# *ANNEX E*

## *Project Works, Cost Estimate, and Implementation Plan*

# THE STUDY
# ON
# THE LINING OF DISTRIBUTARIES AND MINORS
# IN
# PUNJAB
# IN
# THE ISLAMIC REPUBLIC OF PAKISTAN

## VOLUME II

## ANNEX E PROJECT WORKS, COST ESTIMATES AND IMPLEMENTATION PLAN

### Table of Contents

## LIST OF TABLES

## LIST OF FIGURES



## ATTACHMENTS

# Annex E Project Works, Cost Estimates and Implementation Plan

## E.1 Project Works

### E.1.1 Structure Planning

Proposed structure planning are shown in Table E-1~4. Detailed data are compiled into the attachment for the inventory survey and the basic design of the structures.

- Each distributary canal system is proposed to be transferred to the relevant farmer's organization and discharge measurement and control is necessary at outlet from main and branch canals. For the purpose, installation of diversion gates are proposed to the distributaries lacking them such as Mungi, Janiwala, Pirmahal, Killianwala, Thamman and China and automatic discharge reader and recorder are also proposed to be installed to all distributaries. Meter Flume is to be removed at construction.

- As required function of outlet, proportional extraction of water and silt independently from downstream water level is necessary for the project. Adjustable Proportional Module (APM) Outlet which has been applied at most of cases at present situation has been claimed its weak silt extraction function and Open Flume Outlet is exposed and vulnerable. Adjustable Orifice Semi-Module (AOSM) is thus proposed in general for the project since AOSM, applied for Command Water Management Project, showed good performance for proportional extraction of water and silt[1]. Proposed numbers of outlets by types are shown below.

| Type of Outlet | Lower Jhelum | Lower Chenab | CBDC | Project Total |
|---|---|---|---|---|
| AOSM | 225 | 487 | 125 | 837 |
| Open Flume Type | 75 | 62 | 16 | 153 |
| Pipe Outlet | 10 | 19 | 19 | 48 |
| Total | 310 | 568 | 160 | 1,038 |

- Use of existing bridges with repair if necessary and replacement of Footpath Bridge by VR (Village Road) Bridge as well as new installation of VR Bridge if required among where bank damage by cattle was observed are proposed to improve rural transportation and minimize cattle passage over channel. As the

[1] Reference to SWABI SCARP Working Paper 37

results of the structure planning, total numbers of bridges tolerant for vehicle passage increase to be 442 (every 1.31 km) from 229 (every 2.53 km excluding the bridges fatally damaged).

- For the purpose of canal bank protection, 267 Buffalo Wallow (Cattle Ghat) are proposed nearby each bridges at watercourse head. Washing Steps, Drop and Spillway will be replaced disregarding the present condition. Canal Crossings (Aquiducts and pipe crossings), pipe culvert and railway bridges will be used as they are.

### E.1.2 Construction Volume for Earthwork and Concrete Works

Construction volumes for each king of works are decided by basic design based on the results of canal route survey executed within the Phase II field work period. Each work volumes are shown in Table B-5~8. The canal route survey was conducted through 541.27 km (Total length of the canals selected at Interim Stage is 583.42 km and out of which 553.23 km was estimated total length to be surveyed) consisting baseline survey, cross section survey and structure inventory survey and designed total length came to be 539.51 km. Total acreage of land compensation is estimated to be 138 ha and 2.7 m width outside ROW in average. Average work volume per linear meter estimated based on canal sections surveyed and designed are; 4.15 m3 excavation, 8.69 m3 embankment and 0.5 m3 concrete. The work volumes show wide fluctuation according to surface condition within ROW and thus more detailed survey is recommended to be executed at the time of Detailed Design. Designed canal profiles are shown in the Drawings (Vol. IV).

### E.1.3 Construction Procedure and Methods

(1) Construction Method

Specifications of earthwork and dimension of improved canal cross section are proposed as shown in Figure B-6. Stripping thickness of 0.2 m is proposed respectively for outside and inside of canal prism. Bank cutting thickness within canal prism of 1.0 m or 2.0 m and over-embankment exceeding designed lining surface is proposed by 0.5 m or 1.0 m respectively for the cases that water depth is shallower than or equal to/deeper than 3.5 feet. Compaction is to be done up to designed lining height and earthen freeboard is formed by spoil banking. Width and minimum embankment from field level for operation and maintenance road are 4.0 m and 0.3 m(1 foot) respectively. Bank width

for filling section are proposed to be 1.0 m (Q < 50 cusec), 1.5 m (50 < Q < 150 cusec), 2.0 m (150 < Q < 300 cusec) and 2.5 m (Q > 300 cusec). Half width are respectively proposed for cutting section.

Earthworks is planned to start by stripping at the canal bottom and bank cut by combination of bulldozer and backhoe after completion of temporary diversion work by every 300 to 500 m according to site condition. Haulage of earth material is not considered for the diversion work. Succeedingly, embankment work including over-embankment portion which will be cut after compaction. Borrow of earth material is planned within ROW and areas where vitally salt affected and abandoned and average hauling distance is estimated to be 500 m. Embankment work is executed with emphasis on water content control by water bowser, bulldozer and roller. Cutting and trimming of lining surface is done by backhoe and by manual work.

Lining work is started with preparation of lining base layer by mortar, followed by spreading low-water-content-concrete with steel slip form and vibrator and finished with manual surfacing. Curing with supplying enough humidity (preferably kept under water or spraying water continuously) is strongly recommended to avoid surface crack.

## E.2 Cost Estimates

### E.2.1 Basic Conditions and Assumptions for the Cost Estimates

Foreign currency portion corresponding to services and material imported and local currency portion corresponding to domestic services and material are separately estimated for each cost items for the purpose of project evaluation and planning of loan arrangement. The project cost comprises investment cost, replacement cost and O&M cost. Institutional reform cost is included within the investment cost. Cost estimates are based on current price at the time of May, 1996 for material, manpower and machinery refereed from price index and statistics of import. Exchange rate of Rs. 34 to US$ 1.0 is applied for cost estimate at the same time.

### E.2.2 Estimates of the Project Cost

Project cost is thus estimated to be Rs. 3,120 million out of which the foreign currency portion turns to be Rs. 1,674 million and 54% and the local currency portion be

Rs. 1,446 million and 46%. The project cost, unit cost and work volume of each work items are shown in Table E-9. Distributary-wise project cost are shown in the Table E-10 ~ 22.

### E.2.3 Breakdown of the Project Cost

Investment cost consists of 1) Compensation Cost, 2) Direct Construction Cost, 3) Administration and Consultant Cost, 4) Institutional Reform Cost, 5) Physical Contingency and 6) Price Contingency. Compensation cost of about Rs. 3.0 million includes land compensation cost for construction work outside of the Right of way and replacement cost of the facilities which would be damaged by the construction work. Direct construction cost of about Rs. 1,985 million includes gate installation, earthwork, lining, work, related facilities and miscellaneous works. Miscellaneous works are estimated to be 3% of total cost of the other items in the direct construction cost for temporary outlets, discharge measurement facilities, admixture of concrete and other uncounted items above while construction period. Administration and consultant cost comprises remuneration for expatriate consultants and local stuffs and office maintenance cost including procurement cost of equipments required in the project office. The administration and consultant cost is estimated to be Rs. 284 million and 14.3% of the direct construction cost. Institutional reform cost of about Rs. 76 million and 3.8% of the direct construction cost includes remuneration of expatriate consultant and stuffs (Rs. 64 million), procurement and operation cost of vehicle (Rs. 8 million), office maintenance cost including procurement cost of equipments (Rs. 3 million) and activities and transmission cost (Rs. 1 million) and described in detail in chapter 5.4. Physical contingency is estimated to be 10 % of the direct construction cost. Price contingency is estimated to be about 20% based on price escalation of 3% per year in both foreign and local currency for 4 year net construction period by the year of 2004.

Periodical repair of concrete lining portion as well as related facilities of the distributaries and minors to keep sustainable lined canal prism. The replacement cost is estimated to be 20% of the direct construction cost for every 20 years, namely Rs. 19.85 million and 1% of devaluation of canal is predicted and the replacement cost per 20 years comes to be Rs. 397 million.

### E.2.4 Unit Cost Analyses

Unit cost for manpower and material as of May 1996 are surveyed and summarized in the Table E-23. Operation cost of construction machinery are summarized in the Table E-24. Unit cost of each kind of works are listed and compared with the similar project in Table E-25. The unit costs are thus justified applicable for cost estimates of the Project.

### E.2.5 Annual Disbursement Schedule

Table E-26 shows annual disbursement schedule in accordance with the proposed project implementation schedule.

### E.2.6 Replacement Cost and O&M Cost

Periodical repair of concrete lining portion as well as related facilities of the distributaries and minors to keep sustainable lined canal prism. The replacement cost is estimated to be 20% of the direct construction cost for every 20 years, namely Rs. 19.85 million and 1% of devaluation of canal is predicted and the replacement cost per 20 years comes to be Rs. 397 million. O&M cost is divided into facility maintenance cost and personnel cost. Consideration of safety factor, facility maintenance cost is estimated as high as the same item being spent for unlined channel of about Rs. 17.80 million per year for desilting work and remedies against weeding, erosion and devastation of canal prism. Personnel cost is estimated to be drastically reduced down to Rs. 5.03 million. Annual replacement cost and O&M cost are summarized in the following table.

Annual replacement cost and O&M cost (Unit: Rs. 1,000)

| Item of Cost | LJC | LCC | CBDC | Total |
|---|---|---|---|---|
| (1) Direct Cost | 677,290 | 1,078,770 | 229,440 | 1,985,500 |
| (2) Annual replacement cost and O&M cost | | | | |
| 1) Replacement*1 | 6,773 | 10,788 | 2,294 | 19,850 |
| 2) O&M Cost | | | | |
| a) Maintenance | 5,990 | 9,602 | 2,210 | 17,802 |
| b) Personnel | 1,323 | 2,845 | 860 | 5,028 |
| Total | 14.087 | 21,901 | 5,356 | 41,344 |
| (3) Annual replacement cost and O&M cost / Direct Cost (%) | 2.1 | 2.0 | 2.3 | 2.1 |

## E.3 Project Implementation Plan

### E.3.1 General

In accordance with the institutional reforms of the water sectors, the Provincial Irrigation Departments (PIDs) will be transformed into Provincial Irrigation and Drainage Authorities (PIDAs). Below the PIDAs, financially self-accounting Area Water Boards (AWBs) will be created. Below the AWB level, farmers will be encouraged to form Water Users Formations at the distributary and minor level on a pilot concept basis. In the current critical time, establishment of implementation program not only for construction work, but also operation and maintenance program - with institutional reforms - is of paramount importance. In this regard, it is strongly recommended to organize an executing agency as shown in Fig. E-1, for executing construction work and for promoting the farmers participation as well.

### E.3.2 Implementation of Construction Work

The executive agency for the Project would be PIDA, which would be responsible for the planning, design, bidding and supervision of the project work, and keep close coordination with the three irrigation systems of LJC, LCC and CBDC offices on the project approval, finance and project implementation. The Project would be implemented under the organization of PIDA, which would be reorganized from PID, and would be of great importance in the coordination of activities among the respective departments concerned.

Prior to the commencement of the project work, the Project Director would be appointed under the Managing Director of PIDA. Three Deputy Directors would be nominated as co-managers to assist the Project Director to cover the responsibilities of respective departments of Technical/Civil Engineering, WUA & FO/Agriculture and Legislation.

Under the Technical Department, aiming at the smooth implementation, Planning, Engineering & Construction Section, Right-of-Way and Coordination Section, and Financial Section would be organized. Planning, Engineering & Construction Section would have the work for planning and monitoring of construction work, design and support of construction work and supervision of contract work. Right-of-Way and Coordination Section would deal with land acquisition, education and training to farmers,

management of claim during the construction. Financial Department would be in charge of disbursement and accounting.

### E.3.3 Construction Mode and Method

The open international competitive bidding would be conducted with financial assistance from international institution. The procedure of pre-qualification and bidding for the contract work have not been authorized. According to the draft procedure, the Awarding Committee would be chaired by the Managing Director of PIDA. Every matter would be dealt with by the departments concerned under the proposed organization and approved by the committee, through administrative arrangement of Planning, Engineering & Construction Section.

### E.3.4 Construction Schedule

Upon approval of the project, the detailed design as well as bidding documents, specifications and other documents/drawings necessary for the approval and implementation of the project work should be commenced and at the same time the selection of consultants would be carried out. The consultants would be selected first by the technical proposal. After approval of the selection, the contract conditions would be concluded. The pre-qualification documents would be revised by the consultants upon the commencement of consulting services and advertised after approval. The contract work would be bidden upon the approval of detailed design and construction drawings and started in the construction. The arrangement of all right-of-way should be accomplished before the construction with every efforts. These pre-construction activities are estimated to take about two years. Overall construction schedule is shown in Fig. E-2.

