Environmental Impact Assessment

July 2017

PAK: Jalalpur Irrigation Project

Project No. 46528-002

Part 2 of 9 of the Main Report

Prepared by Irrigation Department, Government of Punjab for the Asian Development Bank (ADB).

Irrigation Department
Government of Punjab

DETAILED DESIGN OF JALALPUR IRRIGATION PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

MAY 2017

CHAPTER-3

ENVIRONMENT LEGISLATIVE REQUIREMENTS AND FRAMEWORK

3.1 General

77. This chapter provides an overview of the policy framework and legislation that applies to control the environmental consequences as a result of project implementation and operation. The project needs to comply with all the applicable environmental policies, laws, guidelines, acts and legislations of Government of Pakistan. JIP is being funded by the ADB, so ADB policies and guidelines related to the project has also been discussed.

3.2 Summary of Relevant Strategies, Policies, Acts and Legislation

78. The summary of major relevant strategies, policies, acts and legislation from environmental perspective are briefly described in Tables 3.1 & 3.2 below:

Table 3.1: Main Strategies/Policies related to Environment and their Relevance to the project

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
1.	**National Conservation Strategy, 1992**	Pakistan National Conservation Strategy (NCS), which was approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the Country. The NCS outlines the Country's primary approach towards encouraging sustainable development, conserving natural resources and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.	The core areas that are relevant in the context of the proposed project are pollution prevention during construction, increasing irrigation water availability, conserving biodiversity and supporting forestry and plantation.
2.	**National Environmental Policy, 2005**	In March 2005, Government of Pakistan (GoP) launched its National Environmental Policy, which provides a framework for addressing the environmental issues. Section 5 of the policy commits for integration of environment into development planning as instrument for achieving the objectives of National Environmental Policy. It also provides broad guidelines to the Federal Government, Provincial Governments, Federally Administered Territories and Local Governments to address their environmental concerns and to ensure effective management of their environmental resources.	Clause (b) of sub-section 5.1 states that EIA related provisions in Environmental Protection Act, 1997, will be diligently enforced for all developmental projects.
3	**National Biodiversity Strategy and Action Plan (Draft), 2015**	Pakistan ratified Convention on Biological Diversity (CBD) in 1994. The Convention requires countries to prepare a national biodiversity strategy and action plan. The draft plan has been widely circulated in March 2015. It focuses on causes and consequences of biodiversity loss such as deforestation, grazing, fishing, pollution etc. It also provides legal and institutional framework. The strategies have been drafted for biodiversity awareness, terrestrial	The strategies and plan would be applicable for JIP to conserve biodiversity in project AOI.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
		ecosystem, forest ecosystem, wetlands, coastal and marine ecosystem,and agro-biodiversity.	
4.	**Pakistan Labour Policy, 2010**	The main objective of the Labour Policy, 2010 is the social and economic well-being of the labour of Pakistan. The Labour Policy, 2010 has following 4 parts: i. Legal Framework; ii. Advocacy: rights of workers and employers; iii. Skill development and employment; and iv. Manpower export.	The labour will be employed for construction of the main canal and its distributaries. The provision of policy will apply to all the labour employed.
5.	**Water Policy, Punjab**	The Policy briefly states that decayed irrigation infrastructure is the main cause of farmers' plight. Punjab Government needs to carry out the institutional reforms in the right direction and bring clarity in objectives they want to achieve. Also, the Government needs to uphold the rule of law in water distribution. There's a vast gap to be filled between official and actual share-lists of water distribution. Increased participation of farmers in the decision making and management of Punjab's canal irrigation system is also advocated by the policy brief.	The proposed development is the irrigation project located in Punjab, which includes the distribution network and also involves farmer's organization for the smooth operation and water distribution of the proposed project.
6.	**ADB's Safeguard Policy Statement, 2009**	ADB affirms that environmental and social sustainability is a cornerstone of economic growth and poverty reduction in Asia and the Pacific region. ADB's Strategy 2020 therefore emphasizes assisting developing member countries to pursue environmentally sustainable and inclusive economic growth. In this context, the goal of the SPS is to promote the sustainability of project outcomes by protecting the environment and people from projects' potential adverse impacts.	Proposed project is being funded by ADB, which mandates the compliance of ADB's SPS 2009 for the EIA. Compliance with ADB's SPS 2009 has been ensured during preparation of updated EIA.
7.	**Water Apportionment Accord (1991)**	In 1991, the Water Apportionment Accord was signed between the representatives of all the four provinces of Pakistan to allocate supplies to the existing projects and future developments of the Indus River System. The need for storage wherever feasible on the Indus and other rivers was also recognized for planning future agricultural developments. The Water Apportionment Accord also included the following provision for Indus Delta: "The need for certain minimum water escape to the sea below Kotri Barrage to check sea intrusion was recognized. An optimum level of 10 Million Acre Feet (MAF) was discussed. It was decided that further studies would be undertaken to establish the minimal escapage needs downstream of Kotri Barrage."	JIP is being designed in accordance with Water apportionment accord by IRSA.

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to project
		Indus River System Authority (IRSA) was established to implement the Water Apportionment Accord with representation from all four provinces and the Federal Government. The system-wise allocations would also be worked out on a 10-day basis with actual average system uses for the post-Tarbela period 1977-82 providing guidelines for developing future regulation pattern.	
8.	**ADB's Public Communication Policy 2011**	The policy aims to enhance stakeholders' trust in and ability to engage with ADB, and thereby increase the development impact of ADB operations. The policy promotes transparency, accountability, and participatory development. It establishes the disclosure requirements for documents ADB produces or requires to be produced.	JIP involves multi stakeholders and it would be necessary to engage all the stakeholders in the whole process. The prepared safeguards instruments will be disclosed in accordance with the requirements of the policy.
9.	**ADB's Accountability Mechanism Policy 2012**	The objectives of the Accountability Mechanism are providing an independent and effective forum for people adversely affected by ADB-assisted projects to voice their concerns and seek solutions to their problems, and to request compliance review of the alleged noncompliance by ADB with its operational policies and procedures that may have caused, or is likely to cause, them direct and material harm. The Accountability Mechanism is a "last resort" mechanism.	In case PAPs' grievances/complaints are unaddressed by multi-tiered Grievance Redressal Committee, ADB provides an independent forum to all the affected personnels to register their complaints directly. However, ADB may refer back the case to multi-tiered GRC for consideration if any complainant approaches ADB without utilizing the project based GRM first

Table 3.2: Main Legislation/Acts related to Environment and their Relevance to the project

Sr. No.	Act	Brief Coverage	Relevance to project
1.	**Punjab Environmental Protection Act, 1997 (Amended, 2012)**	The Punjab Environmental Protection Act, 1997 (Amended, 2012) is comprehensive legislation and provides the legislative framework for protection, conservation, rehabilitation and improvement of the environment. The 'environment' has been defined in the Act as: (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 interrelationships between any of the factors specified in sub-clauses 'a' to 'f'. The notable points of the law are: • No proponent of a project shall commence construction or operation unless he has filed an EIA with the	The provision of the act is applicable to irrigation project for conducting an IEE/EIA according to section 12 and to obtain environmental approval from the EPD/EPA. The section 11 of the act is applicable in term of compliance with Punjab Environmental Quality Standards (PEQs). Similarly section 13 of the act prohibits the import of hazardous waste. The provisions of section 16 are also applicable to comply with the discharge or emission of any effluent, waste, air pollutant or noise or disposal of waste or handling of hazardous substance. Under

