

GOVERNMENT OF THE PUNJAB
PLANNING AND DEVELOPMENT BOARD
(IRRIGATION SECTOR)

Date of receipt of PC-I in P&D Board: 24-02-2025

WORKING PAPER FOR PDWP

PART-A

PROJECT PROFILE:

1.	Project Title	Rehabilitation of Rangpur Canal System
2.	Location	District Jhang, Muzafargarh
3.	Sponsoring Agency	Irrigation Department
4.	Executing Agency	Irrigation Department
5.	Maintenance & Operation	Irrigation Department
6.	Name Of Relevant Department(S) /Stakeholder(S) Invited In Pre-PDWP	<ul style="list-style-type: none">• Irrigation Department• Joint Chief Economist• Technical Advisor Finance Department• Director PERI• CEO Urban unit
7.	Name Of Sector's Specialist / Consultant / Advisor Expert Invited In Pre-PDWP	<ul style="list-style-type: none">• Irrigation Department• Joint Chief Economist• Technical Advisor Finance Department• Director PERI• CEO Urban unit
8.	PC-1 Cost	Rs. 999.877 Million
9.	Source of Financing	Provincial ADP 2024-25 at G.S. No. 2351
10.	Allocation 2024-25	Rs. 250.000 Million
11.	Implementation Period	28 Months till June 2027

12. Project Description

The Rangpur Canal System was established in 1936 to irrigate the vast area of fertile lands within the boundary of Jhang & Muzaffargarh Districts, particularly along the right bank of River Chenab. To begin with, it was designed as a non-perennial system. Afterwards, keeping in view the geological data of the vicinity, it was transformed into a perennial in 1939. Its designed capacity was reckoned as **2710 cusecs**. Since its inception, this important system has played a vital and dynamic role in boosting the prosperity of the motherland on one hand and ameliorating in livelihood of the impoverished peasants.

Rehabilitation of Rangpur canal comprised of earthwork execution for desilting of bed, maintaining design bank levels, cross-section and side slopes. The provision of stone studs is given for controlling embayment in the head reaches of channel. The provision of stone pitching at upper stream and downstream of hydraulic structures and repair and maintenance of existing rest house buildings are included in the project. Justification to

restore its designed capacity / parameters to ensure uninterrupted irrigation supplies to the area, meeting the farmers demand which has not been achieved for past more than 20 years.

Project Objectives

1. Assurance of authorized and sustainable canal supply at tail.
2. To curtail mishap and leakages consequent of weak banks and berm less reaches of the channel.
3. Equitable distribution of canal water will be ensured in the area of command.
4. Improvement in irrigation facilities in the area.
5. Maintaining the cropping pattern in tail reach and assurance of cash crops for export and raw materials for local industries.
6. To mitigate the chance of mishap and leakages due to berm less and weak banks along the vulnerable reaches of the channel.
7. Improvement in the economic and social standings of the local inhabitants of the area.

13. (a) Sector Issues

- Growing water shortages, which are further worsened in periods of drought.
- The irrigation and drainage infrastructure has deteriorated overtime due to a combination of age, chronic under-funding of maintenance and repair (M&R), and lack of appropriate asset management planning.
- Gaps in meeting financial sustainability of the system owing to low recovery of Abiana, inefficient operational regimes and low M&R funding.
- Lack of participatory approach in operations, maintenance and management of irrigation services leading to inefficiencies, inequities and lack of ownership by users.
- Imprudent and inefficient utilization and management of groundwater.

(b) Sector Strategy

- Implement structural measures for optimal utilization of surface water resources.
- Plan effective utilization of public investments for modernization of irrigation infrastructure.
- Develop and practice holistic approaches to optimize surface and groundwater use efficiencies with the aim to maximize agricultural productivity of irrigated lands.
- Mitigate environmental degradation and groundwater mining.
- Extended broad-based institutional reforms already initiated in the province to achieve improved service delivery targets.
- Extended and improve drainage flood protection, hill torrent management and command area development interventions in riverine and rain-fed (Barani) areas.

