oxide (NO)	24 h		**40**	µg/m^3	3.72	Chemiluminescence
Oxides of Nitrogen (NOx)	24 h		**120**	µg/m^3	13.97	Chemiluminescence
Particulate Matter (PM_{10})	24 h		**150**	µg/m^3	20.32	Beta-Attenuation
Particulate Matter ($PM_{2.5}$)	24 h		**35**	µg/m^3	11.88	Beta-Attenuation
Suspended Particulates (SPM)	24 h		**500**	µg/m^3	198	Gravimetric Sampling
Lead	24 h		**1.5**	µg/m^3	0.02	Gravimetric Analysis
Ozone	1 h		**130**	µg/m^3	95.05	Non-Dispersive UV Absorption Method
Noise	Day-time	12h.50 m	**65**	dB (A)	44.2	Noise Logger
	Night-time	11h.10m	**55**		40.3	Noise Logger

For Detailed Monitoring Results Please see **Log Table 1.0*

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Log Table 1.0

WINAQMS:PC-PORT/75935250/log.009937939

Site: 1

Coordinates : Latitude: 29.31618889

Longitude: 71.57888889

Date	Time	CO	NO	NO2	NOx	SO2	O3	PM10	PM2.5
		mg/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
16-01-18	11:00	0.53	3.13	10.07	13.20	3.77	92.31	18.54	11.54
16-01-18	12:00	0.48	3.80	10.29	14.08	3.76	93.41	18.76	12.34
16-01-18	13:00	0.56	4.23	10.42	14.65	3.76	94.02	18.88	11.65
16-01-18	14:00	0.51	4.00	10.35	14.34	3.78	95.65	18.99	11.54
16-01-18	15:00	0.47	3.76	10.27	14.02	3.75	94.21	19.23	11.64
16-01-18	16:00	0.55	4.20	10.41	14.61	3.82	95.65	19.98	11.53
16-01-18	17:00	0.50	3.96	10.33	14.29	3.78	93.45	20.14	11.78
16-01-18	18:00	0.58	4.40	10.48	14.87	3.76	96.34	20.34	11.92
16-01-18	19:00	0.53	4.16	10.39	14.55	3.78	94.21	20.45	11.96
16-01-18	20:00	0.39	3.19	10.09	13.28	3.83	92.42	20.56	11.98
16-01-18	21:00	0.57	4.36	10.46	14.82	3.76	96.98	20.89	11.94
16-01-18	22:00	0.57	4.36	10.46	14.82	3.76	96.98	20.89	11.94
16-01-18	23:00	0.51	4.12	10.38	14.49	3.82	94.32	21.14	11.92
17-01-18	00:00	0.38	3.16	10.08	13.24	3.77	96.54	21.76	11.9
17-01-18	01:00	0.57	4.33	10.45	14.78	3.76	94.32	21.98	11.84
17-01-18	02:00	0.41	3.36	10.14	13.50	3.82	98.42	20.32	11.89
17-01-18	03:00	0.37	3.12	10.07	13.19	3.76	95.02	21.23	11.92
17-01-18	04:00	0.55	4.29	10.44	14.73	3.77	97.54	21.32	11.78
17-01-18	05:00	0.42	3.33	10.14	13.47	3.79	98.11	22.54	11.87
17-01-18	06:00	0.39	3.09	10.06	13.15	3.76	92.34	20.32	12.12
17-01-18	07:00	0.44	3.53	10.20	13.73	3.77	96.21	21.54	12.22
17-01-18	08:00	0.43	3.30	10.13	13.43	3.81	94.53	20.12	12.02
17-01-18	09:00	0.46	3.72	10.26	13.98	3.75	95.05	20.01	11.99
17-01-18	10:00	0.45	3.50	10.19	13.69	3.77	95.32	19.54	11.89

Data Analysis							
Minimum Value	0.37	3.09	10.05	13.14	3.75	92.31	18.54
Maximum Value	0.58	4.39	10.47	14.87	3.83	98.42	22.54
Mode	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Variance	0.04	0.22	0.02	0.38	0.00	0.28	59.33
Quartile @ 1st 4 Hours	0.42	3.30	10.13	13.43	3.09	7.19	58.53
Quartile @ 2nd 4 Hours	0.49	3.77	10.27	14.05	3.15	7.72	66.22
Quartile @ 3rd 4 Hours	0.54	4.18	10.40	14.59	3.20	8.18	72.89
Standard Deviation	**0.06**	**0.47**	**0.14**	**0.62**	**0.06**	**0.53**	**7.70**
Mean Value	**0.48**	**3.74**	**10.26**	**14.01**	**3.78**	**95.05**	**20.32**

Ambient Air Monitoring Reports

**Standard Deviation define the deviation from the mean or average value in that specific time period, sometimes we use this data to analyzer the variation which rise and fall due to traffic concentration on nearby roads or Industrial emissions.

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AMBIENT AIR QUALITY, METEOROLOGY AND NOISE LEVEL RESULTS

Air Quality, Meteorology and Noise Monitoring Schedule

Sr. No.	Site	Start Date/Time	Completion Date/ Time	Duration	Lat.	Lon.
2.	South side near Mushraf khu	17/01/2018 12:00 Hrs.	18/01/2018 11:00 Hrs.	24h	29.31368889	71.59333333



Air Quality Monitoring Assessment

Location Coordinates:

Point Number: South side near Mushraf khu

GPS Coordinates: Latitude: 29.31368889

Longitude: 71.59333333

Nearby Area: Mushraf khu

Type: Landmark

Meteorological Data at Monitoring Site: Dated: January 17, 2018

Parameters	Units	Results
Air Temperature – 24 Hours Average	°C	21
Air Humidity – 24 Hours Average	% rH	37.5

Air Pollutants and Noise Data at Monitoring Site:

Parameter	Averaging Time		NEQS	Unit	*Avg. Conc.	Methodology
Carbon Monoxide (CO)	8 h		**5**	mg/m^3	0.50	Non-Dispersive Infrared Spectrophotometry (NDIR)
Sulfur Dioxide (SO_2)	24 h		**120**	µg/m^3	3.78	UV Fluorescent
Nitrogen Dioxide (NO_2)	24 h		**80**	µg/m^3	12.73	Chemiluminescence
Nitric Oxide (NO)	24 h		**40**	µg/m^3	3.72	Chemiluminescence
Oxides of Nitrogen (NOx)	24 h		**120**	µg/m^3	16.45	Chemiluminescence
Particulate Matter (PM_{10})	24 h		**150**	µg/m^3	31.32	Beta-Attenuation
Particulate Matter ($PM_{2.5}$)	24 h		**35**	µg/m^3	15.38	Beta-Attenuation
Suspended Particulates (SPM)	24 h		**500**	µg/m^3	178	Gravimetric Sampling
Lead	24 h		**1.5**	µg/m^3	0.02	Gravimetric Analysis
Ozone	1 h		**130**	µg/m^3	97.21	Non-Dispersive UV Absorption Method
Noise	Day-time	12h.50 m	**65**	dB (A)	48.5	Noise Logger
	Night-time	11h.10m	**55**		44.2	Noise Logger

For Detailed Monitoring Results Please see **Log Table 2.0*

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Log Table 2.0

WINAQMS:PC-PORT/75935250/log.009937939

Site: 2

Coordinates : Latitude: 29.31368889

Longitude: 71.59333333

Date	Time	CO	NO	NO2	NOx	SO2	O3	PM10	PM2.5
		mg/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
17-01-18	12:00	0.48	3.80	11.29	15.08	3.76	96.43	30.21	13.34
17-01-18	13:00	0.56	4.23	12.42	15.65	3.76	97.54	31.32	16.65
17-01-18	14:00	0.51	4.00	13.35	16.34	3.78	97.51	31.42	15.54
17-01-18	15:00	0.47	3.76	12.27	16.02	3.75	97.24	31.23	16.64
17-01-18	16:00	0.55	4.20	12.41	16.61	3.82	95.65	32.43	15.43
17-01-18	17:00	0.5	3.96	12.33	15.29	3.78	97.21	31.21	15.45
17-01-18	18:00	0.58	4.40	12.48	16.87	3.76	98.76	33.21	15.92
17-01-18	19:00	0.53	4.16	12.39	15.55	3.78	98.87	30.23	15.96
17-01-18	20:00	0.54	3.19	12.09	15.28	3.83	99.87	31.25	14.32
17-01-18	21:00	0.57	4.36	13.46	16.82	3.76	96.98	30.54	13.94
17-01-18	22:00	0.57	4.36	13.46	16.82	3.76	96.98	30.54	13.94
17-01-18	23:00	0.51	4.12	13.38	16.49	3.82	94.53	31.52	16.92
18-01-18	00:00	0.52	3.16	13.08	17.24	3.77	98.32	33.61	14.9
18-01-18	01:00	0.57	4.33	13.45	17.78	3.76	98.21	33.33	14.32
18-01-18	02:00	0.41	3.36	14.14	17.50	3.82	97.21	32.54	15.89
18-01-18	03:00	0.54	3.12	13.07	18.19	3.76	97.31	31.32	15.32
18-01-18	04:00	0.55	4.29	13.44	17.17	3.77	97.54	31.76	16.78
18-01-18	05:00	0.42	3.33	14.14	17.47	3.79	98.11	32.77	15.87
18-01-18	06:00	0.39	3.09	13.06	16.15	3.76	96.31	31.21	14.12
18-01-18	07:00	0.44	3.53	12.20	16.73	3.77	96.21	30.23	13.43
18-01-18	08:00	0.43	3.30	12.13	16.43	3.81	96.34	30.21	15.02
18-01-18	09:00	0.46	3.72	12.26	15.98	3.75	95.05	29.11	15.99
18-01-18	10:00	0.45	3.50	12.19	16.69	3.77	97.54	30.22	15.89
18-01-18	11:00	0.5	3.27	12.32	15.39	3.79	97.26	30.32	15.87

Data Analysis							
Minimum Value	0.37	3.09	11.29	15.08	3.75	94.53	30.21
Maximum Value	0.58	4.39	14.14	18.19	3.83	99.87	33.61
Mode	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Variance	0.04	0.22	0.02	0.38	0.00	0.28	59.33
Quartile @ 1st 4 Hours	0.42	3.30	10.13	13.43	3.09	7.19	58.53
Quartile @ 2nd 4 Hours	0.49	3.77	10.27	14.05	3.15	7.72	66.22
Quartile @ 3rd 4 Hours	0.54	4.18	10.40	14.59	3.20	8.18	72.89
Standard Deviation	**0.06**	**0.47**	**0.14**	**0.62**	**0.06**	**0.53**	**7.70**
Mean Value	**0.50**	**3.74**	**12.73**	**16.45**	**3.78**	**97.21**	31.31792

Ambient Air Monitoring Reports

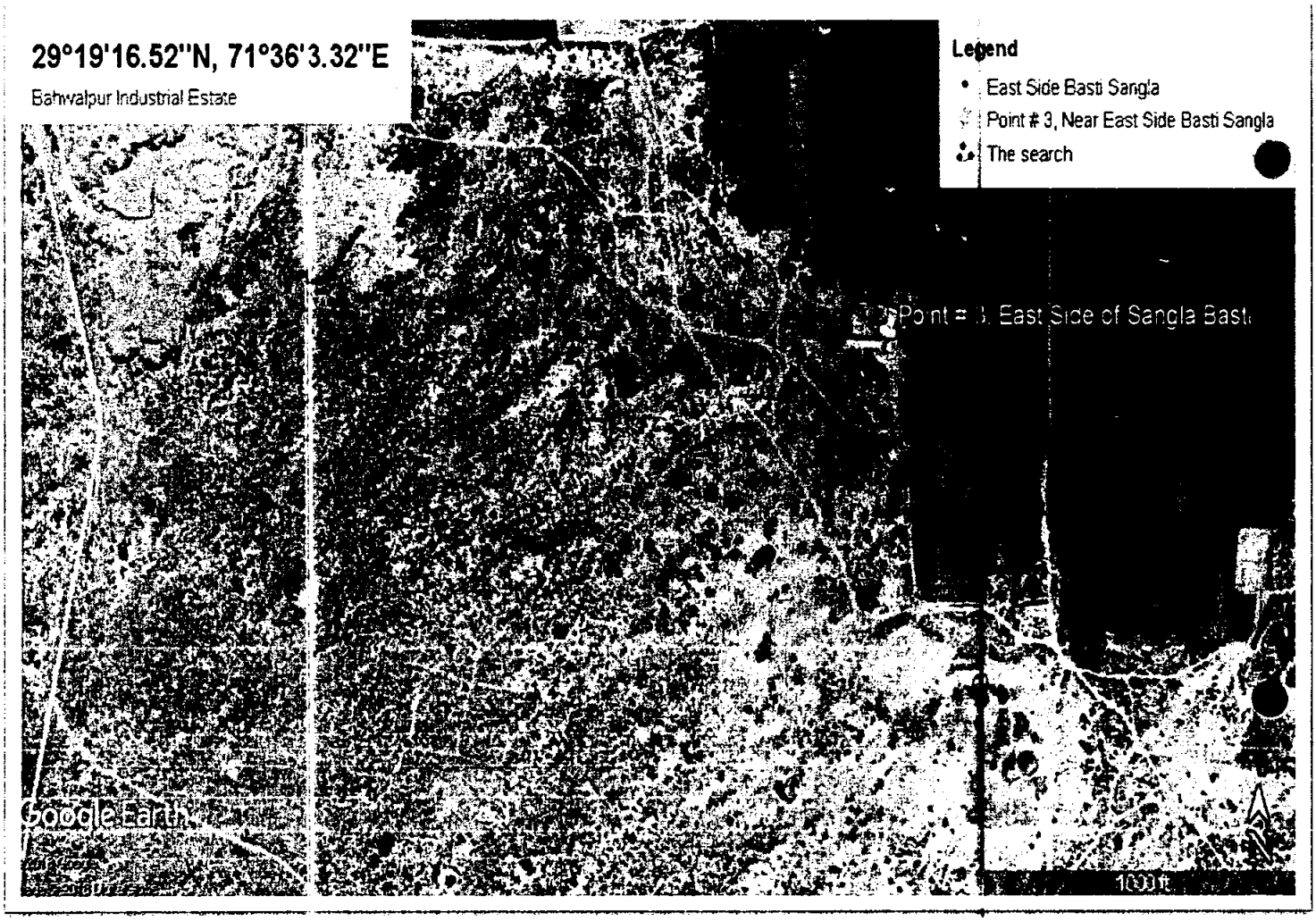
**Standard Deviation define the deviation from the mean or average value in that specific time period, sometimes we use this data to analyzer the variation which rise and fall due to traffic concentration on nearby roads or Industrial emissions.

SAMD CONSULTANTS

AMBIENT AIR QUALITY, METEOROLOGY AND NOISE LEVEL RESULTS

Air Quality, Meteorology and Noise Monitoring Schedule

Sr. No.	Site	Start Date/Time	Completion Date/ Time	Duration	Lat.	Lon.
3.	East side of Sangla Basti	18/01/2018 13:00 Hrs.	19/01/2018 12:00 Hrs.	24h	29.32125556	71.60083333



Air Quality Monitoring Assessment

Location Coordinates:

Point Number: East side of Sangla Basti

GPS Coordinates: Latitude: 29.32125556

Longitude: 71.60083333

Nearby Area: Sangla Basti

Type: Landmark

Meteorological Data at Monitoring Site: Dated: January 18, 2018

Parameters	Units	Results
Air Temperature – 24 Hours Average	°C	21
Air Humidity – 24 Hours Average	% rH	37.5

Air Pollutants and Noise Data at Monitoring Site:

Parameter	Averaging Time		NEQS	Unit	*Avg. Conc.	Methodology
Carbon Monoxide (CO)	8 h		**5**	mg/m^3	0.50	Non-Dispersive Infrared Spectrophotometry (NDIR)
Sulfur Dioxide (SO_2)	24 h		**120**	$\mu g/m^3$	3.84	UV Fluorescent
Nitrogen Dioxide (NO_2)	24 h		**80**	$\mu g/m^3$	13.53	Chemiluminescence
Nitric Oxide (NO)	24 h		**40**	$\mu g/m^3$	3.77	Chemiluminescence
Oxides of Nitrogen (NOx)	24 h		**120**	$\mu g/m^3$	17.30	Chemiluminescence
Particulate Matter (PM_{10})	24 h		**150**	$\mu g/m^3$	26.40	Beta-Attenuation
Particulate Matter ($PM_{2.5}$)	24 h		**35**	$\mu g/m^3$	12.71	Beta-Attenuation
Suspended Particulates (SPM)	24 h		**500**	$\mu g/m^3$	184	Gravimetric Sampling
Lead	24 h		**1.5**	$\mu g/m^3$	0.02	Gravimetric Analysis
Ozone	1 h		**130**	$\mu g/m^3$	96.97	Non-Dispersive UV Absorption Method
Noise	Day-time	12h.50 m	**65**	dB (A)	51.6	Noise Logger
	Night-time	11h.10m	**55**		37.8	Noise Logger

For Detailed Monitoring Results Please see **Log Table 3.0*

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Log Table 3.0

WINAQMS:PC-PORT/75935250/log.009937939

Site: 3

Coordinates : Latitude: 29.32125556

Longitude: 71.60083333

Date	Time	CO	NO	NO2	NOx	SO2	O3	PM10	PM2.5
		mg/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
18-01-18	13:00	0.56	4.23	13.55	16.35	3.76	97.54	27.32	13.65
18-01-18	14:00	0.51	4.06	13.35	16.34	3.78	97.51	26.42	13.54
18-01-18	15:00	0.47	3.76	13.98	17.87	3.95	97.24	26.23	13.64
18-01-18	16:00	0.55	4.20	13.41	17.32	3.82	96.65	27.46	12.43
18-01-18	17:00	0.5	3.96	13.43	17.29	3.78	97.21	27.21	12.45
18-01-18	18:00	0.58	4.40	13.54	16.87	3.87	98.76	27.21	12.92
18-01-18	19:00	0.53	4.16	13.39	17.55	3.88	96.87	26.23	12.96
18-01-18	20:00	0.54	3.39	14.12	16.76	3.83	97.87	26.25	11.32
18-01-18	21:00	0.57	4.36	13.46	16.82	3.76	96.98	26.54	12.94
18-01-18	22:00	0.57	4.36	13.46	16.82	3.76	96.98	26.54	12.94
18-01-18	23:00	0.51	4.12	13.54	16.49	3.82	95.51	26.52	11.92
19-01-18	00:00	0.52	3.46	14.08	18.24	3.87	97.32	25.61	12.90
19-01-18	01:00	0.57	4.33	13.45	17.78	3.76	96.21	25.33	12.32
19-01-18	02:00	0.41	3.36	14.14	17.78	3.82	97.21	25.54	11.89
19-01-18	03:00	0.54	3.12	14.54	18.19	3.86	97.31	26.32	12.32
19-01-18	04:00	0.55	4.19	13.44	17.17	3.97	97.54	26.76	11.78
19-01-18	05:00	0.42	3.43	14.23	18.47	3.79	98.11	25.77	11.87
19-01-18	06:00	0.39	3.29	13.06	16.15	3.76	96.31	27.21	11.12
19-01-18	07:00	0.44	3.53	13.56	16.73	3.97	96.21	26.23	12.43
19-01-18	08:00	0.43	3.40	13.43	16.43	3.81	96.34	26.21	12.02
19-01-18	09:00	0.46	3.82	13.26	18.43	3.75	97.05	26.11	12.99
19-01-18	10:00	0.45	3.40	12.19	16.69	3.97	96.54	27.22	13.89
19-01-18	11:00	0.5	3.37	13.43	18.34	3.79	97.26	26.32	13.87
19-01-18	12:00	0.53	3.36	12.98	17.54	3.97	96.23	25.43	14.54

Data Analysis							
Minimum Value	0.39	3.12	12.19	16.15	3.75	95.51	25.43
Maximum Value	0.58	4.40	14.54	18.47	3.97	98.76	27.46
Mode	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Variance	0.04	0.22	0.02	0.38	0.00	0.28	59.33
Quartile @ 1st 4 Hours	0.42	3.30	10.13	13.43	3.09	7.19	58.53
Quartile @ 2nd 4 Hours	0.49	3.77	10.27	14.05	3.15	7.72	66.22
Quartile @ 3rd 4 Hours	0.54	4.18	10.40	14.59	3.20	8.18	72.89
Standard Deviation	**0.06**	**0.47**	**0.14**	**0.62**	**0.06**	**0.53**	**7.70**
Mean Value	**0.50**	**3.7778**	**13.53**	**17.30**	**3.837**	**96.976**	26.40

Ambient Air Monitoring Reports

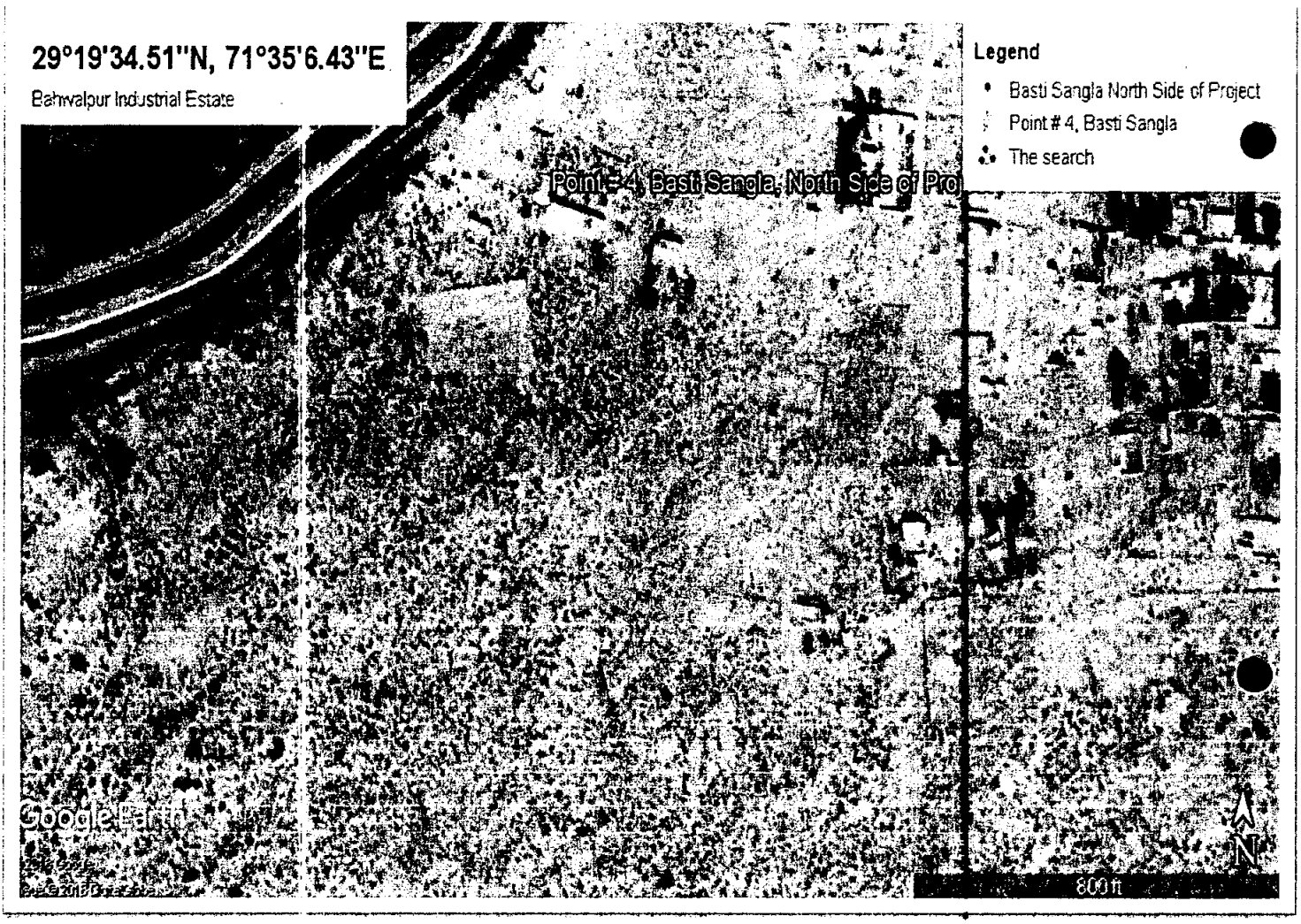
**Standard Deviation define the deviation from the mean or average value in that specific time period, sometimes we use this data to analyzer the variation which rise and fall due to traffic concentration on nearby roads or Industrial emissions.

