

Chapter-II
Performance Audit

CHAPTER-II PERFORMANCE AUDIT

Public Works Department

2.1 Construction of Rural Roads Financed by NABARD

Performance Audit on 'Construction of Rural Roads Financed by NABARD' covered issues of planning, finance, execution and quality control/ monitoring. Audit noticed deficiencies in planning, fund management, execution of projects, contract management, quality control and monitoring. Some of the major findings are as under:

Highlights:

- *Public Works and Planning Departments had not provided inputs to MLAs for prioritisation of projects under NABARD and selection of projects was made without anticipating bottlenecks, coordinated approach and comprehensive analysis of projects.*
(Paragraph 2.1.6.1)
- *Out of the 106 projects sanctioned during 2013-18, no project was sanctioned for distressed areas against 65 projects recommended by MLAs although roads were sanctioned for already connected villages.*
(Paragraph 2.1.6.1)
- *Three test-checked divisions had executed five projects at a cost of ₹7.76 crore without provision of black-top as required under NABARD guidelines depriving the public of all-weather road connectivity.*
(Paragraph 2.1.6.5)
- *Calculation of internal rate of return/ economic rate of return and benefit cost ratio in DPRs was not based on reliable data.*
(Paragraph 2.1.6.7)
- *In nine test-checked divisions, ₹10.71 crore irregularly withdrawn from the Consolidated Fund against NABARD projects were lying unspent in deposit head for 10 to 82 months. Against reimbursement of expenditure as loan for projects sanctioned during 2013-18, there was short claim of ₹57.73 crore from NABARD.*
(Paragraphs 2.1.7.1 and 2.1.10.1)
- *Non-obtaining of performance security, non-levy/ non-recovery of compensation for delay, inadmissible payment of cost-escalation and non-recovery of royalty and useful stones from contractors resulted in extension of undue financial benefit/ favour of ₹10.94 crore in 119 contracts.*
(Paragraphs 2.1.8.1 to 2.1.8.5)
- *Out of 269 projects sanctioned for ₹859.26 crore, 132 projects with the sanctioned cost of ₹393.79 crore were taken up for execution within one year. Only 65 projects were completed within stipulated period of four years after incurring an expenditure of ₹135.07 crore.*
(Paragraph 2.1.9.1)
- *In 17 test-checked divisions, 123 projects (out of 269) sanctioned for ₹414.67 crore were awarded to the contractors after a delay of one to 111 months resulting in further delay in execution of the projects.*
(Paragraph 2.1.9.3)
- *Thirty three roads constructed by eight test-checked divisions at a cost of ₹49.00 crore were not passed for vehicular traffic by road fitness committees rendering expenditure on these roads as largely unfruitful.*
(Paragraph 2.1.9.8)

- **Quality control mechanism was ineffective as Executive Engineers of test-checked divisions had not taken action for rectification of deficiencies in 28 projects pointed out in 134 inspections carried out by State Quality Control Wing (32) and State Quality Monitors (102) during 2013-18.**
(Paragraph 2.1.10.3)

2.1.1 Introduction

Rural road connectivity is a key component of rural development, facilitating the delivery of economic and social services leading to increased agricultural productivity, non-agricultural productivity and employment, and in turn expanding rural growth opportunities and incomes.

Government of India (GoI) created Rural Infrastructure Development Fund (RIDF) in the year 1995-96 in collaboration with National Bank for Agriculture and Rural Development (NABARD) for providing loan assistance to State Governments for creation of durable assets in rural areas. Roads and Bridges Sector was included for funding under NABARD from the year 1996-97 for construction and up-gradation of rural roads¹ and bridges to provide improved connectivity to villages from highways and market centres. NABARD provides loan assistance to the State up to 90 per cent of total cost of projects for construction of rural roads and bridges. The projects are sanctioned by NABARD on the basis of detailed project reports (DPRs) submitted by the State Government with reference to annual NABARD borrowing limit² of the State fixed by the Government of India. Funding under NABARD is by way of reimbursement of expenditure incurred on the projects on monthly basis upon submission of statement of expenditure by the State Government. Interest rate payable on loan assistance from April 2012 is linked to the bank rate prevailing at the time of reimbursement minus 1.5 percentage points with the repayment period of seven years and grace period of two years.

Out of total road length of 35,545 kilometres (kms) in the State, rural roads constitute 28,836 kms, of which NABARD roads constitute 6,627.64 kms (23 per cent). Against the total funds of ₹ 2,282.97 crore sanctioned by the State Government for construction of rural roads during 2013-18, ₹ 1,463.09 crore (64 per cent) were sanctioned through NABARD loans.

The status of the road projects constructed under NABARD from 1996 to 2018 in the State is shown in **Table-2.1.1** below:

Table-2.1.1: Status of the road projects under NABARD during 1996-2018

(₹ in crore)						
Sanctioned Projects	Cost	Completed Projects	Expenditure	Dropped Projects	Projects in progress	Expenditure
1,609	3,857.62	1,252	2,260.04	28	329	454.25

2.1.2 Organisational set-up

Additional Chief Secretary (Public Works), as the administrative head of the Public Works Department (PWD) has overall responsibility for implementation of rural road

¹ Road connecting rural areas with urban market centres, highways, rail head, etc. or a link between two rural locations, other district roads and roads connecting villages to growth centers.

² 2013-14: ₹ 350 crore; 2014-15: ₹ 400 crore; 2015-16 to 2017-18: ₹ 500 crore per annum.

projects under NABARD. PWD is responsible for preparation of DPRs, execution, quality control and monitoring of projects. The Engineer-in-Chief (E-in-C) as Head of the Department is assisted by E-in-C (Quality Control and Design), Zonal Chief - Engineers (CEs), Circle Superintending Engineers (SEs) and Executive Engineers (EEs). Planning Department is responsible for inclusion of projects prioritised by MLAs in the Annual Plan, and submission of DPRs to NABARD for sanction. For monitoring progress of projects at State level, the Government has constituted (February 1996) a High Power Committee under the chairmanship of the Chief Secretary. Monitoring at district level is to be done by District Level Monitoring Team constituted (December 1999) under the Chairmanship of Deputy Commissioner. Finance Department is the Nodal Department for financing loans from NABARD and their repayment.

2.1.3 Audit objectives

Audit objectives were to ascertain whether:

- There existed policy framework for planning process covering identification, prioritisation and selection of projects including fund management;
- Tendering process and contract management ensured execution and completion of projects according to the prescribed time schedule;
- Execution of projects was economical, efficient and effective; and
- Quality controls and monitoring mechanisms were adequate and effective and there was overall achievement of benefits targeted.

2.1.4 Audit scope and methodology

The performance audit covered the period from 2013-14 to 2017-18. The audit was conducted from February 2018 to June 2018, and involved the office of the Advisor, Planning; E-in-C, PWD; and EEs of 17 (out of 54) divisions³ stratified for test check on the basis of sanctioned project outlays. Out of total 905 projects (576 completed during 2013-18 and 329 in-progress as on March 2018), 269 projects (30 per cent) were selected for test-check. This included 129 completed projects (22 per cent) and 140 on-going projects (43 per cent). The audit methodology included test-check of records of the aforementioned offices and joint physical inspection of works. The audit objectives, scope, methodology and criteria were discussed in an entry conference held with the Additional Chief Secretary (ACS), Public Works in February 2018. The audit findings were discussed with the ACS in an exit conference held in January 2019. The replies and views of the authorities concerned have been incorporated at appropriate places in the report. The latest status in respect of audit findings was awaited as of September 2019.

2.1.5 Audit criteria

Audit criteria used for assessing implementation of the programme were derived from the following sources:

³ Bilaspur, Dalhousie, Dhama, Dehra, Ghumarwin, Hamirpur, Jaisinghpur, Jubbal, Kullu-II, Mandi-I, Nurpur, Paonta Sahib, Salooni, Sangrah, Theog, Udaipur and Una.

- Annual Plans, Regulations, Orders/ Instructions of Government of India/ State Government;
- NABARD guidelines and norms of implementation of the projects;
- Central Public Works Accounts Code, Works Manuals and State Schedule of Rates 2009;
- Terms and conditions of NABARD loan agreements; and
- Himachal Pradesh Financial Rules, 2009.

Audit findings

2.1.6 Planning

The State Government started the policy of prioritization of schemes by MLAs for NABARD funded projects in 2003-04. Every year, before finalization of State budget, each MLA may propose two schemes of roads/ bridges for funding through NABARD. Prior to recommendation, MLAs should be given input by PWD Engineers about the technical feasibility of projects being recommended after considering anticipated bottlenecks and remedial measures. After the projects are proposed by MLAs, these are discussed in Annual Plan meeting, following which DPRs are prepared by PWD and scrutinized by Planning Department before seeking sanction from NABARD. PWD should ensure project execution and its completion in a time-bound manner.

The shortcomings in providing input to MLAs for recommendation of projects, prioritisation and sanction of projects, preparation of DPRs, etc. are discussed in the succeeding paragraphs. The findings are based on a test-check of projects; the State Government may review all projects to identify and address similar shortcomings.

2.1.6.1 Project prioritisation and sanction

As per State Government instructions (December 2010), before recommending projects for inclusion in the Annual Plan, the MLAs should have prior consultation with the local PWD Executive Engineers (EEs). As per NABARD guidelines, priority should be given to new projects and projects in distressed areas⁴. The Public Works Department is to ensure sanctioning of projects across all constituencies.

(i) Lack of prior consultation –

Audit noticed that for the projects recommended by MLAs during 2013-18, there was no record of prior consultation with EEs in PWD; thus, technical inputs were not obtained before recommending projects. The Planning Department had also not checked for compliance with the requirement of prior consultation by MLAs with local EEs before inclusion of the projects in the Annual Plan. This aspect was also not discussed in the High Power Committee meetings chaired by the Chief Secretary.

(ii) Uneven geographical spread of sanctioned projects –

The details of projects recommended by MLAs and sanctioned by NABARD during 2013-18 are given in **Table-2.1.2** below:

⁴ Backward areas/ regions declared as per indicators of remoteness: accessibility (25 per cent), demography (35 per cent), infrastructure (36 per cent) and agriculture (4 per cent).

Table-2.1.2: Details of projects recommended by MLAs and sanctioned by NABARD during 2013-18

(₹ in crore)

Year	Projects recommended by MLAs	Projects sanctioned by NABARD					
		Out of those recommended during 2013-18		Out of those recommended prior to 2013-14		Total Projects sanctioned	
		No.	Amount	No.	Amount	No.	Amount
2013-14	162	53	225.53	22	19.30	75	244.83
2014-15	165	34	145.17	46	110.83	80	256.00
2015-16	154	18	64.44	89	321.17	107	385.61
2016-17	168	1	4.12	52	246.31	53	250.43
2017-18	175	0	0	84	326.22	84	326.22
Total	824	106	439.26	293	1,023.83	399	1,463.09

Source: Departmental figures.

Of the 293 sanctioned projects recommended prior to 2013-18, 34 projects of ₹ 158.45 crore were sanctioned for 16 constituencies having distressed *panchayats*. However, of the 106 sanctioned projects recommended by MLAs during 2013-18, no project was sanctioned for distressed areas against 65 projects recommended by MLAs for these areas.

(iii) Sanctioning of projects for already connected villages

During joint physical inspection carried out (May and June 2018) by Audit, it was noticed that in three (out of 17) test-checked divisions⁵, three projects were sanctioned (between October 2009 and June 2016) for ₹ 9.78 crore to connect three villages⁶ which had already been connected by roads (under PMGSY). The already-connected status of these roads was not disclosed in the DPRs. Expenditure of ₹ 4.66 crore was incurred on execution (formation cutting, retaining and breast walls, metalling/ tarring, etc.) of these projects.

Thus, funds were spent on the roads to already connected villages which could have been utilized for construction of roads for connecting 7,628 out of total 17,882 unconnected villages in the State.

Regarding the lack of prior consultation, the ACS, in the exit conference, stated that although informal consultations were usually held between MLAs and EEs before recommendation, the matter of devising some system of formal recommendations would be taken up in the MLAs meeting. In respect of uneven geographical spread of sanctioned projects, the Advisor, Planning stated (May 2018) that projects under NABARD were sanctioned on the basis of MLAs' recommendations and sanctions depended on pace of preparation of DPRs by the Public Works Department. Regarding the sanctioning of projects for already connected villages, the ACS stated (December 2018) that the projects were sanctioned as per prioritisation of the MLAs. However, the State Government had not discharged its responsibility of advising MLAs before recommendation of projects and was therefore responsible for the deficiencies in project prioritisation and sanction highlighted above.

⁵ Dalhousie, Dhami and Nurpur.

⁶ Dungru (Dalhousie), Kot (Dhami) and Ghetta (Nurpur).

Thus, projects were sanctioned without identifying and addressing bottlenecks, distressed areas were not given due attention, and funds spent on roads to already-connected villages could have been utilised for construction of roads to distressed areas and other high priority roads: 7,628 (out of total 17,882) villages in the State remained unconnected by roads as of January 2019.

Recommendation: *The Government may consider devising a suitable system for prioritisation of projects by MLAs as per documented inputs of Public Works and Planning Departments, accord priority to projects for distressed areas in order to facilitate balanced development.*

2.1.6.2 Preparation of DPRs with wrong certificate of land availability

For preparation of DPRs for projects under NABARD, EEs are required to ensure encumbrance-free land and provide certificates thereof in the DPRs.

Audit noticed that in eight (out of 17) test-checked divisions⁷, the EEs had submitted wrong certificates for availability of private land and forest clearance in DPRs of 13 projects (out of 269 projects of 17 test-checked divisions) sanctioned (between September 2007 and October 2014) by NABARD for ₹ 26.44 crore. As a result, there were issues of land dispute (five projects) and non-availability of forest clearance (eight projects) because of which the projects could not be executed/ completed as of March 2018 as discussed under paragraph 2.1.9.6. Expenditure of ₹ 12.48 crore was incurred on 10 projects while no expenditure was incurred on the remaining three projects.

The ACS stated (December 2018) that in case of private land, the Department was in the process of discontinuing the practice of obtaining affidavit from private land owners and ensuring that clear title of private land in the name of the Department is obtained before proposing projects to NABARD. In case of forest land, it was stated that instructions had been issued (October 2015) directing that forest clearance must be obtained before tendering of works. However, the Department should ensure strict compliance with the requirement of encumbrance-free land to avoid land disputes with private land-owners and Forest Department during the execution stage.

Submission of wrong certificates of availability of land meant that the roads were not constructed/ completed due to subsequent issues of land disputes (five projects) and non-availability of forest clearance (eight projects), depriving the public of the intended benefits. Expenditure of ₹ 12.48 crore incurred on 10 projects remained idle while three projects could not be taken up.

2.1.6.3 Delay in finalisation of DPRs

Instructions (December 2010) required that EEs should review the position of preparation of DPRs every quarter and furnish a project-wise status of DPRs to the MLAs concerned and the E-in-C, PWD.

Audit observed, however, that the instructions *ibid* did not stipulate any timeline for preparation of DPRs for recommended projects. Further, there was no record of any quarterly review of position of preparation of DPRs or reporting of the same by the EEs to the MLAs concerned or E-in-C, PWD. The Department had not maintained any data

⁷ Dalhousie, Dehra, Dhami, Ghumarwin, Hamirpur, Theog, Udaipur and Una.

on status of preparation of DPRs for the 718 unsanctioned projects (824-106) recommended by MLAs during 2013-18. Test-check of DPRs for 128 projects (MLAs priority: 2006-17) showed that the Department had taken between six months and 107 months in finalisation of the DPRs. In addition to the above, it was also observed that the Department had not maintained any project-wise or year-wise data of projects submitted to NABARD for sanction. The ACS accepted the facts and stated that guidelines were being formulated in this regard.

Thus the time taken in finalisation of DPRs of 128 test-checked projects ranged between six months and 107 months which had a cascading effect on project sanction: only 106 (13 per cent) out of 824 projects could be sanctioned during 2013-18. The Advisor, Planning agreed (May 2018) that sanction of projects depended on pace of preparation of DPRs by the Public Works Department.

Recommendation: *The State Government may consider formulating guidelines stipulating timelines for preparation of DPRs in order to facilitate project completion and accrual of targeted benefits in time.*

2.1.6.4 Non-provision of maintenance cost

NABARD guidelines provide for capitalization of funds up to 10 per cent of the project cost for maintenance of roads after their completion and a clause for defect liability period of two to three years was to be incorporated in the contract.

NABARD was vested with the responsibility of vetting the DPRs and to ensure that provision for maintenance cost was made in the DPRs. However, Audit noticed non-provision of maintenance cost in all the 269 DPRs in the 17 test-checked divisions. Since provision for maintenance cost was required as per guidelines, this aspect should have been ensured by NABARD while vetting loan proposals and projects without provision for maintenance cost should not have been sanctioned by NABARD.

NABARD guidelines stipulate that the contractors/firms shall be responsible for defect liability period preferably for three years and in no case less than two years. Contrary to guidelines *ibid*, clause for defect liability period was not incorporated in 357 out of 374 contracts worth ₹ 583.62 crore in respect of 252 out of 269 projects awarded during 2013-18 in 17 test-checked divisions. Failure of the State Government as well as NABARD in ensuring incorporation of defect liability period in contracts for road works resulted in non-ensuring of maintenance of road projects through contractors and instead the maintenance of the same was left to be done through State budget.

In fact in four out of 17 test-checked divisions, expenditure of ₹ 10.53 lakh was incurred by the EEs on repair and maintenance within two to three years of completion of the roads.

The ACS stated (December 2018) that instructions for inclusion of provision for maintenance cost in the DPRs had been issued (September 2018) and provision of five years' defect liability period was being included in the new standard bidding document.

