Evaluation of the Quality of Civic Amenities at Rehabilitation Sites of the Sardar Sarovar Project

A

REPORT

Submitted to

Sardar Sarovar Project - Fake Sale Deeds and Rehabilitation Sites Irregularities Inquiry Commission

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CERTIFICATE

The Report "Evaluation of the Quality of Civic Amenities at Rehabilitation Sites of the Sardar Sarovar Project" is herewith being submitted to The Fake Sale Deed and Rehabilitation Sites Irregularities Enquiry Commission, dated 10th April, 2014.

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Sardar Sarovar Project-Fake Sale Deeds and Rehabilitation Sites Irregularities Inquiry Commission

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Sri Mohan Bhai Patidar

.....and many more.....including the student groups/volunteers from various Institutes.

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Sri Prashant Bhatnagar: Office Assistance

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List of Abbreviations

BIS	Bureau of Indian Standards
CPHEEO	Central Public Health and Environmental Engineering Organisation
GoI	Government of India
HP	Handpump
Lpcd	litres per capita per day
MBs	Measurement Books
MLD	Million Litres per Day
MPWD Manual	Madhya Pradesh Works Department Manual
NBA	Narmada Bachao Andolan
NVDA	Narmada Valley Development Authority
NWDT	Narmada Water Dispute Tribunal
OHT	Overhead tank
PAFs	Project Affected Families
PHED	Public Health Engineering
PWD	Public Works Department
R&R	Resettlement & Rehabilitation
SoR	Schedule of Rates
SSP	Sardar Sarovar Project
TS	Technical Sanction
TW	Tubewell
WTP	Water Treatment Plant

Table of Contents

CHAPTER 1

Chapter 1. Background of Inquiry & Compliance with NWDT Award

Table of Contents

Chapter 1. Background of Inquiry & Compliance with NWDT Award

1.1 Background

1. The Sardar Sarovar Project (SSP) located on the River Narmada in the State of Gujarat, ranks amongst the largest multi-purpose Water Resources Projects with noteworthy scale of human rehabilitation and resettlement. Due to its size and location, the impacts of the Sardar Sarovar Project are essentially inter-State.

2. For this reason, the Narmada Water Disputes Tribunal (NWDT) was set up in 1969 to adjudicate upon the sharing of the Narmada waters and resolve the interstate disputes amongst the States of Madhya Pradesh, Maharashtra, Gujarat and Rajasthan.

3. In its final Order and decision gazetted on December 12, 1979, the Tribunal came up with sixteen clauses, with Clause XI specifically detailing the directions regarding Submergence, Land Acquisition and Rehabilitation of displaced persons. This was the *de facto* recognition that resettlement and rehabilitation (R&R) of a large number of families would occur, necessitating clear provisioning for those affected.

4. Under sub-clause III of Clause XI, the liability of Gujarat to pay Compensation for Land Acquisition and Rehabilitation was fixed up. This liability, besides other things, included charges and expenses required to be incurred for rehabilitation of oustees, and oustee families in their respective territories in accordance with the specified directions, as well as provisioning for costs on account of establishment charges for land acquisition, rehabilitation, and other departmental staff which Madhya Pradesh (and also Maharashtra) may have considered necessary for the purpose of such acquisition and rehabilitation.

5. This financial mechanism thus allowed the State of Madhya Pradesh to make quality provisioning for the oustees not willing to migrate to Gujarat with specific provisions for Rehabilitation defined in Sub-Clause IV of Clause XI of the NWDT Award.

6. With assured financial mechanism in place, and with virtually non-existent financial constraints which are often amongst the greatest of hurdles in ensuring quality rehabilitation, it was incumbent upon the State of Madhya Pradesh to ensure sound implementation of various provisions and ensure quality of the civic amenities for the benefit of the oustees.

7. However, as has been experience world-over on various large development projects, rehabilitation and resettlement is always a painful process for those who get impacted.

8. The Honourable Supreme Court of India, in its judgement dated 18.10.2000 in the case reported in 2000(10) SCC 664 and subsequently in its judgement dated 15.03.2006 in the case reported in 2005 (4) SCC 32, had affirmed that resettlement and rehabilitation of the Project affected Persons /Families (PAPs/PAFs) is part of their fundamental Right to Life guaranteed under Article 21 of the Indian Constitution, and through the R&R measures the PAPs/PAFs must be better off after their displacement.

9. In the present project, the resettlement and rehabilitation provisioning and efforts notwithstanding, the process got entangled in legal disputes. A writ petition (WP No. 14765 of 2007 Narmada Bachao Andolan vs State of Madhya Pradesh and others), was filed as a PIL alleged various irregularities and corruption in implementation of measures for resettlement and rehabilitation (R&R) of the project affected persons of the Sardar Sarovar Project in the State of Madhya Pradesh. The petitioner alleged that despite spending Crores of Rupees, the benefits of R&R stipulations envisaged in the NWDT Award have not been actually received by the PAPs/PAFs on account of irregularities and corruption categorised in a number of heads, one of which was Corruption at R&R sites wherein the "quality of construction of the amenities has been very poor".

10. In response, the Honourable High Court of Madhya Pradesh, Jabalpur, in its Order dated 21.08.2008, appointed an Inquiry Commission headed by Honourable Justice S S Jha, Retd. Judge of the High Court of M.P., with one of the matters to be investigated being the probe for ascertaining if the provided amenities at the R&R sites were of standard quality.

11. To assess and inquire into quality of infrastructure and amenities, the Honourable Justice S S Jha Commission, also called the Fake Sale Deed and Rehabilitation Sites Irregularities Enquiry Commission, vide the Work Order 40/RR Sites/2011-12 dated 01.12.2011 of the then Secretary Sri D S Solanki of the Higher Judicial Services, subsequently appointed MANIT-Bhopal and IIT-Bombay, Mumbai. Dr. Mukul Kulshrestha and Dr. R S Jangid, Professors in the Civil Engineering Departments of the two Institutes respectively, were to lead a team of specialists, into each of the R&R sites to evaluate civic amenities provided to oustees.

12. While Professor (Dr.) Mukul Kulshrestha from MANIT-Bhopal led the team of specialists, whose names are listed in the Acknowledgement section of this Report, for investigations at the R&R sites and also into an assessment of relevant Records made available, as well as into documentation of this Inquiry Report, Professor (Dr.) RS Jangid representing IIT-Bombay was into the advisory role overlooking various aspects of the inquiry. Together the team had the responsibility of

investigating infrastructure at 88 R&R sites for amenities related to civil construction, water-supply & sanitation, and electrical services.

13. The sites visits were undertaken during the period December 2011 to January 2013, and each of the 88 R&R sites spread over various Districts such as Barwani, Khargone, Dhar, Alirajpur, Jhabua etc. were visited by a team of experts comprising specialists in various areas, who recorded their observations on the infrastructure found at R&R Sites, and collected photographic evidence as well.

14. During the entire process of Site visits, the Honourable Commission remained well-informed and key representatives from the Commission including Honourable Justice Sri S S Jha himself in the initial stages, followed by present and former Honourable Secretaries to the Commission, Sri B P Sharma from Higher Judicial Services and Sri D S Solanki also from Higher Judicial Services respectively, as well as Sri R S Verma, Administrative Officer to the Commission and Joint Collector, Administrative Services, MP State, remained present during all the inspections at the R&R sites.

15. The Site Visits were facilitated by the NVDA Officials, coordinated by Sri S K Dhim, SE (PWD) NVDA- SSP Circle, Barwani and the respective Executive Engineers, Assistant and Sub-Engineers for the R&R sites being visited. The names of these officers are listed separately in the Acknowledgement section.

16. The Narmada Bachao Aandolan (NBA) was invariably represented by a group of large number of activists and volunteers, and at times, led by the social activist Ms Medha Patkar. Some of their representatives accompanying the MANIT-team members during the field visits are listed in the Acknowledgement Section.

17. Representatives of the Media, Journalists, and some of the inhabitants of various R&R sites also often accompanied the proceedings, which were transparent and into public domain.

18. Subsequently, the Technical review of the Measurement Books (MBs), selected Contracts, Designs, Estimates, Test certificates etc. was undertaken at MANIT, Bhopal. These records and the quality of Infrastructure were analysed in the light of various Government Manuals, Orders and Circulars such as: M.P. Works Departmental Manual 1983; Manuals of Central Public Health & Environmental Engineering Organisation, Govt. of India; Various Schedule of Rates (SORs), E-in-C, MP PHED's Circulars and Orders from time to time; REC Specifications and Construction Standards; The Indian Electricity Rules,1956; and various IS Codes applicable to Civil, PHE, & Electrical works etc..

19. This Joint Inquiry Report from MANIT-Bhopal and IIT-Bombay in its succeeding Chapters and Sections presents the findings of the probe in the context of NWDT Award, which forms the basis of provisioning of various amenities at R&R sites.

1.2 Inconsistencies in Provisioning of Amenities in the Infrastructure provided at various R&R Sites.

20. During Site Inspections, as well as during the checking of necessary Records, typically the following facts came to the notice of this Inspection team:

- At Jalkheda, there are no Civic buildings such as Primary Schools, Community-Hall-cum-Panchayat Bhawans, Primary Health Centre and Seed Godowns, No Tree Platforms, and no Halaos exist at this site.
- At Khajuri, there were again no civic buildings like Primary Schools, Community Hall-cum-Panchayat Bhawans, Primary Health Centre or Seed Godowns. There existed only one Tree Platforms Chabutra, while there were no Halaos at the site.
- At Jalkoti there exists only a Primary School, but there are no Community Hall-cum-Panchayat Bhawans, Primary Health Centre or Seed Godowns. Neither were there any Tree platforms or Halaos at the site.
- At Umda there was a Panachayat Bhawan, but there were no Primary Schools, Primary Health Centres or Seed Godowns. However, there existed 2 Tree Platforms and Halaos each at the site.
- At Saita, there is only a Seed Godown, but no Primary Schools, Community Hall-cum-Panchayat Bhawans, and Primary Health Centre. There did exist 2 Tree Platforms and Halaos each at this site.
- At Chenpura there is one Primary School and a Tree Platform and Halao each, but no Community Hall-cum-Panchayat Bhawan, Seed Godown or Primary Health Centre exist at the site.

21. Thus, amenities seem to have been provided at random, varying from site to site. Such inequities in provisioning of infrastructure were apparently against the spirit of providing uniform access to amenities to oustees, as envisaged in the NWDT Award.

22. To assess the quantum of inequities across the R&R sites, efforts were made to identify the instances of non-existence of various amenities at R&R sites.

23. Table 1.1 details the typical instances of non-existence of these amenities at various R&R sites. Strangely, a number of these amenities seemed not present at large numbers of Sites.

24. It is evident from Table 1.1 that Primary Schools have not been built at 6 R&R sites overlooking the necessity to provide primary education. Community Hall-cum-Panchayat Bhawans have not been constructed at 20 Sites indicating a lack of concern to the social well-being of rehabilitated families. Something as important

as the Primary Health Centre was not constructed across 27 R&R Sites, whereas Seed Stores/Godowns were missing at 26 R&R sites, notwithstanding the rural context of the R&R sites. 10 of the R&R sites did not have any Tree Platforms, once again indicating a lack of concern to the social well-being of the people in the rural context. Inexplicably, even the Halaos (Cattle Troughs) were not constructed across as many as 28 of the 88 R&R sites ie, nearly a third of the sites, completely overlooking the fact that water is as essential to cattle as to humans and that livestock constitutes an integral part of the lives of people in the rural context.

25. Besides, there were other missing amenities which are not listed in the Table 1.1. These comprise typically the drainage systems which have not been constructed across more than 50 R&R sites putting the rehabilitated families to extreme inconvenience during monsoons at several sites.

26. There may exist exceptional set of reasons for omission of necessary infrastructure in a rare case or two. However, there can be little justification in non-provisioning of important amenities at large numbers of various R&R sites.

27. No R&R site should generally lack the basic infrastructure (unless it is for a very justified and reasonable purpose), in line with the ruling guideline of Honourable Supreme Court that through the R&R measures the PAPs/PAFs must be better off after their displacement.

28. Such observations therefore prompted this Inspection Team to further investigate if the provided amenities fulfil the obligation and commitment to oustees as envisaged in the NWDT Award.

Table 1.1. Typical Absence of Necessary Infrastructure at R&R sites.

Amenity	Numbers of R&R Sites at which the Amenity has not been provided	Name of the R&R sites without the Amenity
Primary Schools	06	Jalkheda, Khajuri, Umda, Nisarpur II,III,Bhamta Jangarwa, Saita
Community Hall-cum-Panchayat Bhawans*	20	Raswa Deb, Chenpura, Gawla II,Jalanpur Dhalkheda, Saita, Semalda, Perkhad, Balwara, Shakirpura, Mirzapur, Jalkheda, Malangaon, Ratwa, Tawlai Khurd, Khalkhurd (Dharampuri), Dharampuri, Khajuri, Jalkoti, Morekatta, Bhawati II
Primary Health Centres (including Ayurveda Dispensaries and Hospitals)	27	Kasrawad, Borlai III, Lohara, Raswa Deb, Chenpura, Gawla II, Balkhad, Gawla I, Jalanpur Dhalkheda, Saita, Kathora, Perkhad, Balwara, Shakirpura, Mirzapur, Jalkheda, Barda Manavar, Tawlai Khurd, Khajuri, Umda, Khalkhurd(Dharampuri), Nisarpur II, III, Jalkoti, Kaisur, Bhawati II,Bhamta Jangarwa, Awalda
Seed Stores/Godowns*	26	Kasrawad, Borlai III, Chakeri, Raswa Deb, Chenpura, Gawla II, Chichli, Gawla I, Jalanpur Dhalkheda, Kathora, Perkhad, Balwara, Shakirpura, Jalkheda, Malangaon, Ratwa, Barda Manavar, Tawlai Khurd, Khalkhurd (Dharampuri), Dharampuri, Khajuri, Umda, Jalkoti, Kaisur, Bhawati II, Awalda
Tree Platforms	10	Bhavariya, Bhilsur, Chikalda,Perkhad, Shakirpura, Jalkheda, Tawlai Khurd, Khalkhurd (Dharampuri), Dharampuri, Jalkoti
Catttle Troughs (Halaos)	28	Borlai II, Khalkhurd, Nimbola, Khujawan, Brahmangaon, Khalbujurg, Bhawariya, Bhilsur, Gehalgaon, Chikalda, Gangli, Perkhad, Moreghadi, Balwara, Shakirpura, Mirzapur, Jalkheda, Ratwa, Tawlai Khurd, Khalkhurd (Dharampuri), Dharampuri, Khajuri, Nisarpur II, III,Nisarpur I, Jalkoti, Musapua, Kaisur, Amalali

*Additionally Nisarpur II/III has incomplete Panchayat Bhawan and Seed Godown works.

1.3 Compliance with NWDT Award

29. Any Technical evaluation would be incomplete if the compliance with the provisions of the NWDT Award were not reviewed. The NWDT Award had explicitly provided for certain specific amenities to be made available to the oustees. In this context, Table 1.2 sums up the comparison of various Amenities existing at individual R&R sites versus the Amenities required as per the NWDT Award, and the corresponding shortfall, if any, at each of the R&R sites.

30. It may be noted that the NWDT Award had provided for amenities provisioning for the oustees on the basis of number of families. Thus at each site, for instance, Primary Schools (3 room set) were to be provided @1 per 100 families, while Seed Stores were to be provided @1 per 500 families etc. In this manner, at each site with given numbers of plots meant to accommodate a family each, the numbers of amenities required to fulfil NWDT obligation can be calculated, and the fraction rounded off to the next higher whole number as amenities numbers cannot be fractional.

31. Thus, an R&R site with 140 Plots @ 1 Primary School per 100 families ought to have 2 Primary Schools (1.4 rounded off to next higher whole number). Similarly, for instance, a well (Handpump/tubewell) to be provided as a drinking water source @ one for every 50 families, and for a site that may have less than 50 plots (such as Ratwa, Bhawati II, Gulata, Musapura, Amlali, Malangaon etc.), 1 well would still have to be provided even if there are say, only 10 plots at the site, while a site with 60 plots would actually require 2 wells (Handpump/tubewell) as the amenity cannot be provided in fractions.

32. To be more than fair to the implementing agency (NVDA), a buffer of upto 5% is provided for marginal cases in calculating the amenities numbers. Thus, for instance, it is assumed conservatively that an R&R site with 104 families may still do with 1 Primary School only and this school would additionally accommodate another 8-12 children from 4 extra families (@2-3 children per family), rather than make investments for another Primary School for children of 4 families.

33. This forms a fair basis of computation of certain specific amenities at each R&R site as enumerated in Table 1.2. Other amenities described in the NWDT Award can be calculated with similar criterion and methodology, while those amenities that are not mentioned in the NWDT Award ought to be provided with due justification as per the needs assessed by NVDA.

34. Table 1.3 subsequently sums up the various shortfalls at the cumulative project level and presents a summarised critique of the amenities at the project level.

35. As evident in Table 1.3, inexplicably the total number of plots at all the 88 R&R Sites is very large (25478) as compared to the number of families displaced (21447) as per the letter of the NVDA vide No. 983/Punarvas/MANIT/13 dated 17/9/13 of Adhikshan Yantri, NVDA duly Forwarded by the Commissioner NVDA vide 5285/30/punarvas/MANIT/13, Indore dated 26/09/2013 (Annex 1-A). This mismatch in the form of extra provisioning of 4031 plots to an extent of 18.8% is significant. It may be noted that other available data (derived from typical Annex 1-B- illustration for one site) indicates that the provisioning of plots may actually be even higher at 26621 plots implying 24.12% over-provisioning relative to the numbers of families displaced.

36. It should be noted that large extra-provisioning of plots significantly increases the risk of misappropriation in the allotment of plots, and may allow even fake entrants into the R&R sites. Review of this aspect however, lies beyond the scope of the present enquiry, and needs to be undertaken separately.

37. An extra provisioning of 18.8% - 24.12% made in the numbers of plots, would also result into unjustifiable higher cost of project, with increase in expenditure for land clearance and land levelling, internal roads, electrification, drinking water etc., besides the unnecessary burden of compulsory acquisitions of extra lands for facilitating much lesser resettlement of oustees, notwithstanding the pain that private owners of such extra acquired lands would have inflicted by way of loss of their lands (sometimes belonging to their ancestors and hence invaluable psychologically), often acquired at below market price as is the usual practice.

38. It may be noted that under NWDT Award Clause XI – "Directions Regarding Submergence Land Acquisition and Rehabilitation of Displaced Persons", the Sub Clause V(11) specifically mentions "In the event of any land acquired for rehabilitation of oustee families is not used for the purpose, it shall be returned to the original owner on payment, where feasible or otherwise disposed of and due credit given to Gujarat".

39. While provisioning for plots is excessive, notably, at Dharampuri R&R site the plot size has been arbitrarily reduced to 40x60 ft as compared to 60x90 ft plots at all other R&R site. This is in violation of the NWDT Award which is explicit in terms of plot sizing- granting an entitlement of 60 ft x 90 ft plot for every oustee family. It is relevant to point out that the argument that Dharampuri is an urban area and hence the reduced plot size, does not hold much water as the NWDT Award does not differentiate rural and urban oustees in terms of plot sizes being provided to them. Furthermore, the R&R site at Dharampuri does not have drainage system, street lighting, Solid waste management facilities etc. that may help it label it as urbanised area. Even the sewerage system provided is designed to

fail as it has been designed for 100 litres per capita per day (lpcd) of sewage, whereas water supply provisioning at the site is less than 70 lpcd and this water supply is nowhere near 135 lpcd as expected in an urban area with sewerage system (CPHEEO Manual on Water Supply and Treatment, prepared by the Expert Committee, Constituted by the Government of India, Ministry of Urban Development, New Delhi, 1999). Moreover, the R&R site will have a developed population below even 25000, and no Nagar Palika Bhawan has apparently been constructed at the R&R site/construction work did not appear in the records provided, despite provision in Technical Sanction for an amount of Rs 45.38 Lakhs for construction of Nagar Palika Bhawan for which allocation was thus made. Also notably, even the recommendation of the Task Force Team vide Commissioner Field NVDA Indore dated 17.11.2003 has recognised the area under submergence as "rural" (Annex 1-C), and has nowhere in the document recommended for reduced plot sizes of 40x60 ft at Dharampuri as compared to 60x90 ft at all other R&R site. Thus, reduced Plot sizes at Dharmpuri R&R site are discriminatory in terms of barely 45% plot area having been provided to oustee families at this site.

40. As a side note, although the efforts of NVDA in providing R&R sites in close proximity of villages under submergence are creditable with most R&R sites located within 5 to 6 Kms of villages under submergence, yet there have been a quite a few exceptions where the R&R sites have not been in desirable proximity to their submerged villages. Reducing displacement distances was necessary as oustee crop lands do not always come under submergence, and rehabilitation in close proximity becomes essential to ensure that the at least the life sustaining farming activity goes on as usual in such cases. Close proximities further ensure lower costs of resettlement including the cost of physically dislocating and shifting. Besides, close proximities also make the process of resettlement easier and more acceptable.

41. However, there have been notable exceptions where displacements have been rather large. Thus, for instance, R&R site of Anjad Barda (Annex 1-B) had a distance of 86 Kms from Kari, 83 kms from Tuwarkheda, 80 Kms from Ghongsa, 75 Kms from Kuli, and 42 Kms each from Amlali, Bhamta and Jangarwa. Anjad Barda also had oustees from other sites like Borkhedi (36 Kms), and Bijasan (Theekri) (37 Kms). Similarly, Morekatta R&R site has a distance of 17 Kms from Kari, 14 Kms from Tuwar Kheda, and 12 Kms each from Moretakka and Ghongsa villages, all of which represent villages under submergence whose populations are to be resettled at Morekatta R&R site. Again, Ganpur (Narmada Nagar) R&R site has been planned 8 Kms from Kheda, and 7 Kms from Bodhwada (the latter two being the villages under submergence along with several others). For Dharamrai R&R site, the distance to under submergence villages of Katarkheda and

Chhachkuan is 12 Kms and 8 Kms respectively. The Mirzapur R&R site is 8 Kms away from Malangaon, one of the villages under submergence.

42. These displacements though not large by urban standards, may imply extreme inconvenience to farmers, especially those who are aged, who would often find it impossible to daily ply to their fields now, compared to earlier situation where they could easily walk to their fields and work the entire day on fields, with food etc. being delivered to them on-field by children and women of the family, who too could walk the smaller distances to their crop fields, and provide help intermittently. Such inconveniences, including the costs of resettlement, make the realities of rehabilitation more agonizing, dampening the process of rehabilitation.

43. Social impacts, aside, it is evident from Table 1.3 that in a number of cases, the mandatory provisions of the NWDT Award have not been met. This under-provisioning, has occurred in almost every case, and is rather very significant in terms of magnitude:

- Thus under-provisioning was as much as 64.5% for the Primary Schools with only 109 Primary Schools (3-roomSchools) built against 307 such 3-room schools required as per NWDT Award.
- For Community Hall-cum-Panchayat Bhawans the under-provisioning was 39.64% with 67 built against 111 required
- For Primary Health Centres the under-provisioning stood at 47.74% with only 58 Primary Health Centres/Ayurveda Dispensaries/ Hospitals constructed at various R&R sites relative to 111 required as per NWDT Award.
- For Seed Godowns, the under-provisioning was 42.34% with 64 Seed Godowns built against 111 required.
- For Tree Platforms, the under-provisioning was 45.43% with 311 Tree platforms constructed out of a total of 570 required.
- Troughs (Halaos) for Livestock had a whopping under-provisioning of as much as 74.56%, with only 145 Halaos constructed across R&R sites against 570 required as per NWDT Award.
- Drainage had an under-provisioning of 64.77% with defunct and damaged system existing even where drainage has been officially provided. More than 50 R&R sites have no drainage system, whatsoever. At 21 of the 31 R&R sites with drainage, the drains were laid without any designs, notwithstanding the risk of wastage of public money, while for the remaining 10 sites where drainage has been claimed as designed, the claim itself remains dubious.

- Culverts were part of the cross-drainage works, but their numbers and sizing were completely arbitrary as these were not designed, and actual requirement based on catchment studies or drainage plans was not even assessed.

- Children's Parks, Water Ponds, Street Lights, Shamshan Ghats, and Plantation work including Compensatory Afforestation etc. had 100% under-provisioning.

- Similarly, the under-provisioning for Charnoi Bhoomi (Grassland for Livestock) is likely to be severe in the absence of any study and documentation on assessment of livestock population and its precise requirement versus the grass yield expected from typical soil type, topography and geology at each individual R&R site.

- Furthermore, this Inspection team has not come across any scientific survey etc. conducted that could have formed the basis for deciding the numbers of Middle Schools, Higher Secondary Schools, Post Offices, Veterinary Hospitals etc. whose numbers were left to the discretion of implementing agency. Thus, under/over-provisioning, if any, in such cases is unknown.

44. The very significant under-provisioning is likely to have large impact on quality of lives of oustees settled at the R&R sites. Typically for example,

- Shortages in number of Primary Schools will either result in lesser enrolments in an era of Right to Education, or will simply overcrowd the existing schools.

- Absence of Primary Health Centres and the lack of medical facilities may result in higher morbidity and mortality as well as in inconvenience and costs in taking patients to a doctor at other places.

- Absence of requisite number of halaos, and assured Charnoi Bhoomi will force livestock owners to face huge hardships in seeking water and food for the domesticated animals. This may eventually discourage people to rear livestock, impacting their lifestyles and economy significantly.

- Absence of water ponds implies loss of opportunity to recharge groundwaters even as drinking water shortages are a common sight, and would also result in non-conservation of drained waters by current haphazard and adhoc disposal of this precious resource into crop fields, which is a source of disputes as farmers do not want water drainage and floods into their fields.

- Absence of facilities like drainage system at majority of the R&R sites, and adhoc and undersigned numbers and placements of culverts at R&R sites would greatly enhance the difficulties in the lives of oustees causing avoidable misery and pain especially during monsoons.

45. It may be noted that amenities like Children Park, Places of worship, Shamshan Ghat, Plantation etc. were part of the infrastructure that was initially thought appropriate for provisioning even by the NVDA. Thus, if one reviews the various Administrative Sanctions sought by the NVDA Engineers (Typically, Annex 1-D for Chichli R&R site (Theekri), it becomes apparent that the initial provisioning included not just Temple (Estimated Cost Rs. 92200/-), Children Park (Estimated Cost 197000/-), Shamshan Ghat (Estimated Cost Rs. 35000/-), Grazing Land (Estimated Cost Rs 70000/-), Arboriculture (Estimated Cost Rs 225000/-), but the Prashaskiya Prativedan also considered Dharamshala, Cattle Shed/Tin Shed (Estimated Cost Rs 351000/-), and Khalihan (Estimated Cost Rs 70000/-). Such amenities were therefore part of the provisioning in line with Honourable Supreme Court's directive that through the R&R measures the PAPs/PAFs must be better off after their displacement.

46. This wide provisioning was again a part of the discussions and approvals in Meetings of the NVDA, as indicated by the records available. Thus, the 110th Meeting of NVDA dated 15.06.2004 (Annex 1-E) based on which Technical sanctions for R&R site of Dharampuri were provided by the Chief Engineer (PWD), NVDA (Annex 1-E), still mentions approvals of Estimated Costs for Temple (Rs 1500000/-), Plantation (Rs 200000/-), Children Park (Rs 788000), Shamshan Ghats (2 in numbers with total estimated cost Rs 70000/-). It may be noted that this approval formed the basis for granting Technical Approvals accorded by the Chief Engineer (PWD), NVDA in phases (Annex 1-E).

47. At some R&R sites such provisioning remained even a part of Technical Sanctions that allocates the money for particular use at specific R&R sites. Thus, for instance, for Bhawati II, Tree Plantations were accorded a sanction of Rs 48500/-, and Children Park Rs 86300/- vide the Technical Sanction approved by Additional Director (Rehabilitation)/SE, NVDA (Annex 1-F).

48. Yet, such provisioning subsequently got diluted, and was never implemented. It is not known on whose directives and instructions this happened, and where the money sanctioned and allocated for Plantation /Children Park etc., at sites like Bhawati II has been adjusted as no deviations have been reported, and this "no deviation" has even been certified for sites like Bhawati II (Annex 1-G).

49. The fact however remains that as per the information provided by NVDA (Annex 1-A), "No separate Provision has been made" for Cremation Grounds, only "Space provided at each R&R site" for Religious places of worship, Children's Parks have disappeared -"In every layout, some space will be used as play ground", and "no separate Charnoi Bhoomi has been provided at R&R sites".

50. Water ponds that could have recharged ground-waters and absorbed drainage water to prevent it from damaging crops in nearby agriculture fields have not been constructed. Significantly, the ponds could also have added aesthetic value to the R&R sites, as well as possibly some commercial value through aquaculture etc.

51. Plantation work has met similar fate. And even the Compensatory Afforestation work at the R&R sites has not been undertaken on the ground that "Total numbers of trees cut for all kinds of Construction work and Plots demarking activities at all R&R Sites" is "Nil" (Annex 1-A). It will suffice to add here that at the scale of development that has taken place at 88 R&R sites, it appears very unlikely that absolutely zero trees would have been cut to facilitate the development works undertaken, including site levelling.

52. It is feared that absence of provisioning of amenities like Street lights, absence of assured land for grazing (charnoi bhoomi) and absence of adequate drinking water amenities (halaos) for the livestock at large numbers of sites, etc. would only render the quality of life of the displaced people worse off as compared to their original status.

53. It may be noted that currently the effects of the under-provisioning of the amenities are not immediately visible as the total occupancy in terms of houses having been built or under construction at the sites is less than even 25%. But, in due course of time, if and when the R&R sites become fully habitated, the lack of amenities will become evident and would certainly be complained about.

54. It is evident that the provisions of NWDT Award have not been met, and have been grossly ignored by NVDA. Shortfalls in providing amenities resulting in obvious implications for the quality of life of the oustees may just be one factor that may be hindering the process of resettlement, as none of the R&R site still has 100% rehabilitation till date and several sites lie almost completely deserted.

55. Other factors that may be hindering the process of resettlement may relate to the possibility of sub-par quality of the infrastructure in place at the 88 R&R sites. This aspect has been dealt in the next three chapters, followed by recommendations in Chapter 5 of this Report.