14. Relationship of the project with sectoral policy / growth strategy, 2025

15. **Alignment with Punjab spatial strategy, 2047 (comments of urban unit)**

Not received/provided yet

16. **Other Major on Going and Potential Projects in the Sector**

- Construction of Flood bund from Hairo Flood Bund to Raikh Baghwala Flood Bund on Right side of River Indus (to project head regulator of Kadra Creek and adjoining abadies)
- Flood protection of Kamoki and adjoining areas
- Rehabilitation and up-gradation of Trimmu Barrage, Punjnad Head Works
- Construction of Jalalpur Irrigation project and its System.
- Improvement of Irrigation Water Supply at Tail Reaches of Irrigation Channels of Minors in Selected Area of Punjab.
- Construction of Dadhochha Dam
- Construction of Sorra Dam
- Construction of Ghabir Dam

17. **General Abstract of Cost**

Sr. No.	Description	PC-I Cost Before Pre-PDWP	PC-I Cost After Pre-PDWP
1	Rehabilitation of Rangpur Canal System from RD 0+000 to 320+000 (Package-A)	851.952	699.320
2	Rehabilitation of Rangpur Canal System from RD 320+000 to 422+025 tail (Package-B)	361.513	300.557
	Grand Total	1213.465	999.877

18. **Unit Cost**

N/A

20. **Period of Implementation**

28 Months till June 2027

21. **Annual Recurring Expenditure**

Rs. 2.400 Million

22. **Annual Income after Completion**

N/A

23. **Requirement of vehicle/ staff/consultancy**

Not Required

24. **Existing Facility**

Canal system exists but rehabilitation work needed / required.

Part-B

25. **Technical Appraisal**

The Pre-PDWP meeting of the scheme was convened on 13-03-2025 under the Chairmanship of Member (Water) P&D Board, Lahore. The comments / observations raised by Irrigation, Consultant (ID) and Technical Sectors of P&D Board, replies by sponsoring agency and decisions of Pre-PDWP are juxtaposed as under:

Sr. No	Observations	Departmental Reply	Pre-PDWP Decision
IRRIGATION SECTOR (Package-A)			
1.	The Sponsor has provided 16 months implementation period for	The completion timeline has been revised to June 2027 and updated	PDWP may decide

Sr. No	Observations	Departmental Reply	Pre-PDWP Decision
	execution of the 1213.465 Million cost project which seems insufficient. Sponsor may review the same.	accordingly in the PC-1	
2.	The provision of 2 miles transportation of barrowed earth for the reach RD 0+000 to RD 14+000 has been made by the Sponsor while balance reaches from RD 140+000 to RD 320+000 has been provided 1/4 miles. Sponsor may also rationalize the lead from the reach RD 0+000 to RD 140+000.	The channel regime in the reach RD 0+000 TO RD 140+000 is shallow and wide. As a consequence, berm less reaches were observed. In detail earthwork statement after cut/fill balance there is need for extra filling of good soil for top of bank in order to achieve design bank levels. Berm cutting QTY = 2,800,427.50 cft Bank Filling QTY = 5,905,157.50 cft Extra Fill (Borrow) Net = 4,378,847.50 cft After detail deliberation and considering site conditions and availability of good soil 2-mile lead for borrow pit excavation is provided. However, from RD 140+000 TO 318+000 berm cutting is excess over bank filling so ¼ mile lead is provided for its suitable disposal.	Noted
3.	Stone pitching D/S of fall structures has been provided in a length of 150ft. Sponsor may rationalize the same to 100 ft.	Stone pitching D/S of the structure is already provided on the basis of site conditions i.e., embayment and disturbed section.	Noted
4.	The size of stone apron has been kept by the sponsor 5'x5' which is on much higher side. Sponsor may rationalize the same to 4'x3'. More over the same apron size has been adopted for the whole canal while it should be calculated as per canal discharge reaches.	The size of the apron 5x 5 is taken based on the scour depth calculation. The detail sheet of calculation is annexed herewith.	Noted
5.	Pacca brick work ratio (1:4) has been provided for construction of side walls of cattle Ghats with cement plaster ratio (1:3) ½" thick has been provided which is unjustified. Sponsor may delete the same.	Pacca brick work ratio (1:4) has been provided for construction of side walls of cattle which is unavoidable however plaster work for the same may be excluded.	Noted
6.	Rs. 48.790 Million has been provided as price escalation on the whole amount of civil and mechanical.	Price escalation has been calculated at 6.5% of total civil work amount. The same may be corrected excluding amount for mechanical work.	Noted
7.	The project "Rehabilitation of Rangpur canal system is being proposed for implementation under ADP 2024-25 while clearance / vetting of subject PC-I by ADP Consultants M/S NESPAK is missing from the document. Sponsor may attach the same with	The observation has been attended.	Noted