In the absence of defect liability period due to non-provision of maintenance cost, the Department have to bear repair and maintenance cost for the completed projects which should have been borne by the contractors.

2.1.6.5 Non-provision of black-top for construction of roads

As per guidelines for projects under NABARD, construction of all-weather roads and black-top (metalled) roads should be proposed in DPRs.

Audit noticed that in three test-checked divisions⁸, five (out of 129) projects were completed (between September 2014 and December 2016) at a cost of ₹ 7.76 crore without black-top as no provision for the same was made in the DPRs. The constructed roads were neither upgraded to metalled roads even after two to four years from the date of their completion nor was there any plan for the same, thus depriving the public of all-weather road connectivity.

NABARD stated (July 2018) that projects were sanctioned as proposed by the State Government. In the exit conference, the ACS stated (December 2018) that the Department was following the practice of constructing *katcha* road in the first stage and black-topping in the second stage considering the terrain of the area. However, the practice of two-stage construction was permissible for only PMGSY and State-funded roads, and no such provision was permissible under NABARD guidelines which clearly stipulated that roads had to be all-weather and metalled (black-top). Moreover, the Department had not initiated the second stage of metalling in respect of the above five roads even after two to four years from their completion. This would have resulted in damage to the road surface, higher road maintenance costs, poor ride quality and higher vehicle operating costs.

Provision for black-top was neither made in the DPR nor had the Department taken any action for metalling of five test-checked roads even after two to four years from their completion which would adversely affect the road surface ride quality and result in higher road maintenance costs and vehicle operating costs.

2.1.6.6 Lack of planning and coordination in construction of bridge

To reduce the distance between village Dhandhole and Lad Bharol in Jaisinghpur division, a project for construction of 60 metres span pre-stressed box cantilever bridge over Binwa *khad* on Balh Bajouri (Dhandole) to Jamthala Lad Bhadol road was sanctioned (August 2009) under NABARD (RIDF-XV) for ₹ 3.80 crore. There was, however, lack of planning and coordination in execution of the work of the bridge and the following deficiencies were noticed:

(i) Instead of 60 metres span pre-stressed box cantilever bridge mentioned in the sanction, the Division released (June-August 2011) ₹ 1.05 crore to Mechanical Division, Kullu for fabrication of 68 metres span steel truss bridge without any justification or approval for change of the span and design of the bridge. The Mechanical Division, Kullu had completed 80 *per cent* work of the bridge with expenditure of ₹ 1.05 crore upto March 2019. Notwithstanding the ongoing construction of steel truss bridge, the Division again revised the design and span of the bridge and awarded (June 2016) the work of construction of 71 meters span pre-stressed box cantilever bridge to contractor-C for ₹ 6.25 crore. The contractor had executed the work of value of ₹ 2.83 crore and balance work was in progress.

⁸ Dalhousie, Dhamsi and Theog.

(ii) The work construction of approaches on both sides of the bridge, awarded (September 2011) for ₹ 0.68 crore to Contractor-A and stipulated to be completed by July 2012, was stopped (October 2012) and the Division closed (April 2015) the contract after paying ₹ 0.62 crore to the contractor.

(iii) The work construction of sub-structure of the bridge, awarded (May 2013) to Contractor-B for ₹ 0.89 crore, was shelved due to non-achievement of ledge⁹ distance of 4.5 metre during construction of abutment as it was realised that the planned length of the bridge was required to be increased. This indicated that the Division had not accurately assessed the technical requirements for the bridge and its sub-structure. The Department closed (September 2015) the contract after paying ₹ 0.08 crore to the contractor including payment of arbitration award of ₹ 0.04 crore.

Thus, the division had repeatedly changed the design and span of the bridge and awarded its works in parts rather than for the entire bridge. This reflected poor planning and lack of coordination in execution of the work. As a result, construction of the bridge had not been completed even after expenditure of ₹ 4.58 crore (NABARD: ₹ 3.80 crore and State funds: ₹ 0.78 crore) and lapse of nine years since the project was sanctioned. The expenditure of ₹ 1.05 crore on construction of the steel truss bridge by Mechanical Division, Kullu was also bound to be wasteful.

The ACS stated (December 2018) that the work was delayed due to change of span of the bridge from time to time and revised administrative approval and expenditure sanction of ₹ 7.22 crore had been accorded (April 2018). However, lack of coordination and repeated failure of the Department to finalise the design and drawings resulted in non-completion the bridge for more than nine years, wasteful expenditure of ₹ 1.05 crore, and likely cost overrun of ₹ 3.42 crore (90 per cent) which would not be reimbursed by NABARD.

Repeated change in design and span of the bridge reflected poor planning and lack of coordination due to which the bridge could not be completed resulting not only in idle expenditure of ₹ 3.53 crore and wasteful expenditure of ₹ 1.05 crore but also in depriving the beneficiaries of road connectivity.

2.1.6.7 Calculation of Internal Rate of Return/ Economic Rate of Return and Benefit Cost Ratio

NABARD sanctions loan for construction of rural roads on the basis of internal rate of return¹⁰ (IRR)/ economic rate of return (ERR) and benefit cost ratio (BCR) as per economic details/ parameters¹¹ provided by the EEs in the DPRs.

Audit noticed that calculation of IRR/ ERR and BCR in DPRs of 269 projects in 17 test-checked divisions was not based on reliable data¹². Rather than obtaining reliable/ official data from the departments concerned, the public works divisions were using approximated/ self-assessed figures which had no reliable basis. As verified from

⁹ A projecting ridge/ portion of the slab of bridge which remains on the abutment of the bridge.

¹⁰ Internal Rate of Return is a measure of an investment rate of return.

¹¹ Number of villages connected, population of directly/ indirectly connected villages, crop cultivation, per hectare agriculture net income, incremental non-farm income, distance reduction and saving in transportation cost, etc.

¹² Data from Revenue Department, Agriculture Department, and Gram Panchayats.

the economic details in the DPRs, in 39 (out of 269) DPRs in five (out of 17) test-checked divisions¹³, the economic details provided in the DPRs were unrealistic¹⁴. In 32 (out of 269) projects of five test-checked divisions¹⁵ the calculation of details was wrong¹⁶. Records of *Gram Panchayats* concerned in respect of three roads showed that actual population of the villages did not match with the population shown in the DPRs¹⁷.

Incorrect depiction of IRR in the DPRs indicated that the IRR calculation had been made merely to meet the requirement of NABARD for obtaining sanction and the benefits derived after completion of the road would not be assessed. Besides, the Department/ NABARD had not carried out any post completion evaluation study to assess the benefits derived from the NABARD projects during 2013-18.

In the exit conference, the ACS accepted the facts and stated that the matter would be examined. However, wrong/ unrealistic data furnished by the divisions was overlooked at E-in-C level while finalisation of DPRs for onward submission to NABARD.

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

2.1.7 Financial Management

Budget provision is made by the State Government for execution of rural road projects approved by NABARD under tranches of RIDF. EEs incur expenditure as per the budget provision for the projects approved by NABARD. The expenditure upto 90 per cent of the approved project cost is reimbursed by NABARD on the basis of monthly expenditure statement submitted by the EEs.

Against budget allocation of ₹ 1,330.22 crore during 2013-18, the Department had booked expenditure of ₹ 1,321.27 crore. The audit findings are detailed in the following paragraphs. The findings are based on a test-check of projects; the State Government may review all projects to identify and address similar shortcomings.

2.1.7.1 Unspent funds under deposit head

In nine (out of 17) test-checked divisions, the EEs had withdrawn ₹ 18.38 crore¹⁸ from the Consolidated Fund during 2011-18 and showed it as final expenditure while keeping the amount under deposit head against works actually not executed on the

¹³ Dalhousie: six, Dhami: 17, Hamirpur: two, Theog: 12 and Nurpur: two.

¹⁴ Total cultivated area was more than the total influence (affected) area, Columns regarding total villages to be connected, farm activities, non-farm activities, non-recurring employment generation, etc. were left blank, annual incremental non-farm income per village and total annual incremental non-farm income for total villages to be covered was shown same, etc.

¹⁵ Dalhousie: four, Dhami: 11, Nurpur: seven, Salooni: three and Theog: seven.

¹⁶ Wrong totalling of columns in the check-list for DPRs, and Calculation of per hectare annual average net income with reference to per hectare annual average gross income and per hectare annual average cultivation cost was wrong.

¹⁷ Galog Nehra Okhru Keru road project: 987 as per *Panchayat* records and 3,660 as per DPR; Ghanhatti Bhajol Bhaghar road project: 1,033 as per *Panchayat* records and 658 as per DPR; and Dhami Bainsh road project: 968 as per *Panchayat* records and 465 as per DPR.

¹⁸ Dalhousie: ₹ 0.81 crore, Ghumarwin: ₹ 5.14 crore, Salooni: ₹ 1.11 crore, Theog: ₹ 2.15 crore, Kullu-II: ₹ 0.69 crore, Udaipur: ₹ 1.95 crore, Bilaspur-I: ₹ 0.40 crore, Dehra: ₹ 3.13 crore and Jaisinghpur: ₹ 3.00 crore.

ground. Of this amount, expenditure of ₹ 7.67 crore was incurred in the subsequent years for execution of the works and balance of ₹ 10.71 crore¹⁹ was lying unspent under deposit heads for more than 10 to 82 months.

Withdrawal of funds without physical achievement in order to avoid lapse of budget was irregular and reflected lack of financial control. Besides, keeping the borrowed funds unutilised under deposit head (outside budgetary process) for prolonged periods resulted in their unnecessary blocking as the same could have been utilised on other needy works, and in denial of timely benefits to the public.

In the exit conference, the ACS accepted the facts and stated that it was a routine practice to keep funds under deposit heads and the same are utilised on the scheme subsequently. However, the funds were lying unspent under deposit heads since March 2012.

2.1.7.2 Irregular booking of material

State Financial Rules read with provisions of Central Public Works Account (CPWA) Code strictly prohibit fictitious book adjustments such as debiting to a work, cost of material not required or purchased in excess of actual requirement to avoid lapse of budget. Audit noticed that:

(i) In 11 (out of 17) test-checked divisions²⁰, the EEs had booked material (tor steel, bitumen, inter link chain and cement) worth ₹ 10.94 crore by charging expenditure to NABARD works at the end of financial years 2013-18 without actual utilisation on the works. Of this, material of ₹ 9.12 crore was written back to stock in the subsequent financial years and balance ₹ 1.82 crore was lying unutilised in material at site account of the divisions. The EEs concerned stated (March to July 2018) that material was debited to works to avoid lapse of budget.

(ii) In six test-checked divisions, the EEs withdrew (between March 2015 and May 2017) ₹ 2.45 crore²¹ from treasury for booking of material for other works by charging the expenditure to NABARD works resulting in irregular diversion of funds and unauthorised reimbursement of NABARD loan. The EEs concerned stated (May to July 2018) that the expenditure was incurred on other roads in view of exigency of the works.

The material booked by the EEs without actual consumption on works and the stock adjustments carried out (to avoid lapse of budget) constituted temporary misrepresentation of quantity of material utilised against works. Besides, reimbursement claim submitted to NABARD without actual utilisation of material on the works was also irregular.

¹⁹ March 2012: ₹ 1.12 crore, March 2015: ₹ 3.28 crore, March 2016: ₹ 0.84 crore, August 2016: ₹ 0.35 crore, March 2017: ₹ 2.12 crore and March 2018: ₹ 3.00 crore.

²⁰ Bilaspur-1, Dalhousie, Dhama, Dehra, Ghumarwin, Hamirpur, Jaisinghpur, Nurpur, Salooni, Sangrah and Una.

²¹ Dhama: ₹ 0.50 crore, Ghumarwin: ₹ 0.29 crore, Kullu-II: ₹ 0.15 crore, Nurpur: ₹ 0.22 crore, Paonta Sahib: ₹ 0.14 crore and Udaipur: ₹ 1.15 crore.

Recommendation: *The Government may consider ensuring strict monitoring of utilisation of funds optimally and effectively to avoid their blocking for prolonged periods.*

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

2.1.8 Contract Management

Contract is a voluntary, deliberate and legally binding agreement which provides framework to discipline and guard interest of the contracting parties. If certain clauses are not provided/ complied with, there would be undue favour to the contractor. The deficiencies observed in contract management are discussed below.

2.1.8.1 Non-provision of performance security in contracts

With a view to safeguard the interest of procuring departments, Himachal Pradesh Financial Rules (HPFRs), 2009 provide for obtaining performance security for an amount between five and 10 per cent of the contract value from the successful contractor upon the award of contract. Audit noticed that:

- Out of 57 contracts in four (out of 17) test-checked divisions²², performance security of ₹ 2.70 crore was not obtained from the contractors in 35 contracts worth ₹ 53.91 crore resulting in extension of undue favour to the contractors besides putting public money at risk against losses. It was found that in the absence of performance security, in two contracts for ₹ 2.02 crore (Dhami and Dalhousie divisions), the contractors had left the works without completion but the divisions could not take any action in the absence of performance security.
- On the request of contractors, the ACS waived (March 2016) the condition of obtaining performance security in violation of the above rules, which constituted undue favour to the contractors besides jeopardising public interest. Due to this decision, an amount of ₹ 0.63 crore on account of performance security was not obtained in 11 contracts for ₹ 12.62 crore executed by four test-checked divisions²³ during 2016-18.

The ACS stated (December 2018) that the clause for performance security was deleted in order to enhance the bid capacity of contractors for successful completion of works. However, absence of clause for performance security meant that public interest was not safeguarded against damages/ losses.

The Department would not have the option of forfeiting performance security of defaulting contractors for breach of agreement as no clause for performance security was included in the contract agreement. The decision of the ACS to waive the condition of obtaining performance security on the request of contractors constituted undue favour to the contractors besides jeopardising public interest.

Recommendation: *The State Government may consider providing clauses for performance security and defect liability period uniformly in all contracts to secure public interest against losses.*

²² Dalhousie, Dhami, Hamirpur and Theog.

²³ Dalhousie, Dhami, Hamirpur and Salooni.

2.1.8.2 Non-levy of compensation for delay

In terms of clause-2 of the contract, a work should be completed by a contractor within stipulated time, and where the time is the essence of the contract, contractor is required to adhere to the prescribed time schedule. For breach of the contract, the contractor is liable to pay compensation up to maximum of 10 *per cent* of the contract value.

Audit noticed that in eight divisions²⁴, 30 (out of 84) contracts awarded (2013-18) for ₹ 62.10 crore to 25 contractors were not completed within stipulated period of six to 24 months. However, the Department had not taken any action to levy compensation of ₹ 6.21 crore under clause-2 of the contract for delay ranging between one and 31 months. Non-levy of compensation for breach of contractual provisions constituted extension of undue favour to the contractors. In the exit conference, the ACS accepted the facts and stated that necessary directions would be issued to all the divisions.

2.1.8.3 Inadmissible payment of cost escalation

As per E-in-C instructions (October 2012), price escalation under Clause-10(CC) of the contract is to be paid to a contractor if the completion gets delayed due to un-avoidable circumstances (beyond the control of the contractor) and the requisite extension is applied for by the contractor within 30 days of the date of occurrence of hindrance.

In two test-checked divisions²⁵, price escalation cost of ₹ 48.42 lakh was paid (between July 2013 and September 2017) under Clause-10(CC) *ibid* in four contracts to contractors without receiving request for time extension within the stipulated period of 30 days for the hindrances occurred. The contractors had submitted extension applications after 14 to 40 months from the stipulated dates of completion. The divisions had not maintained record of occurrence of hindrances despite which extension was granted on the basis of hindrances mentioned in the applications. In the absence of records, the actual occurrence of hindrances could not be verified. Non-adherence to the contractual provision resulted in irregular expenditure of ₹ 48.42 lakh for price escalation and constituted extension of undue favour to the contractors.

In the exit conference, the ACS accepted the facts and stated that recoveries would be made from the contractors.

2.1.8.4 Non-recovery of royalty

As per terms and conditions of contract, royalty charges²⁶ for material (stone, sand, stone aggregate) should be deducted from each running bill of the contractors as per rates approved by the Mining Department. M-form issued by the Mining Department to the crusher owner/ quarry owner, is the proof of royalty paid on the material to be used on the work by the contractor. Audit noticed that:

- In five (out of 17) test-checked divisions, the EEs had neither obtained M-form from the contractors as a proof of payment of royalty nor deducted (between April 2013 and March 2018) royalty of ₹ 47.49 lakh²⁷ from the running account bills of contractors in nine (out of 129 projects) completed projects (₹ 27.59 lakh) and six (out of 102) ongoing works (₹ 19.90 lakh).

²⁴ Dalhousie, Dhama, Ghumarwin, Hamirpur, Nurpur, Salooni, Sangrah and Theog.

²⁵ Hamirpur: ₹ 18.56 lakh and Theog: ₹ 29.86 lakh.

²⁶ Rate of Royalty Charges per metric tonne: @ ₹ 40 upto March 2015 and ₹ 60 thereafter.

²⁷ Dehra: ₹ 14.32 lakh, Ghumarwin: ₹ 1.71 lakh, Jaisinghpur: ₹ 2.17 lakh, Jubbal: ₹ 14.67 lakh, and Mandi-I: ₹ 14.62 lakh.

- In four (out of 17) test-checked divisions, against royalty of ₹ 53.06 lakh due from the contractors in 16 projects, royalty of ₹ 26.26 lakh was recovered (between April 2013 and March 2018) from the contractors resulting in short recovery of ₹ 26.80 lakh²⁸.

The ACS stated (December 2018) that recovery would be effected after verification.