# *TABLES*

# Table E-1 Summary of Proposed Structures

| No. | Name of Distributry System | Outlet(Nos) | | | | Drop | | Bridge(Nos) | | | | | | | | | | | | | Step | Aqui- | Water | Pipe | Escape | Gates | Buffalo | total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total nos | Type of Outlet | | | Type A nos | Total nos | Type of Bridge | | | | | | | | | | | | RW | Total nos | duct | Course Cross | Culvert | | | Wallow | |
| | | | AOSM | Flume | Pipe | | | AR | | | | DR | | | | VR | | | | | | | | | | | | |
| | | | A | A | A | A | | All | A | B | C | All | A | B | C | All | A | B | C | B | A | B | B | B | A | A | A | |
| 1 | Pindi | 10 | 7 | 3 | | 3 | 4 | 0 | | | | 0 | | | | 4 | 1 | 1 | 2 | | | | | | | | 1 | 18 |
| 2 | Hujjan | 126 | 82 | 41 | 3 | 11 | 87 | 2 | 0 | 2 | 0 | 7 | 0 | 2 | 5 | 78 | 46 | 0 | 32 | 0 | 38 | 1 | 0 | 2 | 0 | 0 | 56 | 321 |
| 3 | Kirana | 174 | 136 | 31 | 7 | 12 | 98 | 1 | 0 | 1 | 0 | 9 | 0 | 3 | 6 | 82 | 30 | 13 | 39 | 6 | 21 | 1 | 0 | 2 | 0 | 0 | 52 | 360 |
| | LJC Total | 310 | 225 | 75 | 10 | 26 | 189 | 3 | 0 | 3 | 0 | 16 | 0 | 5 | 11 | 164 | 77 | 14 | 73 | 6 | 59 | 2 | 0 | 4 | 0 | 0 | 109 | 699 |
| 4 | Saranwala | 57 | 43 | 6 | 8 | | 26 | 0 | | | | 2 | | | 2 | 24 | 10 | 1 | 13 | | 10 | 1 | | | | | 17 | 111 |
| 5 | Nasrana | 172 | 136 | 26 | 10 | 12 | 71 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 63 | 17 | 6 | 40 | 3 | 1 | 3 | 0 | 2 | 0 | 0 | 35 | 296 |
| 6 | Gojra | 40 | 33 | 7 | 0 | 3 | 10 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 6 | 1 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 63 |
| 7 | Mungi | 86 | 83 | 2 | 1 | 1 | 21 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 3 | 17 | 12 | 1 | 4 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 12 | 124 |
| 8 | Janiwala/Hamza | 32 | 26 | 6 | 0 | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 4 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 48 |
| 9 | Pirmahal | 100 | 89 | 11 | 0 | 3 | 50 | 0 | 0 | 0 | 0 | 9 | 0 | 1 | 8 | 40 | 24 | 1 | 15 | 1 | 0 | 0 | 5 | 2 | 1 | 2 | 25 | 188 |
| 10 | Killianwala | 81 | 77 | 4 | 0 | 1 | 21 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 3 | 17 | 11 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 21 | 113 |
| | LCC Total | 568 | 487 | 62 | 19 | 23 | 207 | 0 | 0 | 0 | 0 | 28 | 0 | 3 | 25 | 175 | 79 | 11 | 85 | 4 | 12 | 5 | 5 | 5 | 1 | 8 | 124 | 943 |
| 11 | Theman | 72 | 51 | 7 | 14 | 1 | 31 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 29 | 21 | 0 | 8 | 1 | 10 | 2 | 0 | 0 | 0 | 2 | 14 | 130 |
| 12 | China | 88 | 74 | 9 | 5 | 1 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 23 | 0 | 3 | 0 | 3 | 1 | 0 | 0 | 0 | 2 | 20 | 139 |
| | CBDC Total | 160 | 125 | 16 | 19 | 2 | 57 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 55 | 44 | 0 | 11 | 1 | 13 | 3 | 0 | 0 | 0 | 4 | 34 | 269 |
| | Grand Total | 1,038 | 837 | 153 | 48 | 51 | 453 | 3 | 0 | 3 | 0 | 45 | 0 | 8 | 37 | 394 | 200 | 25 | 169 | 11 | 84 | 10 | 5 | 9 | 1 | 12 | 267 | 1,911 |

Note; A: New or Replaced, B: Retained and C: Repaired

## Table E-2 Proposed Structures for LJC Area

| No. | Name of Distributry | Name of Minor | Outlet(Nos) | | | | Drop | Bridge(Nos) | | | | | | | | | | | | | Step | Aqui-duct | Water Course Cross | Pipe Culvert | Escape | Gates | Buffalo Wallow | total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total nos | Type of Outlet | | | Type A nos | Total nos | Type of Bridge | | | | | | | | | | | | | | | | | | | |
| | | | | AOSM | Flume | Pipe | | | AR | | | | DR | | | | VR | | | | RW | Total nos | | | | | | | |
| | 1 | 2 | | A | A | A | A | | All | A | B | C | All | A | B | C | All | A | B | C | B | A | B | B | B | A | A | A | |
| 1 | Pindi | | 10 | 7 | 3 | | 3 | 4 | 0 | | | | 0 | | | | 4 | 1 | 1 | 2 | | | | | | | | 1 | 18 |
| 2 | Hujan | | 63 | 53 | 8 | 2 | 7 | 33 | 1 | | 1 | | 1 | | | 1 | 31 | 28 | | 3 | | 23 | | | 1 | | | 26 | 153 |
| 3 | Hujan | Arian | 6 | 3 | 3 | | 1 | 7 | 0 | | | | 0 | | | | 7 | 2 | | 5 | | 4 | | | | | | 5 | 23 |
| 4 | Hujan | Kot Momin | 12 | 3 | 9 | | 1 | 8 | 1 | | 1 | | 3 | | | 3 | 4 | 1 | | 3 | | 2 | | | 1 | | | 5 | 29 |
| 5 | Hujan | Kot Raja | 5 | 1 | 4 | | | 3 | 0 | | | | 0 | | | | 3 | 1 | | 2 | | | | | | | | 2 | 10 |
| 6 | Hujan | Bhikhi | 9 | 6 | 3 | | | 4 | 0 | | | | 0 | | | | 4 | 1 | | 3 | | 3 | | | | | | 3 | 19 |
| 7 | Hujan | Sahowai | 7 | 4 | 2 | 1 | | 12 | 0 | | | | 0 | | | | 12 | 6 | | 6 | | 4 | | | | | | 4 | 27 |
| 8 | Note; A: New | M.Wala | 5 | 2 | 3 | | | 7 | 0 | | | | 1 | | | 1 | 6 | 3 | | 3 | | 2 | | | | | | 3 | 17 |
| 9 | Hujan | Tangu | 5 | 3 | 2 | | 1 | 4 | 0 | | | | 1 | | 1 | | 3 | 1 | | 2 | | | | | | | | 3 | 13 |
| 10 | Hujan | Jaspal | 14 | 7 | 7 | | 1 | 9 | 0 | | | | 1 | | 1 | | 8 | 3 | | 5 | | | 1 | | | | | 5 | 30 |
| | sub-total | | 126 | 82 | 41 | 3 | 11 | 87 | 2 | 0 | 2 | 0 | 7 | 0 | 2 | 5 | 78 | 46 | 0 | 32 | 0 | 38 | 1 | 0 | 2 | 0 | 0 | 56 | 321 |
| 11 | Kirana *3 | | 99 | 89 | 8 | 2 | 12 | 37 | 1 | | 1 | | 4 | | | 4 | 31 | 15 | 4 | 12 | 1 | 21 | | | 1 | | | 28 | 198 |
| 12 | Kirana | Saruli | 2 | 0 | 2 | | | 3 | 0 | | | | 0 | | | | 3 | 2 | | 1 | | | | | | | | | 5 |
| 13 | Kirana | Hadda | 8 | 4 | 4 | | | 3 | 0 | | | | 0 | | | | 3 | | | 3 | | | | | | | | 2 | 13 |
| 14 | Kirana | Malkana | 16 | 11 | 4 | 1 | | 9 | 0 | | | | 2 | | | 2 | 7 | 1 | 1 | 5 | | | | | 1 | | | 5 | 31 |
| 15 | Kirana | Wasuana | 7 | 5 | 2 | | | 4 | 0 | | | | 1 | | 1 | | 3 | 2 | | 1 | | | | | | | | 1 | 12 |
| 16 | Kirana | Tandallan | 10 | 5 | 3 | 2 | | 13 | 0 | | | | 1 | | 1 | | 11 | | 4 | 7 | 1 | | | | | | | 5 | 28 |
| 17 | Kirana | Rodion | 11 | 8 | 3 | | | 8 | 0 | | | | 0 | | | | 6 | 2 | 2 | 2 | 2 | | 1 | | | | | 3 | 23 |
| 18 | Kirana | Hunde | 10 | 6 | 2 | 2 | | 9 | 0 | | | | 1 | | 1 | | 6 | 5 | | 1 | 2 | | | | 1 | | | 3 | 22 |
| 19 | Kirana | Killa | 7 | 4 | 3 | | | 8 | 0 | | | | 0 | | | | 8 | 3 | 2 | 3 | | | | | | | | 3 | 18 |
| 20 | Kirana | Dhabian | 4 | 4 | 0 | | | 4 | 0 | | | | 0 | | | | 4 | | | 4 | | | | | | | | 2 | 10 |
| | sub-total | | 174 | 136 | 31 | 7 | 12 | 98 | 1 | 0 | 1 | 0 | 9 | 0 | 3 | 6 | 82 | 30 | 13 | 39 | 6 | 21 | 1 | 0 | 2 | 0 | 0 | 52 | 360 |
| | Grand Total | | 310 | 225 | 75 | 10 | 26 | 189 | 3 | 0 | 3 | 0 | 16 | 0 | 5 | 11 | 164 | 77 | 14 | 73 | 6 | 59 | 2 | 0 | 4 | 0 | 0 | 109 | 699 |

Note; A: New or Replaced, B: Retained and C: Repaired *3: excluding chokera disty diversion facility

## Table E-3 Proposed Structures for LCC Area

| No. | Name of Distributry | Name of Minor | Outlet(Nos) | | | | Drop | Bridge(Nos) | | | | | | | | | | | | | Step | Aqui- | Water | Pipe | Escape | Gates | Buffalo | total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total nos | Type of Outlet | | | Type A nos | Total nos | Type of Bridge | | | | | | | | | | | | Total nos | duct | Course Cross | Culvert | | | Wallow | |
| | | | | AOSM | Flume | Pipe | | | AR | | | | DR | | | | VR | | | | RW | | | | | | | |
| | 1 | 2 | | A | A | A | A | | All | A | B | C | All | A | B | C | All | A | B | C | B | A | B | B | B | A | A | A | |
| 1 | SARANG WALA | | 57 | 43 | 6 | 8 | | 26 | 0 | | | | 2 | | | 2 | 24 | 10 | 1 | 13 | | 10 | 1 | | | | | 17 | 111 |
| 2 | NASRANA | | 135 | 117 | 8 | 10 | 10 | 38 | 0 | | | | 4 | | | 4 | 33 | 9 | 1 | 23 | 1 | 1 | 2 | | 1 | | | 25 | 212 |
| 3 | NASRANA | SAIDUANA | 3 | | 3 | | | 7 | 0 | | | | 0 | | | | 7 | 2 | | 5 | | | | | | | | | 10 |
| 4 | NASRANA | KHILLIANA | 5 | 2 | 3 | | | 2 | 0 | | | | 0 | | | | 2 | 1 | | 1 | | | 1 | | | | | | 8 |
| 5 | NASRANA | NARWALA | 3 | 3 | | | | 5 | 0 | | | | 1 | | | 1 | 4 | 2 | 1 | 1 | | | | | | | | | 8 |
| 6 | NASRANA | SATIANA | 6 | 1 | 5 | | | 3 | 0 | | | | 0 | | | | 3 | 1 | | 2 | | | | | | | | 1 | 10 |
| 7 | NASRANA | NATHERI | 8 | 5 | 3 | | 1 | 8 | 0 | | | | 0 | | | | 7 | | 3 | 4 | 1 | | | | | | | 5 | 22 |
| 8 | NASRANA | DOOMRA | 12 | 8 | 4 | | 1 | 8 | 0 | | | | 0 | | | | 7 | 2 | 1 | 4 | 1 | | | | 1 | | | 4 | 26 |
| | Sub-total | | 172 | 136 | 26 | 10 | 12 | 71 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 63 | 17 | 6 | 40 | 3 | 1 | 3 | 0 | 2 | 0 | 0 | 35 | 296 |
| 9 | GOJRA | | 36 | 32 | 4 | | 2 | 8 | 0 | | | | 3 | | | 3 | 5 | | 1 | 4 | | | | | | | | 7 | 53 |
| 10 | GOJRA | ZEERA | 4 | 1 | 3 | | 1 | 2 | 0 | | | | 1 | | | 1 | 1 | 1 | | | | | | | | | | 3 | 10 |
| | Sub-total | | 40 | 33 | 7 | 0 | 3 | 10 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 6 | 1 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 63 |
| 11 | MUNGI | | 77 | 77 | | | | 15 | 0 | | | | 3 | | | 3 | 12 | 11 | 1 | | | | | | 1 | | 2 | 11 | 106 |
| 12 | MUNGI | MUNGI | 9 | 6 | 2 | 1 | 1 | 6 | 0 | | | | 1 | | 1 | | 5 | 1 | | 4 | | | 1 | | | | | 1 | 18 |
| | Sub-total | | 86 | 83 | 2 | 1 | 1 | 21 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 3 | 17 | 12 | 1 | 4 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 12 | 124 |
| 13 | JANTWALA/HAMZA | | 22 | 18 | 4 | | 2 | 5 | 0 | | | | 0 | | | | 5 | 3 | 1 | 1 | | | | | | | | 2 | 31 |
| 14 | JANTWALA | AMIRWALA | 10 | 8 | 2 | | 1 | 3 | 0 | | | | 0 | | | | 3 | 1 | | 2 | | | | | | | 1 | 2 | 17 |
| | Sub-total | | 32 | 26 | 6 | 0 | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 4 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 48 |
| 15 | PIR MAHAL | | 55 | 50 | 5 | | 1 | 29 | 0 | | | | 4 | | 1 | 3 | 25 | 15 | | 10 | | | | 5 | 2 | 1 | 2 | 20 | 115 |
| 16 | PIR MAHAL | THERA | 5 | 3 | 2 | | | 2 | 0 | | | | 0 | | | | 2 | 2 | | | | | | | | | | | 7 |
| 17 | PIR MAHAL | MEGNEJA | 12 | 9 | 3 | | 1 | 7 | 0 | | | | 1 | | | 1 | 5 | 1 | 1 | 3 | 1 | | | | | | | | 20 |
| 18 | PIR MAHAL | JUNEJWALA | 24 | 23 | 1 | | 1 | 9 | 0 | | | | 4 | | | 4 | 5 | 5 | | | | | | | | | | 4 | 38 |
| 19 | PIR MAHAL | JANDWALA | 4 | 4 | | | | 3 | 0 | | | | 0 | | | | 3 | 1 | | 2 | | | | | | | | 1 | 8 |
| | Sub-total | | 100 | 89 | 11 | 0 | 3 | 50 | 0 | 0 | 0 | 0 | 9 | 0 | 1 | 8 | 40 | 24 | 1 | 15 | 1 | 0 | 0 | 5 | 2 | 1 | 2 | 25 | 188 |
| 20 | KILIANWALA | | 70 | 68 | 2 | | | 17 | 0 | | | | 4 | | 1 | 3 | 13 | 10 | | 3 | | 1 | | | | | 3 | 15 | 106 |
| 22 | KILIANWALA | MINOR #3 | 11 | 9 | 2 | | 1 | 4 | 0 | | | | 0 | | | | 4 | 1 | | 3 | | | | | | | | 6 | 22 |
| | Sub-total | | 81 | 77 | 4 | 0 | 1 | 21 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 3 | 17 | 11 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 21 | 128 |
| | Total | | 568 | 487 | 62 | 19 | 23 | 207 | 0 | 0 | 0 | 0 | 28 | 0 | 3 | 25 | 175 | 79 | 11 | 85 | 4 | 12 | 5 | 5 | 5 | 1 | 8 | 124 | 958 |