Sr. No	Observations	Departmental Reply	Pre-PDWP Decision
	the PC-I.		
8.	The L-Section of Rangpur canal from RD 0+000 to RD 320+000 is missing from the document. Sponsor may attach the same with the PC-I.	The observation has been attended.	Noted
9.	The drawing of gauge reader huts is neither signed by any officer nor approved by the Competent Authority. Sponsor may attach approved copy of drawing with the document. Similarly drawing of Cattle Ghats is also not approved.	The observation has been attended.	Noted
10.	The depth of U/S & D/S cut off walls of X-Regulator has been taken 10.05 ft which seems incorrect. Sponsor may correct the same as per design criteria.	After reviewing, it was confirmed that the 10.05 inch mentioned in the drawing refers to the thickness of the cut-off wall. The cut-off depths are 7.5 ft at downstream and 2.75 ft at upstream of the cross regulator. The depths of cutoffs are calculated after detail analysis.	Noted
11.	The quantity of fabrication of mild steel reinforcement for regulators has been taken 10 lbs / cft which is on excessive side. Sponsor may take 6 lbs / cft steel for the RCC work.	Agreed needs no clarification	Noted
12.	Quantity of Pre-cost cement concrete blocks ratio 1:2:4 and inverted filter under PCC blocks is also seems incorrect. Sponsor may correct the same.	The quantity of PCC blocks has been checked and given as per requirement. This quantity is sufficient, as the bed width of the channel is 105 ft.	Noted
13.	The rate of Rs. 85000/- sft has been taken for fabrication and installation of gates and gearing system as lump sum provision which is un-justified. Sponsor may attach the detailed design and drawings of gates and gearing system with the PC-I.	The rate of Rs 85500/- sft has been taken as per approved Northern tube-well division (Government manufacturing of gates). The detail design and drawing of gates will be taken at the TS stage.	Noted
14.	Rs. 18.035 Million as a additional cost of machinery and other has been provided in the estimate of fabrication and installation of gates and gearing system of X-Regulators which is unjustified. Sponsor may delete the same.	The same amount has taken on lumpsum basis to cater for the additional cost of hoist machinery etc. of already existing 14 no of gates uninstalled gates which has no hoist machinery.	Noted
15.	The rate of Rs. 85500/- for fabrication and gates and gearing system has been provided which includes hoisting machinery also while the same rate has been applied where the gates are	There are 14 no gates available at site out of total 43 no of required gates. These are only gates with no hoisting machine etc. It is therefore additional cost of 18.035 million included in the PC-1 for catering hoist	Noted

