



**IRRIGATION DEPARTMENT
GOVERNMENT OF BALOCHISTAN**

**PROJECT DESIGN, CONSTRUCTION SUPERVISION AND
IMPLEMENTATION SUPPORT FOR BALOCHISTAN WATER
RESOURCES DEVELOPMENT SECTOR PROJECT
(LOAN 3700-PAK)**



**IEE REPORT
KILI SARDAR AKHTAR (PIS) SUBPROJECT
ZHOB RIVER BASIN**

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A Joint Venture of
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in association with
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ACRONYMS

AB	Acquiring Body
AP	Aggrieved Party
ADB	Asian Development Bank
AJK	Azad Jammu Kashmir
BBISE	Balochistan Board of Intermediate & Secondary Education
BCIAP	Balochistan Community Irrigation and Agriculture Project
BEPA	Balochistan Environmental Protection Agency
BHUs	Basic Health Units
BOD	Biochemical Oxygen Demands
BRSP	Balochistan Rural Support Program
BWRDP	Balochistan Water Resources Development Project
CCR	Community Complaint Register
CDs	Civil Dispensaries
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
DO	Dissolved Oxygen
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPC	Environmental Protection Council
EPI	Expanded Program on Immunization
EPRCP	Environmental Planning and Resource Conservation Project
FOs	Farmer Organizations
GIS	Geographic Information System
GoB	Government of Balochistan
GRC	Grievance Redress Committee
GRM	Grievance Redressal Mechanism
H ₂ S	Hydrogen Sulphide
IEE	Initial Environmental Examination
IFC	International Finance Corporation
EHS	Environment, Health and Safety
IWRM	Integrated Water Resources Management
M&E	Monitoring and Evaluation
MCHC	Maternal & Child Health Center
MCM	Million Cubic Meter
MNCH	National Maternal, Newborn and Child Health
MSDS	Material Safety Data Sheet
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards

NOC	No Objection Certificate
NOx	Oxides of Nitrogen
NTU	Nephelometric Turbidity Unit
PDEIP	Power Distribution Enhancement Investment Project
PEPA	Pakistan Environmental Protection Act
PEPO	Pakistan Environmental Protection Ordinance
PHE	Public Health Engineering Department
PIS	Perennial Irrigation Schemes
PMD	Pakistan Meteorological Department
PPC	Pakistan Penal Code
PPEs	Personal Protection Equipment
PPP	Public Private Partnership
PIU	Project Implementation Unit
BID	Balochistan Irrigation Department
QESCO	Quetta Electric Supply Company
RB	Requiring Body
RCC	Reinforced Cement Concrete
REA	Rapid Environmental Assessment
RHCs	Rural Health Centers
SIEE	Summary Initial Environmental Examination
SMART	Self-Monitoring and Reporting Tools
SOx	Oxides of Sulfur
SPS	Safeguard Policies
TA	Technical Assistance
TCI	Techno Consult International
TDS	Total dissolved solids
TSS	Total Suspended Solids
UNEP	United Nation Environment Program
VOCs	Volatile Organic Compounds
WHO	World Health Organization
WUA	Water User Association

EXECUTIVE SUMMARY

A. INTRODUCTION

1. Balochistan Water Resources Development Sector Project consists of implementation of 11 sub-projects in two potential river basins namely Mula and Zhob in the Balochistan. The Kili Sardar Akhtar Irrigation Subproject is selected as the second sub-project of Zhob River Basin for implementation¹. Detail design of the sub-project has been prepared by the BWRDSP consultants.

2. Killi Sardar Akhtar (PIS) Subproject perennial irrigation subproject is located in Union Council of Laka Bund, tehsil and district Zhob, around 49 km south-east of Zhob city in Gosa Kibzai. Access is through a metaled road initially on Zhob to D.I. Khan road for a distance of 17 kms, then turning to right through link road via Killi Ghurdah Babar by travelling another 32 kms.

3. The proposed intervention for the subproject includes; (a) Construction of infiltration galleries, (b) Construction and rehabilitation of water conveyance system and associated structures. The sub-project is aimed to rehabilitate and improve damaged infrastructure to enhance size of command area having irrigation facility.

4. The broader objective of the Irrigation Projects is aimed at:

- Increasing command area to cultivable command area,
- Sustained water supply to the present command area.

B. LEGISLATIVE FRAMEWORK

5. The proposed project is governed by a host of national and provincial statutes and regulations. Furthermore, as the Asian Development Bank (ADB) is expected to be involved as a donor / financier, its relevant policies and guidelines will also govern the proposed project. Amongst the various rules and statutes, as summarized in Chapter-2 of this IEE Report, the most pertinent from an environmental perspective are as follows:

- National Policy on the Environment;
- National Biodiversity Strategy & Action Plan;
- The Land Acquisition (Balochistan Amendment) Act, 1985;
- National & Provincial Conservation Strategy;
- Pakistan Environmental Protection Act, 1997;
- Balochistan Environmental Protection Act, 2012;
- Pakistan EPA Review of IEE and EIA Regulations, 2000;
- Balochistan Forest Regulation 1890;
- The Balochistan Antiquities Act, 2014;

¹ Asian Development Bank (ADB) Project review mission from 2 to 7 October 2019,

- The Balochistan Wildlife (Protection, Preservation, Conservation and Management) Act, 2014; and
- ADB's Safeguard Policy Statement (2009).

C. DESCRIPTION OF PROJECT

6. The Consultants have proposed the intervention for the subproject based on the field investigations, consultation with the stakeholders, review of feasibility and desk studies. In this regard, following interventions will be carried out: (a) Construction of infiltration galleries, (b) Construction of water conveyance system and associated structures – which relate to the Killi Sardar Akhtar PIS subproject as a whole.

7. Salient features of the Project are shown in below Table A.

Table A: Salient Features of Proposed Kili Sardar Akhtar Sub-project

Type of structure	Infiltration Gallery & Offtake Well
Coordinates	N 3435417.93m, 548553.4m E Zone 42R
Infiltration Gallery (m)	450
Canal (m)	3,300
Time Division Structures (Nr.)	10
Aqueduct (m)	100
Flood Protection Bund (m)	164
Water Storage Tanks (Nr.)	1
Watershed Area (Ha)	22
Available Water (MCM)	3
Design Command Area (Ha)	230
Cost of Infrastructure (Mil. Rs.)	83.49

D. PROJECT ALTERNATIVES

a) No Project Alternative

8. The Project Area is considered as poor from an economic perspective. Subsistence farming is the economic mainstay. In case the proposed project is not implemented, the socio-economic conditions will not change as such. With the increasing population and scarcity of resources, residents are forced to abandon their homes in search of livelihood and grazing grounds for their cattle stock. Over the years, some part of gabion wall has been damaged due to flood flows in the Mula River. The intake structure is damaged and not supplying water to the supply channel. Water availability is scarce in area hence the proposed project will contribute positively to the project area.

b) Subprojects Alternative

9. The following two options were considered at Kili Saradr Akhtar:

- A water intake structure, as head works, with proper flood protection works for canal system and lining the entire water channel to the command area including

drainage structures.

- An infiltration gallery along with lined irrigation channel up to the command area.

10. Table B below provides comparison of alternatives with respect to cost, design and environment for Mula River interventions:

Table B: Comparison of Alternatives

Parameters	Weir	Infiltration Gallery
Cost	Costly	Cheaper
Design	Weir can only be operateable during surface flow of river.	Infiltration gallery can provide water to agricultural field around the year
Perceived Environmental Impacts	Soil erosion, loss of natural vegetation, deployment of external labor force.	Soil erosion, loss of natural vegetation, deployment of external labor force.

E. BASELINE CONDITIONS

i. Physical Environment

11. High mountains surround the project area which lies near Killi Sardar Akhtar area. The terrain is generally flat in the subproject and its command area. It is located in an environment of degraded rangelands. The average altitude of the Killi Sardar Akhtar (PIS) Subproject command area is 1680 m above mean sea level.

12. The sub project site is bounded by mountain ranges as Shinkai Ghar in the North, Mand Ghar in the South, Nar/Tor Ghar in the East and Rakhpur ghar in the West. Regional geological rock Formations in the Project area are Parh Group and Pab Sandstone Formations.

13. The seismic zoning map of Pakistan, indicates that the project area lies in the zone 2B. This zone is liable to MSK VI or less and is classified as the Low Damage Risk Zone. The Medvedev–Sponheuer–Karnik scale, also known as the MSK or MSK-64, is a macro seismic intensity scale used to evaluate the severity of ground shaking on the basis of observed effects in an area of the earthquake occurrence.

14. Mean monthly temperature in June rises to a highest value of 29.4oC and falls to the lowest value of 6.3oC in January. June, July and August are the hottest months in summer season. December, January and February are the coldest months in winter season.

15. The average annual rainfall of the area is about 297.3 mm (11.7 inches), while on the average the maximum monthly rainfall is 66.4 mm during the month of July and a minimum of 5.2 mm in October. During summers wind speeds are generally higher than wind speeds in winters.

16. The soil type is very deep clay. The soil was moderately calcareous. No salinity and sodacity was encountered in soils

17. Ambient air and noise conditions in the Project Area, is generally clean and quiet, because only a few houses were visible in the project areas. There are no industrial setups within the area of influence of the Project Area. Vehicular traffic is absent as well as road infrastructure.

ii. Biological and Natural Environment

18. The proposed project does not interfere with any ecological parameters, however, can be seen as a positive contributor in improving the carrying capacity and overall improvement of the ecosystem.

19. **Flora** of sub-Project area includes Almond, Apple, apricot, grapes, pomegranates, Chinar, Euclayptus, Ber (*Zizyphus nummularia*), Phulai (*Acacia modesta*), Makhi (*Caragana ambigua*), Tamarix sp. And Saccharam sp.

20. **Fauna** includes **Mammals:** Fox (*Vulpes cana*), Asiatic Jackal (*Canis aureus*), Cape hare (*Lepus capensis*), Porcupine (*Hystrix indica*), Afghan Hedgehog (*Hemiechinus auritus megalotis*), etc. **Birds:** Chukar (*Alectoris chukar*), See see partridge (*Ammoperdix griseogularis*), Magpie (*Pica pica*), a number of sparrows, Finches, buntings, seasonal/migratory waterfowls, hawks, and sand grouse etc. **Reptiles:** Afghan Tortoise (*Agriemys horsfieldii*), Brown Cobra (*Naja oxiana*), Goh (*Varanus griseus*), etc. **Amphibians:** Amphibians found in the tract include common frog (*Rana tigrina* and common toad (*Bufo bufo*).

21. **Archaeology and Cultural Heritage:** Sites of importance in regard to cultural heritage are not reported from the specific area of the project.

iii. Demographic and Socio-economic Environment

22. The main tribe living in the sub-project area are Kakarh, Khhosa and Faqirzai. Pushto is spoken as the major language in the area while small number of the people can speak Urdu. The communities belong to Muslim religion group. The main occupation of the people of the project areas are agriculture and livestock rearing. The most of the farmers supplement their income from labor and shop keeping, transporters, private and government jobs etc. For cattle and sheep rearing large tracts of grazing land are still available. In the command area of Killi Sardar Akhtar, in Kharif season, cotton, fodder and a small portion of land for vegetables are being sown while in Rabi season, wheat and fodder was recorded.

23. Houses are mainly constructed of locally available impermanent materials, typically mud or sub-baked bricks fused with baked mud strengthened with chopped straw. These materials make poorer households susceptible to invasion of vermin and seasonally unstable,

needing reconstruction after heavy rainy season. The houses made of impermanent materials, generally do not have border walls.

24. There is no group of people that could be termed as “Indigenous Community”, under the definition of ADB.

25. No resettlement is envisioned, however, land distribution among the tribe members at individual basis of ownership need to be done.

F. ENVIRONMENTAL IMPACTS & MITIGATIONS

26. The project is expected to cause few environmental and social impacts, both positive and negative. Positive impacts due to project interventions are:

- Employment opportunities to some locals for design phase surveys.
- An anticipated positive impact on socio-economic conditions during construction phase is the creation of limited-time employment opportunity for the local population. Since the project interventions will require substantial input from manual labor, even people with relatively lower levels of education or skills could get short term employment.
- A substantial land will be irrigated under the proposed scheme.
- Household income will increase substantially with irrigation improvement measures owing to availability of water for irrigation, crop yields, increase in the number of animals, and availability of other occupational opportunities.
- The Project will positively contribute in improving the carrying capacity of biological environment and overall improvement of the ecosystem.
- Availability of irrigation and agriculture would support livestock growth and in due course of time would enable farmers to diversify in areas of dairy production.
- Availability of water for cultivation of crops will support cropping during Rabi as well as Kharif season over the entire command area. During due course of time, availability of water will support agriculture and other production system and will help in converging into an integrated system wherein all the components of the ecosystem will be producing at their optimal level including the human element.

27. Phase wise negative impacts due to Project interventions are provided below:

Killi Sardar Akhtar Infiltration Galleries (a) Construction of infiltration galleries, (b) Construction of water conveyance system and associated structures)

□ Construction Phase

- **Changes in land use pattern, Cultural conflicts, Influx of external work force, Land degradation due to solid waste disposal of camp site, Workshop facilities will spread oils & chemicals, Soil erosion**

Mitigation: Site for camp site shall be selected keeping in view the cultural norms of the area to avoid undue interference of the Construction contractor's staff with the local residents. Local residents shall be given priority in the employment opportunities generated during construction and operations phase. The land shall be rented for the camp site and equipment yard. No resettlement is envisaged for this purpose.

- **Workshop facilities may spread oils & chemicals**

Mitigation: Proper disposal of used oil and chemical waste in accordance with MSDS shall be ensured. Efficient Use of Chemicals shall be ensured. Good housekeeping practices shall be ensured at workshop areas. Mixing of waste into fresh water sources shall not be allowed.

- **Deterioration of air quality due to machinery & equipment**

Mitigation: Proper engine tuning of machinery/ equipment to meet National Environmental Quality Standards of Pakistan limits. Water should be sprinkled where needed and appropriate, particularly at work sites near the communities.

- **Noise pollution**

Mitigation: Equipment with high levels shall be fitted with noise reduction devices. Regular inspection, maintenance and lubrication of the construction vehicle and equipment shall be performed. Use of PPEs such as ear plugs and ear muffs by the workers shall be ensured.

Vehicles shall have exhaust mufflers (silencers) to minimize noise generation. Nighttime traffic shall be avoided near the communities. Local population shall be taken in confidence if such work is unavoidable.

- **Land degradation due to solid waste disposal of camp site**

Mitigation: Ensure proper disposal of camp site waste at designated landfill/disposal sites. If the project area does not have any disposal site the construction contractor shall use any depression for waste dumping. Prior to dumping the contractor should get the NOC from local authorities for disposal of solid waste. An impervious liner shall be laid to waste sites before the dumping of solid waste. The impervious liner shall be approved by the supervision consultant. After the dumping of solid waste, the depression should be covered by scarified material. Good housekeeping practices within the camp site shall be adopted to minimize waste generation. Disposal of campsite waste near residential colonies or in agricultural fields shall not be allowed

- **Water contamination**

Mitigation: Proper sewage disposal arrangements for camp sites and compliance of NEQS will result in decrease in water pollution. Periodic monitoring as mentioned in EMP, will result in decrease in water pollution.

- **Loss of vegetation**

Mitigation: The construction crew shall be provided with LPG as cooking (and heating, if required) fuel. Use of fuel wood shall not be allowed.

Compensatory tree plantation (five times the trees cut down for construction) should be carried out at appropriate locations within the project area.

- **Health and Safety issues**

Mitigation: Protective fencing to be installed around the Camp to avoid any accidents. Firefighting equipment shall be made available at the camps. The camp staff shall be provided firefighting training. All safety precautions shall be taken to transport, handle and store hazardous substances, such as fuel. Health & safety plan should be prepared by contractor and get it approved by supervision consultant.

Road signage shall be fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic. Project drivers shall be trained on defensive driving. Vehicle speeds near / within the communities shall be kept low, to avoid safety hazard and dust emissions.

Demarcation tapes to be installed around the construction site to avoid any unauthorized entry. Personal protective equipment should be made available at site and the usage of the PPEs should be ensured. Contractor shall prepare and submit a Site-specific EMP (SSEMP), Site Specific Health & Safety Plan (SSHSP) and SOP to manage COVID-19 risks for approval by Supervision consultant

Delay in project execution

Mitigation: community leaders should be carried out to ensure that any social frictions are identified and resolved before they become inflamed. There are safety requirements for construction projects that include control of public access to the site along with regulations aimed at safeguarding workers. Suitable arrangements that conform to national health and safety requirements and also appropriate international best practice will need to be followed. There are specific procedures that need to be observed for the transport, storage and handling of explosives that will be required for the operation of quarries and also underground excavation. It will be necessary to liaise with local communities and initiate and support a public awareness program, particularly targeted at children, about the risks and dangers of large construction sites.

- **Soil erosion and contamination**

Mitigation: Vehicular traffic on unpaved roads shall be avoided as far as possible. Vehicles and equipment shall not be repaired in the field. If unavoidable, impervious sheathing shall be used to avoid soil and water contamination. Water should be sprinkled where needed and appropriate, particularly at work sites near the communities to suppress dispersion of dust.

Material borrowing and disposal plan should be prepared. Cultivation fields should be avoided for borrowing material to the extent possible. Written consent of the land owner should be obtained for material (soil) borrowing. Photographic record (before, during, after) should be kept for the borrow and disposal areas. Leveling of borrow sites

- **Air pollution**

Mitigation: Vehicular traffic on unpaved roads shall be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir shall be minimized. Vehicles shall be kept in good working condition and properly tuned, in order to minimize the exhaust emissions.

Proper engine tuning of machinery/ equipment to meet National Environmental Quality Standards of Pakistan limits. Water should be sprinkled where needed and appropriate, particularly at work sites near the communities.

- **Noise pollution**

Mitigation: Vehicles shall have exhaust mufflers (silencers) to minimize noise generation. Nighttime traffic shall be avoided near the communities. Local population shall be taken in confidence if such work is unavoidable.

Equipment with high levels shall be fitted with noise reduction devices. Regular inspection, maintenance and lubrication of the construction vehicle and equipment shall be performed. Use of PPEs such as ear plugs and ear muffs by the workers shall be ensured. Avoid night time activity.

- **Damage to infrastructure**

Mitigation: All damaged infrastructure shall be restored to original or better condition.

- **Site overburden**

Mitigation: Wind direction shall be considered while selecting sites for stock piles. Stockpiles of overburden shall be kept covered where possible. Ensure proper disposal of construction waste at designated landfill/disposal sites. If the project area does not have any disposal site the construction contractor shall use any depression for waste dumping. Prior to dumping the contractor should get the NOC from local authorities for disposal of solid waste. Proper disposal of waste material. Demarcate the waste site and provide details of land use. Finally take approval from supervision consultant. An impervious liner shall be laid to waste sites before the dumping of solid waste. The impervious liner shall be approved by the supervision consultant. After the dumping of solid waste, the depression should be covered by scarified material Dismantled asphalt pavement shall be dumped to the waste site.

- **Borrow pit management**

Mitigation: As far as possible wasteland or natural areas with a high elevation will be demarcated for borrowing earth material. Where the use of agriculture land

is unavoidable, the top 300 mm of the plough layer will be stripped and stockpiled for redressing the land after the required borrow material has been removed. Where deep ditching is to be carried out, the top 1 m layer of ditching area will be stripped and stockpiled. The ditch will initially fill with scrap material from construction and then leveled with the stockpiled topsoil. Ditches or borrow pits that cannot be fully rehabilitated will be landscaped to minimize the erosion and to avoid creating hazards for people and livestock. Land owners will be compensated according to the terms of lease agreement negotiated with the land owners, and restoration action agreed upon by the contractor will be duly carried out.

- **Sites of Historical, Cultural, Archeological or Religious Significance**

Mitigation: Proponent shall ensure that the construction contractor staff is educated about the location and importance of the cultural sites that exist in the Project area. The contractor shall ensure that these sites are not affected by the construction related activities including movement of the project vehicles and obtaining borrow material for construction. These aspects will be included in the trainings to be conducted for the contractor's staff. In case of chance find of any sites or artifacts of historical, cultural, archeological or religious significance, contractor shall ensure that the work is stopped at that site, the provincial and federal archeological departments are notified immediately, and their advice is sought before resumption of the construction activities at such sites. Graveyards shall not be disturbed during the construction activities including movement of the project vehicles and obtaining borrow material for construction.

- **Operation & Maintenance Phase**

- **Social issues and System sustainability**

Mitigation: Agreements between different communities/tribes. Perennial irrigation schemes may function smoothly in normal conditions and circumstances but do face problems during extraordinary situations, i.e. when flow is higher or lower than normal.

Ensure community participation in management and operation of the irrigation system. Training of community.

- **Health issues**

Mitigation: Proper treatment system shall be provided. Water quality will be tested as per WHO/ GOP standards to ensure the integrity of the water supply system. Turbidity and free residual chlorine tests shall be regularly performed. Arsenic will be tested as per WHO standards.

- **Solid waste generation**

Mitigation: Ensure proper disposal of waste at designated landfill/disposal sites.

- **Loss of pastoral lands**

Mitigation: Stall feeding practices for livestock, so that remaining pastoral lands are available for wild animals.

- **Conservation issues**

Mitigation: Design has already provided cattle drinking structures at different intervals and pedestrian bridge for canal crossing approximately at 500 m interval. It will be the responsibility of BID to ensure the proper maintenance of aforementioned structures. By adopting the aforementioned measures, the impact would be finally of low significance.

- **Banned fertilizer & pesticides will cause health issues, Contamination of fresh water through surface runoff**

Mitigation: Concerted efforts by the department of agriculture to disseminate information regarding sustainable use of fertilizers will help in keeping the use at an optimal level; Ammonium Nitrate (AN) and Calcium Ammonium Nitrate (CAN) fertilizers will not be allowed; and Use of restricted pesticides identified by WHO shall not be allowed. The list of restricted pesticides is attached as **Annexure 15** of this report

- **Risk due to Natural Hazard i.e. flooding and earthquakes (System sustainability) Mitigation:** Emergency Response Plan for Infiltration Gallery will be followed which is attached as **Annexure – 12** of this report.

G. ENVIRONMENTAL MANAGEMENT PLAN

28. The EMP sets out mitigation actions, monitoring actions, responsibilities, and schedules for impact mitigation and monitoring. Environmental monitoring has to be undertaken during both the construction and operational phases to ensure the effectiveness of the proposed mitigation measures.

29. EMP also provides its implementation mechanism during construction and operational phases

- **Implementation during Construction Phase:** The executing agency for this Project is Balochistan Irrigation Department (BID) having core implementation responsibility. The immediate requirement considering the existing institutional setup of EA (BID) is the establishment of Environmental & Social Management and Monitoring Cell (ESMMC). The ESMMC will overall monitor the environment related activities of Supervision Consultant and Construction Contractor and report to EPA-Balochistan regarding implementation status of EMP. Construction Contractor will be in direct coordination with Supervision Consultant through its HSE Department. Contractor's HSE Department is highly recommended to be on-board before mobilization.

- **Implementation during O&M:** The key players involved during operation of the proposed project are the ESMMC of EA (BID), District Environmental Officers of Zhob, Water User Associations (WUA) & Farmer Organizations (FOs) Chairman and Vice Chairman. ESMMC will get input from WUA and FOs, randomly check the project operation in context of EMP and report to BEPA annually.

30. The EMP is prepared taking into account environmental consequences of the proposed action. Mitigation measures are suggested in Environmental Mitigation Plan at different stages of activities with performance indicators to mitigate the potential impacts. Environmental Monitoring Plan has also been prepared as a part of EMP which details about monitoring mechanism of a specific receptor /item, its frequency and parameters to be considered. The designer has carefully considered all recommendations related to the design. Though construction impacts are not severe, proper mitigation measures are needed. A suitable training program is proposed to train the Contractor(s) staff who will be involved in the Construction Phase and the professional staff from the proponent involved at the operational phase of the project. All required permits shall be obtained from the concerned departments before starting the related activity. Grievances should be addressed promptly, as suggested in the EMP.

H. EMP Budget

31. The EMP budget for construction period of Project is PKRs. 20,68,000 which covers cost of laboratory analysis, supervision consultant, third party monitoring, and trainings. For operation and maintenance phase, the cost is estimated for initial three years of operation which is PKRs. 1,22,000 covering costs of laboratory analysis, third party monitoring, trainings and community engagement.

I. CONCLUSION

32. The report provides conclusion based on the impacts assessed and the mitigation measures suggested. It is recommended that EMP will be made a part of all bidding/tender document. Contractor will be bound to completely implement relevant mitigation measures set out in the EMP. Also, the cost related to these mitigation measures has to be borne by the Contractor. Contractor shall prepare detailed Burrow, Quarrying and Disposal Plan, site specific HSE Plan as mentioned in EMP.

33. No land acquisition and involuntary settlement are involved. No indigenous persons reside or will be affected by the proposed interventions in the areas of influence.

34. Environmental impacts during the construction phase are related to the establishment of campsite which are temporary and can be minimized with better management. Construction worker camps will not necessarily be based on the scale of the works needed. If for some unforeseen reason a larger workforce is needed, the construction camp will not be located in settlement areas or near sensitive water resources and will be provided with lavatories. Local employment will be preferred to avoid cultural conflicts.

35. Construction of subproject is going to bring positive changes in the area in terms of availability of water, cultivation of crops, establishment of new settlements and improvement in the standard of life of the inhabitants of the area. Land which is lying barren at present would change to lush green valley through provision of irrigation water. Availability of irrigation and agriculture would support livestock growth and in due course of time would enable farmers to diversify in areas of diary production.

36. Some activities under this project have been identified to cause low to moderate environmental negative impacts and their mitigation measures have been prescribed. Proper and timely execution of these measures will reverse most the negative impacts in the long term however there will be some residual impacts of the project. Overall the project causes moderate to high positive impacts on the physical and socio-economic environments and should therefore be approved for implementation.

1. INTRODUCTION

37. Balochistan is the largest province of Pakistan in terms of area and smallest in terms of population. It is reckoned to be comparatively less developed and the sole reason is scarcity and paucity of water. Islamic Republic of Pakistan received a loan (3700-PAK) from the Asian Development Bank (ADB) for financing the Balochistan Water Resources Development Sector Project (BWRDSP). The project will support implementation of the integrated water resources management policy of the Government of Balochistan (GoB).

38. Government of Balochistan has now hired the services of the Consultants¹ for Project Design, Construction Supervision and Implementation Support (hereafter called 'the Consultants' for Balochistan Water Resources Development Sector Project (BWRDSP). The project consists of development of 11 subproject in two river basin (Mula & Zhob). The Consultants will help GoB in preparing detailed design of three core subprojects and also feasibility studies and detailed design of the balance non-core subprojects.

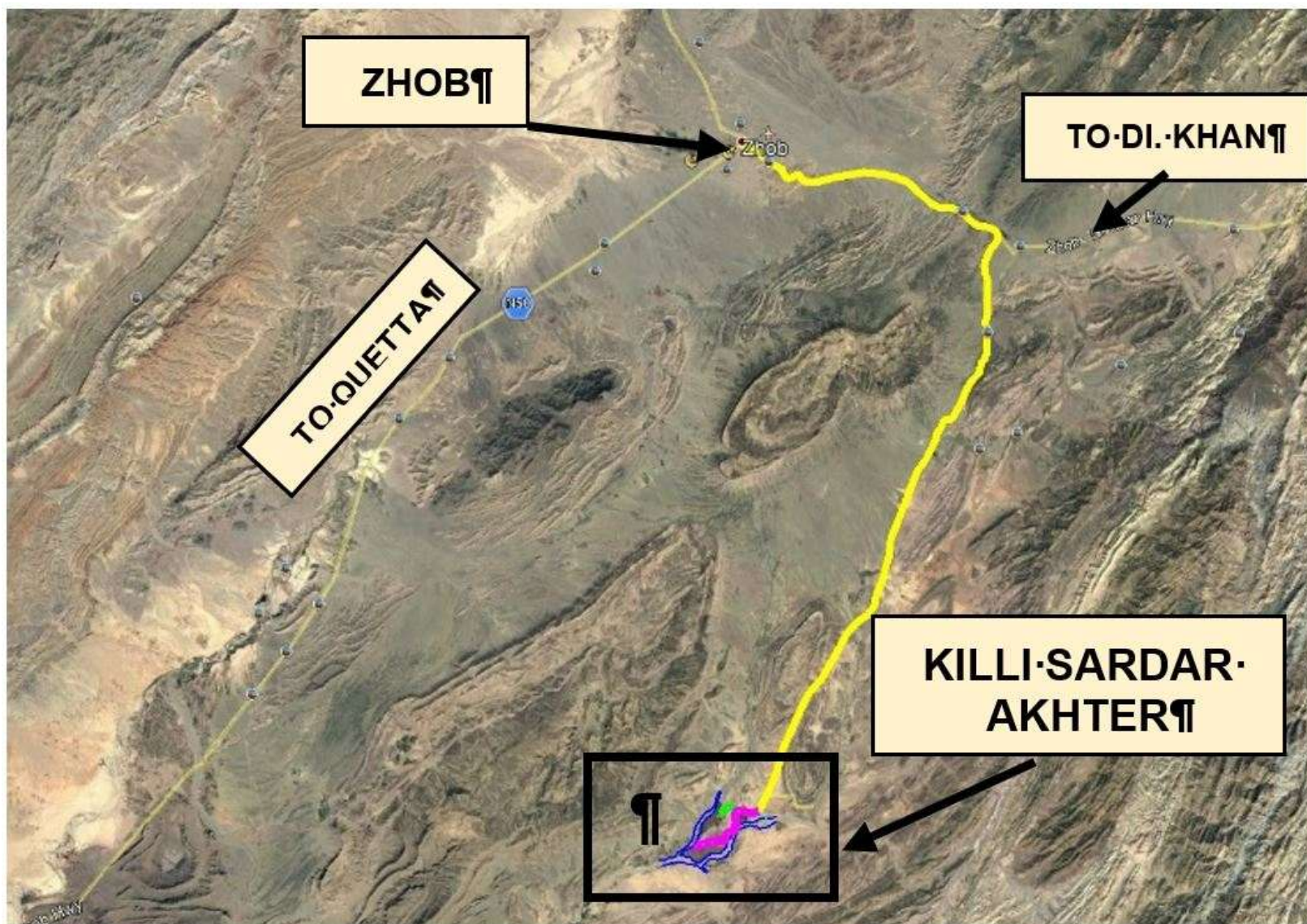
39. Killi Sardar Akhtar (PIS) Subproject is one of subprojects of the Zhob river basin. The assignment under consideration involves conducting an Initial Environmental Examination of this project.

1.1 Kili Sardar Akhtar Subproject

40. The Killi Sardar Akhtar (PIS) Subproject perennial irrigation subproject is located in Union Council of Laka Bund, tehsil and district Zhob, around 49 km south-east of Zhob city in Gosa Kibzai. The coordinates of the scheme are 31° 03' 5.31" North, 69° 30' 31.91" East. The location of sub-project is shown on the Location Map in **Figure 1**.

41. Infiltration galleries shall be constructed across Sawar River and its tributary to irrigate about 230 ha – all of which is currently being irrigated and shall be improved. Surface water is low in Sawar River. The River mostly flows below ground level. There is extensive land available in the area. Farmers rely on 5 No. open wells and an unlined channel from Cheena Viala spring for irrigation. A large portion of land in the area is barren, it is used for rain-fed (khushkaba) farming. Crop productivity is negligible due to non-availability of water. The proposed scheme has been planned downstream of Ahmadzai weir site having catchment area of 367 km². After construction of sub-project, lands belonging to eight villages in Qila Sardar Akhter Khan, Ghundi, Churmanwala, Zakoza, Baz Khula, Dabari, Kharhpani and Dodazai will be benefitted from irrigated agriculture.

Figure 1: Location of Core Sub Project Mula River Basin (Karkh River Scheme)



1.2 Proposed Interventions

42. The proposed interventions can be divided into three broad categories. **Figure 2** gives clear idea of the project interventions:

- i Construction of infiltration gallery,
- ii Lining of Perennial Channel and rehabilitation of existing irrigation system.

1.3 Environmental Assessment

43. The apex Pakistani law governing the subject of environment is the Pakistan Environmental Protection Act – 1997 (PEPA-97). Under Section 12 of the Act, it is mandatory for the proponents of the projects² to execute the IEE and / or EIA (where warranted), and get the approval from federal agency (i.e. Pak-EPA). This function has been delegated under Section 26 to provincial EPAs.

44. After the 18th amendment to the constitution of Pakistan, environment became a provincial subject, and the environmental law governing the construction of Kili Sardar Akhtar infiltration galleries at district Zhob is the “Balochistan Environmental Protection Act 2012”. This act also provides for IEE or EIA (as the case maybe) for projects under its clause 15.

45. The EIA / IEE regulations of 2000 provide categories of projects for which IEE or EIA needs to be conducted. The proposed project falls under the category of “Water management, dams, irrigation & flood protection” and hence the environmental study is conducted and an IEE report is being prepared.

46. For ADB’s SPS, all loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA) and requires the completion of the environmental categorization form. REA has been conducted and attached as **Annexure – 1**.

47. Accordingly, a proposed project is classified as ‘Category B’ if it is unlikely to cause significant adverse environmental and social impacts. A project is classified as ‘Category B’ if it’s potential adverse environmental impacts on human populations or environmentally important areas, (e.g., wetlands, forests, grasslands, and other natural habitats) are less adverse, site-specific, and reversible with the exception of a few.

² The Act defines a Project as: “Any activity, plan, scheme, proposal or understanding involving any change in the environment and includes:

- Construction or use of buildings or other works;
- Construction or use of roads or other transport systems;
- Construction or operation of factories or other installations;
- Mineral prospecting, mining, quarrying, stone-crushing, drilling, and the like;
- Any change of land use or water use; and
- Alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations.”

48. According to ADB, an IEE is required for 'Category B' projects to determine the likelihood of significant environmental impacts. In such a case, an EIA study of the project is warranted. If an EIA is not needed, the IEE is regarded as the final environmental assessment report. Public consultation is a mandatory task to be undertaken during the IEE process.

49. Based on the above requirements of national and provincial regulations, as well as the ADB policy, an Initial Environmental Examination of the proposed interventions is being carried out.

50. The overall objective of IEE study is to elucidate the anticipated aspects of the proposed project and their impacts on the surrounding environment in order to propose necessary mitigation measures to prevent/minimize adverse impacts. To achieve this objective, an assessment of the existing environmental status of the project site is a prerequisite and, therefore, included in this study by collecting and reviewing the baseline data of various environmental attributes.

51. The IEE report will be prepared to ensure adequate environmental and social management during the lifecycle of the project for the previously mentioned interventions of the Karkh Mula River Basin Project.

52. It intends to provide mechanisms for ensuring that potential environmental and social impacts of the current program are identified, assessed and mitigated as appropriate, through an environmental and social screening process.

53. The IEE report is also required to, comply with the Pakistan / Balochistan Environmental and social requirements, as outlined in the prevailing IEE / EIA Guidelines. The IEE will also comply with the ADB Safeguard Policies SPS – 2009 or 2012 for environmental management of projects.

1.4 More Specific Objectives of IEE Report

54. More specific objectives of this IEE report include following:

- i. Meet the statutory requirements set forth by the Pakistan Environmental Protection Act (PEPA) 1997 and the Balochistan Environmental Protection Act 2012.
- ii. Comply with ADB policies and safeguards for environmental and social management of projects
- iii. Facilitate proponents and financiers of the project in ensuring environmental and social acceptability of the project
- iv. Establish a baseline of existing environmental status at the project site prior to project initiation by collecting secondary and primary data/information on physical, biological and social environment of the project area.

- v. Help the project proponents to incorporate necessary measures for legally compliant and socially acceptable environmental performance of their project.
- vi. Identify significant environmental impacts (both positive and negative) during all stages of the project implementation and propose mitigation measures for negative impacts

1.5 Scope of IEE

55. The scope of the assignment will consist of the following sections:

Description of the Project:

56. Complete description of the relevant parts of the project will be provided, using appropriate visual aids (maps, photographs, satellite imageries etc.) where necessary.

Analysis of Project Alternatives:

57. Alternatives of the project will be examined including no-action option.

Legislative and Regulatory Considerations:

58. A comparison of national and international standards (such as International Finance Corporation (IFC)'s Environment, Health & Safety (EHS) requirements) will be conducted in the IEEs to identify most stringent standards, applicable to this project and will be included in the IEE report. The appropriate authority jurisdictions that will specifically apply to the project will also be identified.

Description of the Environment:

59. The baseline data on the relevant environmental characteristics of the Study Area will be assembled, evaluated and presented. This section includes the detailed description of the following environmental attributes within the project area. The 'Project Area' is defined as the area within which the impact of the project may be expected. The Killi Sardar Akhtar (PIS) Subproject includes a infiltration gallery structure located at coordinates 31° 03' 5.31" North, 69° 30' 31.91" East on Sawar Rud a tributary of Zhob River; which is situated in Zhob District. Access is through a metaled road initially on Zhob to D.I. Khan road for a distance of 17 kms, then turning to right through link road via Killi Ghurdah Babar by travelling another 32 kms.

Physical Environment:

60. Locations and surroundings, site plans and layout, geography, polar coordinates, soils and geology, topography and drainage system, seismic zone, water resources, air and water quality, public water supplies, climate and ambient noise.

61. Most of this information is from primary data collected during site visits & stakeholders' consultations and design report prepared by BWRDSP consultants. Monitoring and testing of major environmental parameters done at Sri Toi dam subproject of Zhob River Basin have been made part of this part.

☐ Biotic and Natural Environment:

62. Data pertaining to Flora and fauna of the terrestrial ecosystems, rare or endangered species and sensitive habitat will be collected and assessed from relevant department and local community. A list of fauna and flora has been given with conservation status and local information.

☐ Socio-economic Environment:

33. Demographics, employment, land use, community structure, public health, communal facilities or services, sites affected by the project and community perceptions about the project.

34. Primary data was collected during site visits and stakeholders consultation. from the project feasibility report prepared by the Social team has been used.

☐ Potential Impacts of the Project:

35. Impacts related to the project will be identified and distinction for significant impacts will be made between positive and negative, direct and indirect, short and long term, during different phases of the project implementation. Cumulative impacts will also be identified. Special attention will be paid to:

- Impacts of the project on the ecology;
- Impacts of the project on the existing socio-economic conditions;
- Impacts of the project on ambient noise levels;
- Impacts of the project on the ambient air quality;
- Impacts of the project on water quality;
- Impacts of the project on soil characteristics; and
- Impacts of the project on health and safety.

36. Environmental impact studies represent a blend of technical information and analysis along with value judgments. To assess an environmental threat posed by an aspect, the principal factors to be considered are:

- the likelihood that the threat may be realized; and
- in the event of realization of the threat, the nature and extent of the consequences.

37. A qualitative risk assessment methodology has been adopted for this project, comprising the Likelihood and Consequence values detailed in **Table 1** and **Table 2**.

Table 1: Qualitative Likelihood Values

Likelihood Indicator	Likelihood Description	Explanation
A	Almost Certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Might occur at some time
D	Unlikely	Could occur at some time
E	Rare	May only occur in exceptional circumstances

Table 2: Qualitative Consequence Values

Consequence Indicator	Consequence Description	
1	Insignificant	Negligible, reversible, requires very minor or no remediation / minor injury with slight negative health impact
2	Minor	Reversible, requires minor remediation / major, non-fatal health impact to one or more individuals
3	Moderate	Reversible, short-term effect, requires moderate remediation / severe, non-fatal health impact to one or more individuals
4	Major	Serious impact, medium term effect, requires significant remediation / single fatality or severe irreversible disability or impairment
5	Catastrophic	Disastrous impact, long term effect, requires major remediation / multiple fatalities, major permanent health impacts on a large number of individuals

38. On the basis of a likelihood and consequence matrix (**Table 3**), each hazard may be categorized into broad 'risk categories' and the required management approach for each risk category can be defined.

Table 3: Risk Matrix – Risk Categories and Management Response

		Consequence				
		1	2	3	4	5
Likelihood	A	M	M	H	H	H
	B	L	M	H	H	H
	C	L	L	M	H	H
	D	L	L	L	M	H

	E	L	L	L	M	M
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H = High Risk – Proposed works methods not acceptable and must be altered.

M = Moderate Risk – Detailed management action plan to be prepared, including monitoring program.

L = Low Risk – Routine management procedures to be defined and monitoring requirements

39. Residual impacts after implementation of mitigation measures have also been provided.

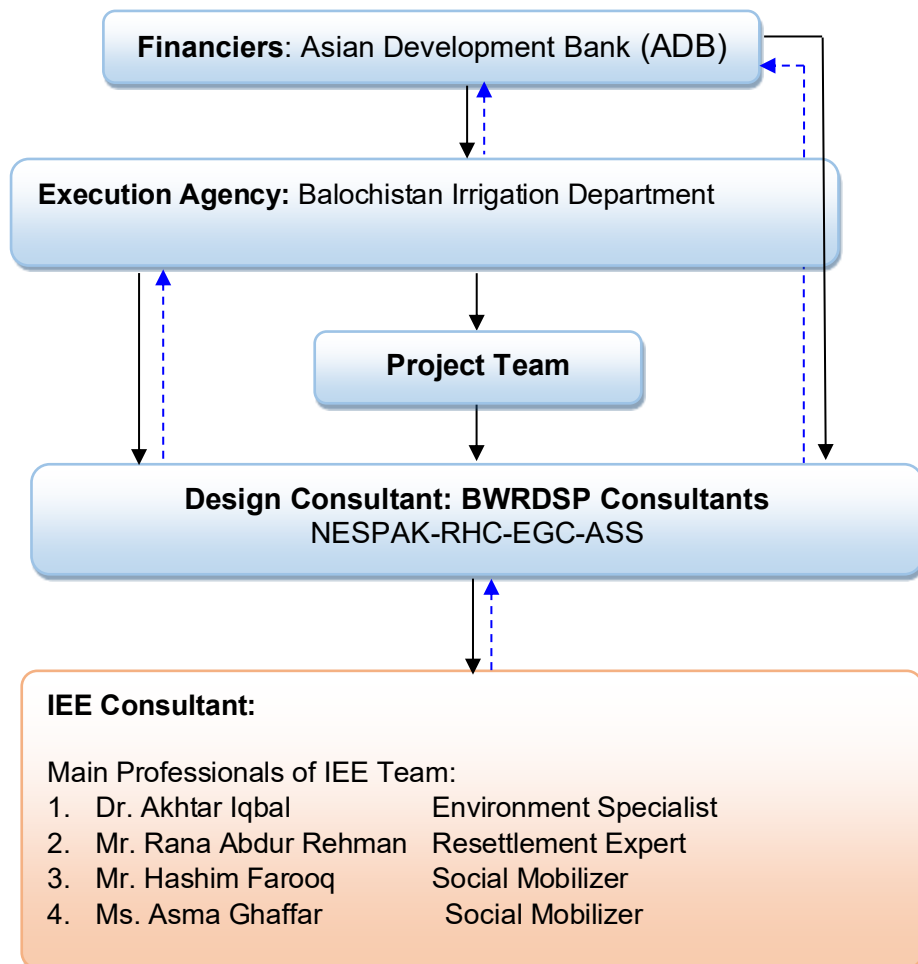
□ Mitigation measures for Adverse Impacts:

40. Possible measures to prevent or reduce significant negative impacts to acceptable levels will be identified. Recommendations to adopt feasible mitigation measures will be included in the report.

□ Development of an Environmental Monitoring and Management Plan:

41. The critical issues requiring monitoring to ensure compliance to mitigation measures will be identified. Impact management and monitoring plan for operations will be presented.

1.6 IEE Team Arrangement



1. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

2.1 General

47. This chapter elucidates the current legal framework which is applicable on the proposed project in context of environment and sustainable development. The institutional arrangement that exists in Pakistan and may influence the environmental management of the proposed project is also discussed in this chapter. The IEE report also conforms with the guidelines as provided in ADB's Safeguard Policy Statement (SPS) 2009.

2.2 Background

48. The Government of Pakistan realized the importance of environmental preservation way back in the early 1980's. Until the 1980's development policies were formulated irrespective of environmental considerations. A variety of environment-related acts and ordinances existed, but the Pakistan Environmental Protection Ordinance 1983 (PEPO) was the first effort to deal with environmental concerns systematically. The ordinance created a legal basis for comprehensive environmental policy making, the establishment and enforcement of standards, environmental impact assessments and the inclusion of environmental considerations in development policies³. In 1984, the promulgation of this ordinance was followed by the establishment of the Pak-EPA, the primary government institution dealing with environmental issues. The PEPO 1983 was replaced with a new Act of Parliament in 1997 i.e. PEPA Act 1997.

49. The UN International Summit on Environment was held in 1992 in Rio de Janeiro, to highlight the importance of environment protection and to promote sustainable development. Pakistan also became a signatory of this summit, after which the Government of Pakistan developed a National Conservation Strategy (NCS), approved in March 1992. It was decided that all reports regarding strategies, policies and program for sustainable development will be drawn up on the basis of the NCS⁴. Another major environmental policy initiative formulated in 1999 was Environmental Planning and Resource Conservation Project (EPRCP)⁵.

50. The enactment of PEPA 1997 took up the key issues of PEPO and in addition provided for a considerable strengthening of institutions at the national and provincial level for the formulation, execution and enforcement of environmental policies and conferred broad-based enforcement powers to the EPA⁶. NEQS for municipal and liquid industrial effluent, industrial gaseous emissions and motor vehicle exhaust and noise, were issued by Pakistan EPA in 1994.

³ "Industrial policy and the Environment in Pakistan": United Nations industrial development organization;

⁴ "A model process to develop a National Agenda": Pakistan National Conservation Strategy; pg.1.

⁵ "Industrial policy and the Environment in Pakistan": United Nations industrial development organization; 11 December, 2000; pg.9.

⁶ "Industrial policy and the Environment in Pakistan": United Nations industrial development organization; 11 December, 2000; pg.9

51. Pakistan EPA review of IEE and EIA Regulations, 2000 and Pakistan Environmental Assessment Procedures were published, to provide necessary guidelines for preparation, submission and review of IEE and EIA.

2.3 National Environmental Policy

52. The National Environment Policy aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development. The Policy provides broad guidelines for addressing environmental concerns and ensuring effective management of their environmental resources. The provincial, AJK, Northern Areas and local governments, however may devise their own strategies, plans and programs in pursuit of this Policy.

53. Enforcement of the policy is being carried out through National Environmental Quality Standard (NEQS) and Self-Monitoring & Reporting Tools (SMART) in order to optimize energy and environmental resource consumption within the industries; encourage reduction, recycling and reuse of municipal and industrial solid and liquid wastes; introduce discharge licensing system for industry; devise and implement master plans for treatment of municipal and industrial wastewater in urban and rural areas. The policy has not been revised since 2005.

2.4 IWRM Policy

54. The Integrated Water Resources Management (IWRM) Policy in Balochistan was approved in 2006 which highlighted the reforms needed for water resources monitoring and planning in the province. The policy also enforces the adoption of IWRM approach for basin sustainability.

55. As per Draft Balochistan Comprehensive Development Strategy 2013 -2020 the water sector development will be as under:

56. "For the irrigation water, the strategy is clear that evolving Water Resource Management System and Institutional Framework will be central to sustainable water use in the province. The theme is pillared on undertaking river basin wide management of water with greater focus on the flood irrigation Sailaba and creating water storages on all strategic locations in the river basins and handling the Sailaba irrigation and dams command area in an integrated manner. Under the Strategy, GoB will support establishment of Drip Irrigation Manufacturing Plants in the province under PPP mode for providing either front- end or back-end subsidy to get a system introduced with full institutional support. There is emphasis that water supply and sanitation require a dedicated attention and given the massive gap, it is planned to undertake integrated water supply and sanitation system in partnership with the local communities especially women through a community infrastructure program for a minimum of 5000 settlements.

2.5 Balochistan Acquisition of Land Act 1974 & (Amendment) Ordinance 1976

57. The primary law for acquisition of land for public purposes in Pakistan is the “Land Acquisition Act, 1894” (hereinafter referred as the Act). The land acquired under the Act vests in the Province and it is only thereafter that the Province may transfer it to someone else.