Table 1.2. R&R Site-wise Analysis of Requirement as per NWDT Award and the shortfall in Actual Provisioning of Civil Infrastructure

R&R Site	Plots for Nos. of Families that can be settled at the Site	Primary Schools- One Primary School (3 rooms) for every 100 families			One Community Hall cum Panchayat Bhawan- One for every 500 families			Primary Health Centre/Ayurveda Dispensary - One for every 500 families			Seed Godown - One seed store for every 500 families			Tree Platform - One for every 50 families			Cattle Trough (Halao) - One for every 50 families		
		As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall
Achoda	137	2	1	1	1	1	0	1	1	0	1	1	0	3	3	0	3	3	0
Amalali	37	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	0	1
Awalda	283	3	1	2	1	1	0	1	0	1	1	0	1	6	4	2	6	1	5
Balkhad	121	2	1	1	1	1	0	1	0	1	1	1	0	3	3	0	3	3	0
Balwara	86	1	1	0	1	0	1	1	0	1	1	0	1	2	2	0	2	0	2
Barda Anjad	1032	11	3	8	3	1	2	3	1	2	3	1	2	21	10	11	21	5	16
Barda Manavar	354	4	1	3	1	1	0	1	0	1	1	0	1	8	7	1	8	3	5
Beganda	124	2	1	1	1	1	0	1	1	0	1	1	0	3	3	0	3	3	0
Bhamta Jangarwa	61	1	0	1	1	1	0	1	0	1	1	1	0	2	1	1	2	0	2
Bhavariya	119	2	1	1	1	1	0	1	1	0	1	1	0	3	0	3	3	0	3
Bhawati I	250	3	1	2	1	1	0	1	1	0	1	1	0	5	3	2	5	2	3
Bhawati II	19	1	1	0	1	0	1	1	0	1	1	0	1	1	1	0	1	1	0
Bhilkheda	235	3	1	2	1	1	0	1	1	0	1	1	0	5	7	0	5	4	1
Bhilsur	23	1	1	0	1	1	0	1	1	0	1	1	0	1	0	1	1	0	1
Bijasan	80	1	1	0	1	1	0	1	1	0	1	1	0	2	4	0	2	0	2
Borlai I	162	2	1	1	1	1	0	1	1	0	1	1	0	4	4	0	4	2	2
Borlai II	556	6	2	4	2	1	1	2	1	1	2	1	1	12	10	2	12	0	12
Borlai III	525	6	1	5	2	1	1	2	0	2	2	0	2	11	8	3	11	5	6
Brahmangaon	459	5	2	3	1	1	0	1	1	0	1	1	0	10	10	0	10	0	10
Chakeri	113	2	1	1	1	1	0	1	1	0	1	0	1	3	5	0	3	3	0
Chandankhedi	113	2	1	1	1	1	0	1	1	0	1	1	0	3	3	0	3	2	1
Chenpura	50	1	1	0	1	0	1	1	0	1	1	0	1	1	1	0	1	1	0

R&R Site	Plots for Nos. of Families that can be settled at the Site	Primary Schools- One Primary School (3 rooms) for every 100 families			One Community Hall cum Panchayat Bhawan- One for every 500 families			Primary Health Centre/Ayurveda Dispensary - One for every 500 families			Seed Godown - One seed store for every 500 families			Tree Platform - One for every 50 families			Cattle Trough (Halao) - One for every 50 families		
		As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall
Chichli	211	3	1	2	1	1	0	1	1	0	1	0	1	5	3	2	5	3	2
Chichli Kasravad	296	3	1	2	1	1	0	1	1	0	1	1	0	6	7	0	6	7	0
Chikalda	700	7	1	6	2	1	1	2	1	1	2	1	1	14	0	14	14	0	14
Datwara	189	2	1	1	1	1	0	1	1	0	1	1	0	4	6	0	4	2	2
Dehar	74	1	1	0	1	1	0	1	1	0	1	1	0	2	3	0	2	2	0
Dharampuri	3365	34	2	32	7	0	7	7	1*	0	7	0	7	68	0	68	68	0	68
Dharamrai	234	3	1	2	1	1	0	1	1	0	1	1	0	5	8	0	5	2	3
Ekalwara	490	5	2	3	1	1	0	1	1	0	1	1	0	10	3	7	10	3	7
Gangli	104	1	1	0	1	1	0	1	1	0	1	1	0	3	2	1	3	0	3
Ganpur Manavar	700	7	1	6	2	1	1	2	1	1	2	1	1	14	15	0	14	4	10
Ganpur Sirsi	240	3	1	2	1	1	0	1	1	0	1	1	0	5	5	0	5	3	2
Gawla I	60	1	1	0	1	1	0	1	0	1	1	0	1	2	2	0	2	2	0
Gawla II	53	1	1	0	1	0	1	1	0	1	1	0	1	2	2	0	2	1	1
Gehalgaon	338	4	1	3	1	1	0	1	1	0	1	1	0	7	8	0	7	0	7
Gulata	48	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0
Iklera	142	2	1	1	1	1	0	1	1	0	1	1	0	3	2	1	3	2	1
Jalanpur Dhalkheda	111	2	1	1	1	0	1	1	0	1	1	0	1	3	3	0	3	3	0
Jalkheda	80	1	0	1	1	0	1	1	0	1	1	0	1	2	0	2	2	0	2
Jalkoti	53	1	1	0	1	0	1	1	0	1	1	0	1	2	0	2	2	0	2
Jamda	136	2	1	1	1	1	0	1	1	0	1	1	0	3	2	1	3	2	1
Kadmal	330	4	2	2	1	1	0	1	1	0	1	1	0	7	3	4	7	2	5
Kaisur	180	2	1	1	1	1	0	1	0	1	1	0	1	4	3	1	4	0	4

R&R Site	Plots for Nos. of Families that can be settled at the Site	Primary Schools- One Primary School (3 rooms) for every 100 families			One Community Hall cum Panchayat Bhawan- One for every 500 families			Primary Health Centre/Ayurveda Dispensary - One for every 500 families			Seed Godown - One seed store for every 500 families			Tree Platform - One for every 50 families			Cattle Trough (Halao) - One for every 50 families		
		As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall
Kalyanpura	67	1	1	0	1	1	0	1	1	0	1	1	0	2	1	1	2	1	1
Kasravad	900	9	1	8	2	1	1	2	0	2	2	0	2	18	17	1	18	5	13
Kathora	151	2	1	1	1	1	0	1	0	1	1	0	1	3	3	0	3	3	0
Kawanthi	239	3	2	1	1	1	0	1	1	0	1	1	0	5	5	0	5	4	1
Khajuri	52	1	0	1	1	0	1	1	0	1	1	0	1	1	1	0	1	0	1
Khalbujurg	769	8	1	7	2	1	1	2	1	1	2	1	1	16	10	6	16	0	16
Khalkhurd Kasravad	192	2	1	1	1	1	0	1	1	0	1	1	0	4	3	1	4	0	4
Khalkhurd, Dharampuri	1119	12	1	11	3	0	3	3	0	3	3	0	3	23	0	23	23	0	23
Khedi	730	8	2	6	2	1	1	2	1	1	2	1	1	15	10	5	15	5	10
Khujawa	652	7	1	6	2	1	1	2	1	1	2	1	1	13	3	10	13	0	13
Kikarwas	142	2	1	1	1	1	0	1	1	0	1	1	0	3	3	0	3	2	1
Kirmohi	111	2	2	0	1	1	0	1	1	0	1	1	0	3	5	0	3	3	0
Kukra	261	3	1	2	1	1	0	1	1	0	1	1	0	6	5	1	6	5	1
Lakhangaon	158	2	1	1	1	1	0	1	1	0	1	1	0	4	2	2	4	2	2
Lohara	109	2	1	1	1	1	0	1	0	1	1	1	0	3	2	1	3	2	1
Madwada	267	3	2	1	1	1	0	1	1	0	1	1	0	6	4	2	6	2	4
Malangaon	30	1	1	0	1	0	1	1	1	0	1	0	1	1	2	0	1	2	0
Mehgaon	185	2	1	1	1	1	0	1	1	0	1	1	0	4	4	0	4	2	2
Mirzapur	146	2	1	1	1	0	1	1	0	1	1	1	0	3	4	0	3	0	3
Mohipura	336	4	1	3	1	1	0	1	1	0	1	1	0	7	5	2	7	3	4
Moregadhi	342	4	1	3	1	1	0	1	1	0	1	1	0	7	10	0	7	0	7
Morekatta	59	1	1	0	1	0	1	1	1	0	1	1	0	2	3	0	2	3	0

R&R Site	Plots for Nos. of Families that can be settled at the Site	Primary Schools- One Primary School (3 rooms) for every 100 families			One Community Hall cum Panchayat Bhawan- One for every 500 families			Primary Health Centre/Ayurveda Dispensary - One for every 500 families			Seed Godown - One seed store for every 500 families			Tree Platform - One for every 50 families			Cattle Trough (Halao) - One for every 50 families		
		As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall	As per NWDT	As per Actual	Shortfall
Musapura	39	1	1	0	1	1	0	1	1	0	1	1	0	1	3	0	1	0	1
Nalvai	126	2	1	1	1	1	0	1	1	0	1	1	0	3	2	1	3	2	1
Nimbola	392	4	1	3	1	1	0	1	1	0	1	1	0	8	8	0	8	0	8
Nisarpur I	598	6	7	0	2	2	0	2	1*	0	2	1	1	12	14	0	12	0	12
Nisarpur II, III	2616	27	0	27	6	1	5	6	0*	0	6	1	5	53	50	3	53	0	53
Panya	209	3	2	1	1	1	0	1	1	0	1	1	0	5	4	1	5	4	1
Perkhad	237	3	1	2	1	0	1	1	0	1	1	0	1	5	0	5	5	0	5
Raswa Deb	35	1	1	0	1	0	1	1	0	1	1	0	1	1	1	0	1	1	0
Ratwa	77	1	1	0	1	0	1	1	1	0	1	0	1	2	2	0	2	0	2
Rekti	63	1	1	0	1	1	0	1	1	0	1	1	0	2	2	0	2	2	0
Salta	101	1	0	1	1	0	1	1	0	1	1	1	0	2	2	0	2	2	0
Sala	474	5	1	4	1	1	0	1	1	0	1	1	0	10	5	5	10	5	5
Semalda	323	4	4	0	1	0	1	1	1	0	1	1	0	7	12	0	7	5	2
Shakirpura	99	1	1	0	1	0	1	1	0	1	1	0	1	2	0	2	2	0	2
Sirsani	59	1	1	0	1	1	0	1	1	0	1	1	0	2	1	1	2	1	1
Sondul	295	3	1	2	1	1	0	1	1	0	1	1	0	6	2	4	6	1	5
Takiyapur	184	2	1	1	1	1	0	1	1	0	1	1	0	4	3	1	4	2	2
Tawlai Khurd	150	2	2	0	1	0	1	1	0	1	1	0	1	3	0	3	3	0	3
Umda	61	1	0	1	1	1	0	1	0	1	1	0	1	2	2	0	2	2	0
Urdana	205	3	1	2	1	1	0	1	1	0	1	1	0	5	6	0	5	3	2
Vishwanath Kheda	188	2	1	1	1	1	0	1	1	0	1	1	0	4	3	1	4	3	1
Total		**307**		**205**	**111**		**43**	**111**		**38**	**111**		**50**	**570**		**211**	**570**		**419**

*Full-fledged hospitals exist at Dharampuri and Nisarpur, and hence the shortfall in Primary Health Centre is treated as Zero at these sites.

Table 1.3: Infrastructure Actually Created versus Provisioning needed against NWDT Award & the Gross Shortfalls at combined 88 R&R Sites

S. No.	Amenity	Criterion	Minimum Numbers of Amenity as per Criterion	Numbers actually provided at the 88 R&R sites*	% Facility provided against Requirement	% Under/Over-provisioning against the requirement
1	Plots for resettlement of project affected families	Provide one plot per family	21447 Plots for 21447 Oustee Families	25478 Nos. of Plots	118.79%	18.79% Over-provisioning
Comment: Over provisioning of plots. 4031 (18.79%) extra Plots exist. This implies Extra expenditure on Roads, Electricity and Water Services, because of this over-provisioning. Other data indicates that the actual provisioning of plots may be as high as 26621 Plots implying 24.12% overprovisioning. There also exists reduced plot sizes at Dharampuri relative to those at all other 87 R&R sites which were sized in accordance with NWDT Award.						
2	Primary Schools	NWDT Award: 1 for every 100 families	307	109	35.5%	64.5% Under-provisioning
3	Community Hall-cum-Panchayat Bhawans	NWDT Award: 1 for every 500 families	111	67	60.36%	39.64% Under-provisioning
4	Dispensary/Primary Health Centres	NWDT Award: 1 for every 500 families	111	58	52.25%	47.74% Under-provisioning
5	Seed Stores/ Godown	NWDT Award: 1 for every 500 families	111	64	57.65%	42.34% Under-provisioning
6	Tree platforms	NWDT Award: 1 for every 50 families	570	311	54.56%	45.43% Under-provisioning
7	Troughs (Halaos) for Cattle	NWDT Award: 1 for every 50 families	570	145	25.43%	74.56% Under-provisioning
8	Children's Parks	NWDT Award: 1 for every 500 families	111	0	0%	100% Under-provisioning
Comment: No developed Parks seen at any site. Open spaces claimed to have been left for Children Playground (and not Park). Neither the claimed Playgrounds, nor any Parks have been developed.						
9	Ponds	NWDT Award: 1 for every 500 families	111	0	0%	100% Under-provisioning
Comment: 3 Ponds pre-exist at 3 R&R sites. However, no new Village Pond has been created by NVDA.						
10	Religious Place of Worship	NWDT Award: 1 for every 100 families	307	0	0%	100% Under-provisioning
Comment: Only Space has been earmarked and provided for building religious places of worship at most R&R site. A temple each was seen at a few R&R sites like Borlai II. However, even the open spaces provided are not proportionate to provision of NWDT Award (1 per 100 families), so that at large R&R sites, people including the aged , children and the females, will have to walk a lot to reach the single place of worship for which space has been provided.						

.....cont..

S. No.	Amenity	Criterion	Minimum Numbers of Amenity as per Criterion	Numbers actually provided at the 88 R&R sites*	% Facility provided against Requirement	% Under/Over-provisioning against the requirement
11	Construction of approach roads and link roads for Abadies	NWDT Award: 3 Kms. per every new Abadi	264 Kms	59.313 Kms of Approach Road + 513.4 Kms of Internal Roads	More than adequate	Over-provisioning
12	Wells (Tubewells/Handpumps)	NWDT Award: 1 for every 50 families.	570	482 Handpumps +802 Tubewells	More than Adequate	Over-provisioning
Comment: Additionally, piped water supplies have also been provided from River Narmada at certain sites. Yet, water shortages are in vogue at most R&R sites (Chapter 3.1). A very large number of the claimed handpumps and tubewells either do not work, or do not have adequate yields, or are not perennial. Further the failure rate for the borewells has been high and stands at almost I failed borewell for every 2 successful borewells (Chapter 3.1).						
13	Electrical distribution lines and street lights	NWDT Award: 2 Kms per 100 families	614 Kms	766 Kms (279.7 HT + 486.3 LT) No Street Lights provided at any site	More than adequate in terms of length 0% Street Lights Provided	Over-provisioning with respect to Line length. 100% Under-provisioning of Street Lights, despite the fact that Street Light Conductors exist at most sites.
14	Drainage facility	Technically Required at every R&R site	At 88 Sites	31 Sites	35.22%	64.77% Under-provisioning
Comment: No Drainage provided at more than 50 sites. Half-round pipe drains provided at 31 sites, most of which are defunct. Of 31 sites, only 21 sites have drain pipes that are laid without any design whatsoever. Only 10 R&R sites are claimed to have a designed drainage. There is an apprehension that even this design work has at times been carried out after purchase of pipes and execution of work.						
15	Culverts	Technically Required at every R&R site	At 88 Sites	87 Sites	98.86%	1.13% Under-provisioning
Comment: No Culverts have been provided at one R&R site – Bhilsur. Total of 3027 Culverts are provided at 87 of the 88 R&R sites. Numbers of culverts, as well as their sizing, are completely arbitrary and is not backed by any catchment study. Culverts are not individually designed.						

.....cont..

S. No.	Amenity	Criterion	Minimum Numbers of Amenity as per Criterion	Numbers actually provided at the 88 R&R sites*	% Facility provided against Requirement	% Under/Over-provisioning against the requirement
16	Social amenities for each municipal town going under submergence, viz, water supply and sanitary arrangements layout	NWDT Award: water supply and sanitary arrangements layouts	Water supply	Water supply network arrangements made at Dharampuri.		Provisioning made
			Sewage	Sewerage system provided only at Dharampuri.		Provisioning made only at Dharampuri
			Solid Waste arrangements.	No Solid waste collection & management provision made even at Dharampuri.		100% Under-Provisioning with respect to Solid waste arrangements
Comment: It is debatable if part of Dharampuri under submergence can be treated as "municipal town going under submergence". The Sewerage system at Dharampuri has been designed @100 lpcd for water supplies designed @ less than 70 lpcd. Thus, sewerage network has only been designed to fail in reality.						
17	Middle/Secondary Schools	Desirable: As per requirement	No study has been undertaken to assess quantum of justified requirement. Numbers provided are adhoc.	31	NA	NA
18	Hostels			6	NA	NA
19	Veterinary Hospitals			2	NA	NA
20	Hospitals			2	NA	NA
21	Post Office			8	NA	NA
22	All types of Residential Quarters (F/G/H etc.)			55	NA	NA
23	Aaganwadi			14	NA	NA
24	Cremation Grounds/ Shamshan Ghats			No Provision made	0%	100% Under-Provisioning .....cont..

S. No.	Amenity	Criterion	Minimum Numbers of Amenity as per Criterion	Numbers actually provided at the 88 R&R sites*	% Facility provided against Requirement	% Under/Over-provisioning against the requirement
25	Charnoi Bhoomi - Grass land (Uncultivated Land) for Livestock	Technically Required at every R&R site as per the requirement of Livestock at each site	No separate Charnoi Bhoomi has been provided at R&R Sites.			Severe Under-Provisioning
Comment: No study has been conducted to assess the population of livestock at each R&R site. For this reason, feed requirement of the livestock, and the corresponding land requirement in the form of Charnoi bhoomi at each site, is not known. Randomly allocated small pieces of lands/ nearby village charnoi bhoomis allowed to be used by PAFs without even ascertaining the potential of these lands to provide requisite additional quantity of grass are hardly likely to meet actual requirement, as demand of grass by livestock is often high in the rural context where numbers of domesticated animals may be significant.						
26	Plantation	Technically Required at every R&R site.	No Plantation work undertaken at any site.			100% Under-Provisioning
		Compensatory afforestation needed to be carried out as per the trees cut at the acquired land during the process of development of R&R sites**.	Oddly, the numbers of trees cut in acquired land to develop the R&R sites for all kinds of constructions as well as development of plot area, have been claimed as "Nil", which is hardly a possibility at the scale of development that has taken place at 88 R&R sites. It appears likely that actually no records have been kept for trees cut, and the revenues that should have accrued to the government on account of the resulting wood/timber have been lost due to possible misappropriation.			100% Under-Provisioning

*Information provided by NVDA vide letter no. 983/Punarvas/MANIT/13 dated 17/9/13 of Adhikshan Yantri, NVDA duly Forwarded by the Commissioner NVDA vide 5285/30/punarvas/MANIT/13, Indore dated 26/09/2013 (Annex 1-A).

** Honourable Supreme Court of India has from time-to time taken a proactive role in the matters of forest policy governance.

CHAPTER 2

Chapter 2. Status of Civil Works at R&R Sites

Table of Contents

Chapter 2. Status of Civil Works at R&R Sites

2.1. Building Services

The Civil buildings works at various R&R Sites comprise an array of buildings housing Primary Schools, Panchayats, Seed Godowns, Primary Health Centres, Aaganwadis, Post offices etc. The salient observations on Building Works at the R&R sites are:

1. The buildings at R&R sites have been planned as per type designs of MP PWD. Accordingly, these were found existing almost on similar patterns throughout the R&R sites, with few exceptions and modifications.

2. A perusal of the official records indicated that the "As built" drawings were not available for any of the sites. Wherever "As built" drawings were claimed, it was found that these were essentially the drawings of the superstructure (which had to be same due to type designs employed). However, actual drawings including the measurements for foundations below the ground were missing.

3. It was also observed that most of these buildings, except those at Moregadhi and Khalbujurg, have been constructed with open foundations. The depths of the open foundations were decided without any due geo-technical investigations.

4. While obviously the superstructure was the same because of use of Type designs, designs for foundations had to be site specific in view of variations in Bearing capacities from site to site. Missing foundation designs is indicative of the fact that that the bearing capacities on field were never determined, and this gets substantiated from the records made available which had no test records of Bearing capacity tests for each site.

5. An absence of bearing capacity also implied that the Estimates were adhoc. In fact, the records indicate that the estimates for foundation and plinth (Part I Estimates) were exactly the same for a very large number of sites (discussed in details in Chapter 2.7, Table 2.7.2), implying adhoc planning and estimation. Large numbers of similar estimates for items below Plinth level also imply inflated estimates and over-safe designs for cases where strata have been good resulting in unnecessary cost increases.

6. Also the RCC slabs and other RCC components have evidently not been designed and approved by the competent authority. The submitted records do not produce any evidence related to the design of these RCC components.

7. Most of these buildings have stood the test of time because Civil works take into account a number of safety factors. Though there are noticeable shortcoming in testing of material and its casting, yet the Compressive Strengths determined using a non-destructive test that employed a Rebound Hammer gave satisfactory results on RCC components of most building structures.

8. However, at some R&R sites, some of the buildings have had serious issues, and were found damaged and dilapidated (Plate 2.1.1). Many structures had noticeable cracks due to foundation settlements. A few of these buildings were so highly damaged that they are no more functionally useful, and need to be dismantled immediately to avoid accidents and damage.

9. The Flooring joints were also found very poor, and at several places uneven flooring surface was visible, indicating uneven foundation settlement (Plate 2.1.2).

10. At a few sites, the Stairs at entry to the building had no bonding with the main building structure. Due to this, these were seen dissociated from the building structure and found displaced (Plate 2.1.3). Similarly, in few cases, the bonding was seen to be missing with the Almirah etc also (Plate 2.1.3).

11. A large number of buildings (almost 20-25%) had noticeable external running horizontal cracks in the upper portions just below the roofs (Plate 2.1.4). Such cracks are normal where these are hair cracks. But cracks observed and shown in plate 2.1.2 are wider in nature, and may be due to foundation settlement.

12. Although at most R&R sites, the buildings had fencing (or at least some remaining vestiges of fencing work that may have been carried out earlier), and entry/exit gates, at several sites no fencing or gates were found at all (Plate 2.1.5). In fact, there were no criteria to decide as to why at some places even the provisioning of fencing has not been made, while being made at a majority of places.

13. Often, at most sites, fencing were found damaged or existing only partially. The gates or/and their pillars were also often found damaged (Plate 2.1.6). This was a common occurrence throughout most of the R&R sites where gates and fencing has been provided. This is reflective of the poor state of upkeep and maintenance.

14. The associated civil services with Buildings were found completely lacking. Water supplies, for example, even in School buildings were inadequate. The handposts, cisterns etc were in most of the cases not working, as water supply services themselves have failed in most R&R sites, and also because the taps and necessary connections to handposts were often missing, and a large number of them were defunct (Plate 2.1.7). The cisterns had no provision of cleaning, and the inlet supplies were in any case doubtful. The handpumps/handposts/cisterns had inadequate drainages resulting in insanitary conditions prevailing due to stagnating water, in case water was available.

    The above associated services have been dealt with more elaborately in the services related to PHE works, comprising Section 3.1 of this report.

Barda :Aaganwadi Bhawan

Semalda: Primary School No 4

Chikalda : Primary School no. 2 –Two Views

Lakhangaon : Post office Building Khalbujurg: Prominent Cracks Inside School Building

Plate 2.1.1 Typical Damaged buildings at various R&R Sites .....cont....

Khedi : Hostel

Ratwa: Primary Health Centre

Moreghadi: 2 views inside Primary Health Centre

Ganpur, Manavar: Primary School

Khalbujurg: Seed Store

Plate 2.1.1. Typical Damaged buildings at various R&R Sites .....cont..

Nisarpur: Men's toilet in Hospital and Primary School building

Nisarpur Yatri Pratikshalay

Khalkurd Kasrawat: Primary School ceiling: Reinforcement with Inadequate Cover: Exposed & corroded

Kikarwas: Hostel Building

Bhawaria: Primary School

Plate 2.1.1. Typical Damaged buildings at various R&R Sites

Khalbujurg: Primary School floor

Plate 2.1.2. Typical Uneven Floors – Settlement of Foundations

Moregadhi: Dissociated Steps

Moregadhi: Dissociated Almirah

Plate 2.1.3. Typical lack of Bonding and Dissociations

Mandwada

Chikalda

Ganpur

Mirzapur

Ratwa Primary Health Centre

Plate 2.1.4. Typical horizontal cracks in the buildings at select R&R sites

Talwai Khurd: Primary School

Barda Manavar

Raswa Deb: Primary School

Khujawa: Middle School

Golata: Seed Godown

Lohara: Primary School

Sala: Middle School

Semalda: Primary Health Centre

Plate 2.1.5: Typical Missing Fences, Gates and Pillars at some sites

Khalbujurg: Middle School Saita: Seed Godown

Kadmal: Primary Heath Centre Jalanpur Dhalkheda: Primary School

Anjad Barda: Primary School Gehalgaon: Panchayat Bhawan

Umda: Panchayat Bhawan Kalyanpura: Primary School

Plate 2.1.6: Typical Damaged gates, Pillars, Fencing--A common Occurrence

Semalda Middle School

Shakirpura Primary School

Semalda Primary School

Mirzapur Aganwadi

Lakhangaon Seed Godown

Vishwanath Kheda Panchayat Bhawan

Kirmohi Panchayat Bhawan

Ganpur Sirsi Primary School

Plate 2.1.7. Typical handposts : Missing taps, missing pipes, defunct at several sites , even in Schools

15. Similarly, the toilets were inadequate and essentially unhygienic (Plate 2.1.8) because of no provision of water made in the toilets, and also because of lack of appropriate maintenance. Lack of water again ensured that whatever sewage ensued from these rather defunct toilets was too meagre to travel all the way to septic tanks, which were invariably defunct for a vast majority of cases. Even the planning and execution of these septic tanks was not upto mark: septic tanks constructions and connections were of poor quality, the effluent of septic tanks was left to flow overground (Plate 2.1.9), Connections to Septic tanks were often missing/damaged so that sewage could not flow to septic tanks, and the fact that these were all defunct saved the school, Panchayat premises etc from foul overflows. Even as defunct constructs these septic tanks continue to remain as safety hazards, with most of the not having covers, even inside the Primary School premises where children can easily fall down (Plate 2.1.10). The construction quality of these septic tanks was also not upto mark at some sites (Plate 2.1.11).

    The above associated services have been dealt with more elaborately in the services related to PHED, comprising Section 3.2 of this report.

16. Other ancillary provisions such as playground in Schools were also completely missing in a vast majority of cases. In fact, it was in rare case such as Dharamrai (Kukshi) (Plate 2.1.12) where a playground could be seen. The School grounds were often inadequate and sometimes portions of open ground were intruded by stagnated water around hand pumps/handposts, or open septic tanks at the back or sides. Drainage considerations were also almost absent.

17. In several cases the buildings built have been deployed for no use, or just to store feed for animals by some private persons, the reasons for which may be entirely administrative (example, handing over issues, sites not being occupied by the oustees etc.) and are beyond the scope of the present enquiry.

18. The drainage from building roof tops was not planned. Roof drainage was missing at most places. Drainage pipes were conspicuous by absence, as the roofs did not have parapets at several R&R sites. Drain holes were provided, but were sometimes seen discharging on chajjas (which would eventually make them weak leading to collapse), and in some cases even on building entry door/steps. Blackish exterior marks (erosion of exterior paint) indicated, that the roof slopes were not provided right, and the rooftop water would either drain from anywhere, or would stagnate on roof top leading to seepage on roof and walls (Plate 2.1.13).

19. The supposed free flow of roof-top rain water would be hampered sometimes due to inadequate slopes of roof, thereby creating build-up of dampness due to prolonged wetting, signs of which were often evident on the internal walls and roofs in several cases even in the peak summers just before monsoon. The ventilators often had no chajjas to protect the ingress of rains inside, implying that

ventilation openings were also a source of water seepage into the rooms during the monsoons. Seed Stores significantly, also suffered from the same design lacunae, which is a major shortcoming that could severely affect the quality of the seeds stored. These issues inside the buildings are highlighted in Plate 2.1.14.

20. Approach/Entry to the buildings, including sometimes even to the schools, was not always smooth. In several cases, the road was not extended to the building or engineered approach to the amenities was not provided resulting in poor approach (Plate 2.1.15). In other cases, the building premise were not levelled or raised appropriately relative to the top road formation and large differences in plot level and road formation was the reason behind problem of smooth entry (Plate 2.1.15). Where the building premises near the entrance to these buildings, including the school premises, were found much lower than road formation, there would be a risk of flooding of the access during rains, and as the local resident reported, the school children would be forced to walk barefooted without shoes & socks/footwear up to school building from the roads.

21. The buildings were also sometimes located disregarding safety issues (Plate 2.1.16). One could see even Schools located right next to Overhead tanks, awaiting a tragedy that may befall in unfortunate event of a tank collapse, and giving the schoolchildren unlimited opportunity to scale the tank heights as even the premises were not fenced. At Gangli, one could see a large ditch in front of a Primary School. At Panya, one could see a huge open well, very deep (70-80 ft) within the school premises whose boundary was damaged and broken, and without an inkling of any warning signboard fencing and isolation. Such instances reflect poorly on the sensitivity with which planning and execution have been carried out.

22. The site selection was often far from prudent. For instance, at the two sites of Khalbujurg and Moreghadi where extensive Black-Cotton soils were found forcing structures to be based on pile foundations, one could not help but ask as to why these sites were chosen despite the very rich and productive land for agriculture. The site selection needs to be questioned for such sites, as not only the prime agricultural land has been lost to habitation, significantly, the inhabitants occupying this site would have no reasons to be happy. The civil infrastructure they are likely to inherit would not only comprise damaged buildings, culverts, roads etc, but services like drainage will be a perpetual source of misery. It is also not understandable how the oustees would build up safe houses on their plots, as even the piled structures built by technically qualified engineers have given way. This is corroborated from some of the private houses/personal structures having developed extensive cracks on walls (Plate 2.1.17). This is a major planning lapse, wherein site selection has not taken into account the ground realities.

23. Similar siting issues pertaining to planning lapses occur at other sites like Brahmangaon (Theekri) where the underlying strata is extremely hard in parts (Plate 2.1.18), and even mild blasting may be required to construct houses with minimal foundations. Even if blasting is not permissible for safety reasons, the cost of excavations will be significant for chiselling. Will the oustees be able to bear this extra cost of construction? Is it fair to ask them to do so, just because they have been allotted this particular site? These are relevant questions that needed honest soul searching at the time of site planning.

24. Planning notwithstanding, extensive damage to structure of buildings at some of the sites was observed. An inspection of building foundations was therefore undertaken at select buildings at nearly 25% of the R&R sites i.e., i.e. 22 sites.

25. At two sites, Khalbujurg and Moreghadi, the buildings had foundations on piles, and yet there were extensive damages to the building superstructures. Reasons for such damages could possibly be the larger spacing between piles (> 10 feet), and/or poor workmanship, material and supervision. The piles were also not always seen located exactly below the columns indicating a lop-sided transfer of superstructure weight to the underlying strata or in some cases few piles were not aligned completely vertical (Plate 2.1.19). The workmanship was poor, and no Dummy piles were provided in any of the structures. The result was that at both these sites, the building structures had elaborate cracks, and Almirah etc. had become disjointed from the walls as illustrated in Plate 2.1.19, and floors had uneven settlement (Plate 2.1.2).The pile investigated at Khalbujurg was found to be short by 20 cm, and apparently pile cap of 20 cm was also assumed to be included in the pile length. At Moreghadi, however, the pile length shortfall was 27 cm, and even with pile cap included the pile length fell short of recordings in MBs (Table 2.1.1)

26. At all other remaining sites, the buildings had open foundations. However, it was rather bizarre that the foundation depths varied considerably from building to building and from site to site even for cases when the strata remained similar (Table 2.1.1), (Plate 2.1.20). This indicated to the possibility that the building foundations were not designed and were laid on adhoc basis, a fact confirmed later from the records made available (refer Section 2.7 for details).

27. The variations of open foundation ranges for several buildings as recorded in MBs were very large (Table 2.1.1). For instance at Chikalda Primary School No 2 , the range was 0.91 to 1.56 m, at Bijasan Panchayat Bhawan the range recorded was 0.99 m – 1.69 m, and at Borlai II Primary School 0.45-1.84 m (ie., difference of more than 1.39 m in foundation depth for the same building at various points) etc. Such variations in open foundation depths are not expected and have no explanation, except to make future investigations impossible as the entire foundations cannot be dug at all points to confirm the range recorded in the books.

The randomly excavated points had foundation depths falling within the range in majority of the cases, but the maximum foundation depth was impossible to be determined.

28. It may also be noted that shallow foundation depths like Primary Schools at Balwara (0.25 m) and at Khedi (0.26 m) are not acceptable in any case as this will not provide any grip with the underlying strata, and may lead to skidding, more so if erosion takes place due to weathering action.