Sr. No	Observations	Departmental Reply	Pre-PDWP Decision
	available which is quite unjustified. Sponsor may provide the rate for hoisting machinery and avoid the duplication.	machines etc. cost for available gates only.	
16.	The rate for Non-standardized item of crushed stone filter size 1/8" to 1/2" & 1/2" to 2" are not approved by the Competent Authority. Sponsor may attached approved copy with the PC-I.	The observation has been attended.	Noted
	<u>Package-B</u>		
17.	Rs. 20.703 Million have been provided as price escalation on the whole amount of civil and mechanical works while it should be provided on the amount proposed for the 2 nd year. Sponsor may correct the same.	Compliance made, price escalation has been rectified in the PC-1.	Noted
18.	The Sponsor have provided the item of earth work excavation of drains Irrigation Channels etc 17625056 cft in the Abstract of quantity & cost while in the earth work statement the total excavation is 17166810 cft. Sponsor may correct the same.	The corrected earthwork quantity, as per the earthwork statement, is 17,166,810 cft and has been duly rectified in the PC-I. The observation has been addressed accordingly	Noted
19.	The stone pitching U/S & D/S of structure have been taken in a length of 200ft respectively. Sponsor may amount the same as per package A i.e 50 ft U/S & 100 ft D/S of structure similarly. All the selected items may also be amended.	Compliance has been made by following the same criteria as in Package "A"	Noted
20.	Same as item No. 4 Package A.	The apron width is determined based on scour depth calculations, and the detailed calculation sheet is annexed.	Noted
21.	The Sponsor have made the provision of dismantling brick work quantity 10074.82 cft and the same quantity has been provided as pacca brick work other than building ratio 1:4. Sponsor may justify this item when masonry of bridges is already good condition.	The PC-I includes provisions for dismantling and reconstructing the piers of five bridges. Due to the significant deterioration of the bricks in the piers, their replacement with new brickwork is necessary. Therefore, the provision for new brickwork is justified.	Noted
22.	The Sponsor have made the provision of Rs. 27.271 Million for repairing of 05 No. bridges with replacement of piers. Abutments and super structure while no joint inspection / condition survey report with the consultants is available	M/S NESPAK Consultants vetted the PC-I after conducting a physical inspection of the old bridges. Therefore, the provision for repairing five bridges is justified.	Noted

Sr. No	Observations	Departmental Reply	Pre-PDWP Decision
	with the document . Sponsor may provide the recommendation of Consultants as well.		
23.	The rates of Rs. 1260/- per 100 cft for credit of brick masonry is on much lesser side. Sponsor may apply the separate rate for bricks and bats. Keeping in view the prevailing market rate.	It is clarified that the brick masonry credit of Rs. 1260/- per 100 cft is a composite rate, accounting for both whole bricks and brick bats. The approved rate analysis is attached.	Noted
24.	The width of main of slab varies as 12.0 ft, 13.0ft, 7.16ft, 15.75ft, 15.83ft and 7.16 ft while the approach slab width has been taken 25 ft which needs to be corrected as per actual site conditions.	The observation is not correct as 25ft width is not given in the PC-1. The width of the slab has been provided as per actual site condition for all approach slabs, while a length of 25ft was specified. Therefore, the provision is justified.	Noted
25.	The repair of crest and glaces of structure has been included in the civil work for installation of gates & gearing system. Which may be provided after recommendation of consultants M/S NESPAK.	The provision has been duly recommended and vetted by the consultants following a physical inspection of the canal. Therefore, the provision is justified.	Noted
26.	Major repair / rehabilitation work has been provided in the PC-I but neither video clip nor pictures has been provided by the Sponsor may provide the drone video & snaps of all damaged structures whom repair has been included in the PC-I.	Compliance ensured.	Noted
27.	The Sponsor has proposed to complete the project costing Rs. 1213.465 Million upto June, 2026 with an allocation of Rs. 50.000 Million for the year 2024-25. Sponsor may provide / assurance for the balance amount to complete the project with stipulated time and further revision of PC-I as well as extension in gestation period will not be sought.	Owing to the delayed approval of the scheme, the completion timeline has been revised to June 2027 and updated accordingly in the PC-1.	Noted
	<u>Consultant (ID)</u>		
28.	Last 10 years M&R allocation and expenditure statement may be provided i/c emergent expenditure.	The detail of M&R allocation and expenditure statement has been annexed.	Noted
29.	Whether conversion of right bank of 5R distribution channel RD 260 to 320 in flood bank and 7 No. spurs is based on model study, copy may be provided.	The observation is incorrect. Left bank of Rangpur from RD 260 – RD 320 converted into Rangpur flood embankment after 1973 un-precedent flood which invoked huge damages to Rangpur canal and allied areas. 07 no of studs and 02 no of spurs was	Noted