		Provincial Agency designated by the Provincial EPAs an EIA, and has obtained an approval; • Establishment and formation of the Punjab Environmental Protection Council; • Prohibition of certain discharges or emissions; • Punjab Environmental Quality Standards (PEQS) for wastewater, air emissions and noise; and • Provincial Government can issue notices and enforce them to protect the environment. In the recent amendment of 2012, legislatives powers related to environment and ecology are given to provincial governments from the Federal government. The provinces are required to enact their own legislation for environmental protection. Other amendments include increasing the penalties for violations. For the Jalalpur Irrigation project Environmental Protection Department (EPD)/Environmental Protection Agency (EPA), Government of Punjab (GoPb) is the concerned authority. The capability of regulatory institutions for environmental management is ultimately responsible for the success of environmental assessments and that development projects are environmentally sound and sustainable.	section 17, penalties will apply if anyone fails to comply with the provisions of section 11, 12, 13 and 16.
2.	**Pakistan Environmental Protection Agency, Review of IEE and EIA Regulations, 2000**	These regulations sets out: • Key policy and procedural requirements for filing an EIA; • The purpose of environmental assessment; • The goals of sustainable development; • The requirement that environmental assessment be integrated with feasibility studies; • The jurisdiction of the Federal and Provincial EPA's and Planning & Development (P&D) Departments; • The responsibilities of proponents; • Duties of responsible authorities; • Provides schedules of proposals that the project requires either IEE or an EIA; • The environmental screening process of the projects under schedule I, II and III; and • The procedure for the environmental approval for filing the case with the concerned EPA/EPD for the granting of the NOC.	The provisions of these regulations are applicable for environmental screening of the project which implies that an EIA is required for JIP. The process described in the regulation will be useful for the Client to follow the procedure to file an EIA with EPA, Punjab and to understand its review process along with timelines to be followed.

3.	**Punjab Environmental Quality Standards (PEQS), 2016**	PEQS promulgated recently in 2016. Previously, National Environmental Quality Standards (NEQS) were used for compliance, which were promulgated in 1993 and amended in 1995 and 2000. Specified standards under PEQS are for: • Drinking Water; • Ambient Air; • Noise; • Industrial Gaseous Emissions; • Municipal and Liquid Industrial Effluents; • Motor vehicle exhaust and noise; and • Treatment of Liquid and Bio-Medical Waste.	All projects to be commenced in Punjab must conform to PEQS during all the phases i.e. construction and operation.
4.	**Punjab Wildlife Act, 1974**	The Punjab Wildlife Act (1974) is developed for the regulation of activities relating to protection, conservation and management of wildlife in Punjab.	The Rasul Barrage Game Reserve, which is in the vicinity of the project, has a variety of migratory birds, therefore, the provisions of this law are applicable.
5.	**Punjab Plantation and Maintenance of Trees Act, 1974**	The Punjab Plantation and Maintenance of Trees Act, (1974) regulates tree plantations and enforces measures for their protection.	The requirements of this act are applicable in terms of planting new trees and their maintenance by the occupier of the existing land who would have the physical possession. i.e. Proponent of project.
6.	**Pakistan Antiquities Act 1975 & Punjab Antiquities Amendment Act 2012**	The Punjab Antiquities Amendment Act, 2012 is adopted from the Pakistan Antiquities Act of 1975 with a few minor changes. The Antiquities Act, 1975 (amended in 1990) states the following: • "Ancient" is any object that is at least 75 years old. • All accidental discoveries of artefacts must be reported to the Federal Department of Archaeology; • The Government is the owner of all buried antiquities discovered on any site, whether protected or otherwise; • All new construction within a distance of 200 feet from protected antiquities is forbidden; • No changes or repairs can be made to a protected monument, even if it is owned privately, without approval of the responsible authorities; and • The cultural heritage laws of Pakistan are uniformly applicable to all categories of sites regardless of their state of preservation and classification as monuments of national or world heritage.	The law will be applicable to the project mainly due to its two provisions: ▪ According to the law, any construction activity within 61 m or 200 ft. of protected antiquities, are prohibited. ▪ The provisions of this act would also be applicable, if any accidental archaeological discoveries may occur during the excavation works for the construction of proposed canal.
7.	**The Punjab Special Premises (Preservation), Ordinance, 1985**	The Punjab Special Premises (Preservation), Ordinance (1985) provides the legal framework for preservation of premises of historical, cultural, archaeological, and architectural value in the Punjab province. This legislation empowers the provincial government to	The provision of the ordinance is applicable for protection and conservation of special premises declared by Department of Youth Affairs, Sports, Archeology & Tourism, Punjab. The ordinance is

		notify heritage sites and sites of cultural and archaeological importance and to prohibit implementation of developmental schemes or new constructions within the notified areas around the special premises. So far 246 sites stand notified under the Punjab Ordinance.	applicable in terms of land acquisition, entrance, exploitation and destruction of special premises near sites.
8.	**Pakistan Penal Code, 1860**	The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents.	The provisions of the Penal Code, 1860 are applicable to the project in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions and effluent disposal.
9.	**Canal and Drainage Act amended 2016**	The canal and Drainage Act amended 2016, prohibits fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage.	The provisions of the act are mainly applicable due to the construction of the main canal and operation of the distributaries of the project.
10.	**The Protection against Harassment of Women at the Workplace Act, 2010**	The Protection Against Harassment of Women at the Workplace Act (2010) refers to sexual harassment at the workplace.	This Act will be applicable to the project if women are employed for the construction of the proposed project.
11.	**Employment of Children Act, 1991**	Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any construction, or any other hazardous employment. In accordance with this Article, the Employment of Child Act 1991 prohibits child labour (a child is under 14 years old). Presently GoPb has drafted a new Act "Punjab Restriction of Employment of Children Act 2015" dealing with child labour in the commercial and industrial sectors of Punjab. The Act is expected to be promulgated by the Punjab Assembly shortly.	The relevance of this act to the project will be to prohibit child employment for construction of the proposed project.
12.	**Labour Laws, Government of Pakistan**	The Constitution of Pakistan contains a range of provisions with regards to labour rights, in particular: • Article 11 of the Constitution prohibits all forms of slavery, forced labour and child labour; • Article 17 provides a fundamental right to exercise the freedom of association and the right to form unions; • Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone; and • Article 37(e) makes provision for securing just and human conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment. Labour law is controlled at both provincial	The labour laws will be relevant as it would deal with employment of labour for the construction of the main canal and associated components. Following are the major labour laws which are applicable to the project: • Bonded Labour System (Abolition) Act, 1992 • Employment of Child Act, 1991 • Minimum Wages Ordinance, 1961 • Industrial Relations Act, 2010 • West Pakistan Minimum Wages for Unskilled Workers' Ordinance, 1969

		and national levels with compulsory employment agreements containing the terms set out by the labour laws. The labour laws are a comprehensive set of laws in Pakistan dealing with the following aspects: • Contract of Employment; • Termination of Contract; • Working Time and Rest Time; • Working hours; • Paid Leave; • Maternity Leave and Maternity Protection; • Other Leave Entitlements; • Minimum Age and Protection of Young Workers; • Equality • Pay Issues; • Workers' Representation in the Enterprise; • Trade Union and Employers Association Regulation; and • Other Laws.	
13.	**Guidelines for Public Consultation, 1997**	The guidelines for public consultation are issued by the Pak-EPA and are presented in "Pakistan Environmental Protection Ordinance 1997 and policy and procedure for filling, review and approval of environmental assessment"	The guidelines apply for stakeholder consultations that were conducted during detailed design for updating EIA.
14.	**Guidelines for the Preparation and Review of Environmental Reports, 1997**	These guidelines describe the format and content of IEE/EIA reports to be submitted to Provincial EPA/EPD for obtaining NOC. The guidelines present: • The environmental assessment report format; • Assessing impacts; • Mitigation and impact management and preparing an environmental management plan; • Reporting; • Review and decision making; • Monitoring and auditing; and • Project Management.	The guidelines are applicable for development/updating the EIA.
15.	**Guideline for Solid Waste Management, 2005 (Draft)**	Guidelines for Solid Waste Management (2005) are in draft form (Pak-EPA in cooperation with Japan International Corporate Agency and United Nations Development Programme).	The provision of these guidelines is applicable for waste generation during construction works of the JIP.
16.	**Forest Act, 1927**	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,	This Act will be relevant in case any part of the proposed intervention is located on a land previously prescribed as Forest Land by the Government of Punjab. In such cases, land acquisition will be governed under this Act, and the provincial department responsible for execution of JIP project, will need to negotiate with the

		a Protected Forest or a Village Forest. The said act has since been amended and replaced by the provincial Forest (Amendment) Act 2010, after forestry became into the provincial domain under the 18th amendment to the Constitution of Pakistan. However, the main applicable clauses still hold true in essence.	provincial Forest Department.
17.	**Land Acquisition Act 1894**	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.	Though this law is relevant to the project, its covenants have been covered mainly in the LARP report, which is a companion document of this EIA report.