29. At some of the building structures, foundation failures were quite evident, resulting in massive cracks and damage to the structure (Plate 2.1.21). At other places, the workmanship in the foundations was often found very poor. Poorly laid joints which were often uneven, and laid with thick masonry of poor quality could be seen resulting in cracks/ uneven floors in the superstructure etc. (Plate 2.1.22).

30. The Quality control aspects, and issues related to Designs, Drawings, Estimations and Technical Sanctions have been dealt with separately under Section 2.7.

Table 2.1.1: Select Observations during field inspections versus Measurement Book records for building foundations (Typical)

S. No.	R & R site	Building Structure	Material	Type of Foundation	Foundation Depth (Actual)*m	Foundation Depth as per MB m	MB No.
1	Bhilkheda	Primary School	RR Masonry	Open	1.22	0.93 to 1.385	265
		Seed Store	RR Masonry	Open	1.2	0.847 to 1.17	280, 281
2	Kikarwas, Kukshi	Primary School	RR Masonry	Open	0.42	0.49 to 0.52	176
3	Chikalda	Primary School No. 2	RR Masonry	Open	1.30	0.91 to 1.56	774
		Panchayat Bhavan	RR Masonry	Open	0.85	0.49 to 0.85	770
		Seed Godown	RR Masonry	Open	0.80	0.56 to 0.99	771
4	Balwada	Primary School	RR Masonry	Open	0.66	0.25 to 0.60	445
5	Borlai I	Panchayat Bhavan	RR Masonry	Open	0.90	0.55 to 0.875	335
		Health Centre	RR Masonry	Open	0.90	0.775 to 0.95	333, 334
6	Borlai II	Primary School	RR Masonry	Open	1.14	0.45-1.84	142
		Panchayat Bhavan	RR Masonry	Open	0.96	0.34 to 0.86	144
7	Khedi	Primary School	RR Masonry	Open	0.80	0.26 to 0.91	454
		Middle School	RR Masonry	Open	0.90	0.52 to 0.96	454
8	Bijasan	Panchayat Bhavan	RR Masonry	Open	1.25	0.99 to 1.69	454
9	Amlali	Panchayat Bhavan	RR Masonry	Open	1.15 m	1.02 to 1.447	55, 59
		Seed Godown	RR Masonry	Open	1.10 m	0.755 to 1.28	56, 59
10	Bhavati I	Primary School	RR Masonry	Open	1.02 m	0.53 to 1.16	6, 65
11	Bhavati II	Primary School	RR Masonry	Open	0.68 m	0.717 to 1.275	45, 63
12	Bhamta	Seed Godown	RR Masonry	Open	1.02 m	0.94 to 1.01	596
13	Jamda	Seed Godown	RR Masonry	Open	1.45 m	1.225 to 1.358	538
14	Khalbujurg	Primary School	RCC	Pile foundation	3.6 including pile cap depth of 0.20 m	3.60	153
		Seed Godown	RCC	Pile foundation	3.6 including pile cap depth of 0.20 m	3.60	155
15	Moregadi	Panchayat Bhavan	RCC	Pile foundation	3.53 including pile cap depth of 0.20 m	3.60	141

* Foundation depth at randomly excavated point.

Chandankhedi

Khalbujurg

Plate 2.1.8. Typical Toilets: mostly defunct even inside Schools, unhygienic, stinking, dirty, without water and light. Poor maintenance.

Urdana

Morekatta

Plate 2.1.9. Septic tanks built to discharge on surface (Typical)

Morekatta

Khalbujurg

Moreghadi (Inside the septic tanks)

Plate 2.1.10. Poor construction quality of septic tanks at some sites (Typical)

Gangli Primary School | Achoda Primary School

Gangli Primary Health Centre | Perkhad Aaganwadi

Plate 2.1.11. Typical septic tanks associated with building works: almost invariably Defunct, missing connections, missing gas pipes, and Covers mostly missing - Safety Compromised.

Plate 2.1.12. Dharamrai: Proper space in the school premises for use as a playground

Ratwa PS

Anjad Barda Primary School

Balwara Primary School

Mirzapur Aaganwadi

Nalvai Primary Health Centre

Nisarpur Aganwadi

Nisarpur II/III: Panchayat Bhawan

Khedi Hostel

Plate 2.1.13. Typical impact of inadequate/inappropriate drainage of roof water on Building exteriors. Note the darkish exterior marks made by water.

Rekti Panchayat Bhawan

Kirmohi Panchayat Bhawan

Semalda Middle School

Chikalda Seed Godown

Beganda Primary Health Centre

Balwara Primary School

Plate 2.1.14. Inside of Buildings: Dampness prevalent even in dry season (Typical).

Note: All photographs taken during peak summer season April-June 2012, before the onset of monsoon when dampness would be minimal.

Kukra: Lack of smooth entry to the buildings. The road could have been extended a few meters to reach the gate (or better till the school building), but this small patch has been left undeveloped without considering likely problems during Rains.

Moreghadi: Seed Godown- The access is higher, but the open area around the building has not been levelled, implying water will pool up during monsoons.

Moreghadhi: The road at the left is much higher than the building premises. Plinth has not been raised appropriately relative to road formation.

Plate 2.1.15.Poor Approach/Inadequate Raising &Levelling of building premises(Typical)

Eklera Sala

Overhead Tanks located in the proximity of Primary Schools. What if the tank collapses? Also an absence of fencing and isolation present the school children free access to scale the tank heights.

Gangli: In front of Primary School a large ditch which would fill up in the rains, increasing chances of serious accidents, more so because the school is in the vicinity---Poor planning, and insensitive finishing of construction activities undertaken at the R&R site, accentuating and strengthening the public perception of lack of proper facilities and related insecurities.

Plate 2.1.16.Compromise with safety - Insensitive Planning and Execution (Typical).....cont..

Panya: In Primary School II campus, a huge well 70-80 ft deep exists inside the school premises and fencing. The well has its boundary damaged and broken in parts, and is without fencing. This well water is being pumped by a motor inside the pumphouse located nearby and had a direct connection without any meter. Serious chances of accidents for school-children. Insensitive planning and gross negligence.

Plate 2.1.16. Compromise with safety - Insensitive Planning & Execution (Typical).

Plate 2.1.17. Construction in Prime BC Soil at Moreghadi and Khalbujurg: When the structures made by engineers have given way (top 4 photographs for Moreghadi), how will houses and structures of oustees (bottom 3 photographs) survive the onslaught of BC soil without any Technical help?

Plate 2.1.18. Brahmangaon (Theekri) : Very Hard strata implies difficult construction (Typical)

Noticeable pile eccentricity along the length (left), and shorter pile length (right) at Moreghadi Panchayat Bhawan. The depth of pile was found 20 cm short - as per MB it should have been 3.6 m, but pile measured only 3.4 m. Pile cap had a depth of 0.20 m.

Plate 2.1.19. Poor Pile Foundations and their effects (Typical).....cont..

Lop-sided location of the Pile : Moregadhi Panchayat Bhawan - Pile not located below the weight carrying column, but rather displaced on one side.

Typical settlement failure between Almirah and wall at Moreghadi (Left), & cracks at Khalbujurg Seed Godown (right). At both places, spacing between piles measured > 3 m. No dummy piles were provided in between main piles. Hence, such failures were inevitable in poor strata.

Plate 2.1.19. Poor Pile Foundations and their effects (Typical)

Foundation depth at Borlai II Panchayat Bhavan (left) with foundation depth 34 - 86 cm whereas at Kikarwas Primary School (right) foundation depth in similar strata was found 49-52 cm only.

Bijasan: Aanganwadi located on sloping ground (left) had foundation depth 91-191 cm, whereas in similar sloping land, at the same site, the depth of foundation at Middle School (right) measured 76- 145 cm only.

Foundation of Middle School Building had only 40-61 cms depth at Nisarpur I (left), whereas in similar strata at Primary School Kikarwas (right) 49-52 cm deep foundation was provided.

Plate 2.1.20. Typical variations in Foundation depths even in similar strata.

Chikalda: Primary School Building (left) showing typical foundation failure.

Plate 2.1.21. Typical Foundation Failure

Amlali: Foundation of Panchayat Bhawan- Poor joints

Nisarpur: Foundation at Primary School-poor wormanship

Chikalda-Panchatyat Bhawan: Poor and thick joints-poor workmanship

Plate 2.1.22. Poor Foundation Joints (Typical).....cont..

Bolai I Primary Health Centre (Top) & Morekatta School (Bottom) showing poor and thick masonry joints

Poor masonry joints at Primary School Khedi (left) and Government High School, Dharamrai (right)

Plate 2.1.22. Poor Foundation Joints (Typical).

Chapter 2. Status of Civil Works at R&R Sites

2.2. Roads

The roads provided at the R&R sites can be categorised as Approach Roads to the site, and the roads internal to the site. The Approach Roads in several cases have been constructed, in some other cases these already existed and have been utilized as such, or with some modification/upgradation. The internal roads at the sites were mostly supposed to have standard profile of pavement width of 3 m with top formation width of 6 m (with variations happening in reality), but there were wider roads witnessed as well at a few sites. The internal roads, in some cases were bituminous, although in most cases they were Water Bound Macadam (WBM) Roads. The following are some noteworthy observations:

1. The criterion to provide wider roads at select sites is not known. For example, sites like Khalkhurd (Dharampuri) whereas the pavement width remains at 3-3.1 m, whereas the formation width measured 7.5 m and even 8.5 m for certain internal roads. This is rather strange, considering the fact that no assessment of heavier traffic at these sites exists, and no such study seems to have been carried out from the records made available. Also, there is little justification in keeping the pavement width same at 3 m (single lane), and varying the top formation widths to a great extent that would have resulted in extra expenditures incurred in Earthwork for no justified reason.

2. Increased shoulders by way of larger top formation widths, while keeping the pavement widths at 3 m has been a feature at several sites particularly in the Dharmpuri Division. Thus, it appears that provisioning for wider shoulders has been made without any need assessment, without any justification whatsoever, and is a glaring example of adhoc, arbitrary planning at macro-level, and possible misappropriation. This is also in contradiction to the provisions of IRC:73-1980.

3. This significant enlargement of road widths is a discriminatory provisioning for only a section of the oustees, and is difficult to understand in view of higher expenditures of constructing and maintaining the wider roads.

4. While, at some sites wider roads were provided, at some others roads were not provided to all the plots, making it apparent that the works have been left incomplete. Thus, there were sites like Dharampuri, Balwara, Baganda etc. where some plots were seen without necessary provisioning of internal roads around.

5. Roads at only a few of the R&R sites like Chichli, Khujawan, Nimbola, Sala, Khalbujurg, Moreghadi, Balwada, Beganda, Dharampuri etc. were seen asphalted. Thus, there was a lack of planning and coordination, and apparent differences on the facilities and amenities to be provided to the oustees. The criterion for having Asphalted roads as compared to other sites is not known, and it appears that this choice was mostly random, putting oustees of certain villages at relative disadvantage as compared to others who have access to Asphalted roads. All inhabitants of the R&R sites needed to be provided facilities at par, so that some do not remain underprivileged relative to some others in terms of amenities provided to them. Accordingly, roads at all the R&R sites needed to be asphalted, unless good reason exists for not undertaking this work.

6. Studies pertaining to the overall Environment and Social impact assessment (to minimize negative environmental and social impacts) were not found to have been undertaken in the records made available, even at the entire project level.

7. At the micro-level, at several R&R sites, it was observed that top formation widths of the roads had deviations from 6 m for road sections measured randomly. Table 2.2.1 indicates the top formation widths for some cases where the deviations were ≥ 20 cm. Given the fact that only limited road sections could be checked during the inspection, it is likely that greater deviations may actually exist at the same site and for other road sections, however the values given in the Table 2.2.1 are indicative of the fact that deviations were observed. In rare cases these deviations even exceeded 1 meter of width. And in all the cases the deviations were on the negative side, implying narrower top formation widths for roads, which may result in user inconvenience and is a compromise on road safety. It may be noted that narrower sections at R&R sites are not justified in view of the sites being developed anew on open land with supposedly proper planning, and there exist no constraints that may force narrower sections like at sites which are already developed and where augmentation of infrastructure takes place at some later stage.

8. In contrast, the deviations from the standard 3 m width of pavement were much less common and smaller too. These were again on the negative side implying a narrower pavement width than prescribed. Such deviations were typically observed at Balkhad (pavement width 2.6 and 2.8 m), Jalkoti (2.6 m), Moosapur (2.5 and 2.8 m), and Nisarpur (II/III) (2.8 m) at the sections at which measurements were taken. It is however, possible that at other sections, these roads may not have deviations or may even have greater deviations. This is without ruling out the possibility of deviations at other R&R sites, since all road sections could not be measured.

9. At several R&R sites it was found that the immediate difference between the road and the level of adjoining roadside plot were significant. Since levels could not have been physically verified at all sections, critical appearing sections randomly

chosen on visual basis were selected at selected sites to find out the level difference. Table 2.2.1 illustrates these level differences at sites where the road and plot level differences measured ≥ 1m. It may be noted that there may be several road sections that may possibly have still greater level differences, and several more similar sites, but only to illustrate the point being made, the table will suffice.

10. From the Table 2.2.1, it is evident that as many as 22 sites had level differences between the road and plots ≥ 1 m, for some section or the other, going all the way to as high as 1.8 m at Achoda.

11. Such significant level differences between the road and plots, shall obviously pose immense problems to the residents since high embankments lead to extra cost of plinth filling along the surrounding of buildings/houses. It may be noted that the house plinth level should be at least 30 cm above road formation level, or else there is a risk of water entering into the houses (Reference: M.P.Bhumi Vikas Niyam, 1984 page 136 - (2) "Plinth.- The minimum height of plinth shall be 30 centimetres from the surrounding ground level").

12. In the current scenario, several plot owners will, for no mistake of their own, be forced to raise their plinth levels by 1.3 m - 2.1 m, and this will require large amount of filling, which is indeed a very costly affair, and there is doubt if the oustees, having lost their homes to submergence, will be able to afford the additional costs involved in filling the plots allotted to them. It may be noted that normally the cost of plinth is approximately 20% of overall cost of building and it increases with plinth height.

13. The rather significant level differences will also affect the future services like Sewage collection in such cases.

14. Such level differences between the road and adjoining road-side plots, and their wide prevalence, indicates to the possibility that the local plot earth may have been sometimes utilised during road construction (such allegations from local residents were common during site visits), and even if this may not have happened, it does at the least, reflect poorly on planning sensitivity needed at the local level.

15. It may further be noted that land levelling was a major component of Sanctioned Estimates at several sites. Wherever land levelling has been undertaken, no utilisation of excess soils has been shown in either the Estimates or the MBs. Thus, surprisingly no excess soil seems to have been recovered from land levelling. Instead of officially utilizing the excess material from land levelling wherever possible, extra costs have been incurred on transportation of material brought from outside (with due leads) for raising the road embankments.

16. The height of embankment includes earth work, selected soil/ Granular Sub-Base (GSB), G1, G2 & G3 as per requirement of road design. The layer of earthwork is to be laid to maintain the gradient & level course of road, which should be as minimal as possible. In rural roads the recommended layer of earth work is generally 15 cm. Over this, the crest thickness considered by NVDA includes 15 cm GSB/ selected soil, 15 cm thick G1, 7.5 cm thick G2 & 7.5 cm thick G3 (ie, a total of 45 cm). Thus total thickness including earth layers and the crest should be 60 cm unless some abnormal situation exists at site demand higher embankment

17. However, in present case wherever land levelling is done prior to road formation due to land development at R&R sites, it was easy to avoid earth layer which is primarily provided to maintain the gradient & level course of road. Instead of avoiding the earthwork, actually the provided earth layers have been excessively large. This has resulted in in massive increase of road levels with respect to plot levels (Table 2.2.1) posing inconvenience to oustees occupying these plots as the plinths have to be raised above the top formation of road entailing extra cost. Excessive earthwork evidently implies excessive costs of roads, and gives financial leverage to contractors to make greater profits.

18. In any case, the difference between road formation top and adjoining plots was excessive in many cases, and many of the plots have become low-lying relative to adjacent roads resulting in extra burden on oustees on raising of plinth heights. In all such cases where embankments are excessively high, the oustees need to be compensated for extra cost likely to be incurred on raising of plinths.

19. A serious observation is with regard to the road designs. The Road Designs have apparently not been undertaken, and only a prototype has been used everywhere irrespective of the soil strata The soil CBR shows strength of sub-base, and without knowing CBR values, the road crest deign is impossible. In the present case CBR of sub-base was not tested. It is not clear as to how without testing of sub-base CBRs, the GSB, G1, G2, G3 layer thicknesses etc. were determined for each road with varying soil strata from site to site. As soil strata was not taken into account and CBR of sub-base was not known, the crest thickness was not designed but it was assumed for all sites. This immediately implies uneconomical designs particularly at sites where the strata were good.

20. The aggregate samples collected randomly at road sections at each of the 88 R&R sites were tested at the Laboratories in the Civil Engineering Department at MANIT. The aggregate Impact values were determined to be <30% as per Bureau of Indian standards, Indian standard Methods of test for Aggregate for concrete, IS: 2386 part IV-1963 (Reaffirmed 1997), and test results indicated satisfactory and acceptable aggregate quality.

21. The aggregate samples were not found graded as needed, and G1, G2, G3 were all found mixed up at various R&R sites. This was not entirely unexpected as the roads have been built several years back, and may not have been able to maintain the aggregate gradation.

22. However, at certain sites some layers components were found missing in some roads indicating that the grading was inappropriate in such cases from the time of construction itself. Plate 2.2.1 illustrates some such cases.

23. Some of these roads have outlived their lives or are on the verge, and have had poor maintenance, and need urgent repairs although they have not seen much traffic as several of the R&R sites are not fully habitated as of now. The damaged roads patches include complete collapse in sections (Plate 2.2.2) to wearing, loosening of the aggregate etc of the roads (Plate 2.2.3).

24. Where roads were bituminous, the bitumen thickness was approximately 20 mm. However, the bituminous concrete mix coat was found damaged in patches at several sites (Plate 2.2.4) sites including the approach roads at Brahmangaon, Khedi etc. It also exhibited cracks at places (Plate 2.2.5).

25. The condition of hard shoulders was often found poor at most sites (Plate 2.2.6). This problem was endemic and poor road shoulders, including edge drops, erosion and wearing of shoulder material, cuts, loose material etc. were often seen, despite hardly any traffic flow at most of the R&R sites.

26. Growth of vegetation including grass and bushes etc. on road shoulders was a familiar site (Plate 2.2.7), indicating inappropriate maintenance. The need for proper maintenance and repair therefore exists at a wide majority of R&R sites.

27. In large number of cases, the vegetation did not spare even the pavement itself (Plate 2.2.8), so much at times, that at certain locations it was difficult to recognise that a road lay beneath. This reflects poorly on maintenance that these roads have received thus far.

28. Another point of concern regarding the quality has been inappropriate turning radius at the road crossings. The turnings, by and large, were sharp (Plate 2.2.9), often at 900. Thus, sharp bends were common presenting a gross flaw in the design of the roads, as vehicles including tractors, motorcycles, bullock-carts, and jeeps in the rural context, cannot be expected to turn at such sharp angles. The smooth curvature needed was completely missing flouting the norms of the Indian Road Congress IRC 73-1980, Table 18, Page 35.

29. This again indicates poor execution and design, in which basic principles of road construction and road safety have been violated.

30. The road cambers were not visible at almost all of the R&R sites, and were certainly inadequate. This problem seemed to be endemic across various sites and reflects very poorly on execution, supervision, and design.

31. Road side Drainage was not present in more than 50% of the R&R sites. And even where the drainage system existed, it was mostly not functional and maintained. More on drainage has been covered under its specific heading, but it will suffice here to say that absence of drainage/inadequate drainage may have led to large-scale road and shoulder damages which are abundant at the R&R sites.

32. In fact, absence of camber, combined by a lack of drainage may just be the reason that the roads and shoulders have been infested with vegetation, or have been damaged otherwise compromising with the serviceability of the roads constructed and making them prone to accidents at times. It may be noted that street-lighting is missing at R&R sites, so local bullock-carts etc would have to face the road damages and compromised road safety after it is dark to a much larger extent.

33. The roads are likely to be accident prone, just not because of missing street lights, growth of large bushes etc., but also because electricity poles, plot marker stones etc were found on road shoulders at times (Plate 2.2.10)

34. The road safety also stands severely compromised in cases where undeveloped areas were left along the roadside including deep ditches alongside the roads (Plate 2.2.11). Apparently, no efforts were made to ensure road safety by taking care of such issues at R&R sites.

35. Then there were miscellaneous issues that relate to road conditions that affect and worsen quality of life for residents. These include issues like undulating wave like surfaces of roads indicating poor road construction, low levels of plots relative to road surface, combinations of poor road qualities and poor maintenance reflected in combined poor payment, poor shoulders, vegetation growth etc., gaping holes in roads due to poor jointing of cross drain pipes beneath, and inadequate covers on these pipes (more of these in the section on culverts) etc. (Plate 2.12). All these issues are likely to lead to public inconvenience at R&R sites, or even comprise with the road safety.

36. Works at certain sites like like Khalkhurd (Dharampuri) road work seemed to be in such a shape that these appeared as rather incomplete (Plate 2.13).

37. The Quality control aspects and issues related to Designs, Drawings, Estimations and Technical Sanctions have been dealt with separately under Section 2.7.

Table 2.2.1. Road characteristics with respect to level difference between plots and road top formation at some R&R sites at randomly chosen select sections.

S. No.	R&R Site	Max diff with plot level (m)*	Top formation width (m)**
1	Mehgaon	-	5.2
2	Kirmohi	-	5.44
3	Manwada	1	-
4	Gloata	-	5.8
5	Semalda	-	5.2
6	Semalda	-	5.8
7	Ganpur Sirsi	1.1	4.5, 5.8
8	Perkhad	1	-
9	Semalda	-	5.2, 5.8
10	Achoda	1.8	-
11	Kavanthi	1.05	5.8
12	Gangli	1.2	-
13	Chikalda	1.0	5.6
14	Bhilsur	1	5.5
15	Chichli	1.1	-
16	Gawla II	1.5	-
17	Chenpura	1.1	-
18	Brahmangaon	1.2	-
19	Sala	1	-
20	Jalanpur Dhalkhera	1.1	-
21	Lakhangaon	1.2	-
22	Khalbujurg	1	-
23	Moreghadi	1.4	-
24	Balwara	1.1	-
25	Talwai Khurd	1.1	5.8
26	Khalkhurd	1.1	-
27	Umda	-	5.7
28	Jalkoti	-	5.7,5.8
29	Moosapur	-	5.5,5.7
30	Nisarpur I	-	5.7,5.8
31	Naisarpur II,III	1.5	-
32	Bhawati II	-	5, 3.5
33	Amlali	1.1	-
34	Jamda	-	5.6

*Rows left blank indicate level differences < 1m. Table lists only those measurements where difference was ≥1 m.

** Rows indicate top formation width against 6 m as stipulated. Two values indicate values at two different road sections. Blank entries imply readings not available/ measurements not taken/no deviations found.

Jangarwa

Barda, Manavar

Jalkoti

Talwai Khurd

Achoda

Khalkhurd (Manawar)

Jalkoti : A road cross section at a road collapse

Plate 2.2.1. Improper grading and Missing Component layers

Jalkoti: A collapsed road section

Moosapura: A damaged and collapsed road section.

Chenpura: Typical Road damages

Plate 2.2.2: Collapsed/Malformed Road sections (Typical)

Raswa Deb: Typical Road damages

Gawla II: Typical road damages

Gawla I

Plate 2.2.3: Poor Road Conditions and road damages (Typical).....cont.

Jalanpur Dhalkheda

Tawlai Khurd: Poor quality of road & shoulders

Khalkhurd, Dharampuri

Khalkhurd, Kasravad

Mirzapur: 2 Roads

Borlai II

Plate 2.2.3: Poor Road Conditions and road damages (Typical).....cont.

Nisrapur II/III: Poor roads, vegetation infested shoulders.

Kaisur Kadmal

Kaisur : Loose aggregate material, shoulders infested with vegetation.

Plate 2.2.3: Poor Road Conditions and road damages (Typical)

Perkhad

Kaisur

Bhawati I-Approach road

Niasarpur –I

Beganda : The bitumen surface appears to have been applied partly on the road, or may have just completely eroded over large parts of the road.

Plate 2.2.4.Damaged Bitumen Road Surfaces (Typical)

Khalbujurg

Dharampuri: Longitudinal cracks on Black Top BT Road- Typical of longitudinal crest failure and may be due to poor compaction in layers. Such cracks are also due to poor CBR of sub-surface and other layer material.

Plate 2.2.5. Cracks on Black Top BT Road surfaces (Typical)

Barda, Manavar

Gehalgaon Chikalda

Mirzapur Bhawati II

Mohipura: Boulder protruding (left)&Poor Road shoulders with wave-like drainage (Right)

Plate 2.2.6: Poor Road Shoulders (Typical)

Mehgaon

Sala

Chenpura

Plate 2.2.7.: Road Shoulders lost to Vegetation (Typical).....cont

Moreghadi

Chichli

Nisarpur II/III

Plate 2.2.7.: Road Shoulders lost to Vegetation (Typical)

Saita: A road almost completely lost to vegetation

Saita: Another road lost to vegetation

Moosapura: road lost amongst vegetation

Plate 2.2.8. Extensive Vegetation on Roads (Typical).....cont..

Moosapura: But for culvers, it was difficult to identify this road

Urdana: Road lost to vegetation: Poor upkeep and maintenance

Khajuri, Jhabua: Road lost to grass and vegetation

Plate 2.2.8. Extensive Vegetation on Roads (Typical).....cont..

Balkhad : Remnants of a road

Jalkoti

Umda

Kaisur

Plate 2.2.8. Extensive Vegetation on Road (Typical)

Kaisur

Kaisur

Awalda

Mirzapur

Barda, Manavar

Plate 2.2.9. Sharp Turnings: Inappropriate design and execution (Typical)

Takiapur: Pole and vegetation on road shoulders

Chandankhedi: Poor road condition, Poor condition of shoulders. Mark the position of the plot stone and electric pole. Note that there is no provisioning of street lights.

Plate: 2.2.10. Road safety Compromised: poor positioning of Electric poles, plots etc.

Sirsaani: Deep trenches alongside the road. Are these trenches made during construction by use of soil therein?

Kukra: Deep trenches upto 6 ft on both sides of the main approach road. Road safety jeopardised, more so as engineered side drains are non-existent (though culverts are present, but these are susceptible to silting and chocking up as engineered drainage is not present). What would happen in rains when ditches this deep stand filled up, and driver does not know where the road edge lies?

Plate: 2.2.11. Road Safety Compromised: Deep Trenches alongside the Road (Typical)

Moreghadi: Undulating, Wavy Road Surface.

Nisarpur II/III: Distorted road surface

Morekatta: Poor roads, dilapidated shoulders, and lack of maintenance of roads indicated by growth of bushes.

Plate 2.2.12. Road Conditions that worsen & acerbate conditions for residents (Typical).....cont..

Moreghadi: Damaged shoulders. Also note the level difference between road top and the plot.

Anjad Barda

Chikalda

Holes on middle of roads

Borlai I: Cross drain pipes visible over roads: Inadequate covers on pipes

Plate 2.2.12. Road Conditions that worsen & acerbate conditions for residents (Typical)

Khalkhurd, Dharampuri

Plate 2.2.13: Incomplete appearing road works (Typical)

Chapter 2. Status of Civil Works at R&R Sites

2.3. Tree Platforms/Chabutras

The Tree Chabutras were built to provide a platform for social gathering. The following points are noteworthy with respect to their quality, planning and usability:

1. The Tree platforms were provided at most sites. However there were a number of sites like Jalkheda, Shakirpura, Talwai Khurd, Bhawaria, Bhilsur, Jalkoti, Chikalda etc., where no provisioning was made. This was against the spirit of the NWDT Award that provided for 1 Tree Platform for every 50 families, and there exists no justification for not providing the committed amenities. Besides, not making provision for Tree platform at certain sites is discriminatory to those oustees who would occupy these sites which lack infrastructure compared to others. This therefore reflects poorly on the planning aspect.

2. It was a common occurrence to find Tree Platforms actually without a tree in the centre. In fact, in some rare cases, even the provision for providing a tree at the centre was done away with by making the entire top *pucca*. Apparently, the trees planted, if any, could not be maintained.

3. Also, sometimes the trees seen were typically *Pipal* or *Bargad*, both of which would suffice to destroy the platform structures in a matter of few years because of their elaborate and abundant root network (Plate 2.3.1). In fact, it was not very common to actually find acceptable well-built Tree Chabutras with proper trees at the centre (Plate 2.3.2).

4. The tree platforms had inconsistent sizing, and there existed significant variations in sizes for no special reasons. While a size of 6 m x 6 m was most commonly found, there were notable deviations observed on the field. For example, one of the tree platforms at Moreghadi measured 7.15 m x 7.20 m (too big), while the other one at the same site measured 4.75 m x 1.6 m (too small) (Plate 2.3.3). Variations in sizes to various extents existed at other sites like for example, Barda 6.5 m x 6.5 m; Urdana 6 m x 6.5 m; Panya 5.9 m x 5.9 m; Lohara 6.13 m x 6.1 m; Umda 7.45 m x 7.33 m etc.. Thus standardisation of platform sizes was not observed at R&R sites.

5. Tree Platform heights were also not found standardised. There were significant variations in heights above ground level (Plate 2.3.4). For example, the heights had a range of 0.41 m (Khajuri) - 0.45 m (Kaisur and Nisarpur I), to all the way upto

1.2 m at Beganda and 1.25 at Nisarpur-I. Heights above 1 m were quite common. Thus, variations in heights above ground level were more than 100%. And variations of heights between different platforms at the same sites was also common, implying a lack of standardisation of platform Heights.

When the heights were > 1 m , it made the tree platforms often unsafe to be used especially by the elderly (who may find it inconvenient to climb the steps up), or to children who may accidentally fall down while playing. Thus, some of the tree platforms had heights which would make them inconvenient to be used. The safety aspects in this regard seem to have been completely given a pass.

6. The tree platforms had no provision for washing the top platform-the provisioning of water supply and/or drainage of wash-water has not been made.

7. Approach to the facility was often not provided. The platforms were just built in earmarked open areas, with no provision of approach during say, the wet season. One often would have to walk through the *kuccha* open area, or through the vegetation to approach the tree chabutras. An engineered approach to the amenities should have been planned and provided.

8. Location of platform has no linkage with the demand of structure/user convenience, possibly due to non- consultative approach followed in the planning. Fulfilment of requirement of development as per NWDT award was perhaps the major objective rather than siting the amenities for maximizing their use and convenience of users. Unfortunately even the provisions of NWDT award were not fulfilled as a number of sites had no Tree platforms.

9. Then there were site-specific planning issues pertaining to locations of tree platforms, though the lessons would be generic (Plate 2.3.5). For example, at Moreghadi, a large spread-out site, in a distance of nearly 50 m as many as 3 platforms were found located near Panchayat Building, Seed Godown building and Primary health centre. If the provisioning is justified on the ground that people will gather near these buildings, then this argument should have applied to all other R&R sites.

10. Similarly, at the same site Moreghadi, one could even find a Tree Platform inside the Overhead tank (OHT) premises. Note that OHT premises are not supposedly meant for public use, and represent places not meant for public intrusion.

    In such cases, the only objective behind platform construction becomes the mere fulfilment of constructing X numbers of pre-decided chabutras at the site.

11. Large number of tree platforms across the R&R sites were found damaged; some of them were extensively damaged (Plate 2.3.6).

12. It was also common to find several tree platforms having vegetation sprouting from different parts of the structures, contributing to further structural damage (Some of the photographs in 2.3.6). Thus apparently, little or no efforts were being made to maintain the built Chabutras.

13. Since, large numbers of Tree Platforms at almost every site were seen having varying degrees of damages, therefore, at nearly 25% of the sites, some of the tree platform foundations were excavated and investigated.