58. The Balochistan Acquisition of Land Act allows the government to acquire private land for housing or development schemes. Initially, the law specifically mentioned “in rural areas”, but this was deleted subsequently through the Ordinance in 1976. “Land Acquisition” literally means acquiring of land for some public purpose by government/government agency, as authorized by the law, from the individual landowner(s) after paying a government fixed compensation in lieu of losses incurred by land owner(s) due to surrendering of his/their land to the concerned government agency. The laws essentially are developments on the land acquisition act of 1894 which was created with the purpose of facilitating acquisition by the government of privately held land for public purposes. The word “public purpose”, as defined in the act, refers to the acquisition of land for constructing educational institutions or schemes such as housing, health or slum clearance, as well as for projects concerned with rural planning or formation of sites. It is not necessary that all the acquisition has to be initiated by the government alone. Local authorities, societies registered under the societies registration act, 1860 and co-operative societies established under the co-operative societies act can also acquire the land for developmental activities through the government.

59. Land acquisition requires interaction between the Requiring Body (RB), which is normally a government agency that requires the land for certain national development project, and the Acquiring Body (AB), which is normally the Provincial Revenue Board, since land is a provincial subject according to the Constitution. The division of responsibility between the Requiring Body and the Acquiring Body in broad terms is that the Requiring Body provides the technical input and the Acquiring Body provides the legal input in the land acquisition process. It is the Requiring Body which must ensure that the project, for which the acquisition of land is required, is approved by the authorities and that funds are available. The Requiring Body must also justify the need for land and other property on the basis of field surveys including detailed engineering design and prepare all necessary documents required for decision making.

60. It is to be noted here that no acquisition of privately held land is envisaged for the said project.

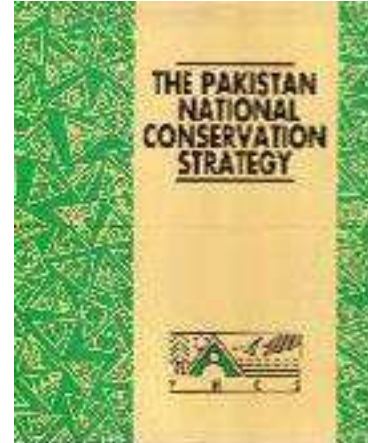
2.6 Environmental Legislations

61. The key environmental regulations and legislations which are applicable to the proposed project is discussed below.

2.6.1 National Regulations

62. The environmental policy framework, which will govern the project, is the NCS of Pakistan. The Pakistan NCS is a broad-based policy statement aimed at achieving environmentally sustainable social and economic development in Pakistan. The three overriding objectives of the NCS are:

- Conservation of natural resources
- Sustainable development
- Improved efficiency in the use and management of resources



63. Three operating principles are identified to achieve these objectives. These are:

- Greater public participation in development and environmental management
- A merging of environmental and economic decision making
- Lasting improvements in the quality of life

64. The NCS specifies the basic guidelines for an integrated effort aimed at protecting the environment and the natural resources of the country. This broad framework provides a comprehensive point of reference for all agencies, departments, private sector companies, financial institutions, and donor agencies for undertaking systematic efforts to bring about an effective change for sustainable development⁷.

2.6.2 Pakistan Environmental Protection Act, 1997

65. The PEPA 1997 is the apex environmental law of the country. Under section 12 of the Act, it is mandatory for the proponents of the projects⁸ to execute the IEE and / or EIA (where warranted), and get the approval from provincial EPA. A copy of PEPA 1997 is attached as **Annexure – 2** of this report.

66. The following rules and regulations have been issued under the Pakistan Environmental Protection Act, 1997.

⁷ Qadar S., and Dogar A. R., *Pakistan's Environmental Laws & Their Compliance*, Lahore Law Times Publications, 2002.

⁸ The Act defines a Project as: "Any activity, plan, scheme, proposal or understanding involving any change in the environment and includes:

- Construction or use of buildings or other works;
- Construction or use of roads or other transport systems;
- Construction or operation of factories or other installations;
- Mineral prospecting, mining, quarrying, stone-crushing, drilling, and the like;
- Any change of land use or water use; and
- Alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations."

Rules:

- National Environmental Quality Standards (Self-monitoring and Reporting by Industries) Rules, 2001.
- Provincial Sustainable Development Fund (Procedure) Rules, 2001.
- Pakistan Sustainable Development Fund (Utilization) Rules, 2001.
- Pollution Charge for Industry (Calculation and Collection) Rules, 2001.
- Environmental Tribunal Procedures and Qualifications Rules, 2000.
- Environmental Samples Rules, 2001.
- Hazardous Substance Rules, 2000.

**Regulations:**

- Review of IEE / EIA Regulations, 2000.
- National Environmental Quality Standards (Certification of Environmental Laboratories) Regulations, 2000.

2.6.3 Balochistan Environmental Protection Act, 2012

67. After the 18th Constitutional amendments the subject of environment vide Notification No.4-9/2011-Min dated 29th June, 2011 stand devolved to the provinces with effect from 1st July, 2011. Even after the deletion of the subject of environment from the concurrent list, the Pakistan Environmental Protection Act 1997 remained intact as per Article 270-AA, Sub Article (6). However, there is provision that the province, through an appropriate legislature / competent authority, may alter, repeal and amend the laws related to the subject.

68. To regulate and effectively address the peculiar environmental issues of the province of Balochistan this act namely “Balochistan Environmental Protection Act 2012” is submitted as per provisions of the Article 270-AA, Sub-Article (6) of 18th Constitutional amendments.

69. In terms of requirements of EIA / IEE, the provincial Act contains, in its section 15, similar provisions as given in the PEPA section 12. The PEPA has entrusted the authority of review and to approve environmental assessments to the provincial EPA. The proposed project falls under the jurisdiction of the Balochistan Environmental Protection Agency (BEPA). The BID has obtained No Objection Certificate (NOC) from the EPA Balochistan in November 2020 that was mandatory requirement before project commencement.

70. An interesting provision of the provincial Act, which is relevant for the proposed project, is given in its section 20. Sub-section 2 of Section 20 states that “When preparing water resource management plans, Departments and other relevant institutions shall at least take the following into account:

- Provisions for integrated watershed management;
- Regulation of sustainable abstraction of groundwater;
- Regulation of the use of ground or surface water for agricultural, industrial, mining, and urban purposes;
- Measures to protect human health and ecosystems;
- Measures to protect wetlands and their associated ecosystems;
- Any other provision necessary for the sustainable use and management of water resources.

2.6.4 Pakistan EPA Review of IEE and EIA Regulations, 2000

71. Two types of environmental assessments can be carried out i.e. IEE and EIA. EIAs are carried out for the projects that have a potentially significant environmental impact, and IEEs are conducted for relatively smaller projects with some relatively lesser significant impacts.

72. The Review of IEE and EIA Regulations 2000, prepared by Pak-EPA under the powers conferred upon it by PEPA-97, categorizes projects for IEE and EIA, respectively⁹. The proposed interventions under Karakh-Mula River are likely to fall under the Category B as defined in Schedule – I of Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000, attached as **Annexure – 3**. According to these guidelines, the proposed project would require an IEE to be conducted.

73. According to the details provided in the regulations regarding preparation, submission, and review of IEE's and EIA's, following is a brief description of the approval process.

- a. A project is categorized as requiring an IEE or EIA using the two schedules attached to the regulations i.e. Schedule I and II attached as (**Annexure – 3**) at the end of this report.
- b. An EIA or IEE is conducted as required and following the Pak-EPA guidelines.
- c. The EIA or IEE is submitted to the concerned EPA: provincial EPAs if the project is located in the provinces or Pak-EPA if it is located in the Federal administered area.
- d. A non-refundable review fee, depending on the cost of the project and the type of the report, is submitted along with the document as per the rates shown in Schedule III.
- e. The submittal is also accompanied by an application in the format prescribed in Schedule IV of the regulations.
- f. The EPA conducts a preliminary scrutiny and replies within 10 days of the submittal of a report, (i) confirming completeness, or (ii) asking for additional information, if needed, or (iii) returning the report requiring additional studies, if necessary.
- g. The EPA is required to make every effort to complete the IEE and EIA review process within 45 and 90 days, respectively, for the issue of confirmation of completeness.

⁹ "PEPA Review of IEE and EIA Regulations, 2000", pg-2

- h. When the EPA accord their approval subject to certain conditions:
- i. Before commencing construction of the project, the proponent is required to submit an undertaking accepting the conditions.
- j. Before commencing operation of the project, the proponent is required to obtain from the EPA a written confirmation of compliance with the approval conditions and requirements of the IEE.
- k. An environmental management plan (EMP) is to be submitted with a request for obtaining confirmation of compliance.
- l. The EPA is required to issue confirmation of compliance within 15 days of the receipt of request and complete documentation.
- m. The IEE approval is valid for three years from the date of accord. The proponents are required to complete the construction and installation within this time period and start operations. In case of any delays, the proponents are required to obtain extension from EPA.

2.6.5 Forest Act 1927

74. The Forest Act, 1927 was largely based on previous Indian Forest Acts implemented under the British. The first and most famous was the Indian Forest Act of 1878. Both the 1878 act and the 1927 one sought to consolidate and reserve the areas having forest cover, or significant wildlife, to regulate movement and transit of forest produce, and duty leviable on timber and other forest produce. It also defines the procedure to be followed for declaring an area to be a Reserved Forest, a Protected Forest or a Village Forest.

75. This Act is not relevant as the project does not does not lie in any of the notified forest land of Balochistan.

2.6.6 The Antiquities Act, 1975

76. This act basically defines how to repeal and re-enact the law relating to the preservation and protection of antiquities. The Federal Government may, by notification in the official Gazette, declare any antiquity to be a protected antiquity for the purposes of this Act. No person shall put any neon signs or other kinds of advertisement, including bill posting, commercial signs, poles or pylons, electricity or telephone cables and television aerials, on or near any protected immovable antiquity. No person shall, for any commercial purpose, make a cinematograph film of any protected antiquity or any part thereof except under, and in accordance with, a license granted by the Director. A contravention of any provision of this Act or the rules shall, where no punishment has been specification provided, be punishable with rigorous imprisonment for a term which may extend to six months, or with fine which may extend to five thousand rupees, or with both.

2.6.7 Pakistan Penal Code 1860

77. The Pakistan Penal Code usually called PPC is a penal code for all offences charged in Pakistan. It was originally prepared on the behalf of the Government of British India. After the partition of India in 1947, Pakistan inherited the same code and subsequently after several amendments by different governments, it is now a mixture of Islamic and English Law. Presently, the Pakistan Penal Code is still in effect and can be amended by the Senate of Pakistan.

2.6.8 The Balochistan Wildlife Protection (Amendment) Ordinance, 2001

78. The Wildlife Protection Ordinance empowers the government to declare certain areas reserved for the protection of wildlife and control activities within these areas. It also provides protection to endangered species of wildlife. As no activities are planned in notified protected areas, no provision of this law is applicable to the proposed project.

2.6.9 Balochistan Goats (Restriction) Ordinance 1959

79. This law may come into play, if any of the proposed intervention falls in any informal grazing pasture, as livestock rearing is an important occupation in the project area. The ordinance empowers the Government to restrict movement and / or grazing etc. of livestock in certain areas.

2.6.10 Balochistan Ground Water Rights Administration Ordinance 1978

80. This law was promulgated to ensure efficient and site-specific management of scarce water resources in Balochistan. The background to the law suggests admission that hydrological conditions in the entire Balochistan vary a great deal from place to place. Hence this Ordinance requires establishment of a Provincial Water Board and District Level Water Committees. The Provincial Water Board shall have representation from the Planning & Development Department, Revenue Department, and Irrigation Department etc., thereby clearly identifying major stakeholders. The Ordinance also calls for registration of all water sources, and establishes protocols for grant of permits by water committees for use of such sources. The statement of objectives for the Ordinance stipulates that the Provincial Water Board shall identify areas with ground water resources and declare them as Designated Ground Water Basins. It also calls for establishment of suitable laws for all designated ground water basins.

2.6.11 The Canal and Drainage Act, 1873

81. This is an act to regulate Irrigation, navigation and drainage. The Provincial Government is entitled to use and control for public purposes the water of all rivers and streams flowing in natural channels, and of all lakes, sub-soil water and other natural collections of still water.

2.7 Institutional Setup for Environmental Management

82. The structural setup of agencies/departments in the environmental sector is such that the Provincial Ministry of Environment governs and regulates environment-related work at the government level. The BEPA works directly under the control of ministry.

1.7.1 Provincial Environmental Protection Council (Provincial EPC) and the Balochistan Environmental Protection Agency (BEPA)

83. After devolution of the subject environment to provincial level under 18th amendment, these two organizations are primarily responsible for administering the provisions of the Balochistan Environmental Protection Act 2012. The EPC oversees the functioning of the BEPA. Its members include the representatives of the government, industry, non-governmental organizations and the private sector. The EPA is required to ensure compliance with the National Environmental Quality Standard (NEQS), establish monitoring and evaluation systems, and both identify the need to, as well as initiate legislation whenever necessary. It is thus the primary implementing agency in the hierarchy. The NEQS for effluent discharge standards, gaseous emissions, vehicular emissions, drinking water and ambient air quality is attached as **Annexure 2** of this report.

84. Another functions of the provincial EPA are the review and approval of environmental assessment reports.

2.8 Asian Development Bank Safeguard Policies

2.8.1 ADB Requirements for Preparation of Environmental Assessments of Projects

85. Asian Development Bank in its Safeguard Policy Statement (June 2009) affirms that “environmental and social sustainability is a cornerstone of economic growth and poverty reduction in Asia and the Pacific” (p 14). Furthermore, the document underlines the ADB’s Strategy 2020, promoting the “sustainability of project outcomes by protecting the environment and people from project’s potential adverse impacts”.

86. The Initial Environmental Examination in hand is fully committed to the requirements determined in the “ADB Safeguard Policy Statement”. The environmental works carried out by BWRDSP Consultants have been essentially guided by these rules as enunciated in the “Outline of an Initial Environmental Examination Report”.

87. In the light of significance attached by ADB to various environmental impacts, Project is classified as Category B project, wherein an Initial Environmental Examination is required.

88. Main reasons behind assigning category B is that the interventions are basically upgradation and rehabilitation of existing irrigation system and no resettlement is envisaged.

However, an environmental assessment using ADB's Rapid Environmental Assessment (REA) checklist for urban development and water supply, (as given in **Annexure-1**), was conducted and results of the assessment show that the projects are unlikely to cause significant adverse impacts. This initial environmental examination (IEE) has been prepared in accordance with ADB SPS's requirements for environment category B projects and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subprojects.

89. Thus, an Initial Environmental Examination (IEE) of the project has been conducted, through the following documents: -

- Review and data collection;
- Field visits and public consultation;
- Derive Baseline Condition for the area of influence of proposed work scheme;
- Alternative Analysis
- Impact identification and analysis, and planning and recommendation of mitigation measures;
- Preparation of an environmental management and monitoring plan.

2.8.2 ADB Safeguard Policy 2009

90. Safeguard policies are generally understood to be operational policies that seek to avoid, minimize, or mitigate adverse environmental and social impacts, including protecting the rights of those likely to be affected or marginalized by the development process. ADB's safeguard policy (2009) framework consists of three Safeguard Policies on the environment, involuntary resettlement and indigenous peoples. These are accompanied by Operations Manual sections on Environmental Considerations in ADB Operations; Involuntary Resettlement; and Indigenous Peoples. All three safeguard policies involve a structured process of impact assessment, planning, and mitigation to address the adverse effects of projects throughout the project cycle. The safeguard policies require that

- Impacts are identified and assessed early in the project cycle;
- Plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented; and
- AP are informed and consulted during project preparation and implementation.

91. The Project will need to comply with all the Safeguard Policies in the subproject or activities, irrespective of whether or not they are being funded in whole or in part by the ADB, the GoP, or any other donor. A brief synopsis of these policies and their relevance for the proposed project is given in the **Table 4**.

Table 4: ADB Safeguard Policy 2009 Relevant to Project

S. No.	Safeguard Policies	Key Requirements	Remarks
1	Environment	Projects and subprojects need IEE to address important issues not covered by any applicable regional or sectoral EA.	Applicable to proposed project
2	Involuntary Resettlement	Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs. Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher	As of now, no involuntary resettlement is envisaged for the proposed project. However, the situation may change at the detailed design level. Therefore, this policy is assumed to be applicable due to the serious nature of possible impacts.
3	Indigenous Peoples	Measures to avoid potentially adverse effects on the Indigenous Peoples' communities; and when avoidance is not feasible, minimize, mitigate, or compensate for such effects. Bank-financed projects are also designed to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender and intergenerationally inclusive.	There are no groups of people in the project area who could be categorized as indigenous people, therefore this policy does not apply to the proposed project.

2.8.3 Relevant International Treaties

- Convention on Biological Diversity

92. The Convention was opened for signature on 5th of June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit"). It remained open for signature until 4th of June 1993, by which time it had received 168 signatures. The Convention entered into force on 29th of December 1993, which was 90 days after the 30th ratification. The first session of the Conference of the Parties was scheduled on 28th of November – 9th of December 1994 in the Bahamas.

93. The Convention on Biological Diversity was inspired by the world community's growing commitment to sustainable development. It represents a dramatic step forward in the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources. Pakistan became its member in 1994. The Inspector General of Forests Office in the Ministry of Climate Change act as its Focal point.

❑ Convention on the Conservation of Migratory Species of Wild Animals

94. Also Known as CMS, it is an environmental treaty under the aegis of the United Nations Environment Program. CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range. This was established at Bonn in 1979 and Pakistan has become its member in 1987. National Council for the Conservation of Wildlife in the Ministry of Climate Change is the focal desk for CMS.

❑ Government of Pakistan Guidance on Managing COVID-19 Risks

95. Government of Pakistan issued Guidelines "Health & Safety of Building and Construction Workers during COVID-19 outbreak" to Managing COVID-19 Risks while Commencing Work in Construction Project, on 11 April 2020. Taking into account these guidelines, the contractor will prepare The contractor will prepare Site-specific EMP (SSEMP) , , Site Specific Health and Safety Management Plan (SSHSMP) and a Standard Operational Procedure (SOP) to manage COVID-19 risks. These plans will be approved by Supervision consultant.

2.8.3 Comparison of International and Local Environmental Legislations

96. The ADB's SPS 2009 requires application of pollution prevention and control technologies and consistency with international good practice, as reflected in internationally recognized standards. The SPS states that when host country regulations differ from these standards, the EA will achieve whichever is more stringent.

97. In order to select the most stringent standards applicable, a comparison of local (PEQS) and international i.e. International Financing Corporation (IFC)/ World Health Organization (WHO) and United States Environmental Protection Agency (USEPA) regulations have been made, as shown in **Table 5** below. For air quality, comparison was only possible for pollutants having same averaging periods in PEQS, IFC and WHO. PEQS for ambient air quality are more stringent in comparison to USEPA and WHO/IFC standards, in the case of most pollutants. The applicable and most stringent parameters for each respective pollutant are highlighted in yellow.

98. Similar to the standards for air quality, the comparison of noise standards provided in **Table 6** clearly shows that PEQS for noise are more stringent in comparison to the WHO/IFC standards. The only exception is the daytime noise level standard for Industrial areas where the WHO/IFC standard is more stringent (70 dB (A)) in comparison to PEQS (75 dB (A)) and so for this particular parameter, the WHO/IFC standard will be used.

99. As far as regulations regarding other environmental parameters are concerned such as acceptable effluent disposal parameters, the local regulations i.e. PEQS are more stringent and would be preferred over any other international regulations such as WHO/IFC.

100. Similar to the standards for air and Noise quality, the comparison of Water quality standards provided in **Table 7** clearly shows that PEQS for biological and physical parameters of drinking water quality are same as for WHO standards except for Total hardness as CaCO₃. PEQS for Chemical, Toxic inorganic and organic parameters are mostly similar/comparable zinc, residual chlorine, Phenolic compounds (as Phenols) mg/l, Poly-nuclear aromatic hydrocarbons (as PAHs) g/l. WHO for Lead and Zn are more stringent comparatively.

Table 5: Comparison of International and Local Air Quality Standards

Pollutants	USEPA		WHO/IFC		PEQS	
	Avg.Time	Standard	Avg.Time	Standard	Avg.Time	Standard
SO ₂	3 hrs	0.5 ppm	24 hr	125 µg/m ³ (IT-1*)	Annual Mean	80 µg/m ³
	1 hr	75 ppb	10 min	500 µg/m ³	24 hr	120 µg/m ³
CO	8 hrs	9 ppm (11 mg/m ³)	-	-	8 hrs	5 mg/m ³
	1 hr	35 ppm (43 mg/m ³)			1 hr	10 mg/m ³
NO ₂	Annual Mean	100 µg/m ³ (53 ppb)	1 yr	40 µg/m ³	Annual Mean	40 µg/m ³
	1 hr	(100 ppb)	1 hr	200 µg/m ³	24 hrs	80 µg/m ³
O ₃	8 hrs	0.07 ppm (148 40 µg/m ³)	8 hrs	100 µg/m ³	1 hr	130 µg/m ³
PM ₁₀	24 hrs	150 µg/m ³	1 yr	70 µg/m ³ (IT-1*)	Annual Mean	120 µg/m ³

Pollutants	USEPA		WHO/IFC		PEQS	
	Avg.Time	Standard	Avg.Time	Standard	Avg.Time	Standard
			24 hr	150 $\mu\text{g}/\text{m}^3$ (IT-1*)	24 hrs	150 $\mu\text{g}/\text{m}^3$
PM ₂₅	Annual Mean	15 $\mu\text{g}/\text{m}^3$	1 yr	35 $\mu\text{g}/\text{m}^3$	Annual Average (IT-1*)	15 $\mu\text{g}/\text{m}^3$
	24 hrs	35 $\mu\text{g}/\text{m}^3$	24 hr	75 $\mu\text{g}/\text{m}^3$	24 hrs (IT-1*)	35 $\mu\text{g}/\text{m}^3$
					1 hr	15 $\mu\text{g}/\text{m}^3$

*IT- 1 as specified by WHO=AQG, 2005

Table 6: Comparison of International and Local Noise Standards

Category of Area/Zone	Limit in dB(A) Leq			
	PEQS		WHO/IFC	
	Day Time	Night Time	Day Time	Night Time
Residential area (A)	55	45	55	45
Commercial Area (B)	65	55	70	70
Industrial Area (C)	75	65	70	70
Silence Zone (D)	50	45	55	45

101. There are no national standards for surface water quality. Instead, drinking water quality and effluent discharge (to inland waters) are listed below. The latter standard assumes a dilution factor of 10 to 1 at discharge and at this dilution is taken as an indicator of acceptable surface water quality.

Table 7: Comparison of National and WHO Environmental Quality Standards for Drinking Water

Properties/Parameters	Standard values	WHO standards	Remarks
Biological			
All water intended for drinking (E. Coli or Thermo-tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E. Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water distribution system (E. Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient	Must not be detectable in any 100 ml sample In case of large supplies, where	Most Asian countries also follow WHO standards

Properties/Parameters	Standard values	WHO standards	Remarks
	samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	
Physical			
Colour	≤15TCU	≤15TCU	
Taste	Non objectionable/ Acceptable	Non objectionable/ Acceptable	
Odour	Non objectionable/ Acceptable	Non objectionable/ Acceptable	
Turbidity	<5NTU	<5NTU	
Total hardness as CaCO ₃	<500mg/l	---	
TDS	<1000	<1000	
pH	6.5 – 8.5	6.5 – 8.5	
Chemical			
Essential Inorganic	mg/Litre	mg/Litre	
Aluminum (Al) mg/l	≤0.2	0.2	
Antimony (Sb)	≤0.005 (P)	0.02	
Arsenic (As)	≤0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl ⁻)	<250	250	
Chromium (Cr)	≤0.05	0.05	
Copper (Cu)	2	2	
Toxic Inorganic	mg/l	mg/l	
Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to most Asian developing countries
Fluoride (F)*	≤1.5	1.5	
Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤0.5	0.5	
Mercury (Hg)	≤0.001	0.001	
Nickel (Ni)	≤0.02	0.02	
Nitrate (NO ₃)*	≤50	50	
Nitrite (NO ₂)*	≤3 (P)	3	
Selenium (Se)	0.01 (P)	0.01	
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source		
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries
Organic			

Properties/Parameters	Standard values	WHO standards	Remarks
Pesticides mg/l			PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted. **
Phenolic compounds (as Phenols) mg/l		0.002	
Poly-nuclear aromatic hydrocarbons (as PAHs) g/l		0.01 (By GC/MS methods)	
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

3. DESCRIPTION OF SUBPROJECT

95. Killi Sardar Akhtar (PIS) Subproject perennial irrigation subproject is located in Union Council of Laka Bund, tehsil and district Zhob, around 49 km south-east of Zhob city in Gosa Kibzai. Access is through a metaled road initially on Zhob to D.I. Khan road for a distance of 17 kms, then turning to right through link road via Killi Ghurdah Babar by travelling another 32 kms.

96. This chapter intends to present the present conditions at the proposed intervention locations along Karkh River and also present the proposed interventions.

3.1 Interventions at Project Site (Infiltration Gallery)

3.2.1 An Overview of Existing Irrigation System

97. In the sub-project area, abundant land is available for agriculture but irrigation water is the limiting factor. The farmers are temporarily irrigating part of command area of the subproject through pumping of surface water from streams/nullah and number of springs (i.e. Charmawal, Ghundai, Pitao Zakozaï etc).

98. Historical Akhtarzai command area was irrigated through infiltration gallery which is either non existing or damaged, later its supply of irrigation water from existing small dam constructed in the Ahmadzai area. Due to any of the reasons, supply from dam is not available from dam either shortage of water or social conflict between the tribes.

3.2.2 Review of Pre-Feasibility level Design

99. Prefeasibility study of the Killi Sardar Akhtar PIS subproject was carried out by the TA-Consultants in 2018. The prefeasibility report indicates an annual water availability as 2.94 million cubic meters (MCM). The report mentions the construction of infiltration galleries just upstream of the road cross at sawar rud, RCC conduit (125m), irrigation channel (2700m) with allied structures, Lining of charmawal spring (700m) and social structures.

100. On the basis of topographic survey of the subproject, layout / axis of infiltration gallery has been reviewed and concluded that most of the proposed command area by the TA – Consultants (i.e. Qila Sardar Akhtar Khan, Ghundi, Churmawala, Pitao Zakozaï, Dabari, Kharhpani and Dodazai) went out of command due to higher ground elevations.

101. To bring the proposed command area under command, layout of the infiltration gallery shifted towards upstream without effecting the existing Ali Zai command area on left river bank as shown in Error! Reference source not found..

102. Even by shifting the infiltration gallery axis, Charmawal and Pitao Zakozaï proposed command areas could not be irrigated through gravity. To make the project feasible, Baz Khel

(new command area) has been identified during desk study at design office and verified through a comprehensive walkthrough survey of design team along with client and farmer organisation representatives. A post visit / walk through meeting was held at Project Director's office and new proposed command area (Baz Khel) was discussed and agreed upon. Layout and description of the command area is shown in

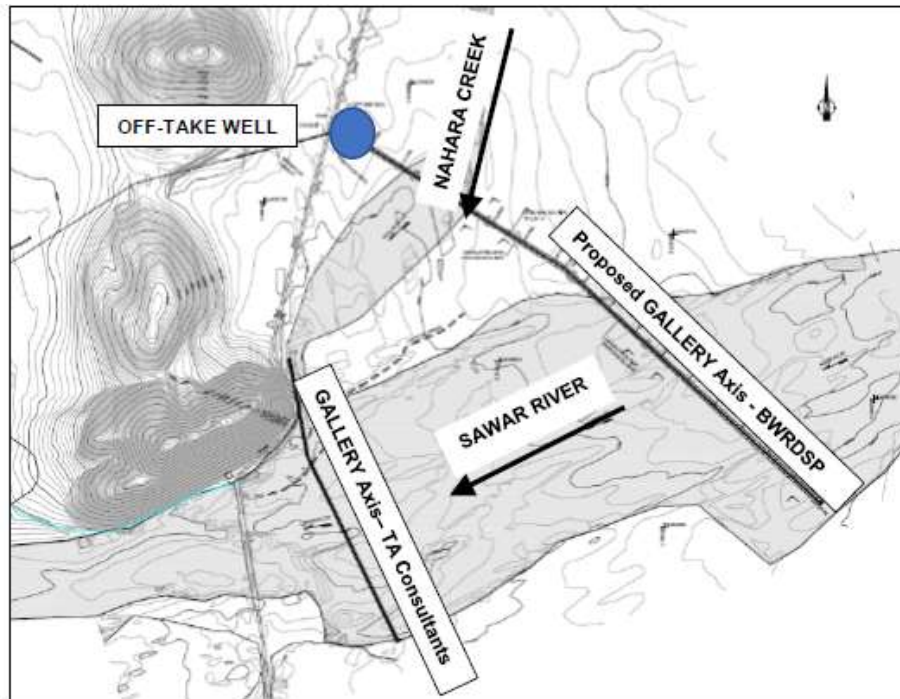


Figure 2: Layout Plan of Proposed Infiltration Galleries at Killi Sardar Akhtar PIS

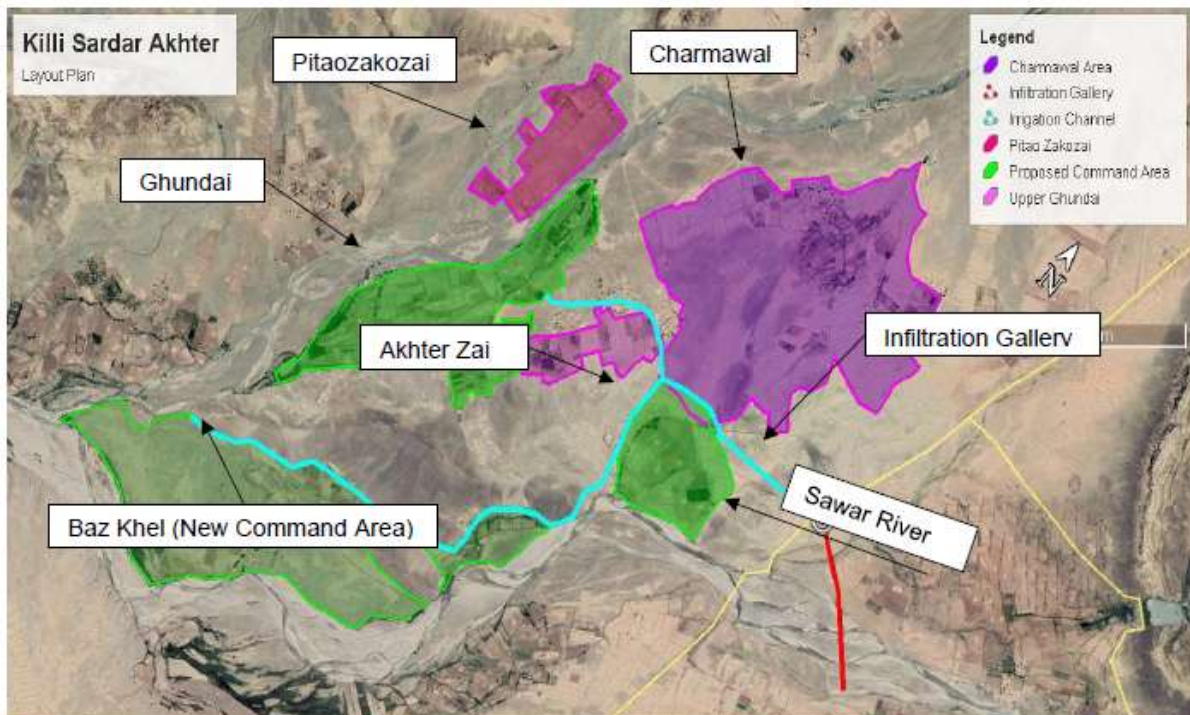


Figure 3:Layout of the Subproject

103. Salient features of the sub-project as given in the Pre-feasibility Study are given in Error! Reference source not found.8.

Table 8: Salient Features of subproject

Type of structure	Infiltration Gallery & Offtake Well
Coordinates	N 34354 17.93m, 548553.4m E Zone 42R
Infiltration Gallery (m)	450
Canal (m)	3,300
Time Division Structures (Nr.)	10
Aqueduct (m)	100
Flood Protection Bund (m)	164
Water Storage Tanks (Nr.)	1
Watershed Area (Ha)	22
Available Water (MCM)	3
Design Command Area (Ha)	230
Cost of Infrastructure (Mil. Rs.)	83.49

3.2.3 Proposed Interventions

104. The Consultants have proposed the intervention for the subproject based on the field investigations, consultation with the stakeholders, review of feasibility and desk studies. In this regard, following interventions will be carried out:

- (a) Construction of infiltration galleries,
- (b) Construction of water conveyance system and associated structures – which relate to the Killi Sardar Akhtar PIS subproject as a whole.

□ Infiltration gallery

105. In Killi Sardar Akhtar PIS sub-project, an infiltration gallery has been designed in bed of Sawar River and Nahra Creek, project layout plan is shown in **Error! Reference source not found.** Details of gallery design parameters are given in Error! Reference source not found.9. It is connected to collection chamber (off-take well) and irrigation channel, which bring water to command area. Proposed gallery is 845.0 m long and placed perpendicular to river / nullah flow at a depth of 1.5 m below river bed.

106. Figures showing plan and profile of the Infiltration Gallery is shown in Error! Reference source not found.4-5. The design involves selection of gallery type, geometry of conduit and design of filter.

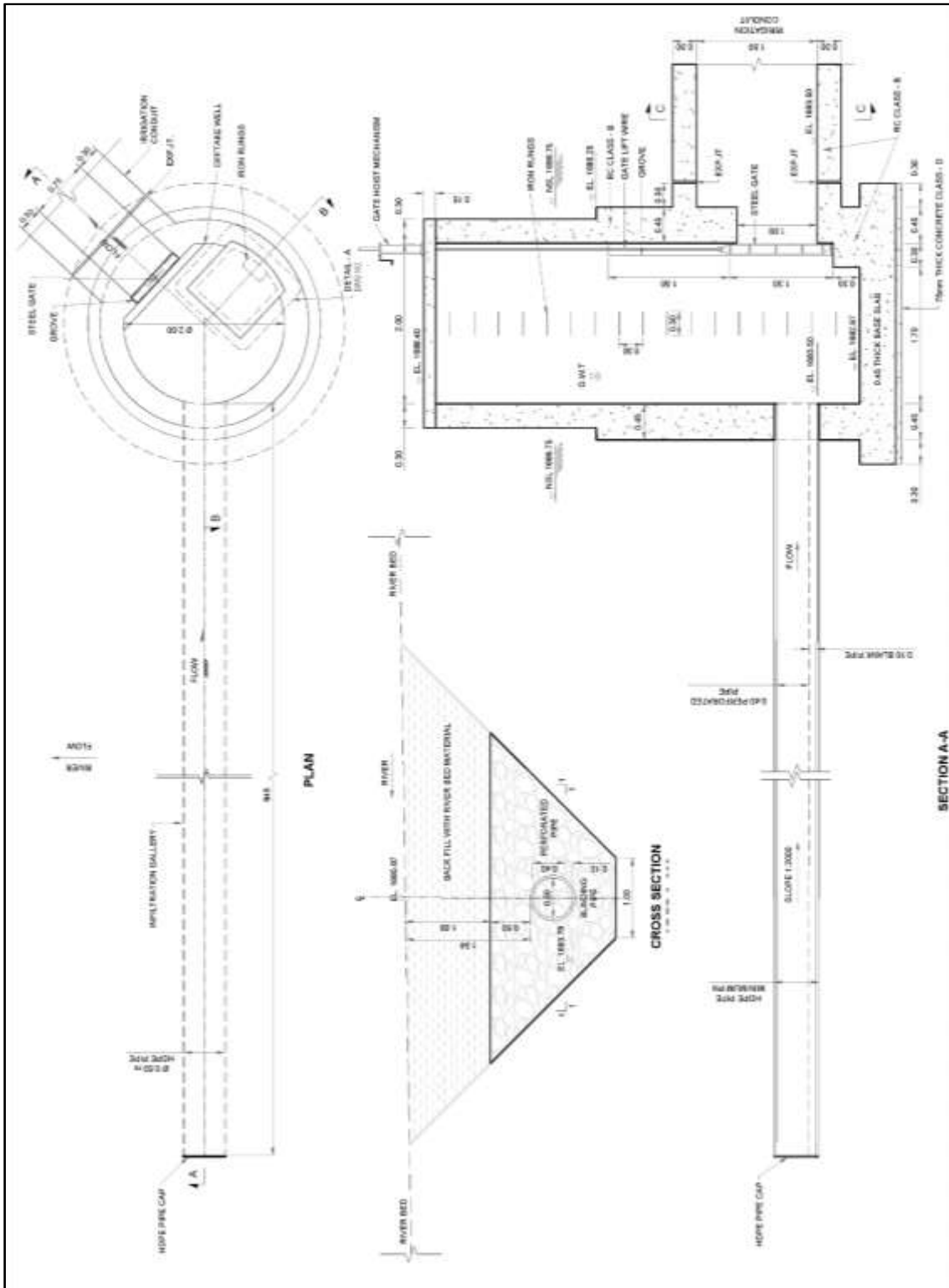
Table 9: Details of infiltration galleries proposed at Killi Sardar Akhtar

Parameter	Designed	Adopted
Gallery Length (m)	300.00	845.00
Gallery Pipe Diameter (m)	0.50	0.50
Design Discharge (cumec)	0.17	0.17
Command Area (Ha)	230.00	230.00
Gallery Elevation (m)	1683.50	1683.50

Figure 4: Layout plan of proposed infiltration galleries at Kili Sardar Akhtar



Figure 5: Killi Sardar Akhtar Infiltration Gallery



□ Irrigation Channel

107. The irrigation system of Killi Sardar Akhtar sub-project comprises main canal offtakes from right side of Infiltration gallery and Ghundai branch offtakes from main canal. The Command area of Akhtar Zai and Bakkhel will be irrigated from main canal and command area of Ghundai will be irrigated from Ghundai branch. Total command area of three Killis 230 ha will be served through perennial irrigation supplies. Presently existing command area of Killi sardar Akhtar is irrigated by tube wells, spring water and rain fed cultivation is also practiced. In Killi Baz Khel and Killi Ghundai (Salmanzai) irrigated farming is done from tube wells and on remaining major area rain fed cultivation is performed.

108. Based on the above information it is assessed that there is no irrigation system exist. Present the existing command area is fed by spring water, surface water pumped from the river, tube wells and rain fed cultivation as shown in **Figure 6**.



Figure 6: Irrigation Trough Diesel Engine (Tube Well) and Killi Sardar Akhtar Zai Subproject Command Area

109. Main channel off takes from the right side of Infiltration gallery. The length of main channel is 4.517 km and ghundai channel off take from main channel at RD 1+176 and length is 0+953 km.

110. Although existing alignment of canals followed at some place however to irrigate further command area existing canals are extended and aligned according to following considerations.

- The channel must command the entire possible command area.
- All the settlements must be avoided in order to economize the land acquisition and resettlement cost.
- Channel alignment should be modified to avoid built-up areas, places of worship and historical importance.

- Channel alignment should avoid all religious places and graveyards.
- Cost of construction including cross drainage works is minimized.
- Acute curves be minimized to achieve smooth flow.
- Excessive sinuosity was avoided to minimize channel lengths.
- Wherever possible, the channel should cross the roads, railways lines and nullahs at 90o angle in order to avoid skew bridges which are costly.
- To balance and to minimize cut and fill quantities

111. Summary of Design parameters of lined channel are given in **Table 10** and **Table 11**. Design Calculations work sheets prepared by consultants given in Annex A (Appendix 6.1).

Table 10: Design Parameters of Main Channel

RD (Km)	Discharge (m ³ /s)	Manning "n"	Bed Slope m/m	Bed Width (m)	Flow Depth (m)	Velocity (m/s)	Free Board (m)
000 to 0+300	0.150	0.020	0.00034	0.75	0.58	0.35	0.92
0+300 to 1+950	0.150	0.020	0.00034	0.75	0.58	0.35	0.32
1+950 to 4+517(tail)	0.150	0.020	0.0010	0.75	0.49	0.51	0.32

Table 11: Design Parameters of Ghundai Branch

RD (Km)	Discharge (m ³ /s)	Manning "n"	Bed Slope m/m	Bed Width (m)	Flow Depth (m)	Velocity (m/s)	Free Board (m)
000 to +100	0.15	0.020	0.0005	0.75	0.50	0.40	0.30
0+100 to 0+500	0.15	0.020	0.0005	0.75	0.50	0.40	1.00
0+500 to 0+660	0.15	0.020	0.0005	0.75	0.50	0.40	0.30

□ Channel Structure

112. A number of structures are proposed on each canal including road crossings, sumps, flow division and time division /off-take structures. Various structures along the canal length are provided where necessary. Other structures included for water use by community in command areas include washing structure and other social structures are also provided on both the channels. Number and type of structures provided on each channel are given in **Table 12**.

Table 12: Number of Structures on Channels of Kili Sardar Subproject

Name of Channel	Total Length (km)	Fall Structure	Sumps	Culvert	Time Division Structure	Tail Structure	Social Structure
Main Channel	4+517	7	4	3	9	1	1
Ghundai Channel	0+953	3	5	0	3	1	0

113. Time division structures have been provided to divert the flow from main channel to secondary channel (water course). The structure comprises stone masonry walls/concrete walls with concrete floor and gated (shutter) openings to feed flow from distributary channel to water course. The gates used in these structures are simple steel sliding shutters. The size of opening to divert water from main channel to water course has been calculated by using the weir formula.

114. Time division structures has been provided on each channel as per existing locations and as requirement of FO during walk-trough survey. Fourteen time division structures including tail structure has been provided along the both canal length.

115. The layout plan and different cross sections of canal and infiltration gallery of the proposed sub-project are shown in **Annexure 4**.

116. The salient features of the proposed interventions are shown in **Table 13**. A typical drawing and cross-section of Kili Sardar Akhtar Infiltration gallery on Mula river is given as **Annexure - 4**.

Table 13: Salient Features – Kili Sardar Akhtar Infiltration Gallery, Irrigation System Sub-project

Sr. No.	Proposed Works	Details
1	Type of Structure	Infiltration Gallery and Channels
2	Infiltration Gallery Length (m)	845.00
3	Infiltration Gallery HDPE Pipe Diameter (m)	0.50
4	Collection Chamber Diameter (m)	2.00
5	Channel Intake Opening Size (m)	B=0.75 x H=1.00
6	Collection Chamber Inverted Level (m)	1683.50
7	Lined Channel Length (m)	4702.00
8	Conduit Channel (m)	800.00
9	Inspection Sump (No.)	8
10	Falls Structure (No.)	10
11	Road Culverts (No.)	3
12	Time Division Structures (No.)	12
13	Tail Structure (No.)	2
14	Washing Structure (No.)	1
15	Animal Drinking Structure (No.)	1
16	Wuzu Structure (Number)	1

Source: Design Report

117. Total estimated cost of recommended plan is Rs 192.871Million as given in **Table 14**.

Table 14: Project Cost

Sr. No.	Description	Amount (Pak Rs.) in million
A	Civil Works	
1	Infiltration Gallery	30,184,621
2	Earthwork and Lining of Kili Canal and Ghundani Channel	70,785,506

Sr. No.	Description	Amount (Pak Rs.) in million
3	Road Culvert	1,708,943
4	Fall Structure	7,083,180
5	Time Division Structure	3,059,612
6	Crossing	75,858
7	Animal Drinking Structure	90,145
8	Washing Structure	29,641
9	Wuzu Structure	36,583
10	Sump	2,564,877
11	Tail Structure	679,992
12	Project Support Facility Building	17,100,000
13	General Items	15,540,000
	Sub Total-A	148,938,958
B	Mechanical Works	
14	Shutter of Time Division & Tail Structures	3,935,040
15	Gallery Well Gate	236,250
16	Steel Graded Rack	22,500
	Sub Total-B	4,193,790
C	Command Area Development and Related Works	
17	Command Area Development	13,832,000
18	Watershed Management	1,553,000
19	Khushkaba Area	
	Sub Total-C	15,385,000
D	Provisional Items	
1	Day Work	2,187,427
2	Specified Provisional Sums	7,000,000
3	Physical Contingencies @ 3% Total (A+B+C)	5,055,532
4	Balochistan Sales Tax @ 6% of Total (A+B+C)	10,111,065
	Grand Total	192,871,772

3.2.4 PROPOSED CONSTRUCTION SCHEDULE

118. Mobilization for this project will include logistics of assembling all necessary plant and construction equipment, providing housing facilities with water sanitary and power utilities, training and organizing work forces and getting construction work underway. It is important that all works discussed under preliminary works including improvement of existing access road are completed prior to start of major civil works. The period for mobilization and preliminary works will extend over first 4 months of the contract period.

3.2.5 Construction of Infiltration Galleries & Associated Structures:

119. The meteorological and river flow data showed that best suited period for construction is from September to December. During this period river flows are low and interruptions in construction activities due to rain will be less frequent. Construction work may however continue with some interruptions in January to August. Values of monthly rainfall based on recorded data at Zhob shows average monthly river flows based on estimated flows for sub-project. In formulating construction schedule it has been assumed that contract will be awarded in the second quarter of 2021.

120. Main factors which affect construction program are planning for material utilization (including procurement of perforated pipe and its transportation to site) and proposed core subproject for diverting river flows during construction. In view of work load involved in construction of infiltration galleries and related works were proposed to be completed in a period of 9 months (beyond pre-construction and preparatory works) involving one main flood period. The river flows are proposed to be diverted through diversion channel which is aligned away from working site.

3.2.6 Construction Equipment

121. **Table 15** shows a tentative list of construction equipment required by the contractor to enable him to undertake this work and meet the prescribed schedule.