Sr. No	Observations	Departmental Reply	Pre-PDWP Decision
		constructed later to divert the river flow and prevent local scouring. The copy of model study annexed.	
30.	Whether model study was carried out for left bank of canal in to flood embankment.	Left bank of Rangpur from RD 260 – RD 320 converted into Rangpur flood embankment after carrying out model study after 1973 un-precedented flood which invoked huge damages to Rangpur canal and allied areas	Copy of Model study may be provided.
31.	Silting of canal is usually a design flow, whether this aspect has been taken in to account.	Agreed needs no clarification	Noted
32.	Year wise average discharge since 1992 at the head tail may be provided to substantiate present discharge of 1800 cusec.	The copy of discharges has been annexed.	Noted
33.	Rehabilitation / refurbishment of rest house and residences is not valid charge, hence deleted.	Rehabilitation / refurbishment of rest house and residences has already been deleted.	Noted
34.	Why stone pitching is being provided, when existing prisms are without stone pitching.	Rangpur canal is working on obsolete needle-based system. In this scheme new gates and gearing system will be installed. As a result, hydraulic conditions of channel may be changed. Keeping these considerations and existing embayment length d/s of cross regulators stone pitching is proposed.	Not agreed. Proposal may be supported with recommendations of Expert committee of Irrigation Department.
35.	What is justifications for gauge reaches huts, because no huts are available now.	Rangpur canal system has large network of off taking distributaries and minors. After installation of gates at the cross regulators and keeping in view of system which is working on demand based and water availability a serious vigilance is required for equitable water distribution. In this regard gauge reader huts are imperative at cross regulators for effective monitoring and operations.	Noted
36.	Why existing brick surfaces being replaced with RCC in X-regulator.	Rangpur canal system was operational back in 1938. There is huge wear and tear on the surface of brick floor u/s and d/s of structure. Moreover, after installation of gates hydraulic conditions could also be changed. In view of these circumstance same thickness of brick floor is replaced with RCC floor.	Not agreed. Proposal may be got recommended from Expert Committee of IPD.
37.	Survey report of each bridge, being replaced and declared as dangerous by the competent authority may be provided.	Redecking or construction of bridges has not been taken in the scope of work.	Noted
38.	There is no need to provide cattle	Rangpur canal is passing from rich	Not agreed