14. At Moreghadi, five platforms had pile foundations (Plate 2.3.7). However, these were not designed, and the length of the piles used was completely arbitrary. At Moreghadi one of the Tree Platform foundation was excavated and it was observed that no pile cap existed indicating faulty execution and supervision. The pile in this case had a length of only 2.75 m relative to 3.6 m of recorded value in the MB (Table 2.3.1). Despite provision of arbitrary pile foundation these platforms were found damaged resulting in wastage of public money. Such cases deserve to attract accountability of concerned officers.

15. At all other sites, platforms had open foundations, which were again not designed. However a Type drawing has been made for specific dimensions without being site specific, and without having structural details. Yet, significant variations were observed from these dimensions from site to site and even within the same site. Such variations in sizes and the variations in soil strata demanded unique foundations for each individual Platform. Thus, no individual designs were seen despite changes in underlying strata, sizes of platforms, and platform heights. This implies uneconomical over-designs for platforms constructed in good strata, and risk of failure of platforms in poor strata as the foundation designs were arbitrary.

16. It is evident from Table 2.3.1 that the range of foundation depths often varied considerably, and this variation had no basis at all. Also, the variation from site to site was arbitrary as the necessary soil investigations were not carried out, nor were the foundations designed. Thus, the foundation depths were totally arbitrary, and without considerations of geo-technical properties, dimensions of the Tree platforms, platform heights above ground level etc., and were completely adhoc.

17. Just as the superstructures were found laid with poor joints, the foundations were found having poor joints, and poor quality of mortar and masonry, leading to large-scale platform collapses or damages (Plate 2.3.7). Poor masonry joints and signs of inadequate curing were observed in several instances. Often the stone masonry/brick masonry in Platform foundations was of very poor quality, and as a result, the platform tops cast were often found to be uneven, and would sometimes sink in pieces collapsing partly or completely (Plate 2.3.7).

18. The Quality control aspects and issues related to Designs, Drawings, Estimations and Technical Sanctions have been dealt with separately under Section 2.7.

Table 2.3.1: Select Observations during field inspections versus Measurement Book records for Tree Platform foundations (Typical)

S. No.	R & R site	Material	Type of Foundation	Foundation Depth (Actual)*m	Foundation Depth as per MB m	MB No.
1	Bhilkheda	RR Masonry	Open	0.82	0.665 to 1.175	161
2	Borlai I	RR Masonry	Open	0.33	0.40 to 0.60	33
	Borlai I	RR Masonry	Open	0.59	0.55 to 0.60	33
3	Borlai II	RR Masonry	Open	0.32	0.40 to 0.70	175
	Borlai II	RR Masonry	Open	0.77	0.76 to 0.91	175
4	Khedi	RR Masonry	Open	1.55	1.30 to 1.77	454
		RR Masonry	Open	1.0	1.10 to 1.22	454
5	Eklera	RR Masonry	Open	0.76	0.57 to 0.816	719
6	Morekatta	RR Masonry	Open	0.40	0.33 to 0.38	147
	Morekatta	RR Masonry	Open	0.50	0.6 to 0.79	147
7	Bijasan	RR Masonry	Open	1.04	0.89 to 1.23	196
	Bijasan	RR Masonry	Open	0.28	0.25 to 0.81	196
8	Amlali	RR Masonry	Open	1	0.60 to 1.07	498
9	Sondul	RR Masonry	Open	0.63	0.75 to 0.79	366
	Sondul	RR Masonry	Open	0.64	0.78 to 0.82	366
10	Moreghadi	RCC	Pile foundation	2.75 no pile cap seen	3.6	135

Semalda Achoda : Neem and Peepal

Plate 2.3.1. Typical Inappropriate choices for Tree varieties planted on Platforms – Elaborate root system will damage platforms in a few years.

Gangli Borlai II

Plate 2.3.2. Some of the better Tree Platforms (Typical): Not a very common occurrence

Moreghadi: A platform built next to sceptic tank Moreghadi: A larger than standard platform

Plate 2.3.3. Typical Variations in Platform sizes: Two Platforms at the same site barely a few meters apart (Illustrative, lesser variations were more common at some R&R sites).

Beganda

Sala (no steps seen)

Jalanpur Dhalkheda: Two platforms : Note the variation in numbers of stones at corners (Two in left photograph vs Three in the Right)

Beganda : Number of stones at corners is Four.

Nisarpur: Number of steps equal to six

Plate 2.3.4. Typical Variations in Platform Heights.

Moreghadi : A Satellite view

1. Top left hand corner: 3 Tree Platforms indicated by blue balloons in Building premises within nearly 50 m: Note the difference in their sizes. Also seen are the nearby located three sceptic tanks with blackish dots indicating that the sceptic tanks covers are missing.
2. On bottom right hand of satellite imagery: A platform in the overhead tank premises (Actual Photograph below).

Moreghadi: A Tree Platform in the secured, secluded Overhead Tank premises

Plate 2.3.5. Typical Planning Issues.

Barda Manavar

Semalda

Ratwa: Two platforms, one with lots of vegetation and shrubs: Improper filling, poor maintenance; another has a damaged structure with wide cracks.

Semalda

Kathora: platform extensively damaged

Khalbujurg: Two Platforms

Plate 2.3.6. Typical Damaged Tree Platforms.....Cont..

Lakhangaon

Nimbola

Borlai III

Raswa Deb

Kasravat

Moosapura Himmatgarh

Mainpura

Chikalda

Plate 2.3.6. Typical Damaged Tree Platforms.

Moreghadi: Typical 2.77 m deep pile foundation (left) for tree platform in the premise of overhead tank. This platform was seen in very poor state (right). The pile depth of 2.77 m had no design basis. The quality of work was also very poor.

Foundation of Tree Platforms showing poor masonry joints leading to vertical cracks at Eklera(left) and poor and almost non-existent masonry joints at Khedi Bagood (right).

Poor quality and collapse of Tree Platform at Khalbujurg (left). Poor masonry joints and vertical cracks at a tree platform at Amlali.

Plate 2.3.7. Poor Platform Foundations (Typical) and their impacts.

Chapter 2. Status of Civil Works at R&R Sites

2.4. Cattle Troughs (Halaos/Halavs)

The Cattle Troughs or Halavs/Halaos have been built to provide water to Livestock and other animals, and these structures form the lifeline for the cattle. Following are some of the observations with respect to halaos:

1. No provisioning of Halaos existed at a number of R&R sites such as Jalkheda, Shakirpura, Ratwa, Talwai Khurd, Balwara,Bhawaria, Bhilsur, Gehalgaon , Gangli, Brahamangaon , Kaisur , Khajuri, Nisarpur I,Nisarpur II& III, Borlai II, Amlali etc.
2. Not making provision for Halaos at certain would put the oustees to immense inconvenience with respect to providing drinking water to their cattle. Absence of halaos is not only discriminatory against those oustees who would occupy these sites which lack necessary infrastructure as compared to those who would occupy fully equipped sites, but significantly it is also against the spirit of the NWDT Award that provided for 1 Halao for every 50 families, and there exists no criterion for making such a choice of not providing halaos.
3. Thus, not making appropriate provision for halaos reflects very poorly on the planning aspect, when something as necessary as making arrangement for drinking water for the Livestock and other animals in the rural areas goes amiss.
4. In fact, no separate provisioning of water demand for livestock has been made while designing water supply schemes at R&R sites. Thus, even where Halaos have been constructed, filling these Halaos and operating them regularly will remain a challenge. Issues related to provisioning of water for halaos have been discussed in Section 3.1 under a separate heading.
5. The lack of sensitivity to the importance of the halaos has also been reflected at several places where actually halaos have been provided and the criterion for providing the necessary numbers of halaos has been very vague and actually random and adhoc. Table 2.4.1 indicates that whereas the NWDT Award provided for one halao and one tree platform each for every 50 families, and whereas in fact, at large number of sites, equal numbers of Tree platforms and halaos were found, at several other R&R sites, the more necessary halaos were provided in significantly lesser numbers as compared to lesser important tree chabutras.
6. It may be noted that whereas halaos are a mandatory necessity in the rural context, the tree platforms are more useful from a social and aesthetic perspective of adding more value to habitat, and yet it is evident from Table 2.4.1 that the halaos have

been given a large thumbs down relative to the tree Platforms. This also flouts the provisions of the NWDT award which provide one Tree platform and one Halao for 50 families. The focus on priority has thus been completely misplaced, despite the fact that halaos comprise lifeline for the Livestock, and its provisioning is almost as important as making the provisioning of drinking water supplies for human beings across any R&R site.

Table 2.4.1. Importance of halaos relative to Tree Platforms at some R&R sites.

R&R Site	Numbers of Tree Platforms	Numbers of Halaos	Importance of halao vs Tree Platforms = Number of halaos/Number of tree platforms *
Tawlai Khurd	0	0	-
Shakirpura	0	0	-
Jalkheda	0	0	-
Bhawaria	0	0	-
Bhilsur	0	0	-
Chikalda	0	0	-
Jalkoti	0	0	-
Moosapur	0	0	-
Gehalgaon	8	0	0
Gangli	2	0	0
Brahamangaon	10	0	0
Kaisur	3	0	0
Khajuri	1	0	0
Nisarpur I	14	0	0
Nisarpur II& III	50	0	0
Borlai II	10	0	0
Amlali	1	0	0
Ganpur,Narmada Nagar	15	4	0.267
Ganpur Sirsi	5	3	0.60
Semalda	12	5	0.416
Manavar	5	4	0.80
Mandwada	4	2	0.50
Takiapura	3	2	0.667
Dehar	3	2	0.667
Chandankhedi	3	2	0.667
Kirmohi	5	3	0.60
Mehgaon	4	2	0.50
Anjad Barda	10	5	0.50
Datawada	6	2	0.333
Kasravad	17	5	0.294
Dharamrai	8	2	0.25
Kikarwas	3	2	0.667
Khedi	10	5	0.50
Bijasan	4	1	0.25

***Importance of halao vs Tree Platforms = Number of halaos/Number of tree platforms. The NWDT Award sets an importance ratio of 1. Ratio ≥1 would be desirable.**

7. An assured water supply source was needed to fill these halaos. NVDA has done well to provide distribution system and placed cisterns close-by to fill the halaos in most cases, though in some cases, Handpumps or tubewells were also seen. But due to the rather systemic failure of distribution systems in large number of cases, as well as because the inlet connections to these halaos being often non-existent, the halaos were found completely dry (Plate 2.4.1). In a number of cases, a cistern would be found nearby, but that itself would be dry (Plate 2.4.2). In some other cases, the tubewell did not have enough yield. The handpumps located nearby obviously, cannot fill halaos. Thus, large numbers of halaos were non-functional, and no adequate arrangements were made for assured filling of halaos.

8. While the inlet arrangements/connections were often missing, so were the outlet arrangements. The drainage from halaos was mostly not in place, no provisions were made to drain the water to nearest drains in an engineered fashion (Plate 2.4.2), and the water could flow on roads, plots, or just pool around depending upon the local topography. As of now, the functional halaos already have heavy waterlogging around them in a number of cases, more so because BC soils were present at several sites and drained water would not easily soak in under such conditions (Plate 2.4.3).

9. In the times to come, the residents who occupy the plots would find the outflows of halaos (if these become operational) with inadequate drainages a nuisance, and this is likely to be a major cause of resident complaints, because pooled up stagnant water mixed with the faeces and urine of approaching animals would create insanitary conditions and would be breeding grounds for insects and mosquitoes.

10. Contributing to the pooling up of water around the halaos would be the fact that there is no provision of stopping the inflow of water once the halao has been filled by use of a simple stop valve or a float ball. This implies that once operational, there would be large spills at virtually every halao, as meticulous manual monitoring for filling halaos is impractical and almost impossible.

11. The halao sizes were not standardised and had considerable variations from site to site (and even at the same site). For example, the Length x Width was 6.1 m x1.55 m at Mehgaon, 4.0 m x 0.86 m at Panya,, 3.8 m x 1.5 m at Mandwada, 3.8 m x 1 m at Lohara, 3.83 m x 1.63 m at Umda, and so on.

12. Similarly the platforms for the cattle to approach and stand upon while drinking water at the halaos were not present at a few halaos at some sites like Umda, Morekatta, Bhawati-I etc., indicating non-standardised practice in halao constructions.

13. The halao heights over the Platform level were found to vary significantly, and were on the higher side many times. Though in several cases, the halao heights were limited to the range 45 cm to 60 cm which would be acceptable; in a wide majority of cases the halaos had a height of 60-70 cm. In still other cases, halao heights exceeded 70 cm (Sala, Lakhangaon, Kathora, Borlai II, Bhilkheda), and even seen at 75-80 cm (Saita, Achoda, Vishwanath Kheda, Khedi, Ganpur (Sirsi), Mehgaon), At Chainpura, Balkhad , Rekti , Manavar and Ekalwara, for one or more halaos, the heights exceeded 80 cms. In case of one halao at Jalanpur Dhalkheda, and another at Chichli (Kasrawad) the heights exceeded 85 cms. In case of another halao at Chichli (Kasrawad) the height even exceeded 1 m.

14. Such large heights make halaos functionally compromised as though the larger cattle may just be able to quench their thirst (although it is possible that even they may not be able to utilize the halaos), smaller animals like goats, calves etc would find it difficult to near impossible to consume water (unless the halao water level stands full all the time), partially defeating the purpose for which these halaos have been built. All that was to be done in such cases was to learn from the villagers who have their own private halaos at times, which they have been successfully using for years and decades. Plate 2.4.4 illustrates such a typical case.

15. And it is not that the correct heights were not known to the construction agencies. In several cases, the heights were lesser and quite acceptable (Plate 2.4.5). However, there was apathy towards providing optimal designs and solutions hampering the functionality. The emphasis was neither on providing necessary numbers, nor on providing a standardised correct design. Incidentally, greater heights would also result in increased costs per unit halao, as well as larger water quantities, implying wasteful expenditure.

16. Such design issue should have been resolved at least in recent construction when lessons should have been taken, and designs improved by feedback. That sadly, has not been the case and adhoc provisioning continues as evident from the Plate 2.4.4 where the case of a halao at Ekalwara under Phase II has been illustrated which is a recent construction.

17. Standardisation of Halao heights over the ground levels for serving average cattle heights right at the planning stage could have avoided above discrepancies and inconveniences. There were variations in halao heights not just amongst different R&R sites, but even amongst the same site (Plate 2.4.6). Obviously, no criterion seems to have been adopted in deciding halao heights, a parameter which is supremely important in enabling comfortable postures for the cattle while drinking.

18. Of course, lower halao heights would have made them approachable for children, but that can happen even now, and presently it is more dangerous due to greater heights of standing water inside. The outer walls once scaled may not allow children to come out in the present scenario if during play children push each other down. The risk has been avoided as of now as halaos are mostly found dry.

19. Approach to the facility has not been provided in several cases. In some cases, there was no platform seen around the halao, and although this may not look to be a problem as of now, but during rains, or when the halaos become operational and start to spill, there would be pooling around, restricting the approach by animals and humans. In other cases, even when the platform existed, the Approach to the platform itself was not proper. An engineered approach to the amenities should have been provided mandatorily.

20. Further, sometimes the halaos have been located very close to the main roads (Plate 2.4.7). This is poor planning as it not only would often restrict and hinder the traffic on road, but would make such zones accident prone. The halaos should not have been located near the highways/main Approach roads. In some other cases halaos were close to individual plots, implying inappropriate undesirable siting as this would either create nuisance and insanitary conditions for plot owners. Sometimes these were located in low lying areas and near the culverts and may become unusable during monsoons as well as create insanitary conditions due to mixing of animal sewage with drain water.

21. Some of these halaos had structural issues including wide transverse/longitudinal cracks (Plate 2.4.8) which may have been caused due to differential settlement behaviour when located in Black-Cotton soil. But in sandy/gravel soils there exists little explanation and all fingers point out to the poor quality joints etc indicating poor workmanship, lack of supervision, and possibly poor construction material used. It may be noted that no test results were found available for bricks, concrete etc employed in the construction of halaos, raising the suspicion of poor quality of material used.

22. Other defects existed such as the Plaster found peeled off sometimes, and bricks found exposed (some photographs in Plate 2.4.8), and at some halaos the platforms were found damaged indicating poor workmanship and lack of proper supervision.

23. The halaos invariably had open foundations, unlike the tree platforms which stood on piles at Moregadhi. No additional preventive measures have been adopted despite the existence of BC soil at a number of sites, and such negligence has resulted in severe damages in some of the halaos.

24. The halao foundations were not designed anywhere. No individual designs were seen and only a Type drawing was made available, which has no relevance in view of significant variations in underlying strata, sizes of halaos, and their heights. It may be noted that the halao foundations were invariably kept at 20 cm irrespective of above considerations. This implies risk of inadequate foundations in poor strata.

25. The Quality control aspects and issues related to Designs, Drawings, Estimations and Technical Sanctions have been dealt with separately under Section 2.7.

Barda Manavar

Mandwada

Borlai III

Chichli (Kasrawad)

Khedi

Awalda

Chichli: Dry Halao forces animals to depend upon pooled drainage from handpump spills.

Plate 2.4.1. Dry Halaos - Infrastructure rendered defunct.

Mohipura :Defunct Cistern nearby

Bhilkheda: Nearby Cistern Platform remains but Cistern is missing

Plate 2.4.2. Dry Halaos - Neither the Cisterns, nor the nearby halaos have any water/ Missing Inlet connections render the infrastructure defunct.

Bhilkheda

Datwada

Plate 2.4.3. Result of universal non-existent outlet drainage and complete absence of a stop mechanism when full: This would be a common scenario across R&R sites if halos were in working state and had water inlet connections and water availability (Typical).

The halao at left has height 75 cm above platform, implying smaller animals cannot drink water comfortably unless water is filled to sufficient depth. Goats, Calves etc may not be able to drink at all. Contrast this with a nearby private Halao 40 cm above ground, neatly made, and in use for past 20 years or so. No elaborate concrete platform required, correct comfortable height for cattle to drink water, and cost-effective as well.

Plate 2.4.4. Ekalwara (Manawar Tehsil): Case of two Halaos : A sarkari Halao (L) vs a Private One (R)

Kavanthi Eklera

Good halao height illustrations (Typical). Or do the animals here have lesser heights?

Plate 2.4.5.: Typical examples illustrating acceptable halao heights over the ground.

Rekti: Case of two halaos at the same site

Plate 2.4.6. Variations in halao heights even at the same site (Typical)

Plate 2.4.7. Bijasan: Halao (thankfully defunct) on the Main Approach road

Malangaon Lakhangaon

Anjad Barda Chichli

Achoda: Note the damaged platform.

Nalvai Mandwada Gawla II

Plate 2.4.8. Typical Damaged/Poor Halaos: Sometimes even when the soil is sandy,(and not at all the universal villain Black-cotton), Halaos lie damaged. Most of these do not have inlet/outlet connections also. Poor workmanship and supervision.

Chapter 2. Status of Civil Works at R&R Sites

2.5 Drainage

The half round drainage system has been provided at 31 of R&R sites, of which the system has been designed at 10 sites. Where drainage system has been provided, it comprises semi-circular half round cement concrete pipes (a total of 301.34 Kms) and in few cases U/V shaped trapezoidal RCC drains (5.92 Kms).

1. If there is one service other than water supply, that affects the quality of life in a very significant way, then it is the drainage. Monsoons can be disastrous, or very inconvenient at the least, and the loss of shelter and belongings, displacement of people and cattle can be very painful. In fact, this was one service after the near universal complaints for drinking water shortages at R&R sites, which the people seemed to be more dissatisfied about at large number of sites.

2. Field visits revealed that at large number of sites no drainage facilities have been provided. It was rather bizarre to find that no drainage exists at more than 50 sites. The criterion for limited designs and for providing drainage only at a few sites is not known. It is not understandable as to why engineered drainage is made available at certain specific sites, while others are bereft of this necessary provision. It may be noted that vide Point no 6, letter 301/Karya/2012-13, Barwani, dated 24/3/13 (Annex 2.5-A) NVDA has acknowledged that drainage was to be provided at all sites as per NWDT Award, and has committed that drainage system will be provided at remaining sites in future.

3. Not providing engineered drainage system at a wide majority of the sites is in itself a huge planning flaw. While there is no doubt that natural drainage cannot be replicated in terms of effectivity and efficiency, it remains effective only so long as there is no significant human intervention. Construction activities like buildings, houses in the plots, and provision of services like roads, excavation carried out for laying water pipelines etc, significantly alter the landscape and topography, and encroachments etc further contribute to hindrances in natural drainages. If natural drainage patterns were to be dependent upon, then they had to be kept intact by way of appropriate planning, which has been rather haphazard as evident by drainage patterns amidst the earmarked plot area. For this reasons of increased human intervention, natural drainage patterns have given way, resulting in essential need for provisioning of Engineered drainage systems at all sites without fail.

4. In the absence of drainage facilities the residents have to often do with pipes put up in adhoc manner. It is noteworthy that rather large numbers of culverts still exist at places where no engineered surface drainage has been provided. However, these are no replacement of a proper drainage system, and adhoc arrangements have to be often made to ensure drainage of the stormwater (Plate 2.5.1). In the absence of catchment studies, studies pertaining to local hydrology, and absence of assessment of expected storm waters, even the laid pipes are often inadequate leading to large public inconvenience by way of flooding on the upstream side.

5. While a majority of sites did not have drainage system, at sites where the drainage was provided, sometimes, for instance at Chenpura, the facility was extended to only a few plots and did not cover the entire site. Thus engineered drainage provided at some sites did not necessarily cover the entire site. The criterion for covering the site partially and for the choice of particular plots only to be covered under drainage is not known.

6. At R&R sites where engineered drainage system has been provided, while most of the sites have semi-circular pipe drains, some sites have trapezoidal/U-shaped concrete drains. The criteria for choosing one type over another, has been missing. Even the consultant designs fail to mention any criterion for adopting one choice over another, and straightaway proceed with the choice of half-round pipe drains.

7. Significantly, no designs were found for the Concrete sections of the drainage system which has a total running length of 5.92 Kms combined for all the sites.

8. Half-round piped drainage has been provided at 31 R&R sites. Of these, the drainage system has been claimed to have been designed at 10 sites only.

9. The remaining 21 sites R&R sites have a half-round piped drainage system, which has no design basis (!), and was therefore adhoc and destined to fail or to have shortcomings leading to large dissatisfaction of inhabitants. It is noteworthy that even the "designed" 10 sites have witnessed shortcomings and failure in the drainage system. Thus, there has been large wastage of public money for which the concerned officers need to be held accountable.

10. The designs for 10 sites appear counterfeit and fake, and appear to have been carried out only to claim authenticity to bolster arguments against possibility of a non-efficient/non-functioning drainage system, and to fulfil obligations of Technical Sanction.

11. In some cases (for example, at Khalkhurd (Dharampuri), most of the pipe purchase date, as well as the date of execution of work (ie., laying of pipes) preceded the Award of design work to the consultant! These designs were assigned to a private consultant of choice who has obliged by coming up with the design option of half-round pipes without evaluating any other option as these pipes were already purchased and laid at the site (More details in Chapter 2.7).

12. These designs were awarded piece-wise to M/S Aqua Consultants, Bhopal, instead of one single award of larger cost for the entire project (More details in Chapter 2.7). This has made it possible to award designs to a private consultant of choice by circumventing elaborate financial and technical procedures and limiting competitive requirements otherwise expected in appointing a consultant of repute.

13. Henceforth, the consultants, hands in glove with the department, recommend only the half-round Cement Concrete pipes without even evaluating other options. These "designs" by the consultant apparently have not been subject to normal process of vetting by either a third party appointed for the purpose or by NVDA itself before accepting them and approving them for implementation in the field (at least no such documents have been submitted in the records provided to this team), and before making payments to the consultants which were made hurriedly within a few days after the Award of work to consultant (More details in Section 2.7).

14. The "designs" have a number of technical flaws (More details in Section 2.7), and yet these were accepted even without vetting, and payments made in a hurry. In all likelihood, the designs are not able to cater to the flow velocities as actual slopes in the field were found often way too steep for any such surface drainage system to remain functional and efficient (Plate 2.5.2). The steep slopes may work during average rainfalls, but during high rainfall intensities, the steep pipe slopes would not allow the flows to remain steady, and unsteady flow regimes including eddies will ensue making Hydraulic jumps resulting in misalignments, broken joints, overflows in half round sections, and subsequent erosion of nearby soil(as has been witnessed on field). The drains were designed for average intensity of rainfall, and were not checked for peak rainfall intensities. The cumulative flows from amongst the plots and from the catchment outside the boundaries of the R&R sites were not accounted for. Thus, there have been serious design lacunas.

15. Strangely, the underlying Soil strata considerations were also missing from the design. In BC soils, the half-round pipes without any underlying drainage material such as a sand cushion or a cohesive non-swelling (CNS) soil cushion were sure to fail as drainage system. Yet, the pipes without any such underlying protection have been provided at sites like Moregadhi which possess classic BC soils. It is rather obvious that in these BC soils the drain pipes will get misaligned, and joints will get broken in the absence of underlying drainage material laid below the pipes to protect them from the alternate swelling and shrinkage of the BC soils due to variations in the temperature and moisture regime. Such damages were visible aplenty at sites like Moreghadhi during the inspections.

16. In all likelihood, the choice of half-round pipe drains was not appropriate, and was rather a bizarre choice as large numbers of oustees are farmers, and frequent movement of agriculture machinery like tractors or other agriculture appliances, and of the vehicles is likely to destabilize the drainage profile. Damages will be frequent in such material as these cannot sustain load. Furthermore, misaligned or

Takiapur -- Pipes put in adhoc manner across roads for providing some drainage. At times this would be sufficient, at times insufficient due to inappropriate pipe diameter to drain water. Result is complaints of water not being drained and flooding of houses.

Plate 2.5.1. Typical adhoc arrangements in absence of an engineered drainage system.

Nisarpur: Too steep profiles for pipe drains to work. The pipes joints are gone, and pipes are misaligned.

Plate 2.5.2.Typical steep Slopes for half round piped drains

Beagnda

Ratwa

Chandankhedi

Kalyanpura

Bhawati II

Nisarpur

Khalbujurg

Balwada

Bhavati II

Typical misaligned, chocked, defunct drain pipes, sometimes hanging and protruding in air, at other times grounded in the present day topography, sometimes left to discharge some distance away from the nearby culvert mouth. Also seen were broken/damaged joints. Even this has been provided only at select R&R sites, and wherever drainage system exists, it is mostly dysfunctional.

Plate 2.5.3. Typical Defunct/damaged drainage pipes

Chandankhedi: Unaligned drainage

Kasrawat (Dharampuri): Doubtful if this drainage system was ever laid, although excavation ruts exist. On a site on which virtually no one lives, one wonders what could have possibly led to such a damaging scenario. Complete apathy and lack of interest in execution of works, or incomplete works may possibly be the reasons. Even if it is a case of incomplete work, who bears the financial damages of this wasted infrastructure?

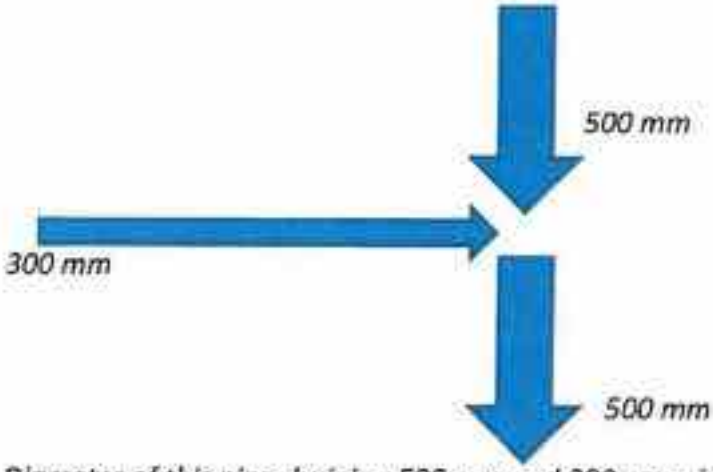
Plate 2.5.4. Poor Construction, Execution and Supervision

Mirzapur: Trapezoidal water drain slopes in middle from both sides (Top 2 photographs). A cut in the middle at lowest point (Bottom photograph) ensures that collected water spreads transversely and gushes out freely unplanned into a habitated area.

Mohipura: Poor construction and execution

Plate 2.5.5. Poor Construction, Execution and Supervision for RCC Drains

Bhawati II (Typical): Is the outgoing pipe diameter sufficient? Also seen are the broken connections at pipe joints. Two 600 mm half round pipes discharge water into another 600 mm half round pipe.



Diameter of this pipe draining 500 mm and 300 mm pipes is still 500 mm

Moreghadi (Typical)

Plate 2.5.6. Typically, 500 mm and 300 mm semi-circular pipe surface drains meet, and instead of discharging to a higher diameter pipe, these discharge to another 500 mm semi-circular drain: A common occurrence -- can be design flaws, more so because the drainage has not been designed at several sites.

Khujhawan

Two drain Pipes passing through the road. Pipes of 300 mm diameter each discharging from plot 256 (upstream of pipe) on one side of the road to the Polt 283 on the other side of the road. No culvert constructed here, the pipe cover below the road here is less than 0.5 m. Adhoc drainage arrangement to supplement existing drainage system at site.

Ratwa –Adhoc pipe laid across the road for drainage with hardly any cover

Note: At some sites, some of these adhoc cross drainage pipes may have been laid by private persons or the community, but nevertheless it reflects the insufficiency of the drainage infrastructure officially created and provided at R&R sites.

Plate 2.5.7. Inadequate drainage systems at Sites - Lack of micro-planning.

Ganpur Sirsi: Photographs of a semi-circular pipe drain coming from slope drains directly towards the Pumphouse some 6-7 m in front, posing risk of flooding of Tubewell and pumphouse during the rains.

Chenpura: Drainage provided in parts only on one side of the road, and towards the lower side (building located on the higher elevation on other side of the road): This implies that the flowing water from higher slope is collected by the drainage system only after it crosses the road, and hence the road remains unprotected from the lateral flow of water flowing rapidly down the slope.

Plate 2.5.8. Poor Planning at R&R sites (Typical)

Mohipura

The Site has cemented side drains (Left) in a part which drains water from the hillock where buildings are located. At stretches, the drain is on one side of the road only, and at other stretches on both sides. The drained water forms a pool crossing the road through culvert (Right), and then overflows damaging the crops around. Lack of plan for final disposal of drained water: a typical problem across R&R sites with drainage system.

Ratwa: the case of drainage system becoming a liability for some

At Ratwa, the ultimate disposal of drainage water is into private agricultural fields. To prevent crop damage and erosion of top soil, the farmers ensure that the surface drain are chocked and culverts blocked by putting Stones etc. But, if farmers stop the flow of accumulated drained water in their fields during the rains, the site gets submerged with water entering homes.

This problem of siting plus a problem of inappropriate ultimate disposal of drainage water is a dispute that has resulted in local unrest (The team was told that skirmishes have taken place and police/administration interventions were common, although this needs to be verified). Negligence in Planning, design and execution can lead to disputes, people fighting amongst each other, and unrest. And this is an issue that now has little patchwork solution.

Note: Earlier to the construction of drainage system also this water would enter the crops due to natural slopes, but now there are limited designed point sources that discharge heavily as the drainage is no more now distributed and spread over a larger area.

Plate 2.5.9. Planning lacunae - Final Disposal of Drained water into crops.....cont..

Kavanthi: The entire collected stormwater from the R&R site and a hillock drains through a Rapta at Main road (Manavar Ganpur road) (Top Photos, and satellite imagery white line of deposited silt above the top blue mark) takes a curve, and goes into a drain to a road (Middle Photo, and satellite imagery bottom blue mark), where inhabitants have their agriculture fields which are not under submergence. This road is in the form of a channel as seen from satellite imagery, and gets flooded to become completely unserviceable for 4 months during and after rains due to BC soil all along. Accidents are likely to be common, as it is the only road connecting the fields. Thus, the water finally drains into crop-fields and is a major issue of contention.

Plate 2.5.9. Planning lacunae - Final Disposal of Drained water into crops

Brahmangaon (Theekri): Two Culverts discharging water at right angles into an area that has higher elevation all around with no place for water outlet. This could have formed an example for other sites, had a proper pond been constructed here making use of the situation, and the ponded water could have recharged groundwater as well as acted as storage for improved aesthetics and for miscellaneous uses.