2.1.8.5 Short recovery of useful stones

As per schedule of quantity of the contract, recovery of useful stones²⁹ @ ₹ 170 and ₹ 300 per cubic metre (on the basis of strata) for excavation in hilly areas should be made from contractors as per rates prescribed in the contract.

Audit noticed that against recovery of useful stones of ₹ 59.85 lakh due from the contractors in eight projects (2009-17) in four test-checked divisions, ₹ 42.18 lakh were deducted from their running account bills resulting in short recovery of ₹ 17.67 lakh³⁰ (two completed projects: ₹ 3.50 lakh and six ongoing projects: ₹ 14.17 lakh). Non-recovery of useful stones resulted in loss of revenue to the government and extension of undue benefit to the contractors. The EEs concerned stated (March to June 2018) that recovery of useful stones would be effected from the contractors.

The Department had granted undue benefit to contractors and caused financial loss to the State exchequer due to non-providing of performance security in the contract, non-levy of compensation for delay, providing cost escalation without receiving the request for time extension within the stipulated period, non-recovery of royalty and short recovery of useful stones.

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

2.1.9 Execution issues

EEs were responsible for ensuring the desired pace of work and completion of projects within the stipulated time and cost. Deficiencies in execution of work/projects such as delay in start of projects, projects lying held up for want of encumbrance-free land, non-passing of roads for vehicular traffic, cost overruns due to delay in completion of projects, etc. are discussed below. The findings are based on a test-check of projects; the State Government may review all projects to identify and address similar shortcomings.

2.1.9.1 Status of project execution

NABARD projects are required to be started within one year and completed within four years from the date of sanction.

A total of 1,609 road and bridge sector projects were sanctioned in the State by NABARD for ₹ 3,857.62 crore during 1996-2018. Of these, 399 projects were sanctioned for ₹ 1,463.09 crore during 2013-18. Total 1,252 projects were completed with expenditure of ₹ 2,260.04 crore during 1996-97 to 2017-18 which included

²⁸ Dharni: ₹ 9.64 lakh, Nurpur: ₹ 13.64 lakh, Theog: ₹ 1.06 lakh and Udaipur: ₹ 2.46 lakh.

²⁹ The stones which are extracted from the road alignment during excavation and can be used for construction work.

³⁰ Ghumarwin: ₹ 1.50 lakh, Jubbal: ₹ 7.44 lakh, Nurpur: ₹ 3.58 lakh and Sangrah: ₹ 5.15 lakh.

576 projects completed during 2013-18. Twenty eight projects were dropped and 329 projects sanctioned for ₹ 1,347 crore were in progress on which expenditure of ₹ 454.25 crore had been incurred up to March 2018.

Status of execution of NABARD projects in 17 test-checked divisions during 2013-18 is shown in **Table-2.1.3** below:

Table-2.1.3: Status of execution of NABARD projects in test-checked divisions during 2013-18

Period	Sanctioned		Completed		Held up		Not started		Incomplete as of March 2018	
	No.	SC	No.	Exp.	No.	Exp.	No.	SC	No.	Exp.
Prior to April 2013	117	380.05	87	213.27	5	8.50	4	11.55	21	62.15
2013-18	152	479.21	42	84.24	4	2.91	25	95.11	81	120.41
Total	269	859.26	129	297.51	9	11.41	29	106.66	102	182.56

(₹ in crore)

Note: SC: Sanctioned cost and Exp.: Expenditure.

The updated position of the projects executed by the test-checked divisions as of January 2019 shows further progress in their execution. The status is shown in **Table-2.1.4** below:

Table-2.1.4: Details of NABARD projects sanctioned, started within one year and completed in four years in test-checked divisions up to January 2019

Period	Sanctioned		Started within one year		Completed within four years	
	No.	SC	No.	SC	No.	Exp.
Prior to April 2013	117	380.05	44	116.55	26	53.57
2013-14	16	66.68	14	39.11	06	10.79
2014-15	53	132.45	24	63.57	19	41.30
2015-16	38	119.24	24	86.63	09	21.13
2016-17	15	50.15	19	71.24	04	7.48
2017-18	30	110.69	07	16.69	01	0.80
Total	269	859.26	132	393.79	65	135.07

(₹ in crore)

Source: Information supplied by Department. Note: SC: Sanctioned cost and Exp.: Expenditure.

It would be seen from the above **Table-2.1.4** that:

- (i) Out of 269 projects sanctioned for ₹ 859.26 crore, only 132 projects with the sanctioned cost of ₹ 393.79 crore were taken up for execution within one year.
- (ii) Only 65 projects were completed within stipulated period of four years after incurring an expenditure of ₹ 135.07 crore.

Non-starting and non-completion of projects within the stipulated period was attributed to non-availability of forest clearance, land disputes, time taken in completion of codal formalities and tendering process.

In the exit conference, the ACS stated that necessary steps would be taken to speed up the progress of the works.

Recommendation: The Government may ensure completion of codal formalities by departmental authorities on availability of land/ forest clearance before approval of projects.

2.1.9.2 Delay in according technical sanctions

NABARD guidelines provide that technical sanction should be accorded within three months from the date of sanction by NABARD. Audit noticed following deficiencies:

- In 82 projects in 13 test-checked divisions³¹, sanctioned for ₹ 305.26 crore during September 2008 to October 2017, there was delay of one to 60 months (more than one year in seven projects) in according technical sanction by the competent authority.
- In 29 projects in nine test-checked divisions³², sanctioned between August 2008 and March 2017, the works were executed without obtaining technical sanction.

Delay in technical sanctions from the competent authority resulted in delay of two to 56 months in completion of 31 projects. The delay was attributed to time taken in preparation of component-wise technical estimates. Execution of projects without obtaining technical sanction indicated that the Department had not followed proper procedure before their execution. Besides, in the absence of technical sanction there was possibility of non-adherence to required specifications and changes in scope of work.

2.1.9.3 Delay in award of works

As per NABARD guidelines, tendering process including award of works of projects should be completed within nine months from the date of sanction.

Audit noticed that in 123 out of 269 projects sanctioned for ₹ 414.67 crore in 17 test-checked divisions, there was delay³³ of one to 111 months in award of works. Of these projects, 23 projects were awarded after delay of one to four years, and five projects were awarded after delay of more than five years. Delay in award of works resulted in further delay in execution and completion of the works depriving the public of the intended benefits in time. Delay in commencement of the projects resulted in delay of 21 to 52 months in completion of 24 projects. The ACS stated (December 2018) that the tendering process was delayed on account of land disputes (paragraphs 2.1.6.2 and 2.1.9.6), court cases and non-availability of contractors qualifying the bid criteria. In the exit conference, the ACS stated that the monitoring would be done at circle and zone levels.

2.1.9.4 Lapsed projects

As per NABARD guidelines, projects should be considered as lapsed if the State Government fails to start the project within two years from the date of sanction.

Audit noticed that 25 projects sanctioned for ₹ 67.02 crore in 11 (out of 17) test checked divisions³⁴ were not started within two years from the date of sanction, and should have been considered lapsed. Though 24 (out of 25) of these projects were taken

³¹ Bilaspur, Dalhousie, Dehra, Ghumarwin, Hamirpur, Jaisinghpur, Jubbal, Kullu-II, Mandi-1, Nurpur, Paonta Sahib, Sangrah and Una.

³² Dalhousie, Dhami, Ghumarwin, Hamirpur, Jubbal, Nurpur, Paonta Sahib, Theog and Una.

³³ Calculated after nine months from the date of sanction.

³⁴ Bilaspur-1, Dalhousie, Dhami, Dehra, Ghumarwin, Hamirpur, Jaisinghpur, Mandi-1, Salooni, Sangrah and Udaipur.

up for execution afterwards, the Department had not obtained revalidation sanction for the same from NABARD. Against expenditure of ₹ 46.82 crore incurred on these projects up to March 2018, the reimbursement of NABARD loan to that extent was irregular. The remaining one project sanctioned for ₹ 2.19 crore during August 2015 was not taken up for execution due to non-obtaining of forest clearance.

The ACS stated (December 2018) that the work could not be started due to non-availability of encumbrance free land, local disputes, non-availability of eligible contractors, limited working season, tough geographical conditions. However, all these aspects should have been taken into account while preparing DPRs of the projects. Moreover, in one case which was not started, land availability certificate had been falsely provided in the DPR.

2.1.9.5 Cost overrun in projects

As per NABARD guidelines, State Government is required to meet cost escalation out of their own resources. Further, Central Public Works Manual (CPWM) provides for obtaining of revised administrative approval in case the expenditure is in excess of 10 per cent of the original approval.

Audit noticed that in 11 (out of 17) test-checked divisions³⁵, 25 (out of 269) projects approved (between December 2006 and October 2014) for ₹ 54.15 crore were completed with expenditure of ₹ 63.32 crore resulting in excess expenditure of ₹ 9.17 crore (17 per cent).

The cost escalation due to delay in execution of the projects resulted in extra burden on the State exchequer which would not be reimbursed by NABARD. Besides, expenditure incurred without revised administrative approval from the competent authority was irregular.

The ACS stated (December 2018) that the cost overruns due to delay in execution, change of scope, cost escalation, etc., would be regularised soon.



2.1.9.6 Non-execution/ completion of projects for want of forest clearance/ land dispute

The Forest Conservation Act prohibits use of forest land for non-forestry purposes without prior approval of GoI. In the case of private land, the Department was also required to ensure encumbrance free land before taking up the works for execution. Audit noticed that the projects detailed in **Table-2.1.5** were not completed for want of forest clearance/ land dispute though the concerned divisions had furnished wrong information of availability of forest clearance/ encumbrance free land in the DPRs as indicated in paragraph 2.1.6.2.

Table-2.1.5: Details of incomplete projects for want of forest clearance/ land dispute

Sl. No.	Particulars of project sanctioned	Audit findings
1.	Construction of 72.00 metres span (Deck Type) bridge over river Chandra at Yangley" in Udaipur division (Month of	The work of Deck Type bridge was awarded (October 2010) to a contractor for ₹ 2.82 crore. The work was lying held up since December 2013 after incurring an expenditure of ₹ 0.32 crore for want of forest clearance as noticed during physical inspection of the project carried out (May 2018) by Audit team (photographs).

³⁵ Bilaspur-1, Dhama, Dehra, Ghumarwin, Hamirpur, Jubbal, Kullu-II, Mandi-I, Theog, Udaipur and Una.

	<p>sanction: January 2010 and sanctioned cost: ₹ 3.19 crore).</p>	 <p>Partially constructed abutment at one side of bridge</p> <p>As replacement of the Deck Type bridge, the division released (March 2018) ₹ 1.80 crore to Mechanical Division, Shamshi for fabrication of 103.7 metres span suspension Bailey bridge downstream (new site), but the work thereof was not awarded as of December 2018.</p>
<p>2.</p>	<p>Construction of link road from Darkata Tripal road to Sandlor via Billpar (kms 0.0 to 1.600) in Dehra Division (Month of sanction: October 2014 and sanctioned cost: ₹ 1.24 crore).</p>	<p>The work awarded (August 2015) for ₹ 0.78 crore was lying in suspended state since October 2016 for want of forest clearance though expenditure of ₹ 0.11 crore was incurred on its execution.</p> <p>During physical inspection conducted (13 June 2018) by Audit, it was observed that the partially constructed cross drainage at Km. 1.090 was lying incomplete since October 2016 and the road was temporarily diverted for movement of vehicles. Similarly, the cross drainage at Km. 1.280 was filled with sand and muck by the local residents for crossing the vehicles (photographs).</p>  <p>Partially constructed road and cross drainage at Km. 1.090 Cross drainage filled with sand/muck at Km. 1.280</p>
<p>3.</p>	<p>Construction of link road from Bard to Duhak via Morthal in Ghumarwin division (Month of sanction: October 2009 and sanctioned cost: ₹ 2.11 crore).</p>	<p>Case for forest clearance was moved by the division in June 2011 and in-principle approval was granted by GoI in March 2015 but the final approval was awaited as of December 2018.</p> <p>In the meantime the work was awarded (August 2016) for ₹ 1.42 crore but the same was lying held up since June 2017 due to non-removal of trees from the road alignment. Expenditure of ₹ 0.27 crore was incurred on the work. The Division took up (between June 2016 and November 2017) the matter with the Forest Department for the removal of trees but the same had not been removed as of December 2018.</p>
<p>4.</p>	<p>Construction of link road (kms 0.0 to 7.185) from Banal to Chamiana in Hamirpur division (Month of sanction: June 2013 and sanctioned cost: ₹ 1.80 crore).</p>	<p>The work awarded (March 2014) for ₹ 1.52 crore was lying held up since March 2016 due to land dispute at kms 0.0 to 1.0 and non-availability of approach from other side where a bridge was required at kms 4.405 which was not provided for in the DPR. An expenditure of ₹ 1.19 crore was incurred on the work up to March 2016.</p>

Thus, failure of the Department to obtain prior forest clearance and assess feasibility of site led to non-completion of roads and bridges and deprived the beneficiaries concerned of the intended road connectivity, besides infructuous/ unfruitful expenditure of ₹ 1.89 crore.

The ACS accepted the facts (December 2018).

2.1.9.7 Execution of substandard works



Audit observed substandard execution of three (out of 24) projects during physical inspection and test check of records as detailed in **Table-2.1.6** below:

Table-2.1.6: Details of substandard execution of work

Sl. No.	Particulars of project sanctioned	Audit findings
1.	Bridge damaged due to use of sub-standard material	<p>Construction of 40 metres span Pre Stressed Concrete/ Reinforce Cement Concrete box Girder Bridge over Luni <i>khad</i> in Mandi-I division was sanctioned under NABARD (RIDF-X) in August 2005.</p> <p>The work awarded (September 2008) for ₹ 53.51 lakh was abandoned by the contractor in March 2011 without assigning any reasons. The contractor was paid ₹ 26.08 lakh upto June 2011 including secured advance of ₹ 8.34 lakh for Pre Stressing Cable. The contract was re-awarded in September 2015 to another contractor for ₹ 48.43 lakh with the condition that the Pre Stressing Cable purchased by previous contractor would be used on the bridge. The contractor intimated (February 2016) that the Pre Stressing Cable was badly rusted due to lying in the open since June 2011 but no action was taken by the department which insisted for execution of work. The same Pre Stressing Cable was used for construction of the bridge without any testing. Due to use of the rusted Pre Stressing Cable, the deck slab of the bridge got deflected in June 2016 by 10 to 15 centimetres, as stated (August and September 2016) by the contractor. The contractor was paid ₹ 47.84 lakh and the work was lying incomplete as of January 2019. Records showed that the E-in-C had directed (August 2016) for restoration and testing of the bridge to ensure its safety before opening for vehicular traffic but no action had been taken by the Department. The Department had incurred expenditure of ₹ 76.10 lakh on the bridge which remained unfruitful.</p> <p>The ACS stated (December 2018) that the material used in the construction of damaged bridge was not substandard. However this contention does not appear correct in light of fact that the bridge got deflected during execution stage due to the use of rusted cable as repeatedly pointed out (August and September 2016) by the contractor.</p>
2.	Bridge collapsed due to execution of sub-standard work	<p>To provide road connectivity to Mooling, Bergul and Shifting villages in Udaipur division, 68.00 metres span steel truss bridge across river Chandra was completed in October 2014 at a cost of ₹ 2.97 crore.</p> <p>Records of inspection of the bridge carried out (June and July 2014) by the EE (Quality Assurance) Mandi showed that the quality of the work was assessed as very poor and the work was graded as "Unsatisfactory". However, the division did not take any action to rectify the deficiencies pointed out³⁶. The bridge collapsed in March 2015. A new bridge at the same site was awarded (April 2016) to another contractor for ₹ 2.83 crore (approved under State head) with stipulation to complete it in 12 months. The contractor had executed work of value of ₹ 2.17 crore and the work was in progress as of December 2018.</p> <p>Execution of sub-standard work and failure of the division to take corrective action resulted in collapse of the bridge causing loss of ₹ 2.97 crore to State exchequer and likely burden of ₹ 2.83 crore for construction of new bridge while also depriving the beneficiaries of intended benefits.</p> <p>The ACS stated (December 2018) that report of the committee constituted under the chairmanship of the Chief Engineer, Mandi Zone to ascertain the reasons for collapse was awaited. However, the constructed bridge was of poor quality and the Department had failed to take action for execution of sub-standard work.</p>

³⁶

Quality control tests were not conducted; laying of concrete was carried out without approval of the mix design by the Engineer-in-charge; curing of concreting was not done causing reduction in strength and test results of sand concrete and aggregate were not as per recommended values.

3.	Substandard work of up-gradation of Dalyanoo-Pullilani-Nainidhar road (Sirmour)	<p>Project³⁷ for up-gradation of the Dalyanoo-Pullilani-Nainidhar road (kms 0.0 to 12.0) in Sangrah division was completed (June 2018) at a cost of ₹ 4.08 crore.</p> <p>However, during joint inspection of the road conducted by Audit with the technical staff of the division, it was noticed that the metalling in kms 6.0 to 8.0 (2.00 kms) carried out during November 2017 was damaged at various places. Though, provision of 3.66 metre high retaining wall was made in the DPR, against which actual execution was 3.16 metre due to which the level of the retaining wall was below the road surface. The retaining wall was left open on both sides and not connected to the edge of the road due to which there was risk of accidents.</p> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;"> Damaged metalling of Dalyanoo-pullilani-Nainidhar road Retaining wall of Dalyanoo-Pullilani-Nainidhar road left open </p> <p>Besides, inspection and monitoring of the work had not been carried out by the NABARD authority/ State Quality Monitor/ State Quality Control wing of the Department. The EE of the Division stated (October 2019) that the contract has been closed and the security deposit of the contractor retained with the Division will be used for rectification. The rectification has not been done as of October 2019.</p>
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Thus, the bridge over Luni *khad* in Mandi-I division was damaged due to use of substandard material resulting in unfruitful expenditure of ₹ 76.10 lakh, while the bridge across river Chandra collapsed due to substandard execution and lack of corrective action by the division resulting in loss of ₹ 2.97 crore. The metalling of Dalyanoo-Pullilani-Nainidhar road in Sangrah division was damaged at various kms before its completion and the retaining wall was left open increasing the risk of accidents, while quality checks had not been undertaken on the project. The execution of substandard works reflected deficiencies in quality control and inspection.