SAMD CONSULTANTS

AMBIENT AIR QUALITY, METEOROLOGY AND NOISE LEVEL RESULTS

Air Quality, Meteorology and Noise Monitoring Schedule

Sr. No.	Site	Start Date/Time	Completion Date/ Time	Duration	Lat.	Lon.
4.	Basti Sangla North side of the project	19/01/2018 14:00 Hrs.	20/01/2018 13:00 Hrs.	24h	29.32625278	71.58500000



Air Quality Monitoring Assessment

Location Coordinates:

Point Number: Basti Sangla North side of the project
GPS Coordinates: Latitude: 29.32625278
Longitude: 71.58500000

Nearby Area: Basti Sangla
Type: Landmark

Meteorological Data at Monitoring Site: Dated: January 19, 2018

Parameters	Units	Results
Air Temperature – 24 Hours Average	°C	21
Air Humidity – 24 Hours Average	% rH	37.5

Air Pollutants and Noise Data at Monitoring Site:

Parameter	Averaging Time		NEQS	Unit	*Avg. Conc.	Methodology
Carbon Monoxide (CO)	8 h		**5**	mg/m^3	0.50	Non-Dispersive Infrared Spectrophotometry (NDIR)
Sulfur Dioxide (SO_2)	24 h		**120**	µg/m^3	3.48	UV Fluorescent
Nitrogen Dioxide (NO_2)	24 h		**80**	µg/m^3	13.94	Chemiluminescence
Nitric Oxide (NO)	24 h		**40**	µg/m^3	03.90	Chemiluminescence
Oxides of Nitrogen (NOx)	24 h		**120**	µg/m^3	17.84	Chemiluminescence
Particulate Matter (PM_{10})	24 h		**150**	µg/m^3	27.24	Beta-Attenuation
Particulate Matter ($PM_{2.5}$)	24 h		**35**	µg/m^3	13.72	Beta-Attenuation
Suspended Particulates (SPM)	24 h		**500**	µg/m^3	184	Gravimetric Sampling
Lead	24 h		**1.5**	µg/m^3	0.02	Gravimetric Analysis
Ozone	1 h		**130**	µg/m^3	96.24	Non-Dispersive UV Absorption Method
Noise	Day-time	12h.50 m	**65**	dB (A)	45.6	Noise Logger
	Night-time	11h.10m	**55**		39.3	Noise Logger

For Detailed Monitoring Results Please see **Log Table 4.0*

SAMD CONSULTANTS

Log Table 4.0

WINAQMS:PC-PORT/75935250/log.009937939

Site: 4

Coordinates : Latitude: 29.32625278

Longitude: 71.58500000

Date	Time	CO	NO	NO2	NOx	SO2	O3	PM10	PM2.5
		mg/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
19-01-18	14:00	0.51	4.06	13.35	17.34	3.78	95.51	26.42	13.54
19-01-18	15:00	0.47	3.76	14.98	18.87	3.35	96.24	27.23	13.64
19-01-18	16:00	0.55	4.20	13.41	18.86	3.52	96.65	28.46	12.43
19-01-18	17:00	0.5	3.96	13.43	18.29	3.28	97.21	28.21	14.45
19-01-18	18:00	0.58	4.40	13.54	17.65	3.37	97.77	28.21	12.92
19-01-18	19:00	0.53	4.16	14.39	17.55	3.18	96.87	26.23	12.96
19-01-18	20:00	0.54	4.39	14.12	18.53	3.53	95.87	26.25	14.32
19-01-18	21:00	0.57	3.36	13.46	17.82	3.46	95.98	26.54	13.94
19-01-18	22:00	0.57	4.36	13.46	16.82	3.26	96.98	26.54	12.94
19-01-18	23:00	0.51	3.12	14.54	18.54	3.22	95.51	26.52	13.92
20-01-18	00:00	0.52	4.46	15.08	18.24	3.87	96.32	26.61	14.90
20-01-18	01:00	0.57	3.43	13.45	17.78	3.36	96.21	27.33	13.32
20-01-18	02:00	0.41	3.56	15.14	16.78	3.52	97.21	26.54	13.89
20-01-18	03:00	0.54	3.62	14.54	18.19	3.86	96.31	26.32	12.32
20-01-18	04:00	0.55	4.17	13.54	17.17	3.37	97.54	28.76	12.78
20-01-18	05:00	0.42	3.53	14.53	17.47	3.29	95.11	27.77	14.87
20-01-18	06:00	0.39	3.69	13.36	17.45	3.56	96.31	28.21	13.12
20-01-18	07:00	0.44	4.23	13.56	17.76	3.17	95.21	28.23	14.43
20-01-18	08:00	0.43	4.40	13.23	17.43	3.71	96.34	26.21	14.02
20-01-18	09:00	0.46	3.52	13.66	17.43	3.85	95.05	27.11	12.99
20-01-18	10:00	0.45	3.40	14.19	18.87	3.47	95.54	28.22	14.89
20-01-18	11:00	0.5	3.57	13.43	17.34	3.79	96.26	27.32	13.87
20-01-18	12:00	0.53	4.66	14.98	17.54	3.37	95.23	27.43	14.54
20-01-18	13:00	0.48	3.80	13.29	18.54	3.46	96.43	27.21	14.34

Data Analysis

Minimum Value	0.39	3.12	13.23	16.78	3.18	95.11	26.21
Maximum Value	0.58	4.66	15.08	18.87	3.87	97.77	28.76
Mode	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Variance	0.04	0.22	0.02	0.38	0.00	0.28	59.33
Quartile @ 1st 4 Hours	0.42	3.30	10.13	13.43	3.09	7.19	58.53
Quartile @ 2nd 4 Hours	0.49	3.77	10.27	14.05	3.15	7.72	66.22
Quartile @ 3rd 4 Hours	0.54	4.18	10.40	14.59	3.20	8.18	72.89
Standard Deviation	**0.06**	**0.47**	**0.14**	**0.62**	**0.06**	**0.53**	**7.70**
Mean Value	**0.50**	**3.90**	**13.94**	**17.84**	**3.48**	**96.24**	27.24

Ambient Air Monitoring Reports

**Standard Deviation define the deviation from the mean or average value in that specific time period, sometimes we use this data to analyzer the variation which rise and fall due to traffic concentration on nearby roads or Industrial emissions.

Note:

- The instruments used were dully calibrated.
- The measurements were carried out on client's request.
- The client is responsible for lawful usage of reported data in future.
- This report is not valid for Court.
- The measurement results based on the time of monitoring.

Monitoring & Prepared By:

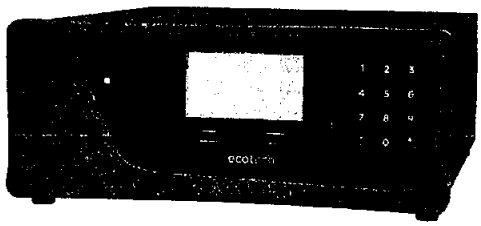
HSE Services

Date: January 31, 2018

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Monitoring Station Details

i. Ambient Gas analyzers are based on 4 main instruments:



1. Serinus 10 Ozone analyser (O3), Ecotech Australia
   (U.S. EPA approved (EQOA-0809-187)
   EN approval (TUV 936/21221977/C)
   Ultraviolet photometry method EN14625
   Determination of Ozone AS3580.6.1 Australian/New Zealand Standards

2. Serinus 30 Carbon Monoxide analyser (CO), Ecotech Australia
   U.S. EPA approved (RFCA-0509-174)
   EN approval (TUV 936/21221977/D)
   Non Dispersive I.R. Spectrometry method EN1426
   Determination of carbon monoxide AS 3580.7.1.2011 Australian/New Zealand standards

3. Serinus 40 Oxides of Nitrogen analyser (NOx), Ecotech Australia
   US EPA approved (RFNA-0809-186)
   EN approval (TUV 936/21221977/A)
   Chemiluminescence method EN14211
   Determination of oxides of nitrogen AS 3580.5.1-2011 Australian/New Zealand Standards.

4. Serinus 50 Sulphur Dioxide analyser (SO2), Ecotech Australia
   U.S. EPA approved (EQSA-0809-188)
   EN approval (TUV 936/21221977/B)
   Ultraviolet fluorescence method EN 14212
   Determination of sulphur dioxide AS 3580.4.1-2008 Australian/New Zealand Standards

ii. For PM Sampling: METONE BAM
   40 CFR Parts 50,51, 52,53 and 58.
   Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method).
   Reference Method for the Determination of Particulate Matter as PM10 in the Atmosphere.

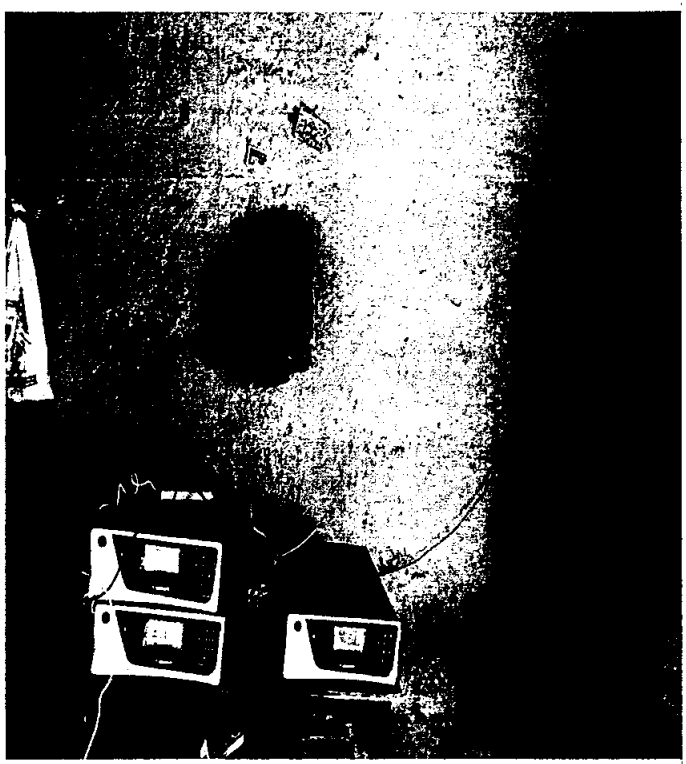
iii. Weather Station: Accurite USA

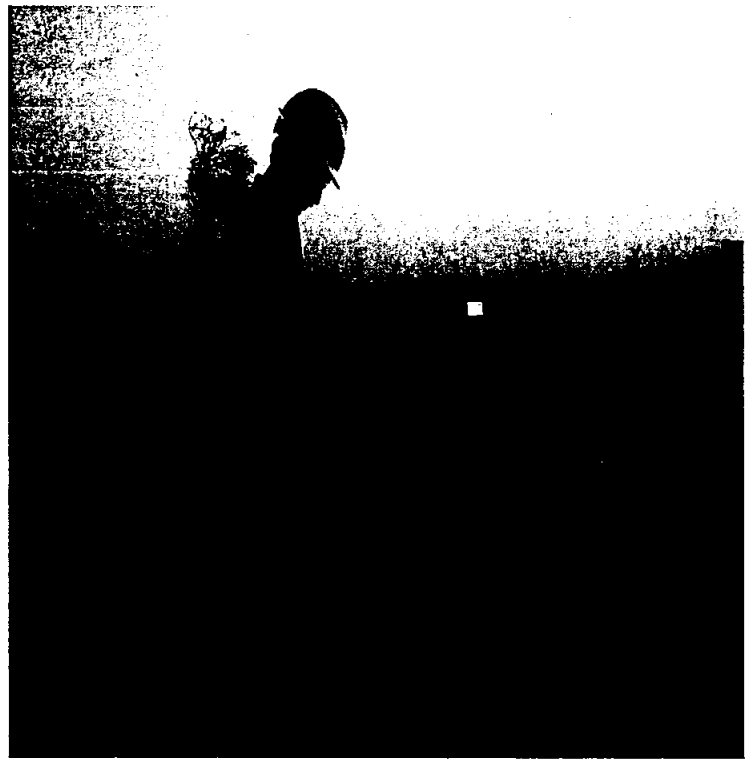
iv. Sound Level Data Logger – Extech USA

v. Oxygen Level Detector – Honeywell USA

vi. GPS – Garmin USA

vii. Temperature & Humidity Data Logger Extech USA





Acknowledgements
This report has been prepared by the staff of the Environmental Monitoring and Reporting Branch of the HSE SERVICES.

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0321-4000347

SAMD CONSULTANTS

HSE Services
Health Safety & Environment, Consultant & Services

EPA Certified Labs

Water Analysis Test Report

Report No.	HSE/L/DW/13/18	Date	Monday, January 22, 2018
Client Name	NESPAK		
Client Adress	Fateh wah Canal		
Sample Nature	Surface Water	Quantity Of Sample	1 Liter
Sample Collected By	HSE Services	Sampling Methodology	EPA Sampling Ruels
Date of Sample Received	25-12--2017		

S.No	Measuring Parameter	Units	REFERENCES (APHA)	PEQs	Test Results	Remarks
1	pH @ 25 °C	-	4500-H+	6.0-9.0	7.4	Ok
2	Temperature	oC	APHA 9030 B	.....	12.7	Ok
3	Total Dissolved Solids	TDS (mg/L)	1030E	3500	1240	Ok
4	Chloride	mg/L	4500 CC(-) B	1000	43.4	Ok
5	TSS	mg/L	APHA 2540-D	200	198	Ok
6	BODs	mg/L	APHA 5210-B	80	20	Ok
7	COD	mg/L	APHA 5220-D	150	37	Ok
8	Boron	mg/L	4500 B	6	1.2	Ok
9	Oil & Grease	mg/L	4500 Gravity method	10	4	Ok
10	Cadium	mg/L	3500 Cd C	0.1	0.01	Ok
11	Mercury	mg/L	4500 Hg	0.01	BDL	Ok
12	Arsenic	As^{-3} (mg/L)	1.17927 (Merck method)	1	0.05	Ok
13	Ammonia	mg/L	4500 NH_3	40	0.14	Ok
14	Phenolic Compounds	mg/L	4500 Photometric	0.1	BDL	Ok
15	Selenium	mg/L	4500 Se	0.5	BDL	Ok
16	Chromium	$Cr6^+$ (mg/L)	3500 Cr B	1	1.69	
17	Copper	Cu^{2+} (mg/L)	3500 Cu	1	BDL	Ok
18	Cyanide	CN (mg/L)	4500 CN B	1	0.01	Ok
19	Fluoride	mg/L	APHA 4500 F	10	3.1	Ok
20	Lead	Pb^{-2} (mg/L)	4500 Pb C	0.5	BDL	Ok
21	Manganese	Mn^{-2}(mg/L)	3500 Mn	1.5	0.1	Ok
22	Sulphate	mg/L	4500 SO_4 -2 E	600	121	Ok
23	Nickel	Ni^{-2} (mg/L)	3500 Ni	1	BDL	Ok
24	Sulfide	mg/L	4500 S -2	1	BDL	Ok
25	Ionic detergenta as MBAs	mg/L	5540 C	20	ND	Ok
26	Zinc	Zn^{-2} (mg/L)	3500 Zn	5.0	BDL	Ok
27	Pesticides	mg/L	USEPA	0.15	ND	Ok
28	Barium	mg/L	3500 Ba	1.5	ND	Ok
29	Silver	mg/L	3500 Ag	1	BDL	Ok
30	Iron	mg/L	3500 Fe	8	BDL	Ok
31	Total Toxic metals	mg/L	3110	2	BDL	Ok
32	Chorine	mg/L	APHA 4500 Cl B/C	1	BDL	Ok

Note :
ND=Not Detected.
PEQS= Punjab Environmental Quality standards
BDL=Below Detectable Limits.
The instruments used were duly calibrated.
The measurements were carried out on client's request.
The client is responsible for lawful usage of reported data in future.
This report is not valid for Court evidence/ Judicial Knowledge.
Company is not responsible for any query if sample is given by Client
Report is just valid for given sample.

Reviewed By _____ HSE SERVICES **Verified By** _____

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HSE Services

Health Safety & Environment, Consultant & Services

ISO 9000 14000 OHSAS 18001

EPA Certified Labs

Water Analysis Test Report

Report No.	HSE/L/DW/08/18	Date	Wednesday, January 31, 2018
Client Name	NESPAK		
Client Adress	Basti Sanghla Khu Jhak Ramzan		
Sample Nature	Drinking Water	Quantity Of Sample	1 Liter
Sample Collected By	HSE Services	Sampling Methodology	EPA Sampling Ruels
Date of Sample Collection	25-01--2018	Analysis type	Chemical / Microbiology

S.No	Measuring Parameter	Units	Testing Method	PEQs	Test Results	Remarks
1	pH @ 25 °C	pH	ASTM D-1293	6.5-8.5	7.4	Ok
2	Temperature	oC	APHA 9030 B	.....	15.2	Ok
3	Total Dissolved Solids	TDS (mg/L)	APHA 2540-C	<1000	814	Ok
4	Chloride	mg/L	ASTM D-512	<250	144	Ok
5	Escherichia Coli	E.Coli(count/100ml)	APHA 9222-G	0/100ml	0	Ok
6	Feacal Coliform	F.Coli(count/100ml)	APHA 9222-G	.....	0	Ok
7	Total Coliform	TC(count/100ml)	APHA9222-B	0/100ml	0	Ok
8	Boron	mg/L	Lovibond Azomethine Method	----	1	Ok
9	Total Hardness	T.Hard (mg/L)	ASTM D-1126	<500	172	Ok
10	Cadium	mg/L	ASTM D-3577	0.01	ND	Ok
11	Mercury	mg/L	Kit Method	≤0.001	ND	Ok
12	Arsenic	As^{-3} (mg/L)	Palintest Arsenic Kit	≤0.05	ND	Ok
13	Aliminum	mg/L	ASTM D-857	≤0.2	BDL	Ok
14	Tubidity	NTU	Lovibond Attenuated Radiation Method	<5	2	Ok
15	Selenium	mg/L	APHA	0.01	BDL	Ok
16	Chromium	$Cr6^{+}$ (mg/L)	Lovibond 1.5-diphenyl-Carbohydrazide Method	.....	1.31	Ok
17	Copper	Cu^{2+} (mg/L)	Lobond Biquinoline Method	2	BDL	Ok
18	Cyanide	CN (mg/L)	APHA 4500CN	≤0.05	ND	Ok
19	Fluoride	mg/L	Lovibond Spadns Reagent Method	<1.5	0.6	Ok
20	Lead	Pb^{-2} (mg/L)	ASTM D-3559	≤0.05	BDL	Ok
21	Manganese	Mn^{-2}(mg/L)	Lovibond PAN Method	≤0.5	0.1	Ok
22	Phenolic Compound	mg/L	ASTM D-1783	....	BDL	Ok
23	Nickel	Ni^{-2} (mg/L)	Lovibond Dimethylglyoxime Method	≤0.02	BDL	Ok
24	Nitrate	$NO3^{-}$(mg/L)	Lovibond chromotropic acid	≤50	12.7	Ok
25	Nitrite	$NO2^{-}$(mg/L)	Lovibond N-(1-naphthyl)-ethylenediamine method	≤3	0.35	Ok
26	Zinc	Zn^{-2} (mg/L)	Lovibond Zincon Method	5.0	0.19	Ok
27	Pesticides	mg/L	APHA	.....	ND	Ok
28	Barium	mg/L	ASTM D-3651	0.7	ND	Ok
29	Residual Chlorine	mg/L	Lovibond DPD Glycine method	0.2-0.5	ND	Ok
30	Color	TCU	Pt-Co Method	≤15	4.0	Ok
31	Odour	odor	Sensory Evalution	Objectionable Non-objectionable	Non-objectionable	Ok
32	Taste	Taste	Sensory Evalution	Objectionable Non-objectionable	Non-objectionable	Ok

Note :

ND=Not Detected.

BDL=Below Detectable Limits.

The instruments used were duly calibrated.