A centralised planning process with specific provisions to be provided at R&R sites could not have made such site-specific provisions that could have contributed in a big way in all-round development of R&R sites. Decentralised micro-planning was necessary with flexibility to introduce limited site specific interventions, and that has been missed sorely.

Plate 2.5.10. An opportunity lost in haphazard planning- Case of Brahmangaon

Ratwa : Although private use of public resources is condemnable, lack of maintenance and a not so functional infrastructure, has led the locals to use drain pipes that are otherwise lying defunct and waste.

Plate 2.5.11. Public Disenchantment with Drainage Infrastructure

Chapter 2. Status of Civil Works at R&R Sites

2.6. Culverts

Large numbers of Culverts (and a few causeways (Raptas)) have been constructed as cross drainage works at the R&R sites. The salient observations with regard to field visits undertaken are as below:

1. The sheer numbers of culverts at several of the R&R sites was baffling. A number of R&R sites had large numbers of culverts. For instance Nisarpur (II and III) (308), Dharampuri (223), Anjad Barda (125), Kasrawad (113), Ganpur (106), Khalkhurda (103), Chikalda (101), Borai III (67), Gehalgaon (63), Mohipura (46), Mandwada (46), Sala (45), Nimbola (52),Brahmangaon (48), Khalbujurg (67), Chichli (43), Kadmal (53), Ekalwada (54), Mirzapur (41), Nisarpur-I (50), Dharamrai (40),Kukra (58), Khedi (82) etc. had culverts numbers looking exceedingly large.

2. The numbers were too large by any criterion. Even for residential colonies with plots, the numbers of culverts rarely matches the numbers provided at several R&R sites. Overall, the numbers of culverts at all sites exceeded 3000.

3. On the other hand rather conspicuously at Bhilsur no culverts have been constructed despite large scale development in the form of building structures like Panchayat Bhawan, Primary School, Primary Health centre, and a Seed Godown. It appears that the site has incomplete works in case of Bhilsur.

4. Thus there has been haphazard planning with respect to provisioning of culverts. Raised road embankments due to large earthwork having been carried out as pointed earlier in Section 2.2 has made the plots to sit on lower levels necessitating culverts to drain water from one plot area to another, in turn necessitating large numbers of culverts.

5. There has also been completely adhoc planning with respect to the synchronisation of drainage and culverts with site hydrology. It may be noted that the surface drainage system has been claimed to be designed only for 10 sites. However, even at these 10 sites where the surface drainage system has been claimed to be designed, the culverts have not been designed.

6. Estimation of flows through a particular culvert would need catchment studies for enabling the sizing of culverts to be determined with any precision. No such catchment studies were seen in any of the records provided. It may be noted that in

the absence of any catchment studies for the culvert, there is absolutely no scientific justification for having such large numbers of culverts at most of these sites. The entire planning has thus been adhoc: no criteria exist as to where to locate the culverts, and in what numbers, and of what sizes.

7. The culvert pipe diameters mostly used have 600 mm, although other diameters like 700 mm and in some case 900 mm, 1000 mm etc have been employed. Yet, there exists absolutely no basis for adopting these different diameters. No designs exist to support the diameters applied on field for individual culverts, and there has been no basis of calculations of culvert diameters since likely flows to individual culverts were never estimated, and no catchment area studies were conducted to determine the hydrological flows. There is no way that thousands of culverts thus executed without design calculations will work efficiently. There has thus been massive wastage of public money for which concerned officers need to be held accountable.

8. It may be noted that a Type drawing has been found in the records provided, but this drawing is neither site specific nor has any structure specific details. This is completely irrelevant and absurd in view of changing pipe diameters, varying culvert dimensions including headwalls, and their respective heights above ground.

9. The work adhocism is reflected in the fact that at large numbers of sites, all culverts in any chosen network were often seen of the same diameter, implying that the cumulative flows downstream were not accounted for (more details in Section 2.7). At some sites like Nisarpur etc. where culverts are constructed at each junction of road, surprisingly more numbers of similar diameter pipes are provided at upstream side junctions and less numbers at downstream side (!) implying absurd execution.

10. Besides the unexplained numbers, and pipe diameters, there is no explanation on dimensioning of culverts also. The culvert dimensions even for the same pipe sizes were not standardised. The heights of the headwalls, as well as their lengths, were completely random: neither a design basis existed for choosing particular lengths and heights, nor was any standardized field practice adopted. Thus, lacunae in designs/ execution/ planning also resulted in lack of standardisation for the culvert superstructures, whose dimensions were adhoc, arbitrary, and without any basis, whatsoever.

11. For example, the height of the headwall above the ground had large variations from culvert to culvert even at the same site. Table 2.6.1 illustrates typically a few variations. For instance at Bhawati 1, the variation in headwall heights was as much as 0.4 m to 1.45 m, ie a difference of more than 1 m. Thus culvert headwall heights varied by more than 300%. The variations were so random that it was easy to find

even adjoining culverts with varying heights, some almost flushed with ground while others having 50-60 cms heights (Plate 2.6.1).

12. Even if one forgets about uniformity in various culverts as regard to observance of similar heights of headwalls above ground, variations were even seen in the same culvert: the two walls across the road were not found at the same level in some cases (Plate 2.6.2) indicating poor execution and supervision.

13. Sometimes, the headwalls were flush with the road, so that road safety stood completely compromised, and vehicles could fall down on the side ditches (Plate 2.6.3). No wheel guards etc. were provided in such cases as safety measures.

14. Similarly, there was no standardisation with regard to culvert headwall lengths. The Culvert headwalls were sometimes excessively long (Plate 2.6.4). Shorter walls could have been equally useful, and would have been less prone to damages, besides being economical in terms of initial costs and maintenance thereafter.

15. Such wild variations in culvert sizing/dimensioning would have required careful and unique design for foundations of each culvert in view of changing loads expected and the changes in strata. However, the foundations of the culverts had no design basis, no geo-technical considerations, and no structural designs were carried out for culverts on individual basis. It has been random, arbitrary construction all the way.

16. There was no provision of pitching on the sides particularly where the topography was sloping to prevent the sides from erosion that may ultimately lead to collapse (Plate 2.6.5).The Culverts headwalls ended abruptly, and in the absence of any protection like pitching on the sides, the soil near the shoulder ends became vulnerable to erosion, chocking the culverts due to eroded material, and leading to damage and collapse if erosion is excessive.

17. It was not uncommon to find chocked/clogged defunct culverts (Plate 2.6.6). With side protections missing, and waterways not constructed, topography having altered over years due to construction activities, and all this coupled with lack of maintenance and regular cleaning, has ensured that culverts have often become completely defunct due to clogging.

18. In certain cases, one could even question as to why there was a culvert built at specific points considering the present day topography (Plate 2.6.7).

19. Then there were several other issues which pertained to lacunae with respect to planning/execution/supervision. Some of these were site-specific or limited to a few sites, but had generalised lessons of their own with regard to planning /execution/supervision. Typically, Handpumps, halaos etc would have un-engineered drainages discharging into culvers, chocking them with mud. In some

cases, downstream culvert sizes were smaller than the pipes discharging to culverts, and there were execution flaws, some of which are illustrated in Plates 2.6.8.

20. The pipe joints beneath the roads comprising the cross drainage were often found inadequate, indicating poor execution. The male/female parts were often not together, and this left gaps beneath the road. Some of these gaps evident by visible gaping holes are illustrated in Plate 2.6.9. These holes are sometimes big enough for the bullock-cart wheel to entre, and are a potential source of accidents for cattle pulling the wheel carts.

21. The gaping holes on roads became visible only because the Cushion/Cover provided over the cross drain pipes were inadequate, sometimes so much that the pipe surface itself would be seen on the road (Plate 2.6.10). It is possible that where sufficient cushions/covers have been provided, the gaping holes on road surface may not appear, despite the fact that the pipes inside and beneath the road surface may not be properly and adequately jointed.

22. The layout of the culverts was also rather bizarre at several sites, especially at sites where engineered drainage system is non-existent or has been provided partially. For a set of culverts, it was often difficult to fathom as to how the water would search its way, and would zig-zag to reach a particular culvert at the downstream, as the culverts were sometimes built in series and were staggered in space, with no intermediary waterway chartered or carved out for the flowing water (Plate 2.6.11). It is noteworthy that some of this zig-zag route would sometimes fall amidst the envisaged plots, and obviously, the risk to life and property of residents in such cases will be very high.

23. Another issue prevalent over a number of R&R sites has been with regard to the locations of the culverts. It was not uncommon to find plots right in front of culvert pipe openings (Plate 2.6.12). Obviously, these will be a source of perpetual misery to those who own these plots. Planning in this respect has been rather insensitive.

24. Not just the plots, but even the water supply pipes, air valve chambers, handpumps, electricity poles, Transformer poles, often used pathways etc were all found in front of culvert pipe openings (Plate 2.6.13), indicating careless execution and faults in overall planning. Some of this Infrastructure may cause hindrance to culvert flows, and culvert flows in turn may endanger the well-being of the infrastructure. It is possible that some of this infrastructure may have come up later than the culverts, but lapses in overall planning and coordination between various services are indeed apparent. This is reflective of adhoc planning and lack of coordination between the different arms of service providers at these R&R sites.

25. The final disposal of culvert water was often unscientific, unplanned and haphazard. The culverts would often discharge into the agricultural fields, where they would destroy the crops or erode the nearby fields and submerge them after heavy downpours. This issue of final disposal being rather adhoc, and mostly unplanned at several sites, has even been a source of major heartburning, unrest and disputes at certain sites, and has already been dealt with in details in Section 2.5 (Plate 2.5.9).

26. One of the reasons that the culverts are needed is to provide cross drainage for protection of roads from flow of water, a purpose that could have been met by raptas also, and with a lot of economy. Another reason for culverts is to ensure safe drainage from the plot area, and unfortunately even that purpose has failed largely.

27. In cases where surface drains have not been provided, the dependence is completely on the existing natural drainage patterns as no trained waterways have been chartered. At most of the sites where large numbers of culverts have been provided, the engineered drainage systems have not been laid. At such places, the aim has been that water collected from natural watercourses will eventually flow from one set of plots to another set through connecting culverts, till a low lying area is reached where final drainage can be disposed.

28. Providing adhoc culverts is however, no solution to the problem of drainage at these sites, as developments of plots and construction activity thereon has altered the topography rendering culverts defunct and creating havoc due to impediment of drainage water. In such a scenario, where topography is changing, the culverts serve hardly any purpose in the absence of engineered surface drains, and hence many of the culverts constructed have gone waste and have become defunct with time as illustrated in Plate 2.6.14.

29. Culverts without surface drains may still have worked natural drainage patterns were trained, ie., if trained waterways have been provided, and plots were demarked so as not to disturb the natural drainage, and later it was seen to it that natural drainage is not affected by construction activities. But the natural drainage is severely affected currently, as trained waterways have not been provided, and plots are cut without any such considerations. The result has been that the natural drainage was often seen meandering across the area earmarked for plots (Plate 2.6.15), severely affecting lives of rehabilitated people.

30. With reliance on natural watercourses to drain water, the system has collapsed, as the natural watercourses are also significantly altered due to these construction activities or because of encroachments (Plate 2.6.15), leaving the drainage water to charter new undefined courses, making culverts defunct, and causing inconvenience and loss to the inhabitants. In the times to come, the construction activity is likely to destroy completely the natural drainage stabilized over decades,

and any remnants of natural drainage would further get annihilated during construction of houses on plots by the residents. The drainage water even now finds a way across houses, severely affecting lives of rehabilitated people especially during the monsoons (Plate 2.6.16). This has been a major problem and a source of public discontentment at several R& R sites, and it is likely to intensify as the topographies get more and more altered with time, and the sites get inhabited to larger extents.

31. Altered topographies in such cases will not only render the culverts defunct, it would also decimate all estimates of discharges effectively annihilating any basis of culvert diameter/size. Thus, in certain cases like Raswa Deb and Takiapur the culverts put into place are not able to take the flow, resulting in submergence upstream, crop loss, inaccessibility due to temporary loss of Approach, flooding of houses and plots, inconvenience to habitants and their cattle, and large scale discontentment and public complaints. The root cause remains faulty planning: An absence of engineered drainage system, allowing the natural drainage through constructed culverts, large scale changes in natural drainage patterns due to anthropogenic and related activities including construction, and yet hoping that the culverts would function despite massive changes in topography and landscape.

32. Large numbers of culverts seen at the R&R sites were found damaged to varying degrees. Therefore, besides the superstructure quality, efforts were made to observe the laid foundations of select culverts at more than 25% R&R sites to determine quality issues, if any.

33. Table 2.6.1 illustrates the large variations in culvert foundation depths from site to site and even at the same site. Since no soil investigations were conducted, and culverts were not designed on individual basis, it is evident that the culvert foundation depths had no basis at all, and the variations in foundation depths were without any scientific basis, and were completely adhoc. These variations were akin to culvert dimensions: random variations were observed from culvert to culvert in terms of heights of headwalls, headwall lengths, and foundation depths.

34. The observations and damages in stone masonry culverts were serious. Inappropriate masonry stone sizing, joint thicknesses upto 4 cm on outer face, and poor packing inside with part hollow and part use of stone chips, poorly cured, and poor quality mortar, were commonly seen. Mortar could be racked by bare finger at many places without any efforts so that at some sites, the culvert structures were available in traces. Foundation joints were also observed hollow in several cases. These poor quality issues associated with stone masonry culverts are illustrated in Plate 2.6.17.

35. In cement concrete culverts, the observations were equally serious, and the possible reasons for damages could be the use of rounded pebbles/large flaky

aggregate material which prevented effective bonding (even 70-80 mm long flaky aggregate material as against maximum 40 mm were often seen), poor curing/no curing which imparted weakness, use of substandard material, etc. (Plate 2.6.18). In several cases it was possible to peel up the concrete with bare hands, such was the quality of cement concrete used.

36. At a number of cement concrete culverts, 16 mm diameter TOR steel bars were found to have been used as temperature reinforcements which is a wasteful and uneconomical provision, and seems to be an undue favour to contractor. These structures appear more like reinforced concrete constructions rather than the plain cement concrete constructions with a provision of nominal (8-10 mm diameter) temperature reinforcement.

37. In some cases, cement-concrete culverts were found plastered. If the concrete proportion is as per specification, and also the mixing, vibration, and centring works are done as per requirement, plastering is actually not needed, and in no case extra payment of plastering is permitted. Despite this, even where the plastering was done, the quality was poor and the upper layers were often found gone in patches, revealing the poor qualities underneath (Plate 2.6.19), thus raising suspicion that plastering was only a hiding ploy.

38. A wide majority of culvert structures were seen without whitewashing. However, in a few cases, whitewashed culvert structures were seen (Plate 2.6.19), and like plastering, the whitewashing work also sought to hide the poor contents inside.

39. In some cement concrete culverts, the sections were found too large resulting in unnecessary and avoidable cost increases. The workmanship was so poor that even the profiles were not maintained in a few cases. Inappropriate foundations also resulted into differential settlements seen sporadically. These issues are highlighted in Plate 2.6.20.

40. The Quality control aspects, and issues related to Designs, Drawings, Estimations and Technical Sanctions have been dealt with separately under Section 2.7.

Table 2.6.1: Select Observations during field inspections versus Measurement Book records for Culvert foundations (Typical)

S. No.	R & R site	Material	Foundation Depth (Actual)*m	Foundation Depth as per MB m	MB No.	Headwall height above road top formation m
1	Bhilkheda	RR Masonry	0.80	0.85 to 1.40	325	0.93
2	Kikarwas	RR Masonry	1.0	0.835-0.915	31	1.16
3	Chikalda	Concrete	0.98	1.01 to 1.02	793,796,798	1.25
		Concrete	0.95	1.00 to 1.02	794, 796,798	1.40
4	Khalbujurg	Concrete	0.70	1.50 av	67	
5	Moreghadi	Concrete	1.48	1.50 av	27	
6	Balwada	Concrete	0.98	0.905 to 1.15	1	0.4
7	Borlai II	RR Masonry	0.78	0.81 to 1.22	170	
8	Khedi	RR Masonry	1.05	0.871 to 1.0	455	
9	Eklera	RR Masonry	0.76	0.78 to 0.97	66	0.56
10	Morekatta	Concrete	0.45	0.35 to 0.40	627	0.83
		Concrete	0.60	0.35 to 0.40	627	0.56
11	Bijasan	Concrete	0.6	1.05 to 1.21	458	0.5
		Concrete	0.6	1.46 to 1.48	458	
12	Bhavati I	RR Masonry	0.6	0.532 to 0.969	101	1.45
		RR Masonry	0.5	0.43 to 0.51	677	0.4
13	Bhavati II	RR Masonry	1.30	1.26 to 1.027	76	0.54
14	Bhamta	RR Masonry	0.4	0.6 to 1.0	667	0.42
		RR Masonry	0.82	0.8 to 1.0	667	
15	Awalda	Concrete	0.4	0.48	688	0.48
		Concrete	0.4	0.475-0.5	688	0.45
16	Sondul	Concrete	0.9	1.17 to 1.54	269	0.77

* Foundation depth at randomly excavated point.

Balwara: Case of 2 nearby culverts nos. 12 and 13 barely a few meters apart. Culvert No 12 has headwall height 50-60 cms above road. Nearby Culvert No. 13 is almost flush with the road.

Kavanthi: Two adjoining Culverts. Note the difference in their heights (almost 70 cms). Culverts ranged from being flushed to 70-80 cms above ground level at this site.

Plate 2.6.1. No standardisation of culvert headwall heights (Typical)

Vishwanath Kheda: The far away headwall on upstream side has 25-30 mm height, whereas the nearer wall on downstream side was 55 cm from Ground level.

Plate 2.6.2. Variations in headwall heights for the same culvert (Typical)

Chenpura

Top Photograph: The road slopes longitudinally, and has no camber so that the water will mostly flow longitudinally along the road damaging it, rather than across the roads to side drains (which have not been provided).

Bottom Photographs: The inlet side is chocked (left). Water has cut its own pathway on the surface near the concreted headwall as evident from the soil cut (Right). Also, note the absence of any side protection (pitching etc.).

Also note the lack of safety measures: There is an abrupt end of the road which makes it risky and accident prone: a vehicle may easily fall down off the road into the ditch. Either the headwall had to be raised above the top formation of the road, or at least wheelguards could have been provided to save the vehicles from falling over. Safety has often not command the much necessary priority.

Plate 2.6.3. Typical Poor Planning, execution and safety issues—Case of Chenpura.

Sharikpura

Ekalwara: Size relative to Jeep, Notice also the extension on one side relative to pipe opening

Two culverts at Beganda

Chichli

Plate 2.6.4. Excessively long Culvert headwalls (Typical).

Borlai 1

Mirzapur

Gawla

Chakeri: soil leaves the wall

Ganpur Sirsi : Also note the plot stone

Plate 2.6.5. Typical story at all sites - No side protection for culverts,no pitching, culvert headwalls end abruptly, leading to soil erosion during rains. Improper designs.

Khujawan

Anjad Barda

Mohipura

Perkhad

Sharikpura

Kathora

Plate 2.6.6. : Clogged defunct culverts. Waterways not properly made or channelized. Poor Maintenance (Typical)

Datwara Kavanthi

Ejkalwara Lakhangaon

Achoda Dharampuri,Dhar

Chenpura Lakhangaon Jalkoti

Plate 2.6.7. Vestiges of culverts: It really would not have mattered if these were not constructed; at least that is what the immediate topography speaks as of now.

Gawla II: Poor drainage for Handpump and halao etc. The unengineered and undesigned drainage from these would drag mud that would invariabley choke culverts (Typical)

Khalbujurg : The smaller size culvert is supposed to drain a larger pipe plus water from semi-circular surface drain. In fact, the semicircular drain cannot take the volumes delivered by larger Drain Pipe from across the road. Design anamolies (Typical).

Gehalgaon : Careless Execution

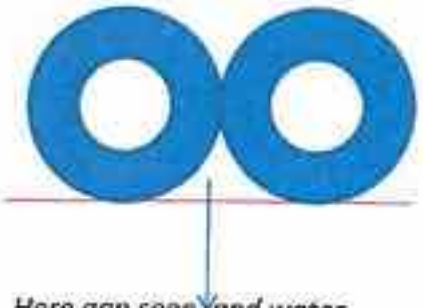


Plate 2.6.8. Poor Execution and Supervision (Typical)

Nisarpur Ratwa

Chichli Kasravad :Massive piping even in hard soil Bhavariya Kukshi

Saita (Kasravat) : 2 different Culverts with inadequate cover, if any.

Anjad Barda Chikalda

Plate 2.6.9. Cross drain Pipes not connected, Inadequate Pipe covers on Road, Roads caving in (Typical): Poor Execution.

Borlai I

Kasravad

Plate 2.6.10. Typical Inadequate Cover/Cushion over the pipe, pipe visible on the road. Poor execution and supervision.

Mirzapur

Brahmangaon,Theekri

Borlai II water flows in zig zag pattern to find out the culvert made

Borlai II: Another set of culverts-water from hills left free to zig-zag

Plate 2.6.11. Drainage Water from culvert left free to find its own course/another culvert in between the plots : No training of water-ways and terrain (Typical)

Jalkheda

Borlai I

Lohara : plot no 103 in front of culvert mouth

Chichli

Takiapur: Plot 117 in front of culvert outlet, plot 119 in front of same culvert inlet

Jalkheda: Another case

Plate 2.6.12. Typical Plots in front of Culvert Pipes: Insensitive planning and execution.....cont..

Khedi

Achoda

Kalyanpura

Plate 2.6.12. Typical Plots in front of Culvert Pipes: Insensitive planning and execution

Gehalgaon

Kirmohi

Ganpur (Narmada Nagar): Air valve Chamber, Cover also missing to facilitate immersion

Chikalda: RCC Pole

Gawla I: Culvert discharging directly on an oft used pathway: No drainage control

Plate 2.6.13. Infrastructure too close to Culverts: Overall Poor planning and execution.....cont..

Bhilkheda: Transformer Switchboard panel

Chikalda: HB Pole

Ratwa: Water supply pipe submerged in flooded culvert dirty water

Mirzapur

Dharampuri Dhar

Plate 2.6.13. Infrastructure too close to Culverts: Overall Poor planning and execution

Eklera : Topography has completely changed after the construction work at the site. The culvert pipe had to be dug to be seen, as evident from the mud on the wall and inside the pipe.

Borlai II: Topography has changed so much that the culvert mouth has almost been buried, and a water supply line has been carelessly laid on the eroded consolidated sediment brought to the culvert mouth by flowing water.

Plate 2.6.14. Severely affected drainage patterns at the R&R sites (Typical)

Kavanthi

Chenpura

Chichli

Plate 2.6.15.Typical Encroachments allowed to happen at sites - Natural drainage affected

Kukra (Badwani): Culvert discharging into plots (plot 39-40) at the back of Primary Health Centre across the road (top). On the house in front (middle and bottom photographs) there are visible signs of dampness left by waterlogging in the last monsoon as the culvert discharge has no watercourse available and water logging is common.

Plate 2.6.16. Flooding due to Culvert Discharges (Typical)

Borlai II

Kirmohi

Takiapur: Inadequate Curing, poor workmanship

Datwara

Gehalgaon

Kaisur

Ganpur, Manawar

Bhilkheda

Kirmohi

Plate 2.6.17. Poor construction of stone masonry culverts (Typical)--Poor masonry work, poor joints, inappropriate curing and poor foundations.....cont..

Amlali: RR Masonry Culvert. Poor workmanship and quality. Culvert pipe mouth seen blocked, and how water will pass through is beyond imagination. Upstream ground level is above road formation level, so water is overtopping road formation rather than pass through culvert pipe

Jamda (left) & Borlai I (right): RR Masonry culvert with poor joints and inferior work quality

Poor quality of workmanship with poor masonry work at culvert foundation at Bhawti II (left) and head wall of RR Masonry culvert at Dharamrai (right)

Plate 2.6.17. Poor construction of stone masonry culverts (Typical)--Poor masonry work, poor joints, inappropriate curing and poor foundations.....cont..

Ganpur: Foundation failure and poor workmanship of RR Masonry culvert

Jamda (left) and Kalyanpura (right) : RR Masonry culverts with poor quality of work

Bijasan: Foundation of RR Masonry culvert showing very poor joints

Plate 2.6.17. Poor construction of stone masonry culverts (Typical)--Poor masonry work, poor joints, inappropriate curing and poor foundations.

Vishwanath Kheda

Balwara

Anjad Barda: Two Culverts

Jalanpur Dhalkheda

Mandwada

Jalkoti, Maheshwar

Plate 2.6.18. Poor construction of cement concrete Culverts (Typical) -- Large flaky aggregates, Poor concreting, and lack of curing.....cont..

Nisarpur

Bhamta Jangarwa

Umda: Poor concrete quality and construction

Moosapura

Plate 2.6.18. Poor construction of cement concrete Culverts (Typical) -- Large flaky aggregates, Poor concreting, and lack of curing.

Beganda: Culvert No 1 (top two photos) had plaster over it nearly 1 cm thick. The inside material was extremely poor quality, and could be easily peeled by bare fingers. Even 8 cm long flacky aggregate material was found. There was hardly any binding seen. From the colour inside it appeared that curing was inadequate. Overall poor quality. It appears that plastering work has been a ploy to hide the quality of material inside. In some cases (example, bottom photo) even whitewashing was noticed (whitewashing on culvert structures has been carried out rarely, and was mostly not seen), and was obviously carried out to hide the poor quality. Similar issues were prevalent in other culverts, example, Culvert no 8.

Plate 2.6.19. Culverts with plastering work (Typical)

Khalbujurg Moreghadi

Typical poor concrete work. Plastering has been done over concrete, and culvert not seen in profile. Khalbujurg culvert headwall appeared declining outward and was not vertical.

Balwada: Typical extra wide concrete section of culvert, and its poor connectivity with the drainage alignment (right)

Khalbujurg: Headwall settlement of Cement Concrete culvert at Khalbujurg where BC soil strata exists. A result of inappropriate foundations resulting in differential settlements.

Plate 2.6.20. Cement Concrete Culverts (Typical): Poor concrete quality, poor alignments, and sometimes use of excessive quantities of concrete.

Chapter 2. Status of Civil Works at R&R Sites

2.7. Geo-Technical Investigations, Designs, Estimates, Procedural Approvals, and Quality Control Details

2.7.1 Geo-Technical Investigations

The load of entire structure, through its Foundations, is transmitted to the underlying soil strata on which the structure rests. For this reason, the characteristics of the strata on which foundations rest are extremely important. Therefore, the geo-technical investigations and appropriate designs of foundations based on these investigations are significant components that decide the well-being of structures.

A geo-technical site investigation in one form or another is always required before the commencement of a building or any other engineering structure. Possibly from the earliest stage, and definitely during the design stage, due investigations are to be conducted. The investigation may range from a simple examination of the surface soil such as digging the ground to have a few shallow trial pits, to a detailed study of the strata, and to a considerable depth below the surface by means of boreholes and tests, in situ and/or laboratory, of the materials encountered. Additional information about ground conditions may also be obtained by examining open trenches or shallow excavations for road works, or hand auger borings. Contoured ordinance sheets and geological maps could also be useful. When troublesome foundation conditions are encountered it would be necessary to sink deep boreholes, supplemented by soil tests. Even if rock is known to be present at a shallow depth it is advisable to excavate down to expose the rock in a few places to ensure that there are no zones of deep weathering or heavily shattered or faulted rocks beneath. Thorough investigations are equally necessary for engineering the structures by providing information for foundation design, and for providing essential information on the soil and ground-water conditions to the contractors tendering for the work.

The following observations from the field explorations and study of records are made with regard to foundations, geo-technical investigations, and design and execution undertaken:

1. Various structures were constructed in a number of districts in the catchment of the Narmada River, and the strata differed from site to site, sometimes very significantly and so grossly as to be visibly different. This fact was obviously known to the vastly experienced and technically qualified authorities of NVDA. It is a matter of regret that technical sanctions were carelessly accorded without

ascertaining detailed geo-technical investigations for evaluating the quality of the underlying strata including its safe bearing capacity.

2. Thus, despite known importance of testing requirements, except for contour survey, resistivity survey, and some random tests at very limited number of sites, the geo-technical investigation were grossly ignored and not carried out. Even tests for safe bearing capacities and determination of CBR values at desired frequencies were not performed, in the absence of which detailed engineering designs were impossible.

3. From the documents submitted it appears that safe bearing capacities of soil for design of Open foundations was not determined , Trail pits were not excavated, and Plate load test were also not conducted. These extremely serious omissions have led to quality issues in buildings like vertical and horizontal cracks appearing on walls, sometimes to an extent that the building is await a near collapse.

4. Similarly, for Roads, to know the strength of soil for which CBR of soil of sub-base, Granular Sub-base (GSB) at every 300 m for each layer of 15 cm or 30 cm thick is mandatory as per Madhya Pradesh Works Department (MPWD) Manual 1983 and IRC codes. The road design and the ultimate strength achieved both are dependent on such test results. Other than this dry density, moisture content, plasticity index of soil are also important and these test are made mandatory as per the contract documents itself. However, these important soil characteristics remained undetermined and the tests at the desired frequency were not undertaken.

5. No soil test results were again found available for construction of any Tree Platforms and Halaos at R&R sites. Thus, Tree Platforms and Halaos were invariably constructed without determining characteristics of the underlying strata.

6. Similarly, to design the head walls of culverts, testing of the safe bearing capacity of soil is mandatory. No such tests were conducted.

7. Even the trial pits that could have helped in giving idea of the underlying soil characteristics were not made for buildings at most of the R&R sites. Trial pits were also not made for Tree platforms and for culvert structures.

8. The Soil investigations were also not carried out even at the 10 sites where Drainage system has been claimed as "designed". The underlying Soil strata considerations were completely missing from the consultant designs for the 10 claimed designs. In BC soil therefore, the status of drains seems critical as was evident during field inspections. In such soils, the half-round pipes without any underlying drainage material such as a sand cushion or a cohesive non-swelling (CNS) soil cushion were sure to fail as drainage system. Thus lack of soil considerations have resulted in the drain pipes that are misaligned, broken joints and failures due to alternate swelling and shrinkage of the BC soils because of variations in the moisture and temperatures.

2.7.2. Design and Drawing Aspects

9. As a consequence of undetermined soil characteristics, it was not possible to ensure that the detailed drawings and designs of each individual structure were carried out in an appropriate manner.

10. Most building drawings were Type drawings of Chief Architect, MPPWD and good enough for estimates for obtaining Administrative approval. However, for Technical Sanctions and construction purposes, structural drawings should be prepared based on designs of each component i.e. foundation, RCC components, Plinth height etc. These provisions are mandatory and are to be approved by competent authority for its structural soundness, and all of these have been flouted.

11. Some information like details of foundations of buildings and other structures were shown by free hand over the photocopies of the records provided and claimed as Type drawings/As built drawings. These detailed marked in original ink over the photocopies appear to have been shown on claimed As built drawings only to satisfy the need of enquiry. In reality, the details of foundations etc. were not provided in the original drawings, and no "As built" drawings were prepared on completion of work for any type of structure, in violation of the provisions of MPWD Manual, 1983.

12. Thus, no foundation details were shown on drawings as only Type drawings without foundation details were used for construction and estimation purposes. These Type drawings (suggested by the Chief Architect, MPPWD without foundation details) did not obviously have the structural details such as reinforcement details of slabs, columns, lintels, chajjas, plinth beams and foundations etc. marked over them. Yet Technical sanctions were accorded despite such missing details as are mandatory for approval of Technical Sanctions, and for construction and Estimation purposes. This is in violation with the provisions of MPWD Manual, 1983 and Technical powers accorded to competent authority for grant of Technical Sanction.