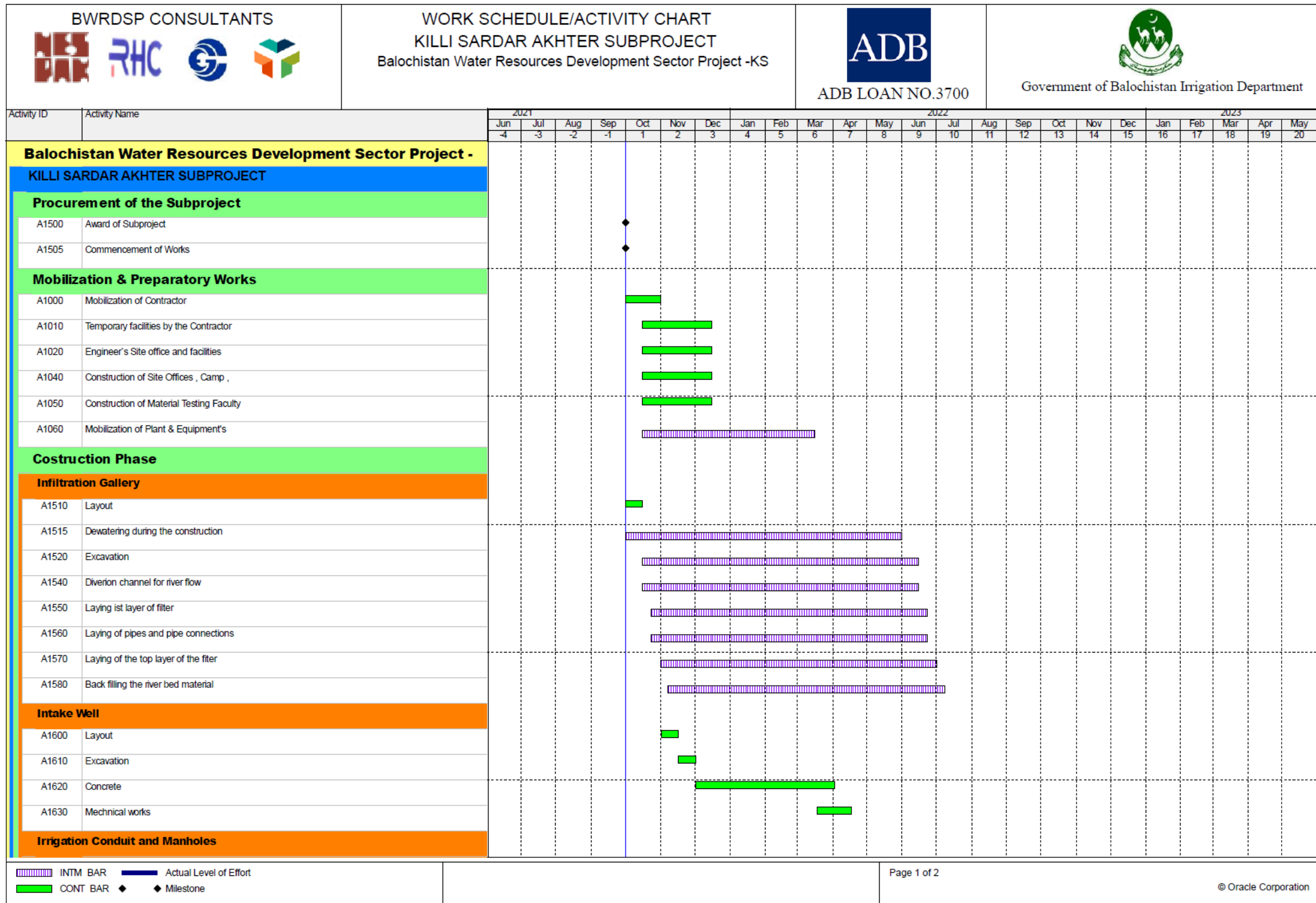
Table 15: List of Construction Equipment Required by the Contractor

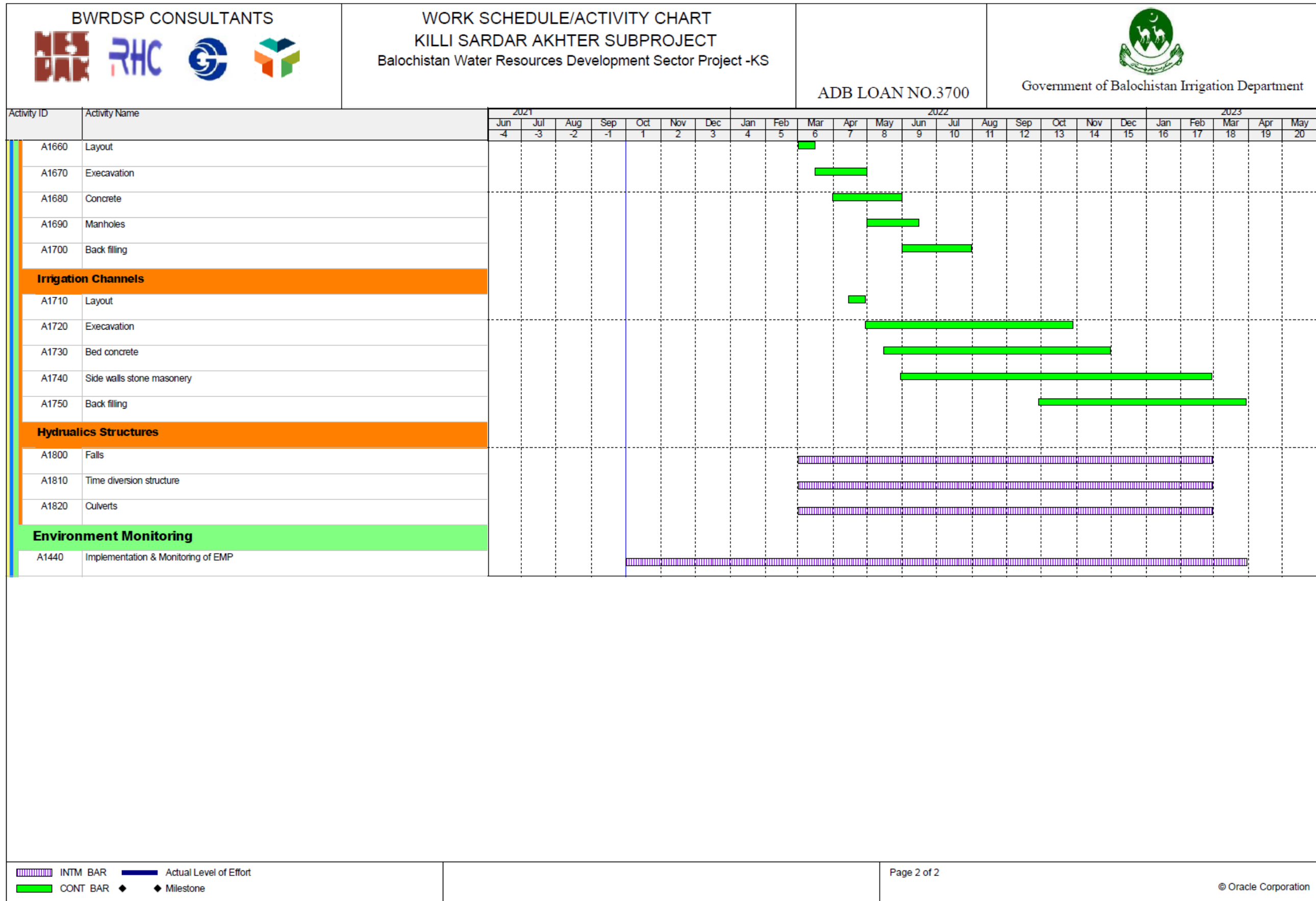
Sr. No.	Description	No. Required
1	Bulldozer D8 with ripper (Blade capacity = 12.9 m ³)	1
2	Motor Grader cat 14G or Equivalent	1
3	Front End Loader Bucket capacity = 6 m ³	2
4	Sheep foot roller for core compaction (10-ton capacity)	2
5	Dump Trucks (capacity = 14 m ³)	4
6	Mobile water tanker 500 gaLLTns	2
7	Hydraulic Excavator with 14" wide bucket	1
8	Concrete Batching Mixer	2
9	Concrete Vibrators	6
10	Centrifugal pumps ½ cfs	2
11	Hand compactors	3
12	Diesel generator	2
13	Jeeps	2

Source: Design Report

122. For construction of proposed Infiltration galleries and Rehabilitation irrigation channels, river protection works and flood protection works construction materials such as fine and coarse filters and stone for stone masonry are available in close vicinity of the project area. The period of construction is estimated as 18 months as per implementation plan.

Figure 7:
Construction Schedule





4. ALTERNATE ANALYSIS

4.1 Project Need and Justification

4.1.1 Kili Sardar Akhtar Infiltration Gallery

123. There exists a katcha bund constructed by farmers to harness rain-water for irrigating khushkaba lands, as previously water from the Sawar River in this reach was not utilized due to lack of water diversion. There are cultivable areas located on both banks of Sawar River being cultivated as khushkaba, whereas remaining area located on right bank of river is being irrigated by 5 open wells by installing pumps functioning on diesel engines.

124. After implementation of sub-project that includes construction of infiltration galleries and channels, it is anticipated that an additional area, which at present is being grown as khushkaba, will be brought under perennial irrigation by providing outlets according to due shares of beneficiaries. In addition, it is also expected that perennial lands lying on left bank of Sawar River will also be cultivated. The proposed sub-project saves perennial supplies of existing springs from conveyance/seepage losses and to harness sub-surface flow of Sawar River by construction of infiltration gallery. Sufficient surface and sub-surface water are available in main river at Gosa area, where large scale of cultivated and cultivable lands are available for agriculture development, but there is a shortage of perennial irrigation water.

4.2 No Project Alternative

4.2.1 Kili Sardar Akhtar infiltration Gallery

125. In the sub-project area, abundant land is available for agriculture but irrigation water is the limiting factor. The farmers are temporarily irrigating part of command area of the subproject through pumping of surface water from streams/nullah and number of springs (i.e. Charmawal, Ghundai, Pitao Zakozai etc).

126. Historical Akhtarzai command area was irrigated through infiltration gallery which is either non existing or damaged, later its supply of irrigation water from existing small dam constructed in the Ahmadzai area. Due to any of the reasons, supply from dam is not available from dam either shortage of water or social conflict between the tribes.

4.3 Interventions at Kili Sardar Akhtar

4.4.1 Alternatives

127. The following two options were considered at Kili Sardar Akhtar:

- A water intake structure, as head works, with proper flood protection works for canal system and lining the entire water channel to the command area including drainage structures.
- An infiltration gallery along with lined irrigation channel up to the command area.

128. It was duly noted during field investigations that the surface water would not be available during the entire year however the subsurface water (river back flow) is available all year round hence the selection of an Infiltration gallery across the entire river bed has been proposed.

129. The objective of the project is to provide more irrigation water to the existing and available command area in villages of the project area.

130. The sub-project will also provide with the flood protection bund (164 m) along some reaches of command area to preserve it from flood water. The provision of permanent infrastructure will improve system efficiency by reducing losses and conveyance times between the source and outlets. Availability of water round the year will increase productivity of the area and enhance income generation activities in the area.

131. **Table 16** below provides comparison of alternatives with respect to cost, design and environment:

Table 16: Comparison of Alternatives

Parameters	Weir	Infiltration Gallery
Cost	Costly	Cheaper
Design	Weir can only be operateable during surface flow of river.	Infiltration gallery can provide water to agricultural field around the year
Perceived Environmental Impacts	Soil erosion, loss of natural vegetation, deployment of external labor force.	Soil erosion, loss of natural vegetation, deployment of external labor force.

132. Comparison of alternative as mentioned in **Table 16** shows that the infiltration gallery is the best alternative with respect to cost and availability of water for whole year.

5. ENVIRONMENTAL & SOCIAL BASELINE CONDITIONS

133. Spatial project boundary is defined as the specific site area that includes the areas of construction and operation and the zones of influence around the project site i.e. physical, biological and socioeconomic. The area of influence around the proposed sub-project interventions are attached **Annexure - 5**. It specifically includes the construction area and the land adjacent to it. The adjacent land includes any area that is directly disturbed by the construction and operational activities of the project. The project boundary may vary for different major areas covered under physical, biological and socioeconomic environment depending upon the areas of influence. This chapter describes the environmental setting of the proposed interventions.

134. The data presented in the following sections has been collected from both secondary and primary sources. For secondary data acquisition, the project team contacted the relevant departments and gathered the required information. Primary data was collected during reconnaissance surveys and detailed visits during March 2020. The secondary data was also verified and visual observations were made during these visits.

5.1 Physical Resources

5.1.1 Geography

135. Balochistan is situated in the southwest of Pakistan and covers an area of 347,190 square kilometers (134,050 sq. mi). It is Pakistan's largest province by area, constituting 44% of Pakistan's total land mass. The province is bordered by Afghanistan to the north and north-west, Iran to the south-west, Punjab and Sindh, and Khyber Pakhtunkhwa and the Federally Administered Tribal Areas to the north-east. To the south lies the Arabian Sea. Balochistan is located on the south-eastern part of the Iranian plateau. It borders the geopolitical regions of the Middle East and Southwest Asia, Central Asia and South Asia. Balochistan lies at the mouth of the Strait of Hormuz and provides the shortest route from seaports to Central Asia. Its geographical location has placed the otherwise desolate region in the scope of competing global interests for all of recorded history.¹⁰

136. Balochistan is rich in exhaustible and renewable resources; it is the second major supplier of natural gas in Pakistan. The province's renewable and human resource potential has not been systematically measured or exploited due to pressures from within and without Pakistan. Local inhabitants have chosen to live in towns and have relied on sustainable water sources for thousands of years.¹¹

137. Zhob means Oozing Water. Zhob is the 2nd oldest district of Balochistan Province after Quetta. It was given the status of District in 1890 and was named as Fort Sandeman in

¹⁰ https://en.wikipedia.org/wiki/Balochistan,_Pakistan#Geography

¹¹ https://en.wikipedia.org/wiki/Balochistan,_Pakistan#Geography

deference of Sir Robert Sandeman. The district was renamed as Zhob, by Zulfiqar Ali Bhutto, the then Prime Minister of Pakistan, in 1975. The district is located in the Northeast of provincial capital Quetta at a distance of 260 km (crow flight) and 320 Km (ground distance). Geographically the district lies between 67°48'41"-69°44'43" East longitudes and 30°26'54"-31°57'8" North latitudes. The total geographical area of the district, according to 1998 Census was 20297 Sq. Km until it was bifurcated into two districts, Zhob and Sherani. Presently Geographical area of the district is 12400 sq. Km (District Development Profile 2011). For administrative purpose the district has been divided into Two Tehsils and 24 Union Councils.

138. Zhob district is situated in the extreme north-east of Balochistan province. Afghanistan lies to the north-west, while South Waziristan Agency (FATA) lies to the north of Zhob. The eastern boundary is marked by the Suleiman range and D.I. Khan district, Sherani District on North-east, Loralai and Musa Khel district border on the south and south west and Killa Saifullah district on the immediate west. Topographically, the district is covered with mountains and hills, which are intersected by broad valleys of Zhob River and its tributaries. The district lies between Toba Kakari Range and Suleman Range extend on Western and Eastern boundaries of the district, respectively. The lowest point of the district is 1500 meters above sea level. People live up to 2500 meters. The highest peak in the district is Takht-i-Suleiman (Solomon's throne) at 4000 meters.

5.1.2 Project Location and Surrounding

139. Killi Sardar Akhtar (PIS) Subproject perennial irrigation subproject is located in Union Council of Laka Bund, tehsil and district Zhob, around 49 km south-east of Zhob city in Gosa Kibzai. The subproject is proposed on flat terrain and a large amount of land is available for cultivation. The proposed subproject will use sub-surface flow for irrigation. Since available sub-surface water is limited, it will restrict total area that can be developed as compared to available land. Access is through a metaled road initially on Zhob to D.I. Khan road for a distance of 17 kms, then turning to right through link road via Killi Ghurdah Babar by travelling another 32 kms.

5.1.3 Geology

140. High mountains surround the project area which lies near Killi Sardar Akhter area. The terrain is generally flat in the subproject and its command area. It is located in an environment of degraded rangelands. The average altitude of the Killi Sardar Akhtar (PIS) Subproject command area is 1680 m above mean sea level.

141. The sub project site is bounded by mountain ranges as Shinkai Ghar in the North, Mand Ghar in the South, Nar/Tor Ghar in the East and Rakhpur ghar in the West. Regional geological rock Formations in the Project area are Parh Group and Pab Sandstone Formations.

5.1.4 Seismicity

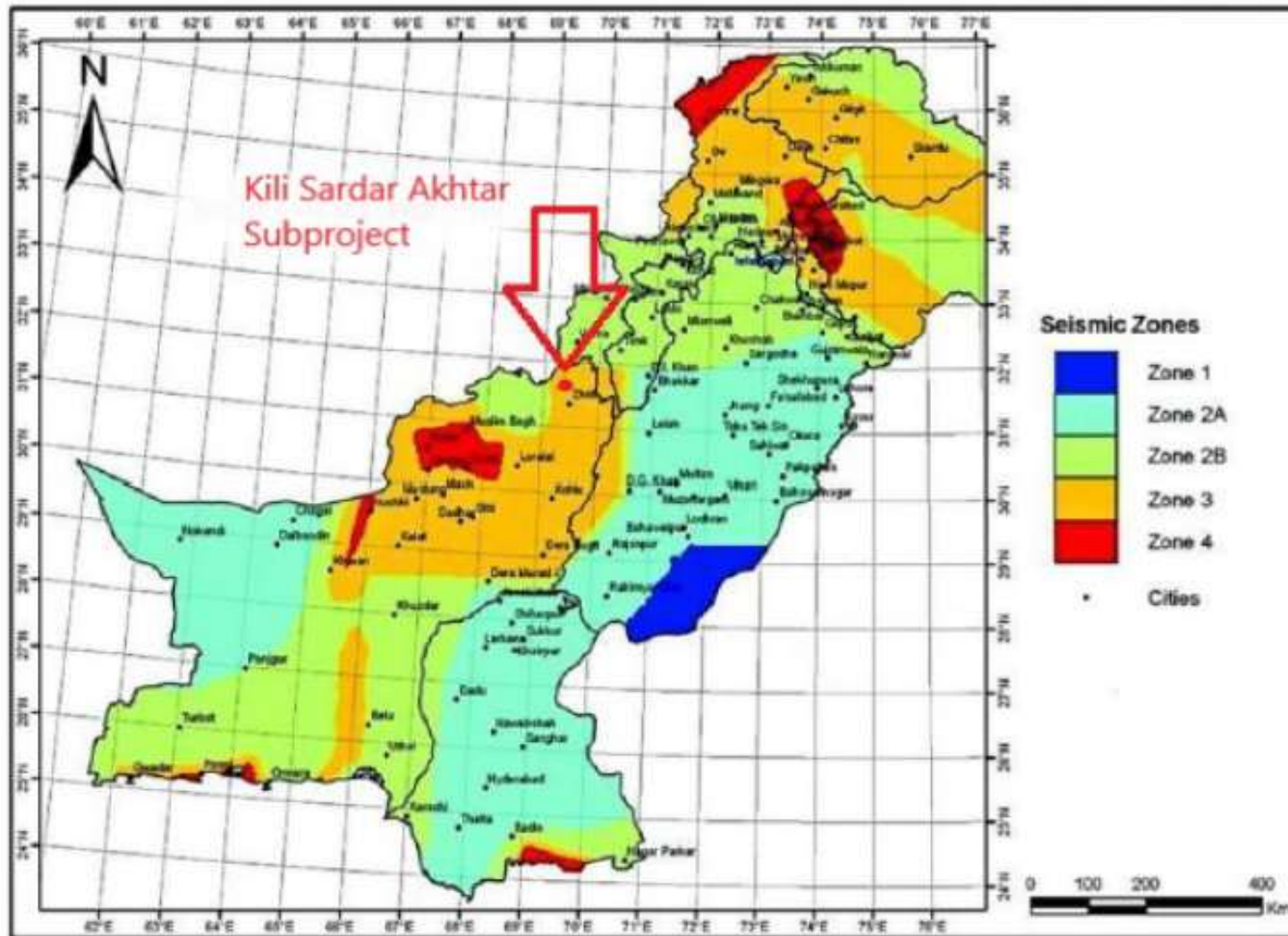
142. The entire province of Balochistan lies in a seismically active region. The province has experienced devastating earthquakes in the past. A powerful earthquake with a magnitude of 7.0 on the Richter scale was recorded on May 31, 1935 and devastated Quetta town and resulting in 35,000 fatalities.

143. Again, on the Nov 28th, 1945, an earthquake measuring 8.6 on the Richter scale hit Balochistan killing almost 4,000 people.

144. A history of recorded earthquakes is attached as **Annexure - 6**.

145. The seismic zoning map of Pakistan, indicates that the project area lies in the **zone 2B**. This zone is liable to MSK VI or less and is classified as the Low Damage Risk Zone. The Medvedev–Sponheuer–Karnik scale, also known as the MSK or MSK-64, is a macroseismic intensity scale used to evaluate the severity of ground shaking on the basis of observed effects in an area of the earthquake occurrence. The updated Seismic Zoning Map of Pakistan is shown below as **Figure 8**.

Figure 8: Seismic Zoning Map of Pakistan



Source: Geological Survey of Pakistan

5.1.5 Topography

146. High mountains surround the project area which lies near Killi Sardar Akhtar area. The terrain is generally flat & irregular in the subproject and its command area. It is located in an environment of degraded rangelands. The average altitude of the Killi Sardar Akhtar (PIS) Subproject command area is 1680 m above mean sea level.

5.1.6 Climate

147. Zhob has a semi-arid climate and its rainfall is just high enough to take it out of the arid climate category found at lower elevations. Unlike most of Balochistan, Zhob does on occasions receive rainfall from the monsoon though this occurs very erratically. The climate of Zhob is very cold in winter as compared to other lower basins of Balochistan. The Killi Sardar Akhtar site is located at an elevated south eastern part of the Zhob basin has intense winters with the mercury dropping below zero degrees Celsius (0 °C). The coldest months are generally December and January while summer in general is warm to hot.

Precipitation

148. Mean monthly rainfall data and the number of rainy days recorded at the Zhob Met Station are given in **Table 17**. The average annual rainfall of the area is about 297.3 mm (11.7 inches) (Ref. 1), while on the average the maximum monthly rainfall is 66.4 mm during the month of July and a minimum of 5.2 mm in October. The maximum rainfall occurs during the months of June to September, which is about 50% of the annual rainfall. Winter rains generally occur during the months of January and February, whereas, October is normally the months with least precipitation. The distribution of average monthly rainfall is shown in **Figure 9** below.

Table 17: Mean Monthly Rainfall in Zhob

Month	Mean Monthly Rainfall (mm)	Rainy Days (No.)
January	15.1	2.3
February	27.3	2.8
March	43.5	4.9
April	31.9	3.4
May	17.3	2.0
June	19.8	2.8
July	66.4	5.0
August	44.8	3.7
September	9.0	0.9
October	5.2	0.7
November	5.5	0.6
December	11.4	1.0
Annual	297.2	30.1

Source (Pakistan Meteorological Department)

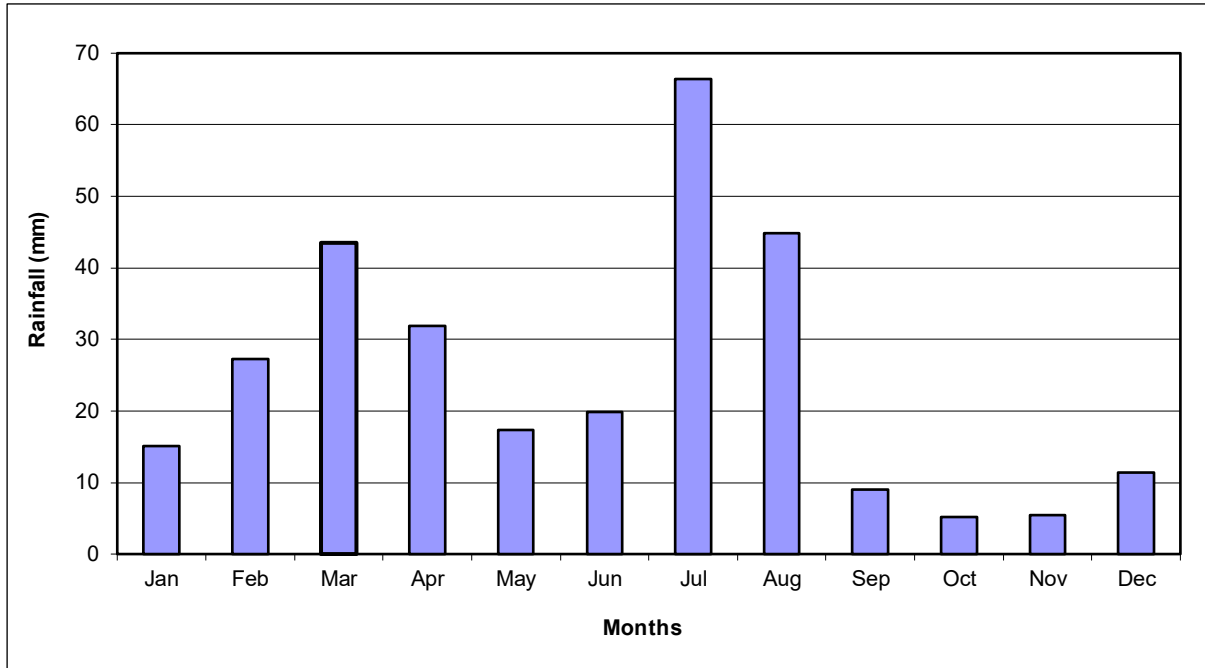


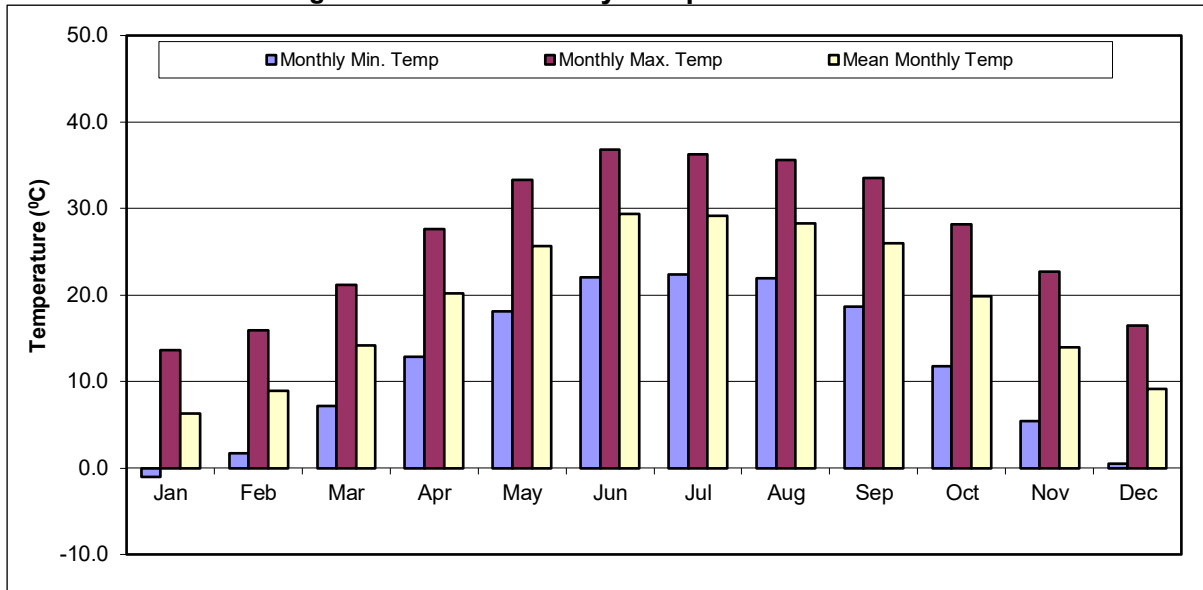
Figure 9: Monthly Distribution of Rainfall at Zhob

5.1.7 Temperature

149. The mean daily temperature ranges from (June being the hottest month) 25.7°C to 29.4°C in the summer season (May to September) and 6.3°C to 9.1°C in winter season (December to February). Mean monthly temperature in June rises to a highest value of 29.4°C and falls to the lowest value of 6.3°C in January. June, July and August are the hottest months in summer season. December, January and February are the coldest months in winter season. The monthly averages of minimum, maximum and mean daily temperatures are given in **Table 18** and shown graphically in **Figure 10** below.

Table 18: Mean Monthly Temperatures in Zhob

Month	Temperature (°C)		
	Min	Max	Mean
January	-1.0	13.6	6.3
February	1.7	15.9	8.9
March	7.2	21.2	14.2
April	12.8	27.6	20.2
May	18.1	33.3	25.7
June	22.0	36.8	29.4
July	22.4	36.3	29.2
August	21.9	35.6	28.3
September	18.6	33.5	26.0
October	11.8	28.2	19.8
November	5.4	22.7	13.9
December	0.5	16.5	9.1

Figure 10: Mean Monthly Temperatures in Zhob

5.1.8 Relative Humidity

150. The relative humidity data at 00:00, 03:00 and 12:00 hours was collected from PMD. Mean monthly relative humidity is given in **Table 19**. At 00:00 hr the relative humidity varies from lowest value of 45.4% in May to highest value of 69.4% in August. At 12:00 hr the lowest value is 16.5 % in May to highest value of 33.7 % in January.

Table 19: Mean Monthly Relative Humidity in Zhob

Month	Relative Humidity (%)		
	00:00 hr	03:00 hr	12:00 hr
January	67.4	62.3	33.7
February	64.7	59.6	31.4
March	64.7	55.8	28.1
April	53.7	44.4	21.6
May	45.4	34.1	16.5
June	47.3	37.4	18.4
July	64.7	54.4	29.4
August	69.4	60.6	28.0
September	62.2	52.2	17.7
October	52.7	41.8	16.5
November	54.9	44.9	23.9
December	61.5	54.9	28.8

151. In a report published by Pakistan' National Disaster Management Authority, Monsoon Season 2016 unfolded with five rain spells at regular intervals starting from 28 June to 16 September 2016. As per Pakistan Meteorological Department (PMD), Monsoon 2016 remained 25% Above Normal against predicted rainfall of 10 - 20% Above Normal. During the month of August, rainfall was largely in excess across much of the Country while in July, the Country experienced slightly less rainfall¹².

5.1.9 Wind Speed

152. The mean monthly wind speed in knots is given in **Table 20**. The data reveals that at 00:00 hours, the wind speeds are generally lower while higher wind speeds are recorded at 03:00 and 12:00 hours. During summers wind speeds are generally higher than wind speeds in winters.

Table 20: Mean Wind Speed at Synoptic Hours in Zhob

Month	Mean Wind at Synoptic Hours (Knots)		
	00:00	03:00	12:00
January	0.8	1.2	3.1
February	0.9	1.3	4.3
March	1.3	1.7	5.4
April	1.5	1.8	6.0
May	1.4	1.6	6.0
June	1.3	1.5	5.9
July	1.3	1.5	5.7
August	1.3	1.4	5.1
September	0.9	1.4	4.0
October	1.0	1.0	3.1
November	0.9	1.0	2.6
December	0.9	1.1	2.6

5.1.10 Hydrology and Floods

153. The hydrological assessments covered the estimation of water availability and design flood at the weir site. Total catchment area at Killi Sardar Akhtar (PIS) Subproject site is 367 square kilometers. Ahmadzai Weir is located upstream of the project site having catchment area of about 225 square kilometers. The water availability was estimated both from stream flow data and rainfall-runoff modelling using satellite-based data. The study used the average annual rainfall of 275 mm and rainfall-runoff factor for Zhob and Gomal basins as 0.10-0.12. This worked out average annual runoff volume at Killi Sardar site as 5.29 million cubic meter

¹² Pakistan' National Disaster Management Authority, "POST DISASTER REPORT MONSOON 2016", <http://www.ndma.gov.pk/publications/Post%20Monsoon%202016%20Report%202%20March%202017.pdf>

(MCM) which includes 1.23 MCM of perennial flows and 4.06 MCM of flood flows in Sawar Rud.

154. In addition to the above, the command area of Killi Sardar Akhtar (PIS) Subproject is being fed by the flows of two other neighboring natural streams and a spring which has an average annual cumulative potential of about 2.54 MCM.

155. For estimation of flood flow, one-day annual maximum rainfall data record of Zhob was used for a period from 1980 to 2018 (39 years). Rainfall Frequency Analysis was carried out using Gumbel's Extreme Value Type-1 Distribution and Log Pearson Type-III. Results by Gumbel Extreme Value Type I best fit. Using the rainfall depth for various return periods, its temporal distribution over the catchment areas and on the basis of Synthetic Unit Hydrograph technique, the estimated peak flood is given in **Table 21**.

Table 21: Estimated Peak Floods at Killi Sardar Site

Return Period (Years)	Estimated Peak Floods	
	(ft ³ /s)	(m ³ /s)
25	23,980	679
50	28,760	814
100	33,590	951

5.1.11 Water Quality

156. Groundwater quality as assessed from tubewell water, dugwells and water pumps was generally within permissible limits. However, Sri Toi Manda (surface) and tubewell (ground) waters showed high salinity. Although, no vast soil salinity was observed except in local patches, land levelling is essential to manage root zone salinity. In unlevelled field salts accumulate on high spots. The ground water quality is given in Error! Reference source not found. The analytical methods used for the analysis of these sample are given and can be referred from the Laboratory reports attached **Annexure- 7** of this report

Table 22:: Summary of Ground Water Quality

Source of water	pH	Soluble salts		Cations	Anions		RSC (meq L-1)	SAR
		EC (dSm ⁻¹)	TSS (mg kg-1)	Ca + Mg (meq L-1)	CO3 (meq L-1)	HCO3 (meq L-1)		
Sri Toi tube well (ground water)	7.9	1.55	1085	6.3	BDL	4.80	1.5	1.69

157. Surface water stored in depressions during field visits was collected and tested in laboratory. Error! Reference source not found. presents result of surface water quality.

Table 23: Summary of Surface Water Quality

S.No.	Parameter	Units	Sampling Locations		
			Wall Site 1	StorageArea	Wall Side2
1	Turbidity	NTU	BDL	BDL	BDL
2	TSS	mg/L	BDL	BDL	BDL
3	TDS	mg/L	2041	1971	1807
4	pH @25oC	-	8.15	8.15	8.30
5	Aluminum (Al)	mg/L	BDL	BDL	BDL
6	Antimony (Sb)	Mg/L	BDL	BDL	BDL
7	Arsenic (As)	mg/L	BDL	BDL	BDL
8	Barium (Ba)	mg/L	BDL	BDL	BDL
9	Boron (B)	mg/L	BDL	BDL	BDL
10	Cadmium (Cd)	mg/L	BDL	BDL	BDL
11	Chromium (Cr)	mg/L	BDL	BDL	BDL
12	Copper (Cu)	mg/L	BDL	BDL	BDL
13	Lead (Pb)	mg/L	BDL	BDL	BDL
14	Manganese (Mn)	mg/L	BDL	BDL	BDL
15	Nickel (Ni)	mg/L	BDL	BDL	BDL
16	Mercury (Hg)	mg/L	BDL	BDL	BDL
17	Selenium (Se)	mg/L	BDL	BDL	BDL
18	Zinc	mg/L	BDL	BDL	BDL

BDL=Below Detection Level

5.1.12 Ambient Air Quality

158. Ambient air in the Project Area, is generally clean, because only a few houses were visible in the project areas. There are no industrial setups within the area of influence of the Project Area. Vehicular traffic is absent as well as road infrastructure. Spot monitoring of Suspended Particulate Matter was tested and is given as Error! Reference source not found.. The monitoring for SPM was done for a period of 2 hours as there wasn't any sensitive receptor near the proposed project area. Error! Reference source not found. below shows average 2 hours results. The proposed project site is a barren site and the nearest village, Kili Hazart Sahib is location about 16 km from the proposed project site. The equipment used for air monitoring is Hazdust EPAM 5000 and test method is USEPA PM10, 2.5 method 201a Lab reports are attached as **Annexure 7**.

Table 24: Results of Ambient Air Quality

Parameters	Location			NEQS
	Wall Side	Storage Area	Wall Side	
Suspended Particulate Matter	8	Nil	12	500 (24 hrs. avg)

Source: Monitored in the Project Area by Laboratory Team

159. The results presented in **Error! Reference source not found.** clearly depicts that the ambient air quality of the Project Area is clean as the values of all monitored parameters are far below the values of NEQS.

5.1.13 Ambient Noise

160. Ambient noise levels were measured and the average 2 hours monitoring results are given as following in **Table 25**. Noise monitoring was done with a type 1 noise meter.

Table 25: Summarized Results of Noise Monitoring

S. No.	Location	Noise Level	NEQS Day Time	NEQS Night Time
1	Wall Side 1	30.1	50-55	45
2	Storage Area	<28	50-55	45
3	Wall Side 2	<28	50-55	45

Source: Monitored in the Project Area by Laboratory Team.

5.2 Ecological Resources

□ Flora

161. The major forest type is Sub Tropical Broad-Leaved Evergreen Scrub forests in District Zhob. These forests occupy the altitudes between 2500 to 5500 feet elevation.

Table 26: Cumulative Floristic List of Karkh and Hitachi Area

#	Taxon	Vernacular/ English name	Family	Life form	Conservation status
01	Pinus gerardiana	Chilgoza Pine	Pinaceae	Tree	Near threaten
02	Olea ferrugenea	Olive	Oleaceae	Tree	Not assessed
03	Pistacia khinjik	Shina	Anacardiaceae	Tree	Least concern
04	Pistachia cabulica	Uzhgai	Anacardiaceae	Tree	Not assessed

#	Taxon	Vernacular/ English name	Family	Life form	Conservation status
05	Reptonia buxifolia	Gurgura	Sapotaceae	Tree	Not assessed
06	Fraxinus xanthoxyloides	Shang/ Wild Ash	Oleaceae	Tree	Not assessed
07	Prunus eburnean.	Wild almond	Rosaceae	Tree	Not assessed
08	Periploca aphylla	Barara	Ascalpidaceae	Shrub	Not assessed
09	Prunus creasus	Anang	Rosaceae	Shrub	Not assessed
10	Scorzonera mollis	Arghuch	Asteraceae	Shrub	Not assessed
11	Datura fastuosa	Datura	Solanaceae	Shrub	Not assessed
12	Narium odorum	Gandarae	Apocynaceae	Shrub	Not assessed
13	Othonnopsis intermedia	Gangu	Asteraceae	Shrub	Not assessed
14	Sophora grifithii	Ghuzera	Fabaceae	Shrub	Not assessed
15	Allium sphaerocephalum	Injaora	Alliaceae	Shrub	Not assessed
16	Zizyphora clinopolioides	Murai		Shrub	
17	Phragmites communis	Nal	Gramineae	Shrub	Least concern
18	Withania cougulans	Khamazurgae	Solanaceae	Shrub	Not assessed
19	Malcolmia africana	Khatol	Brassicaceae	Shrub	Not assessed
20	Caragana ambigua	Makhi	Fabaceae	Shrub	Not assessed
21	Eremurus aucheriana	Shezgae	Aspholpdiaceae	Shrub	Not assessed
22	Plantago ovata	Shkanpara	Plantigenaceae	Shrub	Not assessed
23	Haloxylon grifithii	Shorae	Amarantheaceae	Shrub	Not assessed
24	Artimesia meritima	Tarkha	Asteraceae	Shrub	Not assessed
25	Rhazya stricta	Urgalama	Apocynaceae	Shrub	Not assessed
26	Achillea santolina	Zawala	Asteraceae	Shrub	Not assessed
27	Peucedanum sp.	Ragholae	Apiaceae	Shrub	Not assessed
28	Panicum colonum	Rakhpatti	Poaceae	Grass	Not assessed
29	Tullipa stellata	Sanda	Liliaceae	Shrub	Not assessed
30	Lactuca sp.	Sandreza	Asteraceae	Shrub	Not assessed
31	Daphne oleoides	Malaghunae	Thymelaeaceae	Shrub	Not assessed
32	Nannorrhops ritchiana	Mazari	Arecaceae	Shrub	Not assessed
33	Dodonea viscose	Sanatha	Sapindaceae	Herb	Not assessed
34	Chrysopogon		Poaceae	Grass	Not assessed

#	Taxon	Vernacular/ English name	Family	Life form	Conservation status
	aucheri,				
35	Sorghum halepense	Barau	Poaceae	Grass	Introduced
36	Heteropogon contortus	Barwaza	Poaceae	Grass	Not assessed
37	Poa bulbosa	Margha	Poaceae	Grass	Not assessed
38	Typha angustifolia	Lukha	Typhaceae	Shrub	Not assessed

– Topographic distribution of vegetation

162. Vegetation zones of the district consist mainly of the following categories (**Table 27**):

Table 27: Vegetation Zones of Zhob District

Vegetation Zone	Floristic composition
Hills	Olive (<i>Olea ferrugenea</i>), Blue pine (<i>Pinus gerardiana</i>), Shina (<i>Pistacia khinjik</i>), Uzhgai (<i>Pistachia cabulica</i>), Gurgura (<i>Reptonia buxifolia</i>), Shang/ Wild Ash (<i>Fraxinus xanthoxyloides</i>), Wild almond (<i>Prunus eburnean</i>), etc.
Foothills	Olive (<i>Olea ferrugenea</i>), Phulai (<i>Acacia modesta</i>), Sanatha (<i>Dodonea viscosa</i>), Gymnosporia spinosa, Ber (<i>Zizyphus nummularia</i>), Khamazurgae (<i>Withania cougularans</i>), Khatol (<i>Malcolmia africana</i>), Makhi (<i>Caragana ambigua</i>), Shezgae (<i>Eremurus aucheriana</i>), shkanpara (<i>Plantago ovata</i>), Shorae (<i>Haloxylon grifithii</i>), Tarkha (<i>Artimesia meritima</i>), Urgalama (<i>Rhzya stricta</i>), Zawala (<i>Achillea santolina</i>), Pamangi (<i>Bouce rosia aucheriana</i>), Raghbolae (<i>Peucedanum sp.</i>), Rakhpatti (<i>Panicum colonum</i>), Sanda (<i>Tillipa stellata</i>), Sandreza, (<i>Lactuca sp.</i>), Malaghunae (<i>Daphne oleoides</i>), and Mazari (<i>Nannorrhops ritchiana</i>).
Plains and Stream beds	Commonly found in the entire district where <i>Tamarix sp.</i> And <i>Saccharam sp.</i> are commonly found.

Reference: (Provincial and District Forest Departments, IUCN, UNDP, WWF, GEF)

– Rangelands

163. The type of rangeland present in the district is classified as Suleiman Mountain Ranges. It has species like: *Stipa pennata*, *Pennisetum orientalis*, *Chrysopogon aucheri*, and *Cymbopogon sp.* etc. The productivity is good with average productive capacity of 250 kg /hectare. The rangelands in the district belong to communities living around them. Due to communal ownership, usually these are accessible to all members of the community and also to nomads passing through the area on their traditional routes of migration to new areas.

– Flora of sub-Project area

164. It includes Almond, Apple, apricot, grapes, pomegranates, Chinar, Euclayptus, Ber (Zizyphus nummularia), Phulai (Acacia modesta), Makhi (Caragana ambigua), Tamarix sp. And Saccharam sp.

□ Fauna

165. **Mammals:** Fox (*Vulpes cana*), Asiatic Jackal (*Canis aureus*), Cape hare (*Lepus capensis*), Porcupine (*Hystrix indica*), Afghan Hedgehog (*Hemiechinus auritus megalotis*), etc

166. **Birds:** Chukar (*Alectoris chukar*), See see partridge (*Ammoperdix griseogularis*), Magpie (*Pica pica*), a number of sparrows, Finches, buntings, seasonal/migratory waterfowls, hawks, and sand grouse etc.

167. **Reptiles:** Afghan Tortoise (*Agrionemys horsfieldii*), Brown Cobra (*Naja oxiana*), Goh (*Varanus griseus*), etc.

168. **Amphibians:** Amphibians found in the tract include common frog (*Rana tigrina* and common toad (*Bufo bufo*).

5.3 Social Environment

5.3.1 Tribes/Caste, Language and Religion

169. The main tribe living in the subproject area are Kakarh, Khhosa and Faqirzai. Pushto is spoken as the major language in the area while small number of the people can speak Urdu. The communities belong to Muslim religion group.

5.3.2 Literacy Ratio

170. A person was treated as literate if he or she could read newspaper and write a simple letter in any language. According to the current socio-economic survey, the literacy rate of the studied killies was less than 2 percent.

5.3.3 Main Occupation and monthly Income of the Respondents

171. The main occupation of the people of the project areas are agriculture and livestock rearing. The most of the farmers supplement their income from labor and shop keeping,

transporters, private and government jobs etc. For cattle and sheep rearing large tracts of grazing land are still available.

172. The farm income ranged from Rs 20000 to 25000 while Rs. 18000- to 2000 from off-farm income was recorded. The community hardly fulfill their domestic needs from their limited resources of income.

173. There is potential to grow every type of fruit plants but due to shortage of water, could not sow.

5.3.4 Crops being sown

174. In the command area of Killi Sardar Akhtar, in Kharif season, cotton, fodder and a small portion of land for vegetables are being sown while in Rabi season, wheat and fodder was recorded.

5.3.5 Social Facilities & Pressing Needs

175. The situation regarding social facilities is very alarming in the subproject these. The only facility of electricity is available in the project area. However, not all households have access. There is no facility of health in the local villages and residents have no direct access to the metaled road. Facilities of public transport are also very poor. Facilities of drinking water, sanitation and health are also missing. The facilities of primary school for boys and girls were available, but local communities were not satisfied because of poor buildings and non-availability of teaching staff. The facilities observed in the killies are shown in the following **Table 28**.

Table 28: Availability of Social Amenities in the surveyed Killies

Facilities	Nekozai	Zakozai/Ali zai	Ghundai	Churmalai	Nagizai Baadkhel	Salmanzai
Hospital/Dispensary	No	No	No	No	No	No
RHU	No	No	No	No	No	No
School/college	No	No	No	No	No	No
Bank	No	No	No	No	No	No
Vet. Dispensary	No	No	No	No	No	No
Shop			No	No	No	No
Telephone/Mobile	Mobile	Mobile	Mobile	Mobile	Mobile	Mobile
Drainage/sewerage	No	No	No	No	No	No
Police Check post	Levis	Levis	No	No	No	No
Grain Market	No	No	No	No	No	No

176. Provision of basic facilities is the obligation of the relevant department and is the right of the inhabitants of the area. Pressing needs expressed by the local people are:

- Proper irrigation infrastructure and Irrigation water supply through the year;
- Rehabilitation of existing irrigations structures;
- Land-living;
- Supply of clean drinking water; and
- Market linkage to get a better price of agricultural products, fruits and livestock.

177. The common concerns of the participants were related to the damages of crops, suspension irrigation water during the construction activities and moment of heavy vehicles in the residential area. There are three main villages in the command area of Killi Sardar Akhtar Subproject and consultation held with beneficiaries of all villages. The farmers of the Churamalai village raised concern that land of their village will be utilized for the benefits of other village for the construction of new water channels. They said that they will not allow to construct the water channels on their land.

5.3.6 Stakeholder Consultation

178. The consultations comprised issues/concerns, suggestions included questioning and answering conducted with respondents of different schemes were almost similar because except Siri Toi dam project, all other sub projects are to be rehabilitated and for decades, the irrigators included females of the farming communities have built a patterned behaviour towards agriculture practices, irrigation supplies and shortage, cropping pattern and its related activities that formulated their permanent behaviour of concerns and pressing needs. Thus, during consultation, similar environment was observed regarding concerns and pressing needs of the contacted communities.

□ Consultation with Male Respondents

179. Public consultation plays a vital role in studying the affect and impacts of the subproject on the stakeholders. These consultations have vital role in obtaining the views and perception of the possible affected community for preparing the useful and sustainable policy to implement the sub-project. In this regard, consultations were conducted with the local people residing in the adjacent villages in the subproject area of different locations/reaches of the Sardar Akhter scheme. The discussions focused on impacts of the rehabilitation works on the local communities' interests related to irrigation supplies. A photograph of the male/females' consultations is provided in Appendix-8.1.

180. The people of the area were pleased to know about the proposed sub-project. Rehabilitation and strengthening of Sardar Akhter channel will be favourable for the local communities and their infrastructures. They were of the view that with the rehabilitation works, their agriculture and other related businesses will be improved and they can flourish their livelihoods. The important general objectives of the consultation process were:

- Consult local communities to share information related to the project and interventions proposed in the sub-projects and sharing with the local communities the mitigation measures included in the project design to address the potential impacts;

- Create awareness among the local communities about the project and share the benefits of the subprojects for the local communities and promoting good will towards the project among the communities;
- Create awareness in local communities about their participation in the project activities;
- Brief Grievance Redressal Mechanism (GRM) and participation of local communities in Grievance Redressal Committees and an evolving mechanism for resolution of social and environmental problems,
- Get support from the local communities in land acquisition and successful implementation of the project;
- Assess positive and adverse impact of intervention related to the subprojects on the local communities;
- Assess social facilities in the subproject areas and need assessment;
- Record concerns of the local communities related to the project activities, mitigation measures and suggestion for improvement of the project;
- Consult with FOs to assess their role in irrigation management in the present scenario- need assessment for improvement in their functioning and formation of new FOs;
- Mobilize farming communities for high value agriculture (HVA) proposed in the Project and sustainability of the project.
- Create awareness about Trainings of Farmers on solar power pumping, drip irrigation system, crops and orchards management.
- Assess activities of the Local NGOs and working in the sub-projects areas to create linkage with project development activities;
- Create awareness among women about the project, and their participation in the project activities proposed for the gender development.
- Conduct needs assessment to determine the communities' choices of domestic water supply locations, washing facilities, water collection points, and other facilities;
- Identify potential female activists in the project catchment areas to harmonize with the project initiatives;
- Assess women's participation in income generation in the subproject areas and brief them about the income generation activities proposed in the Project. Assess role of women in agriculture and livestock rearing activities;
- Disclose Gender Action Plan (GAP) and to brief activities proposed for the women participation and development;
- Brief Grievance Redressal Mechanism (GRM) and participations of women in the GRCs;
- Create awareness about their participation in training activities- kitchen gardening and value-added crops;
- Identifications of key person from the communities;
- Assess gender issues in the area; and
- Assess need of women related to skill trainings and their preferences.