3.3. Compliance Procedure for Obtaining NOC from EPA

79. The IEE-EIA Regulations 2000, prepared by the Pakistan EPA under the powers conferred upon it by the PEPA, 1997 provide the necessary details on the preparation, submission, and review of the IEE and the EIA. Categorization of projects for IEE and EIA is one of the main components of the IEE-EIA Regulations 2000. Projects have been classified on the basis of expected degree of adverse environmental impact. Project types listed in Schedule-II of the regulations are designated as potentially seriously damaging to the environment and require EIA, and those listed in Schedule-I that has potentially less adverse effects and require an IEE.

80. The following sections of the IEE-EIA Regulations 2000 have bearing on the proposed project's EIA:

Rule 6: (1) The Federal Agency may issue guidelines for preparation of a IEE or EIA including guidelines of general applicability and sectoral guidelines indicating specific assessment requirements for planning, construction and operation of projects relating to a particular sector. (2) Where guidelines have been issued under sub-regulation (1) a IEE or EIA shall be prepared, to the extent practicable, in accordance therewith and the proponent shall justify in the IEE or, as the case may be, EIA and departure there from. The relevant impact assessment tools are the Guidelines for the Preparation and Review of Environmental Reports and the Guidelines for Public Consultation. No sectoral guidelines for irrigation are issued.

Rule 8: (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 set out in Schedule IV; and (b) copy of receipt showing payment of the review fee.

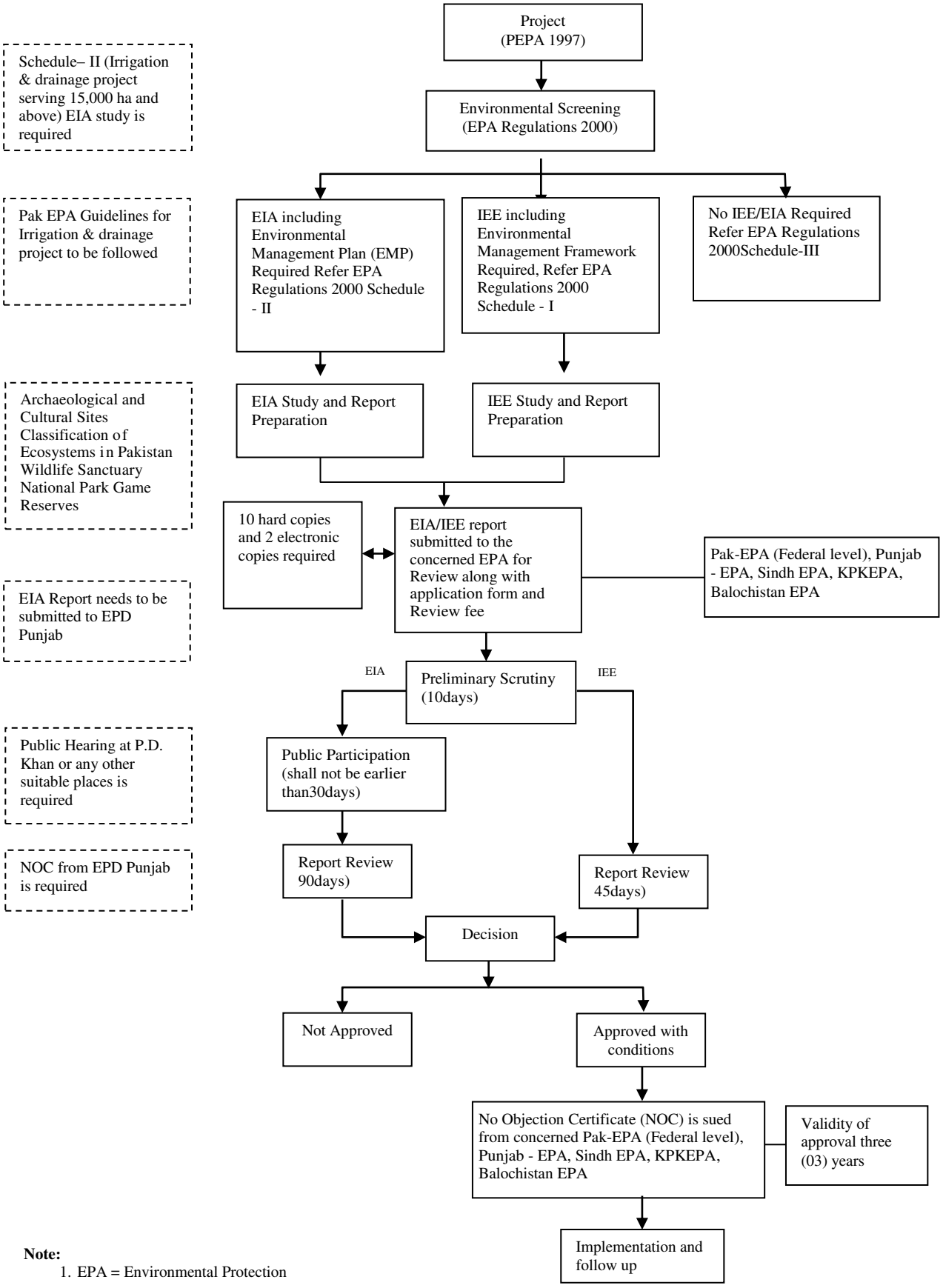
81. The prescribed procedure for review of EIA by the EPA is described in sections 9–14 of IEE and EIA regulations and is depicted in **Figure 3.1**.

82. The key features are:

- On acceptance of the EIA for review, EPA will place a public notice in national English and Urdu newspapers and in local language newspaper informing the public about the project and where it's EIA can be accessed. It will also set a date for public hearing which shall be at least 30 days after the publication of the notice.
- If it considers necessary, the EPA can form a committee of experts to assist the EPA in the review of the EIA. The EPA may also decide to inspect the project site.

83. Article 12(4) of PEPA 1997 binds the EPA to communicate its approval or otherwise within a period of four months from the date the IEE or EIA is filed complete in all respects in accordance with the prescribed procedure, failing which the IEE or, as the case may be, the EIA 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. "Rule 11 of the IEE-EIA

Regulations 2000, states that the EPA shall make every effort to carry out its review of the EIA within ninety days, of issue of confirmation of completeness".



Note:

1. EPA = Environmental Protection

Figure 3.1: Procedure for Submitting the EIA Report

3.4. Asian Development Bank Requirements

84. JIP is funded by ADB, hence ADB's requirement would be complied in all aspects.

3.4.1. ADB's Requirements for Preparation of Environmental Assessments of Projects

85. The EIA in hand is fully committed to the requirements determined in the "ADB Safeguard Policy Statement". The environmental works carried out by the Consultant on behalf of project proponents have been essentially guided by these rules as enunciated in the "Outline of an Environmental Impact Assessment Report".

86. A project is classified as Category A if it is likely to have adverse environmental impacts that are irreversible, adverse or unprecedented. In the light of significance devoted by ADB to various environmental impacts, JIP is to be assigned Category A, wherein an EIA is required.

87. Main reasons to assign category A is that JIP expands over larger area having total length of main canal and distributaries of 300 km, which entails significant civil works to be carried out. The project may cause adverse impacts on local communities, drainage patterns, soil stability etc. Furthermore, the area is currently under rain-fed irrigation, and the proposed project could significantly alter the life of local population. Finally, land acquisition and some localized resettlement might be required.