13. Even the trial pit details were not marked on most drawings, a consequence of the fact that no trial pits were made in vast majority of the cases, as admitted by NVDA in its correspondence (Annex 2.7-A: Typical for one R&R site at Nisarpur II&III where as many as 30 buildings and 308 Culverts exist, all constructed without any trial pits).

14. Thus, the established procedures and practices were all blatantly violated in contravention to provisions of MPWD Manual, 1983, and the entire works were planned and carried out in crude adhoc manner.

15. Even the designs of RCC work such as slab, columns, lintels and footings etc were also not found available in the records provided, except for a few structures at some of the R&R sites in the Dharmpuri division. This is a serious issue of concern and a huge lapse indicating gross negligence by NVDA.

16. All foundations except pile foundations at Moreghadi and Khalbujurg laid have been laid without designs. In the absence of necessary geotechnical investigations, adhoc designs have been adopted by field in-charges who were actually not competent as per provisions of MPWD Manual-1983, to deal with complex design situations arising because of different/varying strata even where the super-structures were similar.

17. Even the pile foundation for tree platform at Moregadhi is arbitrary and has not been designed.

18. Tree platforms and Halaos were not designed, despite the fact that significant variations in sizes of tree platforms and halaos, as well as tree platform heights, and halao dimensions existed not only from site to site, but even at the same site. In the absence of design, such variations were at the discretion of the Engineer-in-charge, and any dimensions would have done as far as the budget provided was getting exhausted. Foundations of these structures also appear to have been decided on adhoc basis in the absence of geotechnical investigations and random variations in superstructure sizes.

19. It may be noted that the designs could not have been the same at all sites as the soil characteristics, Tree Platform sizes and heights, Halao dimensions, and Culvert Headwalls dimensions and Pipe Diameters were seen to vary considerably from site to site and even at the same site. Yet, detailed structural designs were not prepared, overlooking the variations in sizes and changes in underlying strata.

20. The case of Culverts and Drainage is equally serious. While tree platforms, halaos and buildings can have an assumed standard superstructure sizing/dimensioning (with variations only in the foundations as per variations of strata), culverts and drainage dimensioning will indeed change with the flow of stormwater. For instance, culvert pipes/drain pipes upstream will have lesser diameters, and as the flows add up, culverts/drain pipes on the downstream side will tend to have greater pipe diameters to take care of cumulative flows. This is common-sense, and the explanation does not need elaborate Engineering principles and degrees. However, as illustrated in Table 2.7.1 even such obvious logic or rather the common-sense was relegated and given up completely by the qualified Engineers while constructing Culverts (and the surface drains as well). Table 2.7.1 lists the numbers of culverts and pipe diameters constructed at some of the R&R Sites. A mere look at Table 2.7.1 illustrates the complete adhocism and absence of any seriousness in provisioning the infrastructure, as virtually all culverts have same pipe sizes.

21. Thousands of culverts have been made, mostly without any designs, without drainage Plans, without structural design work, and yet after obtaining necessary Technical Sanctions. No soil investigations were conducted, and no catchment studies or drainage plans were made to estimate the inflows/outflows that could have decided the sizing of the culverts. Foundations of Culverts also remained un-designed, despite significant variations in strata and in superstructure dimensions.

Table 2.7.1. Details of Culverts on Internal Roads of some R&R sites (Typical)

R&R site	Total Numbers of Culverts at site	Comment on Pipe diameters
Dharampuri	223	All Culverts have 600 mm Pipe Diameter with Single Line
Nimbola	52	All Culverts have 600 mm Pipe Diameter with Single Line
Nisarpur I	50	All Culverts have 600 mm Pipe Diameter with Single Line
Sala	45	All Culverts have 600 mm Pipe Diameter with Single Line
Khalbujurg	67	All Culverts have 600 mm Pipe Diameter with Single Line
Kadmal	48	All Culverts have 600 mm Pipe Diameter with Single Line
Kavanthi	35	All Culverts have 600 mm Pipe Diameter with Single Line
Ekalwara	54	All Culverts have 600 mm Pipe Diameter with Single Line
Barda Manavar	34	All Culverts have 700 mm Pipe Diameter with Single Line
Moreghadi	25	All Culverts have 600 mm Pipe Diameter with Single Line
Khalkhurd (Dharampuri)	85	All Culverts have 600 mm Pipe Diameter with Single Line
Bijasan	13	All Culverts have 600 mm Pipe Diameter with Single Line
Gangli	12	All Culverts have 600 mm Pipe Diameter with Single Line
Achoda	26	All Culverts have 600 mm Pipe Diameter with Single Line
Khujawan	38	All Culverts have 600 mm Pipe Diameter with Single Line
Balwara	26	All Culverts have 600 mm Pipe Diameter with Single Line
Beganda	19	All Culverts have 600 mm Pipe Diameter with Single Line
Bhilkheda	20	All Culverts have 700 mm Pipe Diameter with Single Line
Khedi	55	All Culverts have 600 mm Pipe Diameter with Single Line
Borlai-I	18	All Culverts have 600 mm Pipe Diameter with Single Line
Borlai-II	35	All Culverts have 600 mm Pipe Diameter with Single Line
Anjad Barda	90	All Culverts have 600 mm Pipe Diameter with Single Line
Panya	35	All Culverts have 600 mm Pipe Diameter with Single Line
Mandwada	43	All Culverts have 600 mm Pipe Diameter with Single Line
Lohara	15	All Culverts have 600 mm Pipe Diameter with Single Line
Nalvai	19	All Culverts have 600 mm Pipe Diameter with Single Line
Mehgaon	27	All Culverts have 600 mm Pipe Diameter with Single Line
Lakhangaon	18	All Culverts have 600 mm Pipe Diameter with Single Line
Perkhad	19	All Culverts have 600 mm Pipe Diameter with Single Line
Urdana	13	All Culverts have 600 mm Pipe Diameter with Single Line
Chichli(Theekri)	26	All Culverts have 600 mm Pipe Diameter with Single Line
Khalkhurd Kasravat	22	All Culverts have 600 mm Pipe Diameter with Single Line
Saita	13	All Culverts have 600 mm Pipe Diameter with Single Line
Umda	16	All Culverts have 600 mm Pipe Diameter with Single Line

22. The fact that culvert pipe diameter were frozen, and mostly 600 mm pipes were employed (a size that had no design basis at all and not even consistent with common-sense) has had serious consequences on overall planning and costing of the project, and on the oustee families constructing houses on developed plots. Due to large scale use of 600 mm diameter pipes in culverts constructed in bulk around the corners of plot areas, the heights of road embankment after necessary cover on the laid culvert pipes for safe pipe cushioning has almost universally raised embankments, many times even 1 m and above relative to the plot area. This obviously has resulted in huge expenditures on raising of road embankments. The situation has become more severe when the difference in plot level and top of road formations has reached 1 m and above as witnessed at many places. As per standard engineering practices the height of the house plinth level with respect to road top level should be minimum 15 to 30 cm above road top to protect the rain water entering the road-side houses. This implies that the residents will have to raise plinths more than 1 meter in several cases. Thus it is a painful and expensive proposition to the oustee plot owners to bear extra cost of raising the plinths for no mistake of their own. It is unfortunate that this had to happen on a newly developing site where levelling options are aplenty. It is also unfortunate that alternative options like providing raptas to minimize the embankment heights and to save excessive costs of roads and culverts were not tried to minimize cost of housing for individual plot-owners. Probably the entire focus was to execute the works somehow and book the expenditures.

23. Most roads were neither designed, nor drawings prepared and approved as per MPWD Manual 1983. In the absence of necessary soil tests at desirable numbers of cross section along the road length, designs of roads had no basis, and irrespective of underlying strata the road design adopted was the same. Also, no traffic density assessment, particularly for the Approach Roads seem to have been made. The entire road network was therefore developed as per the discretion of the engineer-in-charge. No wonder that the consequences were excessive raising of road formations without considering the implications of high formations on plots lying relatively low, forcing the oustees to make investments on filling to raise their plinths putting the burden on displaced rehabilitated oustees.

24. This when such issues were avoidable, and the proper designs if carried out would have instead of raising road formations, replaced the soil of sub-surface by making trenches in road section below ground and replacing weak soil by good CBR soil. In the absence of proper design work, the sole goal would have possibly been to exhaust the available budgets, and the easiest thing was to raise the road formations. Unfortunately, such uneconomical and technically weak and incompetent proposals were approved by competent authority without assessing its impact on the lives of those who were to be compensated with settled habitations.

25. The Drainage has not been laid at more than 50 R&R sites. At 21 Sites half-round pipes have been laid as drains, without any design basis whatsoever notwithstanding the extreme risk of wastage of public money.

26. Only at 10 R&R sites, drainage is claimed to be designed. But the designs by the Consultants did not provide the necessary drawings, as well as the Estimates, as are expected from any Consultant. Yet, the consultant bills were paid in a hurry.

27. Even the "claimed" drainage designs at 10 sites were made by deliberately choosing half-round pipes in a wide majority of cases, a choice that was inappropriate as large numbers of oustees are farmers, and frequent movement of agriculture machinery like tractors or other agriculture appliances, and of the vehicles is always likely to destabilize the half-round pipe drainage profile. Damages will be frequent in such material as these cannot sustain load. Furthermore, misaligned or disturbed drainage profiles would also create hurdles for the cattle which may damage itself while dwelling near the roadside. Functionally also any damaged drainage profile is likely to create nuisance due to large water spills at unwarranted locations. All such considerations were ignored in the designs and no option other than half-round pipes was evaluated.

28. It also does not appear that the consultant designs on drainage have been subject to normal process of vetting by either a third party appointed for the purpose or by NVDA itself before accepting them (at least no such documents have been submitted in the records provided to this team), and it appears that no department authority has approved them for implementation in the field.

29. The drains were designed for average intensity of rainfall, and were not checked for peak rainfall intensities. The steep slopes may work during average rainfall intensities, but during high rainfall intensities the steep pipe slopes would not allow the flows to remain steady, and unsteady flow regimes including eddies will ensue making Hydraulic jumps resulting in misalignments, broken joints, overflows in half round sections, and subsequent erosion of nearby soil. This has been a serious design lacuna.

30. Furthermore, an important parameter - the underlying Soil strata considerations were also missing from the design. In BC soils, the half-round pipes without any underlying drainage material such as a sand cushion or a cohesive non-swelling (CNS) soil cushion were sure to fail as drainage system. Yet, the pipes without any such underlying protection have been provided at sites like Moregadhi which possess classic BC soils. It is rather obvious that in these BC soils the drain pipes will get misaligned, and joints will get broken in the absence of underlying drainage material laid below the pipes to protect them from the alternate swelling and shrinkage of the BC soils due to variations in the moisture regime.

2.7.3. Facts on Claimed Designs and Purchases

Thus, vast majority of the Civil Infrastructure was put in place without any designs whatsoever, in adhoc manner. For the entire Infrastructure that has been claimed as "designed" the following is noteworthy:

31. The buildings had open foundations at 86 R&R sites, and these foundations were not designed. Only at two sites of Moreghadi and Khalbujurg, the buildings had designed pile foundations. At Moreghadi, even the tree platform pile foundation had no design basis, as no such documents were found in the records submitted.

32. The drainage system at 10 R& R sites was also claimed as "designed". These designs appear counterfeit and fake, and appear to have been carried out only to claim authenticity to bolster arguments against possibility of a non-efficient/non-functioning drainage system, and to fulfil obligations envisaged in the Technical Approvals. This Inquiry Committee is aware of the rather harsh and unkind use of words here, but from the available records, it does appear that the entire process of designs was a sham and misappropriation of public money.

33. The consultants rather strangely begin the drainage designs by choosing a half round semi-circular pipe without narrowing on alternative options and without justifying as to why half-round pipes have been chosen as a unique and bizarre method of providing drainage irrespective of the strata variations.

34. Thus, the drainage design work did not contemplate and evaluate any alternative option for drainage type except the half-round pipes. It appears that even the drainage designs for a select number of R&R sites were carried out merely to rebut the already executed drainage configurations.

35. On a very serious note, it appears from a perusal of the records that the consultants did not evaluate the design options for drainage type, because they were merely obliging through choosing half-round pipe option, as pipes were already purchased and mostly laid and much of the work executed prior to designs, and so the consultants were only fitting design values to half-round pipe diameters already purchased and laid. The case of Khalkhurd (Dharampuri) is illustrative of the counterfeit that has typically taken place.

36. To take the specific case of Khalkhurd (Dharampuri) site:
    - The work order for the design of drainage system was issued to M/S Aqua Consultants, Bhopal vide work order no. 593 dated 14.3.2007 (Agreement. no. 21/2007-08, period of completion: 15 days from issue of work order) (Annex 2.7-B), for which bill was entered in MB no. 75, page 71 and paid amount was Rs. 45029/- vide cheque no. 025109 dated 24.05.2007 (Annex 2.7-B).

- In this case, surprisingly the pipe orders were issued by EE vide his order number 1321 dated 22.06.2006 to MP LUN (Annex 2.7-C) i.e., more than 8.5 months prior to issuing work order to consultant, when obviously the designed pipe sizes could not have been known.
- In turn, MPLUN issued an order to M/S Sudarshan Construction, Maksi, for supply of RCC Half-round pipes NP3, 300 mm diameter, for allocation at R&R site Khalkhurd vide LUN order Number C-609318 dated 13.07.2006 (Annex 2.7-C). ie, 8 months prior to issuing work order to consultant.
- The Bill for the above supplies was entered in MB Number 75, Page 34 and as per certificate endorsed by Sub Divisional Officer , PWD , NVDA, Subdivision Number 1 Dharampuri, the Material received was received in good condition and same was taken in MAS (Material At Site) Account of the month of August 2006 (Annex 2.7-C).
- Thus, the Half-round pipes were procured starting 6.5 months prior to award of design work to the consultant, when actually the pipe sizes to be deployed were not known!
- The delivery bill for the Half-round pipes was received vide number 75 dated 11.09.2006 (Rs 35,171/-). Again more supply orders to LUN were issued vide 1437 dated 06.07.2006 by EE, NVDA and delivery obtained vide Bill no. 76 dated 11.09.2006 (Rs 7,00,000/-). Other deliveries were obtained with reference to various orders for pipe purchase by EE-NVDA, vide Bill no. 83 dated 25.09.2006 (Rs 5,60,000/-), Bill no. 97 dated 23.10.2006 (Rs 2,80,000/-), Bill No. 08 dated 23.10.2006 (Rs 1,20,000/-), Bill No. 122 dt 31.10.2006 (Rs 4,48,000/-), Bill No. 213 dated 09.01.2007 (Rs 14,84,000/-). All these pipe deliveries were thus made even before the work order to the design consultant was in place.
- After the award of consultancy on 14.03.2007, a part of the previous supplies vide EE order No. 1823 dated 18.09.2006 were also delivered vide bill 008 dated 10.04.2007 (Rs 17,16,655/-). However, much of the half-round pipe delivery had already been made before the Award of design work to the Consultant!
- In the mean-time, the order for laying and fixing of half-round pipe 300 mm diameter NP-3 was also given to M/S Sudarshan Construction (the same firm which supplied its pipes) vide EE Order no. 1321 dated 22.06.2006, and measurements were recorded on MB number 144 (Annex 2.7-D), and similarly other supplies were executed in continuation to respective supply orders by same supplier, and quantitates were recorded on MB 144 (upto Page 39), as per the record made available.

- Thus execution (laying and fixing) of pipes was also going on immediately after the supplies were made, and all work was completed and payments made on 24.05.2007. Much of this work of laying and fixing of half round pipes was actually completed even before the award of design work to the consultants!

37. To sum up, most of the supply as well as most of the execution of drainage work at Khalkhurd (Dharampuri) were over even before the consultants were awarded the design work!

38. To justify the use of half-round pipes as drains, with the pipes already purchased and work already executed for most part, the consultants did not evaluate options for drainage type and came up with the use of half-round pipes as the only option, despite its technical limitations notwithstanding.

39. Because of design compulsions the consultant also had to recommend use of 400 mm and 450 mm diameters half-round pipes, but as the work was already executed and all purchase orders for 300 mm pipes were in place, therefore all execution was carried out using 300 mm pipes only at the entire site defying not just the design of consultants, but even the common-sense as discharges add up cumulatively and would need pipe diameters to progressively get larger downstream. Such realization does not even require engineering degrees, yet the qualified and experienced technical staff did not find it inappropriate to execute such work, defying all logic and sensitivity.

40. Surprisingly, the consultant designs were of such poor quality that 400 mm diameter drains were sometimes discharging to 300 mm diameter pipes as visible in the Plan of Stormwater drain. The designs were made on basis of average rainfall intensity and not on peak rainfall intensity, and were not even checked for peak flows. Cumulative discharges were not accounted for in the designs, and cumulative flows from the catchment of the R&R site was completely overlooked, and only the discharges within the R&R site boundaries were considered. Thus hydrology of area outside the R&R site boundary was not even considered, even when the R&R site boundary does not define the catchment area. Cement-concrete half round pipes were chosen irrespective of the underlying soil characteristics, i.e., irrespective of whether the strata was rocky or BC soil. With such gross blunders, the designs speak volumes about the technical competence of the consultants.

41. Yet, these faulty and poor designs were accepted, and payments made. There was no due process of vetting and then accepting the consultant designs. No node to node drawings were apparently sought from the consultants. Payments were hurriedly made, and indicate to the possibility of serious malpractices.

42. Such malpractice of appointing consultant later, and purchasing pipes of a particular size and executing works beforehand, obviously required that consultants of choice were appointed for undertaking the designs to suit the already executed work. This was achieved by splitting the design work into smaller parts, and awarding the lower valued work to consultant of choice, circumventing the need to follow elaborate and detailed methods needed for higher value design works that would have ensured wide participation of several consultants resulting in appointing a professional consultant of repute.

43. Thus, Short Notice Inviting Tenders (NITs) were called for piece-wise design work of individual R&R sites rather than having combined design work of higher cost. A combined design work for various sites would have entailed higher value requiring elaborate quotations, larger participation of consultants, elaborate technical and financial bidding etc, and may have resulted into appointment of a professional consultant who may not have acceded to provide designs as wanted. This was circumvented by breaking the work site-wise, and calling short NITs.

44. The Drainage designs works were therefore awarded in piecemeal manner and site-wise as following: (Annex 2.7- E)

- Nimbola, 15 km @ 1050/- per km = 15750.00/ Amount Paid Rs. 16154.00
- Khalbujurg part 1 and part 2 25 km @ 1050/- per km = Rs. 26250.00
- Moregadhi 36 km @ 1050/- per km = Rs 37800.00
- Khujawan 15 km @ 1050/- per km= Rs. 15750.00
- Balwada 08 km @ 1050/- per km = Rs. 8400.00
- Khalkhurd 39 km @ 1050/- per km = Rs. 40950.00
- Anjad, Barda 22.5 km @ 977/- per km = Rs. 21982.50
- Borlai 11 km @ 1050/- per km = Rs. 11550.00

45. It may be noted that there was very limited participation, and it appears that only 2 consultants participated: NK Dighe and Aqua Consultants, both from Bhopal in response to short Notice Inviting Tenders (Annex 2.7- E). It may be further be noted that there is no evidence in the records made available that the NIT was published in State level Newspapers, and it is possible that these short NITs may have been circulated only as Notice board of the division office or made available to only limited known parties. In any case, the response was limited only to 2 consultants as above.

46. Henceforth, Aqua Consultant with lowest quotes were chosen for each site, and approved on a notesheet on 13/03/2007 (Annex 2.7-E). Next day, on 14/03/2007, orders were released by Executive Engineer, NVDA for various sites, as against the

NIT No. 03/2006-07. For Khaikhurd, the order was released as enclosed with Annex 2.7- E.

47. For another R&R site of Khalbujurg combined order with Khujawan site was released dated 14/03/2007 as enclosed with Annex 2.7-F. It appears that for some R&R sites including Khalbujurg (Annex 2.7-F), 9 days later on 23/03/2007, entries were already made in MBs and First Running bills were released on 24/03/2007, ie., within 10 days after the award of work to M/S Aqua Consultants, for an amount of Rs 32487/- (Annex 2.7-F), which was more than 77% of the total contract amount of Rs 42000/-.

48. However, when the second and Final bill was released on 24/05/07 for drainage design works of Khalbujurg and Khujawan sites, the total amount released was Rs 54395/- as against agreement amount of Rs 42000/- (Annex 2.7-F). Thus for this agreement, the total deviation was as much as 29.5%. This financial deviation of 29.5% far exceeded the powers of 10% as maximum allowable deviations permitted to Executive Engineers with the prior permission of SE. Such blatant violations represent serious financial irregularities and need further scrutiny for other similar cases besides the necessary action as deemed fit.

49. Thus consultant of choice were approved, who in turn obliged by giving designs with only option of half-round pipes. In return again, the designs were not even checked or vetted, and the consultant fee was released hurriedly despite large and unapproved deviations without obtaining the necessary node to node drawings etc. from the consultants.

50. There was thus a hand-in-glove situation with the consultant of choice (Aqua Consultants) who committed the design fraud which was accepted with closed eyes by the department, and payments made in violation of deviations allowed. This is a clear case of malpractices, to put it mildly, and in reality the so called design work appears to be a sham and blatant eyewash.

51. While awarding the piece-wise work to specific consultants, it appears that neither the credentials of consultants including their annual turnovers, previous relevant work experience etc were considered, nor were the credentials of experts working with the consultants examined for their job experience related to design of drainage systems, though the NIT was issued on form B, which requires consultant credentials for assessing the eligibility.

52. This Inquiry would like to go no further on this matter in assessing the authenticity of the award to a particular private consultant, technical capacity of the consultant, or on departmental process of approval of design work submitted by consultants, or

on prior purchase of designed diameter pipes, or on large financial deviations, but the matter appears extremely serious prima-facie.

53. The Inquiry Committee limits its comments to the fact that the quality of the drainage work has suffered immensely because in the garb of technical designs, malpractices have occurred in all likelihood and certainty, and the drainage system that has been laid is essentially adhoc, undersigned and arbitrary, without any rational basis whatsoever, leading to wastage and misappropriation of public money resulting in continued large-scale suffering of the inhabitants, which is often countered by the counterfeit claims of having a designed drainage system at R&R sites.

54. This case deems to be fit for a detailed investigation by an appropriate authority such as the CBI/Lokayukta/CAG etc. including investigations on all purchases /designs pertaining to Civil, PHE and Electrical works.

55. Thus notably, for almost the entire infrastructure, the basis of according the technical sanctions-the detailed designs and drawings were not prepared, and it is not clear as to how sanctions and approvals were made without detailed designs for each structure at each site. If approvals were made on good faith of undertaking design work before purchases and work execution, such faith was not kept later, and no efforts were made by higher officers as well as the competent authorities to see that detailed designs and drawings were in place before execution. Thus, there were not just the procedural lapses/blunders that occurred; there was clear failure with regard to the vital monitoring of the project, which would have brought in the necessary feedbacks and corrections.

Not disclosed by NBA

2.7.4. Estimates

56. In the absence of detailed Designs, the Estimates were prepared on approximation, and all provisions were made on tentative average basis. This was a natural outcome of not having detailed designs in place for each individual structure such as buildings, tree platforms, halaos, culverts, roads etc.

57. Approximate Estimates imply that the approximate costing would be invariably kept on higher side in order to cover up the deviations later, and there would be a natural tendency to play safe by overestimating. Thus, approximate Estimates would have in all probabilities, led to higher cost for the project, even while amplifying the leverage for malpractices to exist.

58. The building Estimates were prepared in two parts: part I and part II.

    - Part I estimates were prepared for foundation and upto plinth level, whereas
    - Part II estimates were prepared for superstructure (above plinth level).

    The advantage of this break-up was that the building superstructure Estimates (Part II) which followed Type designs could be frozen for all similar proposals, and only the Part I Estimates would be required to be detailed from site to site and structure to structure depending upon the foundation depths needed according to various soil strata encountered. Thus Part I Estimates cannot be expected to be same for different buildings at various sites, except where the soil strata is same, which may at best happen in only a select few cases.

59. However, as illustrated in Table 2.7.2, of the total records submitted, a whopping 91.67% of the Primary Health Centres had exactly the same Part I Estimates, 61.7% of Primary schools had the same set of Part I Estimates, while 25.53% of Primary Schools had another set of same Part I Estimates, 83.33% of Middle Schools had the same Estimates for Part I, Aganwadis had two sets of Estimates: one applying to 57.14% of Buildings and another to remaining 42.16%. Panchayat Bhawans with exactly the same Part I Estimates were as many as 87.5%, whereas 88.57% of all Seed Godowns for which records were submitted had exactly the same Part I Estimates. (Note: Estimates were not submitted for all sites and all structures. Besides, two sites were excluded from analysis as Moreghadi and Khalbujurg had Pile foundations leading to different sets of Part I Estimates). Details of the amount of Part-I Estimates for each type of building, and the R&R sites having the same Estimates are also provided in Table 2.7.2.

60. Such large number of buildings of same type cannot have same Estimates by any chance as the soil strata variations were even visually significant from site to site, and the buildings therefore would have differing foundations. Quite obviously, the

Estimates were not prepared for each building, and mere projections were made to avoid detailed work. There is also every possibility that these Estimates were assumed on higher side to avoid shortfalls, and this may have led to massive increase in costs and associated malpractices.

61. It may be relevant to point out that the total Estimates, despite the Part-I estimates being same in large number of cases, were made to vary by introducing smaller changes in Part II estimates by virtue of additional provisions like towel rods, soap stands and similar other provisions in several buildings, many of which were never meant to be implemented, and were not seen during the site visits.

62. The other structures were no better with respect to Estimates. As illustrated in Table 2.7.3, for the records made available, 100% of Tree Platforms at all sites had exactly the same Total Estimates of Rs 28978/- for each Tree Platform - despite the massive variations in Tree platform dimensions, and foundations. Similarly, 96.77% of Halaos had the same Estimates of Rs 10200/- for each halao, the variation in their sizes etc. notwithstanding.

63. For Culverts, as illustrated in Table 2.7.3, there were sets of Total Estimates prepared for various sites. For the documents provided, 36.84% of sites had all culverts with estimates of Rs 36107/- each, 15.79% sites had an Estimate of 16000/- per culvert, and two sets comprising 13.15% and 34.21% sites each having estimates of Rs 39000/- and Rs 31000/- per culvert for culvert constructions over the entire site, the large differences in sizing of the headwalls of the individual culverts, and the sizing of diameters that ought to increase downstream notwithstanding as seen at the same R&R sites. The adhocness is evident from the fact that in Dhar District alone, for as many as 518 culverts at 13 R&R sites costing was estimated at average of Rs 31000/- per culvert (Annex 2.7- G). Evidently, such average Estimates had no scientific/engineering basis as no detailed catchment area studies were conducted to determine the hydrological flows for estimating the dimensions of culvert pipes, and variations in their costing etc.. And all this, when actual culvert headwall dimensions are found varying randomly from site to site, and even for adjacent culverts, located side-by-side.

64. Thus Estimates were prepared based upon approximations, and averages, a method that is extremely crude and adhoc. Varying Tree platform sizes and heights, halao sizes and heights, changing soil strata and varying superstructure dimensions necessitating foundations to vary, none of these facts were accounted for, and crude estimates were remarkably employed. For culverts also, Estimations were as absurd. With culvert dimensions including headwall lengths and heights varying wildly, as well as the pipe diameters increasing progressively to take care of cumulative flows, there is no possibility of culverts having near uniform costs.

Furthermore, changes in soil strata necessitate foundations to vary from site to site and even at the same site, compelling the corresponding estimates to vary. Evidently, the estimation work was based on approximated average basis, without any engineering designs having been carried out to evolve sizing and costings.

65. Amazingly, even where the works were claimed designed, no detailed estimates were necessarily prepared. Thus, no detailed estimates exist for buildings with piled foundations at Moreghadhi and Khalbujurg. Similarly, no Estimates were prepared / provided by consultants even for the 10 sites where drainage has been claimed as "designed".

66. Quite obviously, the estimation of the entire infrastructure would have been on the higher safer side, resulting in higher provisions reflecting in higher project costs.

67. In the Estimates Large provisions were made for land levelling at several R&R sites. For, instance, at Bhawati II, the Technical Sanction shows an amount of Rs. 3.72 lakhs out of a total sanctioned amount of Rs. 11.59 lakhs (32.11%) to be spent on land levelling alone (Annex 1-F). Thus, large amount of money appears to have been spent / provisioned for spending on land levelling of R & R sites.

68. Remarkably, wherever land levelling has been undertaken, no utilisation of excess soils has been shown in the Estimates. Thus, surprisingly no provision for utilizing excess soil seems to have been made.

69. It is a matter of investigation as to why extra soil for raising of road embankment was transported in and paid extra with due lead etc., even as adjacent plots were levelled, and it would have made sense that the excess soil from the site levelling work of adjacent plot area should have been used in raising the embankments wherever possible, savings costs incurred in raising embankments. However, the Estimates had made no provisioning for utilization of excess soil from site levelling.

70. Thus, the Estimation work was all adhoc, inflated and tentative, had no detailed engineering basis whatsoever, and comprised large-scale approximations and averages. It appears that these Estimates prepared for Administrative Approvals were used again for getting the Technical Sanctions also, without following the rigorous detailed Estimation procedures required for Technical Sanction as per MPWD Manual, 1983. This in all likelihood would have resulted in very high inflated estimates, massive increase in the project cost, and therefore should have logically resulted into possible savings, a matter that has been dealt with in greater details in Section 2.7.7.

Table 2.7.2.: List of R & R Sites where Part I Estimates (as per Technical Sanctions) for various building Types with Open Foundations were exactly the same

S. No.	Building Structure	No. of R&R Sites for which Estimates were made available	Numbers and Names of R&R sites with exactly the same Estimates	Part I Estimate per unit building Rs	% of sites with same Part I Estimates
1	Primary Health Centre/ Aurvedic Dispensa -ry	36	3: Lohara, Chichli (Teh-Kasarwad), Balkhad	22498	8.33%
			33: Morekatta, Bijasan, Amlali, Sondul, Sirsani, Kukra, Khedi, Datawada, Mandwada, Mehagaon, Lakahangaon, Vishwanath Kheda, Gawla II, Chichli (Theekri), Kikarwas, Dehar, Bhanwariya, Bhilsur, Kadmal, Gehalgaon, Rekti, Chikhalda, Ganpur (Narmada Nagar), Ganpur (Sirsi), Gangli, Kawanthi, Ekalwara, Achhoda, Semalda, Urdana, Malangaon, Manawar, Musapura	35895	91.67%
2	Primary School	47	3: Eklera, Lohara, Chichli (Teh-Kasarwad)	18016	6.38%
			3: Bhavti II, Gulata, Datawada	23747	6.38%
			12: Bijasan, Chakeri(Mohipura), Takiyapur, Pichhola (Kirmohi), Gawla, Chainpura, Jalkoti, Perkhad, Urdana, Sharikpura, Mirzapur, Balwara	37221	25.53%
			29: Morekatta, Amlali, Sirsani, Kukra, Kasrawad, Khedi, Mandwada (Panya), Mandwada, Mehagaon, Raswa Deb, Lakahangaon, Vishwanath Kheda, Gawla II, Chichli (Theekri), Kathora, Bhanwariya, Bhilsur, Kadmal, Gehalgaon, Chikhalda, Ganpur (Narmada Nagar), Kawanthi, Ekalwara, Achhoda,Semalda, Barda, Malangaon, Manawar, Beganda	82657	61.7%
3	Middle School	12	2: Chakeri(Mohipura), Mirzapur	70000	16.67%
			10: Kasrawad, Khedi, Barda, Gehalgaon, Mandwada, Lakahan gaon, Chichli(Theekri), Ekalwara, Semalda, Urdana	118755	83.33%
4	Aganwadi	07	4: Bijasan, Perkhad, Urdana, Mirzapur	25144	57.14%
			3: Mandwada (Panya), Vishwanath Kheda, Barda	47625	42.86%
5	Panchayat Bhawan	40	3: Eklera, Lohara, Balkhad	46640	7.5%
			2: Bijasan, Chakeri (Mohipura)	49855	5%
			35: Sondul, Sirsani, Kukra, Kasrawad, Khedi, Borlai I, Golata, Datawada, Mandwada (Panya), Mandwada, Pichhola (Kirmohi), Mahagaon, Lakahangaon, Vishwanath Kheda, Gawla II, Chichli (Theekri), Kathora, Dehar, Bhanwariya, Bhilsur, Nisarpur, Kadmal, Gehalgaon, Rekti, Chikhalda, Ganpur(Narmada Nagar), Ganpur (Sirsi), Kawanthi, Ekalwara, Achhoda, Semalda, Urdana, Barda, Umda,Musapura	82146	87.5%
6	Seed Godown	35	2: Eklera, Balkhad	25904	5.71%
			2: Amlali,Gulata	39633	5.71%
			31: Morekatta, Bijasan, Bhamta, Sirsani, Kukra, Khedi, Datawada, Mandwada,Pichhola (Kirmohi), Mahagaon, Lakahan gaon, Vishwanath Kheda, Gawla II, Chichli(Theekri), Kikarwas, Dehar, Bhanwariya, Bhilsur, Nisarpur, Kadmal, Gehalgaon, Rekti, Ganpur (Narmada Nagar), Ganpur (Sirsi), Gangli, Kawthi, Ekalwara, Achhoda, Semalda, Urdana, Musapura	60667	88.57%

Table 2.7.3: List of R & R Sites where Estimates (as per Technical Sanction) of Civil Structures was exactly the same.