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Water Analysis Test Report

Report No.	HSE/L DW/09/18	Date	Tuesday, January 30, 2018
Client Name	NESPAK		
Client Adress	Maliwale Khu		
Sample Nature	Drinking Water	Quantity Of Sample	1 Liter
Sample Collected By	HSE Services	Sampling Methodology	EPA Sampling Ruels
Date of Sample Collection	25-01--2018	Analysis type	Chemical / Microbiology

S.No	Measuring Parameter	Units	Testing Method	PEQs	Test Results	Remarks
1	pH @ 25 °C	pH	ASTM D-1293	6.5-8.5	7.2	Ok
2	Temperature	oC	APHA 9030 B	.....	15.1	Ok
3	Total Dissolved Solids	TDS (mg/L)	APHA 2540-C	<1000	1065	
4	Chloride	mg/L	ASTM D-512	<250	120	Ok
5	Escherichia Coli	E.Coli(count/100ml)	APHA 9222-G	0/100ml	0	Ok
6	Feacal Coliform	F.Coli(count/100ml)	APHA 9222-G	.....	0	Ok
7	Total Coliform	TC(count/100ml)	APHA9222-B	0/100ml	0	Ok
8	Boron	mg/L	Lovibond Azomethine Method	----	1	Ok
9	Total Hardness	T.Hard (mg/L)	ASTM D-1126	<500	174	Ok
10	Cadium	mg/L	ASTM D-3577	0.01	ND	Ok
11	Mercury	mg/L	Kit Method	<0.001	ND	Ok
12	Arsenic	As^{-3} (mg/L)	Palintest Arsenic Kit	≤0.05	ND	Ok
13	Aliminum	mg/L	ASTM D-857	<0.2	BDL	Ok
14	Tubidity	NTU	Lovibond Attenuated Radiation Method	<5	2.4	Ok
15	Selenium	mg/L	APHA	0.01	BDL	Ok
16	Chromium	$Cr6^{+}$ (mg/L)	Lovibond 1,5-diphenyl-Carbohydrazide Method	.....	1.55	Ok
17	Copper	Cu^{2+} (mg/L)	Lobond Biquinoline Method	2	BDL	Ok
18	Cyanide	CN (mg/L)	APHA 4500CN	≤0.05	ND	Ok
19	Fluoride	mg/L	Lovibond Spadns Reagent Method	<1.5	0.6	Ok
20	Lead	Pb^{-2} (mg/L)	ASTM D-3559	≤0.05	ND	Ok
21	Manganese	Mn^{-2}(mg/L)	Lovibond PAN Method	≤0.5	0.2	Ok
22	Phenolic Compound	mg/L	ASTM D-1783	....	BDL	Ok
23	Nickel	Ni^{-2} (mg/L)	Lovibond Dimethylglyoxime Method	≤0.02	BDL	Ok
24	Nitrate	$NO3^{-}$(mg/L)	Lovibond chromotropic acid	≤50	11.4	Ok
25	Nitrite	$NO2^{-}$(mg/L)	Lovibond N-(1-naphthyl)-ethylenediamine method	≤3	0.29	Ok
26	Zinc	Zn^{-2} (mg/L)	Lovibond Zincon Method	5.0	0.32	Ok
27	Pesticides	mg/L	APHA	.....	ND	Ok
28	Barium	mg/L	ASTM D-3651	0.7	ND	Ok
29	Residual Chlorine	mg/L	Lovibond DPD Glycine method	0.2-0.5	ND	Ok
30	Color	TCU	Pt-Co Method	≤15	7.0	Ok
31	Odour	odor	Sensory Evalution	Objectionable Non-objectionable	Non-objectionable	Ok
32	Taste	Taste	Sensory Evalution	Objectionable Non-objectionable	Non-objectionable	Ok

Note :

ND=Not Detected.

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The instruments used were duly calibrated.

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Water Analysis Test Report

Report No.	HSE/L/DW/11/18	Date	Tuesday, January 30, 2018
Client Name	NESPAK		
Client Adress	Mouza Nauabad Raqba Pervaiz Mushharaf		
Sample Nature	Drinking Water	Quantity Of Sample	1 Liter
Sample Collected By	HSE Services	Sampling Methodology	EPA Sampling Ruels
Date of Sample Collection	25-01-2018	Analysis type	Chemical / Microbiology

S.No	Measuring Parameter	Units	Testing Method	PEQs	Test Results	Remarks
1	pH @ 25 °C	pH	ASTM D-1293	6.5-8.5	7.2	Ok
2	Temperature	oC	APHA 9030 B	.....	13.4	Ok
3	Total Dissolved Solids	TDS (mg/L)	APHA 2540-C	<1000	1830	
4	Chloride	mg/L	ASTM D-512	<250	132	Ok
5	Escherichia Coli	E.Coli(count/100ml)	APHA 9222-G	0/100ml	0	Ok
6	Feacal Coliform	F.Coli(count/100ml)	APHA 9222-G	.....	0	Ok
7	Total Coliform	TC(count/100ml)	APHA9222-B	0/100ml	0	Ok
8	Boron	mg/L	Lovibond Azomethine Method	---	3	Ok
9	Total Hardness	T.Hard (mg/L)	ASTM D-1126	<500	185	Ok
10	Cadium	mg/L	ASTM D-3577	0.01	ND	Ok
11	Mercury	mg/L	Kit Method	≤0.001	ND	Ok
12	Arsenic	As^{+3} (mg/L)	Palintest Arsenic Kit	≤0.05	ND	Ok
13	Aliminum	mg/L	ASTM D-857	≤0.2	BDL	Ok
14	Tubidity	NTU	Lovibond Attenuated Radiation Method	<5	3.7	Ok
15	Selenium	mg/L	APHA	0.01	BDL	Ok
16	Chromium	$Cr6^{+}$ (mg/L)	Lovibond 1,5-diphenyl-Carbohydrazide Method	.....	1.19	Ok
17	Copper	Cu^{2+} (mg/L)	Lobond Biquinoline Method	2	BDL	Ok
18	Cyanide	CN (mg/L)	APHA 4500CN	≤0.05	ND	Ok
19	Fluoride	mg/L	Lovibond Spadns Reagent Method	<1.5	0.5	Ok
20	Lead	Pb^{+2} (mg/L)	ASTM D-3559	≤0.05	ND	Ok
21	Manganese	Mn^{+2}(mg/L)	Lovibond PAN Method	≤0.5	0.09	Ok
22	Phenolic Compound	mg/L	ASTM D-1783	....	BDL	Ok
23	Nickel	Ni^{+2} (mg/L)	Lovibond Dimethylglyoxime Method	≤0.02	BDL	Ok
24	Nitrate	$NO3^{-}$(mg/L)	Lovibond chromotropic acid	≤50	2.9	Ok
25	Nitrite	$NO2^{-}$(mg/L)	Lovibond N-(1-naphthyl)-ethylenediamine method	≤3	0.01	Ok
26	Zinc	Zn^{+2} (mg/L)	Lovibond Zincon Method	5.0	0.23	Ok
27	Pesticides	mg/L	APHA	.....	ND	Ok
28	Barium	mg/L	ASTM D-3651	0.7	ND	Ok
29	Residual Chlorine	mg/L	Lovibond DPD Glycine method	0.2-0.5	ND	Ok
30	Color	TCU	Pt-Co Method	≤15	6.0	Ok
31	Odour	odor	Sensory Evalution	Objectionable Non-objectionable	Non-objectionable	Ok
32	Taste	Taste	Sensory Evalution	Objectionable Non-objectionable	Non-objectionable	Ok

Note :

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Water Analysis Test Report

Report No.	HSE/L/DW/12/18	Date	Tuesday, January 30, 2018
Client Name	NESPAK		
Client Adress	North Side Near School		
Sample Nature	Drinking Water	Quantity Of Sample	1 Liter
Sample Collected By	HSE Services	Sampling Methodology	EPA Sampling Ruels
Date of Sample Collection	25-01--2018	Analysis type	Chemical / Microbiology

S.No	Measuring Parameter	Units	Testing Method	PEQs	Test Results	Remarks
1	pH @ 25 °C	pH	ASTM D-1293	6.5-8.5	7.3	Ok
2	Temperature	oC	APHA 9030 B	.....	13.9	Ok
3	Total Dissolved Solids	TDS (mg/L)	APHA 2540-C	<1000	757	Ok
4	Chloride	mg/L	ASTM D-512	<250	123	Ok
5	Escherichia Coli	E.Coli(count/100ml)	APHA 9222-G	0/100ml	0	Ok
6	Feacal Coliform	F.Coli(count/100ml)	APHA 9222-G	.....	0	Ok
7	Total Coliform	TC(count/100ml)	APHA9222-B	0/100ml	0	Ok
8	Boron	mg/L	Lovibond Azomethine Method	----	1	Ok
9	Total Hardness	T.Hard (mg/L)	ASTM D-1126	<500	150	Ok
10	Cadium	mg/L	ASTM D-3577	0.01	ND	Ok
11	Mercury	mg/L	Kit Method	≤0.001	ND	Ok
12	Arsenic	As^{-3} (mg/L)	Palintest Arsenic Kit	≤0.05	ND	Ok
13	Aliminum	mg/L	ASTM D-857	≤0.2	BDL	Ok
14	Tubidity	NTU	Lovibond Attenuated Radiation Method	<5	2.7	Ok
15	Selenium	mg/L	APHA	0.01	BDL	Ok
16	Chromium	$Cr6^{+}$ (mg/L)	Lovibond 1,5-diphenyl-Carbohydrazide Method	.....	0.85	Ok
17	Copper	Cu^{2+} (mg/L)	Lobond Biquinoline Method	2	BDL	Ok
18	Cyanide	CN (mg/L)	APHA 4500CN	≤0.05	ND	Ok
19	Fluoride	mg/L	Lovibond Spadns Reagent Method	<1.5	0.3	Ok
20	Lead	Pb^{-2} (mg/L)	ASTM D-3559	≤0.05	ND	Ok
21	Manganese	Mn^{-2}(mg/L)	Lovibond PAN Method	≤0.5	0.2	Ok
22	Phenolic Compound	mg/L	ASTM D-1783	....	BDL	Ok
23	Nickel	Ni^{-2} (mg/L)	Lovibond Dimethylglyoxime Method	≤0.02	BDL	Ok
24	Nitrate	$NO3^{-}$(mg/L)	Lovibond chromotropic acid	≤50	BDL	Ok
25	Nitrite	$NO2^{-}$(mg/L)	Lovibond N-(1-naphthyl)-ethylenediamine method	≤3	BDL	Ok
26	Zinc	Zn^{-2} (mg/L)	Lovibond Zincon Method	5.0	0.1	Ok
27	Pesticides	mg/L	APHA	.....	ND	Ok
28	Barium	mg/L	ASTM D-3651	0.7	ND	Ok
29	Residual Chlorine	mg/L	Lovibond DPD Glycine method	0.2-0.5	ND	Ok
30	Color	TCU	Pt-Co Method	≤15	7.0	Ok
31	Odour	odor	Sensory Evalution	Objectionable Non-objectionable	Non-objectionable	Ok
32	Taste	Taste	Sensory Evalution	Objectionable Non-objectionable	Non-objectionable	Ok

Note :
ND=Not Detected.
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Annexure-V
Social Survey Tool

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NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No._____ **Date:** _____

Interviewer: _____ Name of Respondent: _____

S/o: _____ Sex: _____

Mother Tongue: _____ Town/Mohallah: _____

Union Council: _____ Tehsil/District: _____

Age: _____ years Marital Status: _____

Religion: _____ Education: _____

Profession: _____ Caste: _____

Ancestral Occupation: _____ Family Members: _____

Road User Category: _____

1. What is your average monthly income (Rs.)?

1. Up to 13,000 2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

1. Up to 13,000 2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

1. Joint 2. Nuclear

4. What are your major sources of income?

1. Agriculture 2. Livestock 3. Trade /Business
4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

1. Electricity 2. Water Supply 3. Gas
4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

1. Public Water Supply 2. Hand Pumps / Electric Motor
3. Filtration Plant 4. Any other

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. HABITATION

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room					
Animal Shed					
Grain Store					
Tractor Room					
Wash Room					
Kitchen					
Other					

C. AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)

10. What is your agricultural landholding?

1. Productive Land _____ (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.					
2.					
3.					
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.						
2.						
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned					
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions				
2.	Health Institutions				
3.	Religious Place (Mosque / Shrine / Graveyard)				
4.	Recreational Place				
5.	Historical /Archeological Monument				

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project		Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living		Reduction in number of customers	
4.	Value enhancement of the project area		Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues		Enhanced employment opportunities	
3.	Traffic issues/ Movement problems		Value enhancement of the project area	
4.	Safety hazards due to construction		Development of the area and good for people	
5.	Privacy issues		Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	
4.	Implementation of HSE plan should be ensure for a safe working environment	
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	
6.	Local residents should be given priority of jobs	
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	
2.	Provision / up gradation of educational institutions	
3.	Provision / up gradation of medical facilities	
4.	Provision / up gradation of proper waste management system	
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify)	
8.	No response	

Signature of Interviewer

Annexure-VI
Written Feedback of Socioeconomic Survey

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. 1 | Date: 13/1/18

Interviewer: Yasir | Name of Respondent: M. Fajar

S/o: M. Ramzan | Sex: Male

Mother Tongue: Saraiki | Town/Mohallah: Dera M. Ramzan

Union Council: Rama | Tehsil/District: Bahawalpur

Age: 31 years | Marital Status: Married

Religion: Islam | Education: Primary

Profession: Agri. | Caste: Lorah

Ancestral Occupation: _____ | Family Members: 10

Road User Category: _____

1. What is your average monthly income (Rs.)?

   1. Up to 13,000 ✓2. 13,000 to 26,000
   3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

   1. Up to 13,000 ✓2. 13,000 to 26,000
   3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

   ✓1. Joint 2. Nuclear

4. What are your major sources of income?

   ✓1. Agriculture 2. Livestock 3. Trade /Business
   4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

   ✓1. Electricity 2. Water Supply 3. Gas
   4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

   1. Public Water Supply ✓2. Hand Pumps / Electric Motor
   3. Filtration Plant 4. Any other

SAMD CONSULTANTS

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. **HABITATION**

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		6			
Animal Shed					
Grain Store					
Tractor Room					
Wash Room		3			
Kitchen		1			
Other					

C. **AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)**

10. What is your agricultural landholding? father owner

1. Productive Land 80 (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.	Wheat	80			
2.	Cotton	80			
3.	Sugarcane	80			
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.	Cow	4				
2.	Buffalo	3				
3.	Goat	10				

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned	80	80	80		
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G. P. S	0.5 Km
2.	Health Institutions	✓			near 0.5
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Masjid. Mohandi	In house
4.	Recreational Place		✓		
5.	Historical /Archeological Monument		✓		

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. ✓ Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. ✓ No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. ✓ Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living	✓	Reduction in number of customers	
4.	Value enhancement of the project area	✓	Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	
3.	Traffic issues/ Movement problems	✓	Value enhancement of the project area	✓
4.	Safety hazards due to construction	✓	Development of the area and good for people	✓
5.	Privacy issues		Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	✓
4.	Implementation of HSE plan should be ensure for a safe working environment	✓
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	✓
6.	Local residents should be given priority of jobs	✓
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	✓
3.	Provision / up gradation of medical facilities	✓
4.	Provision / up gradation of proper waste management system	
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify) Need way from Industry area having no way of Boundary wall is completed	
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. (2) | Date: 13/1/18
Interviewer: Yasir | Name of Respondent: M. Ramzan
S/o: M. Bukhsh | Sex: Male
Mother Tongue: Seraiki | Town/Mohallah: Dera M. Ramzan
Union Council: Rama | Tehsil/District: Bahawalpur
Age: 72 years | Marital Status: Married
Religion: Islam | Education: Illiterate
Profession: Retired | Caste: Lasah
Ancestral Occupation: | Family Members: 14
Road User Category:

1. What is your average monthly income (Rs.)?

1. Up to 13,000 ✓2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

1. Up to 13,000 ✓2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

✓1. Joint 2. Nuclear

4. What are your major sources of income?

✓1. Agriculture 2. Livestock 3. Trade /Business
4. Labor 5. Service 6. Any other Retired

5. Which of the following facilities are available in your house?

✓1. Electricity ✓2. Water Supply 3. Gas
4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

1. Public Water Supply ✓2. Hand Pumps / Electric Motor
3. Filtration Plant 4. Any other

SAMD CONSULTANTS

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. HABITATION

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		7			
Animal Shed					
Grain Store					
Tractor Room					
Wash Room		2			
Kitchen		1			
Other					

C. AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)

10. What is your agricultural landholding?

1. Productive Land 80 (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.	Wheat	80	3200		1300 P/M
2.	cotton	80	200		31[illegible] P/M
3.	Sugarcane	80	200		180 P/M
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.	Cow	4				
2.	Buffalo	3				
3.	Goat	00				

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned		80	80		
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G.H.S	0.5
2.	Health Institutions	✓		Govt Hospital	0.5
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Mohammadi Masjid	Near by
4.	Recreational Place		✓		
5.	Historical /Archeological Monument		✓		

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living	✓	Reduction in number of customers	
4.	Value enhancement of the project area	✓	Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	✓
3.	Traffic issues/ Movement problems	✓	Value enhancement of the project area	✓
4.	Safety hazards due to construction		Development of the area and good for people	✓
5.	Privacy issues	✓	Easy access to better facilities	✓
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	✓
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	
4.	Implementation of HSE plan should be ensure for a safe working environment	✓
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	
6.	Local residents should be given priority of jobs	✓
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	✓
3.	Provision / up gradation of medical facilities	✓
4.	Provision / up gradation of proper waste management system	✓
5.	Provision / up gradation of drainage system	✓
6.	Provision / up gradation of sewerage system	✓
7.	Any other (please specify) Need way to alternate route by	
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. 3 | Date: 13/1/08

Interviewer: Yasir | Name of Respondent: Jan Muhd

S/o: M. Bakhsh | Sex: Male

Mother Tongue: Saraiki | Town/Mohallah: Dera M. Ramzan

Union Council: Baman | Tehsil/District: Bahawalpur

Age: 55 years | Marital Status: Married

Religion: Islam | Education: Matric Primary

Profession: Labor | Caste: Lark

Ancestral Occupation: _____ | Family Members: 09

Road User Category: _____

1. What is your average monthly income (Rs.)?

   1. Up to 13,000 ✓ 2. 13,000 to 26,000
   3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

   1. Up to 13,000 ✓ 2. 13,000 to 26,000
   3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

   ✓ 1. Joint 2. Nuclear

4. What are your major sources of income?

   ✓ 1. Agriculture 2. Livestock 3. Trade /Business
   4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

   ✓ 1. Electricity 2. Water Supply 3. Gas
   4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

   1. Public Water Supply ✓ 2. Hand Pumps / Electric Motor
   3. Filtration Plant 4. Any other

SAMD CONSULTANTS

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. HABITATION

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		3			
Animal Shed					
Grain Store					
Tractor Room					
Wash Room					
Kitchen					
Other					

C. AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)

10. What is your agricultural landholding?

1. Productive Land 80 (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.	Wheat				
2.	Sugarcane				
3.	Cotton				
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.	Cow	3				
2.	Buffalo	2				
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned		80	80		
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G.P.S	0.5 Km
2.	Health Institutions	✓			0.5 Km
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Mohammadi	Near home
4.	Recreational Place				
5.	Historical /Archeological Monument				

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. ✓ Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. ✓ No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. ✓ Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living		Reduction in number of customers	
4.	Value enhancement of the project area	✓	Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	
3.	Traffic issues/ Movement problems	✓	Value enhancement of the project area	✓
4.	Safety hazards due to construction		Development of the area and good for people	✓
5.	Privacy issues		Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	
4.	Implementation of HSE plan should be ensure for a safe working environment	
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	
6.	Local residents should be given priority of jobs	✓
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	✓
3.	Provision / up gradation of medical facilities	
4.	Provision / up gradation of proper waste management system	
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify) Need Way from Gadap to area	
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. 4 | Date: 13/1/18

Interviewer: Yasir | Name of Respondent: Haji Gul Mohammad

S/o: M. Bakhsh | Sex: Male

Mother Tongue: Shraiki | Town/Mohallah: Dera M. Panjan

Union Council: Rama | Tehsil/District: Bahawalpur

Age: 65 years | Marital Status: Married

Religion: Islam | Education: Illiterate

Profession: Agri | Caste: Lashari

Ancestral Occupation: | Family Members: 07

Road User Category:

1. What is your average monthly income (Rs.)?

1. Up to 13,000 ~~2.~~ 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

1. Up to 13,000 ~~2.~~ 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

~~1.~~ Joint 2. Nuclear

4. What are your major sources of income?

1. Agriculture 2. Livestock 3. Trade /Business
4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

~~1.~~ Electricity 2. Water Supply 3. Gas
4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

1. Public Water Supply 2. Hand Pumps / Electric Motor
3. Filtration Plant 4. Any other

SAMD CONSULTANTS

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. **HABITATION**

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		ody	04		
Animal Shed					
Grain Store					
Tractor Room					
Wash Room					
Kitcher					
Other					

C. **AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)**

10. What is your agricultural landholding?

1. Productive Land 14 (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.	Wheat				
2.	Sugarcane				
3.	Cotton				
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.	Cow	3				
2.	Goat	6				
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned		14	14		
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G.V.School	0.5 Km
2.	Health Institutions	✓		G. Hospital	0.5 Km
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Mohammadi	Near
4.	Recreational Place				
5.	Historical /Archeological Monument				

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. ✓ Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. ✓ No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. ✓ Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities	✓	Dust & noise pollution	
3.	Increase in standard of living		Reduction in number of customers	
4.	Value enhancement of the project area	✓	Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

SAMD CONSULTANTS

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	
3.	Traffic issues/ Movement problems	✓	Value enhancement of the project area	
4.	Safety hazards due to construction	✓	Development of the area and good for people	✓
5.	Privacy issues	✓	Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	✓
3.	Harmful effects on local residents during construction should be minimized	✓
4.	Implementation of HSE plan should be ensure for a safe working environment	
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	✓
6.	Local residents should be given priority of jobs	✓
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	
3.	Provision / up gradation of medical facilities	✓
4.	Provision / up gradation of proper waste management system	✓
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify) Need Long Term Industrial	
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. (5)
Interviewer: Yasir
S/o: M. Munir
Mother Tongue: Saraiki
Union Council: Rome
Age: 24 years
Religion: Islam
Profession: Farm Addi
Ancestral Occupation:
Road User Category:

Date: 13/1/18
Name of Respondent: M. Naseer
Sex: Male
Town/Mohallah: Dera M. Hanif
Tehsil/District: Bahawalpur
Marital Status: Un Married
Education: Primary
Caste: Lashari
Family Members: 09

1. What is your average monthly income (Rs.)?

1. Up to 13,000 ✓2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

1. Up to 13,000 ✓2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

✓1. Joint 2. Nuclear

4. What are your major sources of income?

✓1. Agriculture 2. Livestock 3. Trade /Business
4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

✓1. Electricity 2. Water Supply 3. Gas
4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

1. Public Water Supply ✓2. Hand Pumps / Electric Motor
3. Filtration Plant 4. Any other

SAMD CONSULTANTS

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. HABITATION

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room					
Animal Shed					
Grain Store					
Tractor Room					
Wash Room					
Kitchen					
Other					

C. AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)

10. What is your agricultural landholding?

1. Productive Land 16 (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.	Wheat				
2.	sugarcane				
3.	cotton				
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.						
2.						
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned		16	16		
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G.P.S School	1 km
2.	Health Institutions	✓			1 km
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Mohammadi	Near
4.	Recreational Place				
5.	Historical /Archeological Monument				