88. During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent.

89. Thus, a full EIA of the project has been conducted, through the following documents:-

- Updated EIA report including an updated EMP (this document);
- Land Acquisition &Resettlement Plan (LARP) for involuntarily relocation of the impacted villages and communities (companion document); and
- Initial Poverty & Social Assessment (IPSA) (companion document at the PPTA stage).

3.4.2. ADB's Safeguards Policy Statement 2009

90. ADB affirms that environmental and social sustainability is a cornerstone of economic growth and poverty reduction in Asia and the Pacific region. ADB's Strategy 2020 therefore emphasizes assisting Developing Member Countries (DMCs) to pursue environmentally sustainable and inclusive economic growth.

91. The objectives of ADB's safeguards are to:

- avoid adverse impacts of projects on the environment and affected people, where possible;
- minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
- help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

92. ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:

- environmental safeguards;
- involuntary resettlement safeguards; and
- Indigenous Peoples safeguards.

93. To achieve the policy objectives and deliver the policy principles, ADB carries out the actions described in the subsection i.e. "B. Policy Delivery Process". To help borrowers/clients and their projects achieve the desired outcomes, ADB adopts a set of specific safeguard requirements that borrowers/clients are required to meet in addressing environmental and social impacts and risks. ADB staff, through their due diligence, will review, supervise and ensure that borrowers/clients comply with these requirements during project preparation and implementation. These safeguard requirements are as follows:

- Safeguard Requirements 1: Environment (*Appendix 2 of SPS, 2009*);
- Safeguard Requirements 2: Involuntary Resettlement (*Appendix 3 of SPS, 2009*);
- Safeguard Requirements 3: Indigenous Peoples (*Appendix 4 of SPS, 2009*); and
- Safeguard Requirements 4: Special Requirements for Different Finance Modalities (*Appendix 5 of SPS, 2009*).

The JIP will need to comply with all the ADB's Safeguard Policies in all aspects and activities i.e. for the subproject as well, 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 3.3.**

Table 3.3: ADB Safeguard Policies 2009 Relevant to project

Sr. No.	Safeguard Policies	Key Requirements	Remarks
1.	**Environment**	projects and subprojects need EIA 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, involuntary resettlement is envisaged for the proposed project and LARP is under preparation.
3.	**Indigenous Peoples**	Measures to avoid potentially adverse effects on the Indigenous People's 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 inter generationally inclusive.	As per the ADB definition, 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.

3.5. International Protocol/Conventions

94. As Pakistan is a member of a number of international organizations such as United Nations Organization (UNO), Organization of the Islamic Conference (OIC), South Asian Association for Regional Cooperation (SAARC), Economic Cooperation Organization (ECO) etc., so it has to follow the international protocols and obligations related to the environment. The major protocols, ratification dates by Pakistan and obligations related to the proposed project are given in below table:

Table 3.4: International Agreements/Conventions Relevant to the Project

Sr. No	Agreement/Convention	Ratification	Description/Relevance
1.	**Convention on Biological Diversity, 1994** Web Link: https://www.cbd.int/	Pakistan signed this treaty in 1992 and it was ratified by cabinet in 1994.	The Convention on the Biological Diversity (CBD) has three main goals: Conservation of biological diversity (or biodiversity); sustainable use of its components; and fair and equitable sharing of benefits arising from genetic resources. The law is relevant as JIP is proposed intervention on natural resource management and it surrounds natural habitats/game reserves (i.e. 1.3 km away from project AOI)
2.	**The Rio Declaration, 1992** Web Link: http://www.unep.org/documents. multilingual /default.asp? documented =78 & articled = 1163	Pakistan signed the treaty on 13 Jun 1992 and ratified on 1 June 1994	The Rio Declaration comprises 27 principles which address important issues such as; sustainable development to integrate environmental protection into the development process; common but differentiated responsibilities to conserve, protect and restore the earth's ecosystems; public participation and information access at the national level, reduce and eliminate unsustainable patterns of production and consumption. The law is relevant as JIP has been proposed with a focus on protection of natural environment.
3.	**Kyoto Protocol, 1992** Web Link: http://unfccc.int/kyoto_protocol/items/ 2830.php	Pakistan has ratified Kyoto Protocol in 2005	The Kyoto Protocol is a protocol to reduce Greenhouse gasses that cause climate change. It was agreed on 11th December, 1997 at the 3rd Conference of the countries to the treaty when they met in Kyoto, and entered into force on 16th February, 2005. As of November 2007, 175 countries have ratified the protocol. One hundred and thirty seven (137) developing countries have ratified the protocol, including Brazil, China, India and Pakistan but have no obligation beyond monitoring and reporting emissions.

Sr. No	Agreement/Convention	Ratification	Description/Relevance
			JIP has been proposed with an objective to fulfill the protocol by putting no change to climate.
4.	**Stockholm Convention on Persistent Organic Pollutants (POPs), 2004** Web Link: http://chm.pops.int/TheConvention/Overview/tabid/3351/	The Stockholm Convention on Persistent Organic Pollutants was signed on 22 May 2001 and entered in to force on 17 May, 2004. Pakistan signed the convention on December 6, 2001	Convention seeks to protect human health and the environment from POPs as set out in Article 1, which are chemicals that remain intact in the environment for long periods, become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife. The law would be relevant at later stages of JIP due to increase in agricultural activities and use of pesticides.
5.	**UN Convention to Combat Desertification (UNCCD), 1994** Web Link: http://www.unccd.int/en/Pages/ default.aspx	Pakistan signed the Convention on 15th October 1994 and ratified it on 24 February, 1997	The UNCCD is a Convention to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements. With implementation of JIP, major portion of barren land would come under cultivation.
6.	**Convention on the International Trade of Endangered Species (CITES), 1975** Web Link: https://www.cites.org/	Pakistan signed the Convention in 1973 and ratified it in April 1976.	The convention entered in to force on 1 July 1975. The principal obligations of contracting parties to the CITES are to safeguard the trade in rare or endangered species and it established a permit system to control imports and exports of wild fauna and flora. According to this convention species threatened with extinction whose movement between countries is prohibited except for conservation purposes such as captive breeding, species whose commercial trade is permitted but export permits are needed. Jhelum river provides natural route and habitat for migratory species. During implementation of JIP, construction camps would be established nearby the game reserve/protected areas.
7.	**UNESCO Convention on the Protection of the World's Cultural and Natural Heritage, 1972** Web Link: http://whc.unesco.org/en/ convention text/	Pakistan ratified this convention on 23 July 1976.	Convention concerning the Protection of the World Cultural and Natural Heritage - requires parties to adopt a general policy on the protection of the natural and cultural heritage, to set up services for such protection, to develop scientific and technical studies, to take appropriate legal, technical, scientific and administrative measures and to

Sr. No	Agreement/Convention	Ratification	Description/Relevance
			foster training and education for such protection. JIP design and EIA team paid due attention to archaeological sites and local norms. Both of these factors will also be considered During implementation of JIP.

3.6. Comparison of International and Local Environmental Legislations

95. 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.

96. 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 3.5** 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.

97. Similar to the standards for air quality, the comparison of noise standards provided in **Table 3.6** 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.

98. 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.

Table 3.5: 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	8 hrs	100 µg/m^3	1 hr	130 µg/m^3

		(148 40 µg/m³)				
PM_{10}	24 hrs	150 µg/m³	1 yr 24 hr	70 µg/m³ (IT-1*) 150 µg/m³ (IT-1*)	Annual Mean 24 hrs	120 µg/m³ 150 µg/m³
PM_{25}	Annual Mean 24 hrs	15 µg/m³ 35 µg/m³	1 yr 24 hr	35 µg/m³ 75 µg/m³	Annual Average (IT-1*) 24 hrs (IT-1*) 1 hr	15 µg/m³ 35 µg/m³ 15 µg/m³

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

99. The standards highlighted in green for each respective pollutant are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project.