S. No.	Structure	No. of R&R Sites for which Estimates were made available	Numbers and Names of R&R sites with exactly the same Estimates	Estimate per unit Structure Rs	% of sites where same Estimates were used
1	Tree Platforms	40	40: Bhavati I, Awalda, Bhamta, Sondul, Kasrawad, Khedi, Borlai III, Chakeri(Mohipura), Mandwada (Panya), Mandwada,Takiyapur, Pichhoda (Kirmohi), Gawla, Raswa Deb, Lakahangaon, Vishwanath Kheda, Chainpura, Gawla II, Chichli (Theekri), Brahmangaon, Kathora, Sayata, Jalkoti, Jalanpur-Dhalkheda, Achoda, Nisarpur, Dharamrai, Kikarwas, Bhanwariya, Kadmal, Gangli, Ekalwara, Ganpur (Narmada Nagar), Ganpur Sirsi, Urdana, Umda, Mirzapur,Malangaon, Manawar, Musapura	28978	100%
2	Halao	31	30: Bhamta, Awalda ,Sondul, Borlai I, Borlai III, Mandwada (Panya), Mandwada, Takiyapur, Pichhoda (Kirmohi), Mahagaon, Raswa Deb, Vishwanath Kheda, Gawla II, Chichli (Theekri), Brahmangaon, Kathora, Saita, Jalanpur-Dhalkheda, Bhanwariya, Rekti, Kadmal, Umda, Gangli, Ganpur(Narmada Nagar), Ekalwara, Urdana, Malangaon, Manawar, Musapura, Khujawa, Achoda	10200	96.77%
3.	Culverts	38	14: Morekatta, Sirsani, Kukra, Kasarawad, Chakeri, Mohipura, Mehagaon, Raswa Deb, Brahmangaon, Chandankhedi, Bhawariya, Gangli, Perkhad, Urdana	36107*	36.84%
			6: Bhavati II, Golata, Kirmohi, Gawla, Chainpura, Dehar	16000*	15.79%
			5: Mandwada, Panya, Vishwanath Kheda, Kathora, Sharikpura	39000*	13.15%
			13: Jalkheda, Nimbola, Khalbujurg, Moreghadi, Lakhangaon, Sala, Khujawan, Beganda, Pipaldagarhi, Balwara, Iklera Bujurg, Guleti, Khalkhurd	31000*	34.21%

**Several other sites also used a combination of these Estimates with other Estimates. So the actual numbers of culverts having same estimates was much larger in reality.*

2.7.5. Technical Sanctions/Approvals

71. Considering that almost 88 sites were to be developed for oustees, it is understandable that administrative approvals were effected based upon Type drawing and rough Estimates for hastening the entire process. But if Technical sanctions are accorded on the same basis, without making detailed designs and estimates, then it speaks volumes of the professional competency, and is nothing short of a massive blunder representing gross violation of all acceptable norms.

72. Even if it assumed that Technical Sanctions by competent authority were granted based on good faith on clauses that before execution detailed designs, drawings and Estimate would be undertaken, one fails to understand why this was not regulated and monitored, and why feedbacks were not obtained even when the good faith was blatantly breached all across.

73. To illustrate the above, one needs to peruse the Revised Technical Sanction approved by Chief Engineer (PWD), NVDA Bhopal for construction of Internal Roads, Approach Roads and Culverts at R&R sites in the Dhar District, vide the letter number CE/PWD/NVDA/Technical/90/05/155 Bhopal dated 13.01.2006 (Annex 2.7-H). Typically for Roads and Culverts, the Technical Sanctions on approximate Estimates were accorded by Chief engineer PWD, NVDA, Bhopal subject to following conditions :

    a. The expenditure not to exceed the approved amount

    b. The Drawing and Design of each work shall be approved by a competent officer prior to undertaking the work and these designs and drawings shall be as per MOST (Ministry of Surface Transport) provisions.

    c. It must be ensured that the pipes purchased earlier are used adequately.

74. Evidently, provision envisaged in 73 b above were flouted as Drawing and Design of each work was not undertaken, and works got executed without detailed Designs, Drawings, and Estimates.

75. It was not just a matter of misplaced faith in the "competent Officers". For example, in case of drainage works, the Technical Sanction of side drains were awarded by the Chief Engineer PWD, NVDA Bhopal, vide letter number CE/PWD/NVDA/Technical/122/06/1200 Bhopal dated 04.04.2006 considering cement-concrete NP3 half round pipe diameter of 300 mm for Khalkhurd. The Technical sanction also included provision for preparation of detailed drawing and design from expert designer with a provision of LS 35000/-.

76. However procurement of pipe, as well as execution was largely undertaken prior to award of work to designer consultant. The provision envisaged in Technical Sanction was addressed by awarding the work to a consultant of choice, who obliged by returning with designs as already executed. The Designer also did not give detailed drawings as was envisaged in technical sanction.

77. Such gross violations were not even monitored by the authorities granting Technical Sanctions, or if monitored, possibly they just chose to keep their eyes closed to such blatant violations. Nevertheless, this was a failure of the monitoring mechanism leading to misappropriations in all likelihood.

78. Most remarkably, the Technical Sanctions were accorded based on approximate estimates prepared without due soil investigations, and without any designs of the foundations and reinforcements (except at Moreghadi and Khalbujurg where pile foundations have been designed by EPCO). No efforts were undertaken to design and evolve at least Part-I Estimates based on soil strata and design of foundations specific to the site and structure, with drawings re-prepared for each structure with foundations details for each building and the bar bending schedule for RCC components. It is very unfortunate and almost shocking that in no case of buildings at any site, this idea for evolving Estimates laid down in MPWD Manual 1983 to accord necessary technical sanctions prior to construction was followed, mainly because of completely ignoring the necessary soil investigations for each site and at places within the site where soil strata changes.

79. The same holds for all structures like Tree Platforms, Halaos, culverts etc . No individual designs have been made for foundations. No soil investigations have been conducted, and approximate tentative Estimates are made for a single structure and multiplied by large numbers of Platforms/halaos/culverts respectively (despite significant changes in their dimensions from site to site and even at the same site), and Technical sanctions obtained thereupon.

80. In short, the Technical Sanctions were accorded without detailed designs and drawings prepared (which in turn, had to be based on geotechnical investigations which were not carried out), and without detailed estimates (which in turn, required detailed designs) for each individual structure.

81. While the procedures were completely flawed, the senior officers who ought to have ensured that necessary geo-technical investigations, detailed designs, drawings, detailed Estimates etc. were prepared, failed to ensure proper implementation and compliance. There also seems to be gross negligence on the monitoring part by the senior officials, who failed to monitor, regulate and ensure that work execution took place only after Detailed Designs, Drawings and Estimates were available.

2.7.6. Duplicity in obtaining Technical Sanctions for Adhoc Provisioning and Estimates of Cattle Troughs

82. In what construes a very serious observation, against the same Administrative Approval, the Technical Sanctions were separately obtained by the PWD and PHED Divisions of NVDA for Cattle troughs at large number of R&R sites.

83. Not just were the Technical Sanctions for Halaos taken separately by the two divisions, these sanctions were obtained for different Halao numbers for the same R&R site. Thus, the same NWDT criteria (1 water trough per 50 families), did not prevent PWD and PHE Divisions to assess the requirements differently at the same R&R sites. For example, at Ganpur (Manawar) PWD Sanctioned 4 Halaos as against 6 approved by PHE, at Kadmal PWD sanctioned 2 Troughs as against 6 sanctioned by PHE etc. Thus different numbers of Halos were got approved under the Civil and PHE works.

84. Thus financial allocations were made differently by the Civil and PHED divisions for the cattle troughs at the same sites, and the cattle troughs not even constructed in numbers approved vide the total of two Technical Sanctions.

85. To give a few examples, illustrative of a much larger numbers of cases:

- At Ganpur (Manawar) cattle troughs 10 numbers @3000/- each were accorded the Technical Sanction vide TS No. 80 dated 23.10.1997 under the PHE works. This sanction was accorded by Competent authority ie., SE Env, NVDA, and it was further downsized (strangely the numbers reduced to 6 halaos from original 10 envisaged) by PHE vide TS No 256 dated 6.8.2005 with a provision of reduced 6 numbers @12000/- this time (Annex 2.7-I). Surprisingly, for the PWD Division of NVDA, the Additional Direction (Rehab)/SE, NVDA, Indore also accorded the Technical Sanction, but for 4 numbers of cattle troughs at the same site of Ganpur, Manavar @16500/- each (Annex 2.7-J). The latter 4 cattle troughs sanctioned by the PWD Division seem to have been actually constructed by EE, PWD, NVDA, whereas those 6 troughs approved by PHED were ostensibly never constructed as only 4 cattle troughs were found at the site during the site visits.
- Similarly for Kavathi, 3 Nos of Cattle Troughs @ Rs 12000/- each were allocated Technical Sanction by PHE, NVDA vide TS no. 118 dated 24/12/2001. For the same R&R site, again the PWD, NVDA obtained Technical Sanction for 2 Troughs @ Rs 10200/- each vide letter of Additional Director (Rehabilitation), NVDA, letter No. 2252/R-64, Indore dated 24/10/2002 (SER No. 42/2002-2003), and another 2 more troughs vide CE SER No. 6/05-06. The

latter 4 cattle troughs were constructed by the PWD Division of NVDA, whereas 3 Cattle troughs sanctioned by PHE, NVDA never came up.

- For Kadmal R&R site also the TS was accorded vide No 250 dated 06.08.2005 wherein provision for cattle trough was made 6 nos. @12000/- each by the PHE, NVDA. Again, by the PWD Division TS was accorded vide letter 2252/R-64 dated 24/10/2002 and SER No. 42/2002-2003 for 2 cattle troughs @Rs 10200/- each. In reality, only 2 of the latter troughs were found constructed at the site.
- At Achoda PHE Division of NVDA got Technical Sanction for construction of 3 Halaos vide No. 120 dated 24.12.2001 @12000/- each. Again, the PWD division also vide TS No. 322/TS/02 dated 04.02.2002, obtained Technical Sanction for 3 halaos@10200/- each. During site visits, only 3 halaos were confirmed constructed at Achoda.

86. It is also very bizarre that different Estimates per unit Halao exist for the same site as prepared and sanctioned by the two Divisions of NVDA. It is noteworthy that both PWD and PHE Divisions of NVDA prepared Estimates based on MP PWD SOR, Schedule of Rates (SOR), in force from November 1, 1999. Yet, the cost per unit Halao varied significantly even for the same site.

87. This fact in itself is reflective of the adhocness with which Estimates were prepared by Engineers and amenities of standard dimensions were planned by the Planners. Government Estimates for the same amenity (per unit of cattle trough) at the same site, calculated on basis of the same SOR, cannot be ideally swinging wildly. Yet, facts point out to the contrary.

88. It is also noteworthy that at all places no deviations have been reported and certificates have been issue to this effect. It is therefore important to have specialized investigations as to who ordered that sanctioned constructions were not to be carried out, and where the approved and allocated funds have been consumed, as the proportionate numbers of halaos have not been seen on the field.

89. Such instances are not isolated and are widely prevalent at several sites, reflecting a lack of monitoring and control and coordination of apex authorities. It also reflects possible swindling as no deviations have been reported, and it is recommended that such malpractices be investigated in details possibly by independent agencies like CBI/Lokayukta/CAG etc.

2.7.7. Deviations and Disappearance of Savings

90. While deviations from the NWDT Award have been aplenty and have been discussed in details in Chapter 1 of this Report, there have been numerous instances of Deviations from Technical Sanctions also. This despite the fact that NVDA has given certificates of no deviations.

91. In reality, significant deviations are expected, because Estimates were approximate, and had to be on higher side and resultant savings should have been accrued due to a number of factors:

- Escalated Estimates were prepared with a provision of approximately 1.5 m foundation depths for buildings at many of the sites. However, during field checking as well as during checking of MB Records, the foundations of most of the buildings were found less than or close to 1 meter depth. As elaborated in Table 2.1.1 the foundations have recorded in actual ranges such as 0.49 to 0.85 m (Chikalda-Panchayat Bhawan), 0.26 to 0.91 m (Khedi-Primary School), 0.775-0.95 (Borlai I-Primary Health Centre) etc., relative to uniform foundation depths assumed in the approximated Estimates as confirmed by the fact that large numbers of buildings had exactly the same Estimates as illustrated in Table 2.7.2. Thus, the actual foundation depths for almost every construction show ranges less than the uniform foundation depths assumed in Estimates, thereby implying large resultant savings in work execution relative to what was Estimated for tendering and approvals.
- It is also apparent from the records and site visits that in many cases height of buildings as recorded in MBs were less by 20 to 40 cm as compared to Type Design heights on which Estimates were based, and thus savings and hence deviations should have accrued relative to Estimates prepared.
- Like the case of foundations for buildings, similar significant variations in foundation depths have occurred for Culverts, Tree platforms etc. relative to higher uniform depths of foundations assumed in Estimates, and this should have led to considerable deviations and savings.
- Many times Technical Sanctions were accorded for Buildings etc , but these were actually not built. Similarly, there were other Amenities like Tree Platforms and Halaos etc. for which approvals and allocations were obtained, but these were not constructed / provided. A typical example is the R&R site of Dharampuri where apparently not all construction approved has taken place. Similarly, Technical Sanction for Halaos were taken at the R&R site of Kadmal, but the Halaos were not seen constructed at the site. The allotted

money for such missing construction work and amenities should therefore have resulted into savings.

- As spelled out in the previous section 2.7.6, there are numerous cases on record that while awarding overall sanctions, PHED and PWD wings of NVDA accorded Technical Sanction separately for differing numbers of Halaos with significant cost differences at several sites. Thus, despite the financial allocations made many of these halaos (especially those whose sanctions were obtained by the PHED wing of NVDA) were not constructed. This would evidently result into deviations and into implied savings.
- Various items like Land levelling in public schools, towel rods, wash basins, internal electrification, fencing etc. that were provisioned in Estimate and Tenders for public buildings, but appear not to have been executed in many cases, also imply savings.
- Large amount of money appears to have been spent on land levelling of R&R sites. Remarkably, wherever land levelling has been undertaken, no utilisation of excess soils has been shown in either the Estimates or the MBs. Thus, surprisingly no excess soil seems to have been recovered from land levelling, and such significant savings have disappeared, although in reality savings from excess soil from land levelling would have accrued.

92. Despite such instances of possible savings, it has been found that no deviations have been reported by NVDA. Thus, it is not clear as to where all such savings have been adjusted without any approvals, and without an iota of deviation. It is also not clear as to why the approved works were not always undertaken for construction? Who gave orders for non-implementation of already approved works in the Technical Sanctions? And if orders were given, where the resultant savings have disappeared as no deviations are reported?

93. In view of the above, there appears possible foul play to cover up the actual deviations, and the likely misappropriations need to be probed by a specialized agency such as the CBI/Lokayukta /CAG etc.

2.7.8. Quality Control Aspects

Quality control and safety represent increasingly important concerns for project managers. Defects or failures in constructed facilities can result in large costs in the form of damages, litigations and enquiries. Even with minor defects, re-construction may be required, and utility operations may be rendered impaired resulting into increased costs and delays. In the worst case, failures may cause personal injuries or even fatalities. As with cost control, the most important decisions regarding the quality of a completed facility are made during the design and planning stages rather than during construction. And this obviously demands active involvement of top management and technical staff of the organisation undertaking the project work.

For the present case, the following points are noteworthy:

94. Even with all the negligence and frivolity in geotechnical investigations, Designs, Estimates and in Technical Sanctions, some damage could have been controlled by ensuring strict Quality Control during construction phase. Quality control in construction typically involves ensuring compliance with minimum standards of material and workmanship, and in this establishment of quality control Unit and laboratory, Testing at mandatorily required frequencies as is necessarily required in any infrastructure project, and regular quality monitoring could have greatly helped.

95. But here again, the Quality Control Unit was not established, no laboratories for testing material were set up, Third party evaluation remained very marginal, and monitoring was evidently slack as reflected in the substandard quality of workmanship and execution. Thus, a combination of possibly usage of poor quality of material, compounded with poor execution ensued, leaving much to be desired from the infrastructure that has been made available at the R&R sites.

96. The observations authenticated with photographs are sufficient to establish the quality status of R & R works on the site. These observations indicate quality deficiencies in the infrastructure created at different R & R sites. These field observations were further authenticated with records pertaining to test results of different materials for all the 88 R&R sites. To provide such records, NVDA officials were given substantial time to collect and produce test results against frequency desired for each material as per MPWD Manual/ IS Codes/ BIS / Contract condition. This team even gave a format to be filled up so that some idea of tests required as per mandatory frequency may be obtained. However, the records were not provided in the prescribed format, and only certain photocopies of test conducted in very few numbers were produced. Accordingly, after confirming that the copies of tests made available are all that is available with NVDA,

whatever test result sheets were provided, have been analysed and compiled for data analysis pertaining to various quality control tests.

97. Quality control is necessary for ensuring safety, reliability and durability of structures. It may be noted that NVDA is an Institution working for Govt. of Madhya Pradesh and all its financial norms for tendering, publication of NIT, execution of works, purchases and quality control mechanisms have to be governed by the Madhya Pradesh Works Department (MPWD) Manual, 1983. Thus, all quality control aspects are adjudged and compared with provisions of MPWD Manual, 1983, relevant IS/ BIS codes, and the Contractual Provisions.

2.7.8.1. Quality Control Set-Up

98. The MPWD Manual 1983 Vol. 1, Chapter VI, Section 5 para 6.015 states "A separate Quality Control Unit shall be established for all Dams, and for structures costing more than Rs. 50 lakhs. For Other Works Quality Control Unit sufficient to carry out the test as specified in paragraph 6.003 shall be established".

99. Strangely, no quality control Organization/Unit was set up to look after the project work, and not even the testing laboratories were setup as mandated by MPWD Manual, 1983. The expenditure incurred on development works was Rs 170.5652 crores in the present project, which was way above Rs 50 Lakhs, and hence a quality control Unit as well as the Labs should have been necessarily established.

100. An absence of dedicating Quality Control Unit and Testing Laboratories in a large rehabilitation project indicating lack of quality control system brought in place by NVDA is not just a violation of provisions of MPWD Manual, 1983, but also indicates a lack of sensitivity to ensure work quality, corroborating the evidence of poor works often observed during the field visits.

101. The MPWD Manual, 1983 also indicates the kind of quality control organisation and lab set up that is required in any large project such as the present one. In fact, the provision of trained staff to regulate quality should also have been made to ensure quality control, but this apparently has been given a pass, and is a major lacuna in project planning that has led to quality fiasco.

102. The quality control certificates of half-round pipes were also not found in the records, for the ostensive reason that these are supplied by Laghu Udyog Nigam, MP (LUN). However, LUN itself warrants and recommends that "the consignee may do inspection at site", and further that the purchaser must see to it the quality of supplied material is satisfactory before taking delivery of the material supplied (Annex 2.7-K). From the records made available, it appears that such quality checks were not thought necessary by NVDA.

2.7.8.2. Analysis of Test Results

The purpose of testing of material is to ensure and authenticate quality of material used as per specification of each item. The mandatory Regular Testing carried out as per prescribed frequencies is necessary to ensure that construction work adheres to Specifications, and the construction achieves its desired ultimate strength.

103. In the absence of field laboratory and organization Unit setup as mandated by MPWD Manual, 1983, regular Testing at prescribed frequencies even by a Third party could have ensured some quality control. Unfortunately, even this front has been pathetically lacking as tests have not been conducted as per the frequency of testing prescribed in various IS codes, MPWD Manual, and in Contract documents.

104. As most places, test results of material and concrete cube test, steel, bitumen, cement, sand, aggregate, mortar, water quality, soil test such as CBR, dry density of soil, moisture content, liquidity and plasticity index etc., were completely missing, or wherever few results were made available, they were far from meeting the desired frequency at which tests need to be conducted.

105. For building works, Tables 2.7.4 illustrates the lapses in quality control mechanism. The MPWD Manual 1983 states that material tests and samples of concrete, mortar, be tested at certain specified frequency. As against this, Trial Pits were not excavated, and tests for Cement, rubble, workability of Concrete, steel reinforcement were not conducted at most sites. Not even a 1% testing was carried out for bricks and sand, while aggregate used for building construction was tested barely 1.07% of the times it ought to have been tested. The tests for strengths for concrete were carried out to 5-8% of the actual tests that were needed to be undertaken. The result of grossly inadequate testing is visible in the field with inappropriate quality parameters leading to settlements of structures, exposures of ceiling reinforcement, seepages through slabs; horizontal, vertical and diagonal cracks in walls and foundations at various building structures.

106. For Road works, the situation was no different. Table 2.7.5 indicates that out of 28 parameters, 19 parameters were tested less than 1% of the required times. Of the remaining 9 parameters, another 7 were tested less than 10% of the times required, and only two parameters as detailed in Table 2.7.5 were tested nearly 46% of the times the tests ought to have been conducted.

107. For Tree Platforms (Table 2.7.6), the cement and concrete were never tested. Rubble was tested at less than 1% of the time, and aggregates tested nearly 10.4% of the time whereas sand was tested 23.4% of the time the tests ought to have been conducted. This poor quality determination at the time of construction has reflected in widespread tree platform damages witnessed in the field.

108. Halaos were a neglected lot (Table 2.7.7), and no material testing seems to have been conducted for bricks, cement, concrete, sand and aggregates.

109. For Culverts the testing theme remained unchanged (Table 2.7.8) with no tests conducted for Rubble, Steel, Cement, and Hume Pipes. Concrete and Aggregates were tested less than 1% of the times, and sand was tested for less than 3% of times, all this negligence resulting into poor status of culverts at the R&R sites.

Table 2.7.4.: Quality Control in Buildings Works: Available Tests vs Tests Required

S. No.	Test Item and its Minimum Test Frequency*	Estimated Quantity for Total Buildings at all R&R sites	Minimum Nos. of Tests reqd. for estimated quantity	Actual Nos. of Tests conducted for all Buildings	% of Tests actually conducted to that Required	Remark
1	Trial pits excavated for design of foundations - Minimum one per site	86 Sites	86	0	0%	Buildings exist only at 86 R&R sites-No Buildings exist at Khajuri and Jalkeda.
2	Test of cement - 1 test per 50 MT	8240 MT	165	0	0%	Actual purchase bills & test certificate of material shall be submitted to the department by contractor
3	Test of sand - Once a fortnight	11207 cum	2802	18	0.64%	Assuming working period is 2 months
4	Test of aggregate - Once a fortnight	22414 cum	5603	60	1.07%	Assuming working period is 2 months
5	Test of bricks (cum) once per each supplied	59940 cum	5994	18	0.30%	One truck load will supply max 10 cum bricks
5	Test of Rubble (cum) once per each supplied	16397 cum	1640	0	0%	One truck load will supply max 10 cum rubble stone
6	Test of steel-(MT) Confirming to IS 1786-1985- 1 test per Lot	1642 MT	205	0	0%	Assuming 8 MT steel is supplied in each lot
7	Test of concrete strength- cube test - M7.5 (cum)- One per shift per mixer if mixer used are more than 1	7433 cum	743	60	8.075%	Assuming max. 10 cum per shift
8	Test of concrete strength- cube test - M 10 (cum)- One per shift per mixer if mixer used are more than 1	10816 cum	1082	60	5.54%	Assuming max. 10 cum per shift
9	Test of concrete strength- cube test - M 15 (cum) - One per shift per mixer if mixer used are more than 2	10515 cum	1052	60	5.70%	Assuming max. 10 cum per shift
10	Workability of concrete test. One per shift per mixer if mixers used are more, then minimum 3 test	16235 cum	1624	0	0%	Assuming max. 10 cum per shift

**As per provisions of MPWD Manual, 1983 and Contract document.*

Table 2.7.5.: Quality Control in Road Works: Available Tests vs Tests Required

S. No.	Particulars of Item and its Minimum Test Frequency*	Quantity executed	Min test required per unit quantity NIT Table 900-2, Table 900-3 & as per MPPWD order no. F/9-1/97/G/19 dt, 07.4.97	No. of Test conducted as per information provided	% of Tests actually conducted to that Required	Remarks
1	Test of Soil for base and sub base CBR @ every 300 m length of road in km	573 km	1909	17	0.89%	Approach road 59.313 km & 513.4 km internal road length at all 88 sites Soil=(9.2+7.6) *0.4*572.713 *1000 GSB=3.45*0.15*572.713*1000 G1=3.33*0.15*572.713*1000 G2 = 3.15*0.075*572.713*1000 G3= 3.0*0.075*572.713*1000
2	Test of Soil for base and sub base @ Density Test 1-2 test per 800 cum of soil	1935770 cum	2420	17	0.70%	
3	Test of Soil for base and sub base @ Moisture content Test- for every 250 cum	1935770 cum	7743	17	0.22%	
4	Test of Soil for base and sub base @ PI Test for per 8000 cum of sol	1935770 cum	242	17	7.02%	
5	Test of Soil for base and sub base @ Sand Content per 8000 cum of soil	1935770 cum	242	17	7.02%	
6	Test of GSB- CBR @ every 300 m length of road	573 km	1909	17	0.89%	
7	Test of GSB- @ Density Test 1-2 test per 800 cum of soil	296379 cum	370	17	4.59%	
8	Test of GSB- @ Moisture content Test- for every 250 cum	296379 cum	1186	17	1.43%	
9	Test of GSB- @ PI Test for per 8000 cum of sol	296379 cum	37	17	45.9%	
10	Test of Soil for base and sub base @ Sand Content per 8000 cum of soil	296379 cum	37	17	45.9%	
11	Test for Hard Shoulder CBR @ every 300 m length of road	573 km	3818	17	0.45%	
12	Test for Hard Shoulder @ Density Test 1-2 test per 800 cum of soil	687256 cum	1718	17	0.41%	
13	Test for Hard Shoulder @ Moisture content Test- for every 250 cum	687256 cum	5498	17	0.31%	
14	Test for Hard Shoulder @ PI Test for per 8000 cum of sol	687256 cum	172	17	9.88%	
15	Test for Hard Shoulder @ Sand Content per 8000 cum of soil	687256 cum	172	17	9.88%	

S. No.	Particulars of Item and its Minimum Test Frequency*	Quantity executed	Min test required per unit quantity NIT Table 900-2, Table 900-3 & as per MPPWD order no. F/9-1/97/G/19 dt, 07.4.97	No. of Test conducted as per information provided	% of Tests actually conducted to that Required	Remarks
16	Impact Test of aggregate per 200 sq m road surface	5429319 sqm	27147	23	0.08%	G1=3.33*0.15*572.713*1000 G2 = 3.15*0.075*572.713*1000 G3= 3.0*0.075*572.713*1000
17	Abrasion Test of aggregate per 200 sq m road surface	5429319 sqm	27147	23	0.08%	
18	Grading of Aggregate per 200 sq m road surface	5429319 sqm	27147	23	0.08%	
19	Deleterious constituents test (IS:2720 Part XXVII) as required but minimum one test per day per km for each G 1 , G 2 and G 3 layer	5429319 sqm	1718	23	1.33%	
20	Atterberg limit for binding material for WBM per 250 sq m road surface	5429319 sqm	21717	23	0.11%	
21	Flakiness index test per 200 sq m road surface	5429319 sqm	27147	23	0.085%	
22	Density of Compaction layer test per 500 sq m road surface	5429319 sqm	10859	23	0.21%	
23	Bitumen- Binder temperature at each dumper load at site per 5 cum of truck load	11214 cum	2243	1	0.045%	Open Graded Pre Mix Concrete with seal coat 2mm thick and 186.903 km in total length of all 88 sites = 3.0*0.02*186.903*1000 = 11214.18 cum
24	Bitumen- rate of spread of binder for total area in sqm -to be completed in 50 days period frequency of test - two test per day	560709 sqm	200 (Primer coat and seal coat)	1	0.5%	
25	Bitumen- aggregate impact value per 50 sqm	560709 sqm	11214	1	0.009%	
26	Bitumen-flakiness index one per 50 sqm	560709 sqm	11214	1	0.009%	
27	Bitumen-stripping value of aggregate Initially one set of 3 respective specimen for each of shift at site minimum twice a day in a set of 3 sample each for total 50 days.	11214 cum	300	1	0.33%	
28	Grading of Aggregate one per 25 sqm of aggregate	560709 sqm	22428	1	0.004%	

**As per provisions of MPWD Manual, 1983 and Contract document.*

Table 2.7.6.: Quality Control in Tree Platforms: Available Tests vs Tests Required

S. No.	Test Item and its minimum test frequency*	Quantity executed	Minimum Nos. of Tests reqd. for estimated quantity	No. of Tests Conducted	% of Tests actually conducted to that Required	Remark
1	Trial pits excavated for design of foundations - CBR once for each site	78 Sites	78	0	0%	Tree Platforms exist only at 78 R&R sites
2	Test of cement - 1 test per 50 MT	1060 MT	21	0	0%	The test certificate of material shall be submitted to the department by the contractor with bill
3	Test of sand - Once a fortnight	3470 cum	145	34	23.44%	Assuming working period is 12 months
4	Test of aggregate - Once a fortnight	2314 cum	96	10	10.41%	Assuming working period is 12 months
5	Test of Rubbles (cum) - once per each supplied	4827 cum	483	2	0.41%	One truck load will supply max 10 cum Rubble stone
6	Test of concrete strength- cube test - M 10 (cum) - One per shift per mixer if mixer used are more than 1	2504 cum	250	0	0%	Assuming max. 10 cum per shift
7	Workability of concrete test - One per shift per mixer if mixer used are more than 3	2504 cum	250	0	0%	Assuming max. 10 cum per shift

**As per provisions of MPWD Manual, 1983 and Contract document.*

Table 2.7.7.: Quality Control in Halaos: Available Tests vs Tests Required

S. No.	Test Item and its minimum test frequency*	Quantity executed	Minimum Nos. of Tests reqd. for estimated quantity	No. of Tests Conducted	% of Tests actually conducted to that Required	Remark
1	Trial pits excavated for design of foundations - CBR 1 for each site	60 Sites	60	0	0%	Halaos are constructed only at 60 R&R sites
2	Test of cement -1 test per 50 MT	188 MT	4	0	0%	The actual purchase bill & test certificate of material shall be submitted to the department by the contractor
3	Test of sand - Once a fortnight	352 cum	60	0	0%	Halaos are Constructed at only 60 R&R sites. Hence, minimum work of 1 day will be required per site at the most conservative level.
4	Test of aggregate - Once a fortnight	704 cum	60	0	0%	
5	Test of bricks(cum) - once per each supplied	146 cum	60	0	0%	
7	Test of concrete strength- cube test - M 7.5 (cum) - One per shift per mixer if mixer used are more than 1	632 cum	60	0	0%	
9	Test of concrete strength- cube test - M 15 (cum) - One per shift per mixer if mixer used are more than 2 at each site	168 cum	60	0	0%	
10	Workability of concrete test One per shift per mixer if mixer used are more than 3 at each site	800 cum	60	0	0%	

**As per provisions of MPWD Manual, 1983 and Contract document.*

Table 2.7.8.: Quality Control in Culverts: Available Tests vs Tests Required

S. No.	Test Item and its minimum test frequency*	Quantity executed / estimate	Minimum Nos. of Tests reqd. for estimated quantity	No. of Tests Conducted	% of Tests actually conducted to that Required	Remarks
1	Trial pits excavated for design of foundations – 1 for each site	87 Sites	87	1	1.13%	Minimum one at one site- No Culverts provided at Bhilsur
2	Test of cement- 1 test per 50 MT	9451 MT	189	0	0%	The actual purchase bill & test certificates of material shall be submitted to the department by the contractor
3	Test of sand - Once a fortnight	27558 cum	1148	34	2.96%	Assuming working period is 12 months
4	Test of aggregate - Once a fortnight	36712 cum	1530	10	0.65%	Assuming working period is 12 months
5	Test of Rubble (cum) once per each supplied	26906 cum	5381	0	0%	Assuming each load carry 5 cum in truck
6	Test of steel in MT Confirming to IS 1786-1985-1 test per lot	150 MT	19	0	0%	Assuming 8 MT steel is supplied in each lot
8	Test of concrete strength- cube test - M 10 (cum) - 1 per shift per mixer if mixer used are more than 1	39732 cum	3973	10	0.25%	Assuming max. 10 cum per shift
10	Workability of concrete test	39732 cum	3973	0	0%	Assuming max. 10 cum per shift
11	NP-3, 600 mm diameter Hume pipe- 2 tests per lot of max. 100 pipes supplied for 88 sites.	21000 meters	168	0	0%	2800 culverts of 600 mm diameter NP3, 7.5 m running length per culvert, assuming all single line conservatively
12	NP 3-900 mm diameter Hume pipe- 2 tests per lot of max. 100 pipes supplied for 88 sites.	1703 meters	14	0	0%	227 culverts of 900 mm diameter NP 3-7.5 m running length per Culvert, assuming all single line conservatively

**As per provisions of MPWD Manual, 1983 and Contract document.*

2.7.8.3. Quality Control for Purchases through M. P. Laghu Udyog Nigam (LUN)

Established in the year 1978, the M.P.LUN is the principle procurement agency of Madhya Pradesh, and has been arranging supplies of various goods to several departments of State Government, Institutions and Organizations against rate contracts and quantity contracts under the Store Purchase Rules for M.P. Government. This apparently ensures supply of specified material throughout the State at competitive rates due to invitation of Centralized Tenders resulting in saving of time, labour, and money for the individual Government Departments intending to purchase the material by an otherwise tedious process including inviting tenders, setting committees, and finalization of rates etc.