2.1.9.8 Roads completed but benefits not derived



During scrutiny of records along with physical inspections of 24 projects, conducted by Audit, it was observed that there were instances of roads having been completed but benefits not derived due to various reasons, as detailed in **Table-2.1.7** below:

Table-2.1.7: Details of roads completed but benefits not derived

Sl. No.	Particulars of project sanctioned	Audit findings
1.	Non-passing of completed	As per directions (June 2008) of the E-in-C, action to get completed roads passed by Road Fitness Committees ³⁸ was to be taken by all EEs within one month of their completion.


³⁷ Improvement of geometrics and gradients in kms 0.0 to 12.0, cross drainage, sub-base course Grade-I in kms 6.0 to 12.0, sub-base course Grade-II and III, metalling and tarring in kms 4.0 to 12.0 and essential side drains and parapets in kms 0.0 to 12.0 including construction of dumping structures.

³⁸ Committee consisting of Sub-Divisional Magistrate (Chairman) and three members, i.e. Executive Engineer HPPWD, Deputy Superintendent of Police and Regional Manager of HP Road Transport Corporation.

	roads for traffic	<p>Audit noticed that 33 (23 per cent) out of 129 roads (length: 153.94 kms) completed (2013-18) at a cost of ₹ 49.00 crore in eight (out of 17) test-checked divisions³⁹ were not passed for plying of vehicular traffic due to non-availability of required width (five metres) at various kms (two cases) and land disputes after completion (one case) In 30 road projects, no action was initiated by the divisions to get the roads passed for vehicular traffic from the Road Fitness Committee.</p> <p>Photograph of a road short of the required width of five metres noticed during physical verification conducted (February to June 2018) by Audit with the staff of the concerned division is shown below:</p>  <p>Link road from Una Takka road to Kotla Khurd Mohalla Basian with less than five metres width</p> <p>The ACS stated (December 2018) that necessary directions had been issued to the EEs for passing the roads for vehicular traffic immediately after completion. However, the Department had neither constructed the roads with the required width nor obtained prior written consent of the land owners.</p>
2.	Non-use of road due to non-construction of bridge	<p>Project for construction of link road from Khiah to Bhatara via Bharnot and Thalakna (kms 0.0 to 4.855) including bridge over Pung khad at kms 1.555 in Hamirpur division was recommended (January 2011) by MLA. However, DPR of the project was prepared by the division for ₹ 2.86 crore without any provision for the bridge, and the project was sanctioned (December 2011) for ₹ 2.78 crore. The road work⁴⁰ awarded (August 2012) to a contractor for ₹ 2.32 crore and stipulated to be completed by August 2013 was completed (June 2017) by the contractor after expenditure of ₹ 2.66 crore. However, the bridge required over Pung khad at kms 1.555 not included in the DPR was not constructed and the Department had not taken any action for construction of the bridge as of June 2018.</p> <p>Due to non-construction of the bridge, both portions of the constructed road could not be connected which rendered the expenditure largely unfruitful as also noticed during physical inspection of the road conducted (May 2018) by Audit with technical staff of the Division (photographs).</p>  <p>Completed road from Khiah to Bhatara via Bharnot and Thalakna (kms 0.0 to 4.855)</p> <p>Khiah to Bhatara via Bharnot and Thalakna road without bridge over Pung khad at kms 1.555</p> <p>The EE of the Division stated (June 2018) that the bridge would be constructed through another DPR. The reply is not acceptable as construction of the bridge should have been synchronised with the construction of road so as to ensure all-weather connectivity.</p>
3.	Non-use of road due to closure by land owners	<p>Road from Tahakoli to Dungru via Khera Mandrala kms 0.0 to 4.280 in Dalhousie division sanctioned (October 2009) for ₹ 2.06 crore was completed (November 2016) after expenditure of ₹ 1.45 crore. However, the road could not be opened for traffic as it was closed by a land owner by stacking building material at kms 2.020 to 2.130 and erecting barricades and dumping muck on the road at km 4.190 to 4.280 as also noticed during site visit (May 2018) by Audit with the staff of the division (photographs).</p>

³⁹ Bilaspur-1, Dalhousie, Dhami, Dehra, Hamirpur, Jaisinghpur, Kullu-II and Una.

⁴⁰ Formation cutting, cross drainage, soling, wearing and tarring, parapets and v-shape drain in kms 0.0 to 4.855.

		 <p style="text-align: center;">Closed road from Tahakoli to Dungru via Khera Mandrala in Dalhousie division</p> <p>The Department had neither ensured clear title of land before construction of the road not taken any action to resolve the issue with the land owner though false certificate of land availability was provided in the DPR as indicated paragraph 2.1.6.2. Non-utilisation of the completed road deprived the public of the intended benefits and rendered the expenditure of ₹ 1.45 crore unfruitful.</p> <p>The ACS stated (December 2018) that the road had not been closed by any land owners. The reply was contradictory to the position observed during physical verification by Audit with staff of the Department during which it was clear that had been closed by one of the land owners.</p>
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Non-passing of roads (33 cases), non-construction of bridge (one case) and land dispute (one road) rendered the expenditure of ₹ 53.11 crore incurred on these roads and bridge largely unfruitful as the envisaged benefits could not be realised.

The cases pointed out are based on the test check conducted by Audit. The Department/ Government may initiate action to examine similar cases and take necessary corrective action.

2.1.10 Internal controls

Internal control system is a management tool that detects violation of laid down rules and procedures, assesses reasons for the same with implications, and suggests corrective course of action. Through it, the organisation gains reasonable assurance for efficient and effective operations, reliability of financial reporting, compliance with applicable rules, regulations and statutory obligations. Deficiencies in internal controls have been discussed in the succeeding paragraphs. The findings are based on a test-check; the State Government may review all projects to identify and address similar shortcomings.

2.1.10.1 Financial Controls- Reimbursement of loan by NABARD

NABARD funding is by way of reimbursement of expenditure incurred on the projects on a monthly basis upon submission of statement of expenditure (SOE) by the State Government. The EEs are to submit the details of expenditure incurred on the roads to the Engineer-in-Chief on a monthly basis and claims are further submitted to NABARD through Finance Department for reimbursement.

The position of projects sanctioned, expenditure incurred, reimbursement due and reimbursement actually made by NABARD during 2013-18 (Period of performance audit) is depicted in the **Table-2.1.8** below:

Table-2.1.8: Position of projects sanctioned, expenditure incurred, reimbursement due and reimbursement actually made by NABARD under during 2013-18

(₹ in crore)

RIDF/ Year	Project sanctioned		Exp.	Reimbursement claims				
	No.	Amount		Due	Claimed	Short claim	Received	Short receipt (6-8)
1	2	3	4	5	6	7	8	9
2013-14	75	244.83	181.46	163.31	155.47	7.84	154.72	0.75
2014-15	80	256.00	152.25	137.03	122.28	14.75	119.64	2.64
2015-16	107	385.61	165.54	148.99	126.88	22.11	118.71	8.17
2016-17	53	250.43	38.32	34.49	22.74	11.75	18.55	4.19
2017-18	84	326.22	3.09	2.78	1.50	1.28	1.41	0.09
Total	399	1,463.09	540.66	486.60	428.87	57.73	413.03	15.84

Source: Information supplied by Department.

Against reimbursement of ₹ 486.60 crore (90 per cent of expenditure incurred) due under RIDF-XIX to XXIII from NABARD during 2013-18, the Department had claimed reimbursement of loan of ₹ 428.87 crore resulting in short claim of ₹ 57.73 crore. Even against reimbursement of ₹ 428.87 crore claimed by the Department during the above period, ₹ 15.84 crore had not been received as of March 2018. The ACS stated (December 2018) that submission of reimbursement claims was a continuous process and claims were submitted to NABARD on the basis of actual expenditure incurred on the projects. However, the Department had neither claimed reimbursement keeping in view the actual expenditure incurred nor received the reimbursement actually claimed.

2.1.10.2 Administrative Controls

(i) Splitting up of works

Paragraph 6.44 of PWD Manual of orders, read with instructions issued (April 2012) provides that split up of work/ project should not be carried out to avoid e-tendering or publication through the Press to avoid approval of the higher authority.

Audit noticed that in nine (out of 17) test-checked divisions⁴¹, 23 road projects sanctioned (December 2008 to October 2014) under NABARD for ₹ 104.74 crore were awarded (October 2009 to September 2017) to 124 contractors for ₹ 89.36 crore by splitting each of them into two to 44 works. The projects were split up to avoid wide publicity and sanction of the higher authority facilitating finalisation of tenders at lower level. Evidently, splitting up of the projects vitiated the tendering process of ensuring maximum competition, transparency and fairness besides extension of undue favour to the contractors. A few instances are given in **Table-2.1.9** below:

Table-2.1.9: Details of instances of splitting up of works

(₹ in crore)

Name of the division	No. of projects	Year of sanction	Sanctioned Amount	No. of contracts awarded	Award amount	Delay in completion of work (in months)
Mandi-I	1	2008	3.48	44	5.45	41
Sangrah	1	2013	16.84	5	15.96	14
Una	5	2009 to 2011	16.25	2 to 4	11.48	18 to 22
Udaipur	1	2012	0.11	11	0.20	No delay

⁴¹ Dalhousie, Ghumarwin, Jubbal, Mandi-I, Nurpur, Sangrah, Theog, Udaipur and Una.

The ACS stated (December 2018) that the works were split up by the divisions to speed up the tendering process where contractors with required capacity were not available and due to tough site conditions. However, there was delay of 14 to 41 months in completion of seven out of the eight road projects depicted in Table-2.1.9 in spite of splitting up and the objective of obtaining competitive rates also remained unachieved.

(ii) Expenditure incurred in excess of awarded amount

Audit noticed that in test-checked divisions (except Dalhousie) 82 works were awarded at a cost of ₹ 147.23 crore against which payment of ₹ 173.47 crore was made to contractors for execution of these works resulting in deviation payments of ₹ 26.24 crore (18 per cent). The payment of deviations was, however, made without approval of the competent authority. A few major deviations are shown in Table-2.1.10 below:

Table-2.1.10: Details of instances of major deviations

(₹ in crore)

Name of the division	Name of projects	Award Amount	Expenditure	Excess expenditure
Theog	C/o Kwanti bridge	3.02	5.76	2.74
Hamirpur	C/o link road from NH 17 Kaloor to Kohla Nadaun Amtar	3.75	4.58	0.83
Una	i) C/o link road from Ispur Gagret road to Lower Panjawar via Patwar Khana	2.90	3.70	0.80
	ii) C/o & metalling/ tarring of road from Gagret Oel Ispur road to Mohlla Tiperin upto Swan River	2.25	3.10	0.85

The ACS stated (December 2018) that the expenditure was incurred due to unforeseen circumstances and execution of extra work as per site conditions. However, the division had not obtained prior approval of competent authority for deviation.

2.1.10.3 Quality controls and monitoring

(i) Quality control

Quality control is essential for ensuring execution of projects to the desired quality/ standards. Quality of execution of projects/ works was to be checked by the Department through State Quality Control Wing and State Quality Monitors (SQMs).

• Quality checks by Quality Control Wing and State Quality Monitors

As per instructions (September 2011) of the CE (Quality Control and Design), inspection of all works above ₹ 0.30 crore was to be carried out at regular intervals by the EEs (Quality Control) as well as by SQMs. However, the periodicity of inspection was not prescribed. During 2013-18, the SQMs had conducted 102 inspections of 43 projects in the 14 test checked divisions while no inspection was conducted in the remaining three divisions⁴². Out of 43 projects, 59 defects⁴³ were pointed out in 28 projects but action taken reports for rectification of defects pointed out by the SQMs had not been submitted by the divisions. Besides, 32 inspections were conducted in 29 projects by the EEs (Quality Control) but no specific deficiencies were pointed out and only advisory for improvement was issued. Some instances of sub-standard works noticed during physical inspection by audit have been mentioned in paragraph 2.1.9.7.

⁴² Bilaspur, Ghumrwin and Jaisinghpur.

⁴³ Non-construction of *pucca*/ blocked drains, improvement in berms, non-conducting of quality tests, and removal of debris/ slips.

In the exit conference, the ACS accepted the facts and stated that new SQMs had been appointed and inspection of each road would be done regularly.

- **Quality checks of projects near completion**

As per directions issued (June 2011) by the CE (Quality Control and Design) Shimla, the final bill of a completed project was to be admitted by the EE on recommendation of the SE based on his final inspection of the project.

Audit noticed that 129 projects were completed with expenditure of ₹ 297.51 crore during 2013-18 in the test-checked divisions, but final inspection of the projects was not carried out by the SEs as required. Out of 129 completed projects, final bills of 101 projects (total expenditure: ₹ 239.13 crore) were passed by the divisions without final inspection by the SEs and final bills of the remaining 28 projects had not been passed as of March 2018. The ACS stated (December 2018) that necessary directions had been issued to all field agencies to finalise the bills of completed projects on the basis of final inspection report of the SEs concerned.

- (ii) **Monitoring and inspection**

Monitoring and periodic inspection of projects by concerned authorities is key to effective execution of the projects. The shortfalls are discussed below:

- **Monitoring by High Powered Committee**

Against the required 20 meetings of High Powered Committee⁴⁴ during 2013-18, 15 meetings⁴⁵ were held resulting in shortfall of five meetings. The discussion focused mainly on financial arrangements, submission of DPRs/ PCRs and new proposals for funding under NABARD. The ACS stated (December 2018) that High Powered Committee meetings were conducted to discuss the issues of loan sanction, reimbursements gap position, slow moving projects, etc. However, there was only general discussion on the above issues in the meetings and specific cases of technical deficiencies and benefits derived as mentioned in paragraphs 2.1.6.6, 2.1.6.7, 2.1.9.7 and 2.1.9.8 were not discussed.

- **Monitoring by district level monitoring team**

State Government had constituted (December 1999) district level monitoring team in each district under the chairmanship of the Deputy Commissioner, with two members (Superintending Engineer and District Manager, NABARD) and District Planning Officer as Member Secretary. The committee was to meet on a monthly basis to review the physical/ financial aspects of the programme and carry out random inspections. The Member Secretary was required to submit report of the review in a consolidated manner to the Planning Department within a week of the meeting.

Audit noticed that during 2013-18, the district level monitoring team did not hold any meeting to monitor the projects financed by NABARD. Action for completion of the roads, utilisation of funds and reimbursement of NABARD loan in a timely manner was also not taken. Further, the team had also not carried out any sample inspections due to which the progress of the works was not physically checked. The EEs concerned admitted the facts.

⁴⁴ Constituted (February 1996) by the State Government with the State Chief Secretary as Chairman, six members and Advisor (Planning) as its Member Secretary for review and monitoring the progress of NABARD projects on quarterly basis.

⁴⁵ 2013-14: four, 2014-15: three, 2015-16: two, 2016-17: three and 2017-18: three.

- **Inspections of projects by NABARD and departmental authorities**

NABARD guidelines provide for monitoring of projects by NABARD and departmental authorities through periodic field visits. However, periodicity of field visits was neither specified in the NABARD guidelines nor prescribed by the departmental authorities separately. In respect of 240 projects (out of 269) executed in the test-checked divisions during 2013-18, inspection notes/ site order books in support of the inspections carried out by departmental authorities (EEs, SEs and CEs) were not prepared. This indicated that inspections, if carried out, were not documented. Besides, NABARD had also not carried out any inspection during the above period.

NABARD authority stated (July 2018) that responsibility for inspection lies with the State Government. The ACS stated (December 2018) that regular inspections were being carried out by the departmental authorities. However, there were no inspection notes/ site order books in the 17 test-checked divisions from which the authenticity of such inspections carried out, if any, could be ascertained.

The cases pointed out are based on the test check conducted by Audit. The Department/Government may initiate action to examine similar cases and take necessary corrective action.

Recommendation: *The Government may consider ensuring strict compliance with regard to quality checks to be exercised at various stages by different authorities, promptly rectifying the defects pointed out and monitoring the execution of projects regularly for ensuring timely completion.*

Conclusion

In view of the fact that these projects were being financed through loans from NABARD, it was imperative that project selection was judicious, and execution was time-bound and within the sanctioned cost as cost overruns would not be financed by NABARD. In this context, the shortcomings detailed in the preceding paragraphs assume greater significance. The geographical distribution of sanctioned projects was uneven indicating faulty prioritisation: distressed areas had not been given due attention, while at the same time, there were cases of roads having been sanctioned for already connected villages. Project-level planning was deficient as preparation of DPRs took considerable time, projects were sanctioned without ensuring availability of encumbrance-free land and there were cases of incorrect/ unsuitable site selection and design. Scheme execution was marked by delays and cost overruns. In respect of quality of construction, the practice of constructing non-metalled roads meant that there would be faster wear and tear/ damage to the road surface. The lack of attention towards quality was also evident from the fact that observations arising out of quality control inspections were not attended to. In conclusion, the shortcomings in planning and execution meant that the envisaged benefits did not accrue in time and at the sanctioned cost, and that the quality of construction remained a matter of concern. The cost overruns on account of project delays and additional cost necessitated on account of faulty designs and substandard/ poor quality work would have to be borne by the State Government through budgetary outlays in the future.