Table 29: Key Persons of the Area to arrange Consultation

Facilities	Nekozai	Name of Key Person	Contact No.
Sardar Akhter	Sardar Akhtar	Haji Jafar Kibzai	0348-2154462
		Fazal Amin	0349-2414422
	Ghundai	Malik Ibrahim	0349-2413924
		Mali Azeem	0333-3270699
	Churamalai	Akbar Shah	0336-8115929
		Masoom Shah	0347-3224364
	Zakozai	Abdul Hakeem	0302-3934542
		Haji Abdul Kareem	0343-4151390

181. Public Consultations included meetings and interviews were conducted with the local residents, farmers, women and other stakeholders. The consultations were carried out in accordance with the IR policy of ADB's SPS 2009 and its outcome is discussed in the proceeding sections. Consultations were also held with the PMO, BID and the design teams. The list of consultation meetings is given in **Table 30** while the scanned copies of the participants are provided in the Appendix 8.1.

Table 30: List of Participants Contacted During Public Consultations

Killi Sardar Akhter/Nekzai		
Sr. No.	Name	Occupation
1	Atta Muhammad	Farming/Livestock
2	Laal Khan	Farming/Livestock
3	Jumma Khan	Business
4	Nasir Khan	Farming/Livestock
5	Sardar Jafer Khan	Farming/Livestock
6	Saddam Hussain	Business
7	Fazal Ameen	Farming/Livestock
8	Zahir Khan	Farming/Livestock
9	Bahawal Haq	Livestock
10	Hussan Shah	Farming/Livestock
11	Sana ullah	Livestock
12	Gul Badeen	Faming/ Livestock
13	Babark Khan	Faming/ Livestock
14	Masoom Khan	Faming/ Livestock
15	Haji Noorul Haq	Faming/ Livestock
16	Din Gul	Livestock
17	Abdul Hakeem	Farming
18	Zarghan	Farming
19	Zaar Ullah	Livestock
20	Haji Abul Khan	Livestock
21	Aziz Rehman	Livestock/Farming

22	Shahab-ud-Din	Livestock/Farming
23	Abdul Rehman	Livestock/Farming
24	Niamt Ullah	Livestock/Farming
25	Abdul Khaliq	Livestock/Farming
25	Abdul Razaq	Livestock/Farming
26	Jahangir Khan	Livestock/Farming
27	Adam Khan	Livestock/Farming
28	Alaf Khan	Farming
29	Mir Ahmad Khan	Farming
30	Abdul Qayyum	Farming
killi :Ghundai		
1	Shah Nawaz	Student
2	Hussan Jan	Farming
3	Muhammad Din	Farming
4	Haji Noor-ul-Haq	Farming
5	Malik Azeem	Farming
6	Malik Ibrahim	Farming
7	Nadir Khan	Labour
8	Bashir Khan	Labour
9	Salar Din	Livestock
10	Jabbar Shah	Farming
11	MaliK Din	Livestock
Killi Churamalai		
1	Akbar Shah	Livestock Farming
2	Bismillah Khan	Livestock Farming
3	Masoom Khan	Livestock Farming
Concerns		Response
Where is the proposed site of infiltration gallery?		Proposed location of infiltration gallery was briefed and with the help of Map and location physically also visited with the community people.
Is the solar tube well component part of the sub-project?		Participants were briefed about the criteria for selection of site for the solar tube. They were briefed about the requirement of depth of water table in the area. Participants were also briefed about pilot sites selected in the project areas.
Where the cattle ghats and washing points will be constructed?		Suitable sites for the cattle ghats will be proposed by the communities for the easy access of cattle from the surrounding areas. Locations of washing points will also be selected with gender consultations near the village.
What is the purpose of gender consultations?		Gender consultations are mandatory for ADB funded project. Moreover, trainings for females on kitchen gardening and safe drinking water has been proposed. Participation of women in Grievance Redressal Committees is also necessary. Gender Consultations are being conducted to aware the

	women about their participation in the project components.
What is the route of the new water channel?	Route of the proposed water channels were briefed with map and with the help of GPS.
Will compensation against damages of crops and trees will be provided?	All damages (crops, trees and structures) will be valued and compensated according to the ADB SPS-2009.
Due to construction of canal crossing will become a problem to travel other side.	Road & foot bridges will be provided at different location to cross the canal for their mobility..
Construction activities will disturb the people by noise pollution and dust.	Remedial measures will be adopted to minimise the adverse effects during construction.
The local people, particularly the children and women, may get injuries or even fatalities.	To enhance safety of local people the contractor should use protective devices, including wire mesh containment, displaying warning signs along the work site, blowing sirens, etc.
Which type of the canal has been proposed?	Lined canal has been proposed. It will reduce seepage, losses of irrigation water and make irrigation system more efficient.

□ Gender Consultation

182. No economic growth is possible without due participation of women in the economic activities as they constitute more than half of Pakistan's population. Ever-increasing responsibilities and lesser opportunities along with narrow exposure have always been a great challenge for women of Pakistan. Women are held responsible for doing home all home chores, upbringing children and feed families. In rural areas, women work side-by-side with men. They do home chores, farming, harvesting and manage livestock to supplement the income of the families. In spite of all this, most of times their efforts and struggle are taken for granted. They are hampered by persistent gender inequities that limit their access to decent work, which they need as a vehicle for economic empowerment, social advancement and political participation.

183. The gender and social Consultation revealed extreme poverty in the area. Women used to handle all the chores and outside regarding limited agriculture and livestock with their partners. The participants were pleased with the proposed irrigation project. They think that their land will become fertile and valuable with the supply of surface irrigation water. Over all women were not educated as out of total 62 interviewed females of Sardar Akhter scheme area, only one (1.6 %) female was having middle class education. All were working as housewives. High-priority needs demanded by the community were clean drinking water as it was most distinctive need of the community because they have to fetch water from on every day basis for drinking purpose. The females did not know about the irrigation project in details.

They were explained the project, project objectives and ADB IR policy. The following were the objectives of Gender Consultation:

- Create awareness among the women about gender activities provided in the GAP and ensure their participation;
- Identification of potential female activists in the project catchment areas to harmonize with the project initiatives;
- Assessment of opportunities to develop and implement gender specific intervention in the project ;
- Create awareness among women about the subprojects and its components and involvement and role of the local women in the activities related to the women development proposed in the project;
- Conduct needs assessment to determine the communities' choices of domestic water supply location, washing facilities, water collection points and other like facilities;
- Role of women in income generation activities and decision making (Agriculture, Livestock rearing and any other);
- Need Assessment related to skill trainings;
- Assessment of gender issues and in the subprojects areas; and
- Gender concerns related to the subprojects and suggestions to get maximum benefits from the project.

□ Meetings in subproject area (Killi Sardar Akhter PIS)

184. The subproject areas of Killi Sardar Akhter and Ahmedzai are close to each other and there is same cultural back ground. Meeting held in the three village and 62 female participated (Appendix 8.1). Locations, number of participants with age, occupation and educational status is provided in the **Table 31**.

Table 31: Consultations with Female Participants

Killi Sardar Akhter/Nekzai				
Sr. No.	Name	Age (Years)	Occupation	Education
1	Waseela	27	House Wife	Illiterate
2	Jan Bibi	20	House Wife	Illiterate
3	Naghma	25	House Wife	Illiterate
4	Ehsan bibi	27	House Wife	Illiterate
5	Rukhsana	35	House Wife	Illiterate
6	Noreena	19	House Wife	Illiterate
7	Hanifa	40	House Wife	Illiterate
8	Bakhtawar	25	House Wife	Illiterate
9	Habiba	18	House Wife	Middle
10	Rozeena	25	House Wife	Illiterate
11	Tamam	55	House Wife	Illiterate
12	Asmat bibi	21	House Wife	Illiterate
13	Ayesha	33	House Wife	Illiterate
14	Nadia	40	House Wife	Illiterate
15	Nazia	25	House Wife	Illiterate

16	Saira	21	House Wife	Illiterate
17	Haleema	55	House Wife	Illiterate
18	Nargis	20	House Wife	Illiterate
19	Gamai	35	House Wife	Illiterate
20	Khaleda	20	House Wife	Illiterate
21	Gul bebi	30	House Wife	Illiterate
22	Saira	35	House Wife	Illiterate
23	Sabara	18	House Wife	Illiterate
24	Saima	18	House Wife	Illiterate
25	Khan Bibi	50	House Wife	Illiterate
26	Khan Tama	22	House Wife	Illiterate
27	Gullala	30	House Wife	Illiterate
28	Khatiam	22	House Wife	Illiterate
29	Gull Bashra	30	House Wife	Illiterate
30	Gull Dosta	30	House Wife	Illiterate
Killi Ghundai				
1	Zarjumma	30	House Wife	Illiterate
2	Tamam	35	House Wife	Illiterate
3	Rohina	20	House Wife	Illiterate
4	Feroza	18	House Wife	Illiterate
5	Gul Jumma	25	House Wife	Illiterate
6	Jung Jumma	40	House Wife	Illiterate
7	Khan Bibi	50	House Wife	Illiterate
8	Amina	50	House Wife	Illiterate
9	Tahira	40	House Wife	Illiterate
10	Razia	20	House Wife	Illiterate
11	Ameer Bakht	33	House Wife	Illiterate
12	Zainab	38	House Wife	Illiterate
13	Noe Bakht	55	House Wife	Illiterate
14	Bibi Maryam	50	House Wife	Illiterate
15	Pakai	45	House Wife	Illiterate
16	Saleha	40	House Wife	Illiterate
17	Bibi Jan	18	House Wife	Illiterate
Killi Churamalai				
1	Nehboba	30	House Wife	Illiterate
2	Khadeeja	25	House Wife	Illiterate
3	Rahema	25	House Wife	Illiterate
4	Nor Lai	52	House Wife	Illiterate
5	Pashamba	43	House Wife	Illiterate
6	Jameela	32	House Wife	Illiterate
7	Sangeen	20	House Wife	Illiterate
8	Bahdur Jamal	30	House Wife	Illiterate
9	Zarguna	40	House Wife	Illiterate
10	Hameeda	35	House Wife	Illiterate
11	Shazia	41	House Wife	Illiterate
12	Khan Tama	40	House Wife	Illiterate
13	Shomila	25	House Wife	Illiterate
14	Naz Bubu	22	House Wife	Illiterate
15	Rahema	35	House Wife	Illiterate

Figure 11: Photographic View of the Consultation Activities Kili Sardar Akhtar



A view of site visit at Kiilli Sardar Akhtar Scheme



A view of public consultation in Zakozaï Village



Public Consultation in Badanzai Villag



Gender Consultation meeting in Zakozaï Village



On site Consultation with local community members in Zakozaï Village



Gender Consultation meeting in Ghundai Sulemanzai Village

❑ Roles and Responsibilities of Women Regarding Livestock Management and Income Generation Activities.

185. The women of the project area do not play active role in the agriculture and watershed management activities. Economic activities for women in the subproject area are very rare,

except the livestock rearing at home. Embroidery work and tailoring is also source of income for some women. Poultry rearing is common source of income.

186. In the Project area of Zhob River Basin, women's freedom for movement is limited and where cultural values are strictly observed. In the subproject area Killi Sardar Akhtar, women are not allowed to work outside of their homes and are not allowed to participate in business affairs.

187. Group Discussions were held with women to assess their involvement in livestock management. The discussions revealed that women of the area manage livestock at their homes. They spend time in preparing fodder, cleaning milking and watering of animals and without these activities livestock rearing would be incomplete. These working hours are not recognized and are unpaid. The Project area is potential suppliers of animal products for growing future needs and the role of women will remain significant in this regard and due consideration. Recognition of their role and improvement in their socio-economic status is dire need of the time. In spare time, the women get busy in stitching and embroidery.



Figure 12: Handicrafts Made by Local Women

❑ Decision Making

188. The study explored the role of rural women in decision making in various family affairs. It has been observed that the role of women in decision making was very low like a marriage of children, sale and purchase of property, sale and purchase of animals, decisions regarding the schooling of Children and to attend social activities. It was found during the consultations that the head of tribe male member of the family has a power of decision making. He determines the family interests and makes decisions with regard to the family.

□ **Gender Issues in the subproject Area**

189. According to the women participants their major issues were:

- Unavailability of clean drinking water, health facilities, schools for boys and girls, Drainage and sewerage system, lack of income generating activities or opportunities. The community women fetch water distance is 15 mints walk;
- The participation of local women in government institutions is not visible because of high illiteracy rate in the areas. The community doesn't have any Vocational Center for Women and Girls. Financial services are not available in the subproject areas.
- Women are unaware about property right and ownership;
- Drinking water is not good for health at all because of this people are suffering from disease Diarrhea, Malaria, Hepatitis, joint pain, kidney diseases especially kidney stones includes typhoid. There is no Drainage and Sewerage system;
- Private Roads, transport, vehicles. Mobile phone communication network and internet connections have a significant impact on socialization and modernization. In the subproject areas these services are very poor. Due to the poor public transport mobility of local women is limited;
- Embroidered works are done at home by women and sometimes women sell handicrafts to support their families by creating some additional income. Women have no facility to market their product and their work, but product is not properly rewarded.
- However, females had capabilities to earn money and support their Families but they were not allowed to work out of village.

□ **Pressing Needs of Women**

190. During consultations women expressed following pressing needs:

- Supply of clean drinking water and sanitation facilities;
- Participation of women in income generation activates;
- Provision and up gradation of medical and educational facilities;
- Provision of electricity in the village; and
- Skill trainings centers to enhance skills on income generation activities

□ **Concerns Raised by Female Participants**

191. Following concerns raised by the participants:

- Various NGOs have visited and consulted the women of the local communities and ensured them work with local women in income generation activates and provision basic necessities, but there is no outcome regarding their statements.
- Due to male dominated society and strong cultural values women participation could be insured in the project activates with permission of their male family members.

- Women are not allowed to work and participate in the trainings and other activities.
- Women are expert in embroidery; but there is no market facility to sell their products.

□ **Mitigation Measures to Address the Concerns**

- Consultations held with the male members of the communities and they were briefed about intervention the interventions proposed for women's participation. They were motivated to allow their female members to participate in the training sessions, income generation activities and GRCs, etc.
- Session will be arranged in the clusters where women of the surrounding area could participate easily.
- Under the project women will be involved in income earning activities; i.e. kitchen gardening, food processing and value adding in the agricultural products. These could be carried out inside the premises of the house.

□ **Suggested Income Generation Activities and Training**

192. Information was collected regarding "potential area for increasing women's participation in economic activities". Participants mentioned that fruits and vegetable are often wasted if they are given a comprehensive training to process the fruits to add value and with proper marketing a small scale women led business can be introduced for the women.

193. During the group discussion with female respondents identified following potential areas like in other killies/subprojects area for increasing women's participation in the small scale- women- led agribusiness business for fruits and vegetables:

- Tomato ketchup.
- Maraba (Jam) Making.
- Pickle Making.
- Mini feed mills for livestock feeds, and
- Plastic Tunnel for Fruit drying.

194. Trainings recommended by the female participants which are:

- Livestock Sector (Rearing goat, sheep and cattle);
- Poultry Farming: (Selling poultry products) ;
- Dairy sector, process and packing milk ;
- Training in embroidery, sewing, and marketing;
- Agriculture Sector: Crop Sowing, harvesting and picking; and
- Kitchen gardening (producing vegetables at small scale)

195. Women of the area can run these small businesses for themselves with minimal effort, training and credit facility that will allow them to supplement their earnings. The females were interested to take part in the above mentioned area.

5.3.7 MEETINGS AND CONSULTATION WITH OTHER LINE DEPARTMENTS

□ Meeting with Balochistan Rural Support Program (BRSP)

196. Balochistan Rural Support Program (BRSP) the main organization working in the project area. BRSP is working in the rural areas of Baluchistan and has strong presence and experience for implementing various multi-sector development programs in 24 districts of Baluchistan. The main objective of BRSP is to mobilize and engaging communities in long term development for a positive change in the society and generates demand for services by the communities to raise their voice for their basic rights.

197. A meeting was conducted with representatives of BRSP (District Program Manager & Admin Officer) Zhob district. They were briefed about components of project interventions related to the women's participation proposed for the project to improve the socio-economic condition of the project.

□ Meeting with Human Development Foundation (HDF)

198. A meeting held with field coordinator of HDF and with other representatives of NGOs in Zhob city. Community participation in the BWRDS project was discussed in detail. They also shared their experience of community mobilization and gender involvement in income generation activities. They also shared their activities regarding kitchen gardening and its benefits for the local women.



Meeting with District Program Manager BRSP-Zhob



Meeting with Field Coordinator HDF-Zhob

5.3.8 INFORMATION DISCLOSURE, CONSULTATION & GRIEVANCES REDRESSAL MECHANISM (GRM)

□ Scope of Consultations

199. Discussions and consultations on social safeguard aspects of project were held with the local residents, farmers and women in the close proximity of the project site, PMO and design consultants during the months of March and September 2020. During the consultations, participants were requested to express their concerns with the proposed rehabilitation of Sardar Akhter Perennial Irrigation Scheme (PIS) and suggestions or measures that can address potential consequences and enhance project benefits.

200. The project stakeholders' include the local community, farmers, general public and women. Accordingly, the consultations/ focus group discussion were held with them to provide information about the proposed project activities and expected impacts and their concerns. Other key stakeholders include representatives of Government departments/ agencies involved in the planning, design, implementation and operation of the project, which includes PMO / PIO, On Farm Water Management (OFWM), Irrigation Department etc.

□ General Response

201. During the consultation meetings, participants were informed about the rehabilitation of the Sardar Akhter Perennial Irrigation Scheme (PIS) and they considered it as positive step for the development of the agriculture in the area;

- The participants of the consultation showed concern that any damages to standing crops should be avoided during the construction activities;
- At the maximum extent, local labour should be engaged/ employed in the project related activities;
- The access to the agriculture fields of the local farmers should not be blocked during construction;
- During construction labor force movement should be controlled so that activities of the local population are not disturbed;
- The participants/representatives also stressed the need for timely completion of the project;
- Home privacy and routine activities especially of women should not be disturbed due to construction of work; and
- Project facilities should be located outside the existing residential areas. In order to avoid restricting the daily movement of the local community, construction vehicles should remain confined within their designated areas of movement.

6. ASSESSMENT OF ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

6.1 General

257. This chapter identifies the significant potential environmental and socio-economic impacts which may occur during the project life. The appropriate mitigation measures are also discussed in this and the subsequent chapters of this report. A brief qualitative description of each aspect and the affected environment in the Project Area is presented in the following sections.

6.2 Impact Assessment Methodology

258. For the purpose of evaluating the environmental impact of this proposed project, the following steps have been executed:

- Scoping of impacts
- Environmental screening
- Qualitative impact evaluation
- Describing mitigation measures
- Residual impact significance
- Determining cumulative impacts

259. Each of these steps undertaken for the evaluation of environmental impacts and to describe mitigation measures, is described in the following section.

6.3 Scoping of Impacts

260. Potential environmental impacts of the Project on various environmental features in the Project Area are identified through the following studies:

- Environmental quality baseline monitoring of air, noise and water;
- Detailed review and analysis of primary and secondary data available for all environmental parameters in Project Area such as physical, ecological and social resources;
- Desktop study of engineering investigations, studies and designs;
- Consultations with implementing agencies, local government, affected community, traditional and religious leaders of community;
- Stakeholder consultations with relevant government agencies and national NGOs;
- Knowledge assimilation of international best practices on environmental assessment of irrigation projects.

6.4 Notion of Significance

261. The term “**Environmental Impact**” or simply “**Impact**” covers the negative, adverse or harmful as well as positive, desirable or beneficial impacts of the project on environmental settings. Prediction of impacts of the proposed activity is based on factual data; however, the significance of these impacts involves subjective judgment. The nature of the impacts may be categorised in terms of:

- **Direction** - Positive or Negative
- **Duration** - Long or Short Term
- **Effect** - Direct or Indirect
- **Extent** - Wide or Local

262. Impact significance depends on both the nature of the impact and on the sensitivity of the receptor. The more sensitive the receptor the greater will be the significance of impact of that change. For this IEE Report, nature of change is combined with the sensitivity of the receptor to evaluate the significance of the impact. The significance of impact is characterized as very low, low, moderate, high and very high. Environmental issues having “moderate”, “high” and “very high” significance would be provided with mitigation measures. Residual impacts after implementation of mitigation measures have also been provided.

6.5 Environmental Screening

263. For identification of potential impacts of the project, screening of activities causing impacts had been carried out in different phases of the project life. In the impact assessment exercise, major project activities with their associated environmental issues were identified and then their impacts on the relevant physical, ecological, and socio-economic elements of the area were evaluated.

264. In broader spectrum, the project activities could be categorized in the following phases:

- Implementation & Construction Phase; and
- Operations & Maintenance Phase.

265. During the first phase, the focus will be not only on the engineering design, but also on laying the foundation for integrated planning for water resources management. Extensive inter-departmental coordination will be necessary at this stage for improvement in institutional arrangements and capacity in the areas of environmental and social management and monitoring. Development of decision support systems and training to develop local expertise is expected to substantially improve the management and monitoring of social and environmental impacts.

266. The planning, information management, and capacity-building activities are all intended to facilitate increased awareness-raising to foster ownership, understanding and mainstreaming of environmental and social considerations. Such activities to be planned and partly to be implemented.

267. The construction phase mainly entails construction of infiltration galleries, channels canal and other irrigation structures. These sub-project interventions are expected to introduce direct significant benefits to the local population. This phase will be very sensitive in terms of environmental and social implications, because of a wide range of issues including the very extent of construction activities etc. The interventions planned under this component will become less damage to environment, if the EMP is implemented in letter and spirit.

268. Operations & Maintenance will be another stage where major impacts, both positive and negative, can surface, and the earlier predictions could be validated. This phase will comprise commissioning the constructed infiltration galleries, Channels and other irrigation structures. While the operation phase mostly consists of engineering activities, it has an equally important requirement of continued inter-departmental coordination, for harvesting the full potential of positive impacts of the project.

269. **Table 32** below presents the screening of activities for proposed infiltration gallery, new canal and irrigation system during design, construction and O&M phases.

Table 32: Screening of Activities

Proposed Sub-activities	Screening Results			Significance Prior to Mitigation			Potential Impacts
	Very Low Risk	Moderate Risk	High Risk	Low	Moderate	High	
Killi Sardar Akhtar Infiltration Galleries (a) Construction of infiltration galleries, (b) Construction of water conveyance system and associated structures)							
A. Implementation & Construction Phase							
Construction contractor mobilization and Establishment of campsite and machinery/ equipment Yard		✓			✓		<ul style="list-style-type: none"> • Changes in land use pattern • Influx of external work force • Social conflicts • Workshop facilities may spread oils & chemicals • Deterioration of air quality due to machinery & equipment • Noise • Land degradation due to solid waste disposal of camp site • Water contamination • Loss of vegetation • Health and Safety issues& including COVID-19 related
Security and Safety Risks		✓			✓		<ul style="list-style-type: none"> • Delay in project execution
Transportation of construction material		✓			✓		<ul style="list-style-type: none"> • Soil erosion and contamination • Air pollution • Noise pollution • Health and Safety issues including COVID-19 related • Damage to infrastructure

Proposed Sub-activities	Screening Results			Significance Prior to Mitigation			Potential Impacts
	Very Low Risk	Moderate Risk	High Risk	Low	Moderate	High	
Earthen works		✓			✓		<ul style="list-style-type: none"> • Soil erosion • Site overburden • Borrow pit • Loss of natural vegetation • Damage to infrastructure • Sites of Historical, Cultural, Archeological or Religious Significance • Noise pollution • Air pollution • Health and safety issues & including COVID-19 related • Blocked of access due to earth works and stockpiling of excavated material
Concrete and Form works		✓			✓		<ul style="list-style-type: none"> • Noise pollution • Air pollution • Health and safety issues • Blocked of access due to construction works
B. Operation & Maintenance Phase							
Conflicts caused by unavailability or improper distribution of water in the area		✓			✓		<ul style="list-style-type: none"> • Social issue
Use of water for drinking purposes		✓			✓		<ul style="list-style-type: none"> • Health issues • Social issues
Periodic cleaning and maintenance of the system		✓			✓		<ul style="list-style-type: none"> • Solid waste generation
Increase of agricultural lands		✓			✓		<ul style="list-style-type: none"> • Loss of pastoral lands

Proposed Sub-activities	Screening Results			Significance Prior to Mitigation			Potential Impacts
	Very Low Risk	Moderate Risk	High Risk	Low	Moderate	High	
Community Participation for management and operation of the irrigation system		✓			✓		<ul style="list-style-type: none"> • Social issues • System sustainability
Use of fertilizers & pesticides		✓			✓		<ul style="list-style-type: none"> • Banned fertilizer & pesticides will cause health issues • Contamination of fresh water through surface runoff
Disruption to wildlife		✓			✓		<ul style="list-style-type: none"> • Conservation issues
Risk due to Natural Hazard i.e. flooding and earthquakes		✓			✓		<ul style="list-style-type: none"> • System sustainability

6.6 Assessment of Risk – Environmental Aspects

270. The next stage of the IEE process is a detailed assessment to forecast the characteristics of the main potential impacts. Known as impact analysis. Impact identification and prediction are undertaken against an environmental baseline, often through indicators e.g. air/water, noise, ecological sensitivity, biodiversity. The aim is to take account of all of the important environmental/project impacts and interactions, making sure that indirect and cumulative effects, which may be potentially significant, are taken into consideration.

271. The anticipated environmental impacts due to project is based on the methodology provided in chapter 1 of this report presented below in **Table 33**.

272. Residual impacts after implementation of mitigation measures have also been provided.

273. The project and its activities may have a potential to impact the environment and this section intends to evaluate the significant impacts. It is imperative that the project is considered into its different aspects. The following environmental impacts have been evaluated:

- Impacts owing to Design Phase
- Impacts owing to Construction Phase
- Impacts owing to Operations Phase

274. The impacts of Design and Operational Phases are similar for all intervention. However, impacts for construction phase is specific with respect to sites.

Table 33: Anticipated Environmental Impacts Assessment

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
Kili Sardar Akhtar Infiltration Galleries(Construction of infiltration gallery, lining of covered channel, social structures and time division structures)				
A. Implementation and Construction Phase				
Construction contractor mobilization and Establishment of campsite and machinery/ equipment Yard	Changes in land use pattern Cultural conflicts Influx of external work force Land degradation due to solid waste disposal of camp site Workshop facilities will spread oils & chemicals Soil erosion	B-2	Site for camp site shall be selected keeping in view the cultural norms of the area to avoid undue interference of the Construction contractor's staff with the local residents. Local residents shall be given priority in the employment opportunities generated during construction and operations phase The land shall be rented for the camp site and equipment yard. No resettlement is envisaged for this purpose.	B-1
	Workshop facilities may spread oils & chemicals	B-2	Proper disposal of used oil and chemical waste in accordance with MSDS shall be ensured. Efficient Use of Chemicals shall be ensured. Good housekeeping practices shall be ensured at workshop areas. Mixing of waste into fresh water sources shall not be allowed.	B-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
	Deterioration of air quality due to machinery & equipment	B-2	<p>Proper engine tuning of machinery/ equipment to meet National Environmental Quality Standards of Pakistan limits.</p> <p>Water should be sprinkled where needed and appropriate, particularly at work sites near the communities.</p>	B-1
	Noise Pollution	B-2	<p>Equipment with high levels shall be fitted with noise reduction devices Regular inspection, maintenance and lubrication of the construction vehicle and equipment shall be performed</p> <p>Use of PPEs such as ear plugs and ear muffs by the workers shall be ensured</p> <p>Avoid night time activity</p>	B-1
	Land degradation due to solid waste disposal of camp site	B-2	<p>Ensure proper disposal of camp site waste at designated landfill/disposal sites. If the project area does not have any disposal site the construction contractor shall use any depression for waste dumping. Prior to dumping the contractor should get the NOC from local authorities for disposal of solid waste. An impervious liner shall be laid to waste sites before the</p>	B-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
			<p>dumping of solid waste. The impervious liner shall be approved by the supervision consultant. After the dumping of solid waste the depression should be covered by scarified material.</p> <p>Good housekeeping practices within the camp site shall be adopted to minimize waste generation.</p> <p>Disposal of campsite waste near residential colonies or in agricultural fields shall not be allowed</p>	
	Water contamination	B-2	Waste management plan to be prepared for appropriate disposal of sewage – such as septic tank and soaking pits	B-1
	Loss of vegetation	B-2	The construction crew shall be provided with LPG as cooking (and heating, if required) fuel. Use of fuel wood shall not be allowed.	B-1
	Health and Safety issues	B-2	<p>Protective fencing to be installed around the Camp to avoid any accidents</p> <p>Firefighting equipment shall be made available at the camps</p> <p>The camp staff shall be provided firefighting training.</p>	B-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
			All safety precautions shall be taken to transport, handle and store hazardous substances, such as fuel Health & safety plan & SOP to manage COVID-19 risks should be prepared by contractor and get it approved by supervision consultant	
Security and Safety Risks	Delay in project execution	C-3	Frequent consultation with local community leaders should be carried out to ensure that any social frictions are identified and resolved before they become inflamed. There are safety requirements for construction projects that include control of public access to the site along with regulations aimed at safeguarding workers. Suitable arrangements that conform to national health and safety requirements and also appropriate international best practice will need to be followed. There are specific procedures that need to be observed for the transport, storage and handling of explosives that will be required for the operation of quarries and also underground excavation. It will be necessary to liaise with local communities and initiate and support a public awareness program, particularly targeted at children, about the risks	C-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
			and dangers of large construction sites	
Transportation of construction material	Soil erosion and contamination	B-2	<p>Vehicular traffic on unpaved roads shall be avoided as far as possible. Vehicles and equipment shall not be repaired in the field. If unavoidable, impervious sheathing shall be used to avoid soil and water contamination.</p> <p>Water should be sprinkled where needed and appropriate, particularly at work sites near the communities to suppress dispersion of dust</p>	B-1
	Air pollution	B-2	<p>Vehicular traffic on unpaved roads shall be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir shall be minimized.</p> <p>Vehicles shall be kept in good working condition and properly tuned, in order to minimize the exhaust emissions</p>	B-1
	Noise pollution	B-2	<p>Vehicles shall have exhaust mufflers (silencers) to minimize noise generation.</p> <p>Nighttime traffic shall be avoided near the communities. Local population shall be taken in confidence if such work is unavoidable.</p>	B-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
	Health and Safety issues	B-2	Road signage shall be fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic Project drivers shall be trained on defensive driving. Vehicle speeds near / within the communities shall be kept low, to avoid safety hazard and dust emissions.	B-1
	Damage to infrastructure	B-2	All damaged infrastructure shall be restored to original or better condition.	B-1
Construction Works	Soil erosion and contamination	B-2	Material borrowing and disposal plan should be prepared. Cultivation fields should be avoided for borrowing material to the extent possible. Written consent of the land owner should be obtained for material (soil) borrowing. Photographic record (before, during, after) should be kept for the borrow and disposal areas. Leveling of borrow sites.	B-1
	Loss of natural vegetation	B-2	Compensatory tree plantation (five times the trees cut down for construction) should be carried out	B-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
	Site overburden	B-2	<p>at appropriate locations within the project area</p> <p>Wind direction shall be considered while selecting sites for stock piles. Stockpiles of overburden shall be kept covered where possible.</p> <p>Ensure proper disposal of construction waste at designated landfill/disposal sites. If the project area does not have any disposal site the construction contractor shall use any depression for waste dumping. Prior to dumping the contractor should get the NOC from local authorities for disposal of solid waste. Proper disposal of waste material. Demarcate the waste site and provide details of land use. Finally take approval from supervision consultant.</p> <p>An impervious liner shall be laid to waste sites before the dumping of solid waste. The impervious liner shall be approved by the supervision consultant. After the dumping of solid waste, the depression should be covered by scarified material Dismantled asphalt pavement shall be dumped to the waste site.</p>	B-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
	Borrow pit management	B-2	<p>As far as possible wasteland or natural areas with a high elevation will be demarcated for borrowing earth material.</p> <p>Where the use of agriculture land is unavoidable, the top 300 mm of the plough layer will be stripped and stockpiled for redressing the land after the required borrow material has been removed.</p> <p>Where deep ditching is to be carried out, the top 1 m layer of ditching area will be stripped and stockpiled. The ditch will initially fill with scrap material from construction and then leveled with the stockpiled topsoil.</p> <p>Ditches or borrow pits that cannot be fully rehabilitated will be landscaped to minimize the erosion and to avoid creating hazards for people and livestock.</p> <p>Land owners will be compensated according to the terms of lease agreement negotiated with the land owners, and restoration action agreed upon by the contractor will be duly carried out.</p>	B-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
	Damage to infrastructure	B-2	All damaged infrastructure shall be restored to original or better condition.	B-1
	Sites of Historical, Cultural, Archeological or Religious Significance	B-2	<p>Proponent shall ensure that the construction contractor staff is educated about the location and importance of the cultural sites that exist in the Project area. The contractor shall ensure that these sites are not affected by the construction related activities including movement of the project vehicles and obtaining borrow material for construction. These aspects will be included in the trainings to be conducted for the contractor's staff.</p> <p>In case of chance find of any sites or artifacts of historical, cultural, archeological or religious significance, contractor shall ensure that the work is stopped at that site, the provincial and federal archeological departments are notified immediately, and their advice is sought before resumption of the construction activities at such sites.¹³</p>	B-1

¹³ Project routing does not envisaged any archeological site, however in case of any chance find the ***“Chance Find Procedures”*** should be adopted as given in **Annexure-18**.

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
			Graveyards shall not be disturbed during the construction activities including movement of the project vehicles and obtaining borrow material for construction.	
	Noise pollution	B-2	Equipment with high levels shall be fitted with noise reduction devices Regular inspection, maintenance and lubrication of the construction vehicle and equipment shall be performed Use of PPEs such as ear plugs and ear muffs by the workers shall be ensured Avoid night time activity	B-1
	Air pollution	B-2	Proper engine tuning of machinery/ equipment to meet National Environmental Quality Standards of Pakistan limits. Water should be sprinkled where needed and appropriate, particularly at work sites near the communities.	B-1
	Blocked of access due to earth works and stockpiling of excavated material	B-2	A bypass route should be constructed at the project site to divert the through traffic, thus avoiding the public traffic passing through the site.	B-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
	Health and Safety issues	B-2	<p>Demarcation tapes to be installed around the construction site to avoid any unauthorized entry</p> <p>Personal protective equipment should be made available at site and the usage of the PPEs should be ensured.</p> <p>Health & safety plan & SOP to manage COVID-19 risks should be prepared by contractor and get it approved by supervision consultant</p>	B-1
B. Operation and Maintenance Phase				
Conflicts caused by unavailability or improper distribution of water in the area	Social issues	C-3	<p>Agreements between different communities/tribes</p> <p>Perennial irrigation schemes may function smoothly in normal conditions and circumstances but do face problems during extraordinary situations, i.e. when flow is higher or lower than normal. From the outset water management rules and regulations must incorporate ways to tackle such issues as water scarcity and surplus flows.</p> <p>Local water user associations and groups need to be trained and involved to operate the canals, channels, gates, inlets, outlets and</p>	C-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
			<p>other structures. This needs to be done on collaborative basis with irrigation and agriculture department where communication system among farmers, water user association and department is assured.</p> <p>Farmers in downstream areas should be compensated in case they lose their water rights. All villages deprived of Project's water rights should be compensated for drinking water supply schemes otherwise very soon all villages and settlements will be deserted as underground water may not be fit for drinking purpose for every village and it would probably not be within the financial or technical capacity of local population to initiate such schemes on their own.</p>	
Use of water for drinking purposes	Health issues	C-3	<p>Proper treatment system shall be provided</p> <p>Water quality will be tested as per WHO/ GOP standards to ensure the integrity of the water supply system. Turbidity and free residual chlorine tests shall be regularly performed. Arsenic will be tested as per WHO standards.</p>	C-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
Periodic cleaning and maintenance of the system	Solid waste generation	C-3	Ensure proper disposal of waste at designated landfill/disposal sites.	C-1
Increase of agricultural lands	Loss of pastoral lands	C-3	Stall feeding practices for livestock, so that remaining pastoral lands are available for wild animals.	C-1
Community Participation for management and operation of the irrigation system	Social issues and System sustainability	C-3	Ensure community participation in management and operation of the irrigation system Training of community	C-1
Disruption to wildlife	Conservation issues	C-3	Design has already provided cattle drinking troughs at different intervals and pedestrian bridge for canal crossing approximately at 500 m interval. It will be the responsibility of BIPD to ensure the proper maintenance of aforementioned structures. By adopting the aforementioned measures, the impact would be finally of low significance.	C-1
Use of fertilizers & pesticides	Banned fertilizer & pesticides will cause health issues Contamination of fresh water through surface runoff	C-3	Concerted efforts by the department of agriculture to disseminate information regarding sustainable use of fertilizers will help in keeping the use at an optimal level; Ammonium Nitrate (AN) and Calcium Ammonium Nitrate (CAN) fertilizers will not be allowed; and Use of restricted pesticides identified by WHO shall not be	C-1

Activity / Issue	Potential Impact	Assessment of Risk	Mitigation Measures	Residual Impacts
			allowed. The list of restricted pesticides is attached as Annexure 15 of this report	
Risk due to Natural Hazard i.e. flooding and earthquakes	System sustainability	C-3	Emergency Response Plan for Infiltration Gallery will be followed which is attached as Annexure – 12 of this report.	C-1

7. ENVIRONMENTAL MANAGEMENT PLAN

7.1 Environmental Management Plan (EMP)

7.1.1 General

275. The EMP is a strategic approach towards the effective implementation of the mitigation measures and environmental protection of the Project Area and its surroundings. This EMP ensures that the undue or reasonably adverse impacts of a project are prevented and the positive benefits of the project are enhanced. According to this plan, all the activities related to various phases of the project are controlled and monitored.

276. This EMP encompasses all the phases of the project and may be used as a quick reference by the personnel(s) of client and contractors for effective implementation of the proposed mitigation measures and tracking the overall environmental performance of the project.

277. This EMP addresses all the significant impacts that are identified during the impacts identification process of the EIA at Feasibility Level as well as due to minor modifications in Feasibility Design at the Detail design stage. It should be amended in consultation with the concerned regulatory authority, in this case BEPA, if any issue has been overlooked or if any need would arise as the project continues.

7.1.2 Structure of EMP

278. The contents of this chapter are given below:

- Regulatory Requirements
- Purpose & Need of the EMP
- Objectives of the EMP
- Scope of the EMP
- Institutional Arrangement for Implementation of EMP
 - Institutional Arrangements for Implementation of EMP during Construction Phase
 - a. Role and Responsibilities of the Functionaries involved in EMP Implementation
 - b. Reporting Mechanism
 - c. Non-Compliance of the EMP
 - Institutional Arrangements for Implementation of EMP during Operation Phase
 - a. Role and Responsibilities of the Functionaries involved in EMP Implementation
 - b. Reporting Mechanism
- Environmental Mitigation Plan
- Environmental Monitoring Plan
- Implementation of EMP
 - NOC and other Approvals

- Stakeholder Coordination
- Trainings
- Communication & Documentation
- Grievance Redressal Mechanism (GRM)
- Environmental Management Cost
- Change Management

7.1.3 Regulatory Requirements

279. This EMP refers to the applicable legal framework given earlier as Chapter 2 for the proposed project for the protection of the environment.

7.1.4 Purpose & Need of the EMP

280. Primarily, the purpose of this EMP is to serve as a quick reference for the consultants, contractor as well as the proponents to implement the proposed mitigation measures effectively and to monitor the overall environmental performance of the project. Furthermore, to house the procedure, which the proponent follows to implement and maintain this EMP. The need of the EMP is mentioned as follows:

- Ensure that attention is paid to the actual environmental effects arising from construction, and operation of the proposed project;
- Ensure that anticipated impacts are maintained within the levels predicted;
- Ensure that unanticipated impacts are managed or mitigated before they become a problem; and
- Ensure that environmental management brings about real environmental benefits and achieves environmental sustainability, rather than the Environmental Approval Process being a mere paper chase to secure a development approval¹⁴.

7.1.5 Objectives of the EMP

281. The main objectives of the EMP during different phases of the project is to implement mitigation measures and to evaluate the effectiveness of mitigation measures as proposed in the IEE and recommend improvement if any need would arise.

7.1.6 Scope of the EMP

282. The scope of the EMP includes the following phases of the project:

- Construction Phase; and
- Operation Phase.

¹⁴ Guidelines for Preparation and Review of Environmental Reports, 1997

283. All the activities performed during these phases will be controlled and monitored according to this EMP.

7.1.7 Institutional Arrangement for Implementation of EMP

284. The following is a broad guideline has been proposed for institutional setup under this project as a reference for BID. It is based on the recommendations for PMO of ADB's Siri Toi Irrigation Project. The final organizational structure, working and monitoring of Institutional setup would be proposed by the BID and would be finalized in consultation with ADB's Resident Mission in Pakistan.

□ Institutional Arrangements for Implementation of EMP during Construction Phase

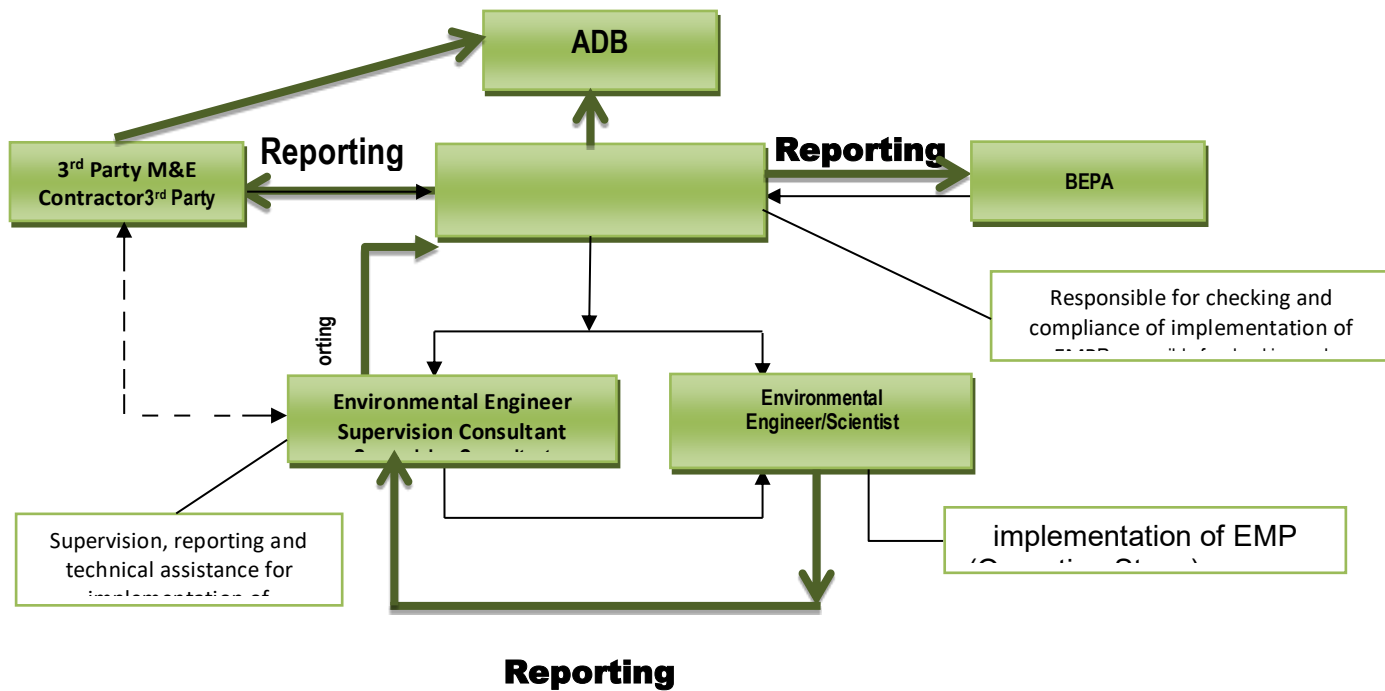
285. The Project Director (PMO, BWRDSP) will formulate an Environmental & Social Management and Monitoring Cell (ESMMC) which will comprise senior professionals, and should preferably have representative of various stakeholders including local administration.

286. The key players involved during construction stage of the proposed project are the ESMMC, 3rd Party M&E Contractor, Balochistan Environmental Protection Agency, the Contractor and the Supervisory Consultants (SCs). The roles, remits and responsibilities of these organizations are outlined below.

287. The following staff will be involved in the implementation of EMP:

- ESMMC Representative;
- 3rd Party M&E Contractor;
- SC's Environmental Engineer/Scientist; and
- Contractor's Environmental Engineer/Scientist.

288. The Construction Contractor will make a bond through contract documents to implement the EMP. The whole EMP will be included as a clause of the contract documents. The organizational setup for implementation of EMP is given below **Figure 13**:



□ Roles and Responsibilities

a) BEPA

289. BEPA is the regulatory authority for issuance of NOC for this proposed project. As part of its mandate, protection of environment is its responsibility. Therefore, this agency will undertake an audit (as and when required) of project activities with respect to the protocols as defined in EMP.

b) 3rd Party M&E Contractor (if required)¹⁵

290. 3rd Party M&E shall be responsible for:

- To make sure that all the contractual obligations related to the environmental and social compliance are met;
- To monitor the progress regarding implementation of environmental safeguard as provided in EMP;
- Oversee the Compliance of all the monitoring programs as given in EMP;
- Check randomly whether monitoring of the environmental aspects of the project during construction phase is being properly carried out;
- Document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports, and make follow-up on these actions to ensure progress toward the desired outcomes;

¹⁵ Normally in other ADB's Projects 3rd Party M&E contractor performed the monitoring of EMP as well.

- Make sure that the Contractor is implementing the additional measures suggested by the M&E Contractor; and
- Reporting the status of EMP compliance to BID and ADB

c) Project Director, PMO-BWRDSP:

291. Project Director through ESMMC will responsibility for assuring implementation of EMP. This includes the following:

- Ensuring that the required environmental training is provided to the concerned staff;
- The Project Director will be responsible for carrying out random site visits to the construction sites to review the environmental performance of the Construction Contractors;
- Review monitoring reports for the progress of environment related activities;
- Make sure that the Construction Contractor is implementing the additional measures suggested by the Supervision Consultant in environmental monitoring reports;
- To assist Contractor for obtaining necessary approvals from the concerned departments.
- Maintaining interface with the other lined departments / stakeholders; and
- Reporting to the BEPA on status of EMP implementation.
- Reporting to ADB on status of EMP implementation.

d) Supervision Consultant: Resident Engineer

292. Resident Engineer's (RE) roles and responsibilities will be:

- To oversee the performance of Construction Contractor to make sure that the Construction Contractor is carrying out the work in accordance with the tender design and follow the specifications;
- Ensuring that the day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner;
- Strong coordination with the Construction Contractor and ESMMC.

e) Supervision Consultant: Environmental Inspector

293. SC's Environmental Inspector will perform following roles and responsibilities:

- Directly reporting to the RE;
- Ensure the implementation of the mitigation measures suggested in EMP;
- To supervise and monitor environmental activities being performed at site;
- To organize periodic environmental training programs and workshops for the consultant's and contractor's staff with the help of Environmental Specialist
- Suggest any additional mitigation measures if required.

f) Construction Contractor: Environmental Supervisor/Inspector

294. Contractor will be bond to appoint a Site Supervisor/Inspector with relevant educational experience and background. Contractor's Environmental Supervisor/Inspector will carry out following activities:

- Implementation of the mitigation measures at construction site;
- Contractor will be bond through contract to take actions against all the special and general provisions of the contract document;
- Contractor will make sure the compliance of EMP recommendations and will also be responsible for effective liaison with local heads of villages;
- Provision of proper Personal Protective Equipment (PPEs) to the workers and train them for their proper use;
- To conduct the environmental and health & safety (especially COVID-19 related) trainings to the workers/labor; and
- Coordinate with RE/Environmental Specialist of SC.

□ Reporting Mechanism

295. Progress reporting related to environmental activities will be responsibility of Supervision Consultant, Environmental Specialist. He will also be responsible for submitting monthly EMP compliance report for the project to the PD-PMO. A bi-annual report of environmental activities shall be submitted to ADB by BID.

296. PD will in turn add his remarks / comments / feedback and submit the Report to ADB and BEPA in accordance with the frequency defined by them. In case the frequency is not defined and/or communicated, bi-annual monitoring reports based on the monthly monitoring report will be submitted to ADB for disclosure on ADB website.