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. ✓ Yes 2. ✓ No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. ✓ No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. ✓ Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living	✓	Reduction in number of customers	
4.	Value enhancement of the project area	✓	Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	
3.	Traffic issues/ Movement problems		Value enhancement of the project area	✓
4.	Safety hazards due to construction	✓	Development of the area and good for people	—
5.	Privacy issues		Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	
4.	Implementation of HSE plan should be ensure for a safe working environment	
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	
6.	Local residents should be given priority of jobs	✓
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	—
2.	Provision / up gradation of educational institutions	—
3.	Provision / up gradation of medical facilities	—
4.	Provision / up gradation of proper waste management system	
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify) Need Way from Gadap to Ky	
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. 6 | Date: 13/1/18

Interviewer: Yasir | Name of Respondent: M. Nasees

S/o: Faheer Baksh | Sex: Male

Mother Tongue: Saraiki | Town/Mohallah: Dera M. Rahim

Union Council: Rawa | Tehsil/District: Bahawalpur

Age: 55 years | Marital Status: Married

Religion: Islam | Education: Matric

Profession: Agri | Caste: Lasak

Ancestral Occupation: | Family Members: 06

Road User Category:

1. What is your average monthly income (Rs.)?

1. Up to 13,000 ✓2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

1. Up to 13,000 ✓2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

✓1. Joint 2. Nuclear

4. What are your major sources of income?

✓1. Agriculture 2. Livestock 3. Trade /Business
4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

✓1. Electricity 2. Water Supply 3. Gas
4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

1. Public Water Supply ✓2. Hand Pumps / Electric Motor
3. Filtration Plant 4. Any other

SAMD CONSULTANTS

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. **HABITATION**

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		05	05		
Animal Shed					
Grain Store					
Tractor Room					
Wash Room					
Kitchen					
Other					

C. **AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)**

10. What is your agricultural landholding?

1. Productive Land 20 (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.	Wheat				
2.	Sugarcane				
3.	Cotton				
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.						
2.						
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned		20	20		
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G. P.S	0.5 Km
2.	Health Institutions	✓		G. Hospital	1 Km
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Mosque	1 Km
4.	Recreational Place				
5.	Historical /Archeological Monument				

F. PROJECT INFORMATION

12. Do you know about the proposed project?

✓ 1. Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. ✓ No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living		Reduction in number of customers	
4.	Value enhancement of the project area		Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

SAMD CONSULTANTS

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Lanc Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	✓
3.	Traffic issues/ Movement problems		Value enhancement of the project area	
4.	Safety hazards due to construction		Development of the area and good for people	
5.	Privacy issues		Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	✓
4.	Implementation of HSE plan should be ensure for a safe working environment	
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	
6.	Local residents should be given priority of jobs	✓
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	✓
3.	Provision / up gradation of medical facilities	✓
4.	Provision / up gradation of proper waste management system	
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify) Need way from Underpass	
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. (7) Date: 13/1/13

Interviewer: Yasir Name of Respondent: M. Iqbal

S/o: M. Ramzan Sex: Male

Mother Tongue: Saraiki Town/Mohallah: Dera M. Ramzan

Union Council: Satgara Kama Tehsil/District: Bahawalpur

Age: 27 years Marital Status: Married

Religion: Islam Education: Matriculate

Profession: Asst Caste: Lasani

Ancestral Occupation: Family Members: 05

Road User Category:

1. What is your average monthly income (Rs.)?

1. Up to 13,000 2. 13,000 to 26,000

3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

1. Up to 13,000 2. 13,000 to 26,000

3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

1 Joint 2. Nuclear

4. What are your major sources of income?

1. Agriculture 2. Livestock 3. Trade /Business

4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

1. Electricity 2. Water Supply 3. Gas

4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

1. Public Water Supply 2. Hand Pumps / Electric Motor

3. Filtration Plant 4. Any other

SAMD CONSULTANTS

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. HABITATION

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		03			
Animal Shed					
Grain Store					
Tractor Room					
Wash Room		1			
Kitchen		1			
Other					

C. AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)

10. What is your agricultural landholding?

1. Productive Land 15 (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.	Wheat				
2.	cotton				
3.	Sugarcane				
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.	Cow	2				
2.	Goat	5				
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned			15		
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G.P.S	1 km
2.	Health Institutions	✓		G. Hospital	2 km
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Mohammadi	
4.	Recreational Place				
5.	Historical /Archeological Monument				

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. ✓ Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. ✓ No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. ✓ Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living	✓	Reduction in number of customers	
4.	Value enhancement of the project area		Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	
3.	Traffic issues/ Movement problems	✓	Value enhancement of the project area	✓
4.	Safety hazards due to construction		Development of the area and good for people	✓
5.	Privacy issues		Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	✓
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	✓
4.	Implementation of HSE plan should be ensure for a safe working environment	✓
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	✓
6.	Local residents should be given priority of jobs	✓
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	✓
3.	Provision / up gradation of medical facilities	✓
4.	Provision / up gradation of proper waste management system	✓
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify) Need Jobs for Industrial area	
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. 8
Interviewer: Yasir
S/o: M. Muneer
Mother Tongue: Saraiki
Union Council: Rama
Age: 28 years
Religion: Islam
Profession: Agri
Ancestral Occupation:
Road User Category:

Date: 13/1/18
Name of Respondent: M. Naseer
Sex: Male
Town/Mohallah: Dera M. Rangwan
Tehsil/District: Bahawalpur
Marital Status: Married
Education: Primary
Caste: Lashi
Family Members: 06

1. What is your average monthly income (Rs.)?

1. Up to 13,000 ✓2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

1. Up to 13,000 ✓2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

✓1. Joint 2. Nuclear

4. What are your major sources of income?

✓1. Agriculture 2. Livestock 3. Trade /Business
4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

✓1. Electricity 2. Water Supply 3. Gas
4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

1. Public Water Supply ✓2. Hand Pumps / Electric Motor
3. Filtration Plant 4. Any other

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. **HABITATION**

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		04			
Animal Shed					
Grain Store					
Tractor Room					
Wash Room		1			
Kitchen		1			
Other					

C. **AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)**

10. What is your agricultural landholding?

1. Productive Land 5 (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.	Wheat				
2.	cotton				
3.	Sugarcane				
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.	Cow	2				
2.	Buffalo	1				
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned		5			
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		e.g. B.S.	1 km
2.	Health Institutions	✓		G. Hospital	1 km
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Mohammadi	Near
4.	Recreational Place				
5.	Historical /Archeological Monument				

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living		Reduction in number of customers	
4.	Value enhancement of the project area	✓	Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	
3.	Traffic issues/ Movement problems	✓	Value enhancement of the project area	✓
4.	Safety hazards due to construction		Development of the area and good for people	✓
5.	Privacy issues	✓	Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	✓
4.	Implementation of HSE plan should be ensure for a safe working environment	✓
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	✓
6.	Local residents should be given priority of jobs	
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	✓
3.	Provision / up gradation of medical facilities	✓
4.	Provision / up gradation of proper waste management system	
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	✓
7.	Any other (please specify) Need ways for New Industry area	
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. 9 | Date: 13/1/18

Interviewer: Yasir | Name of Respondent: M. Sajjad

S/o: M. Nawaz | Sex: Male

Mother Tongue: Saraiki | Town/Mohallah: Dera M. Ramzan

Union Council: Rahim | Tehsil/District: Bahawalpur

Age: 18 years | Marital Status: Unmarried

Religion: Islam | Education: Matric

Profession: No | Caste: Lashari

Ancestral Occupation: | Family Members: 06

Road User Category:

1. What is your average monthly income (Rs.)?

1. Up to 13,000 ✓ 2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

1. Up to 13,000 ✓ 2. 13,000 to 26,000
3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

1. ✓ Joint 2. Nuclear

4. What are your major sources of income?

1. ✓ Agriculture 2. Livestock 3. Trade /Business
4. Labor 5. Service 6. Any other No

5. Which of the following facilities are available in your house?

1. ✓ Electricity ✓ 2. Water Supply 3. Gas
4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

1. Public Water Supply ✓ 2. Hand Pumps / Electric Motor
3. Filtration Plant 4. Any other

SAMD CONSULTANTS

7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. **HABITATION**

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		03			
Animal Shed					
Grain Store					
Tractor Room					
Wash Room					
Kitchen					
Other					

C. **AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)**

10. What is your agricultural landholding?

1. Productive Land _____ (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.					
2.					
3.					
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.						
2.						
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned	✓		✓		
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G. School	0.5
2.	Health Institutions	✓		G. Hospital	1 Km
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Muhammadi	Near home
4.	Recreational Place		✓		
5.	Historical /Archeological Monument		✓		

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project	✓	Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living	✓	Reduction in number of customers	
4.	Value enhancement of the project area	✓	Movement problem / Traffic issues	
5.	Infrastructural development of the project area		Increase in cost of living	

SAMD CONSULTANTS

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition	✓	Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	✓
3.	Traffic issues/ Movement problems	✓	Value enhancement of the project area	✓
4.	Safety hazards due to construction		Development of the area and good for people	✓
5.	Privacy issues		Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	
4.	Implementation of HSE plan should be ensure for a safe working environment	✓
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	✓
6.	Local residents should be given priority of jobs	✓
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	✓
3.	Provision / up gradation of medical facilities	✓
4.	Provision / up gradation of proper waste management system	✓
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify)	Need was between Drainage for us because other was was wrong
8.	No response	

Signature of Interviewer

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) LIMITED

EIA of Construction of Bahawalpur Industrial Estate, Bahawalpur

SOCIO-ECONOMIC SURVEY

A. IDENTIFICATION

Sr. No. 10 | Date: 17/11/18

Interviewer: Yasir | Name of Respondent: Dilawer

S/o: Haji Nasir Khan | Sex: Male

Mother Tongue: Saraiki | Town/Mohallah: Asfan Pur Dera Mehar

Union Council: Rona | Tehsil/District: Bahawalpur

Age: 42 years | Marital Status: Married

Religion: Islam | Education: Illiterate

Profession: Live Stock | Caste: Kashmiri

Ancestral Occupation: _____ | Family Members: 06

Road User Category: _____

1. What is your average monthly income (Rs.)?

   1. Up to 13,000 ✓2. 13,000 to 26,000
   3. 26,001-39,000 4. Above 39,000

2. How much are your average monthly expenditures (Rs.)?

   1. Up to 13,000 ✓2. 13,000 to 26,000
   3. 26,001-39,000 4. Above 39,000

3. What is type of your family system?

   ✓1. Joint 2. Nuclear

4. What are your major sources of income?

   1. Agriculture ✓2. Livestock 3. Trade /Business
   4. Labor 5. Service 6. Any other

5. Which of the following facilities are available in your house?

   ✓1. Electricity 2. Water Supply 3. Gas
   4. Telephone 5. Sewerage 6. Solid Waste Management

6. What are the sources of water for your domestic use?

   1. Public Water Supply ✓2. Hand Pumps / Electric Motor
   3. Filtration Plant 4. Any other

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7. What are the reasons of dissatisfaction?

1. Dirty Water 2. Low Pressure

3. Bad Taste 4. Bad Smell in Water

B. HABITATION

8. What is type of ownership of your structure (house / shop)?

1. Self-Owned 2. Rented 3. Encroachers/Squatters

9. What is the nature of construction of your structure?

1. Pacca 2. Semi-pacca 3. Kaccha 4. Kiosk

Type	Pacca No.	Kaccha No.	Pacca & Kaccha	Estimated Value	Year of Construction
Living Room		10			
Animal Shed		2			
Grain Store					
Tractor Room					
Wash Room		1			
Kitcher		1			
Other					

C. AGRICULTURE AND CROPPING PATTERNS (Ask only from farmers)

10. What is your agricultural landholding?

1. Productive Land _____ (Kanals)

2. Barren Land _____ (Kanals)

CROPS

Details about crops

Sr. No.	Crops	Area Sown (Kanals)	Total Production (kg)	Quantity Sold	Price (Rs)
1.					
2.	/				
3.		/		/	
4.					
5.					

LIVESTOCK

Details about Livestock

Sr. No.	Category	Present Strength		Milk Production/day	Milk Sale	
		No.	Value (Rs.)		Kg/day	Rs./day
1.	Goat	15				
2.						
3.						

4.						
5.						

D. FARM AREA AND IRRIGATION STATUS

Details about Farm and Irrigation Status

Ownership Status	Total (Acres)	Canal (Acres)	Tube wells (Acres)	Canal + Tube wells	Any other (Acres)
Area owned	✓	✓			
Area Rented					

E. FACILITIES

11. Which facilities are present in or nearby the proposed project area?

Sr. No.	Facilities	Yes	No	Name	Distance from Proposed Project
1.	Education Institutions	✓		G. School	1 Km
2.	Health Institutions	✓		Ca. Hospital	1 Km
3.	Religious Place (Mosque / Shrine / Graveyard)	✓		Masjid Nawab	1 Km
4.	Recreational Place		✓		
5.	Historical /Archeological Monument		✓		

F. PROJECT INFORMATION

12. Do you know about the proposed project?

1. ✓ Yes 2. No

13. Is your land or any asset being acquired due to the implementation of this proposed project?

1. Yes 2. ✓ No

If yes, please give details _____

_____

_____

14. In your opinion, should this Project be implemented here?

1. ✓ Yes 2. No

Sr. No.	If Yes, then reason	Response	If No, then reason	Response
1.	Good project		Land Acquisition	
2.	Increase in income generating activities		Dust & noise pollution	
3.	Increase in standard of living	✓	Reduction in number of customers	
4.	Value enhancement of the project area	✓	Movement problem / Traffic issues	
5.	Infrastructural development of the project area	✓	Increase in cost of living	

6.	Any other (please specify)		Any other (please specify)	
7.	No response		No response	

15. In your opinion, what will be possible impacts of this project?

Sr. No.	Impacts (During Construction)	Response	Impacts (After Construction)	Response
1.	Land Acquisition		Time saving due to less traffic congestion	
2.	Dust & noise issues	✓	Enhanced employment opportunities	
3.	Traffic issues/ Movement problems	✓	Value enhancement of the project area	✓
4.	Safety hazards due to construction	✓	Development of the area and good for people	✓
5.	Privacy issues		Easy access to better facilities	
6.	Any other		Any other (please specify)	
7.	No response		No response	

16. What protective measures do you suggest to safeguard your interests?

Sr. No.	Protective Measures	Response
1.	Project should complete well in time	
2.	If any private land is acquired then proper compensation should be paid	
3.	Harmful effects on local residents during construction should be minimized	✓
4.	Implementation of HSE plan should be ensure for a safe working environment	✓
5.	Proper diversion plan should be given to avoid traffic problems during construction phase	✓
6.	Local residents should be given priority of jobs	
7.	No response	
8.	Any other (please specify)	

17. In your opinion, what are some pressing needs of this area?

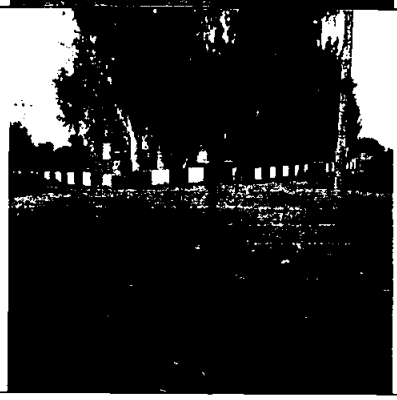
Sr. No.	Pressing Needs	Response
1.	Provision / up gradation of basic facilities (please specify)	✓
2.	Provision / up gradation of educational institutions	✓
3.	Provision / up gradation of medical facilities	✓
4.	Provision / up gradation of proper waste management system	✓
5.	Provision / up gradation of drainage system	
6.	Provision / up gradation of sewerage system	
7.	Any other (please specify) Need Way for Gas Station	
8.	No response	

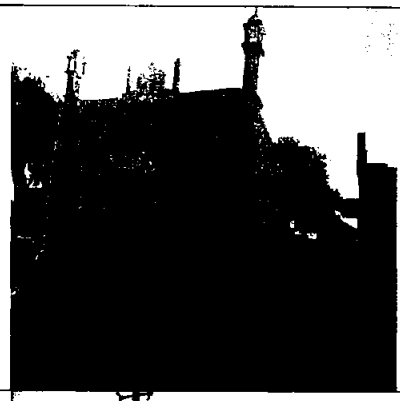
Signature of Interviewer

Annexure-VII
List of Sensitive Receptors

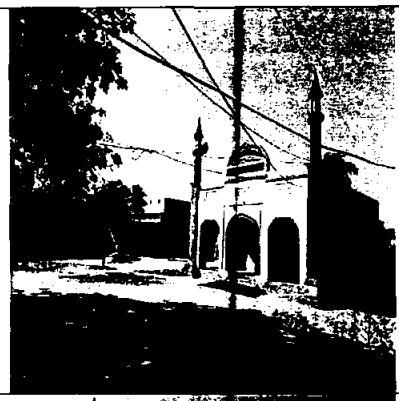
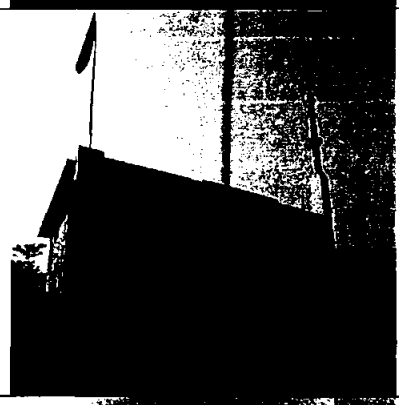
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SENSITIVE RECEPTORS OF CONSTRUCTION OF BAHAWALPUR INDUSTRIAL ESTATE, PUNJAB

Sr. No.	Location	Co-ordinates	Pictorial View
1.	Graveyard Agha Pur	N 29°18'44.7" E 071°34'36.6"	
2.	Ahmad Pur Branch		
3.	BHU Mari Sheikh Shujra	N 29°18'58.1" E 071°34'21.4"	

4.	Muhammadia Mosque (Dera Ramazan)	N 29°19'16.6" E 071°36'03.3"	
5.	Fateh Wah Canal	N 29°18'58.1" E 071°34'21.4"	
6.	Grid Station		
7.	Govt. Girls Primary School (Mari Sheikh Shujra)	N 29°18'58.5" E 071°34'27.3"	

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8.	Noor Masjid (Mari Sheikh Shujra)	N 29°19'02.1" E 071°34'35.8"	
9.	Sangle Wali Pull Village	N 29°19'32.3" E 071°35'29.6"	
10.	Mauza Agha Pur (School Located Inside the Project Site)	N 29°19'22.8" E 071°35'33.2"	

Annexure-VIII
Tree Plantation Plan

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Tree Plantation Plan

As forty five (45) trees are to be removed on account of construction of proposed project, therefore in lieu of these 45 trees, ten (10) times trees i.e. four hundred and fifty (450) will be raised in vacant places and around the perimeter of the industrial estate. Plants are to be grown, keeping the distance from plant to plant as 4 meters and also 4 meters between 2 rows of plants.

It is recommended that 4 to 5 years old plants, grown in the nursery, should be procured for this purpose.

Factors to be considered for tree plantation

Following factors should be considered for tree plantation;

a) Planning

The first three to five years are critical to the success of any plantation. Primary reasons for tree mortality include: a species-site mismatch, poor site preparation, competing vegetation, animal damage, and low seedling quality. Good planning also improves the chances of meeting landowner objectives by making subsequent treatments easier to accomplish. Therefore, planning should commence at least twelve (12) months before the start of planting.

b) Site Inspection

Apart from climate and topography, soil properties (e.g., depth, texture, drainage, and nutrition) are the most important site characteristics to consider. Collectively, these factors dictate the tree species that a given site will support. It is advisable to examine the site for any pre-existing features that could be problematic. These may include plow pans; surface erosion; and changes in hydrologic conditions, such as a water table that is altered after the removal of previous cover, the presence of drainage tiles, blockage of natural drainage, or susceptibility to flooding.

During this site inspection, determine how many pre-planting tasks will be required. For example, it may be necessary to remove any existing vegetation through cultivation or herbicide treatment, or both. Other potential site-specific problems could include: insects and diseases, access control, usage of adjacent land (e.g., complaints of pesticide drift), and herbicide carryover from the last crop that might

injure or kill the trees. Poor site preparation is one of the key reasons for plantation failure.

c) Plantation Plan

The planting plan should include details of all treatments, from initial site preparation to at least three to five years after planting. Following the inspection, the next decision is what trees to plant, a single species or a mixture. Once the species composition is decided, the planting layout must be considered. Depending on how intensively managed the plantation will be, there may be a need for repeated re-entry (for weed control, pruning, pest management, or pre-commercial thinning). If trees are planted in straight rows, the alleys must be wide enough to accommodate equipment for these various silvicultural treatments. If the site is going to be fenced, sufficient room should be left at the ends of the planting rows for equipment to turn around. If trees are spaced randomly, roads or trails may be necessary. Planting density and, therefore, average spacing, will not only affect maneuverability, but will also influence tree quality.

The success of any planting operation depends on the quality of planting stock used. It is essential to locate a nursery that can supply seedlings of a suitable species, seed source, age, size, nutritional status, and Shoot: Root ratio (S: R). It is also important to verify the nursery's storage capabilities, their method of shipping, if seedlings can be delivered on the date(s) specified, and the deadline for placing orders. It might also be useful to determine the possibility for substituting a species or postponing a shipment if there is an unforeseen need to alter or delay implementation of one's planting plan. Planting time is a critical consideration; it is crucial to have sufficient moisture in the soil to ensure seedling survival and rapid early growth.

Types of trees proposed for plantation are given in the Table-1 below:

Sr. No.	Common Name	Scientific Name
1	Alstonia	*Alstonia scholaris*
2	Eucalyptus	*Eucalyptus camaldulensis*
3	Jaman	*Syzygium cumini*
4	Shisham	*Dalbergia sissoo*
5	Sirris	*Albizzia lebbek*
6	Bakain	*Melia azedarach*
7	Pipal (Sacred Fig)	*Ficus religiosa*

Sr. No.	Common Name	Scientific Name
8	Banyan	*Ficus bengalensis*
9	Toot (Mulbery)	*Morus alba*
10	Arjan	*Terminalia arjuna*
11	Moulsary	*Mimusops elengi*
12	Bottle Palm	*Cocos species*
13	Bottle Brush	*Callistemon lanceolatus*
14	Palm	*Cocos species*
15	Ashoka	*Saraca asoca*
16	Conocarpus	*Conocarpus erectus*

Plantation Cost

The cost of raising 450 plants has been estimated as Rs. 353,050/- including price of plants, earthwork, procurement of manures, continued supply of water to young plants throughout the year and its maintenance for five (5) years.