Note; A: New or Replaced, B: Retained and C: Repaired

## Table E-4 Proposed Structures for CBDC Area

| No. | Name of Distributry 1 | Name of Minor 2 | Outlet(Nos) Total nos | Type of Outlet AOSM A | Flume A | Pipe A | Drop Type A nos | Total nos | Bridge(Nos) Type of Bridge AR All | AR A | AR B | AR C | DR All | DR A | DR B | DR C | VR All | VR A | VR B | VR C | RW B | Step Total nos A | Aqui-duct B | Water Course Cross B | Pipe Culvert B | Escape A | Gates A | Buffalo Wallow A | total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Thaman | | 54 | 41 | 3 | 10 | 1 | 22 | 0 | | | | 1 | | | 1 | 20 | 12 | | 8 | 1 | 10 | 2 | | | | 2 | 11 | 102 |
| 2 | Theman | Saharan | 18 | 10 | 4 | 4 | | 9 | 0 | | | | 0 | | | | 9 | 9 | | | | | | | | | | 3 | 30 |
| | sub-total | | 72 | 51 | 7 | 14 | 1 | 31 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 29 | 21 | 0 | 8 | 1 | 10 | 2 | 0 | 0 | 0 | 2 | 14 | 132 |
| 3 | China | | 63 | 56 | 4 | 3 | 1 | 20 | 0 | | | | 0 | | | | 20 | 17 | | 3 | | 3 | 1 | | | | 2 | 16 | 106 |
| 4 | China | Kala | 25 | 18 | 5 | 2 | | 6 | 0 | | | | 0 | | | | 6 | 6 | | | | | | | | | | 4 | 35 |
| | sub-total | | 88 | 74 | 9 | 5 | 1 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 23 | 0 | 3 | 0 | 3 | 1 | 0 | 0 | 0 | 2 | 20 | 141 |
| | Grand Total | | 160 | 125 | 16 | 19 | 2 | 57 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 55 | 44 | 0 | 11 | 1 | 13 | 3 | 0 | 0 | 0 | 4 | 34 | 273 |

Note; A: New or Replaced, B: Retained and C: Repaired

## Table E-5 Project Work Volume Summary

| No. | Name of Distributary | Length | | | Design Discharge | Command Area | Construction Work Volume | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Earthwork in Prism | | | | Earthwork for Diversion | | Haulage | Lining Work | | | Land Compensation | |
| | | Total (km) | Lined (km) | for Lining (km) | (m3/s) | (ha) | Stripping (m3) | Excavation (m3) | Embankment (m3) | Trimming (m2) | Excavation (m3) | Embankment (m3) | Borrow&Haul (m3) | Concrete (m3) | Plaster (m2) | Joints (Linear M.) | (m2) | |
| 1 | Pindi | 6.86 | 0.00 | 6.86 | 0.54 | 2,285 | 2,874.3 | 17,830.8 | 33,447.8 | 22,920.0 | 5,405.3 | 18,298.4 | 28,510.1 | 1,746.3 | 22,920.0 | 7,812.6 | 13,938.5 | |
| 2 | Hujjan | 80.13 | 1.95 | 78.18 | 6.46 | 25,236 | 45,269.4 | 276,813.9 | 560,866.4 | 416,803.3 | 157,713.2 | 381,506.9 | 507,846.2 | 31,755.9 | 416,803.3 | 143,002.0 | 136,959.1 | |
| 3 | Kirana | 107.13 | 10.64 | 96.49 | 12.86 | 36,324 | 86,021.9 | 471,143.3 | 983,768.3 | 800,068.3 | 372,383.4 | 614,634.1 | 754,875.7 | 60,968.8 | 800,068.3 | 270,667.3 | 121,568.9 | |
| | LJC Total | 194.12 | 12.59 | 181.53 | 19.86 | 63,844 | 134,165.6 | 765,788.0 | 1,578,082.4 | 1,239,791.5 | 535,501.9 | 1,014,439.4 | 1,291,232.0 | 94,471.0 | 1,239,791.5 | 421,481.9 | 272,466.5 | |
| 4 | Sarangwala | 25.04 | 0.30 | 24.74 | 2.46 | 6,627 | 13,853.8 | 72,199.5 | 162,495.1 | 138,954.5 | 44,151.3 | 176,203.2 | 222,347.5 | 10,588.0 | 138,954.5 | 47,306.7 | 23,436.7 | |
| 5 | Nasrana | 81.42 | 5.65 | 75.77 | 8.87 | 34,677 | 63,068.1 | 364,533.1 | 763,555.3 | 545,287.5 | 533,637.8 | 276,423.9 | 141,808.3 | 41,580.2 | 545,287.5 | 61,170.2 | 303,211.4 | |
| 6 | Gojra | 17.77 | 2.25 | 15.52 | 1.95 | 7,540 | 8,712.8 | 48,274.9 | 99,850.1 | 82,510.1 | 36,175.8 | 61,583.4 | 76,982.8 | 6,287.6 | 82,510.1 | 29,359.6 | 16,669.9 | |
| 7 | Mungi | 41.29 | 3.98 | 37.31 | 5.39 | 19,161 | 26,146.3 | 160,320.2 | 346,437.0 | 259,539.6 | 114,944.9 | 311,992.6 | 383,164.4 | 19,774.2 | 259,539.6 | 79,125.8 | 76,134.7 | |
| 8 | Janiwala/Hamza | 18.58 | 0.00 | 18.58 | 1.59 | 6,513 | 8,405.1 | 48,315.8 | 95,381.2 | 69,849.2 | 27,789.7 | 56,288.0 | 75,563.7 | 5,321.8 | 69,849.2 | 35,332.3 | 2,639.1 | |
| 9 | Pir Mahal | 82.13 | 0.00 | 82.13 | 5.24 | 18,242 | 50,361.0 | 306,817.6 | 638,323.2 | 461,798.8 | 328,315.9 | 445,610.3 | 448,800.0 | 35,194.9 | 461,798.8 | 155,346.4 | 100,125.8 | |
| 10 | Killianwala | 52.71 | 15.73 | 36.98 | 6.96 | 21,019 | 35,217.7 | 217,627.4 | 454,506.5 | 328,683.0 | 140,293.7 | 589,830.0 | 686,415.4 | 25,043.9 | 328,683.0 | 110,804.6 | 192,600.9 | |
| | LCC Total | 318.94 | 27.91 | 291.03 | 32.46 | 113,779 | 205,764.7 | 1,218,088.5 | 2,560,548.3 | 1,886,622.6 | 1,225,309.1 | 1,917,931.4 | 2,035,082.1 | 143,790.5 | 1,886,622.6 | 518,445.6 | 714,818.5 | |
| 11 | Thamman | 37.09 | 3.22 | 33.87 | 8.29 | 9,816 | 27,122.3 | 144,321.8 | 312,375.0 | 223,425.1 | 156,107.5 | 173,015.8 | 184,961.5 | 17,023.6 | 223,425.1 | 82,392.4 | 209,499.6 | |
| 12 | China | 33.27 | 0.19 | 33.08 | 4.33 | 16,390 | 18,805.0 | 112,374.4 | 235,088.4 | 191,668.2 | 129,230.0 | 141,480.5 | 134,964.5 | 14,605.3 | 191,668.2 | 63,910.7 | 179,379.7 | |
| | CBDC Total | 70.36 | 3.41 | 66.95 | 12.62 | 26,206 | 45,927.3 | 256,696.2 | 547,463.4 | 415,093.3 | 285,337.4 | 314,496.3 | 319,926.0 | 31,628.9 | 415,093.3 | 146,303.0 | 388,879.3 | |
| | Project Total | 583.42 | 43.91 | 539.51 | 64.94 | 203,829.72 | 385,857.6 | 2,240,572.7 | 4,686,094.3 | 3,541,507.4 | 2,046,148.4 | 3,246,867.0 | 3,646,240.1 | 269,890.4 | 3,541,507.4 | 1,086,230.5 | 1,376,164.3 | |

## Table E-6 Project Work Volume for LJC Area

| No. | Name of Distributary | Name of Minor | Length | | | Design Discharge | Command Area | Construction Work Volume | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Earthwork in Prism | | | | Earthwork for Diversion | | Haulage | Lining Work | | | Land Compensation | |
| | | | Total (km) | Lined (km) | for Lining (km) | (m3/s) | (ha) | Stripping (m3) | Excavation (m3) | Embankment (m3) | Trimming (m2) | Excavation (m3) | Embankment (m3) | Borrow&Haul (m3) | Concrete (m3) | Plaster (m2) | Joints (Linear M.) | (m2) | |
| 1 | Pindi | | 6.86 | 0.00 | 6.86 | 0.54 | 2,285 | 2,874.3 | 17,830.8 | 33,447.8 | 22,920.0 | 5,405.3 | 18,298.4 | 28,510.1 | 1,746.3 | 22,920.0 | 7,812.6 | 13,938.5 | |
| 2 | Hujan | | 33.98 | 1.95 | 32.03 | 6.46 | 11,329 | 26,364.2 | 156,927.9 | 339,214.8 | 268,479.3 | 119,183.7 | 256,559.4 | 319,662.7 | 20,455.8 | 268,479.3 | 92,213.4 | 124,844.7 | |
| 3 | Hujan | Arian | 5.43 | 0.00 | 5.43 | 0.33 | 1,392 | 2,164.4 | 14,068.6 | 25,594.0 | 16,671.9 | 6,989.0 | 3,992.4 | 8,528.9 | 1,271.1 | 16,671.9 | 5,572.5 | 0.0 | |
| 4 | Hujjan | Kot Moman | 6.78 | 0.00 | 6.78 | 0.63 | 2,668 | 2,932.7 | 17,633.2 | 33,772.1 | 25,368.7 | 9,906.6 | 11,720.9 | 17,953.2 | 1,932.2 | 25,368.7 | 8,630.8 | 1,704.9 | |
| 5 | Hujjan | Kot Raja | 2.81 | 0.00 | 2.81 | 0.20 | 866 | 1,116.0 | 7,254.0 | 13,196.7 | 7,026.7 | 1,420.5 | 4,227.9 | 8,750.2 | 535.2 | 7,026.7 | 2,632.3 | 0.0 | |
| 6 | Hujjan | Bhikhi | 6.34 | 0.00 | 6.34 | 0.46 | 1,974 | 2,534.0 | 16,471.0 | 29,964.6 | 21,195.8 | 3,305.9 | 24,347.7 | 34,535.4 | 1,614.9 | 21,195.8 | 7,383.0 | 0.0 | |
| 7 | Hujjan | Sahowal | 5.76 | 0.00 | 5.76 | 0.37 | 1,575 | 2,304.8 | 14,981.2 | 27,254.3 | 17,707.6 | 4,255.5 | 21,084.1 | 29,101.6 | 1,348.3 | 17,707.6 | 6,033.7 | 10,409.5 | |
| 8 | Hujjan | M.Wala | 5.87 | 0.00 | 5.87 | 0.31 | 1,311 | 2,344.0 | 15,236.0 | 27,717.8 | 16,182.1 | 4,658.0 | 16,064.3 | 23,888.0 | 1,232.3 | 16,182.1 | 5,751.0 | 0.0 | |
| 9 | Hujjan | Tangu | 4.84 | 0.00 | 4.84 | 0.34 | 1,470 | 1,935.2 | 12,578.8 | 22,883.7 | 14,976.7 | 3,020.8 | 9,379.1 | 16,663.2 | 1,141.1 | 14,976.7 | 4,972.0 | 0.0 | |
| 10 | Hujjan | Jaspal | 8.32 | 0.00 | 8.32 | 0.63 | 2,651 | 3,574.1 | 21,663.2 | 41,268.4 | 29,194.6 | 4,973.3 | 34,131.1 | 48,763.0 | 2,225.0 | 29,194.6 | 9,813.3 | 0.0 | |
| | sub-total | | 80.13 | 1.95 | 78.18 | 6.46 | 25,236 | 45,269.4 | 276,813.9 | 560,866.4 | 416,803.3 | 157,713.2 | 381,506.9 | 507,846.2 | 31,755.9 | 416,803.3 | 143,002.0 | 136,959.1 | |
| 11 | Kirana | | 62.95 | 9.52 | 53.43 | 12.86 | 21,374 | 67,569.8 | 356,181.7 | 771,609.7 | 640,171.1 | 318,546.2 | 474,616.7 | 571,498.6 | 48,783.0 | 640,171.1 | 215,961.5 | 121,568.9 | |
| 12 | Kirana | Saruli | 1.59 | 0.00 | 1.59 | 0.14 | 606 | 634.0 | 4,121.0 | 7,497.1 | 4,064.1 | 1,126.8 | 2,632.4 | 4,881.6 | 310.3 | 4,064.1 | 1,391.2 | 0.0 | |
| 13 | Kirana | Hadda | 4.11 | 1.12 | 2.99 | 0.41 | 1,639 | 1,644.4 | 10,688.6 | 19,445.0 | 12,277.9 | 3,174.4 | 6,246.4 | 11,828.5 | 935.8 | 12,277.9 | 4,266.8 | 0.0 | |
| 14 | Kirana | Malkana | 10.16 | 0.00 | 10.16 | 0.87 | 3,548 | 4,571.4 | 26,254.8 | 50,158.2 | 40,932.4 | 11,020.6 | 38,151.1 | 51,033.9 | 3,118.5 | 40,932.4 | 14,095.0 | 0.0 | |
| 15 | Kirana | Wasuana | 6.89 | 0.00 | 6.89 | 0.41 | 1,731 | 2,802.4 | 18,215.6 | 33,138.4 | 19,771.4 | 8,665.0 | 12,299.7 | 18,557.5 | 1,507.6 | 19,771.4 | 6,798.0 | 0.0 | |
| 16 | Kirana | Tandalian | 3.96 | 0.00 | 3.96 | 0.32 | 1,304 | 1,584.8 | 10,301.2 | 18,740.3 | 12,336.1 | 14,554.6 | 13,569.7 | 7,454.3 | 939.0 | 12,336.1 | 4,182.6 | 0.0 | |
| 17 | Kirana | Rodian | 6.04 | 0.00 | 6.04 | 0.57 | 2,374 | 2,647.5 | 15,691.0 | 29,167.7 | 22,319.6 | 3,636.2 | 27,626.1 | 37,466.6 | 1,701.3 | 22,319.6 | 7,591.8 | 0.0 | |
| 18 | Kirana | Hunde | 4.92 | 0.00 | 4.92 | 0.43 | 1,778 | 1,967.2 | 12,786.8 | 23,262.1 | 15,932.5 | 5,063.2 | 10,637.4 | 16,049.5 | 1,213.9 | 15,932.5 | 5,399.9 | 0.0 | |
| 19 | Kirana | Killa | 4.10 | 0.00 | 4.10 | 0.27 | 1,147 | 1,637.2 | 10,641.8 | 19,359.9 | 12,087.0 | 3,258.2 | 8,537.8 | 13,897.7 | 920.8 | 12,087.0 | 4,043.4 | 0.0 | |
| 20 | Kirana | Dhabian | 2.41 | 0.00 | 2.41 | 0.19 | 822 | 963.2 | 6,260.8 | 11,389.8 | 20,176.2 | 3,238.3 | 20,316.8 | 22,207.5 | 1,538.6 | 20,176.2 | 6,937.2 | 0.0 | |
| | sub-total | | 107.13 | 10.64 | 96.49 | 12.86 | 36,324 | 86,021.9 | 471,143.3 | 983,768.3 | 800,068.3 | 372,383.4 | 614,634.1 | 754,875.7 | 60,968.8 | 800,068.3 | 270,667.3 | 121,568.9 | |
| | Total | | 194.12 | 12.59 | 181.53 | 19.86 | 63,844 | 134,165.6 | 765,788.0 | 1,578,082.4 | 1,239,791.5 | 535,501.9 | 1,014,439.4 | 1,291,232.0 | 94,471.0 | 1,239,791.5 | 421,481.9 | 272,466.5 | |

Total length for LJC is 184.18 km.