Sr. No	Observations	Departmental Reply	Pre-PDWP Decision
	Ghats and what is criteria for this item.	agricultural area. Keeping in view of huge trespassing and existing ghats it is pragmatic to provide at least 06 no of cattle ghats to avoid future prism disturbance and embayments.	
39.	Provision of price variants Rs. 48.790 Million may be deleted, being against the policy of GOPs.	The provision of price escalation @6.5% at civil cost is pertinent considering the fluctuations in the market price of materials and timely completion of project.	Not agreed .Provi sion may be deleted being against policy of GOPb.
40.	Rate of excavation of drains & canal through excavator may be replaced with ordinary excavation rate, which economical.	Rate of excavation of drains & canal through excavator is already economical and site feasible compared to ordinary excavation.	Rate comparison may be given.
41.	Lead of barrow excavate may be reduced to one mile for 2 mile similarly transportation may be taken as 1000 ft.	The availability of good soil is not available in the radius of 1 mile. The transportation of soil is taken as ¼ mile considering feasibility of disposal.	Not agreed. Lead may be reduced as per observation.
42.	Earth work calculation may be got verified from the Consultant.	Earth work calculation has been verified from the Consultant	Noted
43.	What is justification of lead of 6.5 mile is District Jhang (Page 42)	The observation is incorrect. No such lead has been utilized in the subject PC-1	Why it was written on page 42. Needs clarification.
44.	Stone pitching may be corrected as per design.	Stone pitching has already on design.	Noted
45.	Area of gauge reaches hut may be reduced of 400 Sft from 797.23 as per standard.	Area of gauge reader is already based on least measurements. It is based on approved drawing of NESPAK and already executed in Irrigation department.	Not agreed. Area may be reduced as per observation and standard areas notified by P&D.
46.	Provision of plaster 1:3 in cattle Ghat is not justified, only brick pawing floor may be provided if justified.	Agreed needs no clarification.	Noted
47.	Videos / picture of all structures and channels being rehabilitated may be provided to assess their condition.	Annexed herewith.	Noted
48.	Credit of old material may be providing in the PC-I / estimate.	The observation has been attended.	Noted
49.	Additional cost for hoisting machinery @ 40% sft may be justified with calculation.	The same amount has taken on lumpsum basis to cater for the additional cost of hoist machinery etc. of already existing 14 no of gates uninstalled gates which has no hoist machinery.	Not agreed. Observation may be complied with.
50.	Rates of gates and gearing system may be justified on the basis of MRS items like fabrication of heavy steel and other related items. Work shop rates are why	All the rates for fabrication and installing of gates are not provided in the MRS. Therefore, rates are taken from approved northern tube well division rates.	Rate analysis may be provided.

Sr. No	Observations	Departmental Reply	Pre-PDWP Decision
	acceptable if cheaper than MRS rate analysis of work shop rates may be provided.		
51.	Lead chart of stone may be corrected / rationalized as per shortest route. It may be drawn on google map.	The observation has been attended.	Noted
52.	Detail of the building component, Rest Houses, Chief Irrigation Residence may be provided.	No such component exists in scope of work.	Noted
Technical Sector			
53.	The provision of stone pitching is to be justified by advice of Technical Committee of Irrigation Department.	The provision of stone pitching is provided already by the advice of technical engineers of Irrigation Department, keeping in view of embayment and disturbed section across cross –regulators stone pitching is also verified by the NESPAK Consultants after site survey.	Please share the recommendation of the Technical Committee for perusal.
54.	The repair of bridges is to be justified with site picture.	The pictures of deliberated bridges are annexed.	Share in soft
55.	The provision of sewage disposal in regulation huts is to be clarified whether soakge pits of connection to external sewage network will be used.	The sewage disposal of gauge reader huts is very minimal comprised of only one washroom. There is no external sewage network available in near surrounding so it will be executed through soakage it as a cost-effective measure.	Noted
56.	The provision of anticipatory price variation is to be deleted.	Agreed needs no clarification	Noted

Part-C

26. Economic/Financial Appraisal

Project Cost	:	999.877
Cost Benefit Ratio	:	1:2:30
Net Present Worth 15% D.F	:	1193.76
Net Present Worth 20% D.F	:	2659.29
Internal Rate of Return	:	28.26%

Part-D

27. Environmental Appraisal

N/A

28. Consideration by Pre-PDWP

The Pre-PDWP meeting of the scheme was convened on 13-03-2025 under the Chairmanship of Member (Water) P&D Board, Lahore. The comments / observations raised by Irrigation and Consultancy Sectors of P&D Board has been attended by the

administrative department. Hence the scheme is recommended for placement before PDWP.

28. Recommendations

The PC-I at a cost of **Rs. 999.877 Million** with the gestation period of **28 Months till June 2027** is submitted before PDWP for consideration.