Break-up of expenditure per 1 km length or 280 plants @ Rs. 500/- per diem are given in Table-2 to Table-7 below:

Table 2: Estimated Cost of Plantation for First Year

Sr. No.	Particulars of Work	Quantity	Rate (Rupees)	Amount (Rs.)
1.	Layout	---	2 MD	1000.00
2.	Digging of Pits 2.5 ft. each 2.5x500 =1500 cft.	1500 cft.	10 MD	5000.00
3.	Cost of Plants	450 No.	Rs.100/- plant	45,000.00
4.	Cost of planting of plants	450 No.	Rs. 50/- plant	22,500.00
5.	Carriage of plants from private nursery to site including loading/unloading	450 No.	Rs. 30/- plant	13,500.00
6.	Cost of Manure and Bhall (silt) including carriage	450 plants	Lump-sum	3,000.00
7.	H/watering 50 times 450x50 with water bowser, one driver and one coolie	22,500 no.	5 MD/per 1000	31,500.00
8.	Weeding twice 450x2	900no.	5 MD	2,250.00

Sr. No.	Particulars of Work	Quantity	Rate (Rupees)	Amount (Rs.)
9.	Reopening of Pits twice (450x2)/cft/pit	900 cft.	5 MD	2,250.00
10.	Unforeseen			5000.00
Total				**131,000.00**

Table 3: Estimated Cost of Restocking and Maintenance for 2nd Year

Sr. No.	Particulars of Work	Quantity	Rate (Rupees)	Amount (Rs.)
1.	Cost of Plants 20% Restocking	90 No.	Rs.100/- plant	9,000.00
2.	Cost of planting	90 No.	Rs. 50/- plant	4,500.00
3.	Carriage of plants	90 No.	Rs. 30/- plant	2,700.00
4.	H/watering 50 times with water bowser, one driver and one coolie	22,500 no.	5 MD/per %	31,500.00
5.	Reopening of Pits twice (450x2)	900 cft.	5 MD	2,250.00
6.	Weeding twice 450x2	900 no.	5 MD	2,250.00
7.	Unforeseen			5,000.00
Total				**57,200.00**

Table 4: Estimated Cost of Restocking and Maintenance for 3rd Year

Sr. No.	Item	Quantity	Rate (Rupees)	Amount (Rs.)
1.	Cost of Plants 10% Restocking	45 No.	Rs.100/- plant	4,500.00
2.	Cost of planting	45 No.	Rs. 50/- plant	2,250.00
3.	Carriage of plants	45 No.	Rs. 30/- plant	1,350.00
4.	H/watering 40 times	18,000 no.	5 MD/1000	45,000.00
5.	Reopening of Pits twice (450x2)	900	5 MD	2,250.00

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Sr. No.	Item	Quantity	Rate (Rupees)	Amount (Rs.)
6.	Unforeseen			5,000.00
Total				**60,350.00**

Table 5: Estimated Cost of Maintenance for 4th Year

Sr. No.	Particulars of Work	Quantity	Rate (Rupees)	Amount (Rs.)
1.	H/watering 40 times	18,000 no.	5 MD/1000	45,000.00
2.	Pruning and cleaning of plants	450 no.	5 MD	2,250.00
3.	Unforeseen			5,000.00
Total				**52,250.00**

Table 6: Estimated Cost of Maintenance for 5th Year

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	H/watering 40 times	18,000 no.	5 MD/1000	45,000.00
2.	Pruning and cleaning of plants	450 no.	5 MD	2,250.00
3.	Unforeseen			5,000.00
Total				**52,250.00**

Table 7: Total Plantation Cost (From Table 2 to 6)

Sr. No.	Item	Cost (Rs.)
1.	Total cost for raising 450 plants and Maintenance for 5 years	353,050.00

Cost of raising one plant with five years maintenance: **Rs. 784/-**.

Annexure-IX
Emergency Response Plan

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Emergency Response Plan

1. Introduction

Emergency management can be defined as the organization, coordination and implementation of a range of measures to prevent, mitigate, respond to, overcome and recover from the consequences of emergency events affecting the community, its assets and the environment.

2. Purpose of Plan

This plan intends to provide a framework for safety and security to infrastructure, people and vehicles. It assigns responsibility to organizations and individuals for carrying out specific actions at projected times and places in an emergency situation that exceeds the capability or routine responsibility of any one agency.

The emergency response plan provides guidance to:

- Prevent any potential sources causing hazard to the resources during all stages of the project;
- Coordinate between various organizations to take actions in case of emergencies;
- Protect people and property in emergencies and disasters;
- Develop procedures to respond to the emergencies efficiently;
- Identify and ensure availability of personnel, equipment, facilities, supplies, and other resources for use in order to provide timely and efficient response and recovery operations; and
- Confirm that measures taken in an incident are adequate to recover the affected resources or further improvements are needed.

3. Planning

Emergency Response Team

A group/team shall be dedicated to identify and control potential emergencies during the construction and operation of the project. The roles and responsibilities of the group members shall be clearly defined.

The primary responsibilities of the group are described below:

- Identify the potential hazard or risk sources that can lead to emergency situations; Ensure availability of adequate resources, procedures and communication system to deal with the identified emergency situations;
- Ensure awareness and training of the staff to facilitate implementation of the emergency response plan;
- Maintaining the records of any previous incidents; and
- Post-event analysis to bridge the gaps of the existing risk prevention procedures.
- The emergency response team shall include but not limited to the following;
    1. Team Leader
    2. Safety Engineer

3. Reporting officer/Inspector

Team Leader

- Approve/ modify devised measures to prevent or mitigate the risks associated with the identified risk sources
- Arrange resources for dealing with potential emergencies including, financial, equipment's and personnel required to deal with emergencies.
- Assure that the Emergency Response plan is adequate, effective and can be implemented practically.

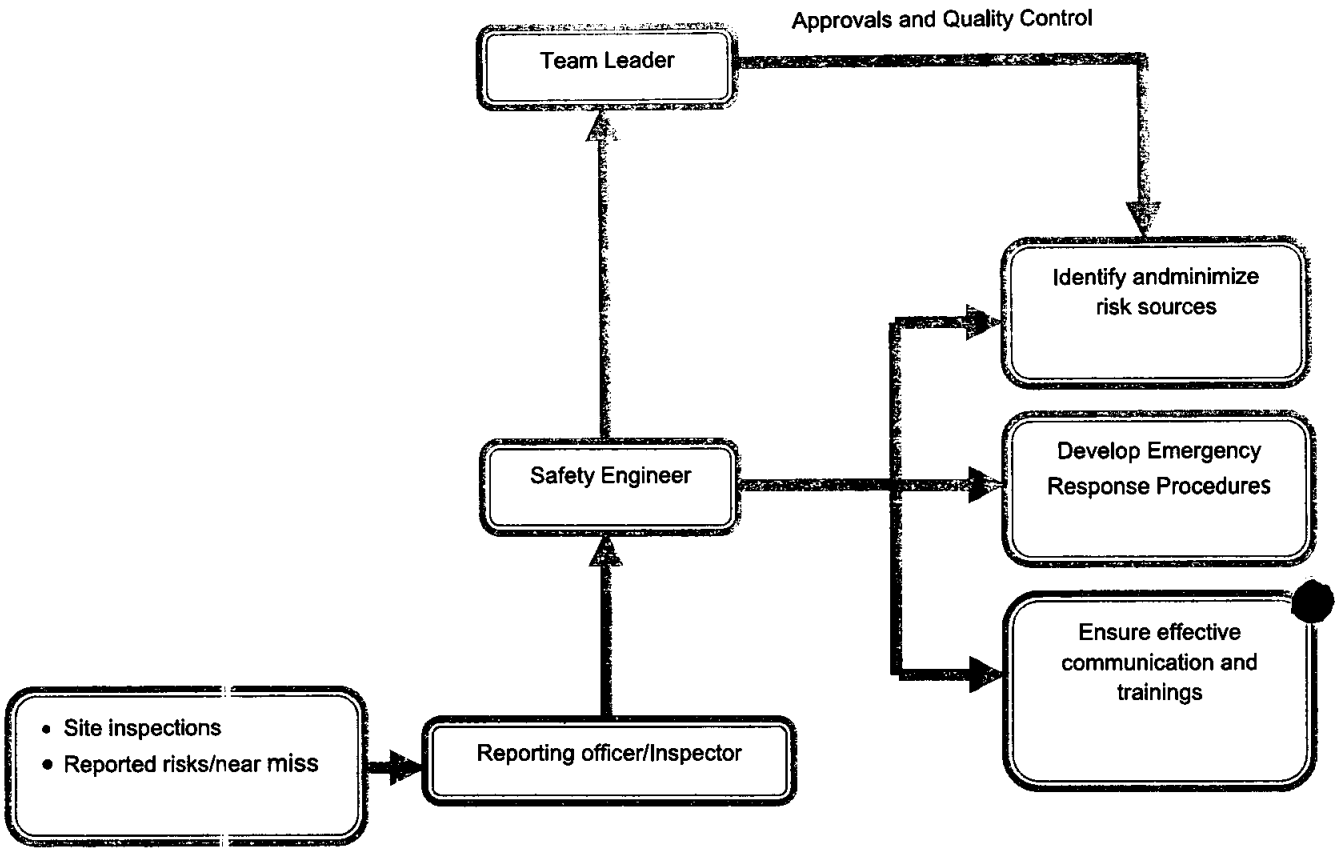
Safety Engineer

- Analyze the Identified risk sources and devise measures to prevent or mitigate the risks in close consultation with the Team Leader;
- Develop and implement the Emergency Response Procedures, in case of the possible emergencies arise;
- Ensure effective internal and external communication; and
- Provide regular trainings and arrange drills to make people aware of dealing with emergencies.

Reporting officer/Inspector

- Regular inspections of the site, to identify potential risks associated with equipment's, materials and work practices;
- Anybody from the site can notify the reporting officer about potential risk and/or near misses on the site;
- Record any identified risks and mitigation measures to control the identified risk; and
- Notify the issue and control measures taken thereby to the safety engineer.

The designation, roles and responsibilities of each member shall be clearly defined and communicated to the employees. An outline of the framework of responsibilities is presented in the following organizational chart:



i. **Hazard Identification**

A comprehensive identification and evaluation of the hazards/risks likely to cause an emergency shall be done by Emergency Response Team (ERT). Major potential emergencies identified in road projects are as follows:

- Structural failure
- Disruption of Utility (Power, Water, Telecommunications, Gas, etc)
- Accidents
- Vehicle accident
- Land slide
- Smoke
- Power/equipment failure or Vandalism
- Fire
- Earthquake
- Terrorism including bombing
- Disease Outbreak

ii. **Prevention and Mitigation**

The ERT shall work to eliminate or reduce the impact of identified emergencies and increasing the resilience of an affected community to recover from the consequences of such events. These activities include:

- Design considerations to control flooding, earthquakes and adequate lightening for fog etc.;
- Regular inspection and maintenance of construction machinery and the structural integrity;
- Review of work schedules based on weather updates; and
- Security controls based on political situations.

4. Emergency Preparedness

The ERT shall be prepared with all necessary resources and the personnel's shall be trained regularly.

i. **Resources**

Finance and administration

The financial resources shall be reserved for dealing with any emergencies arising on site during construction and operation. Responsibilities of the person managing the resources in case of emergencies shall be clearly defined and the required resources shall be adequate and updated regularly.

Equipment's

All the necessary equipment's needed in an event of emergencies shall be made available, as a minimum, the equipment's needed include;

- Personal Protective Equipment's
- Alarms/ Warnings
- Fire extinguishers
- Crowd control, flashlights, signs, barricades
- First Aid Facility
- Detection instruments, e.g.; personal alarm kits; smoke detection instruments
- Tools to fix minor vandalism

Communication

All external and internal communication systems shall be made available. Local emergency numbers shall be clearly posted and communicated to the personnel involved in construction and during operation.

The local emergency numbers are given below, which shall be regularly updated.

Emergency Numbers

Sr. No	Service	Bahawalpur (062)
1	Edhi Center	115
2	Emergency Police	15
3	Bomb Disposal	9255199
4	Rescue	1122
5	Fire Brigade Center	116, 9239027
6	Hospital Civil(casualties)/BVH	0300682866-062-9250411

Trainings

Personnel shall be made aware of the importance of safety, potential emergencies and how to respond in case of emergencies. One day training and mock exercise shall be done to prepare, the personnel to deal with emergencies.

5. Emergency Response

Response includes actions taken to reduce the impacts of an emergency event, and to limit the threat to life, property and the environment.

The emergencies can be dealt with:

- On-Site Management of the situation;
- Off-site coordination to arrange necessary resources to support the on-site management; and
- Providing advice and reports of the situation to stakeholders.

i. Emergency Response Procedure:

Any person can report about an emergency, an on-site worker, an outside agency, or the public. Circumstances change during the course of an emergency in different events, thus, the procedure will vary as per the specific situation on ground. However, a basic action plan to be followed in an emergency is discussed below. This order of response is applicable to almost any emergency and should be followed in sequence.

Assess the situation:

The most important thing to do in case of emergency is to stay calm and avoid panic. Assess the situation, the cause and most immediate requirement to control, limit and/or manage the immediate, ongoing, or further damage.

Immediate control:

The most senior person on the scene should take control and contact, or delegate someone to contact emergency services as posted and communicated by ERT and inform the reporting officer of ERT and explain the situation. The area of emergency shall be restricted by barricades, tapes and adequate signage, if and as required.

Protection from further losses:

i. Once the site is restricted, to provide protection and reduce further losses, the source causing the emergency shall be controlled including equipment's, materials, environment and accident scene from continuing damage or further hazards to the area and people

.e.g.: suppress fire, prevent objects from falling, shut down equipment or utilities, and take other necessary measures as required depending upon the type of emergency;

ii. Provide first aid if required or in doing so;

iii. Designate people to emergency duties. e.g.: assign personnel to guide emergency services on arrival;

iv. Headcount People/personnel to identify any missing persons;

v. People/ personnel shall be directed to safe location;

vi. Arrange diversions for the traffic to reduce disturbance to the flow of traffic, if and as far as possible; and

vii. Preserve the accident scene until experts mark it safe; only disturb what is essential to maintain life or relieve human suffering and prevent immediate or further losses.

ii. Communication:

Emergency service providers:

The emergency service providers 'need to be kept informed of the situation. On site, personnel from the emergency services shall be guided towards the emergency scene, brief about the event, ongoing and potential hazards and cause(s), if known.

Emergency Response Team and Management:

Members of ERT shall be immediately informed and the management shall also be kept informed.

Public:

Timely notifications to public shall be disseminated through electronic and print media depending upon the requirement and urgency of the emergency so that they can adopt alternate routes and avoid the hazards associated with the emergency encountered.

Utilities:

In case of disruption of utilities, the utility control authorities shall be immediately contacted to control the situation.

6. Recovery

Emergency affected individuals, communities and infrastructure shall be restored in terms of emotional, economic, and physical wellbeing including the following as a minimum:

- A detailed analysis and assessment of causes of emergency, extent of damage and gaps if any, in managing the emergency;
- Recovery/replacement of the assets and infrastructure;
- Reinstatement of disrupted services;
- Road and bridge repairs; and
- Updation of safety arrangements and Emergency response procedures to ensure better safety and security in any other arising emergencies.

Annexure-X
Chance Find Procedure

CHANCE FIND PROCEDURES

Project may involve deep excavation. Therefore the possibility of chance find is not ignorable. In case of any chance find, the contractor will immediately report through Supervision Consultant to Directorate General (DG) of Archeological Department, Government of Pakistan to take further suitable action to preserve those antique or sensitive remains. Representative of the DG will visit the site and observed the significance of the antique, artifact and Cultural (religious) properties and significance of the project. The report will be prepared by representative and will be given to the DG. The documentation will be completed and if required suitable action will be taken to preserve those antiques and sensitive remains.

In case any artifact, antiques and sensitive remains are discovered, chance find procedures should be adopted by contractor workers as follows:

- Stop the construction activities in the areas of chance find;
- Delineate the discovered site or area;
- Consult with the local community and provincial Archeological Department
- The suggestion of the local communities and the concerned authorities will be suitably incorporated during taking the preventive measures to conserve the antique, artifact and cultural (religious) properties
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remain, a night guard shall be arranged until the responsible local authorities take over;
- After stopping work, the contractor must immediately report the discovery to the Supervision Engineer.

The contact Address of Archeology Department is given below:

Archeology Department;
Bahawalpur

Annexure-XI
Quarry Management Plan

Quarry Management Plan

1.0 Introduction

After the completion of construction phase of the proposed project, it is the responsibility of the contractor to restore the site that has been disturbed due to construction activities. Punjab Industrial Estates Development and Management Company (PIEDMC has a stewardship responsibility to ensure that the environmental value of the project area is maintained for future generations to appreciate.

2.0 General Quarry Planning and Progressive Rehabilitation

A well-considered quarry development plan prior to starting work, or when opening up new areas will greatly reduce the effort required to achieve appropriate leading practice environmental and safety outcomes for quarry rehabilitation and closure.

The selection of a site, sequencing of quarrying and rehabilitation and final land-use should all be carefully planned prior to commencement of work at a quarry or borrow pit.

2.1 Progressive Rehabilitation

Progressive rehabilitation refers to the rehabilitation of completed parts of a quarry while extractive operations continue in other parts of the quarry. As new quarry sections are opened, worked out areas should be progressively rehabilitated to avoid increasing the total disturbed area of a quarry. Overburden and topsoil can be stripped from areas being opened up and placed directly onto worked out areas which are being rehabilitated. This will avoid double handling of materials and prevent degradation of the topsoil.

Progressive rehabilitation helps to minimize the visual impact of a quarry, control dust and erosion. It also assists in fostering good landowner and community relations.

Recommended progressive rehabilitation practices are:

- Agree on the final land form and use of a site with the relevant landowner.
- Rehabilitate in accordance with the intended final use of the land.

- Plan and develop the quarry in stages towards terminal areas so that progressive rehabilitation works can commence as soon as possible (As shown in **Figure 1**).
- Once the final landform is established, re-vegetate areas to stabilize the landform and to give the vegetation maximum time to establish while the quarry is still in operation.

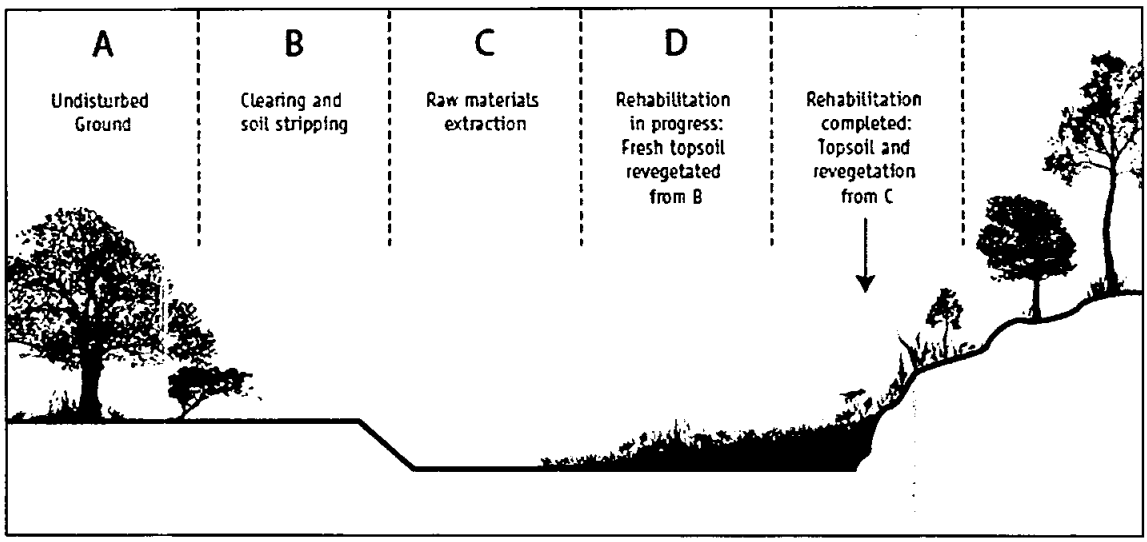


Figure 1: Progressive rehabilitation to manage potential impact on visual amenity

2.2 Re-vegetation

Establishing a self-sustaining cover of vegetation is the best way to stabilize disturbed sites in the long term. Re-vegetation also minimizes the visual impact of quarries. Generally, the vegetation type which existed before the disturbance, or a similar vegetation type will regenerate most successfully.

Prior to the commencement of a quarrying activity the type of re-vegetation should be agreed with the landowner, and should be consistent with the proposed final land-use.

Some indigenous plant species may not thrive in areas where soil conditions are substantially different after quarrying. If this is the case, and the objective is to re-establish vegetation, which fulfils the function of the original native vegetation, then some species from outside the quarry area, may have to be introduced. Care must be taken to avoid introducing a species, which could become an unacceptable fire hazard, invade surrounding areas of native vegetation or become agricultural weeds.

Where agriculture is the planned land-use then the species planted should be those commonly used for pasture or crops known to be successful on soils of similar texture, drainage status, pH and fertility. Suitable legumes should always be considered for their ability to improve soil fertility.

3.0 Rehabilitation of Borrow Pits

Borrow pits are areas either in a road reserve or adjacent land holdings that have been used to extract materials such as gravels and soils. They can vary considerably in size, depending on the quantity of material taken and the borrow pits' reserve body of remaining material. The variable size, shape and nature of borrow pits preclude very specific recommendations; however the following general conditions apply:

- Before extraction commences, licenses and permits should be checked and limits of disturbance and/or clearing must be clearly marked out on the site before any ground disturbing activity takes place; and
- At the completion of extraction, the former borrow pit must be made stable and safe. This usually requires the sides of the pit to be reshaped with gentle safe grades. All disturbed areas associated with borrow pits must be retopsoiled, seeded, fertilized and mulched (if appropriate) as part of the restoration plan. Main Roads has been discouraging the conversion of borrow pits to stock watering points.

Annexure-XII
Construction Waste Management Plan

CONSTRUCTION WASTE MANAGEMENT PLAN

Construction waste material consists mainly of concrete, masonry, limestone, sandstone, metal, and wood, depending on the construction type.