2.2 Sewage Management in Urban Areas

Performance audit of sewage management in urban areas evaluated aspects relating to planning and direction, financial management, execution of sewerage schemes, treatment and disposal of sewage through sewerage and septic tank systems, and monitoring. Some of the major findings are as under:

Highlights:

- *Shortcomings in planning and direction included: non-preparation of strategy, non-ensuring of encumbrance-free land for sewerage schemes, lack of proactive action with regard to upgrading of overstressed STPs, design deficiencies in STPs/ septic tanks, and lack of control over disposal of sludge.*
(Paragraph 2.2.5)
- *Shortcomings in financial management included: inadequate funding for sewerage schemes, non-release of 30 per cent and delayed release of 43 per cent funds by ULBs to IPH divisions, non-utilisation of 58 per cent funds in 11 out of 16 test-checked divisions, non-utilisation of funds received from the Finance Commission by 15 test-checked ULBs, and shortcomings with regard to collection of user charges.*
(Paragraph 2.2.6)
- *Out of 25 test-checked sewerage schemes only one scheme was completed after delay of 205 months; 13 schemes were incomplete (delay: 18 to 230 months); and 11 schemes had not been started due to lack of planning for acquisition/ transfer of land; non-ensuring of encumbrance free land for laying of sewerage network; delay in preparation of DPRs; and lack of funds.*
(Paragraph 2.2.7)
- *Households/establishments were not connecting to sewerage network resulting in under-utilisation of STPs. Three STPs were over-stressed adversely impacting the treatment process and resulting in poor effluent quality.*
(Paragraphs 2.2.8 to 2.2.9.1)
- *Non-functioning of STP components and design shortcomings resulted in poor quality of effluent being released into surface water bodies. In a large number of STPs, criteria for quality of treated effluent were not being met. Sludge treatment was inadequate.*
(Paragraphs 2.2.9.2 to 2.2.9.4)
- *Community and domestic level septic tank systems did not have effluent treatment facility and effluent was being discharged into water bodies without proper treatment. There was no mechanism for de-sludging of the tanks at designated periods or for treatment of sludge before disposal. This had resulted in risk of contamination of water bodies and water borne diseases due to disposal of sludge and effluent without proper treatment.*
(Paragraphs 2.2.10.1 and 2.2.10.2)
- *Monitoring mechanisms were weak at the Department, ULB and IPH division levels.*
(Paragraph 2.2.11)

2.2.1 Introduction

Sewage refers to wastewater which is generated by residential, institutional, commercial and industrial establishments. It can be categorised into two components: black water (water containing human waste discharged from toilets) and grey water (water discharged from kitchens and bathrooms). The objective of a sewage

management system is to ensure that sewage generated and discharged from various establishments is properly collected, transported, treated and disposed of or reused without causing any health or environmental problems⁴⁶. Improper management of sewage can create insanitary conditions leading to environmental pollution through water and soil contamination/ toxicity and cause outbreaks of vector-borne disease.

Sewage management process

There are two systems for treatment and disposal of sewage: sewerage system and septic tank system. Sewage management process is depicted in **Appendix-2.1**.

In sewerage system, sewage is collected from its source of generation and transported through a network of sewer pipes (sewerage) to a sewage treatment plant (STP). An STP includes facilities for primary treatment to remove solid material, secondary treatment to digest dissolved and suspended organic material, tertiary treatment and disinfection for advanced cleaning of wastewater (effluent) to remove nutrients (such as phosphorus and nitrogen) and pathogens, and sludge treatment for dewatering and processing of the semi-solid waste (sludge). The treated effluent and sludge can be reused.

In septic tank system, sewage is collected, stored and treated at or near the source of generation by means of a septic tank and soak pit. Physical, chemical and biological processes remove contaminants, and the treated effluent seeps into the ground through soak pits. Additional treatment of the effluent is required for septic tanks serving large communities. The sludge has to be periodically removed (de-sludging) and treated in an STP or a special sludge treatment facility before being suitable for reuse or disposal. The septic tank system is recommended for individual houses (domestic-level) and small communities (community-level) whose contributory population does not exceed 300.

Responsibility framework

The Urban Development Department (UDD) was responsible for formulation of strategy and planning for sewage management at the State level, providing finance for schemes for sewage management, and monitoring the execution of such schemes. The Department was releasing funds to Urban Local Bodies (ULBs) for capital works; and to the Engineer-in-Chief (E-in-C), Irrigation & Public Health (IPH) for operation and maintenance. The ULBs were responsible for local level planning, supervision over domestic-level septic tank systems, fund management and monitoring. The IPH Department was planning and executing new schemes and undertaking operation and maintenance of existing schemes⁴⁷. The Himachal Pradesh State Pollution Control Board (HSPSCB) was responsible for monitoring compliance with standards, granting authorisations for sewage treatment plants, and reporting. The responsibility framework chart is depicted in **Appendix-2.1**.

⁴⁶ Chapter 2 (Planning) of Central Public Health and Environmental Engineering Organisation (CPHEEO) Manual on Sewerage and Sewage Treatment (Engineering).

⁴⁷ Sewerage systems and community-level septic tank systems.

There are 54 ULBs in the State – two Municipal Corporations (MC), 30 Municipal Councils (MCs), and 22 Nagar *Panchayats* (NPs). As of March 2018, sewerage systems were functional in 20 ULBs⁴⁸ and partially commissioned in four ULBs⁴⁹, while work was in progress in 21 ULBs⁵⁰. Nine ULBs⁵¹ did not have any sewerage system. There were 41 functional STPs in the 24 ULBs having sewerage systems. Data for the community-level septic tank systems in the State was not available with the Department. Domestic-level septic tank systems existed in all ULBs.

2.2.2 Audit objectives

The objectives of the performance audit were to evaluate the performance in respect of the following aspects:

- Planning for sewage management;
- Adequate funding and efficient utilisation of funds;
- Execution of sewerage schemes;
- Treatment and disposal of sewage through sewerage and septic tank systems; and
- Effectiveness of monitoring mechanisms.

2.2.3 Audit criteria

The following sources were referred to for deriving audit criteria:

- CPHEEO Manual on Sewerage and Sewage Treatment (Engineering), 2012;
- CPHEEO Manual on Sewerage and Sewage Treatment (Maintenance and Operation), 2012;
- CPHEEO Manual on Sewerage and Sewage Treatment (Management), 2013;
- Circulars/ orders issued by the authorities concerned; and
- Contracts signed with various agencies.

2.2.4 Audit scope and methodology

The performance audit covered the period 2013-18. The audit scope included UDD, IPH Department and HPSPCB. Further, 16⁵² out of 54 ULBs in the State along with 15 associated divisions⁵³ of IPH Department and MC division, Shimla were selected (on the basis of highest population in descending order) for detailed examination of the sewage management processes. Out of total funds of ₹ 319.16 crore⁵⁴ available

⁴⁸ Arki, Bhuntar, Chamba, Dharmashala, Ghumarwin, Hamirpur, Jawalamukhi, Joginder Nagar, Jubbal, Kullu, Manali, Mandi, Naina Devi Ji, Palampur, Rampur, Rohru, Shimla, Sujanpur, Sundernagar and Una.

⁴⁹ Kangra, Nagrota Bagwan, Paonta Sahib and Solan.

⁵⁰ Baddi, Banjar, Bhota, Chowari, Dalhousie, Dehra, Gagret, Karsog, Kotkhai, Mehatpur, Nadaun, Nalagarh, Narkanda, Nurpur, Rewalsar, Santhokhgarh, Sarkaghat, Sujanpur, Sunni, Talai and Theog.

⁵¹ Baijnath Paprola, Bilaspur, Chopal, Daulatpur, Jawali, Nahan, Nerchowk, Rajgarh and Taliwal.

⁵² Both Municipal Corporations, viz. Shimla and Dharamshala; 12 (Baddi, Bilaspur, Chamba, Hamirpur, Kullu, Mandi, Nahan, Nerchowk, Paonta Sahib, Solan, Sundernagar and Una) out of 30 MCs; two (Baijnath Paprola and Jawali) out of 22 NPs.

⁵³ Baggi, Bilaspur, Chamba, Dharamshala, Hamirpur, Jawali, Kullu, Nahan, Nalagarh, Mandi, Palampur, Paonta Sahib, Solan, Sundernagar and Una-1.

⁵⁴ State budget: ₹ 172.87 crore (Capital works: ₹ 125.42 crore and Operation & maintenance: ₹ 47.45 crore), 13th Finance Commission: ₹ 4.41 crore, JNNURM/ UIDSSMT: ₹ 35.21 crore, AMRUT: ₹ 103.16 crore and Smart city: ₹ 3.51 crore.

for sewage management in the State, expenditure of ₹ 108.37 crore⁵⁵ (34 per cent) was incurred in these test-checked units. The audit methodology consisted of scrutiny of records and joint physical inspection.

Out of the 16 test-checked ULBs, eight⁵⁶ ULBs had fully functional sewerage systems; two ULBs (Paonta Sahib and Solan) had partially-commissioned sewerage systems; work on sewerage scheme was in progress in one ULB (Baddi); and sewerage scheme had been sanctioned in one ULB (Bilaspur) but work had not been started. In the remaining four⁵⁷ ULBs, no sewerage scheme had been sanctioned. Schemes were also sanctioned in the ULBs already having sewerage system for rejuvenation of existing schemes, schemes for left out areas in the towns and schemes for household connectivity. 25 sewerage schemes which were either ongoing or sanctioned during 2013-18 were test-checked, (complete: one, incomplete: 13, and not-started: 11) as discussed in paragraph 2.2.7.

There were 24 functional STPs⁵⁸ in the 10 test-checked ULBs having sewerage systems. Out of the 16 test-checked ULBs, 29 community-level septic tank systems existed in five⁵⁹ ULBs, while domestic-level septic tank systems existed in all ULBs.

An entry conference was held on March 23, 2018 with the Additional Chief Secretary (ACS), UDD to discuss the audit objectives, criteria, scope and methodology. The audit was conducted between March and July 2018. Audit findings were discussed in an exit conference with the Secretary, IPH on January 31, 2019. The replies and views of the authorities concerned have been incorporated at appropriate places in the report. The latest status in respect of audit findings was awaited as of September 2019.

Audit findings

The audit findings have been arranged in seven sections: planning and direction, financial management, execution of sewerage schemes, sewerage network connectivity, sewage treatment and disposal– sewage treatment plant, septic tank systems, and monitoring.

2.2.5 Planning and direction

2.2.5.1 Deficiencies in State-level and ULB-level planning

According to the CPHEEO Manual on Sewerage and Sewage Treatment (Engineering), planning for sewage management and sewerage schemes is required at the State, region and community levels. It was expected that the agencies involved in the State, *i.e.* UDD and IPH Department would have formulated a Strategy document and Action Plan outlining the vision and approach to be adopted with regard to sewage management along with identified strategies and action points. HPSPCB had directed (June 2015) the ULBs to submit an action plan for setting up of sewerage systems for collection, treatment and disposal of sewage. The following were observed:

⁵⁵ Expenditure incurred by divisions: ₹ 50.41 crore, ULBs: ₹ 4.56 crore, AMRUT: ₹ 17.95 crore and O&M: ₹ 35.45 crore.

⁵⁶ Chamba, Dharamshala, Hamirpur, Kullu, Mandi, Shimla, Sundarnagar and Una.

⁵⁷ Baijnath Paprola, Jawali, Nahan and Nerchowk.

⁵⁸ Chamba: 3, Dharamshala: 1, Hamirpur: 3, Kullu: 3, Mandi: 2, Paonta Sahib: 2, Shimla: 6, Solan: 1, Sundarnagar: 1 and Una: 2.

⁵⁹ Bilaspur (12), Chamba (1), Dharamshala (2), Mandi (13) and Una (1).

- (i) There was no macro-level plan or strategy document for establishment of sewerage systems in urban areas over a defined time-period. In the absence of macro-level planning, schemes were being sanctioned as and when ULBs would send requests for schemes. Schemes would be approved/ sanctioned by UDD based on availability of funds and prioritization policy⁶⁰.
- (ii) This practice of ad-hoc approval of schemes without any strategy or plan resulted in nine ULBs (including district headquarters⁶¹: Bilaspur and Nahan) not having any sewerage systems in the State.
- (iii) Even though some of the sewerage networks and STPs in test-checked ULBs had become overstressed, neither the ULBs nor the IPH divisions concerned had initiated timely action to increase the capacity of these networks/ STPs (paragraph 2.2.9.1). Further, STPs in the test-checked ULBs had non-functional components and design deficiencies (paragraphs 2.2.9.2 and 2.2.9.3) which resulted in poor quality of effluent being released into surface water bodies.
- (iv) There were long delays in completion of sanctioned schemes due to land disputes, most of which were due to lack of mechanism to secure encumbrance-free land before sanctioning of schemes or starting of works (paragraph 2.2.7).
- (v) The 16 test-checked ULBs and the respective IPH divisions had not prepared any plan for ensuring treatment and disposal of sewage through septic tanks as per norms: community-level septic tanks constructed by IPH divisions had design deficiencies and treatment of effluent and disposal of sludge had not been ensured as per norms (paragraph 2.2.10.1); ULBs were not exercising supervision over construction of domestic-level septic tanks and soak pits resulting in unscientific disposal of sludge (paragraph 2.2.10.2).

In the exit conference the Secretary, IPH accepted the facts.

Recommendation: *The State Government may ensure holistic planning through formulation of strategy for sewerage systems, initiate timely action for addressing sewerage network and STP capacity issues, devise mechanisms for securing encumbrance-free land before sanction/ execution of schemes, and ensure strict control over disposal of sludge from septic tank systems.*

2.2.6 Financial management

2.2.6.1 Inadequate funding

The activities relating to sewage management in urban areas were being financed through budgeted funds of UDD, grants received from Central Finance Commission (CFC) and Centrally Sponsored Schemes (JNNURM/ UIDSSMT⁶² and AMRUT⁶³).

⁶⁰ First priority to district headquarters, followed by pilgrim and tourist centres, followed by the remaining towns.

⁶¹ Population of Bilaspur: 13,654 (census 2011) and projected population: 64,176 (up to 2040). Population of Nahan: 28,899 (census 2011) and projected population: 58,000 (up to 2052).

⁶² Jawaharlal Nehru National Urban Renewal Mission, and Urban Infrastructure Development Scheme for Small and Medium Towns (a component of JNNURM).

⁶³ Atal Mission for Rejuvenation and Urban Transformation.

Details regarding funds received during 2013-18 in the State for sewage management are shown in the **Table-2.2.1** below:

Table-2.2.1: Details of funds received for sewage management in the State (2013-18)
(₹ in crore)

Year	State Budget	Finance Commission Grant ⁶⁴	Centrally Sponsored Schemes			Total funds ⁶⁵
			JNNURM/UIDSSMT	AMRUT	Smart City	
2013-14	23.00	4.41	22.37	0	0	49.78
2014-15	23.00	NA	0	0	0	23.00
2015-16	24.00	NA	0	24.30	0	48.30
2016-17	32.50	NA	12.84	24.02	0	69.36
2017-18	22.92	NA	0	54.84	3.51	81.27
Total	125.42	4.41	35.21	103.16	3.51	271.71

Source: Figures supplied by Director, UDD.

A total of ₹ 271.71 crore was approved for schemes relating to sewage management during 2013-18. In three out of 16 test-checked ULBs (Baddi, Chamba and Sundernagar) three sewerage schemes could not be completed/ delayed due to shortage of funds as discussed in paragraph 2.2.7.

In the exit conference the Secretary, IPH stated that funding was a major constraint in execution of sewerage schemes and efforts were being made to arrange funds from GoI. However, while funding was indeed a matter of concern, it was also seen that ULBs and IPH divisions were not able to utilise a large percentage of available funds (paragraphs 2.2.6.2 to 2.2.6.4).

2.2.6.2 Non-release/ delayed release of funds by ULBs

UDD was releasing funds to ULBs for capital works for further immediate release to IPH Department for execution.

During 2013-18, 16 test-checked ULBs received ₹ 62.89 crore (including opening balance of ₹ 1.21 crore as of April 2013) from UDD. However, only ₹ 12.49 crore (20 per cent) was released immediately, ₹ 26.83 crore (43 per cent) was released after a delay of three to 43 months, ₹ 4.56 crore (seven per cent) were utilised on sewage management related works by the ULBs themselves, and ₹ 19.01 crore (30 per cent) was still lying blocked with 13 ULBs⁶⁶ for a period ranging between two and 62 months as of March-May 2018.

Non-release and delayed release of funds by ULBs was one reason for lack of progress in scheme execution in Baddi and Chamba. In three ULBs (Baddi, Chamba and Sundernagar), the respective IPH divisions had to spend funds of ₹ 2.79 crore during 2015-18 from other heads of account in order to keep the work of these schemes progressing (paragraph 2.2.7).

In the exit conference the Secretary, IPH stated that UDD had been asked to route funds for capital works directly to IPH Department rather than through ULBs.

⁶⁴ The figures for 2013-14 reflect the amount received under 13th FC for sewage management. For the period 2014-18, funds were received under 14th FC in lump-sum for various activities including, *inter alia*, sewage management; hence, disaggregated figures for sewage management cannot be worked out.

⁶⁵ In addition to these funds, ₹ 47.45 crore were released by UDD to IPH Department for operation and maintenance.

⁶⁶ Baijnath Paprola, Bilaspur, Chamba, Dharamshala, Hamirpur, Jawali, Kullu, Mandi, Nerchowk, Paonta Sahib, Shimla, Solan and Sundernagar.

