खानेपानी आयोजना सर्वेक्षण नर्म्स २०७८

NORMS

for

Detailed Engineering Study
and
Design of Water Supply and Sanitation Projects

नर्म्स मस्यौदा समिति:

सि.डि.ई. श्री प्रेम प्रसाद डोटेल : संयोजक

सि.डि.ई. श्री राजेन्द्र प्रसाद न्यौपाने : सदस्य

सि.डि.ई. श्री किरण पौडेल : सदस्य

सि.डि.ई. श्री हरि प्रसाद तिमिल्सिना : सदस्य

सि.डि.ई. श्री तुल्सी बस्नेत : सदस्य

ई. श्री संजय कोईराला : सदस्य सचिव

सहयोगि:

ई. श्री अभिनय पौडेल

ई. श्री टेकन पण्डित

विशेष धन्यबाद:

उप सचिव श्री झलकराम सुवेदी

शाखा अधिकृत श्री अनिल सुवेदी

प्रदेश सरकार

उर्जा, जलस्रोत तथा खानेपानी मन्त्रालय

गण्डकी प्रदेश

पोखरा, नेपाल

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शुभकामना .....

नेपाली जनताको पटक पटकको वलिदानको उपलब्धिका रूपमा नेपाल एक संघीय लोकतान्त्रिक मुलुक बनेसँगै मुलुकमा संघीय शासन व्यवस्था मार्फत सामाजिक समानता र न्यायसहितको दिगो विकासका लागि प्रादेशिक विकासको अवधारणा अघि बढेको यथार्थ हामी सामु छ । विकासले सृजना गरेका लाभहरूको समावेशी र समानुपातिक वितरणले मात्र वास्तविक संघीयताको मर्म पुष्टि भई नागरिक सन्तुष्ट शासन निर्माण हुने हुँदा गण्डकी प्रदेश सरकारको उर्जा, जलश्रोत तथा खानेपानी मन्त्रालयको कार्यभार सम्हालिरहँदा हामी संघीयता र सुशासनका आदर्शहरू स्थापित गर्न तल्लीन छौं । जनतासँग मन्त्री समस्या समाधानका लागि मन्त्रालय अभियान मार्फत जनताका समस्याहरूसँग प्रत्यक्ष साक्षात्कार हुने तथा तत्काल समस्या समाधानमुखी कदम चाली नागरीक सेवामुखी शासन निर्माण गर्ने कार्यमा हामी निरन्तर छौं र हुनेछौं । संविधानतः प्रदेश सरकारलाई निक्षेपित अधिकारहरूलाई कानून बनाई कार्यान्वयन गर्न सकेमात्र जनताका विकासका अभिलाषा सम्बोधन हुने हुँदा यस खानेपानी आयोजना सर्वेक्षण नर्म्स, २०७८ को कार्यान्वयनबाट हामीले आधारभुत आवश्यकताका रूपमा रहेको खानेपानी क्षेत्रको विकासमा अपेक्षित लाभ लिने तथा गण्डकी प्रदेश सरकारको एक घर एक धारा कार्यक्रमलाई यथाशक्य चाँडो सम्पन्न गर्न थप टेवा पुग्ने कुरामा हामी विश्वस्त छौं ।

यस खानेपानी आयोजना सर्वेक्षण नर्म्स, २०७८ को कार्यान्वयनबाट गण्डकी प्रदेशमा खानेपानी आयोजनाहरू गुणस्तरीय, मितव्ययी तथा पारदर्शि ढङ्गले सम्पन्न हुनेछन् एवं आधारभुत आवश्यकताका रूपमा रहेको खानेपानीमा सबै उपभोक्ताहरूको सहज, सुलभ ढङ्गले पहुँचमा अभिवृद्धि हुनेछ । मन्त्रालयले प्रारम्भिक चरणमा आधारभुत स्तरको र दोश्रो चरणमा शुद्ध प्रशोधित पिउने पानीको सहज पहुँच वृद्धि गर्ने हाम्रो योजना अनुरूप अझै पनि ग्रामीण क्षेत्रहरूमा विद्यमान घण्टौं लगाएर पानी लिन जानुपर्ने बाध्यताको अन्त्य गरी तत्पश्चात प्रशोधन प्लान्ट सहितको शुद्ध पिउने पानीको व्यवस्था गर्ने लक्ष्य राखेको छ। योजनाको लाभ लागत विश्लेषण गरी मागमा आधारित रही समानतामूलक ढङ्गले योजना प्राथमिकीकरण तथा मितव्ययी कार्यान्वयन गर्न, सिर्जित लाभको सामाजिक न्यायको सिद्धान्तमा आधारित रहि वितरण गर्न सके मात्र लोककल्याणकारी राज्यको आदर्श सफलीभूत हुने हुँदा यस प्रकारका कानूनको अक्षरशः कार्यान्वयनमा सहभागी हुन सम्पुर्ण मन्त्रालय परिवारमा हार्दिक आह्वान गर्दछौं । यस नर्म्स निर्माणमा सहयोग पुऱ्याउने मन्त्रालयका सचिव, महाशाखा प्रमुख, डिभिजन सव डिभिजन प्रमुखज्यू एवं अमुल्य राय, सुझाव एवं सल्लाहका लागि विज्ञ समुह, पुर्व प्रशासकहरू एवम् दातृ निकायहरू लगायत मन्त्रालय परिवारप्रति हृदयदेखि आभार व्यक्त गर्दै मन्त्रालयको हितार्थ पुनः यस्तै सहयोगको अपेक्षा गर्दछौं ।
धन्यवाद ।

मा. हरिशरण आचार्य
मन्त्री

शुभकामना .....

गण्डकी प्रदेश सरकार गठनसँगै जारी भएको "प्रशासकीय कार्यविधि (नियमित गर्ने) ऐन, २०७५ ले विभिन्न कार्यविधि, नर्म्स, निर्देशिका बनाउन प्रदेश सरकारलाई अधिकार प्रधान गरेको छ। नेपालको संविधानको अनुसुचि ६ मा प्रदेश स्तरको खानेपानी सेवा र परिवहनको अधिकार प्रदेशलाई दिएको छ। गण्डकी प्रदेश सरकार (कार्य विभाजन नियमावली), २०७४ ले उर्जा जलस्रोत तथा खानेपानीको कार्य जिम्मेवारीमा प्रदेशस्तरको खानेपानी, सरसफाइ तथा स्वच्छता सम्बन्धी प्रदेशिक नीति, कानून तथा मापदण्ड तर्जुमा र कार्यान्वयन, सेवाको शुल्क निर्धारण, योजना आयोजना कार्यान्वयन तथा सञ्चालन संभार र नियमन गर्ने लगायतका जिम्मेवारी तोकिएको छ। आधारभुत स्तरको खानेपानी सुविधाको पहुचँ शत प्रतिशत जनसंख्यामा पुऱ्याइ मध्यम र उच्च गुणस्तरको खानेपानी सुविधाको विस्तार गर्ने लक्ष्य अनुरूप प्रदेश सरकारले लिएको "एक घर एक धारा" को नीति कार्यान्वयन गर्ने जिम्मेवारी यसै मन्त्रालयको रहेको छ।

गण्डकी प्रदेश सरकारद्वारा लिएको लक्ष्य पुरा गर्न विभिन्न नयाँ खानेपानी आयोजनाहरूको निर्माण गर्नुपर्ने तथा जिर्ण खानेपानी आयोजनाहरूको पुनर्स्थापना गर्नुपर्ने र सोको लागि प्रारम्भिक चरणको रूपमा सर्भेक्षण अध्ययन कार्य गरि विस्तृत परियोजना प्रतिवेदन तयार गर्नुपर्ने हुन्छ। अध्ययन सर्वेक्षण कार्यको लागि प्रदेशमा हालसम्म सो सम्वन्धी नर्म्स नभएकोले गण्डकी प्रदेश सरकारद्वारा कार्यान्वयन गरिने खानेपानी आयोजनाहरूको सर्वेक्षण कार्य तथा विस्तृत परियोजना प्रतिवेदनलाई वस्तुनिष्ठ, समायानुकुल, मितव्ययी, व्यवहारिक, कार्यान्वयनयोग्य बनाउनका लागि "खानेपानी आयोजना सर्वेक्षण नर्म्स, २०७८" तयार गरिएको हो। प्रदेश सरकारको मिति २०७८/११/१६ को निर्णयबाट यस खानेपानी आयोजना सर्वेक्षण नर्म्स स्वीकृत भएको छ । यसको पूर्ण कार्यान्वयनको लागि अनुरोध गर्दै नर्म्स बनाउन सहयोग गर्ने सम्पूर्णमा धन्यवाद व्यक्त गर्दछु ।

(ई. रामकुमार श्रेष्ठ)
सचिव

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Province Government

Ministry of Energy, Water Resources and Water Supply

Gandaki Province,

Pokhara, Nepal

Detailed Engineering Study and Design of Water Supply and Sanitation Projects

Terms of Reference

1. Introduction

Detailed Engineering Study and Design of a project is to be carried out after the project is selected for implementation. The study shall be conducted for all new projects, and for all existing projects to be selected for rehabilitation. The detailed study reports are produced as the outcome of the detail survey and design of the projects so that immediate actions could be undertaken for their implementation.

2. Objectives

The overall objective of the study is to formulate technically sound and cost effective water supply and sanitation projects. Specific objectives are to ascertain population and coverage area, project cost, community contribution, detailed construction works, and operation & maintenance requirements.

3. Scope

The detailed scope of the work mostly includes, but not necessarily limited to the following:

- to assess existing situation of water supply and sanitation in the project area;
- to assess existing water supply and sanitation structures in terms of their reuse in case of rehabilitation of existing systems;
- to carry out detailed engineering and socio-economic survey, initial environmental examination (IEE) of the project area;
- to verify the source yield, water quality, intake/deep tube well boring site, reservoir site, pipe alignment and number and location of public taps and other major structures;
- to clarify the community enthusiasm on the execution of the project and willingness to contribute for construction and undertake operation and maintenance responsibility upon commissioning;
- to identify appropriate interventions required to promote sanitation at personal, household and community level, within the project area.

4. Manpower Setup

A team led by an engineer and consisting of one sub-engineer and other field workers shall be assigned for the detailed field study, survey, design, and preparation of the report. The

engineer and sub-engineer should have enough knowledge on community participatory approach and should be capable to conduct socio-economic survey at the field and analyzing the data subsequently.

If consultant is to be employed:

The consultant shall submit proposal for the study explaining in brief their capacity and experience to undertake the job, methodology to be applied and cost required for detailed engineering study and design report for each project. The selection criteria of the consultant shall be based on cost proposal, however, other relevant factors shall also be taken into account.

If employed, the consultant shall be required to assign appropriately qualified and experienced staff having enough knowledge on community participatory approach for the execution of the study.

5. Approach and Procedures

Prior to the visit to the project area, Feasibility Study Report (if feasibility study had been conducted in the project area beforehand) is reviewed and the possibilities for modifications/ improvements on the proposals of the feasibility study shall be investigated and incorporated wherever possible/required during detail survey.

The methodology adopted for conducting detailed field study and survey for preparing a detailed engineering report should be based on wide community participatory approach. The detailed study report should strictly follow the departmental design guidelines and GON directives.

Technical Aspects

The technology adopted should be simple, socially, culturally and environmentally acceptable and its operation and maintenance should be affordable and manageable by the community. Standard structures should be used as far as possible and maximum utilization of locally available construction materials should be ensured for the ease of construction and operation and maintenance.

The detailed study report should be fairly described to the extent that it provides complete details on the following technical aspects required for the smooth implementation of the projects and sustainable operation and maintenance after execution.