Origins and causes of construction waste:

Origins of Waste	Causes of Waste
Contractual	▪ Errors in contract documents ▪ Contract documents incomplete at commencement of construction
Design	▪ Design changes ▪ Design and detailing complexity ▪ Design and construction detail errors ▪ Unclear/unsuitable specification ▪ Poor coordination and communication (late information, last minute client requirements, slow drawing revision and distribution)
Procurement	▪ Ordering errors (i.e., ordering items not in compliance with specification) ▪ Over allowances (i.e., difficulties to order small quantities) ▪ Supplier errors
Transportation	▪ Damage during transportation ▪ Difficulties for delivery vehicles accessing construction sites ▪ Insufficient protection during unloading ▪ Inefficient methods of unloading
On-site Management and Planning	▪ Lack of on-site waste management plans ▪ Improper planning for required quantities ▪ Delays in passing information on types and sizes of materials and components to be used ▪ Lack of on-site material control ▪ Lack of supervision
Material storage	▪ Inappropriate site storage space leading to damage or deterioration ▪ Improper storing methods ▪ Materials stored far away from point of application
Material handling	▪ Materials supplied in loose form ▪ On-site transportation methods from storage to the point of application ▪ Inadequate material handling
Site operation	▪ Accidents due to negligence ▪ Unused materials and products ▪ Equipment malfunction ▪ Poor craftsmanship ▪ Use of wrong materials resulting in their disposal

Origins of Waste	Causes of Waste
	▪ Time pressure ▪ Poor work ethics
Residual	▪ Waste from application processes (i.e., over preparation of mortar) ▪ Off-cuts from cutting materials to length ▪ Waste from cutting uneconomical shapes ▪ Packaging
Other	▪ Weather ▪ Vandalism ▪ Theft

Construction Waste Management Plan

1) Waste Management Goals:

The Builder has established an opinion that this project shall generate at least 50% less waste into landfills and that processes shall be employed to ensure that this goal is met. These shall include prevention of damage to materials to be incorporated into the work due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing poor quantity estimating, as well as through road design.

2) Responsibility:

a) The Project Manager shall be responsible for the implementation of the administrative portions of this program, including the notification of subcontractor management, the training of the site supervisor and the onsite posting of this plan.

b) The site supervisor will be responsible for the implementation of the onsite portions of this program including the training of subcontractor personnel.

3) Waste Prevention Planning:

a) In addition to other requirements specified herein it is a requirement for the work of this project that the contractor comply with the applicable city waste disposal requirements.

b) Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling where practical and possible.

Waste disposal in landfills or incinerators shall be minimized where practical and possible.

c) Project Construction Documents: The General Contractor will contractually require all subcontractors to comply with these recycling guidelines. A copy of this "Construction Waste Management Plan" will accompany all subcontractor agreements and require subcontractor participation.

d) The "Construction Waste Management Plan" shall be implemented and executed as follows and as on the chart:

   i) Salvageable materials will be diverted from disposal where feasible.

   ii) There will be a designated area on the construction site reserved for materials that can be recycled.

   iii) Areas shall be marked to designate what recycle materials are to be stored there.

   iv) Hazardous waste will be managed by a licensed hazardous waste vendor.

4) Communication & Education Plan:

a) This Waste Management Plan will be posted onsite.

b) Each subcontractor will be made aware of the intent of this project with respect to reduction of waste and recycling. Onsite recycling containers and/or areas will be plainly marked.

c) The subcontractor will be expected to make sure all their crews comply with the Waste Management Plan.

d) All recycling containers/areas will be clearly marked.

e) Lists of acceptable/unacceptable materials will be posted at the site.

f) All subcontractors will be informed in writing of the importance of non-contamination with other materials or trash.

5) Motivation Plan:

a) The General Contractor will conduct a pre-award meeting for subcontractors. Subcontractors under consideration will be required to attend the meeting to review project goals and requirements with the project team. Attendance will be a prerequisite

for award of subcontracts. This document will be an attachment to every subcontract. Copies of the attachment will be posted prominently at the job site.

6) Expected Project Waste, Disposal, and Handling:

The following chart identifies waste materials expected on this project, their expected disposal methods and handling procedures. New items may be added as needed.

Material	Quantity	Disposal Method	Handling Procedure
Land clearing debris		Keep separate for reuse and or wood sale. Suitable materials may be delivered to a composting site. Separate topsoil and rock for future landscaping use.	Keep separated in designated areas onsite.
Clean dimensional wood and palette wood		Keep separate for reuse by on-site construction or by site employees for either heating stoves or reuse in home projects. May be offered to public.	Keep separated in designated areas onsite.
Plywood, OSB, particle board		Reuse onsite when possible, landfill or recycle off site.	Keep separated in designated areas onsite. Place in "Trash" container.
Painted or treated wood		Reuse, off site recycle, landfill.	Keep separated in designated areas onsite. Place in "Trash" container.
Concrete		Recycle when possible.	
Concrete Masonry Units		Keep separate for re-use by on-site construction or by site employees	Keep separated in designated areas onsite
Metals		Recycle off site when possible. Separate copper	Keep separated in designated areas onsite. Place in "Metals"

BAHAWALPUR INDUSTRIAL ESTATE

FINANCIAL HIGHLIGHTS

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BIFERCATION OF AREA AND AVAILABILITY OF PLOTS – UPTO JUNE, 2022

Bahawalpur Industrial Estate

- **Plots wise Detail**

Industrial			
Size	**Total**	**Sold**	**Available**
0.5 Acres	48	-	48
1 Acres	274	-	274
Total	**322**	**-**	**322**

Commercial			
Size	**Total**	**Sold**	**Available**
4.6 Marla	262	-	262
0.5 Marla	1	-	1
Total	**263**	**-**	**263**

- **Area wise Detail**

Area	Total	Sold	Available
Industrial	306.57	-	306.57
Commercial	8.25	-	8.25
Total	**314.82**	**-**	**314.82**

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FIVE (05) YEARS PROJECTED REVENUE PLAN – INDUSTRIAL

Acres to be sold	Rate per acre	Total Reven	Terms of Payment	2022-23				2023-24			
				Q-1	Q-2	Q-3	Q-4	Q-1	Q-2	Q-3	Q-4
50	20	1000	30% advance and remaining in 6 installments of 4 months each	-	-	120.00	166.68	153.36	116.70	116.70	116.70
40	24	960		-	-	-	-	-	144.00	200.02	112.03
40	28	1120		-	-	-	-	-	-	-	168.00
30	32	960		-	-	-	-	-	-	-	-
30	36	1080		-	-	-	-	-	-	-	-
45	40	1800		-	-	-	-	-	-	-	-
71.57	44	3149		-	-	-	-	-	-	-	-
306.57		**10,069**	**Sub Total**	-	-	120.00	166.68	153.36	260.70	316.72	396.73
							286.68				**1,127.51**

2024-25				2025-26				2026-27				Total Inflow
Q-1	Q-2	Q-3	Q-4	Q-1	Q-2	Q-3	Q-4	Q-1	Q-2	Q-3	Q-4	
116.70	70.02	23.34	-	-	-	-	-	-	-	-	-	**1000.20**
112.03	112.03	112.03	112.03	56.02	-	-	-	-	-	-	-	**960.19**
233.35	130.70	130.70	130.70	130.70	130.70	65.35	-	-	-	-	-	**1120.22**
-	288.00	112.03	112.03	112.03	112.03	112.03	112.03	-	-	-	-	**960.19**
-	-	324.00	126.04	126.04	126.04	126.04	126.04	126.04	-	-	-	**1080.22**
-	-	-	540.00	210.06	210.06	210.06	210.06	210.06	210.06	-	-	**1800.36**
-	-	-	-	944.72	367.50	367.50	367.50	367.50	367.50	367.50	-	**3149.71**
462.08	600.76	702.11	1,020.80	1,579.57	946.33	880.98	815.63	703.59	577.56	367.50	-	**10,071.09**
			2,785.75				**4,222.50**				**1,648.65**	

FIVE (05) YEARS PROJECTED REVENUE PLAN – COMMERCIAL

Acres to be sold	Rate per acre	Total Revenue	Terms of Payment	2025-26			
				Q-1	Q-2	Q-3	Q-4
4.00	100	400	30% advance and remainig in	-	120.00	70.00	70.00
4.25	120	510	4 installments 3 months each	-	-	-	-
8.25		**910**	**Sub Total**	-	120.00	70.00	70.00
							260.00

2026-27				2027-28				Total Inflow
Q-1	Q-2	Q-3	Q-4	Q-1	Q-2	Q-3	Q-4	
70.00	70.00	-	-	-	-	-	-	**400.00**
-	153.00	89.25	89.25	89.25	89.25	-	-	**510.00**
70.00	223.00	89.25	89.25	89.25	89.25	-	-	**910.00**
			471.50				**178.50**	

BAHAWALPUR INDUSTRIAL ESTATE FINANCIAL PROJECT DETAIL

DEVELOPMENT COMPONENT	ESTIMATED COST (Rs. Million)	Proposed Financial Expenditure					
		Actual Incurred	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027
INTERNAL ROADS	1.933	67	308	692	400	466	-
CAPITAL COST FOR 11KV FEEDER CONNECTION FROM MEPCO	65	60	-	5	-	-	-
CONSTRUCTION OF 132KV GRID STATION WITH CONSULTANCY AND RESIDENT SUPERVISION	1.000	-	-	71	714	143	71
INTERNAL & EXTERNAL SUI GAS SYSTEM	1.012	892	12	60	48	-	-
APPROACH ROAD. BOUNDARY WALL. GATE OFFICE. ADMIN BUILDING AND PANEL ROOM	330	280	30	20	-	-	-
CONSULTANCY	238	50	80	75	19	10	4
LAND COST	1.192	1.192	-	-	-	-	-
WATER SUPPLY NETWORK	411	-	90	120	130	71	-
SEWERAGE SYSTEM	618	-	135	168	175	140	-
EXTERNAL ELECTRIFICATION	975	-	-	254	593	127	-
CETP	2.000	-	-	200	800	800	200
INFLATION	719	-	65	166	286	175	27
ADMINISTRATIVE EXPENSES	222	59	40	40	40	40	3
MARKETING	133	4	30	30	30	30	9
TOTAL ESTIMATED COST	**10,848**	**2,603**	**790**	**1,902**	**3,236**	**2,002**	**315**

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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 Bahawalpur Industrial Estate are trained as per the training manuals of Multan Electric Supply Company (MEPCO).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.

CONSUMER SERVICE MANUAL:-

As per Regulation 10(1) of S.R.O 446(I)/2022 dated 28-03-2022, "Within ninety days after the date of issuance of the electric power supply license, the licensee shall develop and submit a Consumer Supply Manual to the Authority for approval, provided that the Authority may approve a standard Consumer Supply Manual and other licensees may adopt the same for compliance thereof.

PROPOSED SERVICE TERRITORY:-

Service territory is Bahalwapur Industrial Estate, Bahalwapur for which 483 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 Bahalwapur Industrial Estate, Bahalwapur.

The area consists of the saleable plots of ½ Acre, 1 Acre plots for industrialists units and 4.5Marla plots for commercial purpose. Moreover, proper road network, amenities and other utilities are available in the Bahalwapur Industrial Estate, Bahalwapur for ease of business for the industrialists. Moreover, 1 x 132 KV Grid Station planned within estate to cater the ultimate load of 35MW and provide smooth and reliable power supply to the land owners inside the estate.

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BILLING AND COLLECTION PROCEDURE

➢ Electricity Billing Procedure:-

1. Signed reading sheets received from Electrical Department by 05th of every month.
2. Preparation of Electricity (B-1, B-2, B-3, & 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 precede 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 PIEDMC, 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.

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ABILITY TO ACCESS CONSUMER METERING SYSTEMS AND OTHER SERVICES/EQUIPMENT.

Meter reading of all the consumers of PIEDMC is carries out on a routine basis each month to record the consumption during a given period (billing cycle/billing month). The meter reading is generally taken/recorded by the concerned staff of PIEDMC (Meter Inspector, Meter Reader).For the purpose, the consumers of each sub division into a number of batches and sub-batches. The meter reading program shall be prepared in such a way that the meters of a batch are normally read on the same dates each month.

To ensure the proper billing to consumer of industrial estate, all energy meters will be purchased from the WAPDA approved manufacturers who will ensure the accuracy of these meters. Moreover, the testing and calibration of purchased Energy meters will be performed from concerned DISCO at the cost of consumer before energization/Installation of Energy meters.

Meter readings of all types of connections are as under:

Designation	**Load**	**Type of connection**	**Type of Meter**	**Meter Accuracy Class**
Meter Reader	Upto 50 KW.	Temporary	Whole Current Energy Meter	1
Meter Reader	Upto 25 KW.	Permanent	AMR Meter	0.5
Meter Inspector	Above 25KW to less than 500KW.	Permanent	AMR Meter	0.5
Assistant Manager(O&M)	500KW and Above.	Permanent	AMR Meter	0.2

Taking snapshots of meter readings of all consumer categories is mandatory. Meter readings are taken through mobile snapshots/hand held units to ensure correct readings. The snapshots of meter reading including Net Metering facility wherever applicable showing import and export units are printed on electricity bill. PIEDMC shall make available record of snapshots for twelve months for presenting before concerned DISCOs, NEPRA or any other competent forum if required for settlement of billing dispute, raised by any consumer.

Meter Readers shall also check the irregularities/discrepancies in the metering system at the time of reading meters / taking snapshots and report the same in the reading book/discrepancy book or through any other appropriate method as per the practice. The concerned officer/official will take corrective action to rectify these discrepancies.

PIEDMC install back-up meter on all industrial connections having sanctioned load of 25KW and above on request of the consumer. The cost will be borne by the consumer if meters provided/arrange by PIEDMC on consumer's request. In case of any defect in the billing meter, the back-up meter will be converted into billing meter and the bill shall be charged on the basis of the consumption recorded on the back-up meter. Upon replacement of the impugned meter, the same will be treated as back-up meter.

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PIEDMC will be also adopted GSM Based Energy Meter in their Industrial Estates (Already adopted in Bahawalpur Industrial Estate, Bahawalpur). It reduces human intervention required in keeping track of the total power consumption of the users. An SMS is sent directly to the user indicating the consumption and bill without the need of any individual from the Electricity Department to physically visit the site to note down the readings by the use of GSM module. This automation not only reduces the labor cost but also makes the system more efficient and accurate.

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 Bahawalpur Industrial Estate, Bahawalpur 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.

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

1. ELECTICAL CONNECTIONS

PIEDMC will provide temporary and permanent electrical connections to Resident Industrialists. A temporary electric connection for construction and operation purpose or any other emergent requirement of temporary nature will be given to consumer on first stage. A temporary electric power supply connection for the construction shall be provided by PIEDMC initially for a period of six months which is further extendable on three months basis up to connection of the specific job/project for which the temporary connection was obtained. The sanctioning officer ensured that the temporary connection is utilizing for temporary purpose only. After the construction work has been completed at site, the permanent connection will be given to resident industrialist basis upon their load requirement on different Tariffs as per kind of connection.

2. PREVENTIVE/SCHEDULE MAINTENANCE

To keep the electrical power system in safe, stable and reliable operating condition, it is necessary that the system should be operated and maintained properly to retain its each component in or restore it to a state in which it can perform a required function.

The preventive maintenance carried out in accordance with an established time schedule. Scheduled maintenance covers all measures aimed at retaining the design state of the technical equipment belonging to a system and may take place as and when required or in regular/fixed interval of time. Scheduled maintenance includes such activities as cleaning and washing, conservation, lubrication and where necessary amending or replacing parts subject to wear and tear. Scheduled maintenance also involves preparation of maintenance schedules.

carrying out the specified work and dealing with feedback relating to this work. It is worth mentioning that an effective preventive maintenance program always minimizes emergency maintenance breakdowns and damages of grid station equipment.

3. TROUBLE SHOOTING/NON-SCHEDULED MAINTENANCE

Non-scheduled or corrective or emergency maintenance is often not in accordance with an established time schedule and usually needs as result of malfunction or unexpected defect. Non-scheduled maintenance covers all measures aimed at restoring the designed state of the technical equipment belonging to a system. Repair work and part replacement are typical types of corrective maintenance. It also involves planning, handling requests for performing/checking and evaluating the necessary measures (functional tests etc.). To identify the fault in case of Power Failure, the troubleshooting is done through test instruments and corrective measurements which can be used to help narrow the problem area and identify the problem components. Once the equipment is repaired/replaced, the power is restored.

4. COMPLAINT HANDLING

Compliant in respect of new connections, meter reading and billing, electric supply failures and other matters relating to supply of electric power services has been handled by PIEDMC expeditiously. One window Operations are established in PIEDMC offices wherein all types of complaints are received from the consumers who are given acknowledgement of the same with definite dates for their replies according to time frame for handling and redressal of such complaints. These complaint offices shall work on 24-Hours basis even during holidays. The working of these complaints is to be supervised by higher officers of Electrical Department PIEDMC. The Customer Feeder back is also monitored and their grievances are readdressed as well.

5. ENSURE THE QUALITY POWER SUPPLY AS PER NTDC/NERPRA:-

To provide uninterrupted power supply to customers enabling trade and industry, educational & social activities to flourish and enrich the Consumers, PIEDMC ensured the Standard Quality power supply as per NTDC/NEPRA. The parameters of electricity are maintained as per NTDC/NEPRA permissible limit of Voltage, Frequency and Power Frequency to ensure the quality of power to be supplied.

6. CONSTRUCTION OF OWN GRID STATIONS FOR ENSURING QUALITY POWER SUPPLY

PIEDMC is being constructed own one no's 132KV Grid Stations to cope with the increasing load demand and would provide quality electricity to people with lesser power outages, and reduce line losses as well.

7. ESTABLISHING THE ALTERNATE SOURCE OF POWER:-

PIEDMC is also establishing the alternate source of power through IPP's as a long term and short term solution of Energy Short fall as well and to supply continuous electricity to Industrial Estates, to Increase the industrialization and make the availability of 24hrs electricity.

SCHEDULE-III

RELAVANT FEEDER MAPS NUMBER OF CONSUMERS AND EXPECTED LOAD

Description / Tariff	No. of Consumers	Load (MW)
B3	20	14
B2	60	15
B1	20	1
E-ii	100	2.5
Commercial / Community Facilities	-	2.5
TOTAL		**35**

CONSUMER CLASS/CATEGORY ON THE BASIS OF SANCTIONED LOAD AND VOLTAGE LEVEL.

Connection Category of Consumer	Voltage	Load	Type of Connection	No. of Consumers.
Category 1	230/400V	Up to 50KW	Temporary	100
Category 2	230/400V	Up to 25 kW	Permanent	20
	400V	Above 25 kW but not exceeding 500 kW		60
	11KV	Above 500 kW but not exceeding 5000 kW		20

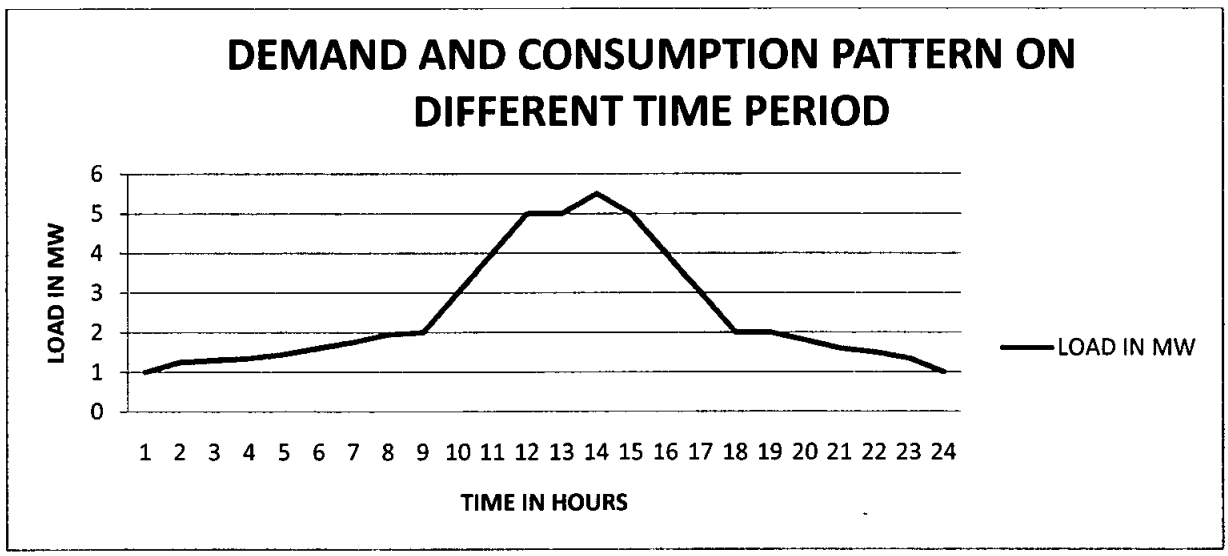
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TARIFF CATEGORIES OF CONSUMER CLASSES TO BE SERVED.

Connection Category of Consumer	Type of Connection	Tariff Category	Load	No. of Consumers.
Category 1	Temporary	E-2	Up to 50KW	100
Category 2	Permanent	B-1	Up to 25 kW	20
		B-2	Above 25 kW but not exceeding 500 kW	60
		B-3	Above 500 kW but not exceeding 5000 kW	20

DEMAND AND CONSUMPTION PATTERN ON DIFFERENT TIME PERIODS:-

Mostly, the industries working hours are 9am to 5pm daily. The Peak load is expected in between 9am to 2pm from Monday to Friday.



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

Procurement of power from IPPs is being considered as a second/cheapest source for the Industrialist Estate through direct connection/wheeling as a long term and short term solution of energy shortfall as well.

Pakistan is currently passing from one of its worst energy crisis. It is very difficult to supply continuous electricity to Industrial Estates, to Increase the industrialization and make the availability of 24hrs electricity. There is a need to add more power in PIEDMC all projects. PIEDMC is aggressively pursuing for adding new power generation capacity for all its projects throughout Punjab province by any PPPs in the affordable cost through wheeling arrangement of NTDCL/ DISCOs. The contract of Power Purchase with PPP's will be regulated as per NEPRA rules and regulations.

12-MONTH PROJECTION ON EXPECTED LOAD, NO. OF CONSUMERS AND EXPECTED SALE OF UNITS FOR EACH CONSUMER CATEGORY.

Month	No. of Consumers	Expected MDI in Kilo-Watt	Expected Unit Consumption.
December-2023	2	50	20134
January-2024	5	1000	78156
February-2024	7	1350	125142
March-2024	12	1825	157856
April-2024	15	2250	258642
May-2024	18	2600	307877
June-2024	20	2750	347865
July-2024	23	3000	406052
August-2024	25	3300	570458
September-2024	28	3650	620470
October-2024	32	5000	1073254
November-2024	35	5700	1261940

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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.
- Cancelation 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

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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.

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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.