Table 3.6: 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

4. DESCRIPTION OF PROJECT

4.1. Introduction

101. This Chapter provides the details of JIP covering location and footprints, salient features and land requirements, project components, water allocation for the project, construction and operation stage interventions, project implementation schedule and cost.

102. JIP funded by ADB, aimed to improve the agricultural productivity of rain fed agriculture by supplying irrigation water during Kharif season through a canal system off-taking from Rasul Barrage.

103. The proposed JIP is located along right bank of River Jhelum with main canal off taking from Rasul Barrage in Punjab, Pakistan.

104. The project aims to bring about 170,000 acres (68,797 ha) of rain fed land under irrigated agriculture. The project comprises of a new non-perennial irrigation system off-taking from the right bank of the Rasul Barrage and will irrigate areas of Tehsil Pind Dadan Khan of District Jhelum and Tehsil Khushab of District Khushab. The proposed system will supply irrigation water for the period from April to September during the flood season.

4.2. Objective of the Project

105. The main objective of JIP is supply of irrigation water to the project area. Most of the area is underlain by unusable to marginally usable groundwater. However, in areas close to river bank, sweet groundwater is available and tube wells are being currently used for irrigation. The irrigation system will not only provide irrigation supplies, but will also become a source for recharging groundwater and drinking water where subsurface water is presently brackish and people have to walk kilometers, as routine, to fetch drinking water. It will also help in leaching surface salinity from the soils and therefore saline areas will be recovered. The provision of drainage system to dispose of saline water of hill torrents will also dispel the chance of water-logging and associated salinity. Therefore, the construction of the canal would help to reduce the poverty of area by increasing the per capita income of the community in the area and there will be consequential increase of Gross Domestic Product (GDP) of Pakistan. The project also aims to strengthen community participation, Private Agriculture Support Services and establishment of Khal Panchayats (KPs).

4.3. Project Location and Footprint

106. The proposed JIP is located between longitude from 72º-20’ to 73º-31’ (east) and latitude from 32º-25' to 32º-43’ (north) along right bank of River Jhelum from Rasul Barrage in Punjab, Pakistan. The area falls in tehsil Pind Dadan Khan and district Khushab.

4.3.1. Access to Site

107. The project area is accessible through a six lane motorway (M-2) and a National Highway and at a two hour drive from the Capital Islamabad and three hour drive from the provincial capital, Lahore. Alternatively, the area may be reached via GT road from Jhelum to Rasul Barrage. The project area is bounded by the salt range hills in the northwest and the River Jhelum in the Southwest. **Figure 4.1** shows the project location.

4.3.2. Footprint

108. The Jalalpur canal traverses a plain comprising flat and mountainous terrain. The layout plan of the project is shown in **Figure 4.2** below:

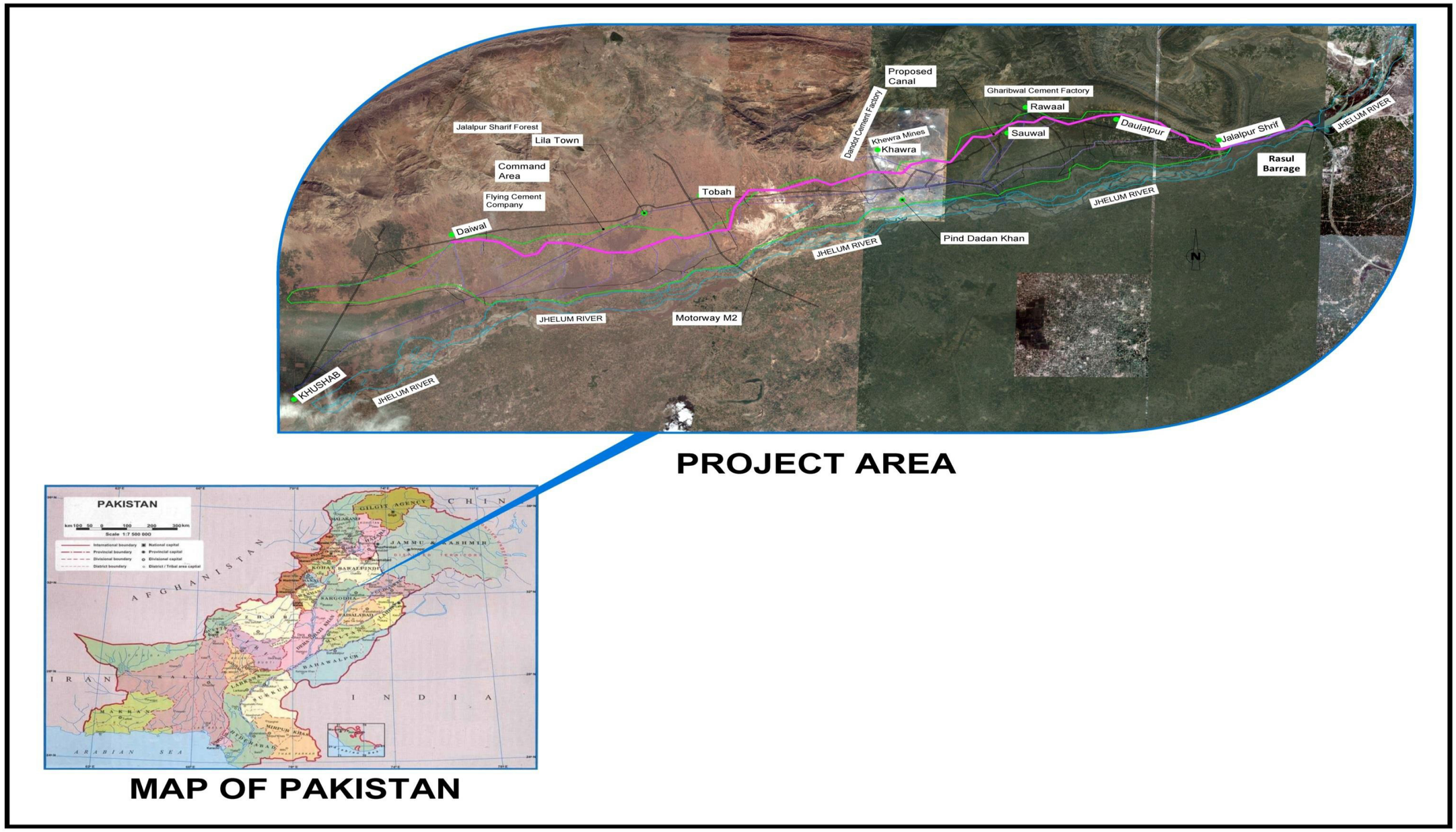


Figure 4.1: Location of Proposed Project

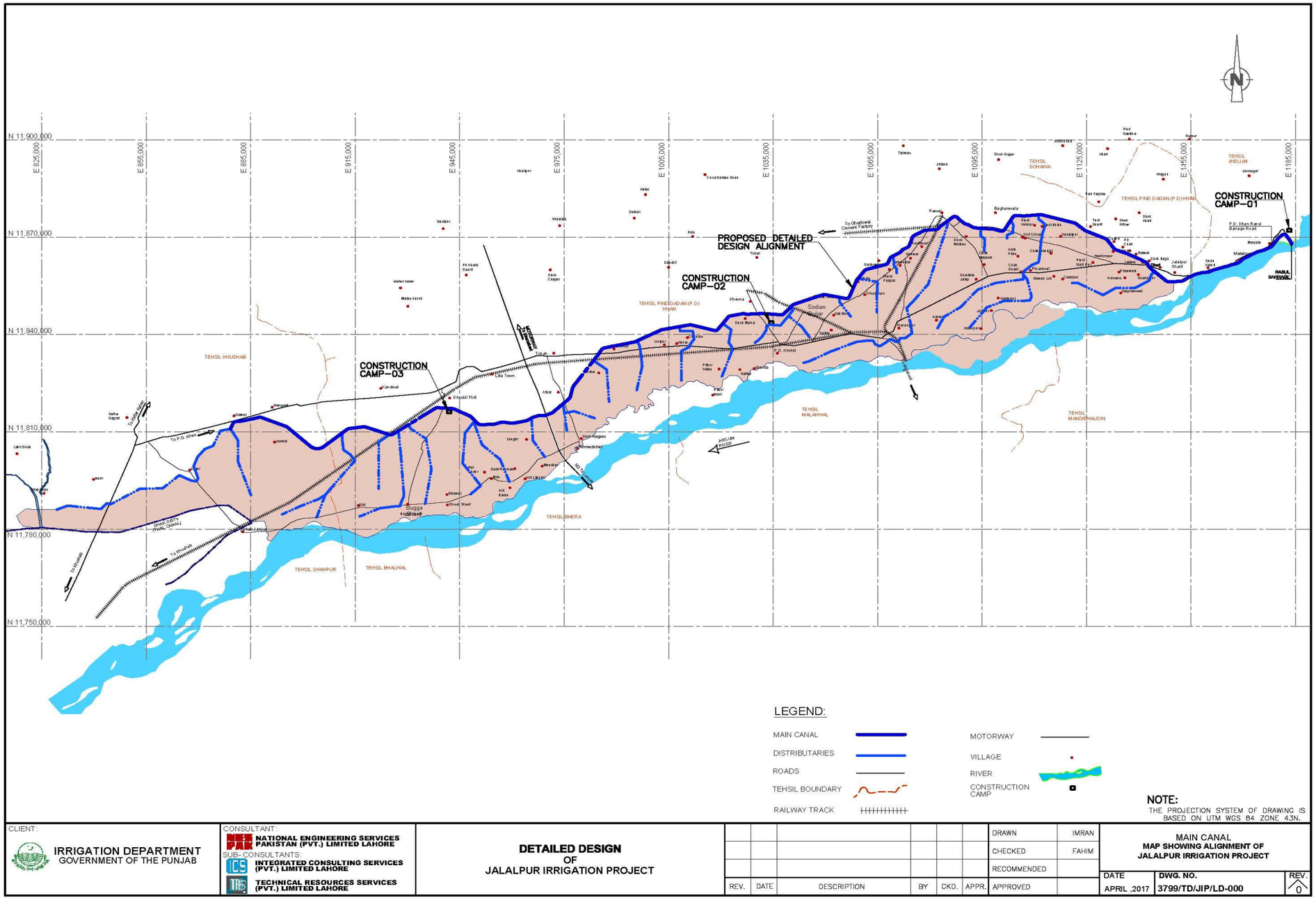


Figure 4.2: Layout Plan of Proposed Project

4.4. Components of the Project[1]

109. The main canal of about 110 km, off-taking from the right flank of the Rasul Barrage, would traverse along the right bank of Jhelum River to irrigate a command area of about 170,000 acre (68,797 ha) on its left side. The command area of JIP is in the form of long strip of land bounded by the salt range hills on northern side and right bank of the Jhelum River on southern side. The distribution system about 176 km comprising of distributaries and minors extends up to the right bank of Jhelum River. There are 66 hill torrents of varying catchment size, which flow across the project area and ultimately fall in Jhelum River. A total of 787 numbers of structures will be constructed along the irrigation system. These include; main canal head regulator at Rasul Barrage, distributary head regulators and main canal cross-regulators, cross-drainage structures for hill-torrents, road bridges at each road crossing across main canal, railway bridges at railway crossings, Foot bridges at each pedestrian crossing, Road Culverts at each road crossing of distributaries, canal Escape at main canal and canal Falls. Summary of proposed structures is shown in **Table 4.1**.

Table 4.1: Summary of Proposed Structure

Sr.	Description	Main Canal	Disty. and Minors	Total
1.	Intake Structure at Rasul Barrage	1	-	1
2.	Disty & Minor Head Regulators	18	3	21
3.	Cross Regulators & Falls	7	103	110
4.	Escape Structure	1	-	1
5.	Railway Bridges	4	1	5
6.	Road Bridges/Culverts	44	81	125
7.	Cross Drainage Structures	59	29	88
8.	Outlets	48	334	382
9.	Footbridges for pedestrians	13	17	30
10.	Tail clusters	0	24	24
	Total	**195**	**592**	**787**

4.4.1. Main Canal and Distribution System

110. The water requirement at watercourse heads depends upon the consumptive use and intensity of crops grown, pre-planting requirements, effective precipitation, depletion of soil moisture, conveyance efficiency of water courses and field application losses. The design discharge calculated for canal is 1,350 cusecs (38.15 m^3/s).

111. The main canal will draw irrigation supplies through a gated intake structure at Rasul Barrage and is proposed to be a contour channel, running at higher contour and irrigating areas only on its left side. The distributaries will then draw irrigation supplies from main canal and are aligned from north towards the river in the south along the relatively steep natural slopes, across the contours and shall pose no problem to the command area. The water to fields will be diverted through a number of outlets from the distributaries and minors. The drainage lines are located on lowest contours between two distributaries and will form the boundary of command area of each distributary. Forty eight (48) numbers of direct outlets are also provided in the main canal to command areas which could not be commanded otherwise from the distributaries. **Figure 4.3 and 4.4** depicts typical cross sections of main canal & distributaries. A coffer dam will be constructed within the right pocket of Rasul Barrage to

[1] *Source: Feasibility Report Jalalpur Irrigation project (NESPAK-ICS Joint Venture), September, 2015*

cordon off the area for construction of the Intake Structure for the Jalalpur canal. Arrangement of the cofferdam is shown in **Figure 4.5.** The coffer-dam will be constructed during the non-flood season and will be removed before flood season.

112. The initial reach of the Main canal upto Jalalpur Sharif (RD 5+000 to RD 33+350) runs through hilly terrain. On the right side is hill slope and on the left side is the Jhelum River. In order to reduce the canal RoW in this reach, a concrete lined section is proposed and to avoid incidence of flood damage, the left bank of the canal upto Jalalpur Sharif will act as Flood Protection Bund. Studs/Spurs of appropriate dimensions will be provided as per findings of physical model study to guide the water away from the Flood Bank. As the right bank is in cut at some locations, retaining walls will need to be provided to support the cut slopes in this area. The remaining reach of the canal is also concrete lined upto its tail at Reduced Distance (RD) 360+698. Eighteen distributaries off take from the main canal, which include three (3) minors. All distributaries and minors are designed as concrete lined channels/canal reaches.