- Existing water supply and sanitation projects/schemes in the Metropolitan City/ Municipality/Rural Municipality related to the project (cross checked through District Profile data);

- Existing situation of water supply in the project area in relation to issues of quantity and quality of water available, hardship, waiting time and mode of collection (type of source);
- Project is a new one or being implemented for interference or supplement such as rehabilitation or up gradation or extension to existing system/s within the project area;
- Succinct information on the intake site, safe yield, water quality, and water right issues (disputes) for the proposed sources;
- Water demand and level of adequacy;
- Coverage data on households, population and institutions in terms of additional coverage or reinstatement of service;
- Components, technology and methodology adopted in system designing;
- Remedies for water quality improvement, if any, based on the quality analysis of the samples of selected source/s;
- Structures used for water supply and sanitation facilities;
- Alternatives, if any, in terms of technology and/or structures;
- Availability and distances for transportation of local materials, the nearest market and road head and distances involved for importation of materials;
- Check list for IEE if necessary;
- Major environmental consequences likely to occur due to construction of the project;
- Detailed hydraulic designs of transmission and distribution pipelines; HDPE pipes shall be used as far as possible;
- Analysis of rates consistent with norms and approved district rates for materials and labour;
- Layout of the project showing relative positions of intake/s, reservoir/s, pipe alignment with appurtenances provided, public stand posts, prominent landmarks and community dwellings, provided bench marks etc.;
- Schematic water flow diagram from intake to the last point of distribution;
- Longitudinal sections of transmission and distribution pipelines following ground profile with static water head and hydraulic gradient lines between water flow points like intake, reservoir, break pressure chamber, distribution chamber, public tap stand posts;
- Complete working drawings of the structures proposed;
- Detail quantity and cost estimates to implement the project;
- Financial analysis and affordability in terms of sustainable operation and maintenance of the system by user's committee;
- Suggestion for WTP with its type, if required.

The following methodology should be adopted

Overall project planning

- Generally, project area or schemes included in a project should be confined within one watershed area;

- Overall planning of the project components will be carried out by the Team-leader;
- Possibility of small independent and multiple reservoir systems should be explored; point source schemes should not be selected;
- Pipe traverse through foot tracks should be preferred;
- Standard methods should be adopted in water sample collection and transportation of samples to laboratory for water quality analysis.

Selection of source

- Perennial spring sources will be preferred over stream sources wherever practical. Special note will be taken of upstream pollution possibilities due to farming; secondary uses of the source like washing clothes and cattle grazing, habitation, etc.;
- Source yield assessment and ascertainments will be made through average of 3 minimum readings;
- Source yield assessments will be preferably carried out in dry season; sufficient allowance for drying should be made based upon thorough consultation with villagers, past experience and observation for source measurements in other seasons;
- Sources with a safe discharge measuring less than 0.10 lps should not be considered;
- In case of deep well boring, water table, yield and quality of underground water should be assessed from near by existing deep tube wells;
- Protection measures required for stability and safe guarding against pollution will be clearly indicated;
- WTP with its type, if required will be clearly suggested.

Surveying

- Survey equipments shall properly be calibrated;
- Topographic survey will be carried out using level instrument/ theodolite for fixing alignment for transmission and distribution pipelines. Bench marks should be established at the source, the reservoir site/s, along transmission and distribution pipelines and other major feature/s by painting enamel paint on permanent features like big rocks, a house, big tree, etc. The established bench marks should be clearly mentioned in the reports. Transmission and distribution routes should be marked by arrows painted preferably by using red enamel paint;
- Distance measurements will be carried out using a fiber glass tape and measurements will follow the ground profile.

Social Aspects

A general mass meeting is held in Metropolitan City/Municipality/Rural Municipality concerned and through wide participatory discussions the community members are apprised of the project activities and their duties and responsibilities prior to study. Thus users' committee is already formed so as to represent the whole beneficiaries in accordance with

the procedures and conditions as stipulated in the Metropolitan City/Municipality/Rural Municipality act. During the entire period of study, the team shall work in close coordination with the WUSC.

Following details should be worked out during the survey and explicitly highlighted in report

- Possibility of interference to selected water source/s use due to existing or probable secondary use;
- Demographic features within the project area like total households and population, distribution of population by gender, distribution of households and population by caste and ethnicity, occupation, average and distribution of family income both in terms of cash and kind, etc.
- Number of households and population below poverty line;
- Present sanitary situation, at personal, household and community level, within the project area;
- Existing numbers of household and public toilets, their type and present use;
- Overall health status within the project area with particular emphasis to occurrence or prevalence of water related diseases;
- Understanding of the project features and implementation procedures by the community;
- Formation of Water Users and Sanitation Committee (WUSC) as per existing policy and strategy and names of WUSC members;
- Names of the proposed VMWs, sanitation motivators and public tap stand post caretakers;
- Commitment by users to actively participate and contribute in the project implementation and undertaking the responsibility of project operation and maintenance upon commissioning;
- Commitment by community to provide required land for project facilities (preferably free of cost) and approximate value of such land; however, the land provided should be convenient for the use of the project;
- Percentage of total cost and the list and approximate value of item works for which the community is willing to contribute (not less than 10% or as per prevailing rule of Gandaki Province);
- Willingness to pay for the water supply and sanitation services by the community;
- Commitment to contribute towards establishing a maintenance fund as specified by the department;
- General attitude of users on implementation of the project and their willingness towards solving problems that might arise during implementation;
- Confirmation of felt need of the project;
- Any other prominent social features that might have a marked bearing on the project.

Following methodology is suggested for various item works

Demographic Features

- Data will be collected through household surveys, focus group discussions and interviews with key informants. These data will be cross checked with Metropolitan City/Municipality/Rural Municipality census data;

Users' commitment

- A mass meeting of beneficiaries will be organized. Project features/ implementation modalities/pre requisites and requirements to be fulfilled by community, O & M issues, etc. will be briefed to the community by the engineer. Quick Reference Tools (QRT) for component costing developed by the department will be used for arriving at approximate project cost.
- Comments from beneficiaries in listed aspects will be encouraged and noted; women and weaker segments will be prompted to express their views.
- A user's committee will be formed on consensus or through democratic selection process by the beneficiaries
- The user's committee will provide signed letters of commitment/s on acquiring required water rights for selected source/s, community contribution, land facilities, responsibility of O&M, establishment of a maintenance fund, construction of household toilets, nomination of VMW/s, sanitation motivator/s, etc.

6. Detailed Engineering Study Design Report

The detailed study report will highlight all the listed issues and preferably include the site map marked on a district map. The report shall comprise four sections with major headings and sub-headings suggested below.

A) Project Summary
B) Abstract of Costs and Quantities
C) Drawings
D) Appendices

A) Project Summary

a) Salient features:
   - Salient Features of Project
   - Scheme-wise Salient Features

b) Project Costs:
   - Summary of Project Costs
   - Scheme-wise Costs
   - Operation and maintenance costs: sustainability analysis if required

c) Introduction/Background Information/Brief Description:
   - Project area: location, accessibility
   - Physical features: topography, climate, vegetation etc.
   - Socio-economic conditions: ethnic composition, gender distribution, occupation, educational and health services, socio-economic activities etc.
   - Existing water supply situation: quantity, general quality, hardship
   - Existing sanitary environment: general practices and conditions regarding personal, household and community hygiene and sanitation

d) Project Features/Details:
   - Proposed scheme/s: number and name of scheme/s, type of system
   - Proposed water source/s: yield, location, protection and conservation measures, water right guarantee
   - Water quality: physical, chemical and microbiological qualities, remedies for quality improvement
   - Technology adopted: discuss with justification, alternatives
   - Design criteria: give justifications if necessary
   - Population coverage
   - Water Demand
   - Components of the project
   - Sanitation: methods to be adopted for sanitation promotion
   - Environmental consideration: impacts and mitigation measures
   - Construction materials: availability and distances for transportation of local materials, nearest market and road head and distances involved for importation of materials
   - Remarks and conclusion

e) Annexes:

Annex-1 General information
Annex-2 Exiting situation of water supply & sanitation in the project area & VDC
Annex-3 Proposed water sources
Annex-4 Household and population survey
Annex-5 Existing public institutions in the project area
Annex-6 Household and population projection
Annex-7 Total water demand and water flow calculation
Annex-8(A) Storage tank sizing (Continuous system)
Annex-8(B) Storage tank sizing (Intermittent system)
Annex-9 Hydraulic design of pipeline
Annex-10 Layout plan
Annex-11 Schematic flow diagram
Annex-12 Water sample analysis report
Annex-13 Financial Analysis and affordability

Annex-14 Checklist for Environmental Parameters (IEE)
Annex-15 Name and persons contacted during survey
Annex-16 Tracking of main structures and pipe line alignment in GPS
Annex-17 Social map

Methodology

- Standard departmental guidelines will be followed;
- Population projections will normally take into account the Metropolitan City/ Municipality/Rural Municipality growth rate; site specific growth rates may be used if it is validated by household survey;
- Scheme layout plan (*not to scale)* and schematic flow diagram will be drawn on A4 size paper separately for each scheme;
- Standard formats will be used for the annexes. Layout plan and schematic flow diagram of all schemes will be arranged in sequence as *Annex-10* and *Annex-11* respectively. Water quality analysis report obtained from water sample testing laboratory will be submitted as *Annex-12*.

B) Abstract of Costs and Quantities

a) Abstract of Costs and Quantities shall consist of

- Cost estimate
- Quantity estimate
- Rate analysis: basis for calculations

Methodology

- Rates of locally available construction materials such as stone, sand, aggregates and timber are worked out summing up the cost of collection of materials and transportation cost (manual or vehicular);
- Rates of labour and non-local construction materials are adopted from district approved rate adding the transportation cost (manual or vehicular);
- Unit rates of relevant work items are developed according to the GON and departmental norms adding 15% contractor's overhead in the total cost of materials and labours;
- Quantities of items for each component are calculated from corresponding drawings;
- Fittings with required size and quantity for each component are estimated separately;
- The costs of proposed components are estimated using worked out unit rates separately for each component with an addition of 13 percent value added tax (VAT) in total cost;
- Provisions of costs for pre-construction, VMWs, motivators and post construction training and costs for the construction of institutional toilets should be made for

each scheme according to the departmental norms and guidelines;

- Scheme costs are worked out summing up the costs of components included in the scheme; and the project costs, summing up the costs of the schemes;
- The costs for detailed survey and detailed study report, project appraisal and agreement and sanitation awareness program should be included in the total project costs;
- Grand total of the project cost should be worked out adding as per Provincial Government rules and regulation.
- The cost to be borne by Province Government and the community in each scheme and project in total should be summarized in a separate sheet listing the item of works and estimated costs for community contribution.

C) Drawings

The following drawings, complete and clear, shall be submitted in the report:

a) Location Map - District map shall be used for the location map. The main structures shall be located in contour map.

b) Layout Plan - The plan shall be drawn free of scale in separate sheet for each scheme and should give the following information:

- Name, type and safe yield of source;
- Location of intake, reservoir and public tap stand posts;
- Pipe lengths and relative elevation difference between the structures provided, such as intake, sedimentation tank, break pressure tank, reservoir, distribution chambers, crossings, etc.;
- Name of Metropolitan City/Municipality/Rural Municipality:
- Name of village/community, ward no.;
- Prominent community buildings and institutions;
- Natural water bodies such as river, stream, lakes and ponds, if any;
- Major roads, highways.

c) Water Flow Diagram - The diagram should contain the following information:

- Pipe lengths and size, type and class of pipe used in each segment as per design;
- Water flow direction in each segment from intake to last point of distribution;

d) L-Section of pipeline - Longitudinal profile should be plotted for complete pumping, transmission and distribution pipelines with detail topographic elevations in a vertical scale of 1:1000 to 1:2000 and horizontal scale 1:5000 to 1:10000. It shall show the following:

- Static hydraulic line and hydraulic gradient line;
- Intake, reservoir, sedimentation tank, break pressure and distribution chambers, air valves, washouts and taps;
- Elevation, total length, partial length, type of soil, discharge and size, type and class of pipe.

e) Structural Drawings - Structural and working drawings of relevant civil structures in a scale as specified in Standard Drawings and Design Guidelines. Type designs shall be used as far as possible.

D) Appendices

It shall contain the following documents:

a) Name of user's committee members, VMWs, Sanitation motivators, etc.;
b) No source dispute guarantees from Metropolitan City/Municipality/Rural Municipality;
c) Assurance letter from Metropolitan City/Municipality/Rural Municipality and Users Committee for land provision for construction;
d) Community contribution guarantee letter from Users Committee;
e) Guarantee letter from Users Committee for undertaking the responsibility of project operation and maintenance upon commissioning;
f) Approved district rates of materials and labours.