## Table E-7 Project Work Volume for LCC Area

| No. | Name of Distributary | Name of Minor | Length | | | Design Discharge | Command Area | Construction Work Volume | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Earthwork in Prism | | | | Earthwork for Diversion | | Haulage | Lining Work | | | Land | |
| | | | Total (km) | Lined (km) | for Lining (km) | (m3/s) | (ha) | Stripping (m3) | Excavation (m3) | Embankment (m3) | Trimming (m2) | Excavation (m3) | Embankment (m3) | Borrow&Haul (m3) | Concrete (m3) | Plaster (m2) | Joints (Linear M.) | Compensation (m2) | |
| 1 | Sarangwala | | 25.04 | 0.30 | 24.74 | 2.46 | 6,627 | 13,853.8 | 72,199.5 | 162,495.1 | 138,954.5 | 44,151.3 | 176,203.2 | 222,347.5 | 10,588.0 | 138,954.5 | 47,306.7 | 23,436.7 | |
| 2 | Nasrana | | 54.64 | 0.00 | 54.64 | 8.87 | 25,094 | 52,893.3 | 299,696.9 | 644,448.3 | 472,776.2 | 493,214.3 | 256,473.6 | 108,010.7 | 36,056.8 | 472,776.2 | 32,858.6 | 299,684.3 | |
| 3 | Nasrana | Saduana | 2.76 | 1.10 | 1.66 | 0.14 | 720 | 1,102.4 | 7,165.6 | 13,035.9 | 3,696.3 | 2,020.8 | 387.4 | 4,236.8 | 281.9 | 3,696.3 | 2,517.2 | | |
| 4 | Nasrana | Khilliana | 4.43 | 0.00 | 4.43 | 0.30 | 1,293 | 1,771.6 | 11,515.4 | 20,949.2 | 13,483.4 | 7,615.6 | 4,298.4 | 6,116.6 | 1,026.6 | 13,483.4 | 4,417.7 | | |
| 5 | Nasrana | Narwala | 5.82 | 2.47 | 3.35 | 0.48 | 2,139 | 1,584.8 | 10,301.2 | 18,740.3 | 14,300.9 | 5,107.1 | 5,745.8 | 9,077.7 | 1,088.6 | 14,300.9 | 5,674.9 | | |
| 6 | Nasrana | Satuana | 3.66 | 0.40 | 3.26 | 0.23 | 1,015 | 1,463.2 | 9,510.8 | 17,302.3 | 9,567.5 | 6,097.7 | 318.8 | 2,012.7 | 729.4 | 9,567.5 | 3,463.1 | | |
| 7 | Nasrana | Nathen | 4.60 | 0.82 | 3.78 | 0.44 | 1,800 | 1,850.0 | 12,025.0 | 21,876.3 | 13,927.2 | 7,046.4 | 3,744.3 | 6,549.2 | 1,061.2 | 13,927.2 | 5,673.9 | | |
| 8 | Nasrana | Domra | 5.51 | 0.86 | 4.65 | 0.61 | 2,616 | 2,402.8 | 14,318.2 | 27,203.1 | 17,536.0 | 12,535.8 | 5,455.5 | 5,804.6 | 1,335.7 | 17,536.0 | 6,564.9 | 3,527.1 | |
| | Sub-total | | 81.42 | 5.65 | 75.77 | 8.87 | 34,677 | 63,068.1 | 364,533.1 | 763,555.3 | 545,287.5 | 533,637.8 | 276,423.9 | 141,808.3 | 41,580.2 | 545,287.5 | 61,170.2 | 303,211.4 | |
| 9 | Goyra | | 15.06 | 2.10 | 12.96 | 1.95 | 6,347 | 7,632.4 | 41,252.3 | 87,074.4 | 75,324.4 | 31,401.8 | 59,028.0 | 73,448.2 | 5,739.6 | 75,324.4 | 26,798.2 | 16,669.9 | |
| 10 | Goyra | Zeera | 2.71 | 0.15 | 2.56 | 0.25 | 1,193 | 1,080.4 | 7,022.6 | 12,775.7 | 7,185.6 | 4,774.0 | 2,555.4 | 3,534.5 | 548.0 | 7,185.6 | 2,561.3 | | |
| | Sub-total | | 17.77 | 2.25 | 15.52 | 1.95 | 7,540 | 8,712.8 | 48,274.9 | 99,850.1 | 82,510.1 | 36,175.8 | 61,583.4 | 76,982.8 | 6,287.6 | 82,510.1 | 29,359.6 | 16,669.9 | |
| 11 | Mungi | | 36.97 | 3.98 | 32.99 | 5.03 | 17,657 | 24,435.9 | 149,202.6 | 326,211.5 | 247,325.2 | 113,181.5 | 305,784.4 | 369,611.8 | 18,841.7 | 247,325.2 | 74,314.0 | 76,134.7 | |
| 12 | Mungi | Mungi | 4.32 | 0.00 | 4.32 | 0.36 | 1,504 | 1,710.4 | 11,117.6 | 20,225.5 | 12,214.4 | 1,763.5 | 6,208.2 | 13,552.7 | 932.5 | 12,214.4 | 4,811.8 | | |
| | Sub-total | | 41.29 | 3.98 | 37.31 | 5.39 | 19,161 | 26,146.3 | 160,320.2 | 346,437.0 | 259,539.6 | 114,944.9 | 311,992.6 | 383,164.4 | 19,774.2 | 259,539.6 | 79,125.8 | 76,134.7 | |
| 13 | Janiwala/Hamza | | 10.96 | 0.00 | 10.96 | 1.59 | 4,360 | 5,157.1 | 28,503.8 | 57,798.6 | 42,676.8 | 17,436.4 | 38,900.3 | 50,758.7 | 3,252.3 | 42,676.8 | 25,999.6 | 2,639.1 | |
| 14 | Janiwala | Amirwala | 7.62 | 0.00 | 7.62 | 0.51 | 2,153 | 3,248.0 | 19,812.0 | 37,582.6 | 27,172.3 | 10,353.3 | 17,387.7 | 24,805.0 | 2,069.6 | 27,172.3 | 9,332.6 | | |
| | Sub-total | | 18.58 | 0.00 | 18.58 | 1.59 | 6,513 | 8,405.1 | 48,315.8 | 95,381.2 | 69,849.2 | 27,789.7 | 56,288.0 | 75,563.7 | 5,321.8 | 69,849.2 | 35,332.3 | 2,639.1 | |
| 15 | Pir Mahal | | 47.57 | 0.00 | 47.57 | 5.24 | 9,902 | 34,433.7 | 216,766.6 | 458,535.2 | 327,746.7 | 279,542.2 | 341,696.2 | 303,922.6 | 24,978.2 | 327,746.7 | 108,393.0 | 99,626.3 | |
| 16 | Pir Mahal | Thera | 4.85 | 0.00 | 4.85 | 0.23 | 1,012 | 1,940.4 | 12,612.6 | 22,945.2 | 12,584.5 | 2,679.1 | 8,464.4 | 16,118.0 | 959.9 | 12,584.5 | 4,212.9 | | |
| 17 | Pir Mahal | Magneja | 9.89 | 0.00 | 9.89 | 0.45 | 1,818 | 4,942.5 | 25,701.0 | 54,367.5 | 40,913.2 | 13,666.4 | 31,454.1 | 46,454.3 | 3,119.2 | 40,913.2 | 14,622.7 | | |
| 18 | Pir Mahal | Juneywala | 16.08 | 0.00 | 16.08 | 1.18 | 4,703 | 7,535.6 | 41,930.2 | 84,633.7 | 71,081.0 | 31,643.5 | 45,466.9 | 56,526.8 | 5,416.1 | 71,081.0 | 24,936.2 | 499.5 | |
| 19 | Pir Mahal | Jandwala | 3.74 | 0.00 | 3.74 | 0.18 | 807 | 1,508.8 | 9,807.2 | 17,841.6 | 9,473.5 | 784.8 | 18,528.7 | 25,778.3 | 721.6 | 9,473.5 | 3,181.7 | | |
| | Sub-total | | 82.13 | 0.00 | 82.13 | 5.24 | 18,242 | 50,361.0 | 306,817.6 | 638,323.2 | 461,798.8 | 328,315.9 | 445,610.3 | 448,800.0 | 35,194.9 | 461,798.8 | 155,346.4 | 100,125.8 | |
| 20 | Killianwala | | 46.05 | 15.73 | 30.32 | 6.96 | 19,278 | 32,552.5 | 200,303.6 | 422,990.5 | 306,346.7 | 123,774.6 | 583,345.6 | 682,257.9 | 23,339.9 | 306,346.7 | 103,258.8 | 192,600.9 | |
| 22 | Killianwala | Minor #3 | 6.66 | 0.00 | 6.66 | 0.39 | 1,741 | 2,665.2 | 17,323.8 | 31,516.0 | 22,336.3 | 16,519.1 | 6,484.4 | 4,157.5 | 1,703.9 | 22,336.3 | 7,545.8 | | |
| | Sub-total | | 52.71 | 15.73 | 36.98 | 6.96 | 21,019 | 35,217.7 | 217,627.4 | 454,506.5 | 328,683.0 | 140,293.7 | 589,830.0 | 686,415.4 | 25,043.9 | 328,683.0 | 110,804.6 | 192,600.9 | |
| | Total | | 318.94 | 27.91 | 291.03 | 32.46 | 113,779 | 205,764.7 | 1,218,088.5 | 2,560,548.3 | 1,886,622.6 | 1,225,309.1 | 1,917,931.4 | 2,035,082.1 | 143,790.5 | 1,886,622.6 | 518,445.6 | 714,818.5 | |

Total length for LCC is 290.07 km.

## Table E-8 Project Work Volume for CBDC Area

| No. | Name of Distributary | Name of Minor | Length | | | Design Discharge | Command Area | Construction Work Volume | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Earthwork in Prism | | | | Earthwork for Diversion | | Haulage | Lining Work | | | Land | |
| | | | Total (km) | Lined (km) | for Lining (km) | (m3/s) | (ha) | Stripping (m3) | Excavation (m3) | Embankment (m3) | Trimming (m2) | Excavation (m3) | Embankment (m3) | Borrow&Haul (m3) | Concrete (m3) | Plaster (m2) | Joints (Linear M.) | Compensation (m2) | |
| 1 | Thamman | | 29.85 | 3.22 | 26.63 | 8.29 | 6,599 | 23,836.9 | 125,552.4 | 275,166.1 | 196,545.3 | 138,853.6 | 162,585.5 | 173,345.6 | 14,975.0 | 196,545.3 | 72,328.7 | 183,665.5 | |
| 2 | Themman | Saharan | 7.24 | 0.00 | 7.24 | 0.82 | 3,217 | 3,285.4 | 18,769.4 | 37,208.9 | 26,879.8 | 17,253.9 | 10,430.3 | 11,615.9 | 2,048.6 | 26,879.8 | 10,063.6 | 25,834.1 | |
| | sub-total | | 37.09 | 3.22 | 33.87 | 8.29 | 9,816 | 27,122.3 | 144,321.8 | 312,375.0 | 223,425.1 | 156,107.5 | 173,015.8 | 184,961.5 | 17,023.6 | 223,425.1 | 82,392.4 | 209,499.6 | |
| 3 | China | | 25.46 | 0.19 | 25.27 | 4.33 | 12,664 | 15,097.1 | 92,060.6 | 193,646.1 | 156,512.1 | 103,220.2 | 124,843.8 | 123,209.0 | 11,928.2 | 156,512.1 | 52,122.0 | 139,590.5 | |
| 4 | China | Kale Minor | 7.81 | 0.00 | 7.81 | 0.96 | 3,726 | 3,707.9 | 20,313.8 | 41,442.3 | 35,156.1 | 26,009.8 | 16,636.7 | 11,755.5 | 2,677.1 | 35,156.1 | 11,788.6 | 39,789.2 | |
| | sub-total | | 33.27 | 0.19 | 33.08 | 4.33 | 16,390 | 18,805.0 | 112,374.4 | 235,088.4 | 191,668.2 | 129,230.0 | 141,480.5 | 134,964.5 | 14,605.3 | 191,668.2 | 63,910.7 | 179,379.7 | |
| | Total | | 70.36 | 3.41 | 66.95 | 12.62 | 26,206 | 45,927.3 | 256,696.2 | 547,463.4 | 415,093.3 | 285,337.4 | 314,496.3 | 319,926.0 | 31,628.9 | 415,093.3 | 146,303.0 | 388,879.3 | |

Total length for CBDC is 67.34 km.