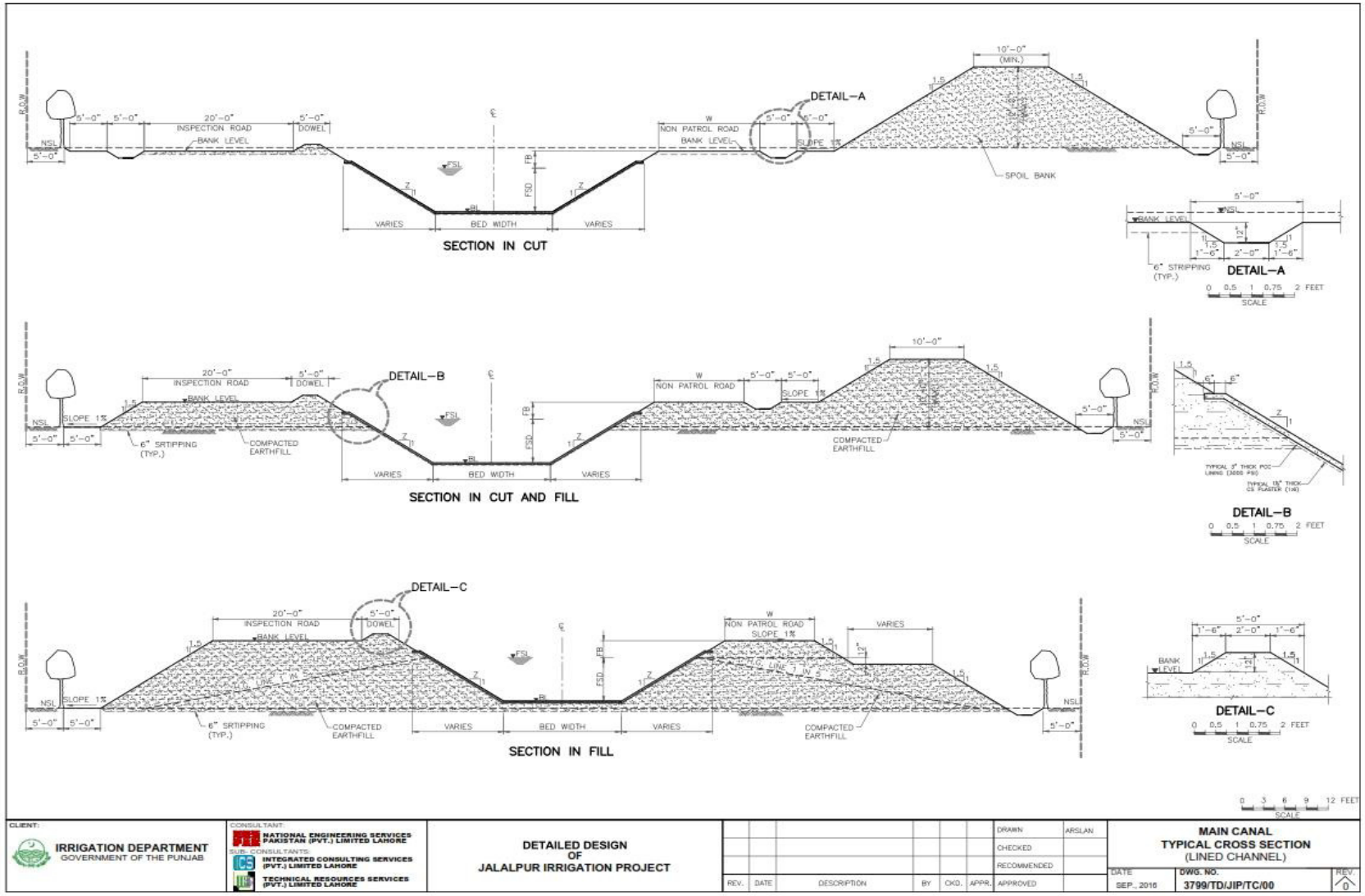


Figure 4.3: Typical X-Section of Main Canal

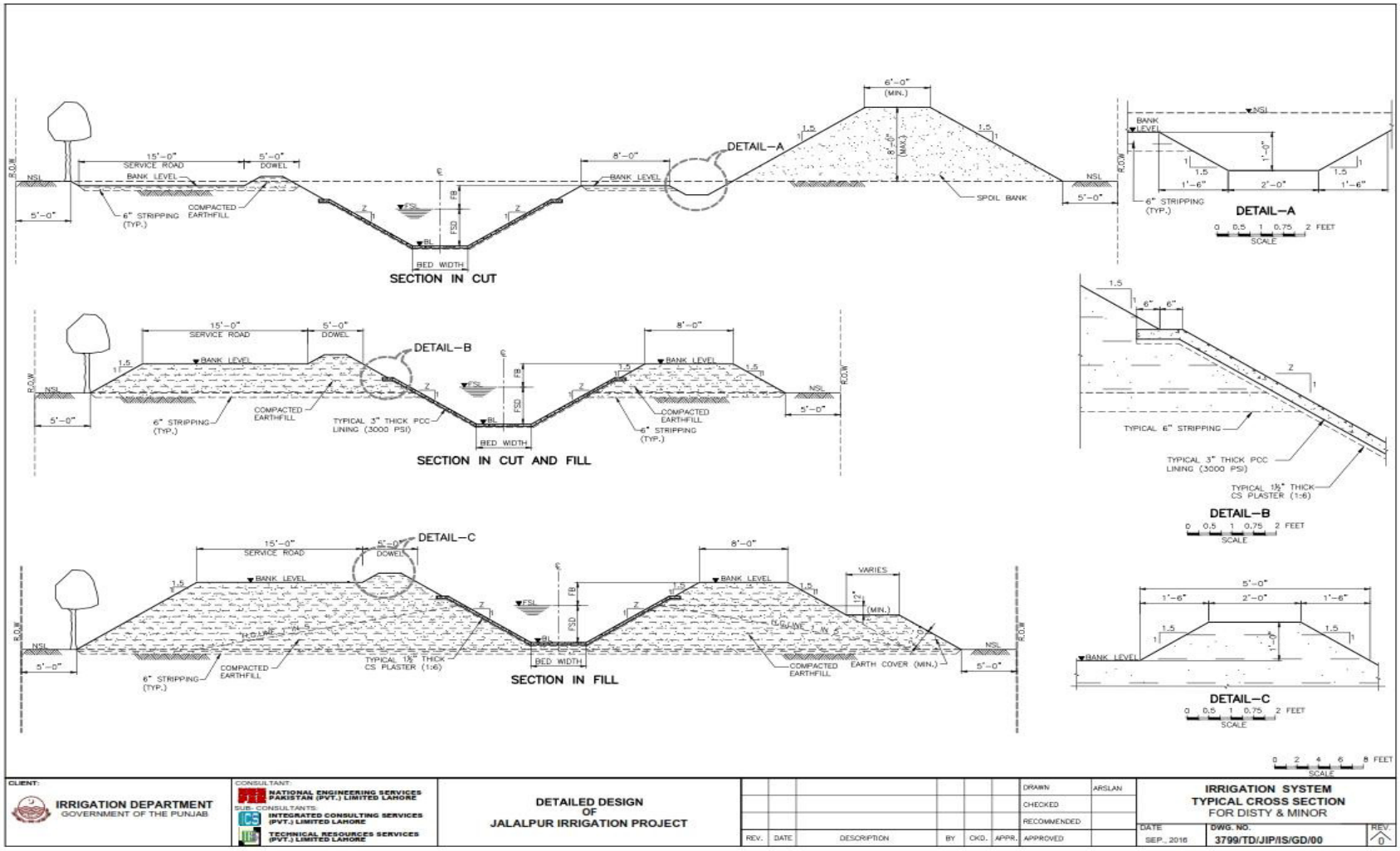


Figure 4.4: Typical X-Sections of Distributaries

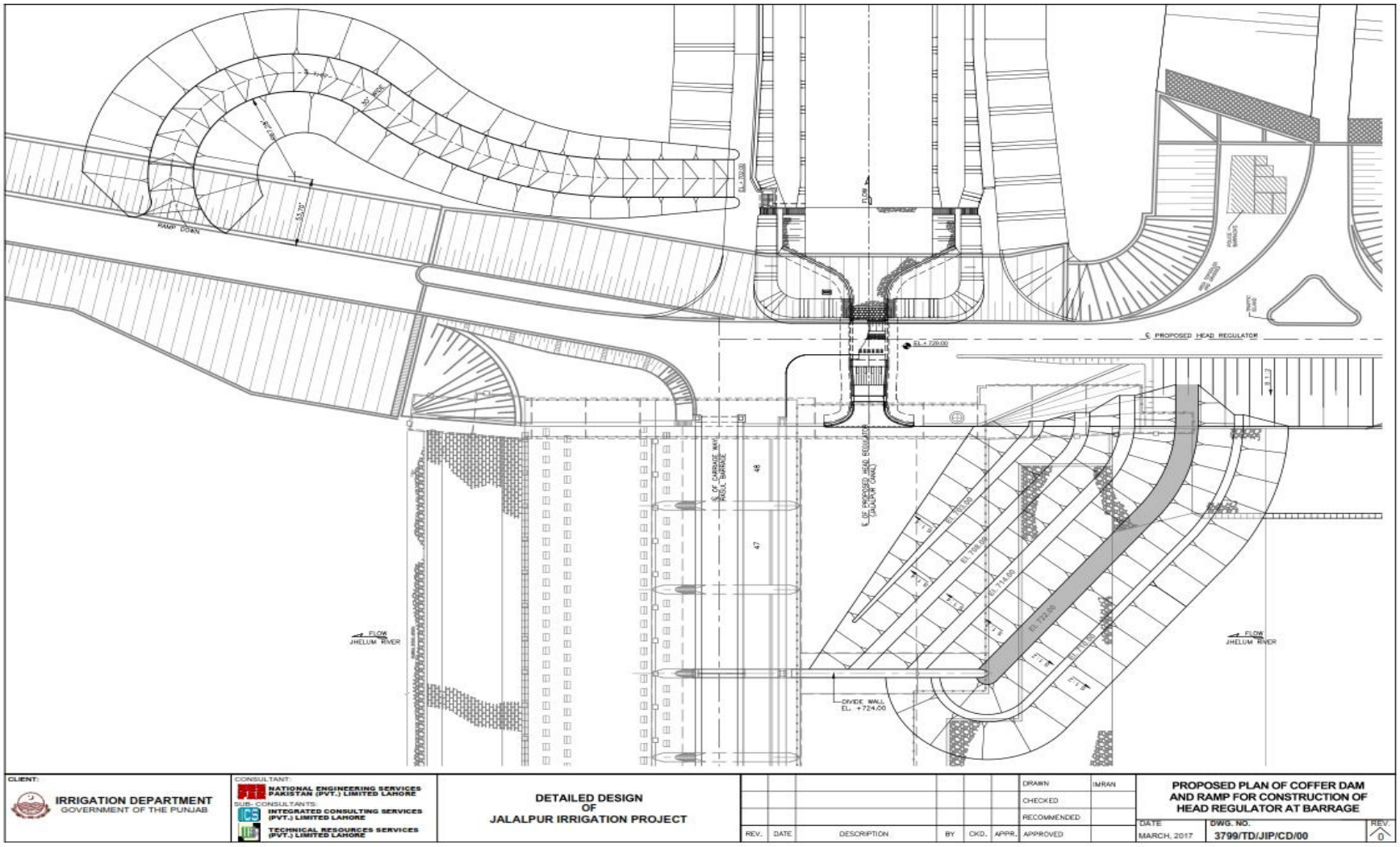


Figure 4.5: Coffer Dam Arrangement

4.4.2. Main Canal Section Characteristics

113. As per geotechnical conditions, stable cut and fill slopes have been found. The Main canal RoW will be provided with main canal prism, canal berms on both sides, an inspection road (shingle road) on the left bank and a non-petrol bank on the right side.

114. The area from Rasul Barrage to Jalalpur Sharif is prone to hill torrents flash flows along the right bank and flood flows from River Jhelum at the left bank of proposed canal. A toe drain will be constructed along the right bank to carry sheet flow to the nearest drainage crossing. At all nullah crossings, suitable cross-drainages have been provided. The left bank of the Jalalpur canal in this reach will act as a Flood Protection Bund.

115. The flood protection bund will need to be provided with studs/spurs at locations as per recommendations of physical model study to direct the flow away from the canal. The river side will be stone protected. The entire flood protection arrangement is model tested.

116. The section from Jalalpur Sharif to Tail is also designed as Lined canal. On the right bank, spoil bank is provided in cut reaches, which will also act as natural barrier against incoming rainwater flow from the hill slopes. Stone-pitched Catch water drain has been provided along the bank to carry the flows to the nearest nullahs.

4.4.3. Distributaries Section Characteristics

117. Canal Section of Distributaries is similar to main canal. However, as the distributaries are not running at the foot hill, a toe drain is not required. All the distributaries have also been concrete lined.

4.4.4. Cut Slopes Design/Excavations

118. Cut slopes or excavations and soil support will be designed to ensure that the overall slope and local inter-berm slopes meet the specified Factors of Safety (FOS) for sliding and toppling. The FOS for cut slope design is given in **Table 4.2**. Cut slopes are generally not designed for seismic conditions unless slope failure could impact adjacent structures. These factors of safety should be considered as minimum values.

Table 4.2: FOS for Cut Slope Design

Case	Description	Factor of Safety
Usual	Normal Static Loading	1.25
Extreme	Earthquake (OBE)	1.1

119. There are number of options which can be used to design an excavation. Techniques include:

- Flattening slopes;
- Benching slopes;
- Lowering the water table; and
- Structural systems such as retaining walls or reinforced slopes.

120. Changing the geometry of a cut slope seems an adoptive and economical option. Moreover, it entirely depends upon the soil type and its characteristics, and availability of space. Cut in purely dry cohesion less soils will depend on the slope angle, while the height of the cut is often the most critical parameter for cohesive soils. Thus, flattening slopes usually

proves more effective for granular soils with a large frictional component. Benching will often prove more effective for cohesive soils. Benching also reduces the amount of exposed face along a slope, thereby reducing erosion. Structural systems are generally more expensive than the other techniques, but might be the only option when space is limited.

4.4.5. Ancillary Works

121. Ancillary works related to irrigation system are following:

- Housing and Infrastructure for regulation staff; and