7. Report Submission

Reports shall be submitted to the Division/Sub-Division Chief of concerned districts office as follows:

- One copy of the detailed field study and survey report will be submitted within one month from the date of work order issued unless otherwise mentioned in the work order; comments and suggestions on the detailed field study and survey report shall be provided to the engineer/consultant within two weeks;
- One copy of detailed engineering design draft report with drawings will be submitted within one month after receiving the comments on detailed survey and field study report; comments and suggestions on the detailed study draft report shall be provided to the engineer/consultant within two weeks
- Minimum 3 Copies of detailed engineering study and design final report with necessary amendments to incorporate comments and suggestions on the draft report will be

submitted within fifteen days after receiving the comments on draft report;

- Final reports shall be computer printed on A4 size photocopy paper and photocopied with standard covers and binding. The cover sheet will include the name of the ministry, concerned district office, name of the project, Metropolitan City/Municipality/Rural Municipality with covered ward nos., name and address of author/team leader (in case of government employees) or consultancy firm (if employed) and month and year of report submission. Minimum three final hard copies and soft copy will be submitted to the concerned offices.

8. Mode of Payment

The concerned Ministry of Energy, Water resources and Water supply or Water Supply and Sanitation Division or Sub-Division office or other concerned offices shall pay the amount to the governmental employees as per Provincial Norms and to the consultant (if employed) as per Agreement as stated below. However, each payment, either in installment or in full, to both the government employees and the consultant shall be made as per the prevailing laws and rules of the Provincial Government.

a) To governmental employees:
   The amount shall be paid to the Engineer assigned for the study after the submission of final report.

b) To consultant (if employed):
   The amount shall be paid as per agreement to the consultant assigned for the study. The amount shall be paid to the consultant assigned for the study after the submission of final report.

Annex-1

GENERAL INFORMATION

1. General Information

Name of Project:

Metropolitan City/Municipality/Rural Municipality: Survey Date:

District: Surveyed By: 1.

2.

2. Accessibility

Distance from district headquarter to project area :

Name of the nearest market for construction materials :

Name of the nearest all weather roadhead :

Mode of transportation from nearest market to site

Mode of transport		Sector		Distance km	Remarks
		From	To		
Vehicle:	Black topped				
	Gravel				
	Earthen				
Manual:	Foot trail				
Air					

3. Existing Situation of Water Supply and Sanitation in the VDC/Municipality

Category		Ward No.									Total
		1	2	3	4	5	6	7	8	9	
Total No.of Households											
Total Population											
Present Water Supply Coverage	HH										
	Pop.										
Present Sanitation Coverage	HH										
	Pop.										

4. Household and Population Coverage by this Project

Category		Ward No.									Total
		1	2	3	4	5	6	7	8	9	
Water Supply											
Additional coverage (not included in previous coverage)	HH										
	Pop.										
Service reinstated (already included in previous coverage)	HH										
	Pop.										
Sanitation											
Households and population in terms of household toilet	HH										
	Pop.										

Annex-2

EXISTING SITUATION OF WATER SUPPLY AND SANITATION IN THE PROJECT AREA & Palika

(To be verified from District Profile Data)

Name of Project: **District:**

Ward No.	Name of Project/Scheme	Type of Project[1]	Project Completed Year	Name of Implementing Agency	Water Supply Service Area and Coverage				Adequacy of Water[2]	General Quality of Water[3]	Current Functional Status of System	No. of Households with	
					Villages/Community / Institutions	No. of HH	Population					Water Seal Latrine	Open Pit Latrine
							Domestic	Institutional					
	Total												

1. Pipe Supply - Gravity [Gr], Pumping [P]; Point Source - Hand Pump [HP], Dug Well [DW], Spring Protection [SP]
2. Adequate [A], Slightly inadequate [B}, Highly inadequate [C]
3. Aesthetically accepted [I], Slightly turbid [II], Highly turbid [III], Turbid with taste and smell [IV], Suspected for water related diseases [V]

Annex-3

PROPOSED WATER SOURCES

Name of Project: **District:**

Scheme No.	Name of Source	Type*	Location			Present use**	Measured		Safe Yield *lps*	Appea-rance+	Taste!	Pollution Possibility0	Dispute$	Source Area			
			VDC	Ward No.	Locality		Date	Yield, *lps*						Veg.1	U.S.Settle2	L/slide3	Erosion4

Note: * SP - Spring, ST - Stream, SFS - Spring Fed Stream

** [A] Water Supply, [B] Irrigation, [C] Water Mill

Date in English Calendar

\+ Clear (C) / Turbid (T)

! Pleasant (P) / Unpleasant (UP)

0 Yes (Y) / No (N)

$ Yes (Y) / No (N)

1 Vegetation: Good (G)/Medium (M)/Poor (P)

2 Upstream Settlement: Yes (Y) / No (N)

3 Landslide Possibility: Yes (Y) / No (N)

4 Erosion Possibility: Yes (Y) / No (N)

Annex-4

HOUSEHOLD & POPULATION SURVEY

Name of Project: **District:**

Scheme No.	Scheme Name	Name of Villages/Communities/ Institutions	Ward No.	Total No. of Households and Population		Distribution of Population by Gender		Distribution of Households and Population by Caste and Ethnicity						No. of HH & Population below Poverty Line		Institutional Population	
								Dalit		Janjati		Others					
				HH	Pop.	Male	Female	HH	Pop.	HH	Pop.	HH	Pop.	HH	Pop.	Male	Female
		Total															

Annex-5

EXISTING PUBLIC INSITUTIONS IN THE PROJECT AREA

Name of Project: **District:**

Scheme No.	Name of Institution	Location		Population				Access to Water Supply (Yes/No)	Access to Toilet (Yes/No)
		Ward No.	Village	Resident		Non-Resident			
				Male	Female	Male	Female		
	Total								

Annex-6

HOUSEHOLD & POPULATION PROJECTION

Name of Project: **Design Period:** ….. Years **District:**

Scheme No.	Scheme Name	Villages/Communities	Ward No.	Survey Year (……..)		Annual Growth Rate, %	Base Year (……..)		Design Year (……..)		Institutions	
				Household	Population		Household	Population	Household	Population	Present Population	Design Population
	Total											

Annex-7

TOTAL WATER DEMAND & WATER FLOW CALCULATION

Name of Project: **District:**

Present Year: **Design Year:** **Annual Growth Rate: ….. %**

Scheme No.	Scheme Name	Tap No.	Ward No.	HH	Population		School and Institutions		Consumption Rate (lpcpd)		Designed Water Demand (lpd)				Tap Flow, lps			Tap Location Reference
					Present	Design	Present	Design	Domestic (D)	Institutional	Domestic	Institutional	Livestock ….% of (D)	Total	Average	Peak	Adopted	
		Total																
		Required Flow from Source = Total Design Demand/86400 = l/sec																
		Available Safe Yield at Source = l/sec																(Peak Factor = ……..)

Annex-8 (A)

STORAGE TANK SIZING

(Continuous System)

Name of Project: **District:**

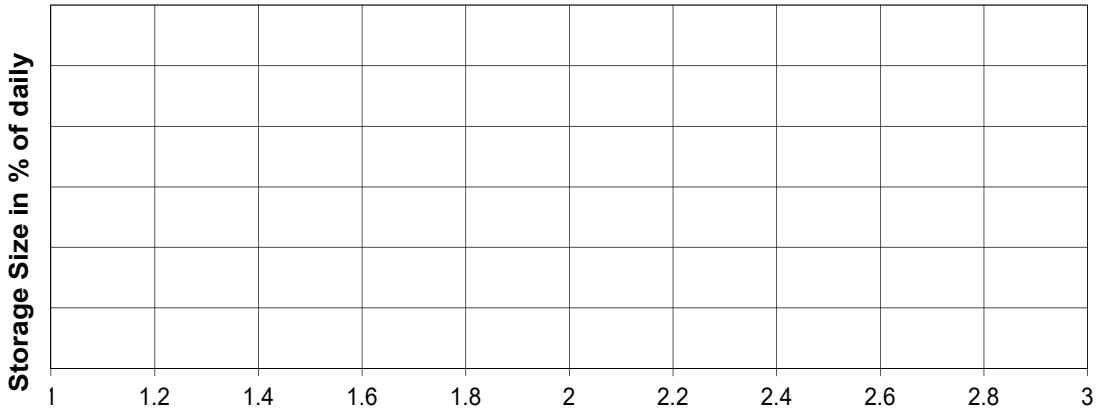
SCHEME NO.: …….

Name of Source(s) :

Type of Source : No. of Taps :…….

Reservoir size is worked out as a prcentage of average daily demand from the graph.

Storage Size in % of Daily Demand



(A) Supply flow to tank Qi = _____ lps

= _____ m^3/day

(B) Total designed daily demand to be supplied through tank Qd = _____ lps

= _____ m^3/day

Qi/Qd = ……., and from graph storage size required = _____ % of Qd

= _____ m^3

Recommended storage tank size = _____ m^3

Note: If Qi/Qd is < 1 then source is inadequate;
If Qi/Qd is > 3 reservoir is not required, however, nominal size can be recommended.

Tank Sizing (as per the above diagram)

1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3
42	30	19	13.5	9.8	7.5	6	5	5	5	5

Annex-8 (B)

STORAGE TANK SIZING

(Intermittent System)

Name of Project: **District:**

SCHEME NO.: …….

Name of Source(s) :

Type of Source : No. of Taps :…….

A) Safe yield/Available discharge from the source : _____ l/s

B) Supply flow to tank from source : _____ l/d

C) Designed demand to be supplied through tank : _____ l/d

D) Total flow of all standpost through tank : _____ l/s

E) Maximum possible supply hours $\frac{B}{D \times 3600}$: _____ hrs

F) Maximum required supply hours $\frac{C}{D \times 3600}$: _____ hrs

G) Adopt intermittent supply for ___ hours

H) Recommended supply time and hours: 1st shift: _____ *AM to* _____ *AM*

2nd shift: _____ *PM to* _____ *PM*

Time Period		Flow Hours		Supply (Inflow), *litres*	Consumption (Demand)		Cumulative Supply, *litres*	Cumulative Demand, *litres*	Cumulative Surplus, *litres*	Cumulative Deficit, *litres*
From	To	In	Out		%	*litres*				
Total				(ΣI)		(ΣD)				

Total Supply (ΣI) = litres Max. Cumulative Deficit (max CD) = litres

Total Consumption (ΣD) = litres Max. Cumulative Surplus (max CS) = litres

Required capacity of storage tank = max CD + max CS - ΣI + ΣD

= _____ litres

= _____ m^3

Recommended to provide storage tank of _____ m^3 capacity.