## Table E-9 Financial Cost for Lining of Distributaries and Minors

| Work Item | Specificaton | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | | | | | 2,421.9 | 0.0 | 2,421.9 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 980.0 | 0.0 | 980.0 |
| | Sub-total | | | | | | 3,401.9 | 0.0 | 3,401.9 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 12 | 10,704.0 | 3,600.0 | 7,104.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 385857.7 | 8,681.8 | 6,713.9 | 1,967.9 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 2240572.7 | 86,262.0 | 60,495.5 | 25,766.6 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 4686094.3 | 271,324.9 | 210,405.6 | 60,919.2 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 3646240.2 | 199,084.7 | 155,329.8 | 43,754.9 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 3541507.6 | 32,227.7 | 0.0 | 32,227.7 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 2046148.5 | 78,776.7 | 55,246.0 | 23,530.7 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 3246867.1 | 167,213.7 | 133,121.6 | 34,092.1 |
| | Sub-total | | | | | | 834,889.7 | 614,598.5 | 220,291.2 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 3541507.6 | 183,450.1 | 43,560.5 | 139,889.6 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 269890.5 | 808,645.9 | 289,403.6 | 519,242.3 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 1086230.6 | 27,155.8 | 21,724.6 | 5,431.2 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 1,019,251.8 | 354,688.7 | 664,563.0 |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 1038 | 26,988.0 | 8,096.4 | 18,891.6 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 200 | 8,000.0 | 2,400.0 | 5,600.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 51 | 3,060.0 | 918.0 | 2,142.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 84 | 5,040.0 | 1,512.0 | 3,528.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 267 | 18,690.0 | 5,607.0 | 13,083.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | 1 | 70.0 | 21.0 | 49.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 37 | 296.0 | 88.8 | 207.2 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 169 | 676.0 | 202.8 | 473.2 |
| | Sub-total | | | | | | 62,820.0 | 18,846.0 | 43,974.0 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 57,830.0 | 29,752.0 | 28,078.0 |
| **Direct Cost** | | | | | | | **1,985,495.5** | **1,021,485.2** | **964,010.2** |
| III Administration and Consulting Cost | | | | | | | 284,236.3 | 206672.0 | 77564.3 |
| IV Institutional Reform Cost | | | | | | | 76,118.2 | 34544.0 | 41574.2 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 234,925.2 | 126,270.1 | 108,655.1 |
| **Base Construction Cost** | | | | | | | **2,584,177.0** | **1,388,971.3** | **1,195,205.7** |
| | | | | | | | 372.9 | 200.4 | 172.5 |
| Price Escaration | | | | | | | 535,760.1 | 285,222.1 | 250,538.0 |
| **Total Project Cost** | | | | | | | **3,119,937.1** | **1,674,193.4** | **1,445,743.7** |
| | US$. per ha | | | | | | 450.2 | 241.6 | 208.6 |

## Table E-10 Financial Cost for Each Distributary Systems

| No. | Name of Distributary | Length | | | Design Discharge | Command Area | Construction Cost (Rs. in Million) | | | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total (km) | Lined (km) | for Lining (km) | (m3/s) | (ha) | Compen-sation | Gate | Earth-work | Lining | Structure | Other | Direct Cost | Admi & Conti | Institu-tion | Phisical Conti. | Base Cost | Price Conti. | Total Cost | |
| | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 1 | Pindi | 6.86 | 0.00 | 6.86 | 0.54 | 2,285 | 0.05 | 0.00 | 5.54 | 6.61 | 0.56 | 0.38 | 13.09 | 1.88 | 0.50 | 1.55 | 17.08 | 0.00 | 17.08 | |
| 2 | Hujjan | 80.13 | 1.95 | 78.18 | 6.46 | 25,236 | 0.56 | 0.00 | 100.37 | 120.31 | 12.14 | 6.98 | 239.81 | 34.34 | 9.19 | 28.39 | 312.30 | 0.00 | 312.30 | |
| 3 | Kirana | 107.13 | 10.64 | 96.49 | 12.86 | 50,765 | 0.33 | 0.00 | 169.59 | 230.88 | 11.55 | 12.36 | 424.38 | 60.30 | 16.30 | 50.13 | 551.45 | 0.00 | 551.45 | |
| | LJC Total | 194.12 | 12.59 | 181.53 | 19.86 | 78,286 | 0.94 | 0.00 | 275.50 | 357.81 | 24.25 | 19.73 | 677.29 | 96.52 | 26.00 | 80.08 | 880.83 | 0.00 | 880.83 | |
| 4 | Sarangwala | 25.04 | 0.30 | 24.74 | 2.46 | 6,627 | 0.14 | 0.00 | 36.37 | 40.10 | 3.74 | 2.41 | 82.62 | 11.95 | 3.16 | 9.79 | 107.65 | 0.00 | 107.65 | |
| 5 | Nasrana | 81.42 | 5.65 | 75.77 | 8.87 | 34,677 | 0.72 | 0.00 | 105.73 | 154.36 | 8.58 | 8.06 | 276.73 | 38.71 | 10.68 | 32.68 | 359.52 | 0.00 | 359.52 | |
| 6 | Gojra | 17.77 | 2.25 | 15.52 | 1.95 | 7,540 | 0.07 | 0.00 | 17.16 | 23.85 | 2.01 | 1.29 | 44.30 | 6.27 | 1.70 | 5.23 | 57.58 | 0.00 | 57.58 | |
| 7 | Mungi | 41.29 | 3.98 | 37.31 | 5.39 | 19,161 | 0.18 | 1.78 | 70.01 | 74.67 | 3.66 | 4.50 | 154.62 | 22.45 | 5.90 | 18.32 | 201.48 | 0.00 | 201.48 | |
| 8 | Janiwala/Hamza | 18.58 | 0.00 | 18.58 | 1.59 | 6,513 | 0.03 | 0.89 | 16.11 | 20.45 | 1.46 | 1.17 | 40.08 | 5.72 | 1.54 | 4.74 | 52.11 | 0.00 | 52.11 | |
| 9 | Pir Mahal | 82.13 | 0.00 | 82.13 | 5.24 | 18,242 | 0.22 | 1.78 | 113.07 | 133.26 | 5.68 | 7.61 | 261.40 | 37.61 | 10.01 | 30.92 | 340.16 | 0.00 | 340.16 | |
| 10 | Killianwala | 52.71 | 15.73 | 36.98 | 6.96 | 27,798 | 0.37 | 2.68 | 110.94 | 94.83 | 4.18 | 6.38 | 219.01 | 32.53 | 8.31 | 26.02 | 286.24 | 0.00 | 286.24 | |
| | LCC Total | 318.94 | 27.91 | 291.03 | 32.46 | 120,558 | 1.73 | 7.14 | 469.38 | 541.51 | 29.32 | 31.42 | 1,078.77 | 155.24 | 41.30 | 127.70 | 1,404.74 | 0.00 | 1,404.74 | |
| 11 | Thamman | 37.09 | 3.22 | 33.87 | 8.29 | 25,877 | 0.39 | 1.78 | 50.70 | 64.64 | 4.39 | 3.65 | 125.16 | 17.81 | 4.81 | 14.82 | 162.98 | 0.00 | 162.98 | |
| 12 | China | 33.27 | 0.19 | 33.08 | 4.33 | 16,390 | 0.34 | 1.78 | 39.31 | 55.29 | 4.86 | 3.04 | 104.28 | 14.66 | 4.02 | 12.33 | 135.63 | 0.00 | 135.63 | |
| | CBDC Total | 70.36 | 3.41 | 66.95 | 12.62 | 42,267 | 0.72 | 3.57 | 90.01 | 119.93 | 9.25 | 6.68 | 229.44 | 32.48 | 8.82 | 27.15 | 298.61 | 0.00 | 298.61 | |
| | Project Total | 583.42 | 43.91 | 539.51 | 64.94 | 241,111.13 | 3.40 | 10.70 | 834.89 | 1,019.25 | 62.82 | 57.83 | 1,985.50 | 284.24 | 76.12 | 234.93 | 2,584.18 | 0.00 | 2,584.18 | |

## Table E-11 Direct Construction Cost for Lining on Pindi Distributary System

| Work Item | Specificaion | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 1.39 | 24.5 | 0.0 | 24.5 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 30.0 | 0.0 | 30.0 |
| | Sub-total | | | | | | 54.5 | 0.0 | 54.5 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 0 | 0.0 | 0.0 | 0.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 2874.3 | 64.7 | 50.0 | 14.7 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 17830.8 | 686.5 | 481.4 | 205.1 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 33447.8 | 1,936.6 | 1,501.8 | 434.8 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 28510.1 | 1,556.7 | 1,214.5 | 342.1 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 22920 | 208.6 | 0.0 | 208.6 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 5405.3 | 208.1 | 145.9 | 62.2 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 18298.4 | 942.4 | 750.2 | 192.1 |
| | Sub-total | | | | | | 5,538.8 | 4,093.9 | 1,444.9 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 22920 | 1,187.3 | 281.9 | 905.3 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 1746.3 | 5,232.3 | 1,872.6 | 3,359.7 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 7812.6 | 195.3 | 156.3 | 39.1 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 6,614.8 | 2,310.7 | 4,304.1 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 10 | 260.0 | 78.0 | 182.0 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 1 | 40.0 | 12.0 | 28.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 3 | 180.0 | 54.0 | 126.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | | 0.0 | 0.0 | 0.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 1 | 70.0 | 21.0 | 49.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | | 0.0 | 0.0 | 0.0 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 2 | 8.0 | 2.4 | 5.6 |
| | Sub-total | | | | | | 558.0 | 167.4 | 390.6 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 381.3 | 197.2 | 184.2 |
| **Direct Cost** | | | | | | | **13,093.0** | **6,769.2** | **6,323.8** |
| III Administration and Consulting Cost | | | | | | | 1,878.4 | 1,369.6 | 508.8 |
| IV Institutional Reform Cost | | | | | | | 501.6 | 228.9 | 272.7 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 1,552.7 | 836.8 | 716.0 |
| **Base Construction Cost** | | | | | | | **17,080.2** | **9,204.5** | **7,875.7** |

**Table E-12 Direct Construction Cost for Lining on Hujjan Distributary System**

| Work Item | Specificaion | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 13.7 | 241.1 | 0.0 | 241.1 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 320.0 | 0.0 | 320.0 |
| | Sub-total | | | | | | 561.1 | 0.0 | 561.1 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 0 | 0.0 | 0.0 | 0.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 45269.4 | 1,018.6 | 787.7 | 230.9 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 276813.9 | 10,657.3 | 7,474.0 | 3,183.4 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 560866.4 | 32,474.2 | 25,182.9 | 7,291.3 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 507846.2 | 27,728.4 | 21,634.2 | 6,094.2 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 416803.3 | 3,792.9 | 0.0 | 3,792.9 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 157713.2 | 6,072.0 | 4,258.3 | 1,813.7 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 381506.9 | 19,647.6 | 15,641.8 | 4,005.8 |
| | Sub-total | | | | | | 100,372.4 | 74,191.2 | 26,181.2 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 416803.3 | 21,590.4 | 5,126.7 | 16,463.7 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 31755.9 | 95,147.0 | 34,051.9 | 61,095.2 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 143002 | 3,575.1 | 2,860.0 | 715.0 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 120,312.5 | 42,038.6 | 78,273.9 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 126 | 3,276.0 | 982.8 | 2,293.2 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 46 | 1,840.0 | 552.0 | 1,288.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 11 | 660.0 | 198.0 | 462.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 38 | 2,280.0 | 684.0 | 1,596.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 56 | 3,920.0 | 1,176.0 | 2,744.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 5 | 40.0 | 12.0 | 28.0 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 32 | 128.0 | 38.4 | 89.6 |
| | Sub-total | | | | | | 12,144.0 | 3,643.2 | 8,500.8 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 6,984.9 | 3,596.2 | 3,388.7 |
| **Direst Cost** | | | | | | | **239,813.7** | **123,469.1** | **116,344.6** |
| III Administration and Consulting Cost | | | | | | | 34,342.0 | 24,980.9 | 9,361.1 |
| IV Institutional Reform Cost | | | | | | | 9,192.9 | 4,175.4 | 5,017.5 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 28,391.0 | 15,262.5 | 13,128.4 |
| **Base Construction Cost** | | | | | | | **312,300.7** | **167,888.0** | **144,412.8** |

## Table E-13 Direct Construction Cost for Lining on Kirana Distributary System

| Work Item | Specificaton | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 12.16 | 214.0 | 0.0 | 214.0 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 115.0 | 0.0 | 115.0 |
| | Sub-total | | | | | | 329.0 | 0.0 | 329.0 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 0 | 0.0 | 0.0 | 0.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 86021.9 | 1,935.5 | 1,496.8 | 438.7 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 471143.3 | 18,139.0 | 12,720.9 | 5,418.1 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 983768.3 | 56,960.2 | 44,171.2 | 12,789.0 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 754875.7 | 41,216.2 | 32,157.7 | 9,058.5 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 800068.3 | 7,280.6 | 0.0 | 7,280.6 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 372383.4 | 14,336.8 | 10,054.4 | 4,282.4 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 614634.1 | 31,653.7 | 25,200.0 | 6,453.7 |
| | Sub-total | | | | | | 169,586.5 | 124,304.1 | 45,282.3 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 800068.3 | 41,443.5 | 9,840.8 | 31,602.7 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 60968.8 | 182,674.7 | 65,376.8 | 117,297.9 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 270667.3 | 6,766.7 | 5,413.3 | 1,353.3 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 230,884.9 | 80,631.0 | 150,253.9 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 174 | 4,524.0 | 1,357.2 | 3,166.8 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 30 | 1,200.0 | 360.0 | 840.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 12 | 720.0 | 216.0 | 504.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 21 | 1,260.0 | 378.0 | 882.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 52 | 3,640.0 | 1,092.0 | 2,548.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 6 | 48.0 | 14.4 | 33.6 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 39 | 156.0 | 46.8 | 109.2 |
| | Sub-total | | | | | | 11,548.0 | 3,464.4 | 8,083.6 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 12,360.6 | 6,252.0 | 6,108.6 |
| **Direst Cost** | | | | | | | **424,380.0** | **214,651.5** | **209,728.4** |
| III Administration and Consulting Cost | | | | | | | 60,304.1 | 43,429.4 | 16,874.8 |
| IV Institutional Reform Cost | | | | | | | 16,303.8 | 7,259.0 | 9,044.8 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 50,131.7 | 26,534.0 | 23,597.7 |
| **Base Construction Cost** | | | | | | | **551,448.6** | **291,873.9** | **259,574.7** |