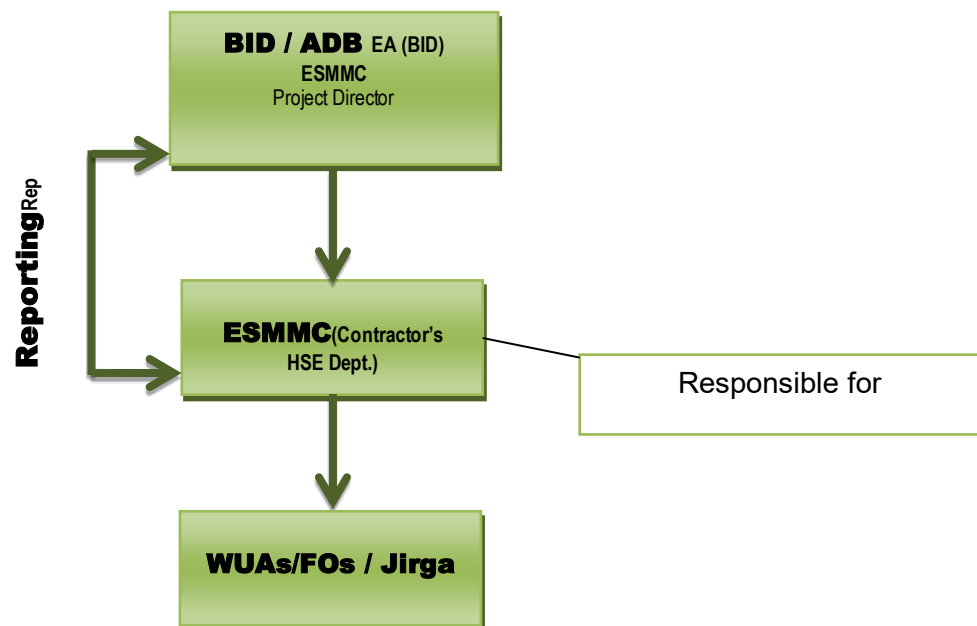
□ Non-Compliance of the EMP

297. The implementation of the proposed EMP involves inputs from various functionaries. Construction Contractor will be primarily responsible for ensuring implementation and reporting of the mitigation measures proposed in the EMP, which will be part of the contract documents. In addition, the Contractor will also need to prepare Site Specific Environmental Management Plan (SSEMP) and get it approved from SC / BID before start of any construction phase. The SSEMP will provide the risk rating for each construction activity and will provide mitigation measures to reduce activities with higher degree of risk. Various plans, and layout maps (construction camp layout plan) will also form part of SSEMP. The provision of the environmental mitigation cost will be made in the total cost of project, for which Construction Contractor will be paid on the basis of monthly compliance reports. However, if the Construction Contractor fails to comply with the implementation of EMP and submission of the monthly compliance reports, deductions will be made from the payments to the Construction Contractor claimed under the heads of environmental components.

□ Institutional Arrangement for Implementation of EMP during Operation Phase

298. The key players involved operation of the proposed project are the BID, BEPA, Water User Associations (WUA)& Farmer Organizations (FOs) or Jirga. The roles, remits and responsibilities of these organizations are outlined below. The following staff will be involved in the implementation of EMP. Organizational setup for implementation of EMP is also given below in **Figure 14**:

- WUA and FOs, or Jirga; and
- BID, Environmental Engineer/Scientist.



□ Roles and Responsibilities

a) Environmental Engineer/Scientist

299. Environmental Engineer/Scientist will have responsibility for assuring implementation of EMP. This includes the following:

- Coordinating and planning the overall activities, as per EMP;
- Environmental Engineer/Scientist will randomly check the operation of project and make sure system is in compliance with EMP;
- Make sure that the WUA & FOs are implementing the measures suggested in the EMP and to report in environmental monitoring reports; and
- Bi-annual reporting to BEPA on environmental compliance of the project during operation stage.

b) Water User Association (WUA) and Farmer Organizations (FOs), Chairman & Vice Chairman / Jirga

300. WUA and FOs will ensure the implementation of the mitigation measures at operation site and will report to BID.

□ Environmental Management Plan

301. Potential impacts and their mitigation measures are devised against the project activities to minimize their significance. Responsibilities for the collection and analysis of data as well as the reporting requirements have been outlined in **Table 34**. Implementation of environmental impact mitigation measures during construction is to avoid and reduce short- and long-term potential environmental impacts. Incorporation of environmental impact mitigation considerations into the tender and contract documents is a fundamental prerequisite for effective implementation of the EMP.

Table 34: Environmental Management and Monitoring Plan

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
Kili Sardar Akhtar Infiltration Gallery (Construction of infiltration galleries; lining of covered channel, open channel lining, social structures and time division structures)					
A. Implementation and Construction Phase					
Construction contractor mobilization and Establishment of campsite and machinery/ equipment Yard	<ul style="list-style-type: none"> Changes in land use pattern Cultural conflicts Influx of external work force Land degradation due to solid waste disposal of camp site Workshop facilities will spread oils & chemicals Soil erosion 	<ul style="list-style-type: none"> Site for camp site shall be selected keeping in view the cultural norms of the area to avoid undue interference of the Construction contractor's staff with the local residents. Local residents shall be given priority in the employment opportunities generated during construction and operations phase The land shall be rented for the camp site and equipment yard. No resettlement is envisaged for this purpose. Residents of village shall be employed for the construction phase (mostly for unskilled jobs). 	<ul style="list-style-type: none"> Monthly rent receipts. Development & implementation of policy on local employments Employment record 	<ul style="list-style-type: none"> Strict compliance monitoring on fortnightly basis Quarterly Reporting 	<ul style="list-style-type: none"> Execution by construction contractor Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> Workshop facilities may spread oils & chemicals 	<ul style="list-style-type: none"> Proper disposal of used oil and chemical waste in 	<ul style="list-style-type: none"> Visual inspection 	<ul style="list-style-type: none"> Daily monitoring report Quarterly Reporting 	<ul style="list-style-type: none"> Execution by construction contractor

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		<p>accordance with MSDS shall be ensured.</p> <ul style="list-style-type: none"> • Efficient Use of Chemicals shall be ensured. • Good housekeeping practices shall be ensured at workshop areas. • Mixing of waste into fresh water sources shall not be allowed. 			<ul style="list-style-type: none"> • Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> • Deterioration of air quality due to machinery & equipment 	<ul style="list-style-type: none"> • Proper engine tuning of machinery/ equipment to meet National Environmental Quality Standards of Pakistan limits. • Water should be sprinkled where needed and appropriate, particularly at work sites near the communities. 	<ul style="list-style-type: none"> • Monitoring shall be done on stack of machinery and equipment. The parameters required to be monitored are, SO_x, CO, VOCs and NO_x. • Evidence of measurement records. 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly reporting 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant PM
	<ul style="list-style-type: none"> • Noise Pollution 	<ul style="list-style-type: none"> • Equipment with high levels shall be fitted with noise reduction devices • Regular inspection, maintenance and lubrication of the construction vehicle and equipment shall be performed 	<ul style="list-style-type: none"> • Monitoring compliance to NEQS for noise (SRO 72 (KE) / 2009) • The sampling shall be done twice on monthly basis at 7m from the source. The duration of sampling 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly Reporting 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		<ul style="list-style-type: none"> • Use of PPEs such as ear plugs and ear muffs by the workers shall be ensured • Avoid night time activity 	shall be 24 hours @ 15 seconds interval over 15 minutes every hour (averaged)		
	<ul style="list-style-type: none"> • Land degradation due to solid waste disposal of camp site 	<ul style="list-style-type: none"> • Ensure proper disposal of camp site waste at designated landfill/disposal sites. If the project area does not have any disposal site the construction contractor shall use any depression for waste dumping. Prior to dumping the contractor should get the NOC from local authorities for disposal of solid waste. An impervious liner shall be laid to waste sites before the dumping of solid waste. The impervious liner shall be approved by the supervision consultant. After the dumping of solid waste, the depression should be covered by scarified material. • Good housekeeping practices within the camp site shall be adopted to minimize waste generation. 	<ul style="list-style-type: none"> • Visual inspection 	<ul style="list-style-type: none"> • Weekly monitoring reports • Quarterly Reporting 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		<ul style="list-style-type: none"> • Disposal of campsite waste near residential colonies or in agricultural fields shall not be allowed 			
	<ul style="list-style-type: none"> • The water resources, both surface and subsurface, may get polluted from hazardous construction materials, wastewater effluent, solid waste, silt from construction and soil erosion, etc. 	<ul style="list-style-type: none"> • Protection of surface and groundwater reserves from any source of contamination such as the construction and oily waste that will degrade quality. • The solid waste will be disposed off in designated landfill sites to sustain the water quality for domestic requirements. • Appropriate measures for disposal of sewage – such as septic tank and soaking pits shall be prepared by contractor and submitted for approval to the Project Director, BWRDP. • Water required for construction shall be used in such a way that the water availability and supply to nearby communities remain unaffected. Surface water shall be used after taking NOC from local government 	<ul style="list-style-type: none"> • Monitoring compliance to NEQS of Surface water quality on monthly basis for, Dissolved Oxygen, pH and Electric Conductivity (EC) with portable DO meter, pH meter and EC meter • Waste management plan in place • Photographic record 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly Water Quality Monitoring reports 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
	<ul style="list-style-type: none"> Loss of vegetation 	<ul style="list-style-type: none"> The construction crew shall be provided with LPG as cooking (and heating, if required) fuel. Use of fuel wood shall not be allowed. 	<ul style="list-style-type: none"> Use of LPG cylinders at campsite 	<ul style="list-style-type: none"> Fortnightly monitoring reports Quarterly reporting 	<ul style="list-style-type: none"> Execution by construction contractor Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> Health and Safety issues 	<ul style="list-style-type: none"> Protective fencing to be installed around the Camp to avoid any accidents Firefighting equipment shall be made available at the camps The camp staff shall be provided firefighting training. All safety precautions shall be taken to transport, handle and store hazardous substances, such as fuel Health & safety plan including SOP's to manage COVID-19 risks should be prepared by contractor and get it approved by supervision consultant 	<ul style="list-style-type: none"> Use of personal protective equipment at campsite Health & safety plan including SOP's to manage COVID-19 risks in place 	<ul style="list-style-type: none"> Fortnightly monitoring reports Quarterly reporting 	<ul style="list-style-type: none"> Execution by construction contractor Monitoring by Supervision Consultant
Security and Safety Risks	<ul style="list-style-type: none"> Delay in project execution 	<ul style="list-style-type: none"> Frequent consultation with local community leaders should be carried out to ensure that any social frictions are identified and 	<ul style="list-style-type: none"> Minutes of meetings of community consultation Dissemination material 	<ul style="list-style-type: none"> Monthly reporting 	<ul style="list-style-type: none"> Contractor

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		<p>resolved before they become inflamed. There are safety requirements for construction projects that include control of public access to the site along with regulations aimed at safeguarding workers. Suitable arrangements that conform to national health and safety requirements and also appropriate international best practice will need to be followed. There are specific procedures that need to be observed for the transport, storage and handling of explosives that will be required for the operation of quarries and also underground excavation. It will be necessary to liaise with local communities and initiate and support a public awareness program, particularly targeted at children, about the risks and dangers of large construction sites</p>			

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
Transportation of construction material	<ul style="list-style-type: none"> • Soil erosion and contamination 	<ul style="list-style-type: none"> • Vehicular traffic on unpaved roads shall be avoided as far as possible. • Vehicles and equipment shall not be repaired in the field. If unavoidable, impervious sheathing shall be used to avoid soil and water contamination. 	<ul style="list-style-type: none"> • Log of vehicle and equipment repairs 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly reporting 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> • Air pollution 	<ul style="list-style-type: none"> • Vehicular traffic on unpaved roads shall be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir shall be minimized. • Vehicles shall be kept in good working condition and properly tuned, in order to minimize the exhaust emissions 	<ul style="list-style-type: none"> • Route maps of vehicle movement • Log of vehicle maintenance • Monitoring shall be done on stack of machinery and equipment. The parameters required to be monitored are CO, NO_x, SO_x, PM₁₀. 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly Air quality monitoring report 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> • Noise pollution 	<ul style="list-style-type: none"> • Vehicles shall have exhaust mufflers (silencers) to minimize noise generation • Nighttime traffic shall be avoided near the communities. Local population shall be taken in confidence if such work is unavoidable. 	<ul style="list-style-type: none"> • Log of vehicle movement time • Visual inspections of the vehicles • Monitoring compliance to NEQS for noise (SRO 72 (KE) / 2009) 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly Noise Monitoring reports 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
			<ul style="list-style-type: none"> The sampling shall be done twice on monthly basis at 7m from the potential source. 		
	<ul style="list-style-type: none"> Health and Safety issues 	<ul style="list-style-type: none"> Road signage shall be fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic Project drivers shall be trained on defensive driving Vehicle speeds near / within the communities shall be kept low, to avoid safety hazard and dust emissions. 	<ul style="list-style-type: none"> Visual inspections Training record 	<ul style="list-style-type: none"> Fortnightly monitoring reports Quarterly reporting 	<ul style="list-style-type: none"> Execution by construction contractor Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> Damage to infrastructure 	<ul style="list-style-type: none"> All damaged infrastructure shall be restored to original or better condition. 	<ul style="list-style-type: none"> Visual inspections Photographic records Infrastructure restoration records 	<ul style="list-style-type: none"> Fortnightly monitoring reports Quarterly reporting 	<ul style="list-style-type: none"> Execution by construction contractor Monitoring by Supervision Consultant
Construction Works	<ul style="list-style-type: none"> Soil erosion and contamination 	<ul style="list-style-type: none"> Material borrowing and disposal plan should be prepared Cultivation fields should be avoided for borrowing material to the extent possible 	<ul style="list-style-type: none"> Evidence of plan in place. Photographic record 	<ul style="list-style-type: none"> Fortnightly monitoring reports Quarterly reporting 	<ul style="list-style-type: none"> Execution by construction contractor Monitoring by Supervision Consultant

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		<ul style="list-style-type: none"> • Written consent of the land owner should be obtained for material (soil) borrowing • Photographic record (before, during, after) should be kept for the borrow and disposal areas. • Leveling of borrow sites. 			
	<ul style="list-style-type: none"> • Loss of natural vegetation 	<ul style="list-style-type: none"> • Compensatory tree plantation (five times the trees cut down for construction) should be carried out at appropriate locations within the project area 	<ul style="list-style-type: none"> • Evidence of plantation. • Photographic record 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly reporting 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> • Site overburden 	<ul style="list-style-type: none"> • Wind direction shall be considered while selecting sites for stock piles. • Stockpiles of overburden shall be kept covered where possible. • Ensure proper disposal of construction waste at designated landfill/disposal sites. If the project area does not have any disposal site the construction contractor shall use any depression for waste dumping. Prior to dumping 	<ul style="list-style-type: none"> • Visual inspections • Monitoring Particulate Matter PM₁₀ 	<ul style="list-style-type: none"> • Daily monitoring reports • Fortnightly monitoring reports of PM₁₀ • Quarterly Reporting 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		<p>the contractor should get the NOC from local authorities for disposal of solid waste. Proper disposal of waste material. Demarcate the waste site and provide details of land use. Finally take approval from supervision consultant.</p> <ul style="list-style-type: none"> • An impervious liner shall be laid to waste sites before the dumping of solid waste. The impervious liner shall be approved by the supervision consultant. After the dumping of solid waste the depression should be covered by scarified material <p>Dismantled asphalt pavement shall be dumped to the waste site.</p>			
	<ul style="list-style-type: none"> • Borrow pit management 	<ul style="list-style-type: none"> • As far as possible wasteland or natural areas with a high elevation will be demarcated for borrowing earth material. • Where the use of agriculture land is unavoidable, the top 300 mm of the plough layer will 	<ul style="list-style-type: none"> • Monthly rent receipts. 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly reporting 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		<p>be stripped and stockpiled for redressing the land after the required borrow material has been removed.</p> <ul style="list-style-type: none"> • Where deep ditching is to be carried out, the top 1 m layer of ditching area will be stripped and stockpiled. The ditch will initially fill with scrap material from construction and then leveled with the stockpiled topsoil. • Ditches or borrow pits that cannot be fully rehabilitated will be landscaped to minimize the erosion and to avoid creating hazards for people and livestock. • Land owners will be compensated according to the terms of lease agreement negotiated with the land owners, and restoration action agreed upon by the contractor will be duly carried out. 			
	<ul style="list-style-type: none"> • Damage to infrastructure 	<ul style="list-style-type: none"> • All damaged infrastructure shall be restored to original or better condition. 	<ul style="list-style-type: none"> • Visual inspections • Photographic records 	<ul style="list-style-type: none"> • Fortnightly monitoring reports • Quarterly reporting 	<ul style="list-style-type: none"> • Execution by construction contractor

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
			<ul style="list-style-type: none"> • Infrastructure restoration records 		<ul style="list-style-type: none"> • Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> • Sites of Historical, Cultural, Archeological or Religious Significance 	<ul style="list-style-type: none"> • Proponent shall ensure that the construction contractor staff is educated about the location and importance of the cultural sites that exist in the Project area. The contractor shall ensure that these sites are not affected by the construction related activities including movement of the project vehicles and obtaining borrow material for construction. These aspects will be included in the trainings to be conducted for the contractor's staff. • In case of chance find of any sites or artifacts of historical, cultural, archeological or religious significance, contractor shall ensure that the work is stopped at that site, the provincial and federal archeological departments are notified immediately, 	<ul style="list-style-type: none"> • Evidence of training provided to contractor staff. • Evidence of maps in place with these sites shown. • Record of appropriate action taken in case of chance find. • Photographic record of chance find 	<ul style="list-style-type: none"> • Immediately after chance find, to be reported in next quarter. 	<ul style="list-style-type: none"> • Execution by construction contractor • Monitoring by Supervision Consultant

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		and their advice is sought before resumption of the construction activities at such sites. ¹⁶ <ul style="list-style-type: none"> Graveyards shall not be disturbed during the construction activities including movement of the project vehicles and obtaining borrow material for construction. 			
	<ul style="list-style-type: none"> Noise pollution 	<ul style="list-style-type: none"> Equipment with high levels shall be fitted with noise reduction devices Regular inspection, maintenance and lubrication of the construction vehicle and equipment shall be performed Use of PPEs such as ear plugs and ear muffs by the workers shall be ensured Avoid night time activity 	<ul style="list-style-type: none"> Monitoring compliance to NEQS for noise (SRO 72 (KE) / 2009) The sampling shall be done twice on monthly basis at 7m from the potential source. 	<ul style="list-style-type: none"> Fortnightly monitoring reports Quarterly Noise quality monitoring reports 	<ul style="list-style-type: none"> Execution by construction contractor Monitoring by Supervision Consultant
	<ul style="list-style-type: none"> Air pollution 	<ul style="list-style-type: none"> Proper engine tuning of machinery/ equipment to meet National 	<ul style="list-style-type: none"> Monitoring shall be done on stack of machinery and 	<ul style="list-style-type: none"> Fortnightly monitoring reports 	<ul style="list-style-type: none"> Execution by construction contractor

¹⁶ Project routing does not envisaged any archeological site, however in case of any chance find the **“Chance Find Procedures”** should be adopted , as given in **Annexure-18**

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		Environmental Quality Standards of Pakistan limits. • Water should be sprinkled where needed and appropriate, particularly at work sites near the communities.	equipment. The parameters required to be monitored are CO, NOx, SOx, PM10. • Evidence of measurement records.	• Quarterly Air Quality Monitoring reports	• Monitoring by Supervision Consultant
	• Blocked of access due to earth works and stockpiling of excavated material	• A bypass route should be constructed at the project site to divert the through traffic, thus avoiding the public traffic passing through the site.	• Traffic diversion plan	• Fortnightly monitoring reports • Quarterly reporting	• Execution by construction contractor • Monitoring by Supervision Consultant
	• Health and Safety issues	• Demarcation tapes to be installed around the construction site to avoid any unauthorized entry • Personal protective equipment should be made available at site and the usage of the PPEs should be ensured. • Health & safety plan including SOP's to manage COVID-19 risks should be prepared by contractor and get it approved by supervision consultant	• Use of personal protective equipment • Health & safety plan including SOP's to manage COVID-19 risks in place	• Fortnightly monitoring reports • Quarterly reporting	• Execution by construction contractor • Monitoring by Supervision Consultant
C. Operation and Maintenance Phase					

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
Conflicts caused by unavailability or improper distribution of water in the area	<ul style="list-style-type: none"> • Social issues 	<ul style="list-style-type: none"> • Agreements between different communities/tribes • Perennial irrigation schemes may function smoothly in normal conditions and circumstances but do face problems during extraordinary situations, i.e. when flow is higher or lower than normal. From the outset water management rules and regulations must incorporate ways to tackle such issues as water scarcity and surplus flows. • Local water user associations and groups need to be trained and involved to operate the canals, channels, gates, inlets, outlets and other structures. This needs to be done on collaborative basis with irrigation and agriculture department where communication system among farmers, water user association and department is assured. • Farmers in downstream 	<ul style="list-style-type: none"> • Agreement between parties • Training records 	<ul style="list-style-type: none"> • Quarterly reporting 	<ul style="list-style-type: none"> • Environmental Specialist to develop reports • PD to review and take management actions, where needed

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		<p>areas should be compensated in case they lose their water rights.</p> <ul style="list-style-type: none"> • All villages deprived of Project's water rights should be compensated for drinking water supply schemes otherwise very soon all villages and settlements will be deserted as underground water may not be fit for drinking purpose for every village and it would probably not be within the financial or technical capacity of local population to initiate such schemes on their own. 			
Use of water for drinking purposes	<ul style="list-style-type: none"> • Health issues 	<ul style="list-style-type: none"> • Proper treatment system shall be provided • Water quality will be tested as per WHO/ GOP standards to ensure the integrity of the water supply system. • Turbidity and free residual chlorine tests shall be regularly performed. • Arsenic will be tested as per WHO standards. 	<ul style="list-style-type: none"> • WHO/ GOP Drinking Water Standards 	<ul style="list-style-type: none"> • Daily monitoring reports of turbidity and free residual chlorine test • Monthly analysis of water quality parameters • Quarterly reporting 	<ul style="list-style-type: none"> • Environmental Specialist to develop reports • PD to review and take management actions, where needed

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
Periodic cleaning and maintenance of the system	<ul style="list-style-type: none"> • Solid waste generation 	<ul style="list-style-type: none"> • Ensure proper disposal of waste at designated landfill/disposal sites. 	<ul style="list-style-type: none"> • Visual inspection 	<ul style="list-style-type: none"> • Monthly monitoring and quarterly reporting 	<ul style="list-style-type: none"> • Irrigation Department • Water User Association
Increase of agricultural lands	<ul style="list-style-type: none"> • Loss of pastoral lands 	<ul style="list-style-type: none"> • Stall feeding practices for livestock, so that remaining pastoral lands are available for wild animals 	<ul style="list-style-type: none"> • Monitoring records 	<ul style="list-style-type: none"> • Monthly monitoring and quarterly reporting 	<ul style="list-style-type: none"> • Agriculture Department • Forestry Department • Wildlife Department
Community Participation for management and operation of the irrigation system	<ul style="list-style-type: none"> • Social issues • System sustainability 	<ul style="list-style-type: none"> • Ensure community participation in management and operation of the irrigation system • Training of community 	<ul style="list-style-type: none"> • Training records • Community participation records 	<ul style="list-style-type: none"> • Monthly monitoring and quarterly reporting 	<ul style="list-style-type: none"> • Irrigation Department • Water User Association
Disruption to wildlife	<ul style="list-style-type: none"> • Conservation issues 	<ul style="list-style-type: none"> • Design has already provided cattle drinking troughs at different intervals and pedestrian bridge for canal crossing approximately at 500 m interval. • It will be the responsibility of BIPD to ensure the proper maintenance of aforementioned structures. By adopting the aforementioned measures, the impact would be finally 	<ul style="list-style-type: none"> • Monitoring and maintenance records 	<ul style="list-style-type: none"> • Monthly monitoring and quarterly reporting 	<ul style="list-style-type: none"> • Irrigation Department • Wildlife Department

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Monitoring and Reporting Frequency	Party(ies) Responsible for Implementation & Monitoring
		of low significance.			
Use of fertilizers & pesticides	<ul style="list-style-type: none"> Banned fertilizer & pesticides will cause health issues Contamination of fresh water through surface runoff 	<ul style="list-style-type: none"> Concerted efforts by the department of agriculture to disseminate information regarding sustainable use of fertilizers will help in keeping the use at an optimal level; Ammonium Nitrate (AN) and Calcium Ammonium Nitrate (CAN) fertilizers will not be allowed; and Use of restricted pesticides identified by WHO shall not be allowed. The list of restricted pesticides is attached as Annexure 15 of this report 	<ul style="list-style-type: none"> Visual inspection Monitoring records Market survey for availability of AN and CAN fertilizers 	<ul style="list-style-type: none"> Monthly monitoring and quarterly reporting 	<ul style="list-style-type: none"> Agriculture department
Risk due to Natural Hazard i.e. Flooding and Earthquakes	<ul style="list-style-type: none"> System sustainability 	<ul style="list-style-type: none"> Emergency Response Plan for Breaching of Infiltration Gallery will be followed which is attached as Annexure – 12 of this report. 	<ul style="list-style-type: none"> Training record of emergency response plan 	<ul style="list-style-type: none"> Monthly monitoring and quarterly reporting 	<ul style="list-style-type: none"> Irrigation Department

7.1.8 Planning for Implementation of EMP

302. NOC and Other Approvals

□ **BEPA Approval Process**

303. The BID has obtained No Objection Certificate (NOC) from the Balochistan EPA that was mandatory requirement before project commencement (**Annexure 10**) .

□ **Stakeholder Coordination**

304. Notwithstanding the efforts so far put in for public participation, this activity will have to be pursued through the forthcoming implementation phases of the project. In particular, the focus will be on the improvement and modification of the proposed intervention designs.

305. Participation mechanisms facilitate the consultative process and include information sharing and dissemination, disclosure, and participation of affected people and other stakeholders in the project related activities. In the peculiar social set-up of the Project Area, it is also important to involve the religious leaders as representatives of the public as well as part of effective communication process. They can provide a very effective medium to bring information to the affected male population through Friday prayers. Local business community, specially the affected one, should also be brought into the process of awareness and participation. The related institutional arrangements should also be in place for continuous consultation throughout the process of planning, implementation and liaison with key stakeholders through continuous process of information disclosure, consultation and participation.

306. During construction, BID will have to implement both EMP. For EMP, an exclusive Environmental & Social Management and Monitoring Cell (ESMMC) will be established. Project Information Centre will be also established for liaison with key stakeholders through continuous process of information disclosure, consultation and participation.

7.2 Environmental Training Needs Assessment

307. In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. An environmental and social training and Technical Assistance (TA) program is to be carried out before the implementation of the project.

308. 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. A suitable training program is proposed to train the Contractor(s) staff who will be involved in the Construction Phase and the professional staff from the proponent involved at the operational stage of the project.

309. The supervision / training consultant will organize training courses for Proponent and Contractor staff to train them in specialized areas such as air and noise pollution monitoring and water quality monitoring etc. The details of this training program are presented in **Table 35**.

Table 35: Personnel Training Program

Training Provided by	Contents	Trainees	Duration
supervision / training consultants/ organizations specializing in environmental management and monitoring	Short seminars and courses on: Environmental laws and regulations, daily monitoring and supervision	<ul style="list-style-type: none"> • Irrigation Staff • Contractor • project staff • Project Implementation Staff 	1 day
Training consultants/ organizations specializing in social management and monitoring	Short seminars and courses on: Social awareness	<ul style="list-style-type: none"> • Project staff dealing in Social/lands matters 	1 day
Training consultants/ organizations specializing in Occupational, health and safety issues	Short lectures relating to Occupational Safety and Health	<ul style="list-style-type: none"> • Contractor's staff 	2 days

7.3 Communication & Documentation

310. Communication and documentation is an essential feature of EMP. The key features of such mechanism are:

Data Recording and Maintenance

311. All forms to be used for recording information during the environmental monitoring will follow a standard format which will correspond to the data base in to which all the gathered information will be placed. Check boxes will be used as much as possible to facilitate data entry. Tracking system will be developed for each form.

Database

312. The database may include the following information:

- Training programs;

- Staff deployment;
- Non-compliance;
- Corrective actions
- List of environmental data and
- List of environmental data to be maintained:
- Soil and land pollution
- Disposal of excavated silt and earth
- Disposal of waste
- Water resource
- Fuel oil and chemical spills
- Vegetation record
- Noise pollution
- Air and dust pollution
- Socio-economic data

□ **Meetings**

313. The following environmental meetings during the project will take place. Primary meeting for setting out the requisite end frame sounding for the regular meetings. Scheduled meetings between Contractor and Supervising Consultants.

314. The purpose of the meeting will be to discuss the conduct of the operation, non – compliances noted by the consultant’s environmental team and measures for their remedy. The meeting will be recorded in the form of a daily/monthly environmental report.

7.4 Grievance Redressal Mechanism

315. A grievance mechanism will be available to allow an AP appealing any disagreeable decision, practice or activity arising from land or other assets compensation. APs will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing during consultation, survey, and time of compensation. A detailed project specific GRM is in **Annexure 11**.

316. A Grievance Redress Committee (GRC) will be established at both project and field level. GRC at project level will include the Project director, representative of PIU/ BIPD, Social Safeguards staff of BIPD, representatives of APs/ or local community and representatives of concerned FO (if any).

7.5 Environmental Management Cost

317. The budget presented in **Table 36 and 37** will include estimates for the cost of mitigation measures, staff employed for implementation of the EMP, tree plantation, and technical assistance.

Table 36: Environmental Management Cost**i. Budget Estimate for Environmental Monitoring During the Construction and Operation Phases**

Components	Parameters	Monitoring Location	No. of Samples/unit	Frequency	Responsibility	Cost Rs
During Construction Period (1.5 Year)						
Air quality	CO, NO _x , SO _x , PM ₁₀	Construction site, batching plant site, and access road/borrow area, nearby village (SC will guide)	4 (Total= 32)	Quarterly	Proponent1 (though Environmental lab)	600,000
Ground Water Quality	Physical-chemical parameters, biological contamination, heavy metals	Nearby Construction site	1 (Total=6)	Quarterly	Proponent (though Environmental lab)	84,000
Surface Water Quality	Physical-chemical parameters, biological contamination, heavy metals	Nearby Construction site and community	2 (Total= 12)	Quarterly	Proponent (though Environmental lab)	168,000
Noise Level		Construction site, camp site, access roads, nearby community	4 (Total= 24)	Quarterly	Proponent (though Environmental lab)	48000
A. Sub-Total						Rs.9,00000
During Operation & Maintenance Period(one year)						
Air quality	CO, NO _x , Sox, PM ₁₀	PMU will guide	2 (Total = 4)	Bi-annually	Proponent(BID)	50000
Ground Water Quality	Physical-chemical parameters, biological contamination, heavy metals		1 (Total = 2)	Bi-annually	Proponent(BID)	28,000
Surface Water Quality	Physical-chemical parameters, biological contamination, heavy metals		1 (Total = 2)	Bi-annually	Proponent(BID)	28,000
Noise Level			4 (Total = 8)	Bi-annually	PMU, BWRDP	16,000
B. Sub-Total						Rs. 1,22000
Total (A+B)=						Rs. 10,22000

ii. Cost of Proponent

Sr. No	Description	Amount
1	Environmental Monitoring cost for construction & operation period (from Table 8-4)	Rs. 10,22000
4	Training & Community Engagement Cost	Rs. 150,000
Total Cost		Rs. 11,72000

iii. Cost of Contractor

Sr. No	Description	Amount
1	Contractor Environmental Engineer salary @ Rs. 80,000/month	Rs. 14,40000
2	Health & safety measures to manage COVID-19	Rs. 500,000
3	Noise monitoring, Dissolved Oxygen, pH and Electric Conductivity (EC) of the water Monitoring on Monthly Basis ²	Rs. 250,000
Total Cost		Rs. 21,90000

Total EMP Cost = Rs. 3,362,000

SC= Supervision Consultant, PMU: Project Management Unit

¹ Proponent (BID) will hire an Environmental laboratory for Air, Noise quality monitoring and Water quality testing and will perform environmental testing according to Table 8-6.

²Contractor will purchase DO meter, EC meter, pH meter, Noise meter for monthly monitoring

8. CONCLUSIONS AND RECOMMENDATIONS

318. This section presents the major conclusions and key recommendations of the IEE study.

8.1 Conclusions

319. Environmental study criteria adopted for this study has been carried out for all phases of each project components. The phases considered are as follows:

- Impacts during Construction Phase; and
- Impacts during Commissioning & Operation Phase.

320. Following is the conclusion statement of the study on the basis of environmental assessment carried out in this report:

321. “Some activities under this project have been identified to cause low to moderate environmental negative impacts and their mitigation measures have been prescribed. Proper and timely execution of these measures will reverse most of the negative impacts in the long term. Overall, the project causes higher positive impacts under the physical, ecological and socio-economic criterions and should be approved for implementation.”

8.2 Findings and Recommendations

322. This study was carried out at the Detail design stage of the project. Predominantly both primary and secondary data with site reconnaissance were used to assess the environmental impacts. The potential environmental impacts were assessed in a comprehensive manner. The report has provided a picture of all potential environmental impacts associated with the sub-projects, and recommended suitable mitigation measures.

323. No Objection Certificate for the proposed sub-project interventions under Balochistan Environmental Protection Act 2012 has been granted by BEPA.

324. The Sub-project does not involve any land acquisition or resettlement impacts as the rehabilitation works includes the improvement of existing channels owned by the BID and the land is already owned by the Government. No indigenous persons reside or will be affected by the proposed interventions in the areas of influence.

325. The environmental impacts from the project will mostly take place during the construction stage. The impacts are likely to be similar at most locations and impacts have been reviewed in the relevant section of this IEE report.

326. Environmental impacts during the construction phase are related to the establishment of campsites which are temporary and can be minimized with better management. Construction worker camps will not necessarily be based on the scale of the works needed. If for some unforeseen reason a larger workforce is needed, the construction camp will not be located in settlement areas or near sensitive water resources and will be provided with lavatories. Local employment will be preferred to avoid cultural conflicts.

327. During the execution of this study, consultations with relevant government officials, academia, NGOs and local community have been conducted to gain their perceptions of the project and ascertain the nature and scope of local participation in project planning and implementation.

328. Water rights are equally distributed among the agriculturists according to the land holdings. The FOs in the sub-project areas have not been active and need to be strengthened. The Agriculture Extension Department in Balochistan can play a vital role in enhancing the cropping intensity of the proposed sub-project area with timely knowledge of best agricultural practices.

329. Construction of sub-project is going to bring positive changes in the area in terms of availability of water, cultivation of crops, establishment of new settlements and improvement in the standard of life of the inhabitants of the area.

330. Land which is lying barren at present would change to lush green valley through provision of irrigation water..

331. Availability of irrigation and agriculture would support livestock growth and in due course of time would enable farmers to diversify in areas of dairy production.

332. The project will generate employment opportunities for local laborers during all three phases of project. The Project will positively contribute in improving the carrying capacity of biological environment and overall improvement of the ecosystem.

333. Household income will increase substantially with irrigation improvement measures owing to availability of water for irrigation, crop yields, increase in the number of animals, and availability of other occupational opportunities.

334. The proposed project does not impact biological component of the area, at construction phase as well as its operation phase. However, the project is likely to bring significant change in opportunities for the community and its surrounding ecosystem in the form of social uplift, agricultural productivity and prosperity.

335. Careful planning and management is recommended to avoid air pollution and generation of solid waste during construction phase especially during storage & transport of overburden soil.

336. Water rights are equally distributed among the agriculturists according to the land holdings. The FOs in the sub-project areas have not been actively and need to be strengthened. The Agriculture Extension Department in Balochistan can play a vital role in enhancing the cropping intensity of the proposed sub-project area with timely knowledge of best agricultural practices.

ANNEXURES

Annexure 1: REA (Rapid Environmental Assessment (REA) checklist for urban development and water supply)

Country/Project
Title:

Pakistan/Balochistan Water Resources Development Project

Environmental Checklist for Killi Sardar Akhtar sub-project

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Sitting			
Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Protected Area ¹⁷	<input checked="" type="checkbox"/>		Project design will provide measures to ensure minimum flow required.
Wetland		<input checked="" type="checkbox"/>	
Mangrove		<input checked="" type="checkbox"/>	
Estuarine		<input checked="" type="checkbox"/>	
Buffer zone of protected area		<input checked="" type="checkbox"/>	
Special area for protecting biodiversity ¹⁸	<input checked="" type="checkbox"/>		Project design will provide measures to ensure minimum flow required.
B. Potential Environmental Impacts			
Will the Project cause			
Loss of precious ecological values (e.g. Result of encroachment into forests/swamplands or historical/cultural buildings/areas, disruption of hydrology of natural waterways, regional flooding, and drainage hazards)?	<input checked="" type="checkbox"/>		
Conflicts in water supply rights and related social conflicts? ¹⁹	<input checked="" type="checkbox"/>		EMP will provide measures to avoid conflicts by adopting local and traditional water rights mechanism already exists in the area.
Impediments to movements of people and animals?	<input checked="" type="checkbox"/>		Project design shall include facilities for easy access of people and animals.
Potential ecological problems due to increased soil erosion and siltation, leading to decreased stream capacity?		<input checked="" type="checkbox"/>	
Insufficient drainage leading to salinity		<input checked="" type="checkbox"/>	

¹⁷ Zhob River ends in Gomal Zam River which is also a wetland and a protected status for wildlife sanctuary.

¹⁸ Zhob River starts from Qila Saifullah specifically near Muslim Bagh which is famous for Apples and passes through whole Qila Saifullah and Zhob where they have stands of Wild Olives and Chilghoza which have conservation significance as it is threaten habitat.

¹⁹ Already Gomal Zam Dam is taking water from Zhob River which may cause conflict.

SCREENING QUESTIONS	Yes	No	REMARKS
intrusion?			
Over pumping of groundwater, leading to salinization and ground subsidence?		<input checked="" type="checkbox"/>	
Impairment of downstream water quality and therefore, impairment of downstream beneficial uses of water?		<input checked="" type="checkbox"/>	
Dislocation or involuntary resettlement of people?		<input checked="" type="checkbox"/>	
Potential social conflicts arising from land tenure and land use issues?	<input checked="" type="checkbox"/>		
Soil erosion before compaction and lining of canals?	<input checked="" type="checkbox"/>		
Noise from construction equipment?	<input checked="" type="checkbox"/>		Noise control measures to be specified in the emp. Impacts are transient.
Dust?	<input checked="" type="checkbox"/>		Dust control measures to be specified in the emp. Impacts are transient.
Labor-related social problems especially if workers from different areas are hired?	<input checked="" type="checkbox"/>		Control measures to be specified in the emp. Impacts are transient.
Waterlogging and soil salinization due to inadequate drainage and farm management?	<input checked="" type="checkbox"/>		Project design shall ensure proper drainage design.
Leaching of soil nutrients and changes in soil characteristics due to excessive application of irrigation water?		<input checked="" type="checkbox"/>	
Reduction of downstream water supply during peak seasons?	<input checked="" type="checkbox"/>		
Soil pollution, polluted farm runoff and groundwater, and public health risks due to excessive application of fertilizers and pesticides?	<input checked="" type="checkbox"/>		
Soil erosion (furrow, surface)?	<input checked="" type="checkbox"/>		
Scouring of canals?	<input checked="" type="checkbox"/>		
Logging of canals by sediments?	<input checked="" type="checkbox"/>		
Clogging of canals by weeds?	<input checked="" type="checkbox"/>		
Seawater intrusion into downstream freshwater systems?		<input checked="" type="checkbox"/>	
Introduction of increase in incidence of waterborne or water related diseases?	<input checked="" type="checkbox"/>		

Source: As provided by PPTA Consultants

Annexure 2: Pakistan Environmental Protection Act (PEPA), 1997 and National Environmental Quality Standards (NEQS)

Pakistan Environmental Protection Act (PEPA), 1997

The Pakistan Environmental Protection Act 1997 was passed by the National Assembly of Pakistan on September 3, 1997, and by the Senate of Pakistan on November 7, 1997. The Act received the assent of the President of Pakistan on December 3, 1997.

The text of the Environmental Protection Act 1997 is as follows:

Act No. XXXIV of 1997

An Act to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development.

Whereas it is expedient to provide for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development and for matters connected therewith and incidental thereto; It is hereby enacted as follows:

1) Short Title, Extent and Commencement

- (1) This Act may be called the Environmental Protection Act 1997.
- (2) It extends to the whole of Pakistan.
- (3) It shall come into force at once.

2) Definitions

In this Act, unless there is anything repugnant in the subject or context:

(i) "adverse environmental effect" means impairment of, or damage to, the environment and includes:

- (a) impairment of, or damage to, human health and safety or to biodiversity or property;
- (b) pollution; and

(c) any adverse environmental effect as may be specified in the regulation.

(ii) "agricultural waste" means waste from farm and agricultural activities including poultry, cattle farming, animal husbandry, residues from the use of fertilizers, pesticides and other farm chemicals;

(iii) "air pollutant" means any substance that causes pollution of air and includes soot, smoke, dust particles, odor, light, electro-magnetic, radiation, heat, fumes, combustion exhaust, exhaust gases, noxious gases, hazardous substances and radioactive substances;

(iv) "biodiversity" or "biological diversity" means the variability among living organizations from all sources, including inter alia terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems;

(v) "council" means the Pakistan Environmental Protection Council established under section 3;

(vi) **"discharge"** means spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping;

(vii) **"ecosystem"** means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit;

(viii) **"effluent"** means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour;

(ix) **"emission standards"** means the permissible standards established by the Federal Agency or a Provincial Agency for emission of air pollutants and noise and for discharge of effluent and waste;

(x) **"environment"** means-

- (a) air, water and land;
- (b) all layers of the atmosphere;
- (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships;
- (e) buildings, structures, roads, facilities and works;
- (f) all social and economic conditions affecting community life; and
- (g) the inter-relationships between any of the factors in sub-clauses (a) to (f)

(xi) **"environmental impact assessment"** means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed;

(xii) **" Environmental Magistrate"** means the Magistrate of the First Class appointed under section 24;

(xiii) **"Environmental Tribunal"** means the Environmental Tribunal constituted under section 20;

(xiv) **Exclusive Economic Zone"** shall have the same meaning as defined in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(xv) **"factory"** means any premises in which industrial activity is being undertaken;

(xvi) **"Federal Agency"** means the Pakistan Environmental Protection Agency established under section 5, or any Government Agency, local council or local authority exercising the powers and functions of the Federal Agency;

(xvii) **"Government Agency"** includes-

- (a) a division, department, attached department, bureau, section, commission, board, office or unit of the Federal Government or a Provincial Government;
- (b) a development or a local authority, company or corporation established or controlled by the Federal Government or Provincial Government;
- (c) a Provincial Environmental Protection Agency; and
- (d) any other body defined and listed in the Rules of Business of the Federal Government or a Provincial Government;

(xviii) **"hazardous substance"** means-

- (a) a substance or mixture of substance, other than a pesticide as defined in the Agricultural Pesticide Ordinance, 1971 (II of 1971), which, by reason of its chemical activity is toxic, explosive, flammable, corrosive, radioactive or other characteristics causes, or is likely to cause, directly or in combination with other matters, an adverse environmental effect; and
- (b) any substance which may be prescribed as a hazardous substance;

(xix) "hazardous waste" means waste which is or which contains a hazardous substance or which may be prescribed as hazardous waste, and includes hospital waste and nuclear waste;

(xx) "historic waters" means such limits of the waters adjacent to the land territory of Pakistan as may be specified by notification under section 7 of the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(xxi) "hospital waste" includes waste medical supplies and materials of all kinds, and waste blood, tissue, organs and other parts of the human and animal bodies, from hospitals, clinics and laboratories;

(xxii) "industrial activity" means any operation or process for manufacturing, making, formulating, synthesizing, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal, or for mining, for oil and gas exploration and development, or for pumping water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purpose;

(xxiii) "industrial waste" means waste resulting from an industrial activity;

(xxiv) "initial environmental examination" means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an environmental effect for requiring preparation of an environmental impact assessment;

(xxv) "local authority" means any agency set-up or designated by the Federal Government or a Provincial Government by notification in the official Gazette to be a local authority for the purposes of this Act;

(xxvi) "local council" means a local council constituted or established under a law relating to local government;

(xxvii) "motor vehicle" means any mechanically propelled vehicle adapted for use upon land whether its power of propulsion is transmitted thereto from an external or internal source, and includes a chassis to which a body has not been attached, and a trailer, but does not include a vehicle running upon fixed rails;

(xxviii) "municipal waste" includes sewage, refuse, garbage, waste from abattoirs, sludge and human excreta and the like;

(xxix) "National Environmental Quality Standards" means standards established by the Federal Agency under clause (e) of sub-section (1) of section 6 and approved by the Council under clause (c) of sub-section (1) of section 4;

(xxx) "noise" means the intensity, duration and character from all sources, and includes vibrations;

(xxxi) "nuclear waste" means waste from any nuclear reactor or nuclear or other nuclear energy system, whether or not such waste is radioactive;

(xxxii) **"person"** means any natural person or legal entity and includes an individual, firm, association, partnership, society, group, company, corporation, co-operative society, Government Agency, non-governmental organization, community-based organization, village organization, local council or local authority and, in the case of a vessel, the master or other person having for the time being the charge or control of the vessel;

(xxxiii) **"pollution"** means the contamination of air, land or water by the discharge or emission or effluents or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or substances alters unfavourably the chemical, physical, biological, radiational, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious, disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to biodiversity;

(xxxiv) **"prescribed"** means prescribed by rules made under this Act;

(xxxv) **"project"** means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes;

- (a) construction or use of buildings or other works;
- (b) construction or use of roads or other transport systems;
- (c) construction or operation of factories or other installations;
- (d) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like; (e) any change of land use or water use; and
- (f) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems; factories or other installations;

(xxxvi) **"proponent"** means the person who proposes or intends to undertake a project;

(xxxvii) **"Provincial Agency"** means a Provincial Environmental Protection Agency established under section 8;

(xxxviii) **"regulations"** means regulations made under this Act;

(xxxix) **"rules"** means rules made under this Act;

(xl) **"sewage"** means liquid or semi-solid wastes and sludge from sanitary conveniences, kitchens, laundries, washing and similar activities and from any sewerage system or sewage disposal works;

(xli) **"standards"** means qualitative and quantitative standards for discharge of effluents and wastes and for emission of air pollutants and noise either for general applicability or for a particular area, or from a particular production process, or for a particular product, and includes the National Environmental Quality Standards, emission standards and other standards established under this Act and the rules and regulations made thereunder;

(xlii) **"sustainable development"** means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs;

(xliii) **"territorial waters"** shall have the same meaning as defined in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(xliv) **"vessel"** includes anything made for the conveyance by water of human beings or of goods; and

(xiv) "**waste**" means any substance or object which has been, is being or is intended to be, discarded or disposed of, and includes liquid waste, solid waste, waste gases, suspended waste, industrial waste, agricultural waste, nuclear waste, municipal waste, hospital waste, used polyethylene bags and residues from the incineration of all types of waste.

3) Establishment of the Pakistan Environmental Protection Council-

(1) The Federal Government shall, by notification in the official Gazette, establish a Council to be known as the Pakistan Environmental Protection Council consisting of;

(i) Prime Minister or such other person as the Prime **Chairperson**

Minister may nominate in this behalf.

(ii) Minister Incharge of the Ministry or Division **Vice Chairperson**
dealing with the subject of environment.

(iii) Chief Ministers of the Provinces. **Members**

(iv) Ministers Incharge of the subject of environment in the provinces. **Members**

(v) Such other persons not exceeding thirty-five as the Federal **Members**
Government may appoint, of which at least twenty shall be non-official including five representatives of the Chambers of Commerce and Industry and Industrial Associations and one or more representatives of the Chambers of Agriculture, the medical and legal professions, trade unions, and non-governmental organizations concerned with the environment and development, and scientists, technical experts and educationists.

vi) Secretary to the Government of Pakistan, in-charge of **Member/Secretary**
the Ministry or Division dealing with the subject of environment

(2) The Members of the Council, other than ex-officio members, shall be appointed in accordance with the prescribed procedure and shall hold office for a term of three years.