Annex-9

HYDRAULIC DESIGN OF PIPELINE

Name of Project:

S.No.	Chainage		Length, *m*		Flow, *lps*	Reduced Level, *m*		Level Difference, *m*	Available Head, *m*	Static Head, m	Pipe Used	Bore of Pipe, *mm*		Head Loss, m	Residual Head, *m*	H.G.L., *m*	Velocity, *m/sec*	Remarks
	Up	Down	Actual	Designed		Up	Down					Outer	Inner					

Annex-10

LAYOUT PLAN

Name of Project: **District:**

Annex-11

SCHEMATIC FLOW DIAGRAM

Name of Project: **District:**

Annex-12

WATER SAMPLE ANALYSIS REPORT

Name of Project: **District:**

FINANCIAL ANALYSIS AND AFFORDABILITY

Name of Project: **District:**

1	Total investment NRs.	
2	Total households / population:	
	i) Households Nos.	
	ii) Population Nos.	
3	O & M expenses required per year:	

a) Personnel Expenses (Manpower Cost)

S.No.	Category	No. of Person	Salary, Rs.	
			Per Month	Per year
	VMW			
	Pump Operator			
	Assistant Pump Operator			
	Office Assistant cum Accountant			
	Plumber			
	Meter Reader			
	Chowkidar/Helper			
	Sub-Total (a)			

b) Energy Cost

S.No.	Description	Total unit per year, KWH	Rate per unit, Rs.	Cost per year, Rs.
1	Electricity cost required to run pump in ___ shift every day at the rate of ___ hours in each shift			
2	Transformer charge @ 15% of electricity cost			
	Sub-Total (b)			

c) Electro-Mechanical Cost

S.No.	Item	Initial cost of item, Rs.	Rate of depreciation per year, Rs.	Cost per year, Rs.
1	Depreciation cost of pump		20% of initial cost	
2	Depreciation cost of transformer		10% of initial cost	
3	Unforeseen cost	10% of total cost of Item No.1 and Item No.2		
4	Maintenance of electromechanical equipments	10% of total cost of Item No.1, Item No.2 and Item No.3		
	Sub-Total (c)			

d) O/M, Repair and Miscellaneous Cost

S.No.	Description	Project cost Rs.	Cost per year Rs.
1	Operation, maintenance and repair of the system @ 1% of total project cost per year		
2	Miscellaneous cost (stationary, telephone, rent, allowances etc.) @ 0.5% of project cost per year		
	Sub-Total (d)		
	Total (a+b+c+d)		
	Additional 5% of Total (a+b+c+d) for bad debt		
	Total (3)		

4	Tariff required for O & M	
	i) Per household per year (3/2i) NRs.	
	ii) Per household per month (4i/12) NRs.	
5	Average household cash income	
	i) Per month as per household survey NRs.	
	ii) Per year (5i x 12) NRs.	
6	Affordability (5i/4ii x 100) %	

Annex-14

CHECKLIST FOR ENVIRONMENTAL PARAMETERS
Initial Environmental Examination

Name of Project: **District:**

S.No.	Actions affefcting Environmental Resources and Value	Damage to Environment	Recommended Feasible Protection Measures	IEE			
				No Significant Effect	Significant Effect		
					Small	Moderate	Major
A	Environmental Problems due to Project Location						
1	Pollution of raw water supply from upstream waste discharge	Increase in cost of treatment					
2	Water use conflicts	Social conflicts					
3	Hazard of land subsidence	Serious damage to land use values, especially flooding hazard					
4	Inadequate compensation for land acquired	Social inequalities					
5	Impairment of historical/ cultural monuments, areas	Loss or depreciation of these values					
B	Problems relating to Design Phase						
1	Delivery of unsafe water to distribution system/ unsatisfactory raw water quality	increase health hazards and increase in costs for treatment; delivered water may not be accepted by public					
2	Inadequate protection of intake works causes polluton	Increased treatment costs/ problems					
3	Excessive algae growth in storage reservoir	Water quality depreciation					
4	Increase in sewage volume	Sewage overflows into urban environment					
5	Inadequate disposal of sludge	Nuisance to affected properties					
6	Difficult water quality and treatment problems	Increased treatment costs					
7	Inadequate buffer zone	Nuisances to neighbour and/or hazards of damage to system facilities					

Name of Project: **District:**

S.No.	Actions affefcting Environmental Resources and Value	Damage to Environment	Recommended Feasible Protection Measures	IEE			
				No Significant Effect	Significant Effect		
					Small	Moderate	Major
8	Management of chlorine used for disinfection	Health safety hazards o workers and public					
9	Water and sewer in same trench/ drain	Hazards of contamination					
10	Problems from transmission lines						
a)	Encroachment into ecology	Loss of prcious ecology					
b)	Impairment in environmental aesthetics	Loss of environment aesthetic					
c)	Continuing soil erosion from non resurfaced areas	Soil erosion plus damage to water quality and land values					
11	Problem of road damage in providing connections to consumers	Road damage, road aesthetics, nuisance to pedestrians					
12	Contaminated water in distribution system	Hazard to human health					
13	No stand by power	System failure causing hardship to people					
C	Problems relating to Construction Phase						
1	Soil erosion / silt runoff / setling on street surface from construction activities	Soil erosion plus damage to water quality/ land values and nuisance to pedestrians					
2	Other construction stage hazards	Depends on effect					
3	Inadequate monitoring	Contractors not likely to comply with constraints					
D	Problems relating to Operation Phase						
1	Delivery of unsafe water to distribution system due to O&M deficiencies	Communicable disease hazards					
E	Other possible problems						

Annex-15

PERSONS CONTACTED DURING SURVEY

Name of Project: **District:**

S.No.	Name of the Person	Designation (if any)	Contact Address		
			VDC/Ward No.	Village	Contact No. (if any)

Annex-16

TRACKING OF MAIN STRUCTURES AND PIPE LINE ALIGNMENT IN GPS

Name of Project: **District:**

Annex-17

SOCIAL MAP

Name of Project: **District:**

Province Government

Ministry of Energy, Water resources and Water supply

Gandaki Province

Pokhara, Nepal

Detailed Engineering Study and Design of Water Supply and Sanitation Project

PROVINCIAL NORMS

The complete work of Detailed Engineering Study and Design shall be carried out as per TOR in all type of Water Supply and Sanitation Projects (WSSP), both new and rehabilitation, prior to implementation of the project. The study shall be conducted either through government employees or acquiring consultancy services.

1. Detailed Engineering Study and Design of WSSP - through Governmental Employees

The costs worked out for complete study and design of one project with 15-20 km combined total length of transmission and distribution pipeline **(excluding the pipe connection for tap points - up to 20 mm dia)** through governmental employees are shown in Table 1.1.

Table 1.1: Costs for Detailed Engineering Study and Design of a WSSP through Governmental Employees

S. No.	Description	Amount, Rs.		
		for Group **A** Districts	*for* Group **B** Districts	*for* Group **C** Districts
A.	**Field Study and Survey Work**			
1	Manpower	77342.80	64444.00	51545.20
2	Materials	12720.00	10600.00	8480.00
	Sub-Total (A)	**90062.80**	**75044.00**	**60025.20**
B.	**Design/Office Work and Report Preparation**			
1	Manpower	14000.00	14000.00	14000.00
2	Materials including Report Preparation (Field Study and Survey Report 2 set, Detailed Engineering Design Draft Report 2 set and Detailed Engineering Design Final Report 6 set)	10020.00	8350.00	6680.00
	Sub-Total (B)	**24020.00**	**22350.00**	**20680.00**
	Total (A + B)	**114082.80**	**97394.00**	**80705.20**
	Total	**114082.80**	**97394.00**	**80705.20**
C.	**Water Sample Testing**			
	Laboratory test of water samples from selected water source/s for water quality parameters specified by Nepal Water Quality Standard Implementation Guidelines 2062 (*Annex-1* and *Annex-2*)	5000.00	5000.00	5000.00
	Grand Total	**119082.80**	**102394.00**	**85705.20**

The amount for the complete work shown in Table 1.1 are basic amount applied for one project with a total of 15-20 km length of transmission and distribution pipeline combined together applicable for both gravity and pumping schemes as well as for combined gravity and pumping schemes either with a single scheme or number of schemes included in the project.

If the total combined length of pipeline is less than 15 km or more than 20 km, the final payment for the completed work shall be made with a deduction or addition respectively on the basic amount. The percentage of amount to be deducted or added on the basic amount is shown in Table 1.2.

Table 1.2: Percentage of amount to be deducted or added on the basis of total length of pipeline in the project

S. No.	Description	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		0-10 km	10-15 km	**15-20 km (Basic Amount)**	20-25 km	25-30 km
1	Percentage of amount to be deducted from the basic amount	25	15	-	-	-
2	Percentage of amount to be added in the basic amount	-	-	-	15	25

The cost matrix of the detailed engineering study and design work of one project through government employees with varying total combined length of the project up to 30 km shall be as shown in Table 1.3.

Table 1.3: Cost matrix of detailed engineering study and design work of one project through governmental employees

S. No.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		0-10 km	10-15 km	**15-20 km**	20-25 km	25-30 km
1	Group **A** districts	89,312.10	101,220.38	**119,082.80**	136,945.22	148,853.50
2	Group **B** districts	76,795.50	87,034.90	**102,394.00**	117,753.10	127,992.50
3	Group **C** districts	64,278.90	72,849.42	**85,705.20**	98,560.98	107,131.50

For the project with total combined length of pipeline more than 30 km, additional payment shall be made for each additional 5 km to the previous total combined length of pipeline. The costs worked out for additional work is shown in Table 1.4.

Table 1.4: Costs for each additional 5 (more than 30) km length of pipeline

S. No.	Description	Amount, Rs.		
		for Group **A** Districts	*for* Group **B** Districts	*for* Group **C** Districts
A.	**Field Study and Survey Work**			
1	Manpower	13014.00	10845.00	8676.00
2	Materials	2100.00	1750.00	1400.00
	Sub-Total (A)	**15114.00**	**12595.00**	**10076.00**
B.	**Design/Office Work and Report Preparation**			
1	Manpower	2000.00	2000.00	2000.00
2	Materials	1134.00	945.00	756.00
	Sub-Total (B)	**3134.00**	**2945.00**	**2756.00**
	Total (A + B)	**18248.00**	**15540.00**	**12832.00**
	Total	**18248.00**	**15540.00**	**12832.00**

The cost matrix for the project with more than 30 km length of transmission and distribution pipeline combined together shall be as shown in Table 1.5. For the project with total combined length of pipeline more than 100 km, additional payment shall be made correspondingly for each additional 5 km.

Table 1.5: Cost matrix of detailed engineering study and design work of one project through governmental employees

S. No.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		30-35 km	35-40 km	40-45 km	45-50 km	50-55 km
1	Group **A** districts	167,101.50	185,349.50	203,597.50	221,845.50	240,093.50
2	Group **B** districts	143,532.50	159,072.50	174,612.50	190,152.50	205,692.50
3	Group **C** districts	119,963.50	132,795.50	145,627.50	158,459.50	171,291.50
S. No.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		55-60 km	60-65 km	65-70 km	70-75 km	75-80 km
1	Group **A** districts	258,341.50	276,589.50	294,837.50	313,085.50	331,333.50
2	Group **B** districts	221,232.50	236,772.50	252,312.50	267,852.50	283,392.50
3	Group **C** districts	184,123.50	196,955.50	209,787.50	222,619.50	235,451.50
S. No.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		80-85 km	85-90 km	90-95km	95-100km	
1	Group **A** districts	349,581.50	367,829.50	386,077.50	404,325.50	
2	Group **B** districts	298,932.50	314,472.50	330,012.50	345,552.50	
3	Group **C** districts	248,283.50	261,115.50	273,947.50	286,779.50	

2. Detailed Engineering Study and Design of WSSP - <u>through Consulting Firm</u>

The costs worked out for complete study and design of one project with 15-20 km combined total length of transmission and distribution pipeline **(excluding the pipe connection for tap points - up to 20 mm dia)** through Consulting Firm are shown in Table 2.1.

Table 2.1: Costs of Detailed Engineering Study and Design of WSSP through Consulting Firm

S. No.	Description	Amount, Rs.		
		for Group **A** Districts	*for* Group **B** Districts	*for* Group **C** Districts
A.	**<u>Field Study and Survey Work</u>**			
1	Manpower	128372.80	107644.00	86915.20
2	Materials	31400.00	31400.00	31400.00
	Sub-Total (A)	**159772.80**	**139044.00**	**118315.20**
B.	**<u>Design/Office Work and Report Preparation</u>**			
1	Manpower	52500.00	52500.00	52500.00
2	Materials including Report Preparation (Field Study and Survey Report 2 set, Detailed Engineering Design Draft Report 2 set and Detailed Engineering Design Final Report 6 set)	19550.00	19550.00	19550.00
	Sub-Total (B)	**72050.00**	**72050.00**	**72050.00**
	Total (A + B)	**231822.80**	**211094.00**	**190365.20**
		231822.80	**211094.00**	**190365.20**
	Value Added Tax (VAT) @ 13%	30136.96	27442.22	24747.48
	Total	**261959.76**	**238536.22**	**215112.68**
C.	**<u>Water Sample Testing</u>**			
	Laboratory test of water samples from selected water source/s for water quality parameters specified by Nepal Water Quality Standard Implementation Guidelines 2062 (*Annex-1* & *Annex-2*)	5000.00	5000.00	5000.00
	Grand Total	**266959.76**	**243536.22**	**220112.68**

The amount for the complete work shown in Table 2.1 are basic amount applied for one project with a total of 15-20 km length of transmission and distribution pipeline combined together applicable for both gravity and pumping schemes as well as for combined gravity and pumping schemes either with a single scheme or number of schemes included in the project.