2.2.6.3 Non-utilisation of funds by divisions

In 11⁶⁷ out of 16 test-checked divisions, ₹ 30.23 crore (58 *per cent*) out of ₹ 52.55 crore received during 2013-18 had been lying unutilised for a period ranging between two and 62 months. In the exit conference the Secretary, IPH stated that matter would be examined.

2.2.6.4 Non-utilisation of funds received for sewage management component under Finance Commission grants

During 2013-18, the 16 test-checked ULBs received ₹ 82.99 crore under CFC grants which were to be spent on providing basic services including sewage management. However, except one⁶⁸ out of the 16 test-checked ULBs, the other 15 ULBs had not incurred any expenditure on sewage management from the funds received.

Non-utilisation of funds received under CFC grants on activities relating to sewage management resulted in deficiencies in collection and disposal of sewage, particularly in the case of domestic-level septic tank systems which was the exclusive responsibility of ULBs.

2.2.6.5 Violation of financial rules/ instructions**(i) Expenditure in excess of estimates**

As per PWD code, revised estimate must be submitted when the sanctioned estimate is likely to be exceeded by more than five *per cent*.

In four test-checked divisions⁶⁹, expenditure of ₹ 44.57 crore was incurred in excess of sanctioned estimates for four schemes but revised estimates of these works were not prepared as of January 2019. The excess expenditure was over 100 *per cent* in case of two schemes: Solan (467 *per cent*) and Sundernagar (167 *per cent*).

The Principal Secretary, IPH stated (March 2019) that expenditure had exceeded the estimated cost due to increase in cost of labour and material. No explanation for non-obtaining of revised estimates was furnished.

(ii) Unauthorised splitting of works

In three test-checked divisions (Dharamshala, Hamirpur and Sundernagar), the Executive Engineers (EEs) floated 170 smaller-value tenders for four works⁷⁰ (estimated cost: ₹ 3.65 crore) keeping estimated cost of these tenders within their power, in violation of the condition that the works should not be split without prior approval of competent authority. Thus, competitive prices could not be derived resulting in award of these components at a cost (₹ 4.55 crore) higher than the estimated cost by ₹ 0.90 crore.

The Principal Secretary, IPH stated (March 2019) that splitting was done for timely execution of the works. However, it was seen that all these works remained incomplete as of January 2019: only 37,113 rmt. (64 *per cent*) out of 57,940 rmt.

⁶⁷ Baggi, Bilaspur, Dharamshala, Hamirpur, Jawali, Kullu, Nahan, Palampur, Paonta Sahib, Shimla and Solan.

⁶⁸ Chamba which spent ₹ 0.16 crore (five *per cent*) of the funds received (₹ 3.37 crore).

⁶⁹ Chamba, Paonta Sahib, Solan, and Sundernagar.

⁷⁰ House to house connectivity under sewerage scheme to Dharamshala town, house to house connectivity in Zone-I and Zone-II & III under sewerage scheme to Hamirpur and house to house connectivity under sewerage scheme to Sundernagar.

sewer lines had been laid due to which only 5,934 (46 *per cent*) connections out of total 13,037 planned connections had been released.

2.2.6.6 Collection of user charges

Under section 5 of the Himachal Pradesh Water Supply Act, 1968, the State Government notified (June 2005) that user charges at the rate of 50 *per cent* of monthly water bill were recoverable from domestic and commercial consumers having sewerage connection. The audit observations in respect of the 11 test-checked ULBs⁷¹ having sewerage systems are as follows:

- In eight ULBs⁷², all households/ establishments using sewerage systems were not being charged for the services: households residing in multi-storied buildings had separate water connections but sewerage charges were being levied only on one or a few water connections registered for sewerage connection by the IPH divisions, instead of being levied on all the water connections in the buildings.
Audit conducted a joint physical inspection and survey (October 2018) of 211 households in these eight test-checked divisions and observed that out of the 484 water connections in these households sewerage charges had not been levied on 246 (51 per cent) water connections.
- In two ULBs (Bilaspur and Shimla), the actual amount of user charges collected and outstanding could not be ascertained as accounting was not transparent. MC Shimla was maintaining accounts of only the total user charges collected while no record of user charges recoverable and outstanding at the end of a particular financial year was maintained. In IPH division Bilaspur, sewerage charges were being credited into the water charges head and no separate accounting was being done for sewerage charges.
- In one ULB (Solan), user charges had not been levied since commissioning of the scheme (December 2009), thus depriving the ULB/ IPH division of an important source of revenue. The Executive Officer, MC Solan stated that user charges had not been levied in order to encourage people to connect to the sewerage system. However, records showed that only 415 connections (17 *per cent*) had been released against capacity of 2,500 connections and utilization of STP in Solan was only 17 *per cent*, indicating that the policy of not levying user charges had not served the stated purpose. Further, resolution on non-levying of user charges had not been passed by the House of MC Solan.

Thus, a significant source of revenue in the form of user charges was not being adequately tapped by the ULBs/ IPH divisions.

The Principal Secretary, IPH accepted the facts and stated (March 2019) that the matter was being reviewed and necessary action would be initiated as per rules.

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

⁷¹ This includes Bilaspur where an old community-level septic tank system existed for which user charges were being levied and collected by the IPH division, Bilaspur.

⁷² Chamba, Dharamshala, Hamirpur, Kullu, Mandi, Paonta Sahib, Sundernagar and Una.

Recommendation: The State Government may consider simplifying the fund release mechanism, ensuring timely release of funds to executing agencies, and devising a system to ensure that sewerage charges are levied and collected from every household/ establishment availing sewerage facilities.

Sewerage systems

This section deals with audit observations relating to execution of sewerage schemes, sewerage network utilization and connectivity, and functioning of STPs.

2.2.7 Execution of sewerage schemes

Sewerage schemes include: schemes for providing sewerage systems (laying of sewerage network and construction of STPs) in towns, schemes for providing sewerage systems in left-out areas of towns, rejuvenation schemes (replacement of worn-out sewer lines, connecting missing links, and augmentation of STP capacity), and schemes for household connectivity (laying of sewer lines up to six metres of houses). Schemes are proposed by ULBs and approved by UDD on the basis of detailed project reports (DPRs) prepared/ finalised by the IPH Department. Funds are released by UDD to ULBs for immediate onward release to IPH Department for execution of the schemes.

The detailed analysis (as of January 2019) of 25 sewerage schemes within the scope of the audit (*i.e.* period 2013-18 in the 16 test-checked ULBs) is shown in **Table-2.2.2** below:

Table-2.2.2: Details of sewerage schemes within the audit scope in 16 test-checked ULBs
(₹ in crore)

Sl. No.	ULB	Sanction date/ Completion period	Amount sanctioned/ released/ expenditure	Status of scheme	Major issues
Schemes for providing sewerage systems in towns					
1.	Bajnath			<i>Not started</i> – DPR for ₹ 58.48 crore prepared by IPH division in November 2016 but yet to be approved.	Non-approval of DPR even after 26 months from DPR preparation.
2.	Jawali			<i>Not started</i> – proposal sent in August 2017 but DPR not yet prepared.	Non-preparation of DPR even after 17 months from proposal.
3.	Nahan			<i>Not started</i> – proposal sent in 2007-08, in-principle approval of IPH Department for ₹ 100.22 crore in February 2018 but DPR yet to be approved.	Delay (10 years) in DPR preparation; non-approval of DPR even after 11 months from DPR preparation.
4.	Ner Chowk			<i>Not started</i> – proposal sent in November 2015 but DPR not yet prepared.	Non-preparation of DPR even after 38 months from proposal.
5.	Sundernagar	03/1992 5 years	5.67 / 15.15 / 15.15	<i>Completed</i> – May 2014 (delay of 205 months).	Land disputes in laying of sewerage network.
6.	Baddi	07/2014 2 years	33.34 / 20.58 / 20.33	<i>Incomplete</i> (running delay: 30 months) – laying of sewerage network completed (₹ 19.17 crore); work of STP not started.	Delay in signing of agreement with executing agency for STP work; lack of funds: short-release of State share, non-release of ULB share, non-release of balance GoI share due to non-completion within stipulated period.
7.	Bilaspur	02/2012 3 years	21.56 / 3.29 / 0.03	<i>Not started</i> (running delay: 48 months)	Delay ⁷³ (45 months) in preparation and approval of DPR; non-finalisation of site for STP even after 83 months due to identification of unsuitable land and delay in land transfer.

⁷³

An Environment Implementation Committee constituted by HPS PCB took serious note in respect of disposal of untreated effluent into Govind Sagar lake from old community based septic tank system and directed (May 2008) to propose a solution within one month.

8.	Paonta Sahib	10/1995, revised in 07/2009 Zone – III approved (12/2018) under NMCG ⁷⁴ 5 years (from 10/1995)	2.62, 11.43, & 11.57 / 20.76 / 15.03	Zone I: Completed – December 2010 Zone II: Completed – March 2016 Zone III: <i>Incomplete</i> – work of laying sewerage network in progress; work of STP not started (running delay: 220 months).	Zones I and II: Delay due to land disputes in laying sewerage network and obtaining clearances for road crossing. Zone III: Land dispute in laying sewerage network and STP; delay in release of funds by ULB to IPH Department; delay (43 months) in DPR preparation as per revised norms (June 2015).
9.	Solan	11/1995 4 years	4.55 / 33.71 / 25.82	<i>Incomplete</i> (running delay: 230 months)	Acquisition of excess land (46%) for STPs; land disputes at STP site and in laying of sewerage network; cost escalation due to Court order for enhancement of land compensation.
Schemes for providing sewerage systems in left-out areas of towns					
10.	Chamba	i) 07/2009 3 years	6.74 / 6.94 / 8.15	<i>Incomplete</i> (running delay: 78 months)	Delay in transfer of land (35 months); land disputes in laying of sewerage network.
11.		ii) ⁷⁵ <i>Not started</i> – DPR prepared in 2017 and approved in October 2018.			Lack of funds. Delay (18 months) in approval of DPR after preparation.
12.	Hamirpur	i) 06/2009 4 years	6.09 / 4.77 / 4.77	<i>Incomplete</i> (running delay: 67 months)	Land disputes in laying main sewer trunk line and sewerage network.
13.		ii) <i>Not started</i> – DPR prepared in 2016 but not yet approved.			Non-approval of DPR even after 25 months of preparation.
14.	Dharamshala	<i>Not started</i> – DPR prepared in 2016 but AA/ES awaited			Non-according of AA/ES even after 25 months of DPR approval.
15.	Shimla	10/2015 3 years	26.00 / 19.42 / 0.00	<i>Not started</i> (running delay: 3 months)	Delay (38 months) in award of work due to non-responsive bids.
Rejuvenation Schemes					
16.	Kullu	2016-18 (under AMRUT) 2019-20	17.86 / 4.00 / 0.40	<i>Incomplete</i>	Delay (20 months) in approving DPR of up-gradation of STPs; non-finalisation of tendering process for laying sewer lines (9 months); delay (9 months) in tendering for setting up of modern laboratories.
17.	Mandi	<i>Not started</i> – capacity of existing system crossed in 07/2009; process for DPR initiated in 03/2016 but DPR for ₹ 51.45 crore not yet approved.			Delay (80 months since crossing of capacity) in starting of DPR preparation by IPH Department; non-finalisation/ approval of DPR even after 33 months.
18.	Shimla	i) 02/2009 (under JNNURM) 3 years	54.74 / 12.33 / 0.00	<i>Not started</i> and subsequently closed.	Non-finalisation of tendering process due to non-responsive bids; non-release of balance GoI funds; non-remission of GoI funds (₹ 9.70 crore) in violation of instructions.
19.		ii) 2015-18 (under AMRUT) 2019-20	85.30 / 56.30 / 18.86	<i>Incomplete</i>	Work regarding up-gradation of STP was not started even after 10 months and other components were under progress.
Schemes for household connectivity					
20.	Dharamshala	07/2016 One year	9.97 / 12.33 / 9.12	<i>Incomplete</i> (running delay: 18 months)	Land disputes for laying sewer lines.
21.	Hamirpur	02/2010 One year	4.16 / 6.12 / 2.82	<i>Incomplete</i> (running delay: 95 months)	Land disputes for laying sewer lines.

⁷⁴ National Mission for Clean Ganga.

⁷⁵ Scheme for Obri, Mai-ka-Bag, and Sultan Mohalla.

22.	Kullu Zone-I,	12/2011	1.88	<i>Incomplete</i> (running delay: 73 months, 66 months, & 26 months respectively)	Land disputes for laying sewer lines in Zones I, Zone II and Zone III.
23.	Zone-II,	07/2012	3.05		
24.	Zone-III	11/2015	2.25 /		
	One year each	5.93 / 5.25			
25.	Sundernagar	07/2013 6 months	5.13 / 4.59 / 4.25	<i>Incomplete</i> (running delay: 60 months)	Land disputes for laying sewer lines; lack of funds.

From the above table, it can be seen that out of total 25 schemes, only one scheme (Sundernagar – Sl. No. 5) was completed (delay: 205 months) while 13 schemes⁷⁶ were incomplete (running delay: 18 to 230 months) and 11 schemes⁷⁷ had not been started. The major causes of delay/ non-start of schemes were as follows:

- ***Lack of planning for land acquisition/ transfer***

Land may be required to be acquired/ transferred for construction of STP, laying of main trunk line, etc. However, it was observed that the DPRs for the schemes did not specify any details about the total area and location of land to be acquired/ transferred. Only a lump-sum provision of fund requirement for land acquisition/ transfer was made, which in the absence of any detailed assessment/ survey, was unrealistic. As a result, there were cases of land dispute, unsuitable site selection, excess land acquisition and litigation which led to running delays in three schemes as detailed below:

- ***Bilaspur*** (Sl. No. 7) – Details of land identified for STP construction was not specified in the DPR; BBMB⁷⁸ land was identified subsequently and transferred but later found to be submerged during site inspection; another site was identified and case for transfer of land pending with BBMB; scheme had already delayed by 48 months but work had not been started; and untreated sewage continued to flow into the Govind Sagar Lake.
- ***Hamirpur*** (Sl. No. 12) – Provision of ₹ 60 lakh in DPR was made for land acquisition without assessment/ specifying details of land to be acquired; execution was started without land acquisition; land disputes arose during laying of main trunk line; acquisition process was started subsequently but scheme had already been delayed by 67 months.
- ***Solan*** (Sl. No. 9)– Unrealistic lump-sum provision of ₹ 10 lakh for acquisition of land for STP was made; land acquired for ₹ 82 lakh; excess acquisition of land (46 *per cent*); land disputes for enhanced compensation emerged during scheme execution; Court orders for enhanced compensation led to payment of ₹ 17.82 crore till date.

- ***Lack of planning for encumbrance-free access for laying of sewerage network***

Encumbrance-free access is required for laying of sewerage network as sewer lines are to be laid in densely-constructed areas involving private land. Although

⁷⁶ Sl. No. 6, 8, 9, 10, 12, 16, 19, 20, 21, 22, 23, 24, and 25.

⁷⁷ Sl. No. 1, 2, 3, 4, 7, 11, 13, 14, 15, 17, and 18.

⁷⁸ Bhakra Beas Management Board.

it is mandatory to leave setbacks⁷⁹ on land during building construction, non-compliance by house-owners without action by ULBs results in non-availability of space for services such as laying of sewer lines. However, these issues were not considered at the time of DPR preparation and the DPRs did not contain any details of survey/ feasibility study for identifying and addressing such bottlenecks. No mechanism such as obtaining NOC/ affidavits from land-owners⁸⁰ to ensure encumbrance-free access to private land for laying of sewer lines was envisaged. The above shortcomings resulted in a large number of land disputes resulting in delay of 11 schemes⁸¹.

• ***Delay in preparation and approval of DPRs***

On the proposals submitted by ULBs, IPH Department prepares and submits DPRs to the UDD for approval of new sewerage schemes. For rejuvenation schemes IPH Department itself initiates the projects and prepares DPRs for funding through UDD. It was observed that the process of preparation and approval of DPRs was taking an inordinately long time:

- For two schemes (Sl. No. 2 and 4), DPRs had not been prepared even after 17 and 38 months from the date of proposal.
- DPRs for three sewerage schemes (Sl. No. 7, 11 and 16) were approved 18 to 45 months after preparation.
- DPRs for four sewerage schemes (Sl. No. 1, 3, 13, and 14) prepared between November 2016 and February 2018 were pending for approval even after 11 to 25 months (as of January 2019).
- The process of preparation of DPR in case of Mandi (Sl. No. 17) was initiated by IPH Department after 80 months since crossing of the capacity of connections.

In this context, it was observed that the Department had not stipulated any time-frame for preparation/ approval of DPRs, thereby contributing to delays.

• ***Lack of funds***

Three schemes (Sl. No. 5, 6, and 10) sanctioned between March 1992 and July 2014 remained incomplete/ delayed due to lack of funds. In Baddi, the State Government and ULB had not released their share while GoI had not released balance funds due to non-completion of scheme within stipulated period. IPH division Nalagarh had to incur expenditure of ₹ 1.17 crore from other heads of account. In Chamba, the IPH division had incurred excess expenditure of ₹ 1.46 crore from other heads while ₹ 0.25 crore was lying unutilised with the ULB. In Sundernagar, the IPH division had incurred excess expenditure of ₹ 0.16 crore from other heads while ₹ 0.50 crore was lying unutilised with the ULB (paragraph 2.2.6.1).

⁷⁹ 'Setback' is the minimum space/ distance required to be maintained (as per Municipal Corporation By-laws) between a building and the boundary of the plot on which the building is being constructed in order to ensure easy access to the building.