(3) The Council shall frame its own rules of procedure.

(4) The Council shall hold meetings as and when necessary, but not less than two meetings shall be held in a year.

(5) The Council may constitute committees of its members and entrust them with such functions as it may deem fit, and the recommendations of the committees shall be submitted to the Council for approval.

(6) The Council or any of its committees may invite any technical expert or representative of any Government Agency or non-governmental organization or other person possessing specialized knowledge of any subject for assistance in performance of its functions.

4) Function and Powers of the Council

(1) The Council shall-

(a) co-ordinate and supervise enforcement of the provisions of this Act;

- (b) approve comprehensive national environmental policies and ensure their implementation within the framework of a national conservation strategy as may be approved by the Federal Government from time to time;
- (c) approve the National Environmental Quality Standards;
- (d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources; (e) coordinate integration of the principles and concerns of sustainable development into national development plans and policies; and
- (f) consider the National Environment Report and give appropriate directions thereon.

(2) The Council may, either itself or on the request of any person or organization, direct the Federal Agency or any Government Agency to prepare, submit, promote or implement projects for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, and the sustainable development of resources, or to undertake research in any specified aspect of environment.

5) Establishment of the Pakistan Environmental Protection Agency

(1) The Federal Government shall, by notification in the official Gazette, establish the Pakistan Environmental Protection Agency, to exercise the powers and perform the functions assigned to it under the provisions of this Act and the rules and regulations made thereunder.

(2) The Federal Agency shall be headed by a Director General, who shall be appointed by the Federal Government on such terms and conditions as it may determine.

(3) The Federal Agency shall have such administrative, technical and legal staff as the Federal Government may specify, to be appointed in accordance with such procedure as may be prescribed.

(4) The powers and function of the Federal Agency shall be exercised and performed by the Director General.

(5) The Director General may, be general or special order, delegate any of these powers and functions to staff appointed under sub-section (3)

(6) For assisting the Federal Agency in the discharge of its functions, the Federal Government shall establish Advisory Committees for various sectors, and appoint as members thereof eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

6) Functions of the Federal Agency

(1) The Federal Agency shall-

- (a) administer and implement the provisions of this Act and the rules and regulations made thereunder;
- (b) prepare, in coordination with the appropriate Government Agency and in consultation with the concerned sectoral Advisory Committees, national environmental policies for approval by the Council;
- (c) take all necessary measures for the implementation of the national environmental policies approved by the Council;

- (d) prepare and publish an annual National Environment Report on the state of the environment;
- (e) prepare or revise, and establish the National Environment Quality Standards with approval of the Council; Provided that before seeking approval of the Council, the Federal Agency shall publish the proposed National Environmental Quality Standards for public opinion in accordance with the prescribed procedure;
- (f) ensure enforcement of the National Environmental Quality Standards;
- (g) establish standards for the quality of the ambient air, water and land, by notification in the official Gazette, in consultation with the Provincial Agency concerned; Provided that
- (i) different standards for discharge or emission from different sources and for different areas and conditions may be specified;
- (ii) where standards are less stringent than the National Environmental Quality Standards, prior approval of the Council shall be obtained;
- (iii) certain areas, with the approval of the Council, may exclude from carrying out specific activities, projects from the application of such standards;
- (h) co-ordinate environmental policies and programmes nationally and internationally;
- (i) establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors;
- (j) take measures to promote research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and sustainable development;
- (k) certify one or more laboratories as approved laboratories for conducting tests and analysis and one or more research institutes as environmental research institutes for conducting research and investigation, for the purposes of this Act;
- (l) identify the needs for, and initiate legislation in various sectors of the environment;
- (m) render advice and assistance in environmental matters, including such information and data available with it as may be required for carrying out the purposes of this Act; Provided that the disclosure of such information shall be subject to the restrictions contained in the proviso to sub-section (3) of section 12;
- (n) assist the local councils, local authorities, Government Agencies and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the standards established by it;
- (o) provide information and guidance to the public on environmental matters;
- (p) recommend environmental courses, topics, literature and books for incorporation in the curricula and syllabi of educational institutions;
- (q) promote public education and awareness of environmental issues through mass media and other means, including seminars and workshops;
- (r) specify safeguards for the prevention of accidents and disasters which may cause pollution, collaborate with the concerned person in the preparation of contingency plans for control of such accidents and disasters, and co-ordinate implementation of such plans;
- (s) encourage the formation and working of non-governmental organizations, community organizations and village organizations to prevent and control pollution and promote sustainable development;
- (t) take or cause to be taken all necessary measures for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development; and
- (u) perform any function which the Council may assign to it.

(2) The Federal Agency may-

- (a) undertake inquiries or investigation into environmental issues, either of its own accord or upon complaint from any person or organization;
- (b) request any person to furnish any information or data relevant to its functions;
- (c) initiate with the approval of the Federal Government, requests for foreign assistance in support of the purposes of this Act and enter into arrangements with foreign agencies or organizations for the exchange of material or information and participate in international seminars or meetings;
- (d) recommend to the Federal Government the adoption of financial and fiscal programmes, schemes or measures for achieving environmental objectives and goals and the purposes of this Act, including:
 - (i) incentives, prizes, awards, subsidies, tax exemptions, rebates and depreciation allowances; and
 - (ii) taxes, duties, cesses and other levies;
- (e) establish and maintain laboratories to help in the performance of its functions under this Act and to conduct research in various aspects of the environment and provide or arrange necessary assistance for establishment of similar laboratories in the private sector; and
- (f) provide or arrange, in accordance with such procedures as may be prescribed, financial assistance for projects designed to facilitate the discharge of its functions.

7) Powers of the Federal Agency

Subject to the provisions of this Act, the Federal Agency may-

- (a) lease, purchase, acquire, own, hold, improve, use or otherwise deal in and with any property both movable and immovable;
- (b) sell, convey, mortgage, pledge, exchange or otherwise dispose of its property and assets;
- (c) fix and realize fees, rates and charges for rendering any service or providing any facility, information or data under this Act or the rules and regulations made thereunder;
- (d) enter into contracts, execute instruments, incur liabilities and do all acts or things necessary for proper management and conduct of its business;
- (e) appoint with the approval of the Federal Government and in accordance with such procedures as may be prescribed, such advisers, experts and consultants as it considers necessary for the efficient performance of its functions on such terms and conditions as it may deem fit;
- (f) summon and enforce the attendance of any person and require him to supply any information or document needed for the conduct of any enquiry or investigation into any environmental issue;
- (g) enter and inspect and under the authority of a search warrant issued by the Environmental Tribunal or Environmental Magistrate, search at any reasonable time, any land, building, premises, vehicle or vessel or other place where or in which, there are reasonable grounds to believe that an offence under this Act has been or is being committed;
- (h) take samples of any materials, products, articles or substances or of the effluents, wastes or air pollutants being discharged or emitted or of air, water or land in the vicinity of the discharge or emission;
- (i) arrange for test and analysis of the samples at a certified laboratory;
- (j) confiscate any article used in the commission of the offence where the offender is not known or cannot be found within a reasonable time:
Provided that the power under clauses (f), (h), (i) and (j) shall be exercised in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898), or the rules made under this Act and under the direction of the Environmental Tribunal or Environmental Magistrate; and
- (k) establish a National Environmental Coordination Committee comprising the Director-General as its chairman and the Director-Generals of the Provincial Environmental Protection

Agencies and such other persons as the Federal Government may appoint as its members to exercise such powers and perform such functions as may be delegated or assigned to it by the Federal Government for carrying out the purposes of this Act and for ensuring inter-provincial co-ordination in environmental policies;

8) Establishment, Powers and Functions of the Provincial Environmental Protection Agencies

(1) Every Provincial Government shall, by notification in the official Gazette, establish an Environmental Protection Agency, to exercise such powers and perform such functions as may be delegated to it by the Provincial Government under sub-section (2) of section 26.

(2) The Provincial Agency shall be headed by a Director-General who shall be appointed by the

Provincial Government on such terms and conditions as it may determine.

(3) The Provincial Agency shall have such administrative, technical and legal staff as the Provincial Government may specify, to be appointed in accordance with such procedure as may be prescribed.

(4) The powers and functions of the Provincial Agency shall be exercised and performed by the

Director-General.

(5) The Director-General may, by general or special order, delegate any of these powers and functions to staff appointed under sub-section (3).

(6) For assistance of the Provincial Agency in the discharge of its functions, the Provincial Government shall establish sectoral Advisory Committees for various sectors and appoint members from amongst eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

9) Establishment of the Provincial Sustainable Development Funds

(1) There shall be established in each Province a Sustainable Development Fund.

(2) The Provincial Sustainable Development Fund shall be derived from the following sources, namely;

(a) grants made or loans advanced by the Federal Government or the Provincial Governments;

(b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, national or international agencies, and non-governmental organizations; and

(c) contributions from private organizations, and other persons.

(3) The Provincial Sustainable Development Fund shall be utilized in accordance with such procedure as may be prescribed for:

(a) providing financial assistance to the projects designed for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, the sustainable development of resources and for research in any specified aspect of environment; and

(b) any other purpose which in the opinion of the Board will help achieve environmental objectives and the purpose of this Act.

10) Management of the Provincial Sustainable Development Fund

(1) The Provincial Sustainable Development Fund shall be managed by a Board known as the Provincial Sustainable Development Fund Board consisting of:

i) Chairman, Planning and Development Board/Additional **Chairperson**

Chief Secretary Planning and Development Department.

(ii) such officers of the Provincial Governments not exceeding **Members**

six as the Provincial Government may appoint, including Secretaries in charge of the Finance, Industries and Environment Departments.

(iii) such non-official persons not exceeding ten as the Provincial **Members**

Government may appoint including representatives of the Provincial Chamber of Commerce and Industry, non-governmental organizations, and major donors.

(iv) Director-General of the Provincial Agency. **Member/Secretary**

(2) In accordance with such procedure and such criteria as may be prescribed, the Board shall have the power to:

(a) sanction financial assistance for eligible projects;

(b) invest moneys held in the Provincial Sustainable Development Fund in such profit-bearing Government bonds, savings schemes and securities as it may deem suitable; and (c) take such measures and exercise such powers as may be necessary for utilization of the Provincial Sustainable Development Fund for the purposes specified in sub-section (3) of section 9.

(3) The Board shall constitute committees of its members to undertake regular monitoring of project financed from the Provincial Sustainable Development Fund and to submit progress reports to the Board which shall publish an Annual Report incorporating its annual audited accounts, and performance evaluation based on the progress reports.

11) Prohibition of Certain Discharges or Emissions

(1) Subject to the provisions of this Act and the rules and regulations made thereunder no person shall discharge or emit or allow the discharge or emission of any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess of the National Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6.

(2) The Federal Government levy a pollution charge on any person who contravenes or fails to comply with the provisions of sub-section (1), to be calculated at such rate, and collected in accordance with such procedure as may be prescribed.

(3) Any person who pays the pollution charge levied under sub-section (2) shall not be charged with an offence with respect to that contravention or failure.

(4) The provisions of sub-section (3) shall not apply to projects which commenced industrial activity on or after the thirtieth day of June, 1994.

12) Initial Environmental Examination and Environmental Impact Assessment

(1) No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Federal Agency approval in respect thereof.

(2) The Federal Agency shall;

(a) review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or

(b) review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.

(3) Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to:

(i) trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial, scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director-General of the Federal Agency is of the opinion that the request for confidentiality is not well-founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or

(ii) international relations, national security or maintenance of law and order, except with the consent of the Federal Government; or

(iii) matters covered by legal professional privilege.

(4) The Federal Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations made thereunder.

(5) Subject to sub-section (4) the Federal Government may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

(6) The provisions of sub-section (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.

(7) The Federal Agency shall maintain separate Registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such Registers shall be subject to the restrictions specified in sub-section (3).

13) Prohibition of Import of Hazardous Waste

No person shall import hazardous waste into Pakistan and its territorial waters, Exclusive

Economic Zone and historic waters.

14) Handling of Hazardous Substances

Subject to the provisions of this Act, no person shall generate, collect, consign, transport, treat, dispose of, store, handle or import any hazardous substance except;

(a) under a licence issued by the Federal Agency and in such manner as may be prescribed;

or

(b) in accordance with the provisions of any other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement or other instrument to which Pakistan is a party.

15) Regulation of Motor Vehicles

(1) Subject to the provisions of this Act and the rules and regulations made thereunder, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the National Environmental Quality Standards, or where applicable the standards established under clause (g) of sub-section (1) of section 6.

(2) For ensuring compliance with the standards mentioned in sub-section (1), the Federal Agency may direct that any motor vehicle or class of vehicles shall install such pollution control devices or other equipment or use such fuels or undergo such maintenance or testing as may be prescribed.

(3) Where a direction has been issued by the Federal Agency under sub-section (2) in respect of any motor vehicles or class of motor vehicles, no person shall operate any such vehicle till such direction has been complied with.

16) Environmental Protection Order

(1) Where the Federal Agency or a Provincial Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring or has occurred in violation of the provisions of this Act, rules or regulations or of the conditions of a licence, and is likely to cause, or is causing or has caused an adverse environmental effect, the Federal Agency or, as the case may be, the Provincial Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order direct such person to take such measures that the Federal Agency or Provincial Agency may consider necessary within such period as may be specified in the order. (2) In particular and without prejudice to the generality of the foregoing power, such measures may include:

(a) immediate to stoppage, preventing, lessening or controlling the discharge, emission, disposal, handling, act or omission, or to minimize or remedy the adverse environmental effect;

(b) installation, replacement or alteration of any equipment or thing to eliminate or control or abate on a permanent or temporary basis, such discharge, emission, disposal, handling, act or omission;

(c) action to remove or otherwise dispose of the effluent, waste, air pollutant, noise, or hazardous substances; and

(d) action to restore the environment to the condition existing prior to such discharge, disposal, handling, act or omission, or as close to such condition as may be reasonable in the circumstances, to the satisfaction of the Federal Agency or Provincial Agency.

(3) Where the person, to whom directions under sub-section (1) are given, does not comply therewith, the Federal Agency or Provincial Agency may, in addition to the proceeding initiated against him under this Act or the rules and regulations, itself take or cause to be taken such measures specified in the order as it may deem necessary, and may recover the costs of taking such measures from such person as arrears of land revenue.

17) Penalties

- (1) Whoever contravenes or fails to comply with the provisions of section 11, 12, 13, or section 16 or any order issued thereunder shall be punishable with fine which may extend to one million rupees, and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues and where such contravention or failure continues: Provided that if contravention of the provisions of section 11 also constitutes contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2) only.
- (2) Whoever contravenes or fails to comply with the provisions of section 14 or 15 or any rule or regulation or conditions of any licence, any order or direction issued by the Council or by the Federal Agency or Provincial Agency shall be punishable with fine which may extend to one hundred thousand rupees, and in case of continuing contravention, or failure with an additional fine which extend to one thousand rupees for every day during which such contravention continues.
- (3) Where an accused has been convicted of an offence under sub-section (1) and (2), the Environmental Tribunal and Environmental Magistrate shall, in passing sentence, take into account the extent and duration of the contravention or failure constituting the offence, and the attendant circumstances.
- (4) Where an accused has been convicted of an offence under sub-section (1) and the Environmental Tribunal is satisfied that as a result of the commission of the offence monetary benefits have accrued to the offender, the Environmental Tribunal may order the offender to pay, in addition to the fines under sub-section (1), further additional fine commensurate with the amount of the monetary benefits.
- (5) Where a person convicted under sub-section (1) or sub-section (2), and had been previously convicted for any contravention under this act, the Environmental Tribunal or, as the case may be, Environmental Magistrate may, in addition to the punishment awarded thereunder:
- (a) endorse a copy of the order of conviction to the concerned trade or industrial association, if any, or the concerned Provincial Chamber of Commerce and Industry or the Federation of Pakistan Chambers of Commerce and Industry;
 - (b) sentence him to imprisonment for a term which may extend upto two years; (c) order the closure of the factory;
 - (d) order confiscation of the factory, machinery, and equipment, vehicle, material or substance, record or document or other object used or involved in contravention of the provisions of the Act; Provided that for a period of three years from the date of commencement of this Act the sentence of imprisonment shall be passed only in respect of persons who have been previously convicted for more than once for any contravention of sections 11, 13, 14 or 16 involving hazardous waste.
 - (e) order, such person to restore the environment at his own cost, to the conditions existing prior to such contravention or as close to such conditions as may be reasonable in the circumstances to the satisfaction of the Federal Agency or, as the case may be, Provincial Agency; and
 - (f) order that such sum be paid to any person as compensation for any loss, bodily injury, damage to his health or property suffered by such contravention.
- (6) The Director-General of the Federal Agency or of a Provincial Agency or an officer generally or specially authorized by him in this behalf may, on the application of the accused compound an offence under this Act with the permission of the Environmental Tribunal or Environmental Magistrate in accordance with such procedure as may be prescribed.
- (7) Where the Director-General of the Federal Agency or of a Provincial Agency is of the opinion that a person has contravened any provision of this Act, he may, subject to the rules, by notice in writing to that person require him to pay to the Federal Agency or, as the case may be, Provincial Agency an administrative penalty in the amount set out in the notice for each day the contravention continues; and a person who pays an administrative penalty for a contravention shall not be charged under this Act with an offence in respect of such contravention.

(8) The provisions of sub-sections (6) and (7) shall not apply to a person who has been previously convicted of offence or who has compounded an offence under this Act or who has paid an administrative penalty for a contravention of any provision of the is Act.

18) Offences by Bodies Corporate

Where any contravention of this Act has been committed by a body corporate, and it is proved that such offence has been committed with the consent or connivance or, is attributed to any negligence on the part of, any director, partner, manager, secretary or other officer of the body corporate, such director, partner, manager, secretary or other officer of the body corporate, shall be deemed guilty of such contravention along with the body corporate and shall be punished accordingly:

Provided that in the case of a company as defined under the Companies Ordinance, 1984 (XLVII of 1984), only the Chief Executive as defined in the said Ordinance shall be liable under this section.

Explanation:

For the purpose of this section, "body corporate" includes a firm, association of persons and a society registered under the Societies Registration Act, 1860 (XXI of 1860), or under the Co-operative Societies Act, 1925 (VII of 1925).

19) Offences by Government Agencies, Local Authorities or Local Councils

Where any contravention of this Act has been committed by any Government Agency, local authority or local council, and it is proved that such contravention has been committed with the consent or connivance of, or is attributable to any negligence on the part of the Head or any other officer of the Government Agency, local authority or local council, such Head or other officer shall also be deemed guilty of such contravention alongwith the Government Agency, local authority or local council and shall be liable to be proceeded against and punished accordingly.

20) Environmental Tribunals

(1) The Federal Government may, by notification in the official Gazette, establish as many Environmental Tribunals as it considers necessary and, where it establishes more than one Environmental Tribunal, it shall specify territorial limits within which, or the class of cases in respect of which, each one of them shall exercise jurisdiction under this Act.

(2) An Environmental Tribunal shall consist of a Chairperson who is, or has been, or is qualified for appointment as, a Judge of the High Court to be appointed after consultation with the Chief Justice of the High Court and two members to be appointed by the Federal Government of which at least one shall be a technical member with suitable professional qualifications and experience in the environmental field as may be prescribed.

(3) For every sitting of the Environmental Tribunal, the presence of the Chairperson and not less than one Member shall be necessary.

(4) A decision of an Environmental Tribunal shall be expressed in terms of the opinion of the majority of its members, including the Chairperson, or if the case has been decided by the Chairperson and only one of the members and there is a difference of opinion between them, the decision of the Environmental Tribunal shall be expressed in terms of the opinion of the chairperson.

(5) An Environmental Tribunal shall not, merely by reason of a change in its composition, or the absence of any member from any sitting, be bound to recall and rehear any witness who has given evidence, and may act on the evidence already recorded by, or produced, before it.

(6) An Environmental Tribunal may hold its sittings at such places within its territorial jurisdiction as the Chairperson may decide.

(7) No act or proceeding of an Environmental Tribunal shall be invalid by reason only of the existence of a vacancy in, or defect in the constitution of, the Environmental Tribunal.

(8) The terms and conditions of service of the Chairperson and members of the Environmental Tribunal shall be such as may be prescribed.

21) Jurisdiction and Powers of Environmental Tribunals

(1) An Environmental Tribunal shall exercise such powers and perform such functions as are, or may be, conferred upon or assigned to it by or under this Act, or the rules and regulations made thereunder.

(2) All contravention punishable under sub-section (1) of section 17 shall exclusively be triable by an Environmental Tribunal.

(3) An Environmental Tribunal shall not take cognizance of any offence triable under sub-section (2) except on a complaint in writing by:

(a) the Federal Agency or any Government Agency or local council; and

(b) any aggrieved person, who has given notice of not less than thirty days to the Federal Agency or the Provincial Agency concerned of the alleged contravention and of his intention to make a complaint to the Environmental Tribunal.

(4) In exercise of its criminal jurisdiction, the Environmental Tribunal shall have the same powers as are vested in the Court of Session under the Code of Criminal Procedure, 1898 (Act V of 1898).

(5) In exercise of the appellate jurisdiction under section 22 the Environmental Tribunal shall have the same powers and shall follow the same procedure as an appellate court in the Code of Civil Procedure, 1908 (Act V of 1908).

(6) In all matters with respect to which no procedure has been provided for in this Act, the

Environmental Tribunal shall follow the procedure laid down in the Code of Civil Procedure, 1908 (Act V of 1908).

(7) An Environmental Tribunal may, on application filed by any officer duly authorized in this behalf by the Director-General of the Federal Agency or Provincial Agency, issue bailable warrant for the arrest of any person against whom reasonable suspicion exists of his having been involved in contravention punishable under sub-section (1) of section 17:

Provided that such warrant shall be applied for, issued, and executed in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898):

Provided further that if the person arrested executes a bond with sufficient sureties in accordance with the endorsement on the warrant, he shall be released from custody, failing which he shall be taken or sent without delay to the officer-in-charge of the nearest police station.

(8) All proceedings before the Environmental Tribunal shall be deemed to be judicial proceedings within the meaning of sections 193 and 228 of the Pakistan Penal Code (Act XLV of 1860), and the Environmental Tribunal shall be deemed to be a court for the purposes of sections 480 and 482 of the Code of Criminal Procedure, 1898 (Act V of 1898).

(9) No court other than an Environmental Tribunal shall have or exercise any jurisdiction with respect to any matter to which the jurisdiction of an Environmental Tribunal extends under this Act or the rules and regulations made thereunder.

(10) Where the Environmental Tribunal is satisfied that a complaint made to it under sub-section (3) is false and vexatious to the knowledge of the complainant, it may, by an order, direct the complainant to pay to the person complained against such compensatory costs which may extend to one hundred thousand rupees.

22) Appeals to the Environmental Tribunal

(1) Any person aggrieved by any order or direction of the Federal Agency or any Provincial Agency under any provision of this Act and rules or regulations made thereunder may prefer an appeal with the Environmental Tribunal within thirty days of the date of communication of the impugned order or direction to such person.

(2) An appeal to the Environmental Tribunal shall be in such form, contain such particulars and be accompanied by such fees as may be prescribed.

23) Appeals from Orders of the Environmental Tribunal

(1) Any person aggrieved by any final order or by any sentence of the Environmental Tribunal passed under this Act may, within thirty days of communication of such order or sentence, prefer an appeal to the High Court.

(2) An appeal under sub-section (1) shall be heard by a Bench of not less than two Judges.

24) Jurisdiction of Environmental Magistrates

(1) Notwithstanding anything contained in the Code of Criminal Procedure, 1898 (Act V of

1898), or any other law for the time being in force, but subject to the provisions of this Act, all contraventions punishable under sub-section (2) of section 17 shall exclusively be triable by a judicial Magistrate of the first class as Environmental Magistrate especially empowered in this behalf by the High Court.

(2) An environmental Magistrate shall be competent to impose any punishment specified in sub-section (2) and (4) of section 17.

(3) An Environmental Magistrate shall not take cognizance of an offence triable under sub-section (1) except on a complaint in writing by:

(a) the Federal Agency, Provincial Agency, or Government Agency or local council; and

(b) any aggrieved person.

25) Appeals from Orders of Environmental Magistrates

Any person convicted of any contravention of this Act or the rules or regulations by an Environmental Magistrate may, within thirty days from the date of his conviction, appeal to the Court of Sessions, whose decision thereon shall be final.

26) Power to Delegate

(1) The Federal Government may, by notification in the official Gazette, delegate any of its or of the Federal Agency's powers and functions under this Act and the rules and regulations made thereunder to any Provincial Government, any Government Agency, local council or local authority.

(2) The Provincial Government may, by notification in the official Gazette, delegate any of its or of the Provincial Agency's powers or functions under this Act and the rules and regulations made thereunder to any Government Agency of such Provincial Government or any local council or local authority in the Province.

27) Power to give Directions

In the performance of their function under this Act:

- (a) the Federal Agency and Provincial Agencies shall be bound by the directions give to them in writing by the Federal Government; and
- (b) a Provincial Agency shall be bound by the directions give to it in writing by the Provincial Government.

28) Indemnity

No suit, prosecution or other legal proceedings shall lie against the Federal or Provincial Governments, the Councils, the Federal Agency or Provincial Agencies, the Director-Generals of the Federal Agency and the Provincial Agency, members, officers, employees, experts, advisors, committees or consultants of the Federal or Provincial Agencies or the Environmental Tribunal or Environmental Magistrates or any other person for anything which is in good faith done or intended to be done under this Act or the rules or regulations made thereunder.

29) Dues Recoverable as Arrears of Land Revenues

Any dues recoverable by the Federal Agency or Provincial Agency under this Act, or the rules or regulations made thereunder shall be recoverable as arrears of land revenue.

30) Act to Override Other Laws

The provisions of the Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force.

31) Power to Make Rules

The Federal Government may, by notification in the official Gazette, make rules for carrying out the purposes of this Act including rules for implementing the provisions of the international environmental agreements, specified in the Schedule to this Act.

32) Power to Amend the Schedule

The Federal Government may, by notification in the official Gazette, amend the Schedule so as to add any entry thereto or modify or omit any entry therein.

33) Power to Make Regulations

(1) For carrying out the purposes of this Act, the Federal Agency may, by notification in the official Gazette and with the approval of the Federal Government, make regulations not inconsistent with the provisions of this Act or the rules made thereunder.

(2) In particular and without prejudice to the generality of the foregoing power, such regulations may provide for:

- (a) submission of periodical reports, data or information by any Government agency, local authority or local council in respect of environmental matters;
- (b) preparation of emergency contingency plans for coping with environmental hazards and pollution caused by accidents, natural disasters and calamities;
- (c) appointment of officers, advisors, experts, consultants and employees;

(d) levy of fees, rates and charged in respect of services rendered, actions taken and schemes implemented;

- (e) monitoring and measurement of discharges and emissions;
- (f) categorization of projects to which, and the manner in which, section 12 applies;
- (g) laying down of guidelines for preparation of initial environmental examination and environmental impact assessment and Development of procedures for their filing, review and approval;
- (h) providing procedures for handling hazardous substances; and
- (i) installation of devices in, use of fuels by, and maintenance and testing of motor vehicles for control of air and noise pollution.

34) Repeal, Savings and Succession

- (1) The Pakistan Environmental Protection Ordinance, 1983 (XXXVII of 1983) is hereby repealed.
- (2) Notwithstanding the repeal of the Pakistan Environmental Protection Ordinance, 1983 (XXVII of 1983), any rules or regulations or appointments made, order passed, notifications issued, powers delegated, contracts entered into, proceedings commenced, rights acquired, liabilities incurred, penalties, rates, fees or charges levied, things done or action taken under any provisions of that Ordinance shall, so far as they are not inconsistent with the provisions of this Act, be deemed to have been made, passed, issued, delegated, entered into, commenced, acquired, incurred, levied, done or taken under this Act.
- (2) On the establishment of the Federal Agency and Provincial Agencies under this Act, all properties, assets and liabilities pertaining to the Federal Agency and Provincial Agencies established under that Ordinance shall vest in and be the properties, assets and liabilities, as the case may be, of the Federal Agency and Provincial Agency established under this Act.

SCHEDULE (See Section 31)

1. International Plant Protection Convention, Rome, 1951.
2. Plant Protection Agreement for the South-East Asia and Pacific Region (as amended), Rome 1956.
3. Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia (as amended), Rome, 1963.
4. Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971 and its amending Protocol, Paris, 1982.
5. Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention), Paris, 1972.
6. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973.
7. Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979.
8. Convention on the Law of the Sea, Montego Bay, 1982.
9. Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985.

10. Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987 and amendments thereto.
11. Agreement on the Network of Aquaculture Centres in Asia and the Pacific, Bangkok, 1988.
12. Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, Basel, 1989.
13. Convention on Biological Diversity, Rio De Janiero, 1992.
14. United Nations Framework Convention on Climate Change, Rio De Janiero, 1992

National Environmental Quality Standards (NEQS)

National Ambient Air Quality Standards

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of Measurement
		Effective from 1 st January 2009	Effective from 1 st January 2012	
Sulphur Dioxide (SO ²)	Annual Average*	80µg/m ³	80µg/m ³	-Ultraviolet Fluorescence method
	24 hours**	120µg/m ³	120µg/m ³	
Oxides of Nitrogen as (NO)	Annual Average*	40µg/m ³	40µg/m ³	-Gas Phase Chemiluminescence
	24 hours**	40µg/m ³	40µg/m ³	
Oxides of Nitrogen as (NO ²)	Annual Average*	40µg/m ³	40µg/m ³	-Gas Phase Chemiluminescence
	24 hours**	80µg/m ³	80µg/m ³	
O ³	1 hour	180µg/m ³	130µg/m ³	-Non dispersive UV Absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400µg/m ³	360µg/m ³	-High Volume Sampling, (Average flow rate not less than 1.1m ³ /minute).
	24 hours**	550µg/m ³	500µg/m ³	
Respirable Particulate Matter.PM ₁₀	Annual Average*	200µg/m ³	120µg/m ³	-β Ray absorption method
	24 hours**	250µg/m ³	150µg/m ³	
Respirable Particulate Matter.PM _{2.5}	Annual Average*	25µg/m ³	15µg/m ³	β Ray absorption method
	24 hours**	40µg/m ³	35µg/m ³	
	1 hour	25µg/m ³	15µg/m ³	
Lead(Pb)	Annual Average*	1.5µg/m ³	1 µg/m ³	-ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2 µg/m ³	1.5µg/m ³	
Carbon Monoxide(CO)	8 hours**	5 mg/m ³	5mg/m ³	-Non Dispersive Infra Red (NDIR) method
	1 hour	10mg/m ³	10mg/m ³	
Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.				
24 hourly/ 8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but Not on two consecutive days.				

NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR INDUSTRIAL GASEOUS EMISSION (mg/Nm³, UNLESS OTHERWISE DEFINED)

S. No.	Parameter	Source of Emission	Existing Standards	Revised Standards
1	Smoke	Smoke opacity not to exceed	40% or 2 Ring-lemann Scale	40% or 2 Ring-lemann Scale or equivalent smoke number
2	Particulate matter ⁽¹⁾	(a) Boilers and furnaces:		
		(i) Oil fired	300	300
		(ii) Coal fired	500	500
		(iii) Cement Kilns	200	300
		(b) Grinding, crushing, clinker coolers and related processes, metallurgical processes, Converters, blast furnaces and cupolas.	500	500
3	Hydrogen Chloride	Any	400	400
4	Chlorine	Any	150	150
5	Hydrogen Fluoride	Any	150	150
6	Hydrogen Sulphide	Any	10	10
7	Sulphur Oxides ⁽²⁾ ⁽³⁾	Sulfuric acid/Sulphonic acid plants	400	5000
		Other plants except Power plants operating on oil and coal	400	1700
8	Carbon Monoxide	Any	800	800
9	Lead	Any	50	50
10	Mercury	Any	10	10
11	Cadmium	Any	20	20
12	Arsenic	Any	20	20
13	Copper	Any	50	50
14	Antimony	Any	20	20
15	Zinc	Any	200	200

S. No.	Parameter	Source of Emission	Existing Standards	Revised Standards
16	Oxides of Nitrogen (³)	Nitric acid manufacturing unit	400	3000
		Other plants except power plants operating on oil or coal:		
		Gas fired	400	400
		Oil fired	-----	600
		Coal fired	-----	1200

Explanations:

1. Based on the assumption that the size of the particulate is 10 microns or more.
2. Based on 1 percent sulphur content in fuel oil. Higher content of sulphur will cause standards to be pro-rated.
3. In respect of emissions of sulphur dioxide and nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards: -

A. Sulphur Dioxide

Sulphur Dioxide Background levels Micro-gram per cubic meter ug/m³ Standards

Background Air Quality (SO ₂ Basis)	Annual Average	Max.24 hours Interval	Criterion I Max. SO ₂ Emission (Tons per Day per plant)	Criterion II Max. Allowable ground level increment to ambient (ug/m ³)
(One Year Average)				
Unpolluted	<50	<200	500	50
Moderately Polluted*				
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	>100	>400	100	10

* For intermediate values between 50 and 100ug/m³ linear interpolations should be used.

** No projects with sulphur dioxide emissions will be recommended.

NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR MUNICIPAL AND LIQUID INDUSTRIAL EFFLUENTS (mg/L, UNLESS OTHERWISE DEFINED)

S. No.	Parameter Standards	Value
1.	Temperature	40°C
2.	pH value (acidity/basicity)	6-10pH
3.	5-days Biochemical Oxygen Demand (BOD) at 20°C	80mg/L
4.	Chemical Oxygen Demand (COD)	150 mg/L
5.	Total Suspended Solids	150 mg/L
6.	Total Dissolved Solids	3500 mg/L
7.	Oil and Grease	10 mg/L
8.	Phenolic compounds (as phenol)	0.1 mg/L
9.	Chloride(asCl ⁻)	1000mg/L
10.	Fluoride (as F ⁻)	20mg/L
11.	Cyanide (asCN ⁻)	2mg/L
12.	An-ionic detergents ⁽²⁾ (as MBAS) ⁽⁵⁾	20mg/L
13.	Sulphate(SO ₄ ²⁻)	600mg/L
14.	Sulphide (S ²⁻)	1.0mg/L
15.	Ammonia (NH ₃)	40mg/L
16.	Pesticides, herbicides, fungicides and	0.15mg/L
17.	insecticides Cadmium ⁽⁴⁾	0.1mg/L
18.	Chromium (4) (trivalent and hexavalent)	1.0 mg/L
19.	Copper ⁽⁴⁾	1.0mg/L
20.	Lead ⁽⁴⁾	0.5mg/L
21.	Mercury ⁽⁴⁾	0.01mg/L
22.	Selenium ⁽⁴⁾	0.5mg/L
23.	Nickel ⁽⁴⁾	1.0mg/L
24.	Silver ⁽⁴⁾	1.0mg/L
25.	Total toxic metals	2.0 mg/L
26.	Zinc	5.0mg/L
27.	Arsenic	1.0mg/L
28.	Barium	1.5mg/L
29.	Iron	2.0mg/L
30.	Manganese	1.5mg/L
31.	Boron	6.0mg/L
32.	Chlorine	1.0mg/L

Explanations:

1. Assuming minimum dilution 1: 10 on discharge. Lower ratios would attract progressively stringent standards to be determined by the Federal Environmental Protection Agency.
2. Assuming surfactant as biodegradable.
3. MBAS means Methylene Blue Active Substances.
4. Subject to total toxic metals discharge as at S. No. 25.

NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR MOTOR VEHICLE EXHAUST AND NOISE

#	Parameter	Standards (maximum permissible limit)	Measuring method
1	Smoke	40% or 2 on the Ringelmann Scale during engine acceleration mode.	To be compared with Ringlemann Chart at a distance of 6 meters or more.
2	Carbon Monoxide	<u>Emission Standards:</u> <u>New Used Vehicles</u> 4.5% 6%	Under idling conditions: Non-depressive infrared detection through gas analyzer
3	Noise	85 db (A)	Sound-meter at 7.5 meters from the source

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Drinking Water Standards

Parameters	WHO Standards	GOP Standards
pH @ 25 °C	6.8-8.5	6.8-8.5
Color	Non objectionable/Acceptable	Non objectionable/Acceptable
Odor	Non objectionable/Acceptable	Non objectionable/Acceptable
Aluminium (Al)	≤0.2mg/L	0.2mg/L
Antimony (Sb)	≤0.005mg/L	0.02mg/L
Barium (Ba)	0.7mg/L	0.7mg/L
Cadmium (Cd)	0.01	0.003
Chloride (Cl)	<250	250
TDS	<500mg/L	<500mg/L
Turbidity	<5NTU	<5NTU
Chromium (Cr)	<0.05mg/L	≤0.05mg/L
Copper (Cu)	<2mg/L	2mg/L
Arsenic (As)	<0.01mg/L	≤0.05mg/L
Total Coliform	0.0cfu/100 ml	0.0cfu/100 ml
E-Coli	0.0cfu/100 ml	0.0cfu/100 ml

Annexure 3: Pakistan EPA Review of IEE and EIA Regulations, 2000

S.R.O. 339 (1)/2001. - In exercise of the powers referred by section 33 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), Pakistan Environmental Protection Agency, with the approval of the Federal Government is pleased to make the following Rules, namely : -

1. Short title and commencement

(1) These regulations may be called the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.

(2) They shall come into force at once.

2. Definitions

(1) In these regulations, unless there is anything repugnant in the subject or context –

- (a) “Act” means the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997);
- (b) “Director-General” means the Director-General of the Federal Agency;
- (c) “EIA” means an environmental impact assessment as defined in section 2(xi);
- (d) “IEE” means an initial environmental examination as defined in section 2(xxiv); and
- (e) “section” means a section of the Act.

(2) All other words and expressions used in these regulations but not defined shall have the same meanings as are assigned to them in the Act.

3. Projects requiring an IEE

A proponent of a project falling in any category listed in Schedule I shall file an IEE with the Federal Agency, and the provisions of section 12 shall apply to such project.

4. Projects requiring an EIA

A proponent of a project falling in any category listed in Schedule II shall file an EIA with the Federal Agency, and the provisions of section 12 shall apply to such project.

5. Projects not requiring an IEE or EIA

(1) A proponent of a project not falling in any category listed in Schedules I and II shall not be required to file an IEE or EIA:

Provided that the proponent shall file.

- (a) an EIA, if the project is likely to cause an adverse environmental effect;
- (b) for projects not listed in Schedules I and II in respect of which the Federal Agency has issued guidelines for construction and operation, an

application for approval accompanied by an undertaking and an affidavit that the aforesaid guidelines shall be fully complied with.

- (2) Notwithstanding anything contained in sub-regulation (1), the Federal Agency may direct the proponent of a project, whether or not listed in Schedule I or II, to file an IEE or EIA, for reasons to be recorded in such direction:

Provided that no such direction shall be issued without the recommendation in writing of the Environmental Assessment Advisory Committee constituted under Regulation 23.

- (3) The provisions of section 12 shall apply to a project in respect of which an IEE or EIA is filed under sub-regulation (1) or (2).

6. Preparation of IEE and EIA

- (1) The Federal Agency may issue guidelines for preparation of an IEE or an EIA, including guidelines of general applicability, and sectoral guidelines indicating specific assessment requirements for planning, construction and operation of projects relating to particular sector.
- (2) Where guidelines have been issued under sub-regulation (1), an IEE or EIA shall be prepared, to the extent practicable, in accordance therewith and the proponent shall justify in the IEE or EIA any departure therefrom.

7. Review Fees

The proponent shall pay, at the time of submission of an IEE or EIA, a non-refundable Review Fee to the Federal Agency, as per rates shown in Schedule III.

8. Filing of IEE and EIA

- (1) Ten paper copies and two electronic copies of an IEE or EIA shall be filed with the Federal Agency.
- (2) Every IEE and EIA shall be accompanied by –
 - (a) an application, in the form prescribed in Schedule IV; and
 - (b) copy of receipt showing payment of the Review Fee.

9. Preliminary scrutiny

- (1) Within 10 working days of filing of the IEE or EIA, the Federal Agency shall –
 - (a) confirm that the IEE or EIA is complete for purposes of initiation of the review process; or
 - (b) require the proponent to submit such additional information as may be specified; or
 - (c) return the IEE or EIA to the proponent for revision, clearly listing the points requiring further study and discussion.
- (2) Nothing in sub-regulation (1) shall prohibit the Federal Agency from requiring the proponent to submit additional information at any stage during the review process.

10. Public participation

- (1) In the case of an EIA, the Federal Agency shall, simultaneously with issue of confirmation of completeness under clause (a) of sub-regulation (1) of Regulation 9, cause to be published in any English or Urdu national newspaper and in a local newspaper of general circulation in the area affected by the project, a public notice mentioning the type of project, its exact location, the name and address of the proponent and the places at which the EIA of the project can, subject to the restrictions in sub-section (3) of section 12, be accessed.
- (2) The notice issued under sub-regulation (1) shall fix a date, time and place for public hearing of any comments on the project or its EIA.
- (3) The date fixed under sub-regulation (2) shall not be earlier than 30 days from the date of publication of the notice.
- (4) The Federal Agency shall also ensure the circulation of the EIA to the concerned Government Agencies and solicit their comments thereon.
- (5) All comments received by the Federal Agency from the public or any Government Agency shall be collated, tabulated and duly considered by it before decision on the EIA.
- (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.

(2) If construction is commenced during the initial three year validity period, the validity of the approval shall stand extended for a further period of three years from the date of issue.

(3) After issue of confirmation of compliance, the approval shall be valid for a period of three years from the date thereof.

(4) The proponent may apply to the Federal Agency for extension in the validity periods mentioned in sub-regulations (1), (2) and (3), which may be granted by the Federal Agency in its discretion for such period not exceeding three years at a time, if the conditions of the approval do not require significant change:

Provided that the Federal Agency may require the proponent to submit a fresh IEE or EIA, if in its opinion changes in location, design, construction and operation of the project so warrant.

18. Entry and inspection

(1) For purposes of verification of any matter relating to the review or to the conditions of approval of an IEE or EIA prior to, during or after commencement of construction or operation of a project, duly authorized staff of the Federal Agency shall be entitled to enter and inspect the project site, factory building and plant and equipment installed therein.

(2) The proponent shall ensure full cooperation of the project staff at site to facilitate the inspection, and shall provide such information as may be required by the Federal Agency for this purpose and pursuant thereto.

19. Monitoring

(1) After issue of approval, the proponent shall submit a report to the Federal Agency on completion of construction of the project.

(2) After issue of confirmation of compliance, the proponent shall submit an annual report summarizing operational performance of the project, with reference to the conditions of approval and maintenance and mitigatory measures adopted by the project.

(3) To enable the Federal Agency to effectively monitor compliance with the conditions of approval, the proponent shall furnish such additional information as the Federal Agency may require.

20. Cancellation of approval

(1) Notwithstanding anything contained in these Regulations, if, at any time, on the basis of information or report received or inspection carried out, the Federal Agency is of the opinion that the conditions of an approval have not been complied with, or that the information supplied by a proponent in the approved IEE or EIA is incorrect, it shall issue notice to the proponent to show cause, within two weeks of receipt thereof, why the approval should not be cancelled.

(2) If no reply is received or if the reply is considered unsatisfactory, the Federal Agency may, after giving the proponent an opportunity of being heard:

(i) require the proponent to take such measures and to comply with such conditions within such period as it may specify, failing which the approval shall stand cancelled; or

(ii) cancel the approval.

(3) On cancellation of the approval, the proponent shall cease construction or operation of the project forthwith.

(4) Action taken under this Regulation shall be without prejudice to any other action that may be taken against the proponent under the Act or rules or regulations or any other law for the time being in force.

21. Registers of IEE and EIA projects

Separate Registers to be maintained by the Federal Agency for IEE and EIA projects under sub-section (7) of section 12 shall be in the form prescribed in Schedule VIII.

22. Environmentally sensitive areas

(1) The Federal Agency may, by notification in the official Gazette, designate an area to be an environmentally sensitive area.

(2) Notwithstanding anything contained in Regulations 3, 4 and 5, the proponent of a project situated in an environmentally sensitive area shall be required to file an EIA with the Federal Agency.

(3) The Federal Agency may from time to time issue guidelines to assist proponents and other persons involved in the environmental assessment process to plan and prepare projects located in environmentally sensitive areas.

(4) Where guidelines have been issued under sub-regulation (3), the projects shall be planned and prepared, to the extent practicable, in accordance therewith and any departure therefrom justified in the EIA pertaining to the project.

23. Environmental Assessment Advisory Committee

For purposes of rendering advice on all aspects of environmental assessment, including guidelines, procedures and categorization of projects, the Director-General shall constitute an Environmental Assessment Advisory Committee comprising –

(a)	Director EIA, Federal Agency	...	Chairman
(b)	One representative each of the Provincial Agencies	...	Members
(c)	One representative each of the Federal Planning Commission and the Provincial Planning and Development Departments	...	Members
(d)	Representatives of industry and non-Governmental organizations, and legal and other experts	...	Members

24. Other approvals

Issue of an approval under section 12 read with Regulation 12 shall not absolve the proponent of the duty to obtain any other approval or consent that may be required under any law for the time being in force.

SCHEDULE I
(See Regulation 3)

List of projects requiring an IEE A.

Agriculture, Livestock and Fisheries

1. Poultry, livestock, stud and fish farms with total cost more than Rs.10 million
2. Projects involving repacking, formulation or warehousing of agricultural products

B. Energy

1. Hydroelectric power generation less than 50 MW
2. Thermal power generation less than 200 KW
3. Transmission lines less than 11 KV, and large distribution projects
4. Oil and gas transmission systems
5. Oil and gas extraction projects including exploration, production, gathering systems, separation and storage
6. Waste-to-energy generation projects

C. Manufacturing and processing

1. Ceramics and glass units with total cost more than Rs.50 million
2. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost less than Rs.100 million
3. Man-made fibers and resin projects with total cost less than Rs.100 million
4. Manufacturing of apparel, including dyeing and printing, with total cost more than Rs.25 million
5. Wood products with total cost more than Rs.25 million

D. Mining and mineral processing

1. Commercial extraction of sand, gravel, limestone, clay, sulphur and other minerals not included in Schedule II with total cost less than Rs.100 million
2. Crushing, grinding and separation processes
3. Smelting plants with total cost less than Rs.50 million

E. Transport

1. Federal or Provincial highways (except maintenance, rebuilding or reconstruction of existing metalled roads) with total cost less than Rs.50 million
2. Ports and harbor development for ships less than 500 gross tons

F. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume less than 50 million cubic meters of surface area less than 8 square kilometers
2. Irrigation and drainage projects serving less than 15,000 hectares
3. Small-scale irrigation systems with total cost less than Rs.50 million

G. Water supply and treatment

Water supply schemes and treatment plants with total cost less than Rs.25 million

H. Waste disposal

Waste disposal facility for domestic or industrial wastes, with annual capacity less than 10,000 cubic meters

I. Urban development and tourism

1. Housing schemes
2. Public facilities with significant off-site impacts (e.g. hospital wastes)
3. Urban development projects

J. Other projects

Any other project for which filing of an IEE is required by the Federal Agency under sub-regulation (2) of Regulation 5

SCHEDULE II
(See Regulation 4)

List of projects requiring an EIA

A. Energy

1. Hydroelectric power generation over 50 MW
2. Thermal power generation over 200 MW
3. Transmission lines (11 KV and above) and grid stations
4. Nuclear power plans
5. Petroleum refineries

B. Manufacturing and processing

1. Cement plants
2. Chemicals projects
3. Fertilizer plants
4. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above
5. Industrial estates (including export processing zones)
6. Man-made fibers and resin projects with total cost of Rs.100 M and above
7. Pesticides (manufacture or formulation)
8. Petrochemicals complex
9. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel), printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million
10. Tanning and leather finishing projects

C. Mining and mineral processing

1. Mining and processing of coal, gold, copper, sulphur and precious stones
2. Mining and processing of major non-ferrous metals, iron and steel rolling
3. Smelting plants with total cost of Rs.50 million and above

D. Transport

1. Airports

2. Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads) with total cost of Rs.50 million and above
3. Ports and harbor development for ships of 500 gross tons and above
4. Railway works

E. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of 50 million cubic meters and above or surface area of 8 square kilometers and above
2. Irrigation and drainage projects serving 15,000 hectares and above

F. Water supply and treatment

Water supply schemes and treatment plants with total cost of Rs.25 million and above

G. Waste Disposal

1. Waste disposal and/or storage of hazardous or toxic wastes (including landfill sites, incineration of hospital toxic waste)
2. Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10,000 cubic meters

H. Urban development and tourism

1. Land use studies and urban plans (large cities)
2. Large-scale tourism development projects with total cost more than Rs.50 million

I. Environmentally Sensitive Areas

All projects situated in environmentally sensitive areas

J. Other projects

1. Any other project for which filing of an EIA is required by the Federal Agency under sub-regulation (2) of Regulation 5.
2. Any other project likely to cause an adverse environmental effect

SCHEDULE III
(See Regulation 7)**IEE/EIA Review Fees**

Total Project Cost	IEE	EIA
Upto Rs.5,000,000	NIL	NIL
Rs.5,000,001 to 10,000,000	Rs.10,000	Rs.15,000
Greater than Rs.10,000,000	Rs.15,000	Rs.30,000

SCHEDULE 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) Meteorology (including rainfall) Ambient air quality Ambient water quality Ground water quality	<u>Available</u> Yes/No Yes/No Yes/No Yes/No	<u>Measured</u> Yes/No Yes/No Yes/No Yes/No
9.	Have estimates of the following been reported?	Water balance Solid waste disposal Liquid waste treatment	<u>Estimated</u> Yes/No Yes/No Yes/No	<u>Reported</u> Yes/No Yes/No Yes/No
10.	Source of power		Power requirement	
11.	Labour force (number)	Construction: Operation:		

Verification. I do solemnly affirm and declare that the information given above and contained in the attached IEE/EIA is true and correct to the best of my knowledge and belief.