## Table E-14 Direct Construction Cost for Lining on Sarangwala Distributary System

| Work Item | Specification | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Conpensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 2.34 | 41.2 | 0.0 | 41.2 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 95.0 | 0.0 | 95.0 |
| | Sub-total | | | | | | 136.2 | 0.0 | 136.2 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 0 | 0.0 | 0.0 | 0.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 13853.8 | 311.7 | 241.1 | 70.7 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 72199.5 | 2,779.7 | 1,949.4 | 830.3 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 162495.1 | 9,408.5 | 7,296.0 | 2,112.4 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 222347.5 | 12,140.2 | 9,472.0 | 2,668.2 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 138954.5 | 1,264.5 | 0.0 | 1,264.5 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 44151.3 | 1,699.8 | 1,192.1 | 507.7 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 176203.2 | 9,074.5 | 7,224.3 | 1,850.1 |
| | Sub-total | | | | | | 36,367.1 | 27,133.8 | 9,233.3 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 138954.5 | 7,197.8 | 1,709.1 | 5,488.7 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 10588 | 31,723.8 | 11,353.5 | 20,370.3 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 47306.7 | 1,182.7 | 946.1 | 236.5 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 40,104.3 | 14,008.8 | 26,095.5 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 57 | 1,482.0 | 444.6 | 1,037.4 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 10 | 400.0 | 120.0 | 280.0 |
| Drop | | nos | 60000 | 18000 | 42000 | | 0.0 | 0.0 | 0.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 10 | 600.0 | 180.0 | 420.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 17 | 1,190.0 | 357.0 | 833.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 2 | 16.0 | 4.8 | 11.2 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 13 | 52.0 | 15.6 | 36.4 |
| | Sub-total | | | | | | 3,740.0 | 1,122.0 | 2,618.0 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 2,406.3 | 1,267.9 | 1,138.4 |
| **Direst Cost** | | | | | | | **82,617.7** | **43,532.6** | **39,085.2** |
| III Administration and Consulting Cost | | | | | | | 11,952.5 | 8,807.7 | 3,144.8 |
| IV Institutional Reform Cost | | | | | | | 3,157.8 | 1,472.2 | 1,685.6 |
| V Physical Contingency (10% of item I, II,III and IV) | | | | | | | 9,786.4 | 5,381.2 | 4,405.2 |
| **Base Construction Cost** | | | | | | | **107,650.6** | **59,193.7** | **48,456.9** |

## Table E-15 Direct Construction Cost for Lining on Nasrana Distributary System

| Work Item | Specificalon | Unit | Unit Cost(Rs.) Total | F | L | Work Volume | Cost(1,000Rs.) Total | F | L |
|---|---|---|---|---|---|---|---|---|---|
| I Conpensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 30.32 | 533.6 | 0.0 | 533.6 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 190.0 | 0.0 | 190.0 |
| | Sub-total | | | | | | 723.6 | 0.0 | 723.6 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 0 | 0.0 | 0.0 | 0.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 63068.1 | 1,419.0 | 1,097.4 | 321.6 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 364533.1 | 14,034.5 | 9,842.4 | 4,192.1 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 763555.3 | 44,209.9 | 34,283.6 | 9,926.2 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 141808.3 | 7,742.7 | 6,041.0 | 1,701.7 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 545287.5 | 4,962.1 | 0.0 | 4,962.1 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 533637.8 | 20,545.1 | 14,408.2 | 6,136.8 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 276423.9 | 14,235.8 | 11,333.4 | 2,902.5 |
| | Sub-total | | | | | | 105,730.1 | 75,908.7 | 29,821.5 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 545287.5 | 28,245.9 | 6,707.0 | 21,538.9 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 41580.2 | 124,582.6 | 44,586.4 | 79,996.1 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 61170.2 | 1,529.3 | 1,223.4 | 305.9 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 154,357.7 | 52,516.9 | 101,840.9 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 172 | 4,472.0 | 1,341.6 | 3,130.4 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 17 | 680.0 | 204.0 | 476.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 12 | 720.0 | 216.0 | 504.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 1 | 60.0 | 18.0 | 42.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 35 | 2,450.0 | 735.0 | 1,715.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 5 | 40.0 | 12.0 | 28.0 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 40 | 160.0 | 48.0 | 112.0 |
| | Sub-total | | | | | | 8,582.0 | 2,574.6 | 6,007.4 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 8,060.1 | 3,930.0 | 4,130.1 |
| **Direst Cost** | | | | | | | **276,730.0** | **134,930.2** | **141,799.8** |
| III Administration and Consulting Cost | | | | | | | 38,709.0 | 27,299.7 | 11,409.2 |
| IV Institutional Reform Cost | | | | | | | 10,678.3 | 4,563.0 | 6,115.3 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 32,684.1 | 16,679.3 | 16,004.8 |
| **Base Construction Cost** | | | | | | | **359,524.9** | **183,472.2** | **176,052.7** |

## Table E-16 Direct Construction Cost for Lining on Gojra Distributary System

| Work Item | Specificalon | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 1.67 | 29.4 | 0.0 | 29.4 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 40.0 | 0.0 | 40.0 |
| | Sub-total | | | | | | 69.4 | 0.0 | 69.4 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 0 | 0.0 | 0.0 | 0.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 8712.8 | 196.0 | 151.6 | 44.4 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 48274.9 | 1,858.6 | 1,303.4 | 555.2 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 99850.1 | 5,781.3 | 4,483.3 | 1,298.1 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 76982.8 | 4,203.3 | 3,279.5 | 923.8 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 82510.1 | 750.8 | 0.0 | 750.8 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 36175.8 | 1,392.8 | 976.7 | 416.0 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 61583.4 | 3,171.5 | 2,524.9 | 646.6 |
| | Sub-total | | | | | | 17,158.3 | 12,567.8 | 4,590.5 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 82510.1 | 4,274.0 | 1,014.9 | 3,259.1 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 6287.6 | 18,838.9 | 6,742.2 | 12,096.7 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 29359.6 | 734.0 | 587.2 | 146.8 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 23,846.9 | 8,344.3 | 15,502.7 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 40 | 1,040.0 | 312.0 | 728.0 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 1 | 40.0 | 12.0 | 28.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 3 | 180.0 | 54.0 | 126.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 0 | 0.0 | 0.0 | 0.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 10 | 700.0 | 210.0 | 490.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | 0 | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 4 | 32.0 | 9.6 | 22.4 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 4 | 16.0 | 4.8 | 11.2 |
| | Sub-total | | | | | | 2,008.0 | 602.4 | 1,405.6 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 1,290.4 | 645.4 | 645.0 |
| **Direst Cost** | | | | | | | **44,303.6** | **22,159.9** | **22,143.7** |
| III Administration and Consulting Cost | | | | | | | 6,265.2 | 4,483.5 | 1,781.7 |
| IV Institutional Reform Cost | | | | | | | 1,704.4 | 749.4 | 955.0 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 5,234.3 | 2,739.3 | 2,495.0 |
| **Base Construction Cost** | | | | | | | **57,576.8** | **30,132.1** | **27,444.7** |

## Table E-17 Direct Construction Cost for Lining on Mungi Distributary System

| Work Item | Specificaion | Unit | Unit Cost(Rs.) Total | F | L | Work Volume | Cost(1,000Rs.) Total | F | L |
|---|---|---|---|---|---|---|---|---|---|
| I Conpensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 7.61 | 133.9 | 0.0 | 133.9 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 50.0 | 0.0 | 50.0 |
| | Sub-total | | | | | | 183.9 | 0.0 | 183.9 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 2 | 1,784.0 | 600.0 | 1,184.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 26146.3 | 588.3 | 454.9 | 133.3 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 160320.2 | 6,172.3 | 4,328.6 | 1,843.7 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 346437 | 20,058.7 | 15,555.0 | 4,503.7 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 383164.5 | 20,920.8 | 16,322.8 | 4,598.0 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 259539.6 | 2,361.8 | 0.0 | 2,361.8 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 114944.9 | 4,425.4 | 3,103.5 | 1,321.9 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 311992.6 | 16,067.6 | 12,791.7 | 3,275.9 |
| | Sub-total | | | | | | 70,006.6 | 52,101.7 | 17,901.9 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 259539.6 | 13,444.2 | 3,192.3 | 10,251.8 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 19774.2 | 59,247.5 | 21,203.9 | 38,043.6 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 79125.8 | 1,978.1 | 1,582.5 | 395.6 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 74,669.8 | 25,978.7 | 48,691.0 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 86 | 2,236.0 | 670.8 | 1,565.2 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 12 | 480.0 | 144.0 | 336.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 1 | 60.0 | 18.0 | 42.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 0 | 0.0 | 0.0 | 0.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 12 | 840.0 | 252.0 | 588.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | 0 | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 3 | 24.0 | 7.2 | 16.8 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 4 | 16.0 | 4.8 | 11.2 |
| | Sub-total | | | | | | 3,656.0 | 1,096.8 | 2,559.2 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 4,503.5 | 2,393.3 | 2,110.2 |
| **Direst Cost** | | | | | | | **154,619.9** | **82,170.5** | **72,449.3** |
| III Administration and Consulting Cost | | | | | | | 22,454.4 | 16,625.2 | 5,829.3 |
| IV Institutional Reform Cost | | | | | | | 5,903.3 | 2,778.8 | 3,124.5 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 18,316.1 | 10,157.4 | 8,158.7 |
| **Base Construction Cost** | | | | | | | **201,477.6** | **111,731.9** | **89,745.7** |

## Table E-18 Direct Construction Cost for Lining on Janiwala/Hamza Distributary System

| Work Item | Specificalon | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 0.26 | 4.6 | 0.0 | 4.6 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 25.0 | 0.0 | 25.0 |
| | Sub-total | | | | | | 29.6 | 0.0 | 29.6 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 1 | 892.0 | 300.0 | 592.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 8405.1 | 189.1 | 146.2 | 42.9 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 48315.8 | 1,860.2 | 1,304.5 | 555.6 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 95381.2 | 5,522.6 | 4,282.6 | 1,240.0 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 75563.7 | 4,125.8 | 3,219.0 | 906.8 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 69849.2 | 635.6 | 0.0 | 635.6 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 27789.7 | 1,069.9 | 750.3 | 319.6 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 56288.0 | 2,898.8 | 2,307.8 | 591.0 |
| | Sub-total | | | | | | 16,112.9 | 11,864.3 | 4,248.6 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 69849.2 | 3,618.2 | 859.1 | 2,759.0 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 5321.8 | 15,945.2 | 5,706.6 | 10,238.6 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 35332.3 | 883.3 | 706.6 | 176.7 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 20,446.7 | 7,272.4 | 13,174.3 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 32 | 832.0 | 249.6 | 582.4 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 4 | 160.0 | 48.0 | 112.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 3 | 180.0 | 54.0 | 126.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 0 | 0.0 | 0.0 | 0.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 4 | 280.0 | 84.0 | 196.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | 0 | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 0 | 0.0 | 0.0 | 0.0 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 3 | 12.0 | 3.6 | 8.4 |
| | Sub-total | | | | | | 1,464.0 | 439.2 | 1,024.8 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 1,167.5 | 596.3 | 571.2 |
| **Direst Cost** | | | | | | | **40,083.0** | **20,472.1** | **19,610.9** |
| III Administration and Consulting Cost | | | | | | | 5,719.9 | 4,142.0 | 1,577.9 |
| IV Institutional Reform Cost | | | | | | | 1,538.1 | 692.3 | 845.7 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 4,737.1 | 2,530.6 | 2,206.4 |
| **Base Construction Cost** | | | | | | | **52,107.6** | **27,837.1** | **24,270.5** |

## Table E-19 Direct Construction Cost for Lining on Pirmahal Distributary System

| Work Item | Specificalon | Unit | Unit Cost(Rs.) Total | F | L | Work Volume | Cost(1,000Rs.) Total | F | L |
|---|---|---|---|---|---|---|---|---|---|
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 10.01 | 176.2 | 0.0 | 176.2 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 45.0 | 0.0 | 45.0 |
| | Sub-total | | | | | | 221.2 | 0.0 | 221.2 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 2 | 1,784.0 | 600.0 | 1,184.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 50361 | 1,133.1 | 876.3 | 256.8 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 306817.6 | 11,812.5 | 8,284.1 | 3,528.4 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 638323.2 | 36,958.9 | 28,660.7 | 8,298.2 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 448800.0 | 24,504.5 | 19,118.9 | 5,385.6 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 461798.8 | 4,202.4 | 0.0 | 4,202.4 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 328315.9 | 12,640.2 | 8,864.5 | 3,775.6 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 445610.3 | 22,948.9 | 18,270.0 | 4,678.9 |
| | Sub-total | | | | | | 113,067.3 | 83,198.2 | 29,869.1 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 461798.8 | 23,921.2 | 5,680.1 | 18,241.1 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 35194.9 | 105,451.0 | 37,739.5 | 67,711.5 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 155346.4 | 3,883.7 | 3,106.9 | 776.7 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 133,255.8 | 46,526.5 | 86,729.3 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 100 | 2,600.0 | 780.0 | 1,820.0 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 24 | 960.0 | 288.0 | 672.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 3 | 180.0 | 54.0 | 126.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 0 | 0.0 | 0.0 | 0.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 25 | 1,750.0 | 525.0 | 1,225.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | 1 | 70.0 | 21.0 | 49.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 8 | 64.0 | 19.2 | 44.8 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 15 | 60.0 | 18.0 | 42.0 |
| | Sub-total | | | | | | 5,684.0 | 1,705.2 | 3,978.8 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 7,613.7 | 3,960.9 | 3,652.8 |
| **Direst Cost** | | | | | | | 261,404.9 | 135,990.9 | 125,414.0 |
| III Administration and Consulting Cost | | | | | | | 37,605.2 | 27,514.4 | 10,090.8 |
| IV Institutional Reform Cost | | | | | | | 10,007.5 | 4,598.9 | 5,408.6 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 30,923.9 | 16,810.4 | 14,113.5 |
| **Base Construction Cost** | | | | | | | 340,162.6 | 184,914.5 | 155,248.1 |