If the total combined length of pipeline is less than 15 km or more than 20 km, the final payment for the completed work shall be made with a deduction or addition on the basic amount as for the governmental employees. The cost matrix of the detailed engineering study and design work of one project through consultancy firm with varying total combined length of the project up to 30 km shall be as shown in Table 2.2.

Table 2.2: Cost matrix for detailed engineering study and design work of one project through consultancy firm

S. No.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		0-10 km	10-15 km	**15-20 km**	20-25 km	25-30 km
1	Group **A** districts	200,219.82	226,915.80	**266,959.76**	307,003.72	333,699.70
2	Group **B** districts	182,652.17	207,005.79	**243,536.22**	280,066.65	304,420.28
3	Group **C** districts	165,084.51	187,095.78	**220,112.68**	253,129.58	275,140.85

For the project with total combined length of pipeline more than 30 km, additional payment shall be made for each additional 5 km to the previous total combined length of pipeline. The costs worked out for additional work is shown in Table 2.3.

Table 2.3: Costs for each additional 5 (more than 30) km length of pipeline

S. No.	**Description**	**Amount, Rs.**		
		for Group **A** Districts	*for* Group **B** Districts	*for* Group **C** Districts
A.	**Field Study and Survey Work**			
1	Manpower	17,424.00	14,520.00	11,616.00
2	Materials	4,150.00	4,150.00	4,150.00
	Sub-Total (A)	**21,574.00**	**18,670.00**	**15,766.00**
B.	**Design/Office Work and Report Preparation**			
1	Manpower	7,500.00	7,500.00	7,500.00
2	Materials	4,145.00	4,145.00	4,145.00
	Sub-Total (B)	**11,645.00**	**11,645.00**	**11,645.00**
	Total (A + B)	**33,219.00**	**30,315.00**	**27,411.00**
		33,219.00	**30,315.00**	**27,411.00**
	Value Added Tax (VAT) @ 13%	4,318.47	3,940.95	3,563.43
	Total	**37,537.47**	**34,255.95**	**30,974.43**

The cost matrix for the project with more than 30 km length of transmission and distribution pipeline combined together shall be as shown in Table 2.4. For the project with total combined length of pipeline more than 100 km, additional payment shall be made correspondingly for each additional 5 km.

Table 2.4: Cost matrix of detailed engineering study and design work of one project through consultancy firm

S. No.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		30-35 km	35-40 km	40-45 km	45-50 km	50-55 km
1	Group **A** districts	371,237.17	408,774.64	446,312.11	483,849.58	521,387.05
2	Group **B** districts	338,676.23	372,932.18	407,188.13	441,444.08	475,700.03
3	Group **C** districts	306,115.28	337,089.71	368,064.14	399,038.57	430,013.00
S. No.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		55-60 km	60-65 km	65-70 km	70-75 km	75-80 km
1	Group **A** districts	558,924.52	596,461.99	633,999.46	671,536.93	709,074.40
2	Group **B** districts	509,955.98	544,211.93	578,467.88	612,723.83	646,979.78
3	Group **C** districts	460,987.43	491,961.86	522,936.29	553,910.72	584,885.15
S. No.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)				
		80-85 km	85-90 km	90-95km	95-100km	
1	Group **A** districts	746,611.87	784,149.34	821,686.81	859,224.28	
2	Group **B** districts	681,235.73	715,491.68	749,747.63	784,003.58	
3	Group **C** districts	615,859.58	646,834.01	677,808.44	708,782.87	

Conditions of payment applied to both governmental employees and consultancy firm:

a) Amount allocated for water sample testing is provisional. The amount shall be paid as per actual bill/s of laboratory and only upon the submission of the bill/s. If the amount allocated is in excess to the bill/s, extra amount should be deducted from the payment. If the amount allocated is not sufficient, additional amount shall be paid as per the bill/s of water testing laboratory.

b) In case of surface water sources, if water samples from the selected source/s have already been tested for specified water quality parameters prior to the detailed survey or during feasibility study, the same analysis report may be used and the amount allocated for water sample testing as well as the manpower costs and material costs associated with the collection of water samples should be deducted from the payment accordingly.

c) In case of underground water sources, water samples can be obtained only after drilling of the deep tube well. Therefore, the amount allocated for water sample testing as well as the manpower costs and material costs associated with the collection of water samples should be deducted from the costs of detailed engineering study and design work of the deep tube well project. Necessary arrangements for water quality testing shall be included in the estimate of deep tube well boring.

d) The amount shall be paid as per TOR with adjustments as shown above in Cost Matrix to the team leader of government employees or the consulting firm executing job upon submission of report/s. No bills and/or invoices of any items other than the bill/s of water quality analysis are required to be submitted.

e) Any payment, either advance or interim or final payment, shall be made deducting taxes from the amount paid as per the prevailing Rules and Regulations of the provincial government of Gandaki province.

Assumptions:

1. For governmental employees (Engineer/sub-engineer/computer operator) rate for field work are taken from prevailing government norms as daily and travelling allowance.
2. For consultancy firm (Engineer/sub-engineer/computer operator) rate for field work are taken from Department of Water Supply and Sewerage Management(DWSSM)norms 2077.
3. This norms will be applicable only for water supply and sanitation projects implemented by Gandaki province.

Updating of the Norms:

The norms shall be updated automatically with the change in the rate of daily allowance and lodging allowance of the government employees. However, the update is carried out only by the ministry for the uniformity all over the Province. The whole norms or the contents of it shall not be changed or altered by any of the district based offices.

Province Government

Ministry of Energy, Water resources and Water supply

Gandaki Province

Pokhara, Nepal

Detailed Engineering Study and Design of Water Supply and Sanitation Project

Details of Cost Estimation

1. Total Cost of Detailed Engineering Study and Design Work

For One Project with 15-20 km of Total Length (Excluding Pipe Connection for Tap Points-20 mm dia)*

Through Governmental Employees

S.No.	Description	Amount, Rs.		
		For Group A Districts	For Group B Districts	For Group C Districts
A	**Field Study and Survey Work**			
1	Manpower	77342.80	64444.00	51545.20
2	Materials	12720.00	10600.00	8480.00
	Sub-Total (A)	**90062.80**	**75044.00**	**60025.20**
B	**Design/Office Work and Report Preparation**			
1	Manpower	14000.00	14000.00	14000.00
2	Materials including Report Preparation (Field Study and Survey Report 2 set, Detailed Engineering Design Draft Report 2 set and Detailed Engineering Design Final Report 6 set)	10020.00	8350.00	6680.00
	Sub-Total (B)	**24020.00**	**22350.00**	**20680.00**
	Total (A + B)	**114082.80**	**97394.00**	**80705.20**
C	**Water Sample Testing**			
	Laboratory test of water samples from selected water source/s for water quality parameters specified by Nepal Water Quality Standard Implementation Guidelines 2062 (*Annex-1* and *Annex-*	5000.00	5000.00	5000.00
	Grand Total	**119082.80**	**102394.00**	**85705.20**

Note:

1. Amount allocated for water sample testing is provisional for estimation purpose. The amount shall be paid as per actual bill/s of laboratory and only upon the submission of the bill/s. If the amount allocated is in excess to the bill/s, extra amount should be deducted from the payment. If the amount allocated is not sufficient, additional amount shall be paid as per the bill/s of water testing laboratory.
2. In case of surface water sources, if water samples from the selected source/s have already been tested for specified water quality parameters in the laboratory prior to the detailed survey or during feasibility study, the same analysis report may be used and the amount allocated for water sample testing as well as the manpower costs and material costs associated with the collection of water samples should be deducted from the payment accordingly.
3. In case of underground water sources, water samples can be obtained only after drilling of the deep tube well. Therefore, the amount allocated for water sample testing as well as the manpower costs and material costs associated with the collection of water samples should be deducted from the costs of detailed engineering study and design work of the deep tube well project. Necessary arrangements for water quality testing shall be included in the estimate of deep tube well boring.
4. All taxes shall be applied as per Government rules and regulations.

*** One Project in general, for Costing Purpose, is Considered with 15-20 km Combined Total Length of Transmission and Distribution Pipeline Excluding Pipe Connection for Tap Points (up to 20 mm dia)**

Province Government

Ministry of Energy, Water resources and Water supply

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Pokhara, Nepal

Detailed Engineering Study and Design of Water Supply and Sanitation Project

2. Total Cost of Detailed Engineering Study and Design Work

For One Project with 15-20 km of Total Length (Excluding Pipe Connection for Tap Points-20 mm dia)*

Through Consulting Firm

S.No.	Description	Amount, Rs.		
		For Group A Districts	For Group B Districts	For Group C Districts
A	**Field Study and Survey Work**			
1	Manpower	128372.80	107644.00	86915.20
2	Materials	31400.00	31400.00	31400.00
	Sub-Total (A)	**159772.80**	**139044.00**	**118315.20**
B	**Design/Office Work and Report Preparation**			
1	Manpower	52500.00	52500.00	52500.00
2	Materials including Report Preparation (Field Study and Survey Report 2 set, Detailed Engineering Design Draft Report 2 set and Detailed Engineering Design Final Report 6 set)	19550.00	19550.00	19550.00
	Sub-Total (B)	**72050.00**	**72050.00**	**72050.00**
	Total (A + B)	**231822.80**	**211094.00**	**190365.20**
		231822.80	**211094.00**	**190365.20**
	VAT @ 13%	30136.96	27442.22	24747.48
	Total	**261959.76**	**238536.22**	**215112.68**
C	**Water Sample Testing**			
	Laboratory test of water samples from selected water source/s for water quality parameters specified by Nepal Water Quality Standard Implementation Guidelines 2062 (*Annex-1* and	5000.00	5000.00	5000.00
	Grand Total	**266959.76**	**243536.22**	**220112.68**

Note:

1. Amount allocated for water sample testing is provisional for estimation purpose. The amount shall be paid as per actual bill/s of laboratory and only upon the submission of the bill/s. If the amount allocated is in excess to the bill/s, extra amount should be deducted from the payment. If the amount allocated is not sufficient, additional amount shall be paid as per the bill/s of water tesing laboratory.
2. In case of surface water sources, if water samples from the selected source/s have already been tested for specified water quality parameters in the laboratory prior to the detailed survey or during feasibility study, the same analysis report may be used and the amount allocated for water sample testing as well as the manpower costs and material costs associated with the collection of water samples should be deducted from the payment accordingly.
3. In case of underground water sources, water samples can be obtained only after drilling of the deep tube well. Therefore, the amount allocated for water sample testing as well as the manpower costs and material costs associated with the collection of water samples should be deducted from the costs of detailed engineering study and design work of the deep tube well project. Necessary arrangements for water quality testing shall be included in the estimate of deep tube well boring.
4. All taxes shall be applied as per Government rules and regulations.

*** One Project in general, for Costing Purpose, is Considered with 15-20 km Combined Total Length of Transmission and Distribution Pipeline Excluding Pipe Connection for Tap Points (up to 20 mm dia)**

Province Government

Ministry of Energy, Water resources and Water supply

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Pokhara, Nepal

Detailed Engineering Study and Design of Water Supply and Sanitation Project

3. Estimate of Manpower for Field Study and Survey Work

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

S.No.	Description of Work	Category, man-days (md)								
		Governmental Employees		**Consultancy Firm**		**Locally Hired Personnel** *for both Governmental Employees and Consulting Firm*				
		Engineer	Sub-Engineer	Engineer	Sub-Engineer	Staff-man	Survey Helper	Tape/Chain man	Site Cleaner	Porter
1	Travel to project site	1	1	2	2					2
2	Pre-study community meeting/Interaction with Users Committee and users	0.5	0.5	0.5	0.5					
3	Identification/verification of project area/ Demand assessment/ Source identification, assessment and ascertaining minimum yield	1	1	1	1					
4	Detailed engineering survey of transmission and distribution pipeline @ 2 - 2.5 km/day including socio-economic survey/data collection	6	6	6	6	6	6	12	6	
5	Initial environmental examination (IEE)	1		1						
6	Post-survey meeting with community/Survey data verification/Collection of required documents from communities and local bodies	0.5	0.5	0.5	0.5					
7	Water sample collection from selected source/s for quality analysis		1		1					
8	Travel back from project site	1	1	2	2					2
	Total	**11**	**11**	**13**	**13**	**6**	**6**	**12**	**6**	**4**

Notes:

*** One Project, for Costing Purpose, is Considered with 15-20 km Combined Total Length of Transmission and Distribution Pipeline Excluding Pipe Connection for Tap Points (up to 20 mm dia)**

1 As per the rules and general logics (considering the factor of geographical condition/remoteness, accessibility, and expensiveness) districts are divided into three groups, Group A, Group B and Group C, for the allocation of man-days. General/basic man-days calculated above are applied to the districts under Group A. Whereas, additional 20 percent of man-days is added in the basic man-days of Group A districts for field work man-days to the districts or part of districts under Group B. Likewise, 20 percent of man-days is deducted in the basic man-days of Group A districts for field work man-days to the districts or part of districts under Group C.