Date: _____

Signature, name and _____
Designation of proponent
(with official stamp/seal)

SCHEDULE VI
[See Regulation 12]

Decision on EIA

- 1. Name and address of proponent _____

- 2. Description of project _____
- 3. Location of project _____
- 4. Date of filing of EIA _____

5. After careful review of the EIA, and all comments thereon, the Federation Agency has decided –

(a) to accord its approval, subject to the following conditions:

or (b) that the proponent should submit an EIA with the following modifications-

or (c) to reject the project, being contrary to environmental objectives, for the following reasons:

[Delete (a)/(b)/(c), whichever is inapplicable]

Dated _____

Tracking no.____

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)

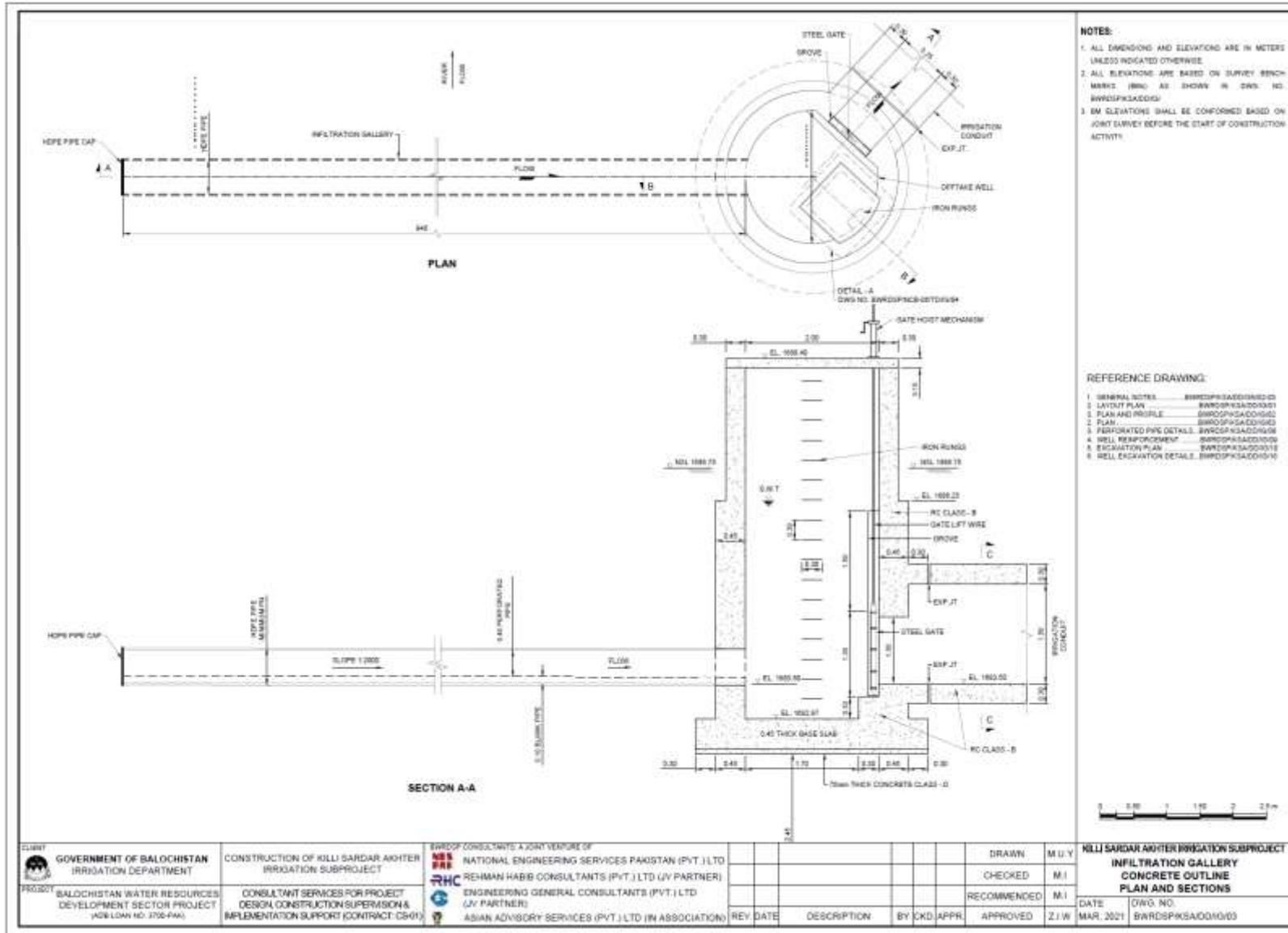
(1) _____

(2) _____

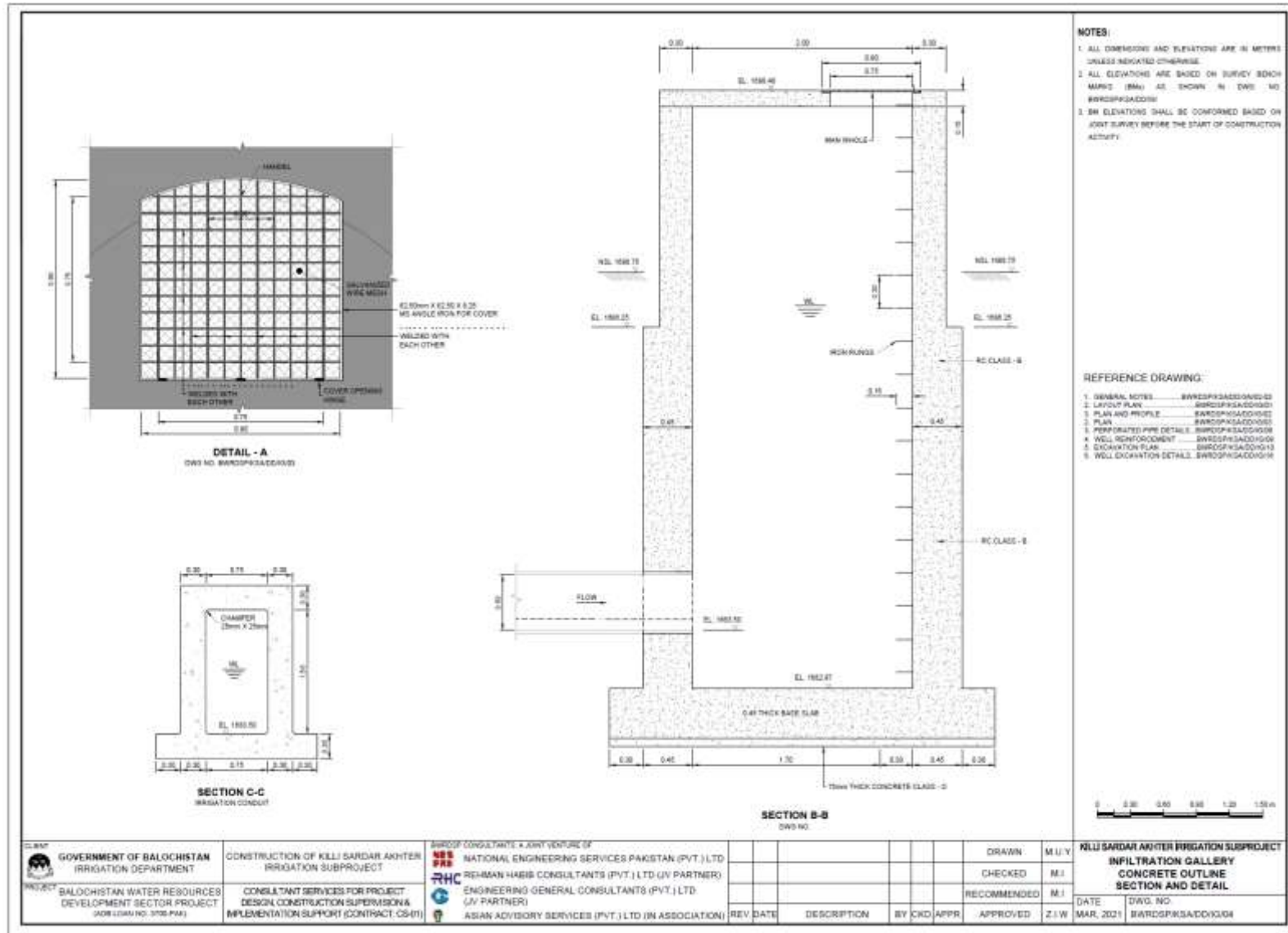
SCHEDULE VIII
(See Regulation 21)
Form of Registers for IEE and EIA projects

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	

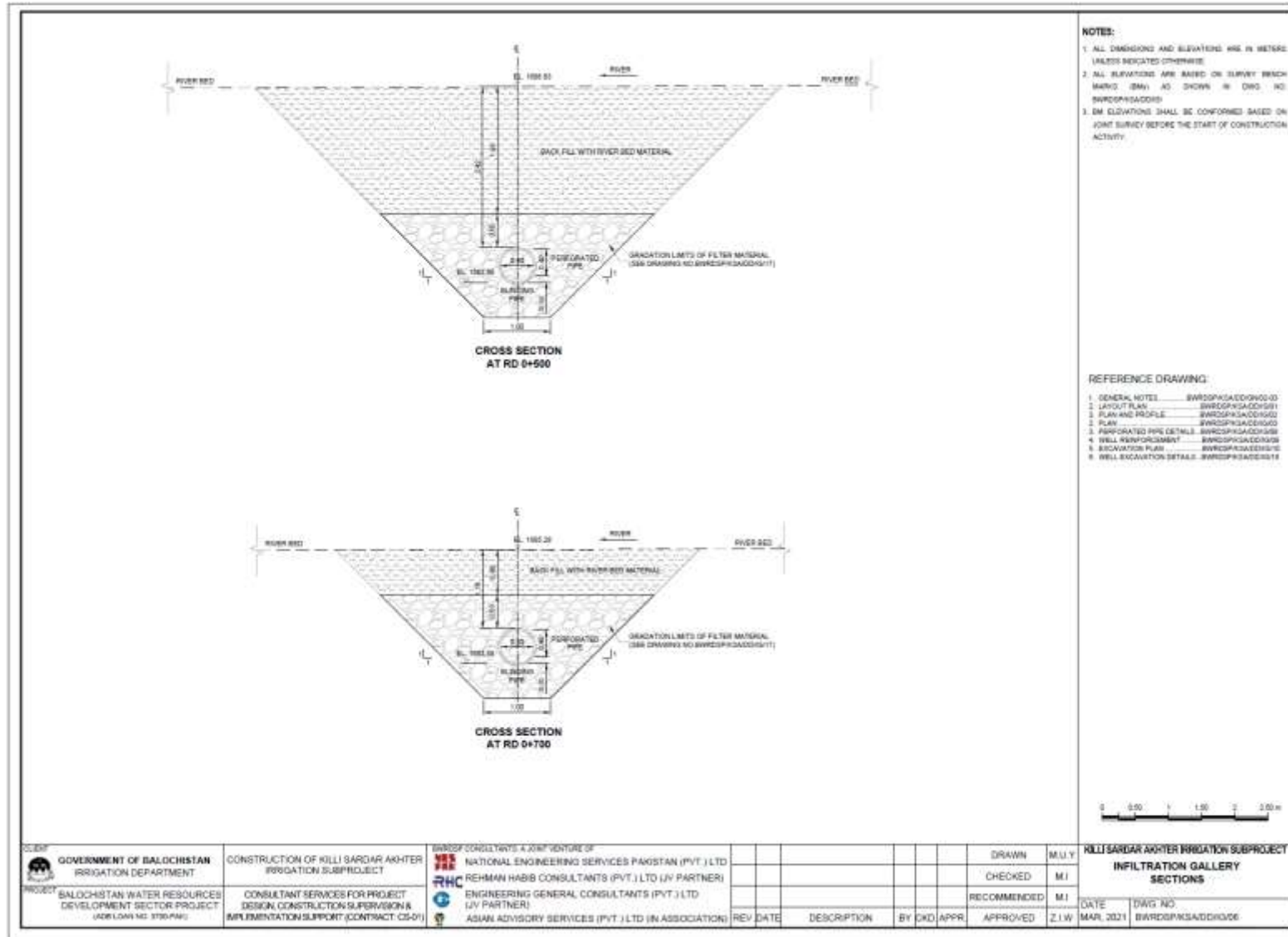
Infiltration Gallery- Concrete Outline Plan and Sections



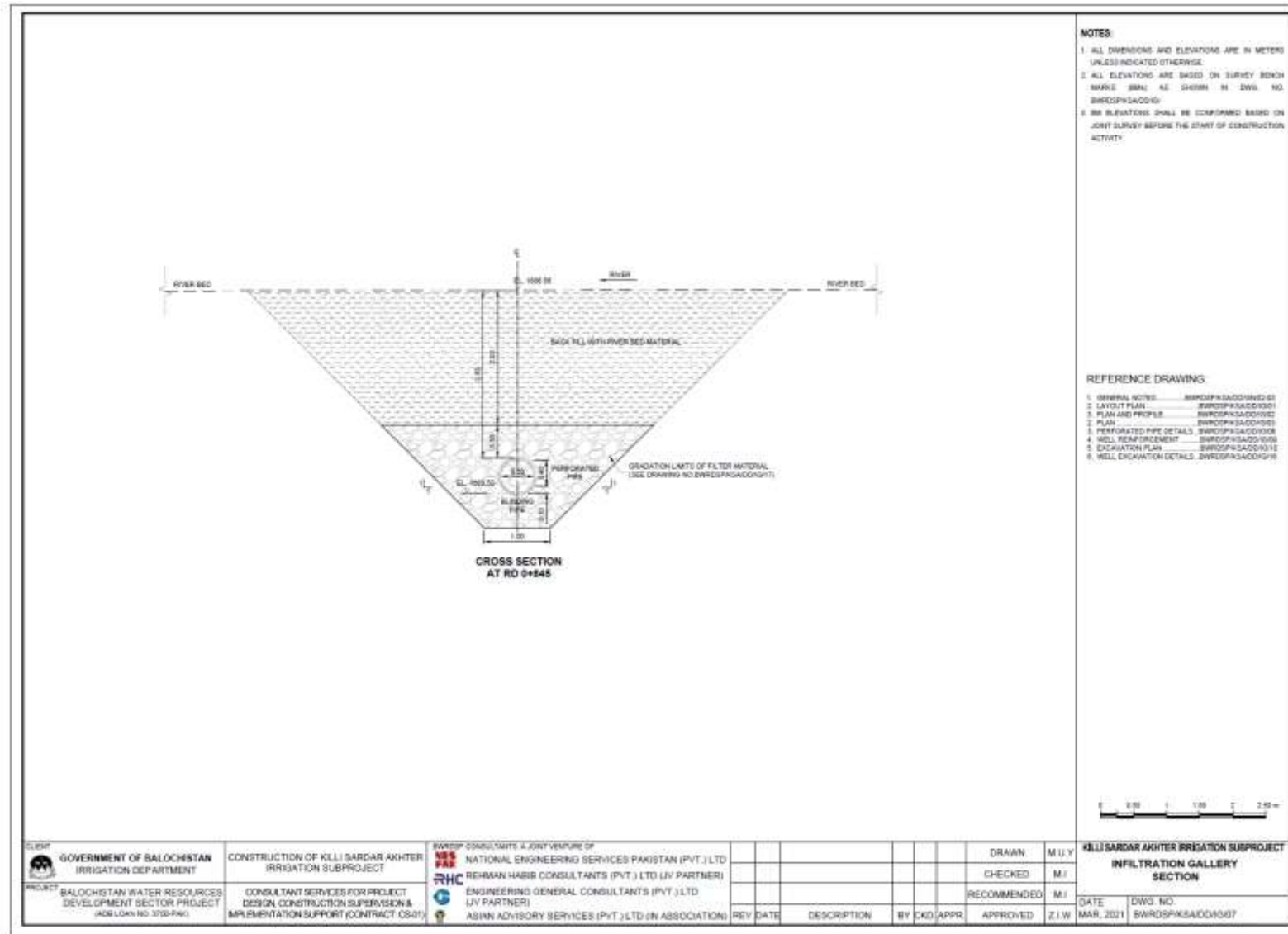
Infiltration Gallery- Concrete Outline Section and Detail



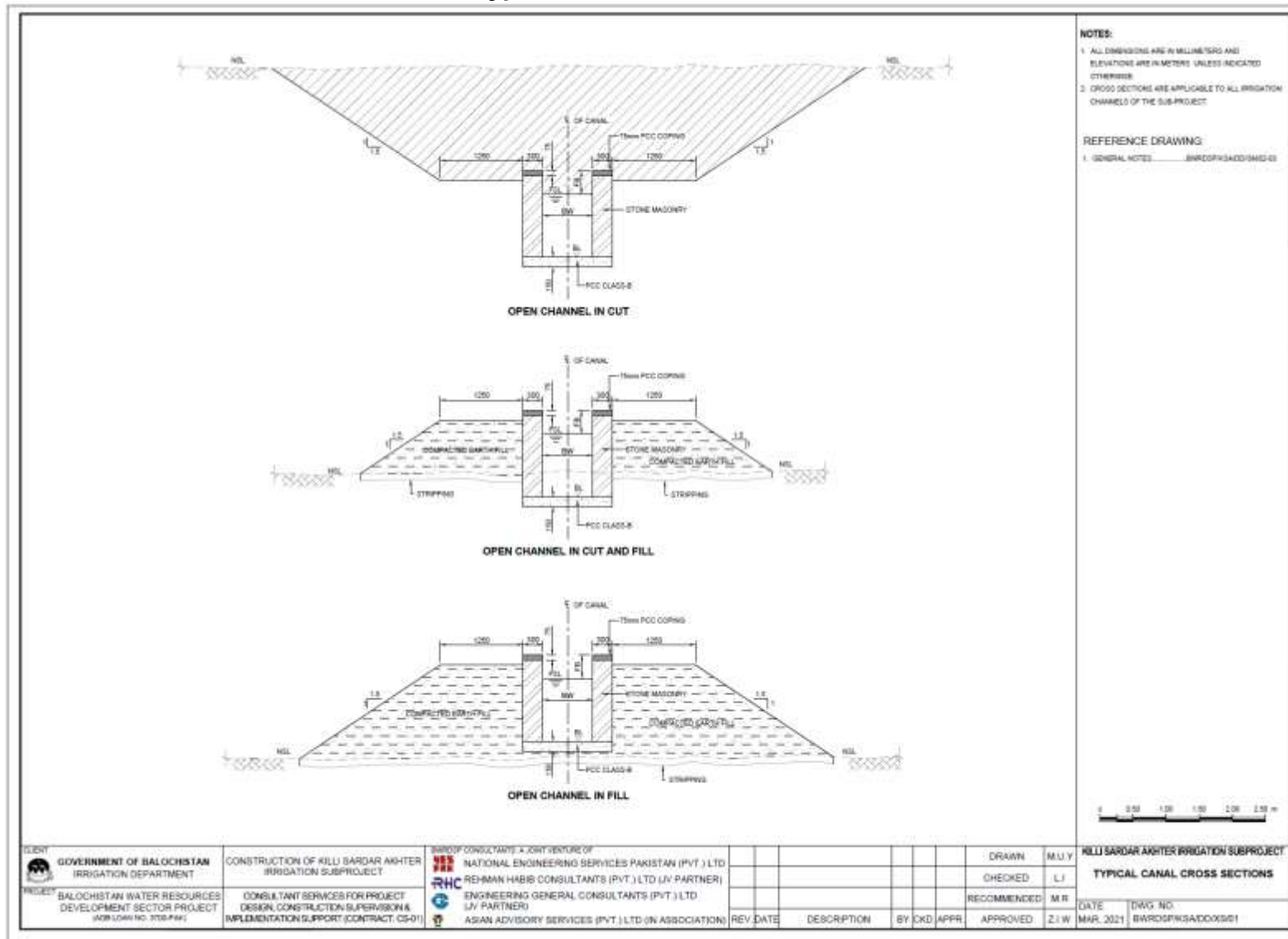
Infiltration Gallery- Sections



Infiltration Gallery- Section

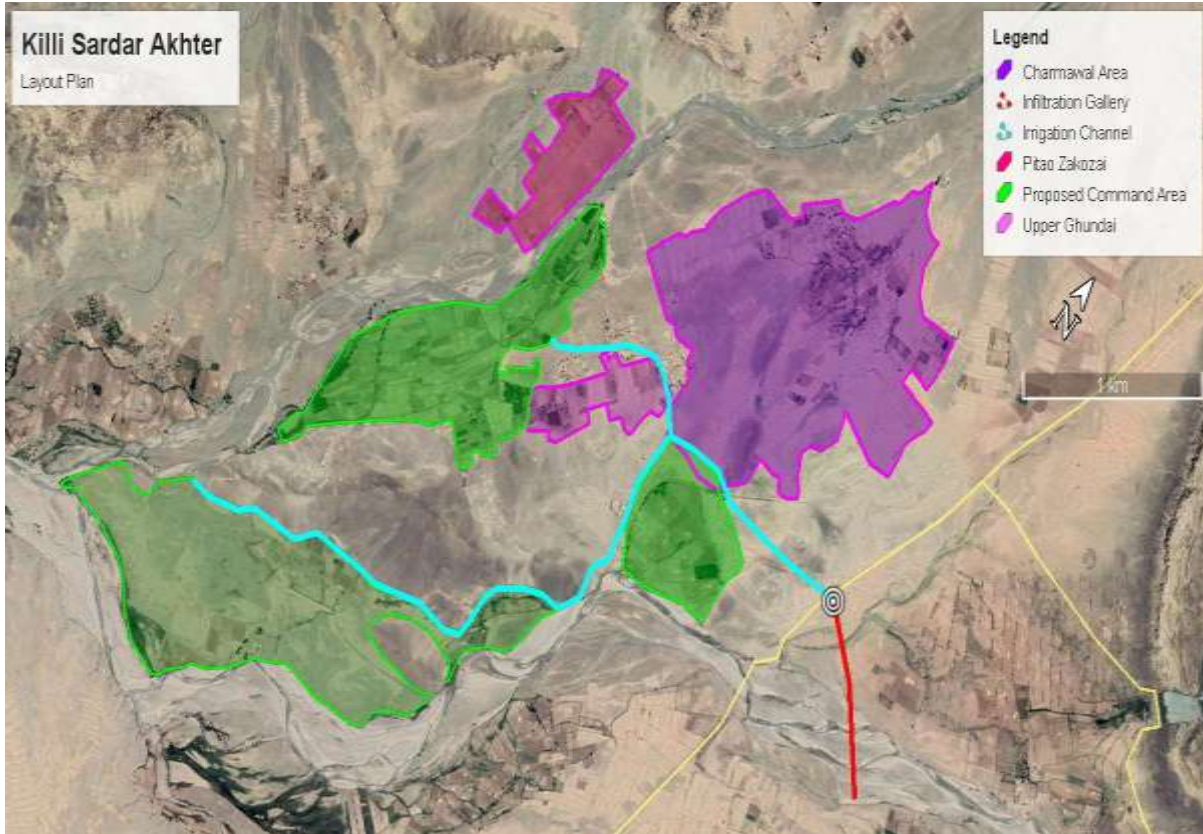


Typical Canal Cross Sections



Annexure 5: Area of Influence around the Proposed Sub-project Interventions

Kili Sardar Akhtar Subproject Interventions with Area of Influence





Annexure 5: A history of recorded earthquakes in Balochistan

Year	Place	Intensity at R/Scale
1909	Kech	7.2
1987	Quetta, Chaman	5.6
1935	Quetta, Mach	7.0
1990	Quetta, Kalat, Khuzdar, Mastung, Kalat, Nushki, Surab	5.8-6.1
1935	Quetta, Mastung, Kalat	7.5
1992	Khuzdar, Nal, Quetta	5.7
1941	Quetta	5
1993	Quetta/Pishin, Makran/Gwadar	5.7
1945	Pasni/Makran	8.6
1995	Quetta	5.2
1952	Loralai	5.8
1996	Quetta	5.3
1954	Khuzdar, Nal, Wadh	5.7
1997	Quetta, Mastung, Mach, Sibi, Harnai	5-6.2
1955	Quetta	6
1998	Quetta, Dalbandin	5.3
1956	Kalat, Barkan	6
1999	Barkan	5.2
1957	Khuzdar	5.5
2000	Quetta, Sibi, Ziarat, Harnai and Duki	6
1975	Quetta	5.4
2002	Balochistan Boarder	6
1978	Quetta, Nushki	5.3
2003	Naukundi, Musa Khail	5.3
1983	Khuzdar	6.5
2004	Sibi	5.5
1986	Khuzdar	5.4

Source: Data extracted from Meteorological Department – Quetta Station

Annexure 6: Lab Results



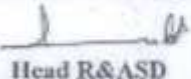




PERAC RESEARCH & DEVELOPMENT FOUNDATION

TEST REPORT			Page 08 of 12
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421G/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7007
Sample Description	Surface Water (Zhob River Wall Site # 1)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	Nil
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	2041
D-1293	pH @ 25 °C	8.15
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

 Prepared by	 Section In charge (E)	 Head R&ASD
---	---	--

The analyses based on Sample (s) provided to us by the Client. The interpretation or opinions expressed represent the best judgment (B.E.O.R.). We have no responsibility and warranty or representation in connection with which such report is used.

Rev. No. 8	Dated: 23-01-2000	I-10-05
------------	-------------------	---------

7-B, Korangi Industrial Area, Adjacent NRL, Karachi-74900
 P/c: +(92-21) 35121857, 35121805, 35054669-72, Fax: +(92 21) 35054745
 Website : www.prdlab.com E-mail: info@prdlab.com, prd@cyber.net.pk



PERAC RESEARCH & DEVELOPMENT FOUNDATION

TEST REPORT		Page 09 of 12	
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421H/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7008
Sample Description	Surface Water (Zhob River Storage Area)	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	Nil
APHA-209C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	1917
D-1293	pH @ 25 °C	8.15
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

Prepared by	Section In charge (E) Head R&ASD

The analyses based on 5 sample(s) provided to us by the Client. The interpretation of opinions expressed represent the best judgment

(I.E. & O.E.). We have no responsibility and warranty or representation in connection with which such report is used.

Rev. No. 0	Dated: 21-01-2000	F-10-05
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 Ph: +(92-21) 35121857, 35121805, 35054669-72, Fax: +(92 21) 35054745
 Website : www.prdlab.com E-mail: info@prdlab.com, prd@cyber.net.pk


PERAC RESEARCH & DEVELOPMENT FOUNDATION

TEST REPORT			Page 10 of 12
Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	24211/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7009
Sample Description	Surface Water (Zhob River) Wall Side # 2	Sampling Date	16-05-2017

TEST METHOD	METHOD TITLE	TEST RESULTS
HACH-8237	Turbidity, NTU	Nil
APHA-200C	Total Suspended Solids, mg/L	Nil
APHA-209B	Total Dissolved Solids (TDS), mg/L	1807
D-1293	pH @ 25 °C	8.00
	Chemical	
By AA	Aluminum (Al), mg/L	Nil
By AA	Antimony (Sb), mg/L	Nil
By AA	Arsenic (As), mg/L	Nil
By AA	Barium (Ba), mg/L	Nil
By AA	Boron (B), mg/L	Nil
By AA	Cadmium (Cd), mg/L	Nil
By AA	Chromium (Cr), mg/L	Nil
By AA	Copper (Cu), mg/L	Nil
By AA	Lead (Pb), mg/L	Nil
By AA	Manganese (Mn), mg/L	Nil
By AA	Nickel (Ni), mg/L	Nil
APHA-320	Mercury (Hg), mg/L	Nil
By AA	Selenium (Se), mg/L	Nil
By AA	Zinc (Zn), mg/L	Nil

Prepared by	Section In charge (E)	Head R&ASD

The analyses based on Sample (s) provided to us by the Client. The interpretation or opinions expressed represent the best judgment (I.E. & O.F.). We have no responsibility and warranty or representation in connection with which such report is used.

Rev. No. 0 Date: 21-01-2009 F-10-05

7-B, Korangi Industrial Area, Adjacent NPL, Karachi-74900
 Ph: +(92-21) 35121857, 35121805, 35054669-72, Fax: +(92 21) 35054745
 Website : www.prdlab.com E-mail: info@prdlab.com, prd@cyber.net.pk



PERAC RESEARCH & DEVELOPMENT FOUNDATION

TEST REPORT

Page 11 of 12

Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421J/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7010-7019
Sample Description	Noise Analysis	Sampling Date	16-05-2017

TEST RESULTS

Code #	LOCATION	Noise dB (A) By Analyzer
7010	Chutta	38
7011	Wandari	41
7012	Khadri	35
7013	Jhalaro	36.2
7014	Acharwund	37
7015	Sinjori	36
7016	Hatachi Khizran Infiltration Gallery	32
7017	Zhob River Wall Side 1	30.1
7018	Zhob River Storage Area	<28
7019	Zhob River Wall Side 2	<28
	NEQS Limits	85

Prepared by	Section In charge (E)	Head R&ASD

The analyses based on Sample (s) provided to us by the Client. The interpretation or opinions expressed represent the best judgment (E.& O.E.). We have no responsibility and warranty or representation in connection with which such report is issued.

Rev. No. 0	Dated: 21-01-2000	F-10-05
------------	-------------------	---------

7-B, Korangi Industrial Area, Adjacent NRL, Karachi-74900
 Ph: +(92-21) 35121857, 35121805, 35054689-72, Fax: +(92 21) 35054745
 Website : www.prdlab.com E-mail: info@prdlab.com, prd@cyber.net.pk



PERAC RESEARCH & DEVELOPMENT FOUNDATION

TEST REPORT

Page 12 of 12

Customer's Name	M/s NEC Consultant (Pvt) Ltd	Test Report No	2421K/2016-2017
Customer's Ref	E-mail	Reporting Date	08-06-2017
Date	05-05-2017	Sample Code	7020-7029
Sample Description	SPM, $\mu\text{g}/\text{Nm}^3$ Analysis	Sampling Date	16-05-2017

Code #	LOCATION	TEST RESULTS
7020	Chutta	12
7021	Wandari	14
7022	Khadri	15
7023	Jhalaro	11
7024	Acharwand	Nil
7025	Sinjori	4
7026	Hatachi Khizran Infiltration Gallery	Nil
7027	Zhob River Wall Side 1	8 ✓
7028	Zhob River Storage Area	Nil ✓
7029	Zhob River Wall Side 2	12 ✓

Prepared by	Section in charge (E)	Head R&ASD

The analysis based on Sample (s) provided to us by the Client. The interpretation or opinions expressed represent the best judgment (E.& O.E.). We have no responsibility and warranty or representation in connection with which such report is used.

Rev. No. 0	Dated: 21-01-2000	F-10-05
------------	-------------------	---------

7-B, Korangi Industrial Area, Adjacent NRL, Karachi-74900
 Ph: +(92-21) 35121857, 35121805, 35054689-72, Fax: +(92 21) 35054745
 Website : www.prdlab.com E-mail: info@prdlab.com, prd@cyber.net.pk

Kilifai - 1

Subproject are: Kili Sardar Akhtar Village: Kili Sardar Date: 03-09-2020

List of Participants

Sr. No.	Name	Occupation	Signature/ Thumb
1	Alia Muhammada	Student	
2	Laal Khan	Farming	
3	Juma Rahim	Student	
4	Nasir Khan	Business	
5	Sardar Jaffer Khan	Farming	
6	Saddam Hussain	Business	
7	Fajal Ameen	Farming	
8	Zehair Khan	Farming	
9	Bahawal Haq	Livestock	
10	Hasan Shah	Farming/Livestock	
11	Sana Ullah	Livestock	
12	Gul Badeem	Farming	
13	Babrak Khan	Farming	
14	Masoom Khan	Farming	
15	Haji Noorul Haq	Farming	
16	Dim Gul	Livestock	
17	/	/	/

Conducted by:

Name: Muhammad Saffad Signature: Date: 03-09-2020

Hashim Farooq

3

نیزوئی - 2 =

Subproject are: Kili Sardar Akhtar Village: Zakojai Date 05-09-2020

List of Participants

0348-333
0139

*
0340-0857579

036

Sr. No.	Name	Occupation	Signature/ Thumb
1	Abdul Hakim	Farming	
2	Zarghun	Farming	
3	Zaam ullah	Livestock	محمد
4	Haji Kareem	Livestock	
5	Aziz Rehman	Livestock/Farm	
6	Shahab ud din	"	محمد
7	Abdul Rehman	"	
8	Naimat ullah	"	
9	Abdul Nabil	"	
10	Abdul Raziq	"	محمد
11	Jahangir Khan	"	
12	Adam Khan	"	

Conducted by:

Name: Muhammad Sajjad Signature:  Date 05-09-2020

Hashim Farooq

3 Hashim

NikiZai - 2

(6)

Gender Consultation

Subproject area: Kili Sardar Village ISTAWA KOTAI Date 05-09-2020

List of Participants

S. No.	Name	Age	Occupation	Education	Sign./Thumb Imp.
1	Haleema	55	H.W	Un-educated	
2	Nazgis	20	H.W	"	
3	Gamai	35	H.W	"	
4	Khaleda	20	H.W	"	
5	Gul bebe	30	H.W	"	
6	Saira	25 40	H.W	"	
7	Sabra	18	H.W	"	
8	Saima	18	H.W	"	
9	Khan Bebe	50	H.W	"	
10	Khan Fama	22	H.W	"	
4	Gullala	30	H.W	"	
12	Khatima	22	H.W	"	
13	Gull Basra	30	H.W	"	
14	Gull DOSTA	30	H.W	"	

Conducted by:

Name: Akma Signature: [Signature] Date 05-09-2020

19 households

Gender Consultation

Subproject area: Kili Akhtar Zai Village GONDAL Date 03-09-2020

List of Participants

S. No.	Name	Age	Occupation	Education	Sign./Thumb Imp.
1	Zarjuma	30	H.W	un-educated	
2	Tamam	35	H.W	"	
3	Rohina	20	H.W	"	
4	Feroza	18	H.W	"	
5	Gul Jumma	25	H.W	"	
6	Jung Jumma	40	H.W	"	
7	Ram Bebe	50	H.W	"	
7	Amina	50	H.W	"	
9	Tahira	40	H.W	"	
10	Razia	20	H.W	"	
11	Ameer BAKHT	33	H.W	"	
12	Zainab	38	H.W	"	
13	Noe BAKHT	55	H.W	"	
14	Bebe Maryam	50	H.W	"	
15	Pakai	45	H.W	"	

Conducted by:

Name: AsmaSignature: Date 03-09-2020

16 Saleha 40 H.W "

17 Bebejan 13 H.W pinning 06/05

18 ~~Asma~~

Chusmanwali

Kili Gender Consultation
 Subproject area: Sardar Akhtar Village Salmon Date 03-09-2020

List of Participants

S. No.	Name	Age	Occupation	Education	Sign./Thumb Imp.
1	Mehboba	30	H.W	Un-educated	
2	Khadeja bebe	25	H.W	Un-educated	
3	Rahema	25	H.W	"	
4	Norai	52	H.W	"	
5	Pashambad	43	H.W	"	
6	Jameela	32	H.W	"	
7	Sangeen	20	H.W	"	
8	Bahadur Jamal	30	H.W	"	
9	Zargona	40	H.W	"	
10	Hameelah	35	H.W	"	
11	Shayia	41	H.W	"	
12	Khan Tama	40	H.W	"	
13	Shamalai	25	H.W	"	
14	Naz Bebe	22	H.W	"	
15	Rahema	35	H.W	"	

Conducted by:

Name: Asma Signature: [Signature] Date 03-09-2020

Annexure 8: Photographs of Consultations



Kili Sardar Akhtar(meeting with Stakeholders)



Meeting with stakeholders of Killi Ghundai



Stakeholder consultation in Killi Churamalai





Gender Consultation in Killi Zakozaï



Gender Consultation in Killi Salmanzai

Annexure 9: BEPA NOC

BALUCHISTAN ENVIRONMENTAL PROTECTION AGENCY

*"Environment is a commonality we all equally share and
its protection is a commonality we all must equally strive for"*



NO.DG/EPA/2020/7689-92/

Dated: Quetta, 27th November, 2020**ENVIRONMENTAL APPROVAL**

To

The Project Director
Balochistan Water Resource Development Sector Project
Government of Balochistan
Irrigation Department

Project Description: **Construction of Sub-Projects proposed under
BWRDS Project for Zhob River Basin**

Location of Project: District Zhob

Date of filling of EIA: 08-10-2020

After comprehensive assessment of subject Environmental Impact Assessment (EIA) Report, the Balochistan Environmental Protection Agency has decided to accord Environmental Approval in favor of the Project Director BWRDS Project for construction of sub-projects proposed under BWRDS project for Zhob River Basin subject to following terms and conditions laid down in Section 17 & 18 of EIA/IEE Regulations 2000 :-

1. The Proponent shall ensure compliance of the National Environmental Quality Standards (NEQS) for ambient air, noise, liquid and waste generated during construction and operation activities of the project.
2. Mitigation Measures suggested in the EIA Report and Environmental Management Plan (EMP) shall be strictly adhered to minimize any negative impacts on soil, ground water, air and biological resources of the Project area.
3. Complete code of Health, Safety and Environment (HSE) shall be developed which should include efficient parameters at specific work place. For this purpose HSE setup should be established and supervised by designated HSE officer at senior level with sufficient administrative and technical authority to perform the assigned function properly. The proponent shall ensure that the operating instructions and emergency response actions are made available to every worker/laborer/commuter at site.
4. Natural flow of water should not be disturbed and the project be executed/carried out within the time frame prescribed as per schedule. The schedule shall be submitted to this office prior to the commencement of the activities.
5. Watershed management practices should be adopted in the catchment areas.
6. Monitoring shall be carried out during the entire period of the Project activities. Monitoring Reports shall be submitted to EPA Balochistan on monthly basis.
7. Compensation shall be provided to the inhabitants in case of loss of agricultural land, crop, property etc. in accordance with the rates prescribed in the Provincial Land Acquisition Act. All conflicting issues regarding compensation, etc, should be settled amicably before the start of the project activities. A Resettlement Action Plan shall be submitted to this office in due course of time.

8. Any change in the approved project shall be communicated to Balochistan Environmental Protection Agency and approval of the same shall be obtained from this Agency.
9. An emergency Response Plan should be established to address the natural and DDMA anthropogenic hazards/catastrophe in coordination with Provincial Disaster Management Authority (PDMA).
10. The proponent shall ensure to take effective measures (installation of protection walls, Gabion walls etc.) for land stabilization and prepare a comprehensive plantation plan at pre-identified dumping sites after land leveling by consulting with relevant authorities.
11. The proponent / Contractor shall make sure the safety and security of wild animals and their habitats at the project site and its environs with the prior consultation and strictly adhering to the guidelines of concerned wildlife authorities.
12. The proponent shall ensure that emission level of machinery are within permissible limits and ensure that work shall not be carried out at night hours.
13. The proponent shall plant 500,000 indigenous forest trees in consultation with Forest Department. The Forest Department shall also take measures for protection and maintenance of these trees and maintain their proper record.
14. The proponent shall ensure that the farmers of tail shall not be affected due to the project operation. Proper share of the water should be made available without any deviation.
15. The proponent shall redress the objection / concerns of neighbors/ stakeholder on priority basis (if any at any stage).
Maximum skilled and unskilled jobs after fulfilling the eligibility criteria shall be given to the local community.
The proponent shall ensure availability of downstream E-Flow during construction and operational phases of the project as per design and maintain record thereof.
16. Given to the geology, topography, terrain and demography of the project areas, pre-identified sites shall be utilized for quarrying purpose so that the issues like land degradation, soil erosion, sedimentation of water bodies and potential threats to the human life & properties and public infrastructure could be avoided.
19. The proponent will install standby power generators (if required) adopting sound proofing techniques and it shall be equipped with chimney with proper height to discharge the hot gases / smoke.
20. After completion of project, project area (camp site, workshops, batching plant and stockpile sites) should be restored to its regional condition. For this purpose documentation in terms of videos and photographs should be kept in record.
21. 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/EIA Regulations 2000.
22. The proponent should ensure the compliance of COVID-19 SOPs for laborers/workers at camp site and construction site.
23. The proponent shall be liable for correctness and validity of information supplied to this Department by the Environmental Consultant.
24. The proponent shall be liable for compliance of Regulations 13, 14 and 19 of IEE / EIA Regulations, 2000, regarding approval, confirmation of compliance, entry, inspections and monitoring.



7689-92
27/11/20

[Handwritten signature]

25. The Proponent shall facilitate BEPA's team during inspection and monitoring project activities.
26. This approval shall be treated as null and void if or any of the conditions mentioned in the approval, BEPA, 2012, Rules and Regulations, Guidelines and instructions is / are not complied with or committed by the proponent or his/her agent or employee.
27. This approval shall be valid (for commencement of construction) for the period of Three Years from the date of issue under the Regulation 17 of IEE/EIA Regulation, 2000.
28. This approval can be withdrawn at anytime without any prior notice if deemed necessary in the Public / National interest.
29. EPA reserves the right to impose any other condition based on its monitoring.
30. 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.

7689-92
27/11/20


DIRECTOR GENERAL

Copy forwarded for information to:-

1. The Secretary Climate Change & Environment Department, Government of Balochistan, Quetta.
2. The Secretary Irrigation Department, Government of Balochistan, Quetta.
3. The Assistant Director EPA, district Zhob.
4. Office / Master file.


DIRECTOR GENERAL



Annexure 10: Grievance Redress Mechanism

1.1 Project Background

The Balochistan Water Resources Development Project (BWRDP) aims to support the Government in water sector planning, management and investment on water sector infrastructure in selected river basins. It will assist the government for investment to improve water storage and supply infrastructure at the Zhob and Mula River basins and improve agricultural farm productivity. The water resource and infrastructure development works will be implemented in territorial jurisdictions of Killa Saifullah, Zhob and Khuzdar Districts along Zhob and Mula River Basins, respectively.

The project will (a) construct new small dams and flood irrigation (spate) systems; (b) improve 300 km of canals, drains, and karezes (subsurface water channels); (c) develop a satellite-based water information system; and (d) build capacity of the local communities, the Balochistan Irrigation Department (BID), and the Agriculture and Cooperative Department (ACD). The indicative outcome of the BWRDP project will be to improve land and water resources, agricultural production and farm income of 10,000 rural households by (i) bringing 10,000 ha of new land under cultivation; (ii) improving 20,000 ha of irrigated land; and (iii) protecting 1,500 ha of watersheds.

BWRDP is a five (05) year project, where Asian Development Bank (ADB) provides \$100 million sector loan and the Government of Balochistan funds \$ 15 million for investment on water sector infrastructure, capacity building and project management components.

1.2 Sector Loan Subprojects

The BWRDP aims to develop water sector infrastructure for improved water supplies for irrigated agriculture and domestic uses; for better watershed management and capacity building of the EA and other stakeholders including the farming communities. From a long list of 351 subprojects for the Zhob (168 sub- projects) and Mula river basins (183 subprojects), 67 possible subprojects were shortlisted. This was further reduced to 20-30 potential subprojects using the following criteria: (i) water and land availability at the subproject level; and (ii) ratio of catchment area to the command area as an indirect indicator for the assessment of hydrologic endowment of the sub-project. Based on these criteria, 11 candidate subprojects (5 in Zhob and 6 in Mula) have been selected for inclusion in ADB's Sector loan including 3 core subprojects.

Of the 3 core subprojects, one is a dam subproject in Zhob River Basin is dam and two clusters of small subprojects in Mula River Basin. Based on the pre-feasibility survey, potential infrastructure development schemes finalized for financing under sector loan are shown in Table 1 below.

Table-1: Potential Schemes to be Included in the Sector Loan

No.	Subproject Name	River Basin
1	Ahmed Zai Perennial and Flood Irrigation Scheme (PIS+FIS)	Zhob River Basin
2	Sabakzai Dam Command Area Development	Zhob River Basin

3	Siri Toi Dam	Zhob River Basin
4	Killi Sardar Akhtar Perennial Irrigation Scheme (PIS)	Zhob River Basin
5	Farmers Managed PIS/FIS Scheme Improvement	Zhob River Basin
6	Churri Infiltration Gallery	Mula River
7	Pashta Khana and Garambowad PIS	Mula River
8	Karkh Valley Development Scheme	Mula River
9	Kharzan Hatachi Infiltration Gallery	Mula River
10	Manyalo, Raiko and Rind Ali PIS	Mula River
11	Farmer's Managed PIS/FIS Scheme Improvement	Mula River

Note: Highlighted are the core subprojects

1.3 Grievance Redress Mechanism (GRM)

The Grievance Redress Mechanism (GRM), outlines the policy and procedure for documenting, addressing, responding and employing methods to resolve project grievances (and complaints) that may be raised by displaced persons (DPs) or community members arising from environmental and social performance, the engagement process, land acquisition and resettlement and/or unanticipated environmental or social impacts resulting from project activities that are performed and/or undertaken by PMO/PIO. The document describes the scope and procedural steps and specifies roles and responsibilities of the parties involved. The purpose of the GRM is to receive, review and resolve grievances from DPs and ensure smooth and fair implementation of subproject activities.

1.4 Principles

A GRM is proposed to address any complaints or grievances arising during the implementation period of the projects undertaken by the PMO/PIO. Members of the public may perceive risks to themselves or their property or their legal rights or have concerns about the possible adverse environmental and social impact that a project may have. Any concerns or grievances should be addressed quickly and transparently, and without retribution to the DP or complainant.

The primary principle is that any complaints or grievances are resolved as quickly as possible in a fair and transparent manner.

All minor complaints regarding land or property disputes that can be resolved should be resolved immediately on the site at the village level Displaced Person Committees (DPCs)/ Farmer Organizations (FOs). In case the concerned parties are unable to resolve the said dispute on the site, the DP may make a complaint to the Grievance Redress Committee (GRC) at the subproject level/district/basin level (PMO/PIO), the details of which are provided herein below. The focus of the GRM is to resolve issues in a customarily appropriate fashion and record details of the complaint, the complainant and the resolution.

1.5 Objectives

The objectives of the GRM are to:

- develop an organizational framework to address and resolve the grievances of individual(s) or community(s), fairly and equitably;

- provide enhanced level of satisfaction to the aggrieved;
- provide easy accessibility to the aggrieved/affected individual or community for immediate grievance redress;
- ensure that the targeted communities and individuals are treated fairly at all times;
- identify systemic flaws in the operational functions of the project and suggest corrective measures; and
- Ensure that the operation of the project is in line with its conception and transparently to achieve the goals for sustainability of the project.

1.6 Structure of Grievance Redress Mechanism

The project shall have multi-tier GRM with designated staff responsibilities at each level. These levels comprise the following:

1.6.1 Displaced Person Committees (DPCs)

For effective coordination in the field with DPs and community, DPCs will be established at the village level to maintain a close rapport with affected persons and local community throughout project implementation.