⁸⁰ State Government was adopting this mechanism for road construction schemes such as PMGSY.

⁸¹ Sl. No. 5, 8, 9, 10, 12, 20, 21, 22, 23, 24, and 25.

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

Recommendation: *The State Government may ensure land acquisition/ transfer and availability of encumbrance-free land at the planning stage, stipulate a time-frame for preparation and approval of DPRs and provide adequate funding for schemes.*

2.2.8 Sewerage network connectivity

2.2.8.1 Low household connectivity with sewerage networks

Every household should connect to the sewerage network so that sewage is safely collected and treated and STP capacity does not remain underutilised. HP Municipal Act, 1994 provides that every household must take a sewerage connection, and the ULBs are empowered to deprive defaulting households of amenities such as water and electricity. This was reiterated⁸² by the Hon'ble High Court of Himachal Pradesh.

Scrutiny of records of the 10 test-checked ULBs having fully/ partially functional sewerage schemes showed that in five⁸³ ULBs the number of released connection ranged between 71 and 115 *per cent* (schemes completed between December 1997 and March 2009). However, in remaining five⁸⁴ ULBs the number of released connections ranged between only eight and 40 *per cent* even though these schemes had been completed between February 2009 and March 2016. The low percentage of released connections was attributable to the following:

- As per instructions issued (September 2000) by the State Government, sewer lines are to be laid up to six metres of each house. However, it was observed that sewer lines had not been laid up to six meters of houses in a large number of cases.

Audit conducted a survey (April-June 2018) of 596 households in the 10 ULBs, in which 183 households (31 per cent) reported that they were not connected to the sewerage network, of which 108 households⁸⁵ (59 per cent) reported the reason as distance of nearest sewer line being more (eight to 205 metres) than six metres from their houses.

This was a deficiency at the planning stage as the DPRs of these schemes did not contain any provision for laying sewer lines up to six metres of houses.

- In areas where sewerage systems did not exist, households would have already constructed domestic-level septic tank systems. Such households may not be

⁸² In the case of CWPIIL 28/2011 Abhishek Rai v/s State of HP and others (as circulated to all ULBs by the Director, UDD in November 2012). "In all Nagar Panchayats/ Municipal Councils/ Municipalities, each and every household must take sewerage connections, and if they do not take sewerage connections they shall be deprived of other amenities such as water and electricity facilities".

⁸³ Chamba: 99 *per cent*, Dharamshala: 86 *per cent*, Kullu: 71 *per cent*, Mandi: 115 *per cent* and Shimla: 92 *per cent*.

⁸⁴ Hamirpur: 40 *per cent*, Paonta Sahib: 37 *per cent*, Solan: 17 *per cent*, Sundarnagar: 38 *per cent* and Una: 8 *per cent*.

⁸⁵ Chamba: 23 out of 28; Dharamshala: 8 out of 20; Hamirpur: 16 out of 24; Kullu: 1 out of 4; Mandi: 17 out of 19; Paonta Sahib: 2 out of 29; Shimla: 3 out of 4; Solan: 2 out of 6; Sundarnagar: 16 out of 16 and Una: 20 out of 33 households not connected with sewerage network.

willing to bear the additional one-time cost and recurring cost/ user charges of connecting to sewerage networks. EEs of IPH divisions (Paonta Sahib and Una) stated that beneficiaries had their own septic tanks and were not ready to dismantle their finished floors or bear the additional cost.

- ULBs had not initiated action (such as imposing fines or depriving defaulting households of other amenities) to ensure that households would connect to the sewerage network. Notices had not been issued by any ULB/ division except MCs Kullu (1,980 notices) and Una (eight notices) and IPH divisions Paonta Sahib (574 notices) and Solan (238 notices). Even these ULBs/ divisions had not followed-up the notices with any subsequent action against defaulting households.

Thus, the low connectivity to sewerage networks was due to non-providing of sewer lines upto the required distance of six metres of houses, additional cost to households and non-initiation of penal action by the ULBs/ divisions concerned. The low percentage of released connections led to underutilisation of STP capacity, which in turn adversely impacted the effectiveness of sewage treatment (paragraph 2.2.9.1).

The Principal Secretary, IPH accepted the observations (March 2019) and stated that the stipulated condition of laying sewer lines upto six meters of houses was being followed for new projects. While the reply indicated that corrective action had been initiated by IPH Department, there was also a need to ensure action by ULBs against defaulting households.

2.2.8.2 Connecting of grey water pipes with sewerage network

As per the CPHEEO Manual, it is mandatory to connect grey water pipes with the sewerage network. DPRs of sewerage schemes provide for connecting of grey water pipes to the sewerage network.

In a survey conducted by Audit in 10 test-checked ULBs having sewerage systems, 227 (55 *per cent*) out of 413 households⁸⁶ reported that they had not connected grey water pipes with the sewerage network. This percentage was particularly high (over 80 *per cent*) in six ULBs⁸⁷. Except MCs Kullu (1,980 notices) and Shimla (11,403 notices), no other ULB had initiated any action against defaulting households.

Grey water pipes not connected with the sewerage network were flowing either into the storm-water drains or into the open. This also meant that the anticipated volume of sewage was not flowing into the sewerage network resulting in underutilisation of STPs, thereby adversely impacting the effectiveness of sewage treatment.

⁸⁶ Chamba: 21 out of 24; Dharamshala: 40 out of 45; Hamirpur: 13 out of 34; Kullu: 18 out of 50; Mandi: 24 out of 29; Paonta Sahib: 31 out of 33; Shimla: 29 out of 121; Solan: 7 out of 26; Sundernagar: 29 out of 36 and Una: 15 out of 15.

⁸⁷ Chamba: 88 *per cent*; Dharamshala: 89 *per cent*; Mandi: 83 *per cent*; Paonta Sahib: 94 *per cent*; Sundernagar: 81 *per cent* and Una: 100 *per cent*.



Grey water pipe being discharged from households into the storm water-drains in Sundernagar (14.05.2018)



Grey water pipe being discharged from a household into storm-water drains in Chamba (06.04.2018)

In the exit conference the Secretary, IPH directed the Department to improve connectivity of grey water pipes to sewerage network.

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

Recommendation: *The State Government may ensure laying of sewer lines up to the required distance from houses and initiate action against defaulting households not connecting to sewerage networks in order to improve sewerage connectivity.*

2.2.9 Sewage Treatment and Disposal: Sewage Treatment Plants

In sewerage systems, the sewage is treated in an STP. An STP includes primary treatment to remove solid material, secondary treatment to digest dissolved and suspended organic material, and tertiary treatment for advanced cleaning of wastewater (effluent) to remove nutrients and suspended solids. The process of sewage treatment and disposal in an STP is shown in **Appendix-2.2**. Raw sewage is screened to remove floating materials and grit (sand, ash, clinker, etc.). Flow equalisation tank regulates the flow into subsequent components/ units. In the primary sedimentation tank/ clarifier suspended solids, organic and residual inorganic solids, free oil, grease, other floating material and chemical flocs⁸⁸ are settled and removed. In the aeration tank, soluble and suspended organic matter is removed by aerobic bacteria, thereby reducing the level of BOD⁸⁹ and suspended solids. The secondary sedimentation tank/ clarifier settles bio-flocculated solids. The settled material from the primary and secondary clarifiers (sludge) is channelled into the sludge digestion tank where it is broken down by anaerobic bacteria. The solid/ semi-solid sludge is then routed to sludge disposal facility for dewatering and converting into dried sludge cakes to be re-used as manure, etc. The treated effluent, before being discharged into surface waters, should be sent for tertiary treatment and disinfection for removal of nutrients (phosphorus and nitrogen) and water-borne pathogens. The treated effluent can be re-used for various purposes such as agriculture, farm forestry, industrial cooling, etc.

⁸⁸ Floc is a small, loosely aggregated mass of flocculent material suspended in or precipitated from a liquid.

⁸⁹ Biochemical Oxygen Demand is the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in water at certain temperature over a specific time period.

The audit observations relating to the process of sewage treatment and disposal in STPs are discussed in the following paragraphs.

2.2.9.1 Capacity utilisation of STPs

According to an internal report of the Department⁹⁰, utilisation of STPs should be at least 80 *per cent* of the designed capacity and low percentage of sewage inflow may adversely affect design assumptions and render the treatment process inadequate.

Out of the 24 test-checked STPs in 10 ULBs, it was observed that 11 STPs in six ULBs were functioning at severely underutilised capacities (below 50 *per cent*), and three STPs in two ULBs were overstressed as detailed in the **Table-2.2.3** below:

Table-2.2.3: Details of 14 underutilised/ overstressed test-checked STPs
(in million litres per day or MLD)

ULB	STP	Installed capacity	Sewage received (per cent of capacity)
Underutilised STPs			
Dharamshala	Chellian	5.15	2.45 (48)
Hamirpur	Hathli	3.13	1.08 (35)
Mandi	Raghunath Ka Paddhar	3.83	1.05 (27)
	Khaliyar	0.47	0.09 (19)
Shimla	Lalpani	19.35	6.18 (32)
	Snowdown	1.35	0.30 (22)
	North Disposal	5.80	1.73 (30)
	Summer Hill	3.93	0.18 (05)
Solan	Shamti	2.90	0.50 (17)
Una	Chanderlok	0.65	0.03 (05)
	Rampur	2.53	0.17 (07)
Overstressed STPs			
Shimla	Dhalli	0.76	1.30 (171)
	Malyana	2.20	3.40 (155)
Hamirpur	Bajuri	0.68	1.02 (150)

Source: Departmental figures.

The capacity utilisation of STPs at Summer Hill (Shimla), Chanderlok and Rampur (Una) was less than 10 *per cent*. The primary reasons for the underutilised capacity of STPs included: large percentage of unreleased connections, non-connecting of grey water pipes to sewerage network, and slow progress to address issues of leakages within the sewerage network.

Excess sewage in the range of 50 to 71 *per cent* above installed capacity was being received in three STPs of two ULBs adversely impacting the treatment capability of these STPs. Samples of treated effluent collected by HPSPCB from these STPs during 2013-18 showed a high failure rate⁹¹. These STPs required immediate up-gradation which should have been planned well before the STPs reached full capacity. However, the DPR for upgrading the STP in Hamirpur had not been finalised by the IPH Department as of January 2019, while a scheme for upgrading the STPs in Shimla had been proposed and approved under AMRUT only in 2017-18 (tendering was under process as of January 2019).

⁹⁰ Report on design and process adequacy of STPs (IPH Department, December 2017).

⁹¹ Calculated as a percentage of the total number of failed samples (165) to the total number of samples lifted (299) by HPSPCB from these STPs during 2013-18 (53 *per cent* in Dhalli, 78 *per cent* in Malyana, and 31 *per cent* in Bajuri).

The divisions concerned had not demonstrated urgency to address the issue of underutilized and overstressed STPs which was adversely impacting the sewage treatment process resulting in the quality parameters of treated effluent being below prescribed standards.

In the exit conference the E-in-C, IPH accepted the facts and stated that lack of land availability was a constraint in upgradation of overstressed STPs.

2.2.9.2 Functioning of STP components

Joint physical inspection and scrutiny of records of 24 test-checked STPs revealed that various STP components were non-functional, as detailed in **Table-2.2.4** below:

Table-2.2.4: Details regarding non-functional STP components

Component	STP	Function	Audit finding
Up-flow Anaerobic Sludge Blanket (UASB) Reactor	Lalpani, Shimla	Sedimentation of flocculent/ granular sludge from incoming sewage, and anaerobic degradation of organic compounds to produce methane-rich biogas. Reduce BOD level in sewage by about 50-60 per cent in summer and about 10-20 per cent in winter.	Two USAB reactors (cost: ₹ 3.10 crore) were non-functional since February 2016 resulting in organic load being beyond design parameters by 20 to 50 per cent, and poor quality of effluent as evidenced by high (52 per cent) failure rate of effluent samples. E-in-C (IPH) accepted the facts and stated that reactors were filled with sludge due to low temperature. However, the Department should have adopted suitable technology for the same as also recommended (November 1998) by an expert (heating part of the feed by utilising gas generated in the UASB reactor to maintain temperature or possibility of a thicker wall to provide insulation).
Filter press	Seven STPs – Kullu (one) and Shimla (six)	Dewatering of sludge before disposal	Filter presses (cost: ₹ 59.26 lakh) were non-functional since installation. Sludge was not being dewatered adequately before disposal. Recommendation of expert for sludge drying beds or centrifuges was not adopted in the design. Subsequently, construction of sludge drying beds was started in September 2016 but not completed as of January 2019. In the exit conference E-in-C, IPH stated that provision for sludge drying beds was being made in schemes for upgradation of STPs.
Sludge drying beds	21 STPs in 10 ULBs ⁹² (uncovered), Chamba and Hamirpur (non-functional)	Dewatering of sludge so that sludge cakes can be used as manure	Sludge drying beds in 21 STPs were not covered; exposure to rain was hindering dewatering process and causing risk of airborne infection. Work of covering the beds had been started only in Kullu. Inadequately dried sludge cakes were being stacked in gunny bags/ open in STP premises without any mechanism for re-use. Sludge drying beds in two STPs in Chamba and Hamirpur were damaged and non-functional. Principal Secretary, IPH accepted the facts.

⁹² Chamba, Dharamshala, Hamirpur, Kullu, Mandi, Paonta Sahib, Shimla, Solan, Sundernagar, and Una.



Damaged / non-functional sludge drying beds at STP Bajuri, Hamirpur (8 June 2018)



Dried sludge stacked in premises of STP Devinagar, Paonta Sahib (21 May 2018)



Uncovered sludge drying beds inundated/ overflowing with water at STP, Shanti, Solan (05 June 2018)

STP components remaining non-functional meant that expenditure of about ₹ 3.69 crore was rendered unfruitful, sewage treatment process was adversely impacted leading to poor quality of treated effluent, and sludge was not being adequately dried rendering it unfit for re-use.

2.2.9.3 Deficiencies in STP design

Scrutiny of DPRs and joint physical inspection of 24 test-checked STPs revealed deficiencies in STP design as detailed in **Table-2.2.5** below:

Table-2.2.5: Details regarding deficiencies in STP design

Design component	Function	Audit finding
Flow equalisation tanks	When the peak flow of sewage exceeds the average flow by a wide margin, it is advisable to use flow equalisation tanks to equalise the sewage flow before feeding to other STP units (CPHEEO Manual). Flow equalisation tanks were also recommended (November 1998) by an expert appointed for reviewing DPRs of STPs in Shimla.	No provision of flow equalisation tanks in 21 ⁹³ out of 24 test-checked STPs. DPRs did not contain any analysis of variation between peak and average flow to assess whether flow equalisation tanks were required or not. Department itself had made assessment (November 2017) that flow equalisation tanks would have improved treatment efficiency. In the exit conference E-in-C, IPH stated that installation was not mandatory. However, the Department had not made any assessment to ascertain need for the same.
Primary clarifier	To separate suspended solids (SS) which can settle by gravity when the sewage is held in a tank, thus reducing the organic load on secondary treatment units. It is used to remove inorganic sand, grit (if any), organic and residual inorganic solids, free oil, grease and other floating material, and chemical flocs produced during chemical coagulation and flocculation.	No provision of primary clarifier in any of the 24 test-checked STPs. Departmental report made the assessment (November 2017) that absence of primary clarifier was resulting in flow of floating and settleable solids into the biological oxidation reactors, and consequently in higher organic loading of the biological oxidation processes leading to poor effluent quality. This indicated that non-provision of primary clarifiers had resulted in reduced efficiency of sewage treatment.

⁹³ Flow Equalisation Tanks had been provided only in the two STPs in Una (Chanderlok and Rampur) and one STP in Paonta Sahib (Devinagar).

Tertiary treatment/ effluent disinfection system	To control eutrophication ⁹⁴ in receiving waters and ensure water-borne pathogen removal. Disinfection of effluent is important as it may contain pathogenic organisms of faecal origin which can cause water-borne diseases. Tertiary treatment/ disinfection of effluent can be done through chemical precipitation (to remove phosphorous and control eutrophication in receiving waters) and chlorination.	No provision of tertiary treatment/ effluent disinfection in 22 ⁹⁵ out of 24 test-checked STPs. As these 22 STPs were discharging effluent into surface water bodies directly or indirectly, tertiary treatment/ effluent disinfection was strongly advisable. This was corroborated by an internal report (November 2017) of the Department which admitted that the lack of tertiary treatment was a major inadequacy and provision of the same was required to minimise risk in reuse of treated effluent.
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In the exit conference the E-in-C, IPH accepted the observations and stated that initiatives were being taken to improve efficiency of sewage treatment.

The above design deficiencies in STPs resulted in reduced efficiency of the sewage treatment process and pathogen-associated risk to lower riparian areas where the treated effluent was being discharged (paragraph 2.2.9.4).

2.2.9.4 Adherence to norms for treated effluent

The objective of sewage treatment is to reduce polluting substances to the standards laid down by the Ministry of Environment and Forests (MoEF), HPSPCB, and National River Conservation Directorate (NRCD). HPSPCB had prescribed standards for treated effluent/ sewage from STPs on biochemical oxygen demand, suspended solids, chemical oxygen demand, oil and grease, and pH. The CPHEEO Manual recommends that a minimum of 20 *per cent* of treated effluent shall be re-used for agriculture, farm forestry, industrial cooling, etc. In the above context, the following were observed:

- (i) The treated effluent was not being re-used in any of 24 test-checked STPs and was instead being discharged into surface water bodies.
- (ii) HPSPCB had not prescribed any standards for faecal coliforms, dissolved phosphorus and total nitrogen, which was recommended by the CPHEEO Manual in case of effluent being discharged into surface water bodies. Thus, neither the risk of pathogenic disease-causing organisms of faecal origin, nor the risk of eutrophication in receiving waters due to dissolved phosphorus and nitrogen, was being assessed.
- (iii) Records of HPSPCB showed that out of the 1,449 samples collected from the 24 test-checked STPs during 2013-18, 393 samples (27 *per cent*) from 20 STPs⁹⁶ did not meet the prescribed standards. The failure rate was over 50 *per cent* in the case of three STPs: Malyana (78 *per cent*); Dhalli (53 *per cent*), and Lalpani (52 *per cent*).