- Communication system for communicating canal related information to relevant authorities.

122. Housing such as guard room has been provided close to all major structures. In addition, offices shall be constructed for regulation staff to manage the irrigation system.

123. A communication system shall be established to communicate system related information such as gauge readings. Currently the information is communicated through canal-wire/telegraph system. However, now the communication system has become quite advanced and various options are available. These include mobile communication, internet communication etc. Communication system for JIP is likely to be mobile based application to assist in reporting of relevant gauges to the PID.

4.4.6. Command Area

124. The initial reach of the canal between Rasul Barrage and Jalalpur Sharif runs through hilly terrain after which the canal shifts slightly away from the hill toe. Numerous hill-torrents cross the main canal at various locations. The command area is mostly underlain by hazardous to marginally usable groundwater. Significant part of the project area is saline. These aspects have been considered while carrying out layout of the canal distribution system.

4.4.7. Drainage System in Command Area

125. One important feature of the command area is that hill torrents that flow from the hilly terrain i.e. Salt Range do not have a well-defined path and are spreaded over vast swaths of land. The water, particularly near Pind Dadan Khan is salt laden and leads to formation/deposition of salts on the soil. Thus drainage of the hill-torrents is an essential requirement of the project. Accordingly, a drainage system has also been planned to facilitate drainage of the hill torrents in to the Jhelum River. The drainage system will serve two functions, (i) to reduce flooding of agriculture land and thereby damaging of crop fields due to saline water & associated water-logging and (ii) to act as drainage channel for leaching surface salinity from the fields.

4.4.8. Layout of Drainage System

126. Various identified hill-torrents entering the command area from the northern side of project area do not have a very well defined path. A drainage system has been proposed to channelize the saltish flood flow of hill torrents to Jhelum River, which otherwise spreads onto command area and causes salinity. The typical cross section of drain is shown in **Figure 4.6** The drainage system will have two advantages:

- These will carry flood waters directly to river and therefore the save the command area from inundation; and
- These will also act as collector channels for drainage effluent and therefore will be beneficial in reclaiming land already affected by surface salinity.

4.4.9. Non-Structural Interventions

127. Non-Structural Interventions include community participation for management and operation of the irrigation system. The exact modality of community participation with regard to management of irrigation system will be developed before or during construction stage.

128. Other interventions include Private Agriculture Support Services (PASS). The local community will be mobilized to establish their private agriculture support centers so as to provide agricultural support services at local level.

129. Overall non-structural interventions will include the following:

- Participatory irrigation management;
- Effective capacity building;
- Financial sustainability;
- Agriculture support services; and
- Local groundwater management.