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Detailed Engineering Study and Design of Water Supply and Sanitation Project

4. Estimate of Manpower for Design and Office Work

For One Project with 15-20 km of Total Length (Excluding Pipe Connection for Tap Points-20 mm dia)*

S.No.	Description of Work	Category, man-days (md)			Remarks
		Engineer	Sub-Engineer	Computer Operator/ CAD Person	
1	Processing of field data/ Population forecast/ Demand calculation/ Identification of system alternatives/ Preparation of Survey Report	1	2	1	
2	Analysis of alternatives if any and selection of system between alternatives / Hydraulic design of pipeline/ Selection of system components/ System design	2	1	1	
3	Preparation of Layout Plan/Flow Diagram/ L-Sections of pipeline/ Structural and working drawings of system components	1	1	2	
4	Rate analysis/ Quantity and cost estimate/ Preparation of Draft Report	1	1	1	
5	Preparation of Final Report/ Printing and binding	2	2	2	
	Total	**7**	**7**	**7**	

Notes:

*** One Project, for Costing Purpose, is Considered with 15-20 km Combined Total Length of Transmission and Distribution Pipeline Excluding Pipe Connection for Tap Points (up to 20 mm dia)**

5. Basis for Cost Estimation

All rates, daily allowance, lodging allowance and wage, are based on the Travelling Expense Rules (Bhraman Kharcha Niyamawali) 2064 of the GON for Governmental Employees, and the basic rates approved and used by Government of Nepal, Ministry of Water Supply, Department of Water Supply and Sewerage Management(DWSSM)norms 2077 for employees from Consulting Firm. Rates for the materials required for the detailed field survey, design/office work and report preparation are based on the general market available rates. Rates for the items, quantity of which can not be determined are allocated in lump sum amount as a percentage of daily allowance for the ease of updating the norms in the future.

As per the rules and general logics (considering the factor of geographical condition/remoteness, accessibility, and expensiveness) districts are divided into three groups, Group A, Group B and Group C, for the allocation of man-days. General man-days calculated above are applied to the districts under Group B. Whereas, additional 20 percent of man-days is added in the man-days of Group B districts for field work man-days to the districts or part of districts under Group A. Likewise, 20 percent of man-days is deducted in the man-days of Group B districts for field work man-days to the districts or part of districts under Group C. Districts into groups are divided as follows:

Group A (Mountain)	Group B (Hill)	Group C (Terai)
1. Manag	1.Tanahu	1. Plain area of Nawalparasi
2. Mustang	2.Syangja	Districts Bardaghat Susta
3. Gorkha (North of Jagat)	3. Kaski	East)
	4. Lamjung	
	5. Gorkha	
	6. Myagdi	
	7. Parbat	
	8. Baglung	
	9. Nawalparasi (Hill)	

1. Basis for Cost Estimation of the Manpower

1.1 For Field Study and Survey Work:

a. Daily allowance for governmental employees (Engineer, Sub-Engineer & Computer Operator) - at basic daily allowance rate of GON.

b. Daily allowance for the personnel from consulting firm (Engineer , Sub-Engineer, Computer Operator) - at the rate equal to the basic daily allownce used by Government of Nepal, Ministry of Water Supply, Department of Water Supply and Sewerage Management(DWSSM)(norms 2077).

c. Wages for locally hired manpower (staff-man, survey helper, tape/chain-man, site cleaner and porter) - at the rate equal to the daily salary for the fourth level government employees for each man-day;

d. Lodging allowance for Governmental employees - as per GON rules;

e. Lodging/out of station allowance for both the personnel from consulting firm - no provision;

f. Travel allowance to the Governmental employee for travelling from office to and back from the project site - lump sum amount equal to one day's daily allowance for engineer to each of the Governmental employee;

g. Travel allowance to the personnel from the consulting firm - at the rate equal to half day's daily allowance for engineer to each of the personnel (assuming the need to travel from outside the district);

h Lodging allowance and travel allowance will not be provided to the locally hired personnel.

1.2 For Office Work and Report Preparation:

a. Daily allowance for Governmental employees (Engineer, Sub-Engineer and Computer Operator/CAD Person), considering the over/extra time (rather than normal office hours) to be given for Office Work and Report Preparation - at a rate equal to fifty percent of basic daily allowance for all group districts;

b. Daily allowance as the wage for consultancy personnel (Engineer, Sub-Engineer and Computer Operator/CAD Person) - at a rate equal to the basic daily allowance used by the Government of Nepal, Ministry of Water Supply, Department of Water Supply and Sewerage Management(DWSSM)(norms 2077) for each of them for all group districts;

c. No other additional allowance shall be provided for the office work and report preparation.

2. Basis for Cost Estimation of the Unquantifiable Items

2.1 For Field Study and Survey Work:

a. Cost for stationary (Flip charts, markers, dotpens, pencils, erasers, etc.) - lump sum amount equal to one day's general/basic daily allowance of the Engineer of GON;
b. Cost for photocopy of formats/questionnaires - lump sum amount equal to one day's general/basic daily allowance of the Engineer of GON;
c. Cost for medicines for first aid - lump sum amount equal to one day's general/basic daily allowance of the Engineer of GON;
d. Cost for depriciation for logistics - accessories of multiple-use like handbags, torchlight, water bottle, umbrella, shoes etc. - lump sum amount equal to three day's general/basic daily allowance of the Engineer of GON;
e. Cost for refreshment for village meetings - lump sum amount equal to one and half day's general daily allowance of the Engineer of GON;
f. Per day rate for the depriciation/rent for survey equipments - at a rate equal to one day's general daily allowance of the Engineer of GON for the whole period estimated for survey work. Depriciation/rent for survey equipments is provided only to the consulting firm.

2.2 For Office Work and Report Preparation:

a. Per day rate for the depriciation/rent for computer, printer and other equipments and accessories - at a rate equal to one day's general daily allowance of the Engineer of GON for the whole period estimated for the design and report preparation. This cost is provided only to the consulting firm.

3. Addition/deduction in the Cost of Materials for Group A/C Districts

a. Considering local market rate and remoteness of the districts, 20 percent in the total cost of materials for Group A districts is added/deducted for both Field and Office work for Group C districts respectively;
b. The addition/deduction of 20 percent in the cost of materials shall be applied only for the works carried out by Governmental employees assuming that the consulting firm will make required procurement outside the district.

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Detailed Engineering Study and Design of Water Supply and Sanitation Project

6. Cost Estimate for Manpower

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

Through Governmental Employees

1 Field Study and Survey Work

S.No.	Category	Daily Allowance/Wage			Lodging Allowance			Travel Allowance (to and back from Project Site) Rs.		Total Amount, Rs.
		man-day	Rate per m.d., Rs.	Amount Rs.	day	Rate per day, Rs.	Amount Rs.	Rate, Rs.	Amount Rs.	
A	**For Group A Districts**									
1	Engineer	13.2	1600.00	21120.00	12.2	500.00	6100.00	400.00	400.00	27620.00
2	Sub-Engineer	13.2	1200.00	15840.00	12.2	350.00	4270.00	400.00	400.00	20510.00
3	Staff man	7.2	716.00	5155.20			-	-	-	5155.20
4	Level man	7.2	716.00	5155.20			-	-	-	5155.20
5	Chain man	14.4	716.00	10310.40			-	-	-	10310.40
6	Cleaner	7.2	716.00	5155.20			-	-	-	5155.20
7	Porter	4.8	716.00	3436.80			-	-	-	3436.80
	Total			**66172.80**			**10370.00**		**800.00**	**77342.80**
B	**For Group B Districts**									
1	Engineer	11	1600.00	17600.00	10	500.00	5000.00	400.00	400.00	23000.00
2	Sub-Engineer	11	1200.00	13200.00	10	350.00	3500.00	400.00	400.00	17100.00
3	Staff man	6	716.00	4296.00			-	-	-	4296.00
4	Level man	6	716.00	4296.00			-	-	-	4296.00
5	Chain man	12	716.00	8592.00			-	-	-	8592.00
6	Cleaner	6	716.00	4296.00			-	-	-	4296.00
7	Porter	4	716.00	2864.00			-	-	-	2864.00
	Total			**55144.00**			**8500.00**		**800.00**	**64444.00**
C	**For Group C Districts**									
1	Engineer	8.8	1600.00	14080.00	8	500.00	3900.00	400.00	400.00	18380.00
2	Sub-Engineer	8.8	1200.00	10560.00	8	350.00	2730.00	400.00	400.00	13690.00
3	Staff man	4.8	716.00	3436.80			-	-	-	3436.80
4	Level man	4.8	716.00	3436.80			-	-	-	3436.80
5	Chain man	9.6	716.00	6873.60			-	-	-	6873.60
6	Cleaner	4.8	716.00	3436.80			-	-	-	3436.80
7	Porter	3.2	716.00	2291.20			-	-	-	2291.20
	Total			**44115.20**			**6630.00**		**800.00**	**51545.20**

2 Design and Office Work for all Group Districts

S.No.	Category	Daily Allowance/Wage			Lodging Allowance			Travel Allowance (to and back from Project Site)		Total Amount, Rs.
		man-day	Rate per m.d., Rs.	Amount Rs.	day	Rate per day, Rs.	Amount Rs.	Rate, Rs.	Amount Rs.	
1	Engineer	7	800.00	5600.00			-	-	-	5600.00
2	Sub-Engineer	7	600.00	4200.00			-	-	-	4200.00
3	Computer Operator/ CAD Person	7	600.00	4200.00			-	-	-	4200.00
	Total			**14000.00**						**14000.00**

Note:

*** One Project in general, for Costing Purpose, is Considered with 15-20 km Combined Total Length of Transmission and Distribution Pipeline Excluding Tap Connection (up to 20 mm dia pipe)**

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Detailed Engineering Study and Design of Water Supply and Sanitation Project