The DPC will act as coordinator among the PMO/PIO, the DPs and local community for coordination and information dissemination to keep them informed about day to day development on the project, particularly about the grievance resolution progress. The Senior Sociologist (PMO/PIO), Social/Community Organizer & Environment Specialist of supervision consultant (Design team) will coordinate with the affected persons for constitution of DPC at the village level comprising of at least five members with one as committee convener. The DPC at village level will provide a platform for DPs to raise and discuss their concerns, resolve petty issues at the village level with PMO/PIO assistance, and coordinate with project executors to communicate the issues and concerns regarding social & environmental issues unresolved at DPC. The project safeguards and engineering staff will coordinate with DPs and village level committees to review and resolve the issue or concern related to LAR planning or implementation & environmental concerns preferably within 15 days from receipt of the grievance. DPC will comprise of the following members;

- Social/Community Organizer of SC (male/female);
- Female member; and
- Two male members
- Environment Specialist of SC (Design Team)

1.6.2 District/ Project Management Office (PMO)/ Project Implementation Office (PIO)/Basin Level

Baluchistan Irrigation Department (BID) shall constitute a Grievance Redress Committee (GRC) headed by Deputy Project Director (DPD) at District/PMO/PIO level for each river basin i.e Zhob & Mula to resolve all grievances and complaints of the DPs and the complainants. The GRC shall comprise of the following members:

- Deputy Project Director (DPD)/EXEN, PMO/PIO as head/convener of GRC;
- Senior Sociologist-Female, PMO/PIO; act as secretary of GRC
- Land Acquisition Collector (LAC) as Member;
- Resettlement Specialist;
- Environment Specialist of SC (PMO Support)and
- Any notable personality from the area to be nominated in writing by the relevant District Administration in consultation with the community.

Note: Representative from any other Department may be called as and when required by the GRC. Environmental Specialist of SC will join GRC meeting related to Environmental issues only.

The GRC will meet once a month and when the need arises. The GRC will review grievances involving all LAR planning and implementation, environmental issues (water, Air, Noise pollution etc) and social issues including, compensation, relocation, and other assistance as well as social issues that may arise due to restricted access to the resources and amenities.

GRC will perform following functions:

- Record grievances, categorize and prioritize the grievances that need to be resolved by the committee and solve them within a month;
- Summon and hear aggrieved persons/parties to produce evidence of their claims and record their view point;
- Communicate its decisions and recommendations on all resolved disputes to project executors and the aggrieved persons for implementation;
- Forward the unresolved cases to GRC-BID/project level within an appropriate time frame with reasons recorded and its recommendations;
- Develop an information dissemination system and acknowledge the aggrieved parties about the development regarding their grievance and decision of GRC-BID/project level;
- Maintain a complaint register accessible to the stakeholders with brief information about complaints and GRC decision with status report; and,
- Maintain complete record of all complaints received by the GRC with actions taken.

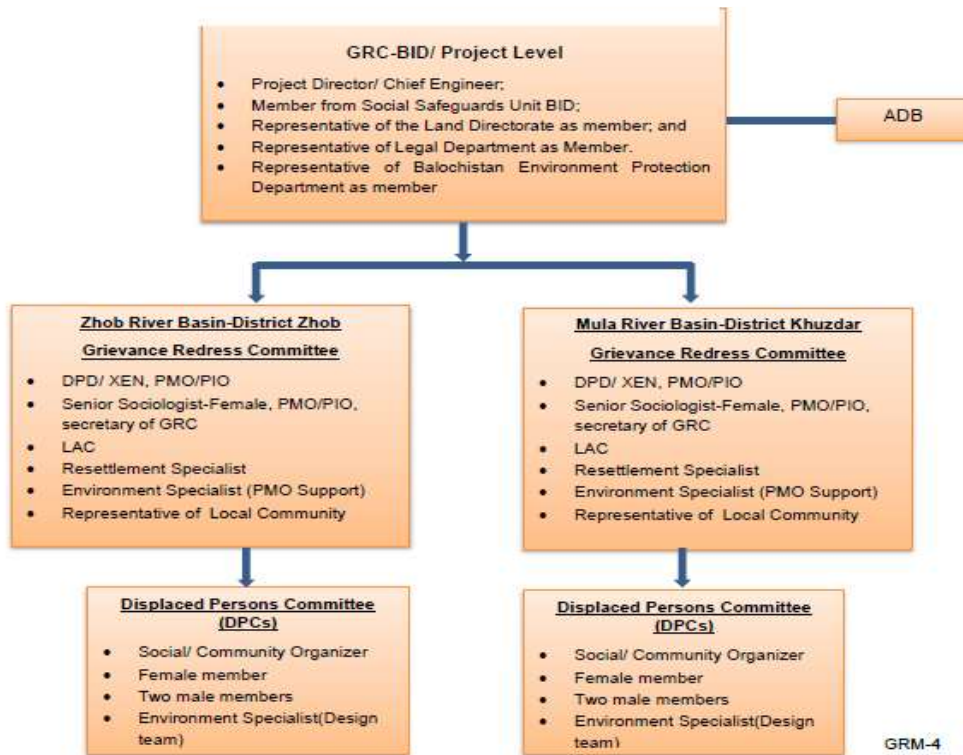
1.6.3 BID/ Project Level

BID shall constitute a Grievance Redress Committee (GRC) at BID/ project level. The committee will have following composition:

- Project Director/ Chief Engineer, as head/ convener of GRC;
- Member from Social Safeguards (female) Unit BID;
- Representative of the Land Directorate as member; and
- Representative of the Legal Department as member.
- Representative of the Balochistan Environment Protection Department as member.

This GRC-BID/project level, through authorized representative, will acknowledge the complainant about his complaint, scrutinize the record of the GRC-PMO/PIO/basin, investigate the remedies available and request the complainant to produce any record in favour of his claim. After thorough review and scrutiny of the available record on complaint, visit the field and collect additional information, if required. Once the

investigations are completed, the GRC-BID/project level shall give decision within 30 days of receipt of the complaint. If the complainant is still dissatisfied with the decision, he can go to the court of law, if he/she wishes so.



Gender representation will be ensured by inducting a female member in both GRCs. The mechanism will ensure the access of DPs to a GRM that openly and transparently deals with the grievances and makes decision in consultation with all concerned that are consistent with SPS-2009 and country safeguard system.

1.7 Grievance Redress Mechanism

The intention of GRM is to resolve a complaint as quickly and at as low a level as possible to avoid a minor issue becoming a significant grievance. Irrespective of the stage of the process, a complainant has the option to pursue the grievance through the court as is his or her legal right in accordance with law. The details of the process are given below:

1.7.1 Grievance Redress Procedure

The GRC will work both at the project and field level. The PMO/PIO safeguards and engineering staff, in coordination with district-level BID staff will inform the DPs about the GRC and its mechanism through consultations, focus group discussion and by posting at prominent places. The complaints received through any media will be screened by type and category and registered in a community complaints register (CCR), where the name & address of complainant, date, description of complaint and action taken will be recorded. The GRC will acknowledge the complaints within 5 days of receipt and will review available records. If required, GRC will advise the safeguards/engineering staff to conduct field visits in consultation with the aggrieved person, local community and the

land revenue staff and submit a fact finding report. Preferably the fact finding will be completed within 15 days from receipt of complaints. The GRC in its formal meeting to be conducted within 30 days from receipt of complaint, will hear and clarify with the complainant (if required so) about the issue and shall conclude and communicate its recommendations for further implementation. Complainant will be kept informed during the process and the GRC decision will be communicated to him in a language and form understandable to him. The GRC proceedings will be documented step by step and all records will be maintained and summarized in the project progress and internal monitoring reports.

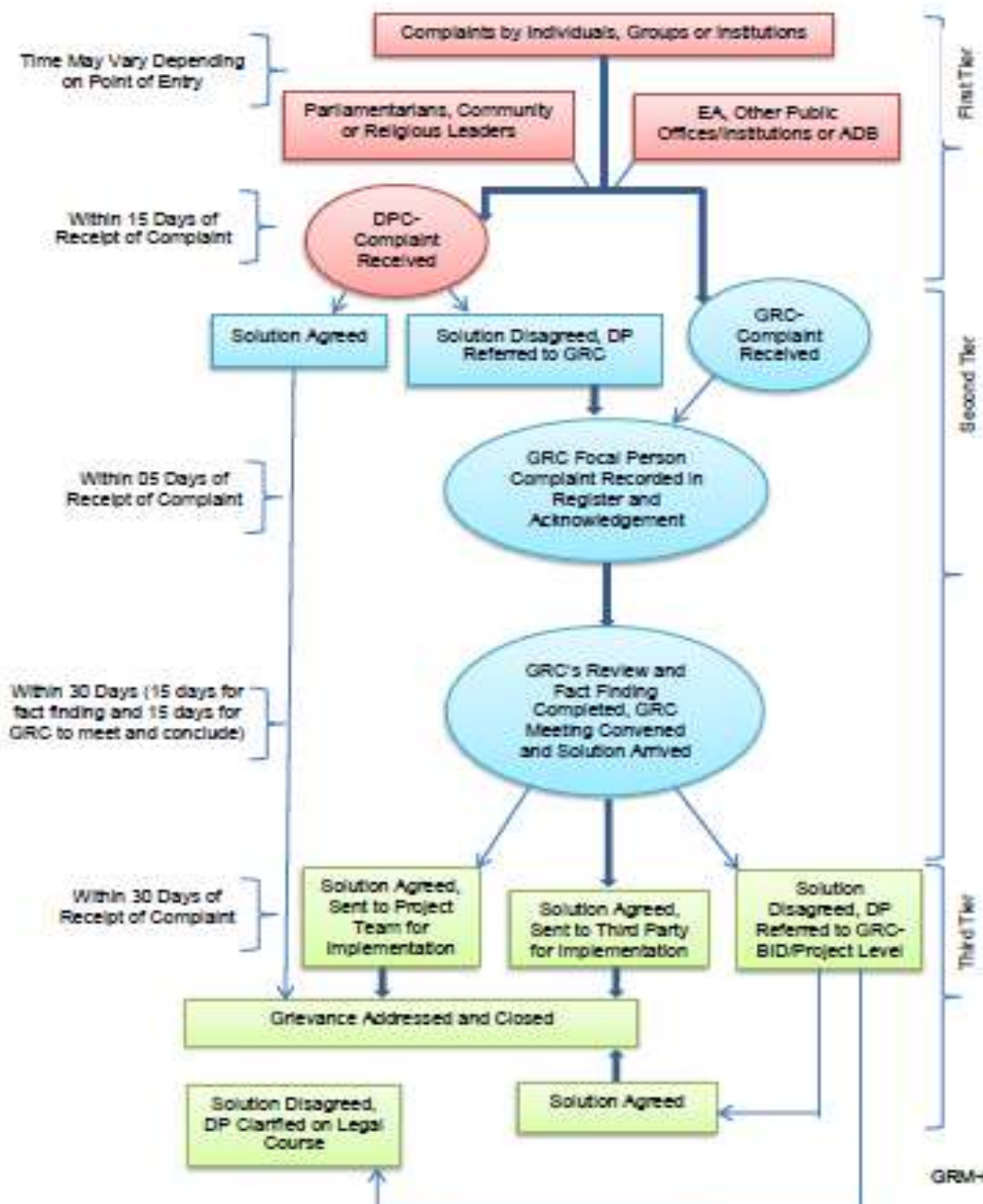
Nonetheless, the complainant will be at liberty to access the formal legal course if he is dissatisfied with the GRC findings and recommendations. If GRC fails to conclude its recommendations either due to some technical or legal constraint, the GRC will immediately report the issue to BID/project level GRC and will request guidance and support it deems necessary. BID/project level GRC will ensure to resolve the grievance in 30 days. In case of any delay, the complainants will be informed on the progress and process about their grievances.

Disputes on land title, land compensation awarded and payable under law and apportionment of compensation will be dealt under the grievance redress mechanism provided in the LAA-1894. Environmental issues will be dealt according to Balochistan environmental protection act 2012 and ADB SPS 2009 guidelines. Any complaint received will be registered in the GRM and the DPs will be clarified on the process and supported to access the legal course. All other issues will be resolved through the project- based GRM. Community complaints and grievances will be addressed through two different processes as described in the following Table-2.

Table-2: Grievance Redressal Process

Land/Crop Compensation Issues	Project/ Other Issues (Including Environmental)
<p>a. First, complaint resolution will be attempted at site (village level) through the involvement of the PMO/DPC/FO.</p> <p>b. If unsettled, grievance can then be lodged to the GRC or DOR/LAC to proceed under law and communicate decision in least possible time.</p> <p>c. GRC will acknowledge the complaint within 5 days of complaint and after initial review and consultation with the LAC, within 15 days of receipt of complaint, the GRC will clarify the legal course of action and guide aggrieved persons to approach appropriate legal forum. PMO will coordinate with the land administration authorities including District Collector and LAC to request early resolution of the issue/complaint.</p> <p>d. In case the grievance pertains to awarded compensation, PMO will clarify with the DPs the process as set out in Section 18 to 22 of the LAA</p>	<p>a. First, complaints resolution will be attempted at site (village level) through the involvement of the PMO/DPC/FO.</p> <p>b. If unresolved, a grievance will be lodged to the GRC, which will acknowledge receipt of the complaint within 5 days.</p> <p>c. The GRC will conduct fact finding in 15 days of receipt of complaint and after review of fact findings reports and hearing the DPs in person will conclude its recommendations in 30 days of receipt of complaint. In case GRC could not decide in stipulated time, the reasons if any will be recorded and the grievance will be resolved in next 30 days.</p> <p>d. If the complainant is not satisfied, he can pursue further by submitting to the appropriate court of law.</p>

Figure-2: Grievance Process and Time Frame



Annexure 11: Emergency Response Plan for Damage of Infiltration Gallery

Infiltration Gallery is susceptible to damage from natural disasters such as flooding, earthquakes, landslide etc. In the event of a major disaster, the following is expected:

There is not enough source water available to meet demand,

There is a problem with the intake, or infiltration gallery, that does not allow enough water to be drawn

A natural disaster creating the situation when water from the source cannot be drawn, preventative measure are prescribed as follows:

- Regular inspection of intake for damage or clogging
- Regular inspection of intake failure

Causes	Preventive measures
Event: CANAL BREACHING	
Canal breaching	<ul style="list-style-type: none"> • Closing of gaps in flood walls by sand bags or other available methods; • Protection of river banks by sand bags, stone, or other available methods; • Counteracting piping which is the main cause of collapse of embankment and dykes etc.; • Protection of bridge piers, weirs, barrages and dams against erosion by rockfill, sand bags and other available methods; • Construction of temporary non-structural protection measures to prevent the propagation of flood on non-protected land; • Cutting of embankment, dykes etc. in order to allow flooding of less important areas, and thus to save other more important areas; • Removing obstacles from active or potential flood ways, relief and flood bypass channels; and • Protection of structures exposed to strong wind wash action.
Event: NOT ENOUGH SOURCE WATER AVAILABLE	
Drought.	<ul style="list-style-type: none"> • Start water conservation measures as soon as water shortage becomes likely. • Plan the development and use of the water source,
Event: POOR RAW WATER QUALITY DURING HEAVY RAINS	
Heavy rain leading to high levels of turbidity	<ul style="list-style-type: none"> • Stabilise raw water quality (using, eg, infiltration gallery or raw water reservoir) to avoid periods of very poor quality. • Inspect catchment for signs of erosion and slips that will potentially be ongoing problems.

Causes	Preventive measures
Event: CONTAMINATION OF THE RIVER OR STREAM	
Contamination sources present in the catchment.	<ul style="list-style-type: none"> • Identify potential sources of contamination • Ensure that changes in land use (including urban developments) and the potential for contamination they create, are well monitored after commissioning of the source. • Restrict activities in the catchment that may contaminate the water. • Gather information about the hydrology of the catchment before undertaking development.
Event: WATER QUALITY NOT IMPROVED BY INFILTRATION GALLERY	
Sediment load in raw water too high.	<ul style="list-style-type: none"> • Establish levels of raw water quality that the gallery cannot handle, and turn the gallery pumps off when these are exceeded.
Poor infiltration gallery design.	<ul style="list-style-type: none"> • Take account of the range of possible raw water qualities when designing the gallery.
Event: INFILTRATION GALLERY PRODUCES LESS WATER THAN IT WAS DESIGNED FOR	
Clogged gravel packs in the infiltration gallery.	<ul style="list-style-type: none"> • Turn off the gallery under extreme conditions to minimise drawing sediment deep into the gravel packs. • Regular programme to scarify gravel pack with tractor mounted unit. (NB: If gallery is in the stream bed a resource consent will be required.) • Regular programme of cleaning gravel packs using compressed air lances.
Gravel packs and/or screen slots calcified or clogged with oxidised iron or manganese.	<ul style="list-style-type: none"> • Regular programme of cleaning gravel packs using compressed air lances
Event: INFILTRATION GALLERY PRODUCES LESS WATER THAN IT WAS DESIGNED FOR	
Gallery clogged by tree roots.	<ul style="list-style-type: none"> • Avoid planting trees near the gallery.
Event: TOO LITTLE WATER CAN BE DRAWN FROM THE INTAKE TO MEET DEMAND	
Screens damaged or clogged.	<ul style="list-style-type: none"> • Regular inspection and cleaning of screens, intensified during times of flood. • Booms and screens to trap weed/algae.
Failure of the intake due to mechanical or structural failure.	<ul style="list-style-type: none"> • Regular preventive maintenance, as required by the conditions, and manufacturers' specifications: lubrication, component replacement, exercise valves. • Regular inspections of intake.
Catastrophic failure (eg, flood, slips or	<ul style="list-style-type: none"> • Intake inspections, regularly and directly after floods etc, with follow-up action if required for existing protection (eg, gabions, piling, screens and grates, etc).

Causes	Preventive measures
earthquake-related damage).	
Pump failure	<ul style="list-style-type: none">• Maintenance according to manufacturers' recommendations.• Standby pump with auto-switch to alternate pumps.• Operate duty and standby pumps using an alternate 'number of days cycle'.
Power failure.	<ul style="list-style-type: none">• Regular inspection of cabling, power lines and connectors.• Stand-by generator.
Vandalism/ sabotage.	<ul style="list-style-type: none">• Construct a fence around the intake site.

Annexure 12: Emergency Response Plan for Flood Protection Bund

Flood-fighting measures are emergency measure deployed in the event when flood protection / control structures and flood proofing measures have failed or rendered ineffective with a sole objective of mitigating flood impacts

Reasons of Flooding:

- Failure of flood walls and embankments;
- Failure of land drainage systems causing flooding of agriculture land; and

Emergency Responses for flood-fighting in a typical case of failure of flood protection / control structures include the following:

- Closing of gaps in flood walls by sand bags or other available methods;
- Protection of river banks by sand bags, stone, or other available methods;
- Counteracting piping which is the main cause of collapse of embankment and dykes etc.;
- Construction of temporary non-structural protection measures to prevent the propagation of flood on non-protected land;
- Cutting of embankment, dykes etc. in order to allow flooding of less important areas, and thus to save other more important areas;
- Removing obstacles from active or potential flood ways, relief and flood bypass channels; and
- Protection of structures exposed to strong wind wash action.

Annexure 13: Chance Find Procedure

Project routing does not envisage any archaeological site. However, in case of any chance find, the **Construction Contractor** will immediately report through **Chief Resident Engineer** of Supervision Consultant to **Deputy Commissioner (DC)** or his nominated representative, to take suitable further actions to preserve such antiques or sensitive remains; and contact the “**Culture, Tourism & Archives Department, (Archaeology Directorate) Government of Balochistan**” for further action.

Representative of the “**Culture, Tourism & Archives Department, (Archaeology Directorate) Government of Balochistan**” will visit the site and observed the significance of the antique, artifact & Cultural (religious) properties and significance of the project. The site visit report will be prepared and given to the **concerned official** of the **Archaeology Directorate**.

In case any artifact, antiques and sensitive remains are discovered, *Chance Find Procedures* should be adopted by Construction Contractors 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 archaeological department;
- The suggestion of the local communities and the concerned authorities will be suitable 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 Construction Contractor must immediately report the discovery to the **Chief Resident Engineer** of Supervision Engineer for onwards communication to **Deputy Commissioner (DC)**;
- Once authorization has been given by the responsible authorities (Archaeological Department), the Construction Contractor will be informed when works can resume.

Annexure 14: The List of Restricted Pesticides

Table 1. Extremely Hazardous (Class Ia) Technical grade Active Ingredients in Pesticides

Common name	CAS no	UN no	Chem type	Phys state	Main use	GHS	LD ₅₀ mg/kg	Remarks
dicarb [ISO]	116-06-3	2757	C	5	I-S	1	0.93	DS 53; EHC121; HSG 64; IARC53; ICSC 94; JMPR 1993, 1996a
difacoum [ISO]	56073-10-0	3027	CO	5	R	1	0.3	DS 57; EHC175; HSG 93
radiolone [ISO]	28772-56-7	3027	CO	5	R	1	1.12	DS 88; EHC175; HSG 94
methalin [ISO]	63333-35-7	2588		5	R	1	2	
calcium cyanide [C]	592-01-8	1575		5	FM	2	39	Adjusted classification; see note 1; ICSC 407
atafol [ISO]	2425-06-1			5	F	5	5000	Adjusted classification; see note 2; HSG 49; IARC 53; ICSC 119; JMPR 1978, 1986a; see note 3
prothoxyfos [ISO]	54593-83-8	3018	OP	L	I	1	1.8	Extremely hazardous by skin contact (LD ₅₀ = 12.5 mg/kg); ICSC 1681
ormephos [ISO]	24934-91-6	3018	OP	L	I	2	7	ICSC 1682
prophacinone [ISO]	3691-35-8	2588		5	R	1	3.1	DS 62; EHC175
enacoum [ISO]	56073-07-5	3027	CO	5	R	1	1.8	EHC 175; HSG 95
ethialone [ISO]	104653-34-1	2588		5	R	1	0.56	EHC 175
hacinone [ISO]	82-66-6	2588		5	R	1	2.3	EHC 175
ulfoton [ISO]	298-04-4	3018	OP	L	I	1	2.6	DS 68; JMPR 1992, 1997a; ICSC 1408
l	2104-64-5	2783	OP	5	I	2	14	See note 4; ICSC 753
oprophos [ISO]	13194-48-4	3018	OP	L	I-S	2	D26	DS 70; JMPR 2000; ICSC 1660; [Oral LD ₅₀ = 33 mg/kg]
coumafen	90035-08-8	3027		5	R	1	0.25	EHC 175; ICSC 1267
tachlorobenzene [ISO]	118-74-1	2729	OC	5	FST	5	D10000	Adjusted classification (notes 3 and 5); IARC 79; ICSC 895; EHC 195
rcuric chloride [ISO]	7487-94-7	1624	HG	5	F-S	1	1	See note 3; ICSC 979
vinphos [ISO]	26718-65-0	3018	OP	L	I	1	D4	DS 14; ICSC 924; JMPR 1998b; [Oral LD ₅₀ = 3.7 mg/kg]
athion [ISO]	56-38-2	3018	OP	L	I	2	13	See note 3; DS 6; HSG 74; IARC 30, Suppl. 7; ICSC 6; JMPR 1996b
athion-methyl [ISO]	298-00-0	3018	OP	L	I	2	14	See note 3; DS 7; EHC 145; HSG 75; ICSC 626; JMPR 1985c, 1996b

Common name	CAS no	UN no	Chem type	Phys state	Main use	GHS	LD ₅₀ mg/kg	Remarks
Phenylmercury acetate [ISO]	62-38-4	1674	HG	S	FST	2	24	Adjusted classification; see notes 3 and 6; ICSC 540
Phorate [ISO]	298-02-2	3018	OP	L	I	1	2	DS 75; JMPR 1997b, 2005; ICSC 1060
Phosphamidon	13171-21-6	3018	OP	L	I	2	7	See note 3; DS 74; ICSC 189; JMPR 1987b
Sodium fluoroacetate [C]	62-74-8	2629		S	R	1	0.2	DS 16; ICSC 484
Sulfotep [ISO]	3689-24-5	1704	OP	L	I	1	5	ICSC 985
Tebupirimfos [ISO*]	96182-53-5	3018	OP	L	I	1	1.3	Extremely hazardous by skin contact (LD 9.4 mg/kg in rats)
Terbufos [ISO]	13071-79-9	3018	OP	L	I-S	1	c2	JMPR 1991, 2004

EHC = Environmental Health Criteria Monograph; DS = Pesticide Data Sheet; HSG = Health and Safety Guide; IARC = IARC Monographs on the Evaluation of

Carcinogenic Risks to Humans; ICSC = International Chemical Safety Card; JMPR = Evaluation by the Joint FAO/WHO Meeting on Pesticide Residues.

Notes to Class Ia

1. Calcium cyanide is in Class Ia as it reacts with moisture to produce hydrogen cyanide gas. The gas is not classified under the WHO system (see Table 8).
2. Captafol is carcinogenic in both rats and mice.
3. The international trade of captafol, hexachlorobenzene, mercury compounds, parathion, parathion-methyl, and phosphamidon is regulated by the Rotterdam convention on Prior Informed Consent (see <http://www.pic.int/>), which entered into force on 24 February 2004. See Table 7, p. 51
4. EPN has been reported as causing delayed neurotoxicity in hens.
5. Hexachlorobenzene has caused a serious outbreak of porphyria in humans. The use and production of hexachlorobenzene is severely restricted by the Stockholm convention on persistent organic pollutants, which entered into force on 17 May, 2004. See <http://www.pops.int/>
6. Phenylmercury acetate is highly toxic to mammals and very small doses have produced renal lesions: teratogenic in the rat.

THE FINAL CLASSIFICATION OF ANY PRODUCT DEPENDS ON ITS FORMULATION

See Pages 7 & 8, and the Appendix

Table 2. Highly hazardous (Class Ib) technical grade active ingredients in pesticides

Common name	CAS no	UN no	Chem type	Phys state	Main use	GHS	LD ₅₀ mg/kg	Remarks
Acrolein [C]	107-02-8	1092		L	H	2	29	EHC 127; HSG 67; IARC 63; ICSC 90
Allyl alcohol [C]	107-18-6	1098		L	H	3	64	Highly irritant to skin and eyes; ICSC 95; <i>Adjusted classification (see note 3)</i>
Azinphos-ethyl [ISO]	2642-71-9	2783	OP	S	I	2	12	DS 72; JMPR 1974
Azinphos-methyl [ISO]	86-50-0	2783	OP	S	I	2	16	DS 59; ICSC 826; JMPR 1992, 2009b
Blasticidin-S	2079-00-7	2588		S	F	2	16	
Butocarboxim [ISO]	34681-10-2	2992	C	L	I	3	158	JMPR 1986a; <i>Adjusted classification (see note 3)</i>
Butoxycarboxim [ISO]	34681-23-7	2992	C	L	I	3	D288	<i>Adjusted classification (see note 3)</i>
Cadusafos [ISO]	95465-99-9	3018	OP	L	N,I	2	37	JMPR 1992
Calcium arsenate [C]	7778-44-1	1573	AS	S	I	2	20	EHC 18, 224; IARC 84; ICSC 765; JMPR 1969
Carbofuran [ISO]	1563-66-2	2757	C	S	I	2	8	DS 56; ICSC 122; JMPR 1997b, 2003b, 2009a; <i>See note 2.</i>
Chlorfenvinphos [ISO]	470-90-6	3018	OP	L	I	2	31	ICSC 1305; JMPR 1995b
3-Chloro-1,2-propanediol [C]	96-24-2	2689		L	R	3	112	<i>Adjusted classification (see notes 1 and 3)</i>
Coumaphos [ISO]	56-72-4	2783	OP	S	AC,MT	2	7.1	ICSC 422; JMPR 1991
Coumatetralyl [ISO]	5836-29-3	3027	CO	S	R	2	16	
<i>Cyfluthrin [ISO]</i>	<i>68359-37-5</i>		<i>PY</i>	<i>S</i>	<i>I</i>	<i>2</i>	<i>c15</i>	<i>JMPR 2008; See note 9, p. 8</i>
<i>Beta-cyfluthrin [ISO]</i>	<i>68359-37-5</i>		<i>PY</i>	<i>S</i>	<i>I</i>	<i>2</i>	<i>c11</i>	<i>JMPR 2008; See note 9, p. 8</i>
Zeta-cypermethrin [ISO]	52315-07-8	3352	PY	L	I	3	c86	See note 9, p. 8; HSG 22; ICSC 246; JMPR 2008; <i>Adjusted classification (see note 3)</i>
Demeton-S-methyl [ISO]	919-86-8	3018	OP	L	I	2	40	DS 61, EHC 197; ICSC 705; JMPR 1990
Dichlorvos [ISO]	62-73-7	3018	OP	L	I	3	56	Volatile, DS 2; EHC 79; HSG 18; IARC 20, 53; ICSC 690; JMPR 1994; <i>Adjusted classification (see note 3)</i>
Dicrotophos [ISO]	141-66-2	3018	OP	L	I	2	22	ICSC 872
Dinoterb [ISO]	1420-07-1	2779	NP	S	H	2	25	

Common name	CAS no	UN no	Chem type	Phys state	Main use	GHS	LD ₅₀ mg/kg	Remarks
DNOC [ISO]	534-52-1	2779	NP	S	I-S,H	2	25	JMPR 1965a; EHC 220; ICSC 462. See note 2.
Edifenphos [ISO]	17109-49-8	3018	OP	L	F	3	150	JMPR 1982. <i>Adjusted classification (see note 3)</i>
Ethiofencarb [ISO]	29973-13-5	2992	C	L	I	3	200	JMPR 1983. <i>Adjusted classification (see note 3)</i>
Famphur	52-85-7	2783	OP	S	I	2	48	
Fenamiphos [ISO]	22224-92-6	2783	OP	S	N	2	15	DS 92; ICSC 483; JMPR 1998b, 2003b
Flucythrinate [ISO]	70124-77-5	3352	PY	L	I	3	c67	JMPR 1986b; see note 9, p.8; <i>Adjusted classification (see note 3)</i>
Fluoroacetamide [C]	640-19-7	2588		S	R	2	13	ICSC 1434. See note 2
Formetanate [ISO]	22259-30-9	2757	C	S	AC	2	21	
Furathiocarb	65907-30-4	2992	C	L	I-S	2	42	
Heptenophos [ISO]	23560-59-0	3018	OP	L	I	3	96	<i>Adjusted classification (see note 3)</i>
Isoxathion [ISO]	18854-04-8	3018	OP	L	I	3	112	<i>Adjusted classification (see note 3)</i>
Lead arsenate [C]	7784-40-9	1617	AS	S	L	2	c10	EHC 18, 224; IARC 84; ICSC 911; JMPR 1969
Mecarbam [ISO]	2595-54-2	3018	OP	Oil	I	2	36	JMPR 1987a
Mercuric oxide [ISO]	21908-53-2	1641	HG	S	O	2	18	ICSC 981; CICAD 50. See note 2
Methamidophos [ISO]	10265-92-6	2783	OP	S	I	2	30	HSG 79; ICSC 176; JMPR 1991, 2003b; See note 2
Methidathion [ISO]	950-37-8	3018	OP	L	I	2	25	JMPR 1998b; ICSC 1659
Methiocarb [ISO]	2032-65-7	2757	C	S	I	2	20	JMPR 1999
Methomyl [ISO]	16752-77-5	2757	C	S	I	2	17	DS 55, EHC 178; HSG 97; ICSC 177, JMPR 1989, 2002
Monocrotophos [ISO]	6923-22-4	2783	OP	S	I	2	14	See note 2; HSG 80; ICSC 181; JMPR 1996b
Nicotine [ISO]	54-11-5	1654		L		1	D50	ICSC 519
Omethoate [ISO]	1113-02-6	3018	OP	L	I	2	50	JMPR 1997a
Oxamyl [ISO]	23135-22-0	2757	C	S	I	2	6	DS 54; JMPR 1986b, 2003b
Oxydemeton-methyl [ISO]	301-12-2	3018	OP	L	I	3	65	JMPR 1990, 2003b; <i>Adjusted classification (see note 3)</i>
Paris green [C]	12002-03-8	1585	AS	S	L	2	22	Copper-arsenic complex
Pentachlorophenol [ISO]	87-86-5	3155		S	I,F,H	2	D80	See note 2; Irritant to skin; EHC 71; HSG 19; IARC 20, 53; ICSC 69

Common name	CAS no	UN no	Chem type	Phys state	Main use	GHS	LD ₅₀ mg/kg	Remarks
Propetamphos [ISO]	31218-83-4	3018	OP	L	I	3	106	<i>Adjusted classification (see note 3)</i>
Sodium arsenite [C]	7784-46-5	1557	AS	S	R	2	10	EHC 224; IARC 84; ICSC 1603
Sodium cyanide [C]	143-33-9	1689		S	R	2	6	ICSC 1118; CICAD 61
Strychnine [C]	57-24-9	1692		S	R	2	16	ICSC 197
Tefluthrin	79538-32-2	3349	PY	S	I-S	2	c22	See note 9, p. 8
Thallium sulfate [C]	7446-18-6	1707		S	R	2	11	DS 10, EHC 182; ICSC 336
Thiofanox [ISO]	39196-18-4	2757	C	S	I-S	2	8	
Thiometon [ISO]	640-15-3	3018	OP	Oil	I	3	120	DS 67; ICSC 580; JMPR 1980; <i>Adjusted classification (see note 3)</i>
Triazophos [ISO]	24017-47-8	3018	OP	L	I	3	82	JMPR 1994, 2003b; <i>Adjusted classification (see note 3)</i>
Vamidothion [ISO]	2275-23-2	3018	OP	L	I	3	103	JMPR 1989; ICSC 758; <i>Adjusted classification (see note 3)</i>
Warfarin [ISO]	81-81-2	3027	CO	S	R	2	10	DS 35, EHC 175; HSG 96; ICSC 821
Zinc phosphide [C]	1314-84-7	1714		S	R	2	45	DS 24, EHC 73; ICSC 602

EHC = Environmental Health Criteria Monograph; DS= Pesticide Data Sheet; HSG = Health and Safety Guide; IARC = IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; ICSC = International Chemical Safety Card; JMPR = Evaluation by the Joint FAO/WHO Meeting on Pesticide Residues.

Notes to Class Ib

1. 3-Chloro-1,2-propanediol in nonlethal dosage is a sterilant for male rats. This compound is also known as alpha chlorhydrin.
2. The international trade of carbofuran, DNOC, fluoroacetamide, mercury compounds, methamidophos, monocrotophos and pentachlorophenol is regulated by the Rotterdam convention on Prior Informed Consent (see <http://www.pic.int/>), which entered into force on 24 February 2004. See Table 7, p. 51.
3. As a precautionary measure, the classification of certain liquid pesticides has been adjusted to avoid those pesticides being assigned to a less hazardous Class in the process of aligning the WHO Classification with the GHS. Details of how the WHO Classification has been aligned with the GHS Acute Toxicity Hazard Categories are described in the introductory notes for Part II.

THE FINAL CLASSIFICATION OF ANY PRODUCT
DEPENDS ON ITS FORMULATION
See Pages 7 & 8, and the Appendix

Table 3. Moderately Hazardous (Class II) Technical Trade Active Ingredients in Pesticides

Common name	CAS no	UN no	Chem type	Phys state	Main use	GHS	LD ₅₀ mg/kg	Remarks
Acephate [ISO]	30560-19-1		OP	S	I	4	945	JMPR 1991, 2003b, 2006b; ICSC 748
Acifluorfen [ISO]	50594-66-6			S	H	4	1370	Strong irritant to eyes
Alachlor [ISO]	15972-60-8	2588		S	H	4	930	See note 1; DS 86; IARC 19, 36, 63; ICSC 371
Alanycarb [ISO]	83130-01-2		C	S	I	4	330	
Allethrin [ISO]	584-79-2		PY	Oil	I	4	c685	See note 9, page 8; EHC 87; HSG 24; ICSC 212; JMPR 1965a
Ametryn [ISO]	834-12-8		T	S	H	4	110	
Amitraz [ISO]	33089-61-1			S	AC	4	800	ICSC 98; JMPR 1999
Anilofos [ISO]	64249-01-0		OP	S	H	4	472	
Azaconazole	60207-31-0			S	F	4	308	
Azamethiphos [ISO]	35575-96-3		OP	S	I	4	1010	
Azocyclotin [ISO]	41083-11-8	2786	OT	S	AC	3	80	JMPR 1990, 1995b, 2006b
Bendiocarb [ISO]	22781-23-3	2757	C	S	I	3	55	DS 52
Benfuracarb [ISO]	82560-54-1	2992	C	L	I	3	205	
Bensulide [ISO]	741-58-2	2902		L	H	3	270	ICSC 383
Bensultap [ISO]	17606-31-4			S	I	4	1100	
Bentazone [ISO]	25057-89-0			S	H	4	1100	HSG 48; ICSC 828; JMPR 1999, 2005
Bifenthrin	82657-04-3	3349	PY	S	I	3	c55	JMPR 1993
Bilanafos [ISO]	71048-99-2			S	H	3	268	
Bioallethrin [C]	584-79-2		PY	L	I	4	c700	See note 2; note 9, p. 8; ICSC 227
Bromoxynil [ISO]	1689-84-5	2588		S	H	3	190	
Bromuconazole	116255-48-2			S	F	4	365	ICSC 1264
Bronopol	52-51-7			S	B	3	254	ICSC 415
Butamifos [ISO]	36335-67-8		OP	L	H	4	630	
Butralin [ISO]	33629-47-9			S	H	4	1049	

Common name	CAS no	UN no	Chem type	Phys state	Main use	GHS	LD ₅₀ mg/kg	Remarks
Butoxydim [ISO]	138164-12-2			S	H	4	1635	
Butylamine [ISO]	13952-84-6	1992		L	F	4	380	Irritant to skin; ICSC 401; JMPR 1982, 1985b
Carbaryl [ISO]	63-25-2	2757	C	S	I	3	c300	DS 3; EHC 153; HSG 78; IARC 12, Suppl.7; ICSC 121; JMPR
Carbosulfan [ISO]	55285-14-8	2992	C	L	I	3	250	JMPR 1987a, 2004
Cartap [ISO]	15263-53-3			S	I	4	325	EHC 76; JMPR 1996a
Chloralose [C]	15879-93-3			S	R	4	400	
Chlordane [ISO]	57-74-9	2996	OC	L	I	4	460	See notes 3 and 4; DS 36; EHC 34; HSG 13; IARC 79; ICSC 740; JMPR 1995a
Chlorfenapyr [ISO]	122453-73-0			S	I,MT	4	441	
Chlormequat (chloride) [ISO]	999-81-5			S	PGR	4	670	ICSC 781; JMPR 2000
Chloroacetic acid [C]	79-11-8	1751		S	H	4	650	Irritant to skin and eyes; data refer to sodium salt; ICSC 235
Chlorphonium chloride [ISO]	115-78-6	2588		S	PGR	3	178	Irritant to skin and eyes
Chlorpyrifos [ISO]	2921-88-2	2783	OP	S	I	3	135	DS 18; ICSC 851; JMPR 2000
Clomazone [ISO]	81777-89-1			L	H	4	1369	
Copper hydroxide [C]	20427-59-2		CU	S	F	4	1000	
Copper oxychloride [C]	1332-40-7		CU	S	F	4	1440	
Copper sulfate [C]	7758-98-7		CU	S	F	3	300	ICSC 751
4-CPA [ISO]	122-88-3		PAA	S	PGR	4	850	
Cuprous oxide [C]	1317-39-1		CU	S	F	4	470	ICSC 421, EHC 200
Cyanazine [ISO]	21725-46-2		T	S	H	3	288	ICSC 391
Cyanophos [ISO]	2636-26-2		OP	L	I	4	610	
Cyhalothrin [ISO]	68085-85-8	3352	PY	Oil	Ix	3	c144	See note 9, p. 8; EHC 99; HSG 38; ICSC 858; JMPR 1985c; JECFA 2000b
Cyhexatin [ISO]	13121-70-5		OT	S	AC	3	265	EHC 15; JMPR 1995b, 2006b
Cymoxanil [ISO]	57966-95-7			S	F	4	1196	

Common name	CAS no	UN no	Chem type	Phys state	Main use	GHS	LD ₅₀ mg/kg	Remarks
Cypermethrin [ISO]	52315-07-8	3352	PY	L	I	3	c250	See note 9, p. 8; DS 58; EHC 82; HSG 22; ICSC 246; JECFA 1996
Alpha-cypermethrin [ISO]	67375-30-8	3349	PY	S	I	3	c79	See note 9, p 8; EHC 142; JECFA 1996; JMPR 2008
Cyphenothrin [(1R)-isomers] [ISO]	39515-40-7	3352	PY	L	I	4	318	
Cyproconazole	94361-06-5			S	F	4	1020	
2,4-D [ISO]	94-75-7	3345	PAA	S	H	4	375	DS 37; EHC 29, 84; HSG 5; IARC 41, Suppl. 7; ICSC 33; JMPR
Dazomet [ISO]	533-74-4			S	F-S	4	640	Irritant to skin and eyes; ICSC 786
2,4-DB	94-82-6			S	H	4	700	
DDT [ISO]	50-29-3	2761	OC	S	I	3	113	See notes 3 and 4; DS 21; EHC 9, 83; IARC 53; ICSC 34; JMPR
Deltamethrin [ISO]	52918-63-5	3349	PY	S	I	3	c135	See note 9, p. 8; DS 50; EHC 97; HSG 30; IARC 53; ICSC 247; JMPR 2001
Diazinon [ISO]	333-41-5	3018	OP	L	I	4	300	DS 45, EHC 198; ICSC 137; JMPR 1994, 2002, 2008
Dicamba [ISO]	1918-00-9			S	H	4	1707	ICSC 139
Dichlorobenzene [C]	106-46-7			S	FM	4	500-5000	Mixture of isomers: ortho (3) 95-50-1, meta (3) 541-73-1, para (2B)
Dichlorophen [ISO]	97-23-4		OC	S	F	4	1250	
Dichlorprop [ISO]	7547-66-2			S	H	4	800	ICSC 38
Diclofop [ISO]	40483-25-2			S	H	4	565	
Dicofol [ISO]	115-32-2		OC	S	AC	4	c690	DS 81; IARC 30; ICSC 752; JMPR 1993
Difenoconazole [ISO]	119446-68-3			S	F	4	1453	JMPR 2009b
Difenzoquat [ISO]	43222-48-6	2588		S	H	4	470	
Dimepiperate [ISO]	61432-55-1		TC	S	H	4	946	
Dimethachlor [ISO]	50563-36-5			S	H	4	1600	
Dimethipin [ISO]	55290-64-7			S	H	4	1180	JMPR 2000, 2005

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Annexure 16: Guidelines

Health & Safety of Building & Construction Workers during COVID-19 Outbreak

Objective

To provide guidelines for the workers involved in building and construction work during the current epidemic of COVID-19.

Rationale

Construction processes are dynamic with significantly varying number of workers on a construction project site from day to day. The workers coming from diverse environments and working closely together increases the risk of exposure to COVID 19.

Building construction involves earth work, procurement of materials and supplies and their storage, construction work done by masons, blacksmiths, electricians, carpenters, plumbers, painters, supervisors, managers and security personnel. These guidelines provide the safety measure to be implemented at the construction site having a dusty environment, continuous flow of different materials and make-shift type of arrangements for storage, food and sanitation calls for implementation of safety precautions at the very basic level of personal hygiene only.

Advice for Site Managers:

Without prejudice to the following, all possible and prescribed actions shall be taken at the project site, as should facilitate the health of all life present at the site.

- Every construction project shall make proper arrangements for uninterrupted building services including but not restricted to, electricity, fuel, water supply, water disposal and sanitation, communication links, washrooms with hand hygiene and shower facility and with proper and adequate supply of soaps and disinfectants.
- Workers should not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site
- Ensure the availability of the thermal gun at the entry and exit of the construction site and no worker should be allowed without getting his/her temperature checked.
- Site manager must maintain a register of all contact details with NID number and addresses of all present at the site in case a follow up or tracing and tracking of contacts is required at a later stage.
- Develop the employee roster to decrease the number of people on the site very day. Split the shifts of the workers in morning and evening with limit of each shift to 8 working hours.
- Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.

- In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must be provided with a face mask. It must be ensured that everyone during his or her presence at the site continues to wear the mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.
- Non-essential work trainings must be postponed avoiding gathering of people.
- Ensure the physical distance by creating more than one route of entry and exit to the site.
- Instruct the workers to inform the construction manager (or authorities) if
 - They develop any symptoms of cough, flu or fever.
 - They have been exposed to someone suspected or confirmed with COVID 19.
 - They have met someone who has a travel history of COVID 19 endemic country
 - They have travelled in last couple of days or plan to travel soon
- All incidences of appearance of the symptoms of COVID-19 shall be immediately documented and maintained at the site and information regarding which shall be immediately communicated through e-mail or else, to the designated health facility, and the sick worker shall be transported to the health facility for further advice and action. The site manager must establish a link with a nearby healthcare facility with arrangements for quick transportation of workers in case of an emergency.
- Persuade the workers to inform the authorities for their safety and of other if they observe any signs and symptoms in a colleague
- Do not allow any worker at the construction site who has the symptoms
- Display the awareness banners about hand hygiene and physical distancing, where you can, around the work site.
- Everyone on the construction site must observe sneezing and coughing etiquettes.
- Workers shall be requested and required to wash their hands as frequently as practicable and shall also be advised not to touch their face with their hands during work.
- Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.
- Only sanitize-able dinning surfaces shall be used, which must be cleaned before each service. Food must be heated to a temperature to no less than 70⁰ C before consumption and shall preferably be served in disposable utensils. If reusable utensils are used, these must be washed with soap and water immediately after use and stored at a safe place.
- The lunch breaks and stretch breaks of the workers must be staggered to avoid the clustering of workers. Workers must not sit at less than 2 meters distance while having meals and while any other activity requiring interpersonal communications.
- In the wake of current restrictions on transportations site mangers will ensure safe transport arrangements for worker which should not be crowded and

should have social distancing in place during the entire process from pickups till drops at destination

- In case of workers sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms
- A supply of safe drinking water must be made available at the project site and maintained.

Advice for Construction Workers:

- All possible and prescribed measures shall be taken to ensure your and others health
- Enter your contact details in the register maintained at the site, in case a follow up or tracing and tracking of contacts is required at a later stage.
- Follow hygiene practices at washrooms and shower facility with proper and adequate use of soaps and disinfectants.
- Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours end.
- In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must use face mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands.
- Workers should wash their hands as frequently as practicable and shall not to touch their face with their hands during work.
- Everyone on the construction site must observe sneezing and coughing etiquettes.
- Workers must maintain no less than two arm lengths between them before, during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labelled and stored without intermix.
- Sick worker should immediately inform the site manager and must get medical advice from nearby health centre.
- Only sanitize able dinning surfaces shall be used. Food must be heated to a temperature to no less than 70o C before consumption and shall preferably be in disposable utensils. If reusable utensils are used, these must be washed with soap and water immediately after use and stored at a safe place.
- Do not sit at less than 2 meters distance while having meals and while any other activity requiring interpersonal communications.
- Do not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site.
- Use safe transport arrangements which should not be crowded and should have social distancing in place during the entire process from pickups till drops at destination.
- In case sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms.

Deliveries or Other Contractors Visiting the Site

- Non-essential visits to the construction sites should be cancelled or postponed.

- Delivery workers or other contractors who need to visit the construction site must go through temperature check before entering and should be given clear instructions for precautions to be taken while on site.
- Designate the workers, with protective gears or at least gloved and mask, to attend to the deliveries and contractors.
- Make alcohol-based hand sanitizer (at least 70%) available for the workers handling deliveries.
- Instruct the visiting truck drivers to remain in their vehicles and whenever possible make use of contactless methods, such as mobile phones, to communicate with your workers.

Note: The above recommendations are being regularly reviewed by the Ministry of National Health Services, Regulations & Coordination and will be updated based on the international & national recommendations and best practices.

The Ministry acknowledges the contribution of Irfan Mirza, Syeda Shehirbano Akhtar and HSA/ HPSIU/ NIH team to compile these guidelines.

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<http://covid.gov.pk/>

<http://nhsrsrc.gov.pk/>

<http://www.hsa.edu.pk/>

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