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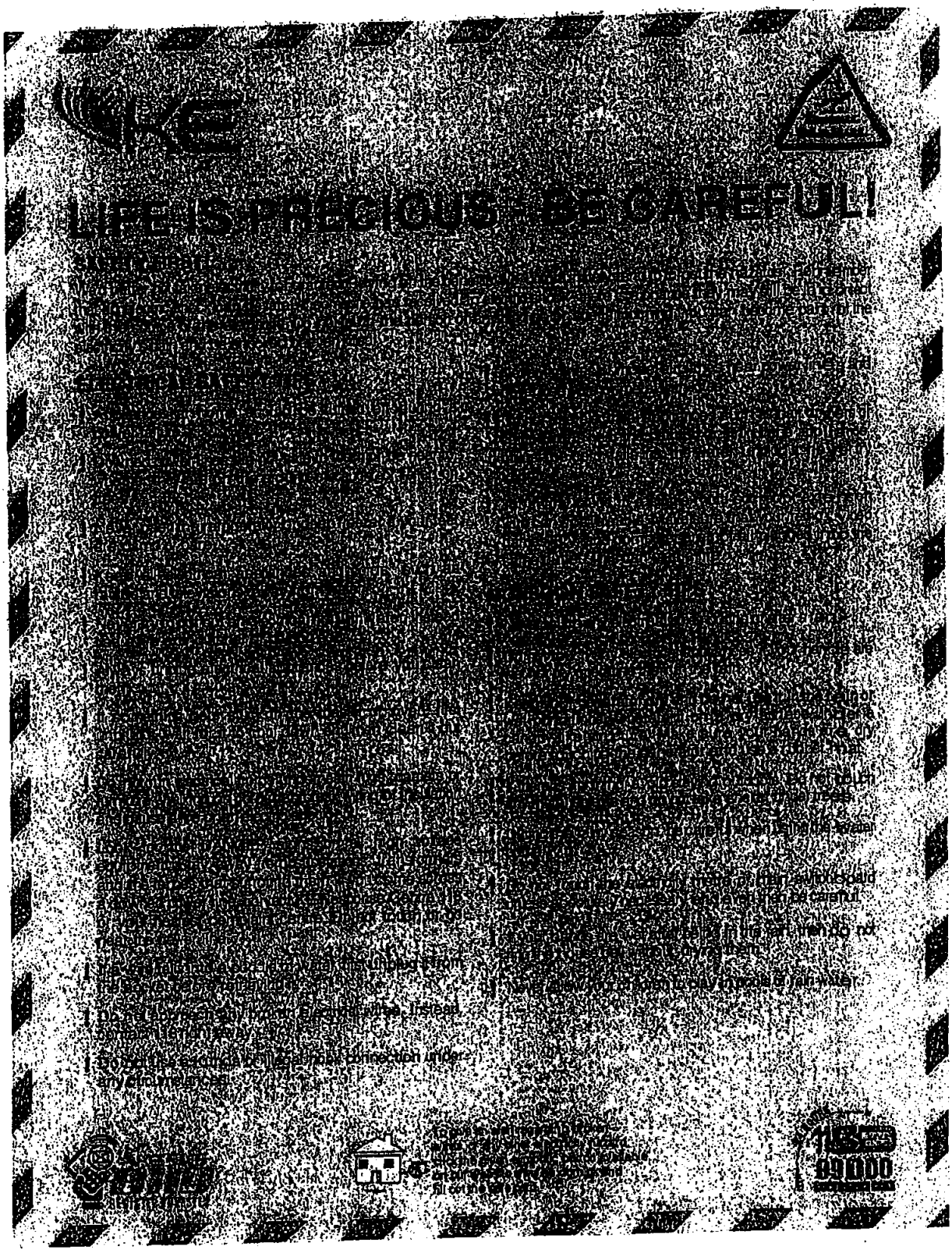
What you need to do during and after the rains/storm:

- 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.

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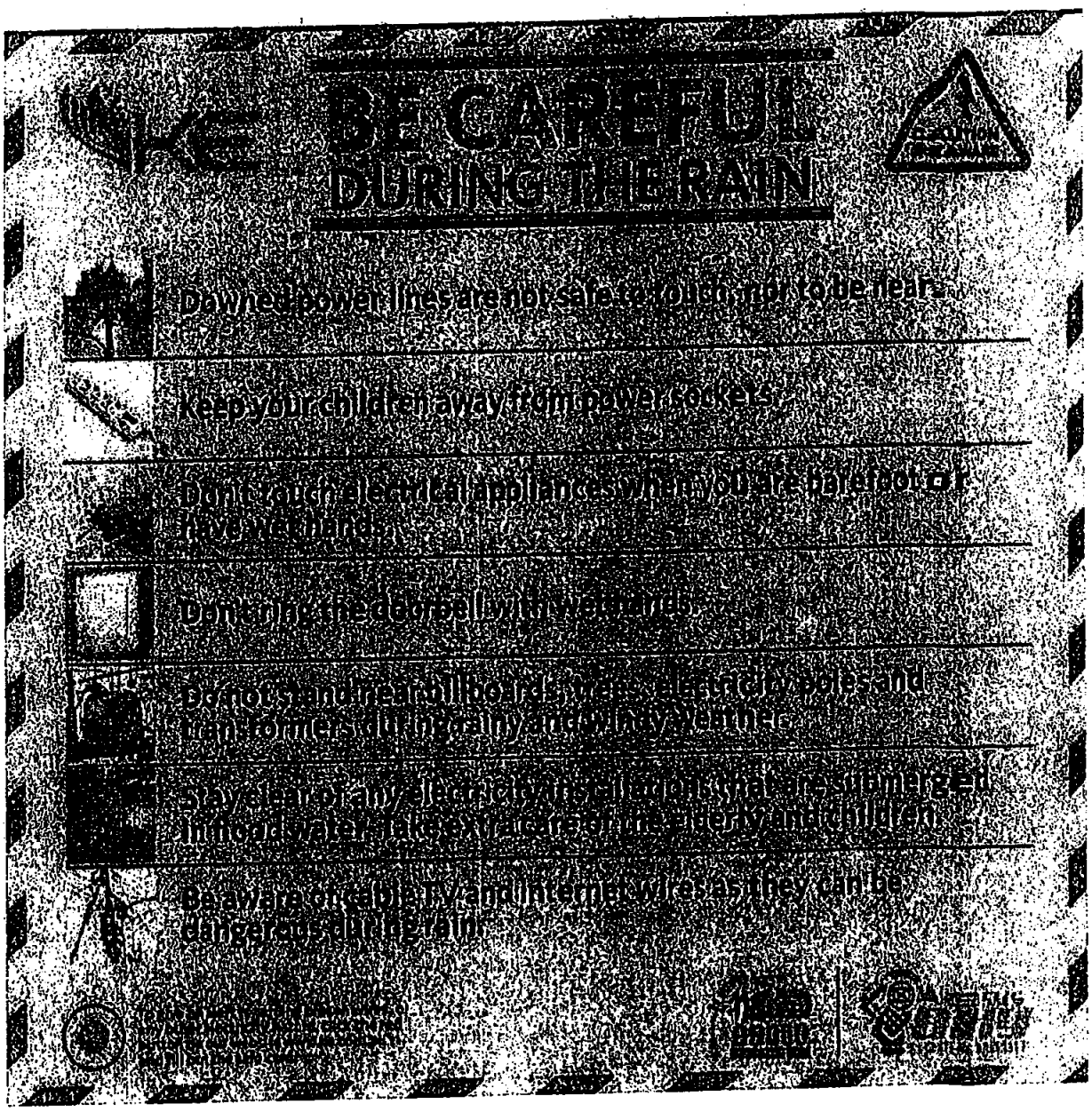
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3. SAFETY LEAFLETS



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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

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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

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- Inspection of Grid Station Equipment
- Weather information
- Interference of animals
- Visitors
- Working of employees of other organizations
- Identification of operating equipment

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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.

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PSC-6.5 **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 if 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

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- Receipt of PTW
- Clearance of PTW
- Cancellation of PTW

For sanction of test & the limited work certificate the following points most 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

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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)
- Insulting 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, conducive shoes, conductive sit (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

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- 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

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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

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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/marking 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

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- 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

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MEPCO ENLIGHTENING LIVES

Tele: 061-9220192
Fax: 061-9220249

Office of the
Chief Executive
MEPCO Ltd, Multan

Memo No. 329-30 /CE(P&E)/DD

Dated: ~~13 JAN 2023~~

[redacted]
Lahore.

Subject:- **ISSUENCE OF DEMAND NOTICE FOR CONSTRUCTION OF 132KV GRID STATION AT BAHAWALPUR INDUSTRIAL ESTATE ALONG WITH ASSOCIATED TRANSMISSION LINE ON COST DEPOSIT BASIS.**

Ref: Your office Memo No. PIE/MEPCO-2835 dated 02.12.2022.

Load flow study conducted by Power Planner Inrernational (PPI), Lahore (consultant of PIEDMC) submitted in the office Director General (MIRAD), MEPCO Ltd Multan was carried out on **65-MW** ultimate load demand.

Reference to your request submitted vide letter under reference it is required to be clarified that in your letter ultimate load demand is written as **50-MW** and initial load demand is written as **25-MW**.

In this regard it is requested to clarify ultimate and initial load demand and accordingly conduct load flow study through private consultant and submit to the office of Director General (MIRAD), MEPCO Ltd Multan for its vetting.

Dy Manger (P&E) 13/1/23
MEPCO Ltd, Multan.

CC..
1. D.G MIRAD, MEPCO H/Q Multan, for information.
2. Concerned file.

SAMD
SAMD CONSULTANTS

MEPCO ENLIGHTENING LIVES

Tele: 061-9220192
Fax: 061-9220249

Office of the
Chief Executive
MEPCO Ltd, Multan

Memo No. 1058-60 /CE(P&E)/DD

Dated: 30 JAN 2023

4253404545

Chief Engineer (Electrical),
PIEDMC, Sundar Industrial Estates,
Lahore.

Subject:- ESTMATE OF COST OF CONSTRUCTION OF 132KV GRIDSTATION IN BAHAWALPUR INDUSTRIAL ESTATE..

Ref: Your office Memo No. PIE/MEPCO/CEO/0154 dated 19.01.2023.

Reference to your letter reffered above it is submitted that for construction of 132kv grid station having 1 x 40MVA power transformer along with associated transmission line (for initial load demand of 25-MW) cost estimate will be prepared after scope of work is finalized by conducting load flow study by Power Planner Inrernational (PPI), Lahore (consultant of PIEDMC).

At the stage tentative cost estimate can not be conveyed utill and unless scope of work is finalized and approved by authority.

It is therefore requested to submit initial and ultimate load demand to the office of Director General (MIRAD), MEPCO Ltd Multan after conducting load flow study, for its vetting and onward submission to this office for according approval of competent authority.

30/1/23

Dy Manger (P&E)
MEPCO Ltd, Multan.

CC..
1. D.G MIRAD, MEPCO H/Q Multan, for information.
2. Chief Engineer (PMU), MEPCO H/Q Multan for information.
3. Concerned file.

GM(Tech)

CE(E)

SAMD CONSULTANTS

PIEDMC	
CEO	
COO	
CFO / CS	
GM (Admin & HR)	
GM (P&C)	
GM (SD)	
GM (Technical)	
GM (Coord)	
GM (SP)	
PD (QABP)	
Diary No. 0475 Init	
Date 01-02-2023	

Engineering Wing
Diary No. 036
Date 01-02-2023

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

December 14, 2023

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

SAMD CONSULTANTS

Head Office: Commercial Area (North) Sundar Industrial Estate, Sundar Raiwind Road, Lahore.
Tel: 042-35297203-6, Fax: 042-35297207, UAN: +92-42-111-743-743
Website: www.pie.com.pk Email: info@pie.com.pk
An Approved Non Profit Organization U/S 2(36)of income Tax Ordinance 2011
ISO 9001:2015

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:-

a. 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.

b. 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)

Company Secretary

ATTESTED TO BE TRUE COPY
PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY
OWNED BY: GOVT. OF PUNJAB
Company Secretary

Chairman

E-STAMP

(1807)

چوہدری ایسوسی ایٹس سٹامپ فروش
انارکلی جاتی عمرہ روڈ لاہور

ID : PB-LHR-7344EE8544AFZDEF
Type : Low Denomination
Amount : Rs 100/-

Scan for online verification

Description : CERTIFICATE OR OTHER DOCUMENT- 19
Applicant : Ali Muazzam Syed (35202-8279686-3)
S/O : Aslam Bahar Syed
Agent : Muhammad Atif Ibrahim (35102 9045080 7)
Address : Lahore
Issue Date : 14-Dec-2023 12:03:36 PM
Delisted On/Validity : 21-Dec-2023
Amount in Words : One Hundred Rupees Only
Reason : NEPRA (Bahawalpur Industrial Estate)
Vendor Information : Asad Hussain | PB-LHR-434 | Sundar Road Mall

SAIFULLAH KHAN KAKAR
NOTARY PUBLIC
ADVOCATE HIGH COURT

نوٹ یہ فرنکشن تاریخ اجرا سے سات دنوں تک کسی بھی قابل استعمال ہے۔ای اسٹامپ کی تصدیق بذریعہ ویب سائٹ ہیوز کیا یا فون نمبر سے کی جا سکتی ہے۔
Type "eStamp <16 digit eStamp Number>" send to 8100

ATTESTED
OATH COMMISSIONER

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 **1,182,134/-** 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 _____ day of December, 2023 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)

SAMD CONSULTANTS

E-STAMP

1806

ID :	PB-LHR-F5F433AD6271DD2E
Type :	Low Denomination
Amount :	Rs 100/-

Scan for online verification

Description :	CERTIFICATE OR OTHER DOCUMENT- 19
Applicant :	Ali Muazzam Syed [35202-8279686-3]
S/O :	Aslam Bahar Syed
Agent :	Muhammad Atif Ibrahim [35102 9045080-7]
Address :	Lahore
Issue Date :	14-Dec-2023 12:02:16 PM
Delisted On/Validity :	21-Dec-2023
Amount in Words :	One Hundred Rupees Only
Reason :	NEPRA (Bahawalpur Industrial Estate)
Vendor Information :	Asad Hussain | PB-LHR-434 | Sundar Road Mall

نوٹ یہ ٹرانزیکشن ناقابل اجرا سے سات دنوں تک کے لیے قابل استعمال ہے۔ای اسٹامپ کی تصدیق بذریعہ ویب سائٹ/ٹیولر کوڈ یا ایس ایم ایس بھی کی جا سکتی ہے۔

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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 and electric power supply license under NEPRA licensing regulation for the following industrial estates:

- Sundar Industrial Estate on September 29, 2022.
- Bhalwal Industrial Estate on June 30, 2022.
- Rahim Yar Khan Industrial Estate on July 29, 2022.
- Quaid-e-Azam Business Park on October 27, 2022.
- Vehari Industrial Estate on June 30, 2022.

The above mentioned applications are still under review by NEPRA.

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 _____ day of December, 2023 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)

SAMD

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

December 14, 2023

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

SAMD CONSULTANTS

Head Office: Commercial Area (North) Sundar Industrial Estate, Sundar Raiwind Road, Lahore.
Tel: 042-35297203-6, Fax: 042-35297207, UAN: +92-42-111-743-743
Website: www.pie.com.pk Email: info@pie.com.pk
An Approved Non Profit Organization U/S 2(36)of income Tax Ordinance 2011

afaq ISO 9001 Quality
ISO 9001:2015

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چوہدری ایسوسی ایٹس اسٹام فروش
اوائل جاتی عمرہ روڈ لاہور

ID : **PB-LHR-7344EE8544AF2DEF**
Type : **Low Denomination**
Amount : **Rs 100/-**

Scan for online verification

Description : CERTIFICATE OR OTHER DOCUMENT- 19
Applicant : Ali Muazzam Syed [35202-8279686-3]
S/O : Aslam Bahar Syed
Agent : Muhammad Atif Ibrahim [35102-9045080-7]
Address : Lahore
Issue Date : 14-Dec-2023 12:03:36 PM
Delisted On/Validity : 21-Dec-2023
Amount in Words : One Hundred Rupees Only
Reason : NEPRA (Bahawalpur Industrial Estate)
Vendor Information : Asad Hussain | PB-LHR-434 | Sundar Road Mall

SAIFULLAH KHAN KHALID
NOTARY PUBLIC
GOVT. OF PUNJAB
ADVOCATE HIGH COURT

نوٹ یہ ٹرانزیکشن تاریخ اجرا سے سات دنوں تک کے لیے قابل استعمال ہے۔ای اسٹامپ کی تصدیق بذریعہ ویب سائٹ،کیوآر کوڈ یا ایس ایم ایس سے کی جا سکتی ہے۔
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ATTESTED
OATH COMMISSIONER

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 **1,182,134/-** 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 _____ day of December, 2023 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)

SAMD CONSULTANTS

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ID : **PB-LHR-F5F433AD6271DD2E**
Type : **Low Denomination**
Amount : **Rs 100/-**

Scan for online verification

Description : CERTIFICATE OR OTHER DOCUMENT- 19
Applicant : Ali Muazzam Syed [35202-8279686-3]
S/O : Aslam Bahar Syed
Agent : Muhammad Atif Ibrahim [35102-9045080-7]
Address : Lahore
Issue Date : 14-Dec-2023 12:02:16 PM
Delisted On/Validity : 21-Dec-2023
Amount in Words : One Hundred Rupees Only
Reason : NEPRA (Bahawalpur Industrial Estate)
Vendor Information : Asad Hussain | PB-LHR-434 | Sundar Road Mall

نوٹ یہہ ٹر انزیکشن تاریخ اجرا سے سات دنوں تک کیے لیے قابل استعمال ہے،ای اسٹامپ کی تصدیق بذریعہ ویب سائٹ،ٹیکسٹ میسج یا ایس ایم ایس کی جا سکتی ہے۔

Type "eStamp <16 digit eStamp Number>" send to 8100

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 and electric power supply license under NEPRA licensing regulation for the following industrial estates:

- Sundar Industrial Estate on September 29, 2022.
- Bhalwal Industrial Estate on June 30, 2022.
- Rahim Yar Khan Industrial Estate on July 29, 2022.
- Quaid-e-Azam Business Park on October 27, 2022.
- Vehari Industrial Estate on June 30, 2022.

The above mentioned applications are still under review by NEPRA.

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 _____ day of December, 2023 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)

SAMD

PIE/BWP/NEPRA-0368
February 20, 2024

To,

Mr. Masroor K
Director, office of 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 BAHAWALPUR INDUSTRIAL ESTATE.**

Reference: *NEPRA letter no. NEPRA/R/LAS-100/280 Dated January 9, 2024, copy attached as annexure- A.*

Dear Sir,

Attach please find PIEDMC response in Tabular form to the comments raised by NEPRA for electric power supply license at Bahawalpur Industrial Estate:

Sr. No.	Objection / Eligibility Criteria	Reply
1	Documents required under Regulation 3: I. Prospectus. II. Certified copies of certificate of incorporation. III. Certified copy of Memorandum & Articles of Association. IV. Feasibility Study.	I. Prospectus as required pursuant to Regulation 3(1) of the regulations has been attached as Annexure 'B' of this Letter. II. Certified copies of certificate of incorporation as required pursuant to Regulation 3(4)(c)(i)(a) of the regulations has been attached in Annexure 'C' of the application. III. Certified copy of Memorandum & Articles of Association as required pursuant to Regulation 3(4)(c)(i)(b) of the regulations has been attached in Annexure 'C' of the application. IV. Feasibility Study as required pursuant to Regulation 3(f) of the regulations has been attached in Annexure 'N' of the application.
3-I-i	The company is registered with the SECP.	PIEDMC is a Section 42 Company registered under the Companies Ordinance 1984. The Companies Ordinance 1984 states in Section 42 sub section (3) that: *The association shall on registration enjoy all the privileges of a limited company and be subject to all its obligations, except those of using the word or words "Limited", "(Private) Limited" or "(Guarantee) Limited", as the case may be, as part of its name.*

		Further, the Companies Act 2017 in Section 42 Sub-section (4) states: *The association on registration under this section shall enjoy all the privileges and be subject to all the obligations of a limited company.* As PIEDMC is registered as a Section 42 Company and is already complying with all the obligations of a corporate entity, it is exempted from this requirement of the Electric Power Supplier Eligibility Criteria.
3-I-ii	Fulfill minimum solvency requirements as provided in Schedule-I to be verified by the Authority, in order to adequately perform its duties and responsibilities under the Act, relevant rules, regulations, commercial code, its supply license and any other legal instruments.	PIEDMC is currently fulfilling two requirements of the minimum solvency criteria namely, the current ratio and the net worth. At the time of incorporation, PIEDMC's authorized capital was Rs. 150 million out of which Rs. 50 million was the paid - up capital. Rs. 50 million was deemed the necessary amount of capital injection required at the time of incorporation after which amounts exceeding this have gone through PIEDMC's accounts which are evident from the audited financial statements attached with the application. Therefore, it is PIEDMC's belief that it is exempt from the requirement of Rs. 150 million paid – up capital clause of the solvency requirements. As for the requirement of the credit rating, PIEDMC is a not-for-profit organization, as evidenced in point 2, which uses its funds to boost the industrialization of the country through its industrial estates. PIEDMC is a wholly owned subsidiary of the Government of Punjab and is working towards the betterment of the industrialists and resultantly the country. As PIEDMC does not operate as a classic public or private listed company, it is our belief that the requirement of credit rating may not be imposed on us in light of the policy of the Government of Pakistan of the Competitive Trading Bilateral Contracts Market (CTBCM), which ensures healthy competition amongst the market participants of the country.
3-I-iii	A strategic business plan for three years duly certified by the chief executive officer or chief financial officer or company secretary, demonstrating its capability to undertake electric power supply business.	Three Years provisional strategic business plan for Bahawalpur Industrial Estate is attached as Annexure-C. However, comprehensive Strategic business plan for three years duly verified by PIEDMC will be submitted to NEPRA in due course of time.