7. Cost Estimate for Manpower

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

Through Consulting Firm

1 Field Study and Survey Work

S.No.	Category	Daily Allowance/Wages			Out of Station Allowance			Travel Allowance (to and back from Project Site) Rs.		Total Amount, Rs.
		man-day	Rate per md., Rs.	Amount Rs.	day	Rate per day, Rs.	Amount Rs.	Rate, Rs.	Amount Rs.	
A	**For Group A Districts**									
1	Engineer	15.6	4000.00	62400.00	14.6	0.00	0.00	2000.00	2000.00	64400.00
2	Sub-Engineer	15.6	2100.00	32760.00	14.6	0.00	0.00	2000.00	2000.00	34760.00
3	Staff man	7.2	716.00	5155.20			-	-	-	5155.20
4	Level man	7.2	716.00	5155.20			-	-	-	5155.20
5	Chain man	14.4	716.00	10310.40			-	-	-	10310.40
6	Cleaner	7.2	716.00	5155.20			-	-	-	5155.20
7	Porter	4.8	716.00	3436.80			-	-	-	3436.80
	Total			**124372.80**			**0.00**		**4000.00**	**128372.80**
B	**For Group B Districts**									
1	Engineer	13	4000.00	52000.00	12.0	0.00	0.00	2000.00	2000.00	54000.00
2	Sub-Engineer	13	2100.00	27300.00	12.0	0.00	0.00	2000.00	2000.00	29300.00
3	Staff man	6	716.00	4296.00			-	-	-	4296.00
4	Survey Helper	6	716.00	4296.00			-	-	-	4296.00
5	Tape/Chain man	12	716.00	8592.00			-	-	-	8592.00
6	Site Cleaner	6	716.00	4296.00			-	-	-	4296.00
7	Porter	4	716.00	2864.00			-	-	-	2864.00
	Total			**103644.00**			**0.00**		**4000.00**	**107644.00**
C	**For Group C Districts**									
1	Engineer	10.4	4000.00	41600.00	9.4	0.00	0.00	2000.00	2000.00	43600.00
2	Sub-Engineer	10.4	2100.00	21840.00	9.4	0.00	0.00	2000.00	2000.00	23840.00
3	Staff man	4.8	716.00	3436.80			-	-	-	3436.80
4	Level man	4.8	716.00	3436.80			-	-	-	3436.80
5	Chain man	9.6	716.00	6873.60			-	-	-	6873.60
6	Cleaner	4.8	716.00	3436.80			-	-	-	3436.80
7	Porter	3.2	716.00	2291.20			-	-	-	2291.20
	Total			**82915.20**			**0.00**		**4000.00**	**86915.20**

2 Design and Office Work for all Group of Districts

1	Engineer	7	4000.00	28000.00			-	-	-	28000.00
2	Sub-Engineer	7	2100.00	14700.00			-	-	-	14700.00
3	Computer Operator/ CAD Person	7	1400.00	9800.00			-	-	-	9800.00
	Total			**52500.00**						**52500.00**

Note:

*** One Project in general, for Costing Purpose, is Considered with 15-20 km Combined Total Length of Transmission and Distribution Pipeline Excluding Tap Connection (up to 20 mm dia pipe)**

8. Cost Estimate for Materials

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

1 Field Study and Survey Work

S.No.	Description of Items	Unit	Quantity	for Governmental Employees		for Consultancy Firm	
				Rate, Rs.	Amount, Rs.	Rate, Rs.	Amount, Rs.
A	**For Group A Districts**						
1	Materials and other items as for Group A districts	as in 1 (B)			10600.00	as in 1 (B)	31400.00
2	Addition in the cost of materials and other items with considerations of the remoteness of the districts	L.S.		@ 20% in the Total Cost of 1 (B)	2120.00	-	-
	Total				**12720.00**		**31400.00**
B	**For Group B Districts**						
1	Level Book	No.	2	100.00	200.00	100.00	200.00
2	Note Book	No.	2	100.00	200.00	100.00	200.00
3	Stationary (Flip Charts, Markers, Dotpens, Pencils, Erasers, etc.)	L.S.	L.S.		400.00		400.00
4	Photocopy of Formats/Questionnaires	L.S.	L.S.		400.00		400.00
5	Area Map	No.	1	300.00	300.00	300.00	300.00
6	Battery for Torch Light	Pairs	4	50.00	200.00	50.00	200.00
7	Candles	Packet	2	100.00	200.00	100.00	200.00
8	Enamel Paint	Litre	1	300.00	300.00	300.00	300.00
9	Spirit	Litre	2	100.00	200.00	100.00	200.00
10	Paint Brush	No.	2	100.00	200.00	100.00	200.00
11	Water bottles for sample collection*	No.	8	50.00	400.00	50.00	400.00
12	Medicines for First Aids	L.S.	L.S.		400.00		400.00
13	Depriciation for logistics - accessories of multiple-use like handbags, torchlight, water bottle, umbrella, shoes etc.	L.S.	L.S.		4800.00		4800.00
14	Refreshment for Village meetings	L.S.	L.S.		2400.00		2400.00
15	Depriciation/Rent for survey equipments	day	13	-	-	1600.00	20800.00
	Total				**10600.00**		**31400.00**
C	**For Group C Districts**						
1	Materials and other items as for Group A districts	as in 1 (B)			10600.00	as in 1 (B)	31400.00
2	Deduction in the cost of materials and other items with considerations of the remoteness of the districts	L.S.		@ 20% in the Total Cost of 1 (B)	2120.00	-	-
	Total				**8480.00**		**31400.00**

2 Design/Office Work and Report Preparation

S.No.	Description of Items	Unit	Quantity	for Departmental Employees		for Consultancy Firm	
				Rate, Rs.	**Amount, Rs.**	**Rate, Rs.**	**Amount, Rs.**
A	**For Group A Districts**						
1	Materials and other items as for Group A districts	as in 2 (B)			8350.00	as in 2 (B)	19550.00
2	Addition in the cost of materials and other items with considerations of the remoteness of the districts	L.S.		@ 20% in the Total Cost of 2 (B)	1670.00	-	-
	Total				**10020.00**		**19550.00**
B	**For Group B Districts**						
1	Photocopy Paper	Packet	1	400.00	400.00	400.00	400.00
2	Gel Pen/Dotpen	Nos.	6	25.00	150.00	25.00	150.00
3	Pencil	Doz	1	60.00	60.00	60.00	60.00
4	Eraser	Nos.	4	10.00	40.00	10.00	40.00
5	Toner for Printer	No.	0.5	6000.00	3000.00	6000.00	3000.00
6	Field Study and Survey Report including photocopy, binding, etc.	set	2	350.00	700.00	350.00	700.00
7	Detailed Design Draft Report including photocopy, binding, etc.	set	2	500.00	1000.00	500.00	1000.00
8	Detailed Design Final Report including photocopy, binding, etc.	set	6	500.00	3000.00	500.00	3000.00
9	Rental cost for design software including compatible hardware	day	7	-	-	1600.00	11200.00
	Total				**8350.00**		**19550.00**
C	**For Group C Districts**						
1	Materials and other items as for Group A districts	as in 2 (B)			8350.00	as in 2 (B)	19550.00
2	Deduction in the cost of materials and other items with considerations of the remoteness of the districts	L.S.		@ 20% in the Total Cost of 2 (B)	1670.00	-	-
	Total				**6680.00**		**19550.00**

* For water quality analysis

Detailed Engineering Study Design of Water Supply and Sanitation Project

9. Total Cost for Additional Lengtn (more than 30 km)

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

Calculation for additional 5 km

1. Through Governmental Employees

S.No.	Description	Amount, Rs.		
		For Group A Districts	For Group B Districts	For Group C Districts
A	**Field Study and Survey Work**			
1	Manpower	13014.00	10845.00	8676.00
2	Materials	2100.00	1750.00	1400.00
	Sub-Total (A)	**15114.00**	**12595.00**	**10076.00**
B	**Design/Office Work and Report Preparation**			
1	Manpower	2000.00	2000.00	2000.00
2	Materials	1134.00	945.00	756.00
	Sub-Total (B)	**3134.00**	**2945.00**	**2756.00**
	Total (A + B)	**18248.00**	**15540.00**	**12832.00**
	Total	**18248.00**	**15540.00**	**12832.00**

2. Through Consultancy Firm

S.No.	Description		Amount, Rs.	
		For Group A Districts	For Group B Districts	For Group C Districts
A	**Field Study and Survey Work**			
1	Manpower	17,424.00	14,520.00	11,616.00
2	Materials	4,150.00	4,150.00	4,150.00
	Sub-Total (A)	**21,574.00**	**18,670.00**	**15,766.00**
B	**Design/Office Work and Report Preparation**			
1	Manpower	7,500.00	7,500.00	7,500.00
2	Materials	4,145.00	4,145.00	4,145.00
	Sub-Total (B)	**11,645.00**	**11,645.00**	**11,645.00**
	Total (A + B)	**33,219.00**	**30,315.00**	**27,411.00**
		33,219.00	**30,315.00**	**27,411.00**
	VAT @ 13%	4,318.47	3,940.95	3,563.43
	Total	**37,537.47**	**34,255.95**	**30,974.43**

Province Government

Ministry of Energy, Water resources and Water supply

Gandaki Province

Pokhara, Nepal

Detailed Engineering Study and Design of Water Supply and Sanitation Project

10. Estimate of Manpower for Field Study and Survey Work (for more than 30 km)

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

Calculation for additional 5 km

S.No.	Description of Work	Category, man-days (md)								
		Governmental Employees		**Consulting Firm**		**Locally Hired Personnel** *for both Governmental Employees and Consulting Firm*				
		Engineer	Sub-Engineer	Engineer	Sub-Engineer	Staff-man	Level-man	Chain-man (2	Cleaner	Porter
1	Travel to project site									
2	Pre-study community meeting/Interaction with Users Committee and users									
3	Identification/verification of project area/ Demand assessment/ Source identification									
4	Detailed engineering survey of transmission and distribution pipeline @ 2 - 2.5 km/day including socio-economic survey/data collection	1.5	1.5	1.5	1.5	1.5	1.5	3	1.5	
5	Initial environmental examination (IEE)									
6	Post-survey meeting with community/Survey data verification/Collection of required documents from communities and local bodies									
7	Water sample collection from selected source/s for water quality analysis									
8	Travel back from project site									
	Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**3**	**1.5**	

Province Government

Ministry of Energy, Water resources and Water supply

Gandaki Province

Pokhara, Nepal

Detailed Engineering Study and Design of Water Supply and Sanitation Project

11. Estimate of Manpower for Design and Office Work (for more than 30 km)

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

Calculation for additional 5 km

S.No.	Description of Work	Category, man-days (md)			Remarks
		Engineer	Sub-Engineer	Computer Operator/ CAD Person	
1	Processing of field data/ Population forecast/ Demand calculation/ Identification of system alternatives/ Preparation of Survey Report	0.5	0.5		
2	Selection of system between alternatives if any/ Hydraulic design of pipeline/ Selection of system components/ System design	0.5			
3	Preparation of Layout Plan/Flow Diagram/ L-Sections of pipeline/ Structural and working drawings of system components		0.5	1	
4	Rate analysis/ Quantity and cost estimate/ Preparation of Draft Report				
5	Preparation of Final Report/ Printing and binding				
	Total	**1**	**1**	**1**	

Province Government

Ministry of Energy, Water resources and Water supply

Gandaki Province

Pokhara, Nepal

Detailed Engineering Study and Design of Water Supply and Sanitation Project

12. Cost Estimate for Manpower (for more than 30 km)

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

Through Governmental Employees

1 Field Study and Survey Work

S.No.	Category	Daily Allowance/Wages			Lodging Allowance			Travel Allowance (to and back from Project Site)		Total Amount, Rs.
		man-day	Rate per m.d., Rs.	Amount Rs.	day	Rate per day, Rs.	Amount Rs.	Rate, Rs.	Amount Rs.	
A	**For Group A Districts**									
1	Engineer	1.8	1600.00	2880.00	1.8	500.00	900.00	-	-	3780.00
2	Sub-Engineer	1.8	1200.00	2160.00	1.8	350.00	630.00	-	-	2790.00
3	Staff man	1.8	716.00	1288.80			-	-	-	1288.80
4	Survey Helper	1.8	716.00	1288.80			-	-	-	1288.80
5	Tape/Chain man	3.6	716.00	2577.60			-	-	-	2577.60
6	Site Cleaner	1.8	716.00	1288.80			-	-	-	1288.80
7	Porter	0	716.00	0.00			-	-	-	0.00
	Total			**11484.00**			**1530.00**		**-**	**13014.00**
B	**For Group B Districts**									
1	Engineer	1.5	1600.00	2400.00	1.5	500.00	750.00	-	-	3150.00
2	Sub-Engineer	1.5	1200.00	1800.00	1.5	350.00	525.00	-	-	2325.00
3	Staff man	1.5	716.00	1074.00			-	-	-	1074.00
4	Level man	1.5	716.00	1074.00			-	-	-	1074.00
5	Chain man	3	716.00	2148.00			-	-	-	2148.00
6	Cleaner	1.5	716.00	1074.00			-	-	-	1074.00
7	Porter	0	716.00	0.00			-	-	-	0.00
	Total			**9570.00**			**1275.00**		**-**	**10845.00**
C	**For Group C Districts**									
1	Engineer	1.2	1600.00	1920.00	1.2	500.00	600.00	-	-	2520.00
2	Sub-Engineer	1.2	1200.00	1440.00	1.2	350.00	420.00	-	-	1860.00
3	Staff man	1.2	716.00	859.20			-	-	-	859.20
4	Survey Helper	1.2	716.00	859.20			-	-	-	859.20
5	Chain man	2.4	716.00	1718.40			-	-	-	1718.40
6	Cleaner	1.2	716.00	859.20			-	-	-	859.20
7	Porter	0	716.00	0.00			-	-	-	0.00
	Total			**7656.00**			**1020.00**		-	**8676.00**