⁹⁴ Eutrophication is the process by which a body of water becomes enriched in dissolved nutrients that stimulate the growth of aquatic plant life usually resulting in depletion of dissolved oxygen.

⁹⁵ Tertiary treatment had been provided in one STP in Hamirpur (Bajuri), and one STP in Paonta Sahib (Devinagar).

⁹⁶ Sitla Bridge: 30 *per cent*; Bhagot: 10 *per cent*; Barga: 31 *per cent*; Hathli: 1 *per cent*; Kakru: 38 *per cent*; Bajuri: 31 *per cent*; Bhoot Nath: 13 *per cent*; Badah: 5 *per cent*; Lankabaker: 10 *per cent*; Khaliar: 18 *per cent*; Ragunath Ka Paddhar: 27 *per cent*; Devinagar: 3 *per cent*; Malyana: 78 *per cent*; Dhalli: 53 *per cent*; North Disposal: 28 *per cent*; Snowdown: 20 *per cent*; Lalpani: 52 *per cent*; Summer Hill: 8 *per cent*; Shamti: 23 *per cent* and Chandpur at Bharjwanoo: 14 *per cent*.

This was attributable to STPs being over-stressed (Dhalli and Malyana) and non-functional components adversely impacting the treatment process (Lalpani).

The non-adherence to discharge standards in 20 STPs meant that the treated effluent/ sewage from these STPs was not safe for the surface water bodies into which it was being directly or indirectly discharged. This would not only have an adverse impact on the ecosystem but also on the health of populations residing and using such water in lower riparian areas. Although HPSPCB had served notices during 2013-18 to the divisions to take remedial measures, action liable to be taken under the respective laws had not been initiated.

In the exit conference the Secretary, IPH stated that a system of weekly review of effluent parameters had been put in place and efforts were being made to monitor and improve the quality of effluent from the STPs. In this context, Audit observed that proposals had been moved and DPRs had been prepared to upgrade 29 out of the 41 STPs in the State.

2.2.9.5 Non-enforcement of contract provisions

The IPH Department had tendered works of laying sewerage networks and operating and maintaining STPs to contractors as per agreements containing provisions on performance guarantee, executing works as per stipulated schedule, providing designated staff for operation and maintenance, testing of effluent quality parameters in STPs, etc. The following cases of non-enforcement of contract/ agreement provisions were observed:

- **Performance Guarantee –**

Performance guarantee of ₹ 24.54 lakh was not obtained by four divisions⁹⁷ from contractors of five works. Thus, these divisions had not adequately safeguarded against the risk of non-adherence to contract provisions by the contractor. All five works stipulated to be completed within 12 to 24 months were incomplete as of January 2019.

The Principal Secretary, IPH stated (March 2019) that performance guarantee would be obtained from contractors in future.

- **Penalty for delay in execution of works –**

In 11 test-checked ULBs, 41 works awarded to 29 contractors by five IPH divisions⁹⁸ were delayed by the contractors. However, the IPH divisions concerned had neither issued any notices to the contractors to expedite execution nor levied compensation of ₹ 72.66 lakh.

The Principal Secretary, IPH stated (March 2019) that notices would be issued to the contractors.

- **Penalty on STP operators –**

- Penalty of ₹ 3.61 lakh recoverable from contractors operating 10 STPs in four divisions⁹⁹ for failure to meet the stipulated effluent quality parameters had not been imposed/ levied.

⁹⁷ Dharamshala: ₹ 5.30 lakh, Hamirpur: ₹ 14.83 lakh, Mandi: ₹ 2.35 lakh and Sundernagar: ₹ 2.06 lakh.

⁹⁸ Chamba: ₹ 29.18 lakh, Mandi: ₹ 2.07 lakh, Paonta Sahib: ₹ 7.80 lakh, Shimla: ₹ 30.07 lakh and Solan: ₹ 3.54 lakh.

⁹⁹ Hamirpur: ₹ 1.39 lakh, Kullu: ₹ 0.56 lakh, Shimla: ₹ 1.24 lakh and Sundernagar: ₹ 0.42 lakh.

- Penalty of ₹ 2.92 lakh recoverable from contractors operating six STPs/maintaining sewerage networks in three divisions¹⁰⁰ for failure to provide designated staff as stipulated in the contract had not been imposed/ levied. Important posts of Process Engineer and Pump Operator were vacant in these STPs which would have adversely impacted operations. Further, the penalty amount prescribed in the contract was very small and contractors would incur more expenditure on deployment of designated staff. Thus, revision of penalty amount prescribed in the contract may be considered.

The Principal Secretary, IPH stated (March 2019) that the matter would be looked into and recovery would be effected.

2.2.9.6 Infrastructure in STPs

The following shortcomings relating to infrastructure were noticed during joint physical inspection (March to June 2018) conducted by Audit in 24 test-checked STPs:

(i) CPHEEO Manual and directions of HPSPCB state that STPs should be equipped with generators. However, generators had not been installed in eight STPs¹⁰¹. Further, generators installed in five STPs¹⁰² were non-functional. Thus, there was no provision for maintaining uninterrupted power supply in these STPs.

(ii) Special Secretary, IPH directed (March 2016) that laboratories in STPs should be equipped with instruments to analyse parameters (BOD, COD, etc.) so that remedial measures such as re-circulation, more oxidation, etc. can be taken by STP operators.

Five¹⁰³ STPs had no laboratory for testing of samples. Further, in five¹⁰⁴ out of the remaining 19 STPs, laboratories were non-functional due to non-availability of required equipment. In Una, neither of the two STPs had functional laboratory and treated effluent was being discharged into surface water bodies without required tests, in contravention of Water (Prevention and Control of Pollution) Act, 1974.

The absence/ non-functioning of laboratories meant that STP operators did not have infrastructure to analyse effluent quality parameters and take remedial action.

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

Recommendation: *The State Government may ensure optimum utilisation of STP capacity by upgrading capacity of over-stressed STPs and improving sewerage connectivity in the case of underutilised STPs; and address the issues of design deficiencies and non-functional components in order to improve the efficiency of sewage treatment.*

¹⁰⁰ Hamirpur: ₹ 0.79 lakh, Mandi: ₹ 0.22 lakh and Sundernagar: ₹ 1.91 lakh.

¹⁰¹ Chamba: Barga, Sitla Bridge and Bhagot; Dharamshala: Chellian; Hamirpur: Hathli, Kakru and Bajuri; and Una: Chanderlok.

¹⁰² Kullu: Badah; Paonta Sahib: Devinagar and Main Bazar; Solan: Shamti; and Una: Rampur.

¹⁰³ Shitla Bridge (Chamba), Kakru and Bajuri (Hamirpur), Lankabaker (Kullu) and Chanderlok (Una).

¹⁰⁴ Bhagote (Chamba), Badah (Kullu), Khaliar (Mandi), Main Bazaar (Paonta Sahib) and Rampur (Una).

2.2.10 Septic tank systems

This section deals with audit observations relating to community-level and domestic-level septic tank systems.

The responsibility of planning, constructing and maintaining community-level septic tank systems rests with IPH Department. The responsibility of constructing domestic-level septic tank systems rests with individual establishments and ULBs are responsible for exercising supervision in respect of their construction and cleaning.

2.2.10.1 Community-level septic tank systems

In community-level septic tank systems serving large communities, the effluent, although clarified to a large extent, still contains dissolved and suspended organic solids and pathogens requiring additional treatment. The accumulating sludge at the bottom of the tank should be de-sludged and treated at least once in two to three years as per CPHEEO Manual, 2012. The sludge has to undergo further treatment in an STP or a special sludge treatment facility before being suitable for application on land or disposal.

There were 29 community-level septic tank systems (March 2018) serving populations ranging between 300 and 2,000 in five out of 16 test-checked ULBs. The observations in respect of these 29 systems, after joint physical inspections and scrutiny of records, are discussed in **Table-2.2.6** below:

Table-2.2.6: Details regarding physically inspected 29 community-level septic tanks

ULB	No. of septic tanks	Construction	No. of users	Soak pits or effluent treatment system	Sludge treatment and disposal facilities
Bilaspur	12	Around 1960 and 1996	907 – 1,637	No soak pits or effluent treatment system available. Effluent discharged directly/indirectly into Govind Sagar lake.	None. Sludge disposed of in the open without treatment.
Chamba	1	1998	1,050	Septic tank unfenced and manhole covers missing. Soak pit system available. No additional effluent treatment facility available. Effluent being discharged into stream without additional treatment.	None. Septic tank de-sludged four times but no record of disposal made available. Sludge disposed of in the open without treatment despite having STP.
Dharam shala	2	2007-08	3,500 (1,500 and 2,000)	Soak pits available in both. No additional effluent treatment system available.	None. Septic tanks not de-sludged even once despite having STP.
Mandi	13	1997 - 2010	3,900 (300 each)	No soak pits in nine septic tanks. No effluent treatment system available in any septic tank. Effluent from seven septic tanks directly discharged into Suketi Khad.	None. One septic tank de-sludged. Sludge disposed of in the open without treatment despite having STP. Remaining 12 septic tanks not de-sludged even once.
Una	1	1999	1,140	No soak pits or effluent treatment system available. Septic tank unfenced, overflowing, and in disrepair.	None. Septic tank not de-sludged even once despite having STP.

Thus, in most cases the effluent was being discharged into water bodies without any treatment despite having STPs in four out of five ULBs (Ref. Table above). Fifteen out of 29 septic tanks had not been de-sludged since their commissioning (period ranging from eight to 22 years), adversely impacting the effectiveness of the treatment process, thereby causing greater pollution to water bodies. Where tanks were being de-sludged, the disposal of sludge in the open without any treatment would be polluting the soil/ land.



Overflowing septic tank at Una (Zone-C) (29.03.2018)



Leakage from Dholra Septic Tank, Bilaspur flowing into Govind Sagar (26.04.2018)



Sewage from septic tank at Suketi Khad flowing into river Beas (03.05.2018)

The Principal Secretary, IPH stated (March 2019) that efforts were being made to lift effluent to nearby STPs.

2.2.10.2 Domestic-level septic tank systems

ULBs are responsible for approving house maps and issuing completion certificates of every new construction within their jurisdiction. As per directions of HPSPCB, ULBs should ensure that every household/ waste generator should be connected with septic tank (of proper design and having adequate capacity) and soak pit.

Audit conducted (April-June 2018) joint physical inspection and survey in 16 test-checked ULBs of 557 households which were not connected with any sewerage systems and hence, should have had a domestic-level septic tank and soak pit system along with de-sludging/ cleaning of the septic tank once every one/ two years. The following were observed:

- 97 households (17 per cent) had not constructed any septic tank and were releasing sewage directly into drains/ nallahs.
- Of the 460 households that had constructed septic tanks, 351 households (76 per cent) had not constructed separate soak pits, thereby adversely impacting the effectiveness of effluent treatment.

It was observed that with the exception of three ULBs (Hamirpur, Mandi and Una), the remaining 13 ULBs were issuing certificates to households without certifying that the household site had been visited and that construction of septic tank was as per design, indicating that no such verification was being conducted.

- Of the 460 households with septic tanks, 259 households (56 per cent) reported that they had not cleaned their tanks. Of the other 201 households, 191 households (95 per cent) reported that they were disposing of sludge in the open/ nallahs/ fields, etc.

It was observed that with the exception of one ULB (Shimla), the remaining 15 ULBs were not providing any services for de-sludging/ cleaning of

domestic-level septic tanks. None of the 16 test-checked ULBs had devised any mechanism for treatment and disposal of the sludge collected from these tanks.

The Additional Director, UDD accepted the audit observation. The Principal Secretary, IPH confirmed (March 2019) the facts.

Non-construction of septic tanks and soak pits and disposal of sludge in the open by households was indicative of poor supervision of domestic-level septic tank systems by ULBs. Disposal of effluent and sludge without treatment was certain to affect the quality of ground water/ surface water/ land and posed the risk of contamination. This was also admitted in an internal report of the IPH Department, which, in the context of outbreaks of jaundice in Shimla during 2007-13, had reported that “There exist no scientific arrangements for disposal of sewage in domestic-level septic tanks constructed by house owners. Resultantly untreated sullage enters into watershed area of the source, and contaminates the water drawn from that source especially during heavy rains when people tend to clean their septic tanks”.



Sewage pipes being discharged into the open by households in Chamba (06 April 2018)



Sewage pipes being discharged into the open by households in Dharamsala (24 May 2018)

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

Recommendation: The State Government may ensure construction of septic tank systems as per norms. Further, ULBs should exercise supervision and control over domestic-level septic tank systems and provide services for treatment of effluent and sludge before discharge/ disposal either themselves or through outsourcing.

2.2.11 Monitoring

Monitoring of sewage management activities was to be done by ULBs, IPH Department and UDD. Audit observed deficiencies in monitoring as detailed below.

2.2.11.1 Monitoring mechanism

(i) A district-level monitoring committee under the chairmanship of Deputy Commissioner had been constituted (October 2015) by the State Government to monitor issues relating to sewage management. The committee was to meet once every quarter and send a report containing action(s) taken and actionable decision(s) to UDD. However, only four¹⁰⁵ out of 16 test-checked ULBs were able to provide

¹⁰⁵ Hamirpur, Kullu, Paonta Sahib and Una.

information on the functioning of such committees, and only seven out of the total 40 required meetings were held in these four ULBs between October 2015 and March 2018. Thus, the monitoring committee which would have addressed local issues such as land disputes, clearances from local authorities, etc., was not functioning as envisaged.

(ii) IPH Department was preparing quarterly progress reports for ongoing schemes, which were also being submitted to UDD for reviewing progress. However, except for two meetings¹⁰⁶, there was no record of any review or action on progress of schemes during 2013-18. There was also no record of any direction issued or action for resolving issues such as land disputes, etc. which were holding-up works. Thus, the mechanism of quarterly reports was not serving the intended purpose of providing direction from the senior management for corrective action.

2.2.11.2 Inspection of works

In order to ensure quality of works and their timely completion, the E-in-C, IPH had issued instructions in April 2000 stipulating inspection of major schemes by officials of the Department (EE, SE and CE). The Special Secretary, IPH issued a Standard Operating Procedure (SOP) in January 2016 for inspection of STPs by officials of the Department (AE, EE, SE, CE and E-in-C). The officials were required to submit inspection notes on each inspection. Scrutiny of records revealed the following:

(i) In 10 out of 12 test-checked divisions where works of sewerage schemes were in progress/ completed (two divisions: Bilaspur and Shimla had not maintained record of inspections conducted), shortfall in inspection of works during 2013-18 was 66, 62 and 36 *per cent* at the level of CEs, SEs and EEs respectively. No record of inspection notes on the works inspected by officers during the above period was found in any of these 10 test-checked divisions. The shortfall in inspections was indicative of inadequate monitoring, which would have contributed to the long delays in execution of works and lack of timely action.

(ii) In four out of 10 test-checked divisions where STPs existed (six¹⁰⁷ divisions had not maintained record of inspections conducted), shortfall in inspection of STPs during 2016-18 was 100, 56, 76, 34 and 25 *per cent* at the level of E-in-C, CEs, SEs, EEs, and AEs respectively. Further, only nine inspection notes had been submitted against a total of 475 inspections conducted. The shortfall in inspections was indicative of inadequate monitoring of STPs, thereby contributing to non-identification of problems in functioning of the STPs and lack of remedial action.

Thus the monitoring, reporting and inspection mechanisms for facilitating removal of bottlenecks at planning stage, timely completion of schemes, and exercising control over functioning of STPs were not functioning as envisaged, thereby contributing to the deficiencies highlighted in preceding paragraphs.

In the exit conference the E-in-C, IPH stated that Standard Operating Procedures for monitoring were not being fully followed but efforts would be made in this regard.

¹⁰⁶ February 2017 and August 2017.

¹⁰⁷ Hamirpur, Kullu, Paonta Sahib, Shimla, Solan, and Una.

The cases pointed out are based on the test check conducted by Audit. The Department may initiate action to examine similar cases and take necessary corrective action.

Recommendation: The State Government may take steps to strengthen the monitoring mechanism and ensure corrective action where required.

Conclusion

Sewage management in urban areas of the State was marked by absence of any macro-level strategy; inadequate funding, non-release and non-utilisation of available funds; long delays in execution of sewerage schemes due to non-ensuring of encumbrance-free land, land disputes, delay in preparation of DPRs, slow pace of scheme execution; lack of supervision and control over septic tank systems of sewage management; and inadequate monitoring.

A large proportion of urban areas had not been covered by sewerage systems. In areas covered by sewerage schemes, the efficiency of the sewage treatment process was not up to the required standard resulting in poor quality of effluent being released into surface water bodies. In the case of septic tank systems, the lack of supervision/ control meant that waste water was either being discharged into storm water drains/ open or not being adequately treated before seeping into the ground, while sludge was being disposed of in the open/ nallahs/ fields, etc., without treatment.

The discharge of untreated or poorly treated effluent into surface water bodies or land and the disposal of untreated sludge in the open would have adverse impacts on the environment and human health.