## Table E-20 Direct Construction Cost for Lining on Killianwala Distributary System

| Work Item | Specification | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 19.26 | 339.0 | 0.0 | 339.0 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 30.0 | 0.0 | 30.0 |
| | Sub-total | | | | | | 369.0 | 0.0 | 369.0 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 3 | 2,676.0 | 900.0 | 1,776.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 35217.7 | 792.4 | 612.8 | 179.6 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 217627.4 | 8,378.7 | 5,875.9 | 2,502.7 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 454506.5 | 26,315.9 | 20,407.3 | 5,908.6 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 686415.4 | 37,478.3 | 29,241.3 | 8,237.0 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 328683 | 2,991.0 | 0.0 | 2,991.0 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 140293.7 | 5,401.3 | 3,787.9 | 1,613.4 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 589830.0 | 30,376.2 | 24,183.0 | 6,193.2 |
| | Sub-total | | | | | | 110,941.4 | 83,495.5 | 27,445.9 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 328683 | 17,025.8 | 4,042.8 | 12,983.0 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 25043.9 | 75,036.5 | 26,854.6 | 48,182.0 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 110804.6 | 2,770.1 | 2,216.1 | 554.0 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 94,832.4 | 33,113.5 | 61,719.0 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 81 | 2,106.0 | 631.8 | 1,474.2 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 11 | 440.0 | 132.0 | 308.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 1 | 60.0 | 18.0 | 42.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 1 | 60.0 | 18.0 | 42.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 21 | 1,470.0 | 441.0 | 1,029.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | 0 | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 3 | 24.0 | 7.2 | 16.8 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 6 | 24.0 | 7.2 | 16.8 |
| | Sub-total | | | | | | 4,184.0 | 1,255.2 | 2,928.8 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 6,379.0 | 3,562.9 | 2,816.1 |
| **Direst Cost** | | | | | | | **219,012.9** | **122,327.1** | **96,685.7** |
| III Administration and Consulting Cost | | | | | | | 32,529.2 | 24,749.8 | 7,779.3 |
| IV Institutional Reform Cost | | | | | | | 8,306.5 | 4,136.8 | 4,169.7 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 26,021.8 | 15,121.4 | 10,900.4 |
| **Base Construction Cost** | | | | | | | **286,239.3** | **166,335.1** | **119,904.1** |

## Table E-21 Direct Construction Cost for Lining on Thamman Distributary System

| Work Item | Specificaton | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 20.95 | 368.7 | 0.0 | 368.7 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 20.0 | 0.0 | 20.0 |
| | Sub-total | | | | | | 388.7 | 0.0 | 388.7 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 2 | 1,784.0 | 600.0 | 1,184.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 27122.3 | 610.3 | 471.9 | 138.3 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 144321.8 | 5,556.4 | 3,896.7 | 1,659.7 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 312375 | 18,086.5 | 14,025.6 | 4,060.9 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 184961.5 | 10,098.9 | 7,879.4 | 2,219.5 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 223425.1 | 2,033.2 | 0.0 | 2,033.2 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 156107.5 | 6,010.1 | 4,214.9 | 1,795.2 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 173015.8 | 8,910.3 | 7,093.6 | 1,816.7 |
| | Sub-total | | | | | | 50,695.4 | 37,110.2 | 13,585.2 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 223425.1 | 11,573.4 | 2,748.1 | 8,825.3 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 17023.6 | 51,006.1 | 18,254.4 | 32,751.7 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 82392.4 | 2,059.8 | 1,647.8 | 412.0 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 64,639.3 | 22,650.4 | 41,989.0 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 72 | 1,872.0 | 561.6 | 1,310.4 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 21 | 840.0 | 252.0 | 588.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 1 | 60.0 | 18.0 | 42.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 10 | 600.0 | 180.0 | 420.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 14 | 980.0 | 294.0 | 686.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | 0 | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 1 | 8.0 | 2.4 | 5.6 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 8 | 32.0 | 9.6 | 22.4 |
| | Sub-total | | | | | | 4,392.0 | 1,317.6 | 3,074.4 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 3,645.3 | 1,850.3 | 1,795.0 |
| **Direst Cost** | | | | | | | **125,156.1** | **63,528.6** | **61,627.5** |
| III Administration and Consulting Cost | | | | | | | 17,812.0 | 12,853.4 | 4,958.6 |
| IV Institutional Reform Cost | | | | | | | 4,806.1 | 2,148.4 | 2,657.8 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 14,816.3 | 7,853.0 | 6,963.3 |
| **Base Construction Cost** | | | | | | | **162,979.2** | **86,383.4** | **76,595.8** |

## Table E-22 Direct Construction Cost for Lining on Chinna Distributary System

| Work Item | Specificaion | Unit | Unit Cost(Rs.) | | | Work | Cost(1,000Rs.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Volume | Total | F | L |
| I Compensation | | | | | | | | | |
| 1.1 Compensation for Land, House etc | | L.S. | 16000 | | 16000 | 17.94 | 315.7 | 0.0 | 315.7 |
| 1.2 Compensation for Hand Pump etc | | L.S. | | | | | 20.0 | 0.0 | 20.0 |
| | Sub-total | | | | | | 335.7 | 0.0 | 335.7 |
| II Direct Construction Cost | | | | | | | | | |
| 1. Gate and Installation | at Disty's Head | nos | 892,000 | 300,000 | 592,000 | 2 | 1,784.0 | 600.0 | 1,184.0 |
| 2. Earthwork | | | | | | | | | |
| 2.1 Stripping (0.2 m) | by machine | m3 | 22.5 | 17.4 | 5.1 | 18805 | 423.1 | 327.2 | 95.9 |
| 2.2 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 112374.4 | 4,326.4 | 3,034.1 | 1,292.3 |
| 2.3 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13 | 235088.4 | 13,611.6 | 10,555.5 | 3,056.1 |
| 2.4 Borrow & Haulage | Excavation and haul within 500 m | m3 | 54.6 | 42.6 | 12 | 134964.5 | 7,369.1 | 5,749.5 | 1,619.6 |
| 2.5 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | 191668.2 | 1,744.2 | 0.0 | 1,744.2 |
| 2.6 Excavation for Diversion Work | by machine | m3 | 38.5 | 27.0 | 11.5 | 129230 | 4,975.4 | 3,489.2 | 1,486.1 |
| 2.7 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | 141480.5 | 7,286.2 | 5,800.7 | 1,485.5 |
| | Sub-total | | | | | | 39,312.9 | 28,629.0 | 10,683.9 |
| 3. Lining Work | | | | | | | | | |
| 3.1 Mortar Pluster | 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 191668.2 | 9,928.4 | 2,357.5 | 7,570.9 |
| 3.2 Concrete insitu | 3" thick | m3 | 2,996.2 | 1,072.3 | 1923.9 | 14605.3 | 43,760.4 | 15,661.3 | 28,099.1 |
| 3.3 Precast Panel | 2" thick | m3 | 3,300.0 | 1,200.0 | 2100 | | 0.0 | 0.0 | 0.0 |
| 3.4 Joint | Rubber/Bitumen | m | 25.0 | 20.0 | 5 | 63910.7 | 1,597.8 | 1,278.2 | 319.6 |
| 3.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40 | | 0.0 | 0.0 | 0.0 |
| | Sub-total | | | | | | 55,286.6 | 19,297.0 | 35,989.6 |
| 4. Structure | | | | | | | | | |
| (New/Replace Installation) | | | | | | | | | |
| Outlet | | nos | 26000 | 7800 | 18200 | 88 | 2,288.0 | 686.4 | 1,601.6 |
| VR Bridge | | nos | 40000 | 12000 | 28000 | 23 | 920.0 | 276.0 | 644.0 |
| Drop | | nos | 60000 | 18000 | 42000 | 1 | 60.0 | 18.0 | 42.0 |
| Washing Step | | nos | 60000 | 18000 | 42000 | 3 | 180.0 | 54.0 | 126.0 |
| Buffalo Wallow | | nos | 70000 | 21000 | 49000 | 20 | 1,400.0 | 420.0 | 980.0 |
| Spillway | | nos | 70000 | 21000 | 49000 | 0 | 0.0 | 0.0 | 0.0 |
| (Repair Work) | 10% of New | | | | | | | | |
| DR Bridge | | nos | 8000 | 2400 | 5600 | 0 | 0.0 | 0.0 | 0.0 |
| VR Bridge | | nos | 4000 | 1200 | 2800 | 3 | 12.0 | 3.6 | 8.4 |
| | Sub-total | | | | | | 4,860.0 | 1,458.0 | 3,402.0 |
| 5. Miscellaneous Items | 3% of Item 1-4 above | L.S. | | | | | 3,037.3 | 1,499.5 | 1,537.8 |
| **Direst Cost** | | | | | | | **104,280.8** | **51,483.5** | **52,797.3** |
| III Administration and Consulting Cost | | | | | | | 14,664.5 | 10,416.4 | 4,248.1 |
| IV Institutional Reform Cost | | | | | | | 4,018.0 | 1,741.0 | 2,277.0 |
| V Physical Contingency (10% of item I, II,III andIV) | | | | | | | 12,329.9 | 6,364.1 | 5,965.8 |
| **Base Construction Cost** | | | | | | | **135,628.9** | **70,005.0** | **65,623.8** |

## TABLE E-23 Price List of Labour and Construction Material

| No. | Item | Unit | Cost(Rs.) Total | Foreign | Local | Remarks |
|---|---|---|---|---|---|---|
| **A. Labour** | | | | | | |
| 1 | Forman | man-day | 250.0 | 0.0 | 250.0 | |
| 2 | Assist. forman/Semi-skilled | man-day | 200.0 | 0.0 | 200.0 | |
| 3 | Heavy equi. ope | man-day | 200.0 | 0.0 | 200.0 | |
| 4 | Assist. heavy equi. ope | man-day | 180.0 | 0.0 | 180.0 | |
| 5 | Dump truck driver | man-day | 180.0 | 0.0 | 180.0 | |
| 6 | Assist. dump driver | man-day | 150.0 | 0.0 | 150.0 | |
| 7 | Common driver | man-day | 150.0 | 0.0 | 150.0 | |
| 8 | Carpenter/Mason | man-day | 200.0 | 0.0 | 200.0 | |
| 9 | Bar bender(cut and bind) | ton | 900.0 | 0.0 | 900.0 | |
| 10 | Common labour(unskilled) | man-day | 110.0 | 0.0 | 110.0 | |
| **B. Construction Materials** | | | | | | |
| 1 | Aggregates, rock and soil | | | | | |
| | a) Sand(normal) | m3 | 110.0 | 0.0 | 110.0 | from Chenab River |
| | b) Sand(coarse) | m3 | 200.0 | 0.0 | 200.0 | from Chenab River |
| | c) Coarse Aggregate/Gravel | m3 | 300.0 | 60.0 | 240.0 | Faisalabad(Rp 200/Salgodha, Rp 420/Lahore) Rock quarry at Salgodha |
| | d) Rock, Riprap | m3 | 425.0 | 85.0 | 340.0 | Rock quarry at Salgodha, cost at Lahore |
| | e) Fine Clay | kg/m3 | 40.0 | 0.0 | 40.0 | |
| 2 | Lumber | | | | | |
| | a) Plywood ,5mm | m2 | 100.0 | 0.0 | 100.0 | |
| | b) Timber ( Plank,1"*12") | m | 130.0 | 0.0 | 130.0 | |
| | c) Timer(Scaffolding,4") | m | 90.0 | 0.0 | 90.0 | |
| 3 | Rainforced iron bar | ton | 20000.0 | 6000.0 | 14000.0 | |
| 4 | Portrand cement | ton | 3700.0 | 1110.0 | 2590.0 | |
| 5 | Fuel and Oil Product | | | | | |
| | a) Gasoline | lit | 16.5 | 5.0 | 11.6 | |
| | b) Diesel | lit | 7.5 | 2.3 | 5.3 | |
| | c) Engine oil | lit | 95.0 | 28.5 | 66.5 | |
| | d) Bitumen 80/100 | kg | 6.0 | 1.8 | 4.2 | |
| 6 | RC Pipe & Flume | | | | | |
| | a) Dia. 6" | m | 125.0 | 25.0 | 100.0 | |
| | b) Dia. 12" | m | 310.0 | 62.0 | 248.0 | |
| 7 | Steel | | | | | |
| | a) Steel Plate/products | ton | 25000.0 | 5000.0 | 20000.0 | |
| | b) Hand Rail | ton | 22000.0 | 4400.0 | 17600.0 | |
| 8 | Other | | | | | |
| | a) Brick | 1,000pc | 1500.0 | 0.0 | 1500.0 | commonly available |
| | b) Ceramic Tile | 1,000pc | 11500.0 | 0.0 | 11500.0 | National Ceramic Co. |
| | c) PVC Sheet (0.08-0.12mm) | m2 | 18.0 | 18.0 | 0.0 | imported from Korea |
| | d) Polyethylene sheet(same) | m2 | 14.0 | 4.2 | 9.8 | Local Product |
| | e) EDPM Rubber Sheet(1mm) | m2 | 300.0 | 300.0 | 0.0 | Japanese Market Price |
| | f) FPA Sheet(0.8mm) | m2 | 170.0 | 170.0 | 0.0 | Estimated price at PC-1 of FESS Project |
| | g) Geo-Textile(1mm) | m2 | 30.0 | 0.0 | 30.0 | |
| | h) Tree Plant | 1,000nos | 5000.0 | 0.0 | 5000.0 | |
| | i) Water Stop(Lining Joint) | m | 20.0 | 20.0 | 0.0 | Rubber Belt(150mm width x 1mm thick) |