2 Design and Office Work for all Group of Districts

S.No.	Category	Daily Allowance/Wage			Lodging Allowance			Travel Allowance (to and back from Project Site)		Total Amount, Rs.
		man-day	Rate per m.d., Rs.	Amount Rs.	day	Rate per day, Rs.	Amount Rs.	Rate, Rs.	Amount Rs.	
1	Engineer	1	800.00	800.00			-	-	-	800.00
2	Sub-Engineer	1	600.00	600.00			-	-	-	600.00
3	Computer Operator/ CAD Person	1	600.00	600.00			-	-	-	600.00
	Total			**2000.00**						**2000.00**

13. Cost Estimate for Manpower (for more than 30 km)

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

Through Consulting Firm

1 Field Study and Survey Work

S.No.	Category	Daily Allowance/Wages			Out of Station Allowance			Travel Allowance (to and back from Project Site)		Total Amount, Rs.
		man-day	Rate per md., Rs.	Amount Rs.	day	Rate per day, Rs.	Amount Rs.	Rate, Rs.	Amount Rs.	
A	**For Group A Districts**									
1	Engineer	1.8	4000.00	7200.00	1.8	0.00	0.00	-	-	7200.00
2	Sub-Engineer	1.8	2100.00	3780.00	1.8	0.00	0.00	-	-	3780.00
3	Staff man	1.8	716.00	1288.80			-	-	-	1288.80
4	Level man	1.8	716.00	1288.80			-	-	-	1288.80
5	Chain man	3.6	716.00	2577.60			-	-	-	2577.60
6	Cleaner	1.8	716.00	1288.80			-	-	-	1288.80
7	Porter	0	716.00	0.00			-	-	-	0.00
	Total			**17424.00**			**0.00**		**0.00**	**17424.00**
B	**For Group B Districts**									
1	Engineer	1.5	4000.00	6000.00	1.5	0.00	0.00	-	-	6000.00
2	Sub-Engineer	1.5	2100.00	3150.00	1.5	0.00	0.00	-	-	3150.00
3	Staff man	1.5	716.00	1074.00			-	-	-	1074.00
4	Survey Helper	1.5	716.00	1074.00			-	-	-	1074.00
5	Tape/Chain man	3	716.00	2148.00			-	-	-	2148.00
6	Site Cleaner	1.5	716.00	1074.00			-	-	-	1074.00
7	Porter	0	716.00	0.00			-	-	-	0.00
	Total			**14520.00**			**0.00**		**0.00**	**14520.00**
C	**For Group C Districts**									
1	Engineer	1.2	4000.00	4800.00	1.2	0.00	0.00	-	-	4800.00
2	Sub-Engineer	1.2	2100.00	2520.00	1.2	0.00	0.00	-	-	2520.00
3	Staff man	1.2	716.00	859.20			-	-	-	859.20
4	Survey Helper	1.2	716.00	859.20			-	-	-	859.20
5	Tape/Chain man	2.4	716.00	1718.40			-	-	-	1718.40
6	Site Cleaner	1.2	716.00	859.20			-	-	-	859.20
7	Porter	0	716.00	0.00			-	-	-	0.00
	Total			**11616.00**			**0.00**		**0.00**	**11616.00**

2 Design and Office Work for all Group of Districts

S.No.	Category	Daily Allowance/Wages			Out of Station Allowance			Travel Allowance (to and back from Project Site)		Total Amount, Rs.
		man-day	Rate per md., Rs.	Amount Rs.	day	Rate per day, Rs.	Amount Rs.	Rate, Rs.	Amount Rs.	
1	Engineer	1	4000.00	4000.00			-	-	-	4000.00
2	Sub-Engineer	1	2100.00	2100.00			-	-	-	2100.00
3	Computer Operator/ CAD Person	1	1400.00	1400.00			-	-	-	1400.00
	Total			**7500.00**						**7500.00**

Detailed Engineering Study and Design of Water Supply and Sanitation Project

14. Cost Estimate for Materials (for more than 30 km)

For One Project with 15-20 km of Total Length (Excluding Tap Connection-20 mm dia)*

1 Field Study and Survey Work

S.No.	Description of Items	Unit	Quantity	for Departmental Employees		for Consultancy Firm	
				Rate, Rs.	Amount, Rs.	Rate, Rs.	Amount, Rs.
A	**For Group A Districts**						
1	Materials and other items as for Group A districts	as in 1 (B)			1750.00	as in 1 (B)	4150.00
2	Addition in the cost of materials and other items with considerations of the remoteness of the districts	L.S.		@ 20% in the Total Cost of 1 (B)	350.00	-	-
	Total				**2100.00**		**4150.00**
B	**For Group B Districts**						
1	Level Book	No.		100.00	0.00	100.00	0.00
2	Note Book	No.		100.00	0.00	100.00	0.00
3	Stationary (Flip Charts, Markers, Dotpens, Pencils, Erasers, etc.)	L.S.	L.S.		100.00		100.00
4	Photocopy of Formats/Questionnaires	L.S.	L.S.		100.00		100.00
5	Area Map	No.		300.00	0.00	300.00	0.00
6	Battery for Torch Light	Pairs	1	50.00	50.00	50.00	50.00
7	Candles	Packet	0.5	100.00	50.00	100.00	50.00
8	Enamel Paint	Litre	0.5	300.00	150.00	300.00	150.00
9	Spirit	Litre	1	100.00	100.00	100.00	100.00
10	Paint Brush	No.		100.00	0.00	100.00	0.00
11	Water bottles for sample collection	No.		50.00	0.00	50.00	0.00
12	Medicines for First Aids	L.S.	L.S.				0.00
13	Depriciation for logistics - accessories of multiple-use like handbags, torchlight, water bottle, umbrella, shoes etc.	L.S.	L.S.		1200.00		1200.00
14	Refreshment for Village meetings	L.S.	L.S.				0.00
15	Depriciation/Rent for survey equipments	day	1.5	-	-	1600.00	2400.00
	Total				**1750.00**		**4150.00**
C	**For Group C Districts**						
1	Materials and other items as for Group A districts	as in 1 (B)			1750.00	as in 1 (B)	4150.00
2	Deduction in the cost of materials and other items with considerations of the remoteness of the districts	L.S.		@ 20% in the Total Cost of 1 (B)	350.00	-	-
	Total				**1400.00**		**4150.00**

2 Design/Office Work and Report Preparation

S.No.	Description of Items	Unit	Quantity	for Departmental Employees		for Consultancy Firm	
				Rate, Rs.	Amount, Rs.	Rate, Rs.	Amount, Rs.
A	**For Group A Districts**						
1	Materials and other items as for Group A districts	as in 2 (B)			945.00	as in 2 (B)	4145.00
2	Addition in the cost of materials and other items with considerations of the remoteness of the districts	L.S.		@ 20% in the Total Cost of 2 (B)	189.00	-	-
	Total				**1134.00**		**4145.00**
B	**For Group B Districts**						
1	Photocopy Paper	Packet	0.25	400.00	100.00	400.00	100.00
2	Gel Pen/Dotpen	Nos.	1	25.00	25.00	25.00	25.00
3	Pencil	Doz	1	60.00	60.00	60.00	60.00
4	Eraser	Nos.	1	10.00	10.00	10.00	10.00
5	Toner for Printer	No.	0.125	6000.00	750.00	6000.00	750.00
6	Field Study and Survey Report including photocopy, binding, etc.	set		350.00	0.00	350.00	0.00
7	Detailed Design Draft Report including photocopy, binding, etc.	set		500.00	0.00	500.00	0.00
8	Detailed Design Final Report including photocopy, binding, etc.	set		500.00	0.00	500.00	0.00
9	Rental cost for design software including compatible hardware	day	2	-	-	1600.00	3200.00
	Total				**945.00**		**4145.00**
C	**For Group C Districts**						
1	Materials and other items as for Group A districts	as in 2 (B)			945.00	as in 2 (B)	4145.00
2	Deduction in the cost of materials and other items with considerations of the remoteness of the districts	L.S.		@ 20% in the Total Cost of 2 (B)	189.00	-	-
	Total				**756.00**		**4145.00**

* For water quality analysis

Province Government

Ministry of Energy, Water Resources and Water Supply

Gandaki Province, Pokhara, Nepal

Cost matrix of detailed engineering study and design work of oneWater Supply and Sanitation project through Governmental employees

S.N.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)																			
		0-10 km	10-15 km	**15-20 km (Basic Amount)**	20-25 km	25-30 km	**Cost for each additional 5 (more than 30)km lenth of pipe Rs**	30-35 km	35-40 km	40-45 km	45-50 km	50-55 km	55-60 km	60-65 km	65-70 km	70-75 km	75-80 km	80-85 km	85-90 km	90-95km	95-100km
	Percentage of amount to be deducted or added from the basic amount	-25	-15		+15	+25															
1	Group A districts	89,312.10	101,220.38	**119,082.80**	136,945.22	148,853.50	**18,248.00**	167,101.50	185,349.50	203,597.50	221,845.50	240,093.50	258,341.50	276,589.50	294,837.50	313,085.50	331,333.50	349,581.50	367,829.50	386,077.50	404,325.50
2	Group B districts	76,795.50	87,034.90	**102,394.00**	117,753.10	127,992.50	**15,540.00**	143,532.50	159,072.50	174,612.50	190,152.50	205,692.50	221,232.50	236,772.50	252,312.50	267,852.50	283,392.50	298,932.50	314,472.50	330,012.50	345,552.50
3	Group **C** districts	64,278.90	72,849.42	**85,705.20**	98,560.98	107,131.50	**12,832.00**	119,963.50	132,795.50	145,627.50	158,459.50	171,291.50	184,123.50	196,955.50	209,787.50	222,619.50	235,451.50	248,283.50	261,115.50	273,947.50	286,779.50

Province Government

Ministry of Energy, Water Resources and Water Supply

Gandaki Province, Pokhara, Nepal

Cost matrix of detailed engineering study and design work of oneWater Supply and Sanitation project through Consulting Firm

S.N.	Category	Total Length of Transmission and Distribution Pipeline (excluding the pipe connection for tap points)																		
		0-10 km	10-15 km	**15-20 km (Basic Amount)**	20-25 km	25-30 km	**Cost for each additional 5 (more than 30)km lenth of pipe Rs**	30-35 km	35-40 km	40-45 km	45-50 km	50-55 km	55-60 km	60-65 km	65-70 km	70-75 km	75-80 km	80-85 km	85-90 km	90-95km	95-100km
	Percentage of amount to be deducted or added from the basic amount	-25	-15		+15	+25															
1	Group A districts	200,219.82	226,915.80	**266,959.76**	307,003.72	333,699.70	**37,537.47**	371,237.17	408,774.64	446,312.11	483,849.58	521,387.05	558,924.52	596,461.99	633,999.46	671,536.93	709,074.40	746,611.87	784,149.34	821,686.81	859,224.28
2	Group B districts	182,652.17	207,005.79	**243,536.22**	280,066.65	304,420.28	**34,255.95**	338,676.23	372,932.18	407,188.13	441,444.08	475,700.03	509,955.98	544,211.93	578,467.88	612,723.83	646,979.78	681,235.73	715,491.68	749,747.63	784,003.58
3	Group C districts	165,084.51	187,095.78	**220,112.68**	253,129.58	275,140.85	**30,974.43**	306,115.28	337,089.71	368,064.14	399,038.57	430,013.00	460,987.43	491,961.86	522,936.29	553,910.72	584,885.15	615,859.58	646,834.01	677,808.44	708,782.87