3-I-iv	Fulfill minimum human resource requirements as provided in Schedule-II to meet all of its service-level commitments and to perform the duties and responsibilities of an electric power supplier in an effective and efficient manner and to provide continuous and reliable electric power supply in accordance with the Act, rules and regulations and other legal instruments.	Agreed. As the Bahawalpur Industrial Estate is a new industrial estate and development activities are ongoing, PIEDMC has 1.5MW load sanctioned for the development stage. PIEDMC has sufficient manpower at Bahawalpur Industrial Estate to look after the daily routine electrical works. As soon as the colonization of the Industrial estate will start, PIEDMC will increase the manpower in the estate to cater for the provision of smooth, uninterrupted power supply to the consumers and for Electrical O&M activities round the clock. The same practice is already done in other PIEDMC industrial Estates e.g., Rahim Yar Khan Industrial Estate, Vehari Industrial Estate, Bhalwal Industrial Estate, Sundar Industrial Estate and Quaid-e-Azam Business Park.
3-I-v	Provide an affidavit substantially in the form attached herewith in Schedule-III by its duly authorized officer solemnly declaring and affirming therein that it shall always fulfill the obligations imposed on it under the National Electricity Policy and the National Electricity Plan made under section 14A of the Act.	The affidavit is attached at Annex " D ".
3-I-vi	Have the ability to ensure prompt and effective coordination with the system operator, market operator and relevant distribution licensees to comply with the provisions of the grid code, distribution code, commercial code and other relevant legal instruments as applicable.	PIEDMC has the ability to ensure prompt and effective coordination with the system operator, market operator and relevant distribution licensees to comply with the provisions of the grid code, distribution code, commercial code and other relevant legal instruments as applicable.
3-I-vii-a	Quality of electric power supply service.	PIEDMC will ensure the quality of electric power supply service through: • Single Point power supply from MEPCO. • Dedicated 132kV Grid station inside Bahawalpur Industrial Estate

		• Operation and maintenance of the electrical network by skilled and experienced manpower • Systems for electricity monthly billing &revenue collection • Information exchange system for communication • Complying with the performance standards and codes specified by the Authority • Ensuring timely dissemination of reporting requirements • Maintenance of complete and accurate records and data of its electric power supply business
3-I-vii-b	Transparency of transactions.	PIEDMC will ensure transparency of transactions by: • Ensuring compliance with the relevant accounting and reporting standards as applicable in Pakistan • Sharing the necessary information and data through its website • Reporting all information required by the Authority for monitoring
3-I-vii-c	Collection and deposit of charges, as may be determined by the Authority, in a timely manner.	PIEDMC will ensure the collection and deposit of charges, as may be determined by the Authority, in a timely manner.
3-I-vii-d	Collection and deposit of any and all surcharges as may be imposed by the Federal Government and applicable taxes in a timely and effective manner.	PIEDMC will ensure the collection and deposit of all surcharges as may be imposed by the Federal Government including applicable taxes, in a timely and effective manner.
3-II-i	Information regarding capability to carry out detailed schemes and programs for supplying electric power to all consumers pursuant to the regulations specified by the Authority.	PIEDMC is capable to carry out detailed schemes and programs for supplying electric power to all consumers pursuant to the regulations specified by the Authority through a completely developed Electrical department headed by Chief Engineer and comprising of other electrical staff which is capable in this regard.
3-II-ii	Information regarding budget developed, demonstrating its financial requirements to ensure that it has adequate financial resources available to engage in electric power supply in an effective and efficient manner.	PIEDMC will ensure adequate financial resources to engage in electric power supply business which is also evident from the audited financial statements attached with the application at Annex "D ".

3-II-iii	Information regarding ability to provide electric power supply to the bulk power consumers of other electric power supplier who defaults on its obligation of electric power supply.	PIEDMC has the ability through its electrical distribution network operated and maintained by skilled and experienced manpower to supply power to bulk power consumers of other electric power supplier within its territory.
3-II-iv	Information regarding ability to ensure timely publication of the Authority's approved rates, charges and other terms and conditions on its website.	PIEDMC will ensure the timely publication of the Authority's approved rates, charges and other terms on its website through its dedicated IT / Media department which is well equipped to undertake the timely publications.
3-III-i	At the time of submission of an application, the applicant shall submit a sworn and verified affidavit to the Authority that it fulfills all the requirements of these rules for grant of the license.	The affidavit in this regard will be submitted to the Authority in due course of time, after fulfilling the relevant requirements of these Rules.

The above replies may please be considered for further process on the already submitted application of Electric Power Supply License for Bahawalpur Industrial Estate.

Best Regards

DA/As above:

20/02.

CHIEF ENGINEER ELECTRICAL

Copy to:-

- The Chief Executive Officer, PIEDMC.
- The Director General Licensing, NEPRA.
- The General Manager Technical, PIEDMC.
- The Consultant, M/s SAMD.

Annexure- A

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
ISLAMIC REPUBLIC OF PAKISTAN
NEPRA Tower, Ataturk Avenue (East) G-5/1, Islamabad
Phone: 9206500, Fax: 2600026
Website: www.nepra.org.pk, Email: info@nepra.org.pk

OFFICE OF THE
REGISTRAR

No: NEPRA/R/LAS-100/ 280

January 9, 2024

Mr. Ali Muazzam Syed
Chief Executive Officer
Punjab Industrial Estate Development & Management Company
Commercial Area (North), Sundar Industrial Estate
Raiwind Road, Lahore

Subject: APPLICATION FOR ELECTRIC POWER SUPPLY LICENCE FOR PUNJAB INDUSTRIAL ESTATE DEVELOPMENT & MANAGEMENT COMPANY AT BAHAWALPUR INDUSTRIAL ESTATE, BAHAWALPUR

This is with reference to the subject application submitted by Punjab Industrial Estates Development and Management Company (PIEDMC) vide letter dated 27.12.2023 (received on 29.12.2023). During initial scrutiny of the subject application, it has been noted that following information / documents required under Regulation 3 of NEPRA (Application, Modification, Extension and Cancellation) Procedure Regulations, 2021 ("Regulations") have not been provided by PIEDMC:

I. * Prospectus as required pursuant to Regulation 3(1) of the Regulations. The prospectus is defined at sub-Regulation (1)(j) of Regulation 2 of the Regulations.

II. *Certified copies of certificate of incorporation as required pursuant to Regulation 3(4)(c)(i)(a) of the Regulations.

III. *Certified copy of Memorandum & Article of Association as required pursuant to Regulation 3(4)(c)(i)(b) of the Regulations.

IV. * Feasibility Study, prescribed vide Regulation 3(f) of the Regulations.

(Please note that the information/documents * are essentially required for registration of application)

2. Please note that in accordance with section 23E (2) of the NEPRA Act, Federal Government has to provide eligibility criteria rules for the persons seeking Electric Power Supply Licence from the Authority. In this context Federal Government vide SRO No. SRO 1107(I)-2023 dated 09.09.2023 has notified Eligibility Criteria (Electric Power Supplier Licences) Rules, 2023 (the "Supply Eligibility Criteria Rules").

3. Rule 3 and Rule 6(1) prescribes the following information/documents required to be submitted by the applicant alongwith application for grant of Power Supply Licence:

I. Information/documents required under Rule 3 of Supply Eligibility Criteria Rules:

i. Certificate of Incorporation with SECP

As per proviso of Rule 3(a) of the Rules a generation company as an applicant for the supply licence shall be registered with the SECP exclusively for its generation as well as supply of electric power business and in such case shall maintain separate accounts for its each business

ii. Information regarding Minimum Solvency Requirement as provided in Schedule-I (copy of Schedule-I is enclosed).

P-1/3

iii. Strategic Business Plan for the three years duly certified by CEO or CFO or Company Secretary, demonstrating its capability to undertake electric power supply business.

iv. Minimum Human Resource Requirement as provided in Schedule-II to meet all of its service-level commitments. (copy of Schedule-II is enclosed).

v. An affidavit signed by duly authorized officer in the form as provided in Schedule-III. (copy of Schedule-III is enclosed).

vi. Information regarding ability to ensure prompt and effective coordination with the system operation, market operator and relevant distribution licensees to comply with the provisions of grid code, distribution code, commercial code and other relevant legal instruments as applicable.

vii. Information regarding ability to discharge following public service obligations:

a. Quality of electric power supply service by:

(i) Automated systems of software tools for billing and collection.

(ii) Exchange system for communication and transaction with the system operation, market operator and relevant distribution licensees, and other relevant entities.

(iii) Complying with the performance standards and any codes specified by the Authority for provision of electric power services, particularly, effective and timely billing and collection of charges, customer support services and resolution of consumer complaints

(iv) Ensuring timely dissemination of reporting requirements

(v) Maintaining the complete and accurate records and data in respect of all aspects of electric power supply business. All such records and data shall, unless provided otherwise under the law, be maintained for a period of five years after the creation of such record or data

b. Information regarding transparency of transaction by:

(i) compliance with the accounting standards and uniform system of accounts as specified by the Authority and in addition to that ensure compliance with international financial reporting standards (IFRS) as applicable in Pakistan.

(ii) Sharing the necessary information and data through website or portal as required by any legal instrument

(iii) information required by the Authority for the purpose of monitoring

c. Collection and deposit of following charges, as may be determined by the Authority, in a timely manner, including but not limited to:

(i) Transmission use of system charges

(ii) Distribution use of system charges

(iii) Market and system operator fee

(iv) Any other charges as provided in Rule 5 of Rules

d. Collection and deposit of any and all surcharges as may be imposed by the Federal Government and applicable taxes in a timely and effective manner.

II. Information/documents required under Rule 4 of Supply Eligibility Criteria Rules:

i. Information regarding capability to carry out detailed schemes and programs for supplying electric power to all consumers pursuant to the regulations specified by the Authority.

ii. Information regarding budget developed, demonstrating its financial requirements to ensure that it has adequate financial resources available to engage in electric power supply in an effective and efficient manner.

iii. Information regarding ability to provide electric power supply to the bulk power consumers of other electric power supplier who defaults on its obligations of electric power supply:

Proviso: the applicant shall only provide this service to the bulk power consumers located in its service territory as defined in its distribution licence

iv. Information regarding ability to ensure timely publication of the Authority's approved rates, charges and other terms and conditions on its website

III. Information/documents required under Rule 6 of Supply Eligibility Criteria Rules:

i. At the time of submission of an application, the applicant shall submit a sworn and verified affidavit to the Authority that it fulfills all the requirements of these rules for grant of the licence.

4. It is, therefore, advised to submit the information/documents within 15 working days of receipt of the letter, for processing of the subject application. Please note that the NEPRA Act and all Rules and Regulations made thereunder are available on NEPRA website (i.e. www.nepra.org.pk).

(Masroor Khan) 09/01/
Director

12-3/8

"Annexure-A".

PROSPECTUS

BAHAWALPUR INDUSTRIAL ESTATE (BWP IE)

Punjab Industrial Estates Development and Management Company (PIEDMC) is a company setup under section 42 of the companies' ordinance, 1984 (now companies act, 2017). PIEDMC is an autonomous, not to profit entity owned by the government of Punjab and is run by a Board of Directors (BOD) comprising of private sector industrialists and ex-officio members. PIEDMC has been instrumental in driving the success of industrial development in the province of Punjab.

Bahawalpur Industrial Estate is being developed over 483 acres in Mouza Dera Masti right over National Highway (N-5) about 12 km from center of Bahawalpur City. The strategic location of Bahawalpur Industrial Estate, near major transportation routes, facilitates easy logistics and connectivity. Development works, including electricity and gas are ongoing and would be completed by December 2024.

Main raw material produce of Bahawalpur region is sunflower, cotton, mustard seed and sugarcane. Moreover, this region yields big amount of wool. Hence, Bahawalpur industrial estate will be a good option for industrialists from textile industry including weaving, spinning, processing and printing. Also, wool processing and weaving unit has strong potential in the area. Oil extraction and solvent extraction plants will also be profitable.

PIEDMC is developing the electrical Infrastructure at Bahawalpur Industrial Estate. The total estimated amount is Rs.975 Millions Approximately. The Electrification system is designed by M/s NESPAK firm duly registered with Pakistan Engineering Council & WAPDA. The distribution system will consist of 15 no's of 11kV feeders which is sufficient to cater the ultimate load of Bahawalpur Industrial Estate.PIEDMC will carry out all these financial plans through its own resources which are generated through selling of plots in the industrial estate and O&M charges to be implemented/recovered on actual basis.

Moreover, PIEDMC is constructed its own 132/11KV Grid Station to provide smooth and reliable quality power supply to the consumers inside the estate.The total estimated amount is Rs.01 Billion Approximately. PIEDMC has sufficient resources to develop and maintain Bahawalpur industrial estate and supply uninterrupted and smooth quality power supply to its consumers and undertake O&M activities in a professional way to the satisfaction of its consumers.

PEDMC has applied to NEPRA for the Electric Power Supplier and Distribution Licenses for its Bahawalpur Industrial Estate with a current maximum load of 35MW.

It is expected that when the BWP IE will be fully developed, there will be around 200 consumers in the estate having different load demand and different tariff categories.

Three years Strategic Business Plan(Provisional):-

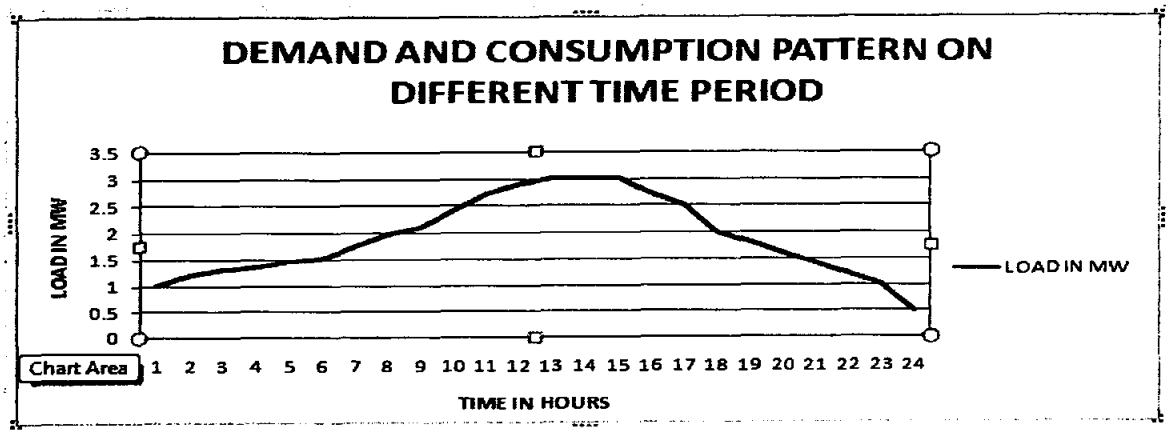
PIEDMC is developing the electrical Infrastructure at Bahawalpur Industrial Estate. The total estimated amount is Rs.975 Millions Approximately. The Electrification system is designed by M/s NESPAK firm duly registered with Pakistan Engineering Council & WAPDA. The distribution system will consist of 15 no's of 11kV feeders which is sufficient to cater the ultimate load of Bahawalpur Industrial Estate, detail is given in Design Report which is attached as Annexure-D.

Moreover, PIEDMC is constructing its own 132/11KV Grid Station to provide smooth and reliable quality power supply to the consumers inside the estate. The total estimated cost is Rs.01 Billion Approximately. PIEDMC has sufficient resources to develop and maintain Bahawalpur industrial estate and supply uninterrupted and smooth quality power supply to its consumers and undertake O&M activities in a professional way to the satisfaction of its consumers.

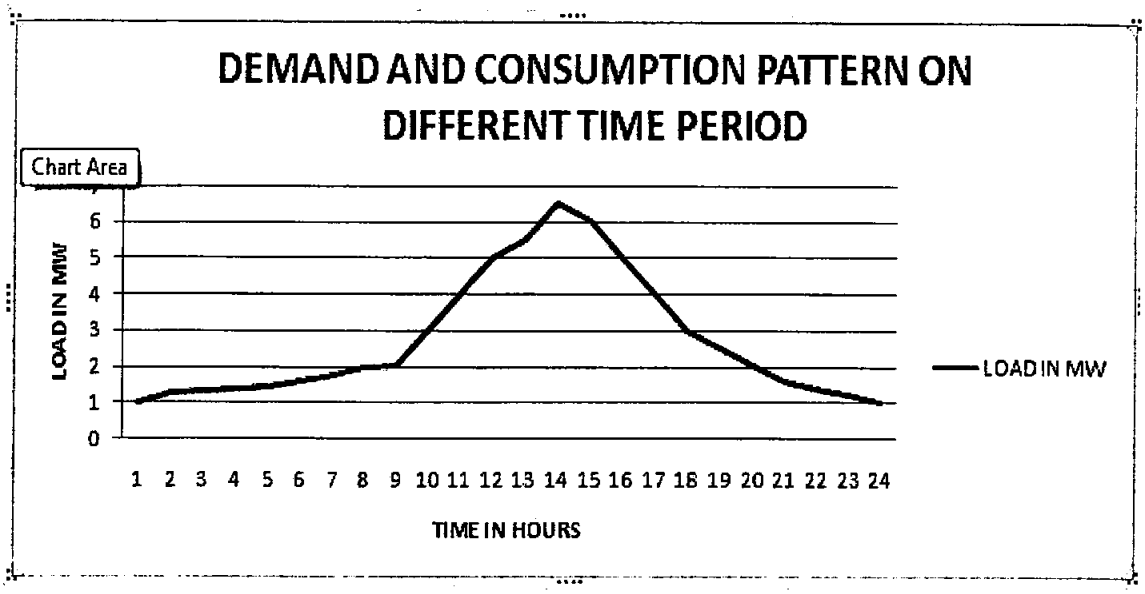
Furthermore, PIEDMC has also plan to purchase power from Independent Power Generators to supply cheapest energy to the consumers. PIEDMC will carry out all these financial plans through its own resources which are generated through selling of plots in the industrial estate and O&M charges to be implemented. The selling price of the plots in fiscal year 2023-24 is 25 Million per Acre. The future plot price will be calculated based on inflation factor at that time.

The anticipated number of consumers in the estate with their load demand for next three years is as fellows.

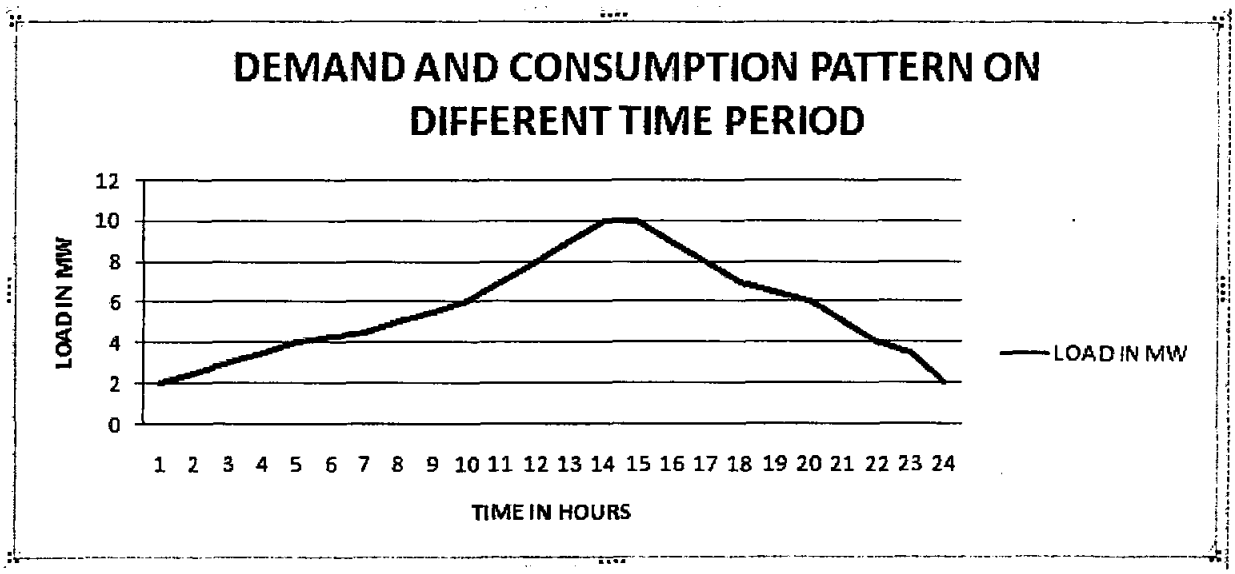
Description / Tariff	No. of Consumers	Year Wise Load in MW 2024-25
B3	1	0.8
B2	6	1.5
B1	4	0.2
E-2	10	0.5
Commercial / Community Facilities	-	
TOTAL	21	3



Description / Tariff	No. of Consumers	Year Wise Load in MW 2025-26
B3	4	3.2
B2	8	2
B1	4	0.2
E-2	20	1
Commercial / Community Facilities	-	0.1
TOTAL	**36**	**6.5**



Description / Tariff	No. of Consumers	Year Wise Load in MW 2026-27
B3	7	4.2
B2	18	4.5
B1	4	0.1
E-2	40	1
Commercial / Community Facilities	-	0.2
TOTAL	**69**	**10**



E-STAMP

چوہدری ایسوسی ایٹس سٹامپ فروش
اڈا مال جاتی عمرہ روڈ لاہور

ID : PB-LHR-491E355D3A507F4A
Type : Low Denomination
Amount : Rs 300/-

Scan for online verification

Description : AFFIDAVIT- 4
Applicant : Ali Muazzam Syed [35202-8279686-3]
S/O : Aslam Bahar Syed
Agent : Self
Address : Lahore
Issue Date : 15-Feb-2024 11:24:41 AM
Delisted On/Validity : 22-Feb-2024
Amount in Words : Three Hundred Rupees Only
Reason : Affidavit For NEPRA
Vendor Information : Asad Hussain | PB-LHR-434 | Sundar Road Mall

نوٹ: یہ ٹرانزیکشن تاریخ اجرا سے سات دنوں تک کے لیے قابل استعمال ہے۔ای اسٹامپ کی تصدیق بذریعہ ویب سائٹ،کیوآر کوڈ یا ایس ایم ایس سے کی جا سکتی ہے۔

Type "eStamp <16 digit eStamp Number>" send to 8100

SAIFULLAH KHALID NOTARY PUBLIC Oath Commissioner ADVOCATE HIGH COURT

ATTESTED
OATH COMMISSIONER
LAHORE

AFFIDAVIT

AFFIDAVIT OF MR. ALI MUAZZAM SYED, CEO OF PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY (PIEDMC)UNDER SCHEDULE - III OF THE ELIGIBILITY CRITERIA (ELECTRIC POWER SUPPLIER LICENSES) RULES, 2023

I, ALI MUAZZAM SYED, Chief Executive Officer being the duly authorized representative of PUNJAB INDUSTRIAL ESTATE DEVELOPMENT AND MANAGEMENT COMPANY, duly authorized in this regard by virtue of Board Resolution No. 134-7 meeting held on dated May 4 2019, hereby solemnly affirm and declare that the Applicant is compliant with and shall always fulfil the obligations imposed on it under the National Electricity Policy and National Electricity Plan made under section 14A of the Act.

Punjab Industrial Estates Development and Management Co. (Govt. of Punjab) PIEDMC CEO

DEPONENT

VERIFICATION:

Verified on oath at Lahore on this the 20 day of February, 2024 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 S

Punjab Industrial Estates Development and Management Co. (Govt. of Punjab) PIEDMC CEO