## Table E-24 Operation Cost of Construction Equipment

| No. | Equipment | Specifications | | Operation Cost | | | Remarks |
|---|---|---|---|---|---|---|---|
| | | Spec. | PS | FC (Rs./hr) | LC (Rs./hr) | Total (Rs./hr) | |
| **A** | **Earth Moving & Excavation** | | | | | | |
| 1. | Bulldozer ,D6 | 11t | 160 | 851 | 90 | 941 | |
| 2. | Bulldozer ,D7 | 17 t | 220 | 1,064 | 130 | 1,194 | |
| 3. | Bulldozer ,D8 with Ripper | 21 t | 290 | 1,918 | 179 | 2,097 | |
| 4. | Tractor shovel | 1.2m3 | 100 | 660 | 127 | 787 | *2 |
| 5. | Excavator | 0.6m3 | 140 | 1,106 | 94 | 1,200 | *1 |
| 6. | Excavator | 1.2m3 | 210 | 2,092 | 130 | 2,222 | *3 |
| 7. | Dredger of 1.2m3 backet | 21 t | 230 | 2,092 | 130 | 2,222 | *3 |
| 8. | Tractor Trailer | 5 t | 60 | 162 | 35 | 197 | *2 |
| 9. | Wheel loader | 2.2m3 | 160 | 1,060 | 109 | 1,169 | *1 |
| 10. | Dump truck | 11 t | 210 | 766 | 151 | 916 | *1 |
| 11. | Dump truck | 20 t | 290 | 1,467 | 206 | 1,674 | |
| **B.** | **Compaction** | | | | | | |
| 12. | Tyre roller | 11-17t | 100 | 336 | 70 | 406 | *1 |
| 13. | Tyre roller | 21-31t | 150 | 586 | 87 | 673 | *3 |
| 14. | Tamping roller (C. dozer) | 17t | 150 | 1,241 | 121 | 1,362 | |
| 15. | Tamping roller (C. dozer) | 21t | 230 | 1,943 | 205 | 2,148 | |
| 16. | Vibration roller | 3t | 25 | 393 | 50 | 443 | |
| 17. | Vibration roller | 15t | 160 | 1,576 | 126 | 1,703 | |
| 18. | Sheep-Foot Roller | 11-17t | 100 | 464 | 99 | 563 | *3 |
| 19. | Pneumatic Vibrater | - | - | 52 | 6 | 58 | *2 |
| 20. | Tractor Water Bowser,4m3 | 5 t | 60 | 174 | 35 | 209 | *2 |
| 21. | Water tank rolly, 10m3 | 11 t | 210 | 696 | 87 | 783 | *1 |
| 22. | Motor Grader of 3.7m brade | 17 t | 150 | 1,241 | 121 | 1,362 | *1 |
| **C.** | **Other Equipment** | | | | | | |
| 23. | Normal Truck | 10t | 160 | 348 | 52 | 400 | *2 |
| 24. | Normal Truck | 2 t | 100 | 232 | 35 | 267 | *2 |
| 25. | Jeep,4-wheel drive | 2 t | 120 | 319 | 46 | 365 | *2 |
| 26. | Truck w/ 2t crane | 10 t | 160 | 406 | 52 | 458 | *2 |
| 27. | Tractor w/ 1t crane | 5t | 60 | 209 | 35 | 244 | *2 |
| 28. | Compressor | 11m3 | 110 | 432 | 101 | 534 | |
| 29. | Compressor | 17m3 | 190 | 636 | 150 | 787 | |
| 30. | Concrete mixer,1bag | 0.16m3 | - | 383 | 35 | 418 | *2 |
| 31. | Concrete mixer ,3bag | 0.5m3 | - | 696 | 58 | 754 | *2 |
| 32. | Truck Mixer(4m3) | 11t | 210 | 696 | 87 | 783 | *3 |
| 33. | Batching Plant,0.6m3 | 41kw | - | 1,297 | 44 | 1,341 | |
| 34. | Generator | 10kVA | - | 174 | 58 | 232 | *2 |
| 35. | Generator | 35kVA | - | 371 | 87 | 458 | *2 |
| 36. | Crusher Plant,dia=600mm | 45kw | - | 539 | 44 | 583 | |
| 37. | Secondary Crusher | 0.5m3 | - | 128 | 17 | 145 | *2 |
| 38. | Fuel Bowser, 10m3 | 11t | 210 | 696 | 87 | 783 | *1 |
| 39. | Low-bed Trailer | 35t | 320 | 1,392 | 174 | 1,566 | *3 |
| 40. | Bitumen Sprayer,Truck Mountec | 11 t | 210 | 696 | 87 | 783 | *3 |
| **D.** | **Boring, Blasting & Piling** | | | | | | |
| 41. | Boring Machine | 3.7kW | - | 94 | 36 | 130 | |
| 42. | Augar Machine | 45kw | - | 539 | 44 | 583 | |
| 43. | Pile Driver | - | 210 | 696 | 87 | 783 | |
| 44. | Pneumatic Jack Hammer | 2" bit | | 220 | 23 | 244 | |
| 45. | Rock Drill | | | 220 | 23 | 244 | |

Note: 1. Blank Remarks means etimated cost according to international price
2. *1: Price Listed from Punjab Gov't 3. *2: Price quated or checked from Local Market
3. *3: estimated from Local Market Price of Equivalent or similar item

## Table E-25 Unit Cost Comparison for Lining Work

| Work Item | Specificaion | Unit | Unit Price(Rs.) | | | Refered Total Unit Price*1 | | | Remarks | Labour |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | F | L | Chashma | FESS | IMP | (Our Interim) | Portion |
| 1. Earthwork | | | | | | | | | | |
| 1.1 Excavation for Canal Prism | by machine&manual | m3 | 38.5 | 27.0 | 11.5 | 42.0 | 110(1.1-3) | 15.2 | 25.0 | 8.6 |
| 1.2 Embankment and Compaction of Bank | by machine, normal | m3 | 57.9 | 44.9 | 13.0 | 52.4 | ▲ | 21.5 | 65.0 | 8.0 |
| 1.3 Borrow & Haul | within 75 m | m3 | 54.6 | 42.6 | 12.0 | 0.6 | ▲ | 1.8 | - | 2.9 |
| 1.4 Trimming & Surface Finishing | Manual | m2 | 9.1 | 0.0 | 9.1 | | 9.2 | 7.9 | 7.0 | 8.8 |
| 1.5 Excavation for Diversion Work | by machine and Manual | m3 | 38.5 | 27.0 | 11.5 | - | - | 14.5 | 25.0 | 10.3 |
| 1.6 Embankment for Diversion Work | by machine | m3 | 51.5 | 41.0 | 10.5 | - | - | 14.5 | 25.0 | 1.5 |
| 2. Lining Work | | | | | | | | | | |
| 2.1 Mortar Pluster | 1:6 mix, 1" mortar | m2 | 51.8 | 12.3 | 39.5 | 65.0 | 44.9 | 36.0 | 35.0 | 20.1 |
| 2.2 Concrete insitu | 1:2:4 mix, 3" thick w/Slop Form | m3 | 2,996.2 | 1,072.3 | 1,923.9 | 2500.0 | 1870.0 | 2,000.0 | 3100.0 | 428.3 |
| 2.3 Precast Panel | 1:2:4 mix, 2" thick | m3 | 3,300.0 | 1,200.0 | 2,100.0 | 2500.0 | 1870.0 | - | - | 400.0 |
| 2.4 Joint | Rubber Joint | m | 25.0 | 20.0 | 5.0 | | - | - | - | 4.0 |
| 2.5 Geomembrane with geotextile | 1 mm | m2 | 340.0 | 300.0 | 40.0 | - | 220.0 | - | 410.0 | 10.0 |

Note; *1: adjusted at 1996 May Chashma: JICA Study for Chashma Lift Irrigation Project in NWFP, 1994
IMP: Irrigation Management Project (ADB), 1996 or Punjab Water Conservation Project, 1994 FESS: Fordowah

## Table E-26 Disbursement Schedule for the Project

| Work Item | Total Cost(1,000Rs.) | | | Disbursement Schedule | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Foreign | Local | 1999 | | 2000 | | 2001 | | 2002 | | 2003 | | 2004 | |
| | | | | F | L | F | L | F | L | F | L | F | L | F | L |
| I Conpensation | 3,401.9 | 0.0 | 3,401.9 | | | | 134 | | 1134 | | 1134 | | 1000 | | |
| II Direct Construction Cost | | | | | | | | | | | | | | | |
| 1. Gate and Installation | 10,704 | 3,600 | 7,104 | | | 300 | 592 | 600 | 1184 | 1500 | 2960 | 1200 | 2368 | | |
| 2. Earthwork | 834,890 | 614,598 | 220,291 | | | 11132 | 3903 | 123075 | 44709 | 145001 | 51448 | 167695 | 60116 | 167695 | 60116 |
| 3. Lining Work | 1,019,252 | 354,689 | 664,563 | | | 6387 | 11815 | 75374 | 141098 | 80532 | 151148 | 96198 | 180251 | 96198 | 180251 |
| 4. Structure | 62,820 | 18,846 | 43,974 | | | 466 | 1088 | 4263 | 9947 | 4072 | 9501 | 5023 | 11719 | 5023 | 11719 |
| 5. Miscellaneous Items | 57,830 | 29,752 | 28,078 | | | 549 | 522 | 6099 | 5908 | 6933 | 6452 | 8103 | 7634 | 8067 | 7563 |
| Direst Cost Total | 1,985,495 | 1,021,485 | 964,010 | 0 | 0 | 18834 | 17921 | 209411 | 202845 | 238038 | 221508 | 278219 | 262088 | 276983 | 259649 |
| III Administration and Consulting Cost | 284,236 | 206,672 | 77,564 | 62002 | 23269 | 31001 | 11635 | 31001 | 11635 | 31001 | 11635 | 31001 | 11635 | 20667 | 7756 |
| IV Institutional Reform Cost | 76,118 | 34,544 | 41,574 | 1727 | 2079 | 5182 | 6236 | 6909 | 8315 | 10363 | 12472 | 10363 | 12472 | | |
| V Physical Contingency | 234,925 | 126,270 | 108,655 | 6373 | 2535 | 5502 | 3593 | 24732 | 22393 | 27940 | 24675 | 31958 | 28719 | 29765 | 26741 |
| Base Construction Cost | 2,584,177 | 1,388,971 | 1,195,206 | 70102 | 27883 | 60518 | 39518 | 272052 | 246322 | 307343 | 271424 | 351541 | 315914 | 327415 | 294146 |
| VI Price Escaration | 535,760 | 285,222 | 250,538 | 6500 | 2585 | 7596 | 4960 | 43331 | 39233 | 59641 | 52670 | 80810 | 72620 | 87345 | 78469 |
| Total Project Cost | 3,119,937 | 1,674,193 | 1,445,744 | 76602 | 30468 | 68114 | 44478 | 315383 | 285554 | 366983 | 324094 | 432352 | 388534 | 414760 | 372615 |

# *FIGURES*

Fig. 6.1-1 Proposed Organization of Project Implementation

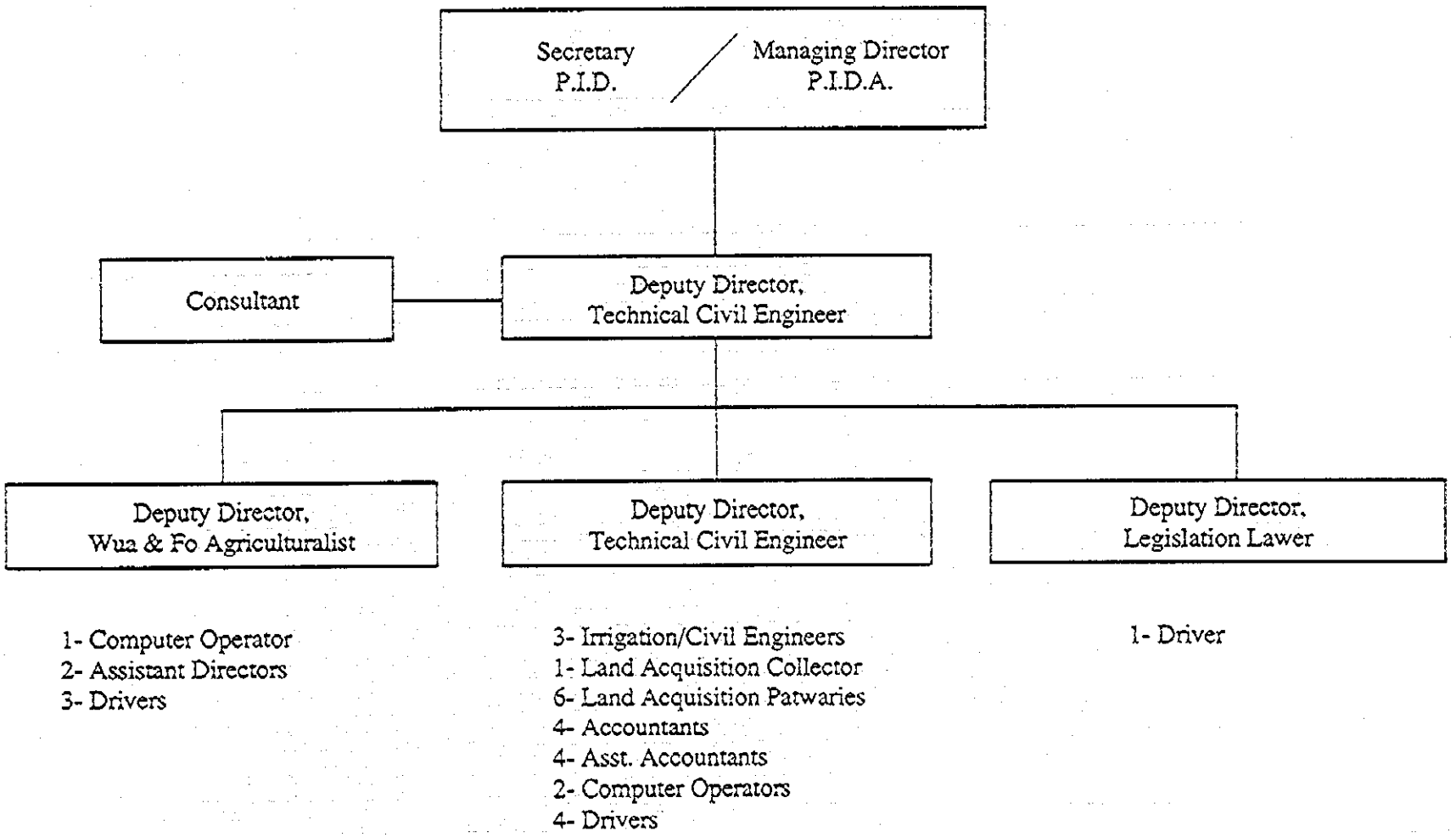

Fig. 6.2.3-1 IMPLEMENTATION SCHEDULE