110. In the present project, major purchasing of goods such as half-round and full concrete pipes, submersible pumps, motors, GI and PVC pipes, valves, hand pump assemblies, Valves, PVC water tanks (cisterns), steel tanks (cisterns) etc. have been through MP Laghu Udyog Nigam (MPLUN). Therefore purchases cannot be objectionable for the method of procurement.

111. However, it is necessary to understand that the mere fact that purchases are made through an authorised government agency does not absolve the responsibility of purchaser from ensuring quality of goods purchased, especially when this authorised government procurement agency (LUN in the present case) explicitly instructs the purchaser (here NVDA) to ensure that the material received is satisfactory before making accepting the supplied material.

112. In order to ensure quality, certain items may be inspected by self, or by a third party appointed for the purpose and the inspection charges are borne by the purchasing department. Thus, the purchasing departments also verify the quality of the product being purchased by way of frequent inspection to the manufacturing unit/godowns/site where this material is stored. An Inspection note needs to accompany the inspected material which is dispatched soon after to the consignee post the inspections. This is besides the random inspection of the material that is carried out by MPLUN from time to time.

113. With all such precautions, the responsibility of ensuring quality vests also with the Purchaser. The LUN Technical Section in its inspection report clearly states (Annex 2.7-K) that if quality of any material is not found upto mark or upto the specification, it has to be reported to LUN within 7 days with all details. LUN reports also mandate that "Consignee may do inspection at Site", and also that before taking possession the purchasing department must see to it that the quality of the material purchased is satisfactory. Thus mere supply by LUN does not guarantee quality of the product, and necessary inspection notes, certificates of

mandatory tests conducted in recognised laboratories, certificates issued by the manufacturer/third party in accordance with requirements of BIS standards etc. along with necessary warranties are mandatorily required to ensure compliance with the requisite standards and specifications. In several cases, the purchaser or its authorised representatives also form witness to random testing carried out as needed to ensure compliance with requisite quality. Mere purchase through LUN does not absolve the purchaser department of all the responsibility in being satisfied with the quality of the product. This is logical as it is the purchaser who is making payments from the public money, and therefore quality and specification of the material and goods should be assured in accordance with the work requirement.

114. It is rather strange that in the present case, except for a few tests for PHED works at sites like Dharampuri etc., third party quality control certificates, or any other certificates of tests in required numbers as per relevant IS codes were not conducted by the suppliers in recognised laboratories or at manufacturer end, or by a third authorised party. If third party testing has been done for each lot for every procured product before it was dispatched to purchaser (NVDA) then results/certificates should have been submitted to the purchaser to ensure that supplied goods are pre-tested and inspected by the third party. At the same time, it was NVDA's responsibility for confirming such certificates before making payments to the third party making inspections, and before accepting the material deliveries. Where third party inspection was not undertaken, it was NVDA's responsibility to seek all test certificates assuring the quality of the product and material purchased from the supplier, as well as the necessary warranty certificates, before making payments.

115. On demand of test result certificates or the material purchased through LUN, it was informed by NVDA that these certificates may not be required in case of LUN supplies. This assertion of NVDA is far from the actual requirement of assuring quality of the material purchased, and is a mere whitewash of the fact that the quality of material procured was never checked and ascertained.

116. Thus, it appears that purchases were made through LUN without ensuring necessary quality of the material purchased, and no efforts were made to confirm the quality standards of the material. Actually, all payments should have been made only on receipt of these certificates, along with the necessary warranties for each material/product purchased. This apparently has not been the case, and the necessary certificates were in all likelihood not asked for, thereby letting the quality aspect of the purchased material to be ignored completely.

117. The whole process of purchase therefore smells of the possibility of an active connivance or collusion, which gets heightened due to large numbers of PVC water

tanks and damaged and broken half-round and full pipes found lying in damaged condition at Bhilkheda site (Plate 2.7.1). Not just this, but large number of the half round pipes laid in surface drains were routinely found damaged at several R&R sites, and PVC Water tanks often found missing and damaged, even as no test results/certificates of half round pipes and PVC Cisterns are made available.

118. What is particularly striking is that no breakage of half round/ full round Concrete pipes during delivery was found recorded in the records/MBs made available. It is actually next to impossible to transport 100% safe pipes all the way from pipe factory to work sites, ranging a few hundred Kilometres, as breakages/damages during transport/loading/unloading are normal and are always expected. Yet, there is no record of breakages/damages, and it is not known if the payments of damaged pipes in transportation/loading/unloading were also made, and if these pipes were accepted and even laid at sites, or merely accepted and stocked at Bhilkheda etc..

119. The same argument hold true for several cases of PVC water tanks (Cisterns), Pumps and Motors, Steel tanks, handpump assemblies, valves, and any other material purchased through LUN. It may be noted that for many of these items, the qualities remain uncertain in the absence of necessary certificates of quality assurances. Also, these items were often found damaged or missing from R&R sites raising suspicion.

120. The entire process of purchase through LUN therefore stands under suspicion by the manner of ignoring the quality issues at the time of purchase, and missing/damaged status of much of this material at sites. It is no one's case that the material supplied should not have been pre-tested and pre-inspected by a 3rd party or by NVDA itself because the purchase was made through LUN. The moot question is why such material was accepted without due test reports and manufacturer's certificates of quality assurance?

2.7.8.4. Quality control for Purchases made by Contractor

121. The same arguments as in above section 2.7.5.3 that hold true for purchases made through LUN will hold true for cases such as RCC and other electric poles, Electric Conductors, RCC NP2/ NP3 pipes etc where material has been procured by the contractor. The mandatory testing, as well as test certificates had to be procured and processed by NVDA before accepting the material and payments had to be made only on confirming the adherence to quality standards. Most of these certificates have not been found present in the Records submitted.

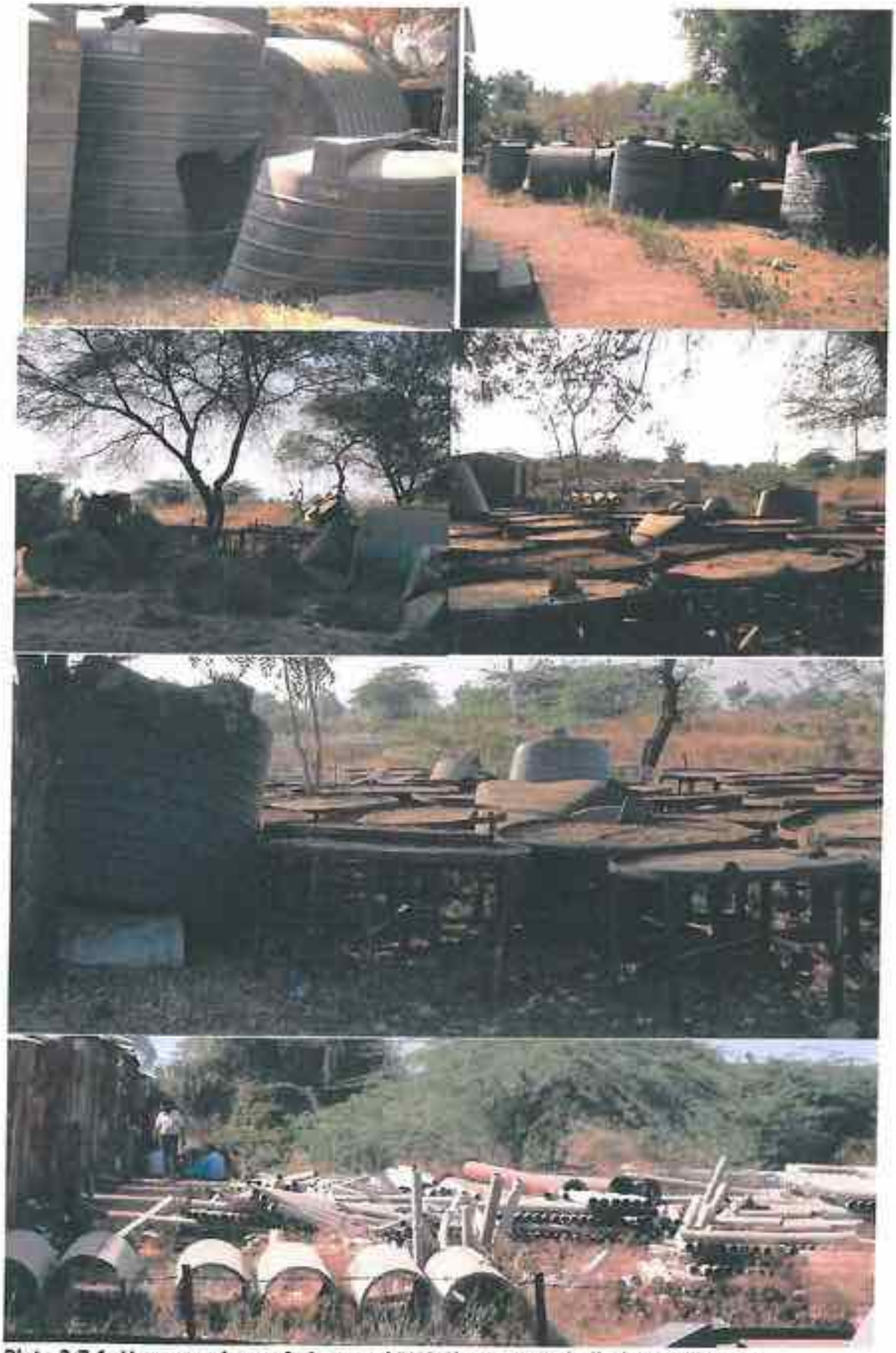


Plate 2.7.1. Huge numbers of pipes and PVC Cisterns stockpiled at Bhilkheda

2.7.9. As Built Drawings

As-built drawings are the final set of drawings produced at the completion of a construction project. They include all the changes that have been made to the original construction drawings, including notes, modifications, and any other important information. As the contractor begins work on the project, the construction drawings are used to lay out walls, install ductworks, if any, run electrical wirings, and construct the remainder of the building. During this process unforeseen conditions may require items to be installed differently than they are shown on the plans. These changes ought to reflect upon in the As Built Drawings.

As-built drawings serve several important functions. They can inform the owner of locations for wiring, plumbing, and other hidden components to make repairs and maintenance easier. They are also helpful for future renovations, and can be used as a base when creating remodeling plans at a later date.

122. The adhocism in planning and construction continued even after the completion of project work. The provision of completion drawings ("As Built" drawings) which should have been prepared as per actual execution as required by MPWD Manual 1983 para 2.181 to 2.184, were astoundingly not prepared for any structures, and payments released without obtaining these necessary Drawings from the Contractors.

123. It may be noted that some Type Drawings ("proposed Drawings") were submitted by NVDA, and labelled as the "As Built Drawings". However, dimensions on photocopies of these Type Drawings were marked in blue pen in original (Annex 2.7-L), and were clearly later additions on photocopies of Type Drawings. These are actually not the detailed Drawings of Buildings drawn after the construction work. Besides, no plumbing, wiring arrangements etc were shown on these Drawings as are expected in As Built Drawings.

124. This violation of not obtaining "As Built" Drawings before making Final Payments to Contractors is serious and should attract action against the responsible officers who have erred.

2.7.10. Some Areas of Concerns

125. Table 2.7.9 presents some of the areas of concern with regard to various issues dealt in this Chapter/Section. It is evident that major shortcomings exist pertaining to the necessary procedures that ought to have been followed, but have been violated.

Table 2.7.9.Observations based on Field Surveys/Records/Designs/Quality Aspects

S. No.	Particulars of Requirement	Status
1	Site Selection: Land Topography and characteristics at selected sites.	No serious efforts were made to select suitable fairly levelled land that would be acceptable to the affected people through a process of elaborate stakeholder consultation. Prime agricultural lands with deep BC soils such as Moreghadi, Khalbujurg etc. were selected with the result that fertile land was lost to buildings and other structures most of which show severe cracks and damages due to typical behaviour of BC soils. This makes it impossible for residents to come up with houses that would not suffer similar fate as the damaged structures created by qualified and experienced engineers through expert designs carried out by consultants. At sites like Kikarwas, the land was too slopey for houses to come up. At sites like Brahmangaon the strata was too hard and not appropriate for people to construct houses without blasting/chiselling the stones which would be a costly proposition. At sites like Sirsani, Approach road to Morekatta, Borli II, Dharamrai etc, catchwater drain was necessary to minimize damage due to flowing water from the foothills. Such provision of Catchwater drain was completely ignored.
2	Geo-technical investigation for deciding foundation types and designs.	Safe bearing capacities of soil samples were not determined, and were assumed.
3	Incorporation of special factors like climatic factors such as flooding, swelling and shrinkage of soil, soil erosion etc. into design	Special protective works like Catchwater drains, pitching on side slopes of roads etc were not integrated with the design work for specific sites developed on foothills/highly undulating lands and lands prone to flooding and erosion. Even catchment area for culvert designs was not determined in any case.
4	Availability of local construction materials such as aggregate, sand etc. for buildings and roads, & water for construction purposes.	Such information was not collected. No lead/quarry charts were found enclosed in the tender documents made available. For construction, water quality test results were also not found in the records made available.

S. No.	Particulars of Requirement	Status
5	Quarry chart of all type of mines which are identified for supply of raw material	Not available in records. Even quarry charts are not available in any of the bids / contracts.
6	Material testing at quarry for suitability of material for construction purpose.	Material testing at quarry seems not to have been carried out as per the records made available.
7	Quantity of material available at quarry as against requirement.	No such assessment of likely quantity seems to have been carried out as per the records made available.
8	Results of laboratory tests of soil and rock samples appropriate to foundation design or for avoiding construction issues.	No such details found available, except for only 2 sites where foundations have been designed viz. Moreghadi and Khalbujurg (pile foundations were designed by EPCO, Bhopal). Yet, buildings with even designed piled foundations have witnessed massive cracks.
9	Establishment of quality organization set-up and lab set up.	MP Works Department (MPWD) Manual 1983 Vol. I, Chapter VI, Section 5 para 6.015 states "A separate quality control unit shall be established for all Dams and for structures costing more than Rs. 50 lakhs. For other works quality control unit sufficient to carry out the test as specified in paragraph 6.003 shall be established". It is also stated that Superintending Engineer will remain in-charge for this set up. In the present case the cost of the works far exceeds 50 lakhs, with the total project cost being 170.5652 crores. And yet, the quality control lab was not set up. A dedicated quality control unit with skilled staff was also not established. These facts indicate a lack of sensitivity towards ensuring quality work.
10	Design of RCC components of buildings such as slab, lintels etc., open foundations, culverts, halaos and tree platforms	No designs have been carried out for individual structures. Not even type designs for select structures at each site have been carried out as per the records made available. Only overhead tanks (lump-sum contracts), a few storm-water drains, and sewerage system at Dharampuri seem to have been designed.
11	Scrutiny of design drawings, soil testing, and estimation by competent authority before granting technical sanction.	For design, drawing, and soil investigation results, no vetting has been carried out by any competent authority. Type drawings of buildings have been the basis for estimation and accord of technical sanction as per records made available.

S. No.	Particulars of Requirement	Status
12	Detailed Estimates	Detailed estimates have no basis in the absence of necessary geo-technical investigations and detailed designs. Estimates have not been prepared for individual structures such as each building, culverts, halaos, platforms etc. Approximations and Averaging have been common. This indicates the likelihood of inflated quantities in the estimates leading to higher project cost to cover up future deviations.
13.	Land Levelling	No efforts were undertaken to utilize the excess soil from land levelling to raise nearby road embankments where possible. Thus, unnecessary cost has been incurred on transportation of material from longer lead to raise embankments resulting in large expenditures. Strangely, nothing is known of the excess soil from land levelling which should have been utilized locally for raising embankments with minimal cost.
14	Deviations	No Deviations have been reported despite large savings expected. The savings have just disappeared.
15	Construction as per Technical Sanctions	Not all works approved vide Technical Sanctions have been undertaken for construction. Yet, no savings are reported, and certificates of no deviations have been given.
16	Material procurement through MP LUN	In storm water drains such as the case of Dharampuri Division, material was procured even before the date of design by consultants. Strangely, no damages recorded in transportation /loading/unloading, and it appears that 100% material procured has been paid for.
17	Tests conducted on material procured through MP LUN / Contractor	Material procured from LUN, particularly the drain pipe purchase, was not always evaluated by a third-party or by NVDA or by a LUN approved/listed laboratory. Full payments were made for entire supplied quantity, despite the fact that no such test results were submitted with the supplied material.
18.	As Built Drawings obtained from Contractor for future renovation, repairs etc.	As Built Drawing were neither obtained, nor prepared. Payments to contractors made without obtaining a record in the form of As Built drawings of what they had constructed.

2.7.11. Concluding Remarks

From a perusal of the Records made available, the following are noteworthy:

126. The building superstructures are based on Typed Drawings, adopted with minor modifications at some places. The Tree platforms, halaos, culverts, etc. have varying dimensions, with variations not having any basis whatsoever.

127. Various Type drawings help facilitate fixing the dimensions / carpet area of each structure to be constructed, but these Type Drawings do not imply same foundations across various structures as local soil characteristics decide the foundation designs. For Tree platforms, halaos, culverts, etc, varying dimensions as well as local soil characteristics will lead to specific foundation designs.

128. However, as per record submitted, most type drawings have been used by NVDA without any actual foundation details for getting Technical Sanctions.

129. Soil characteristics remained undetermined and assumed in most cases. Thus no foundation details, trial pit details and structural details are available for various structures, with the exception of buildings at Moregadhi and Khalbujurg which have pile foundations that are designed, although even the "designed foundations" at these two sites have not helped the buildings have sound structural stability with massive cracks and upheavals in the floors having been witnessed in buildings at Moregadhi and Khalbujurg

130. Remarkably, even where structures have been claimed as "designs", no detailed Estimates were prepared. Claimed designs are those for typical buildings at Moregadhi and Khalbujurg with pile foundations, and drainage at 10 R&R sites.

131. The designs themselves were a formality at least in case of drainage works where half-round pipes were chosen without considering any alternative, and it appears that that to favour Aqua Consultants, cost of work was split into slices of Rs. 50000/- or less so that need of major Tender through wide publicity could be subverted. Looking to design of storm water drains it appears that the consultant had little background of designing complex drainage designs in different soil and topographical condition, and had adopted cement concrete half round pipes for all topographic condition irrespective of strata being rocky or of BC soil, or slopey ground. Thus consultants of choice were appointed to get designs. This was necessitated because half-round pipes were already purchased and works already executed at least at sites like Khalkhurd (Dharampuri) as has been explained earlier. The design work was no more than a sham.

132. In the absence of detailed designs and drawings, Estimates have been based crudely on approximation and averages. In violation of provisions of the MPWD Manual, fresh detailed drawings for each individual structure were not prepared and hence Estimates were prepared on crude adhoc basis. Such Estimates were used for according Technical Sanctions. No prescribed procedure set by Government of Madhya Pradesh for Works Departments have thus been followed.

133. Surprisingly, Technical Sanction (TS) comprised only the adhoc and crude cost assessment of infrastructure, whereas these should have been based upon thorough investigations, on designs based on investigations, and on detailed Estimates based on designs, and all of these should have led to Award of Technical Sanction (TS). Whoever, signs TS also ensures proper investigations, surveys, designs and drawing approvals. In the present case some contracts were large, and yet the competent authority did not vet the drawings, designs, and estimates as per MPWD Manual. Nor did the subordinates bother to ensure that correct requisite documents were placed for obtaining TS as per the standard procedure.

134. For the Civil infrastructure created, there have been serious lapses on part of Implementing Agency throughout the Project work. The top officials failed to review and implement the established procedures and provisions of Manual, and to ensure that the provisions were adhered to in order to check the malpractices. Far from implementing a transparent mechanism, the Estimations were adhoc, crude and unscientific, and may have led to large inflated cost for the project works in all likelihood. Since no deviations have been claimed, the resultant savings have disappeared, and indicate widespread malpractices that need further investigation.

135. The quality of the infrastructure created was always dubious in the absence of mandatory soil investigations, engineered designs and drawings, designs of foundations etc. Estimates were approximations, and could have been far from reality. Technical sanctions were accorded in most adhoc and unprofessional manner without considering designs, drawings, and estimates for individual structures. The entire system was thus, destined to fail right at the Planning stage, even before actual execution.

136. Even during execution, care was not taken to ensure quality control by not setting up laboratory or an independent quality control Unit with trained personnel. The duties and responsibilities of all officers are clearly defined in MPWD Manual, 1983 Volume I, including those related to quality control. The Superintending Engineer had to be overall in-charge of quality control establishment, and despite such defined provisions, no initiatives were taken up by top officers to establish a quality control set up in this project. The subordinates were equally lax in ensuring

monitoring and testing of work quality at mandatorily required frequencies through independent government/certified labs.

137. The contract documents also have clear detailing on quality control provisions, and yet the provisions were never implemented.

138. Thus, at every step quality assurance was relegated to background and there were no efforts to ensure infrastructure quality. It is evident that the quality control has been largely ignored in implementing such large-scale works.

139. What is even more surprising is that these works were executed by select engineers drawn from various departments like PWD, WRD, RES etc, who are supposedly well-versed with quality control requirements and provisions of MPWD Manual 1983, and yet the provisions of their own Works Department Manual were grossly neglected and diluted resulting in unsatisfactory quality of construction.

140. Even the "As Built" Drawings were not obtained before making payments to various contractors.

Thus, the entire process speaks of absolute adhocism and unprofessionalism in public works. Technically sound and fit constructions in such a scenario were impossible, to say, the least.

CHAPTER 3

Chapter 3. Status of Water, Sanitation and Environment at R&R Sites

Table of Contents

Chapter 3. Status of Water, Sanitation and Environment at R&R Sites

3.1. Water Supplies at R&R Sites

If there is one Service that affects the rehabilitated people at R&R sites most, it is the Water Supply Services.

The water supplies at R&R sites comprise the following sources of raw water:

i. Ground water source as handpumps, tubewells and wells.

ii. Surface water source (Narmada water)

This water is supplied sometimes by decentralised sources (viz., handpumps, cisterns etc.) only, while at other times, a network of supply system employing piped conveyance of water from tubewells/surface water sources to Overhead tanks/Cisterns/handposts/and sometimes a distribution system reaching the houses are provided additionally. There also exists provision of 2 water treatment plants for supply of treated waters to few sites like Dharampuri, Nisarpur I, II, III, Gehalgaon and Chikalda, while the remaining sites essentially receive untreated waters. In addition, supplementary water supplies by Tankers are also made to a limited number of R&R sites.

Any evaluation/ Technical review of Water Supply Scheme/Services comprises 2 important issues that would need to be essentially addressed:

1) The water supplied has to be safe. This implies that the water quality needs to be assured in terms of selected parameters as per the various prescribed standards and guidelines which, if breached, may affect health adversely through resulting morbidity (disease) or mortality (death).

2) The State of the Water supply Infrastructure and its Planning has to be sound so as to ensure that minimum water adequacy in terms of amount of water required for satisfying various human demands like drinking, washing, bathing, sanitation, cooking etc , in addition to the demand of water by Livestock for their drinking and bathing, are effectively met. Furthermore, the quality of the water supply infrastructure has to be sound in terms of its adequacy, robustness, ease of operation & maintenance, user convenience, its upkeep, its sustenance for the designed life period, and all this at economic costs.

These 2 issues that define the status of Water Supply Services form the basis of evaluation of these services provided at the R&R sites along with an examination of official records as elaborated in the subsequent sections.

3.1.1. Water Quality – Monitoring, Testing and Analysis

Rural people in India spend at least Rs.100 each year for the treatment of water/sanitation-related diseases. According to the Government of India, this adds up to Rs.6,700 crore annually, which is just Rs.52 crore less than the annual budget of the Union Health Ministry and more than the allocation for education

- *Down to Earth(2002), Vol 10, No. 19*

All life emerges from water, and water sustains all life, but for the same reason, water also takes life when qualities are not assured. In fact, as per the World Health Organisation, poor water qualities and inadequate supplies lead to more than 3.4 million deaths globally each year from water, sanitation, and hygiene-related causes, of which more than 90% deaths occur in the developing world. Research world-over has proven that burden of diseases due to poor water qualities results in plethora of undesirable and avoidable outcomes such as poor human health and quality of life, human disease, suffering and mortality, monetary loses for the poor, loss of working man-days, loss of employment for the poor, loss of school days for the children, increase in family sizes of the poor to compensate for premature death of their children etc..

1. From an Indian perspective, therefore, ensuring water qualities through regular monitoring at prescribed frequencies in terms of defined parameters, and initiating appropriate corrective actions based on the results of extensive and mandatory monitoring remain issues of paramount importance as recognised by various government agencies in their numerous documents.

2. The provision of clean drinking water has been given priority in the Constitution of India, with Article 47 conferring the duty of providing clean drinking water and improving public health standards to the State. Determination of Water quality comprises one of the most important tasks to ensure supply of safe drinking water to the inhabitants. Safe drinking water implies that the quality of water supply is taken care of by the suppliers and beneficiaries get quality potable water, and hence the Public Health Engineering Departments have been emphasizing regular monitoring and surveillance of water quality.

3. In order to avoid large burden of water borne diseases and other diseases due to excess of fluorides, arsenic, etc., and to ensure supply of safe water the Implementation Manual on "National Rural Water Quality Monitoring & Surveillance Programme", 2004, published by the Rajiv Gandhi National Drinking Water Mission, Department of Drinking Water Supply, Ministry of Rural Development, Government of India, emphasizes that the drinking water should be

   - Free from pathogenic (disease causing) organisms
   - Clear and transparent
   - Not saline (salty)
   - Free from offensive taste and smell
   - Free from chemical contaminations that may have adverse effect on human health
   - Free from chemicals that may cause corrosion to pipe and appurtenances or stains on clothes / utensils etc.

4. To ensure above, the Water quality standards are broadly classified into, physical, chemical, microbiological, and biological characteristics, and regular monitoring and surveillance of water supplies is mandatory.

5. The Manual on Water Supply and Treatment (3rd Edition), prepared by the Expert Committee Constituted by the Government of India, and published by the Central Public Health and Environmental Engineering Organisation (CPHEEO), MoUD, New Delhi, 1999, recommends "Samples for systematic chemical examination should be collected at least once every three months in supplies serving more than 50,000 inhabitants and at least twice a year on supplies upto 50,000 inhabitants". For bacteriological sampling, "proper evaluation of the bacteriological quality of the entire water supply" scheme is essential, with "much more frequent bacteriological examination" in the event of an epidemic or immediate danger of pollution". In Distribution Systems, the minimum sampling frequencies for population upto 20000, successive sampling needs to be carried out within a maximum interval of one month between successive samplings, with minimum one sample per 5000 of population per month.

6. Similarly, the Implementation Manual on "National Rural Water Quality Monitoring & Surveillance Programme", 2004, published by the Rajiv Gandhi National Drinking Water Mission, Department of Drinking Water Supply, Ministry of Rural Development, Government of India, suggests increased frequencies of Sampling and Analysis of water supplies, indicating larger emphasis on water quality determination with the passage of time (Table 3.1.1).

7. It is thus evident that water qualities are to be mandatorily monitored and assessed at prescribed frequencies each year for each handpump/tubewell and distribution network, and any breach of this is not-permissible.

8. The records pertaining to water quality assessment and monitoring at R&R sites were therefore sought from NVDA. The initial response during site visits as per proformas provided was that "Nil" test reports were available. This was also the stand vide the letter of the Karyapalan Yantri, NVDA, Badwani, to our queries requesting for "Test results for Water Quality of all individual Handpumps at various R&R sites", to which the response was that test results will be provided after the tests are conducted (Annex 3.1-A, Point No. 16).

9. However, in April 2013, some reports were submitted for tests conducted since 1999. The subsequent observations are based upon the analysis of this Record submitted at later stage, without casting aspersion on the authenticity of submitted records.

Table 3.1.1.Suggested Frequency of Sampling and Analysis of Water Supplies

Source and Mode of Supply	Minimum Frequency of Sampling and Analysis		Remarks
	Bacteriological	Physical / Chemical	
Ground Water:			
Open wells for community supply	Every 7 days	Once initially then 4 times yearly	Pollution usually expected to occur
Covered dug wells and shallow tube wells with hand pumps	Every fortnight	Once initially then 4 times yearly	Situations requiring testing: change in environmental conditions, outbreak of waterborne disease; or increase in incidence of waterborne diseases
Deep tubewells with handpumps	Once initially, thereafter as situation demands	Once initially then 4 times yearly	Situations requiring testing: change in environmental conditions, outbreak of waterborne disease; or increase in incidence of waterborne diseases
Wells and piped supplies	Once initially, thereafter as situation demands	- Once initially, then 4 times yearly - Test weekly for residual chlorine if water is chlorinated	Situations requiring testing: change in environmental conditions, outbreak of waterborne disease; or increase in incidence of waterborne diseases
Springs and piped supplies	Once initially, thereafter as situation demands	- Once initially, then 4 time yearly - Test weekly for residual chlorine if water is chlorinated	Situations requiring testing: change in environmental conditions, outbreak of waterborne disease; or increase in incidence of waterborne diseases
Surface water and Rain water:			
Filtered and/or chlorinated & piped supplies	Once monthly	- Once initially then 4 times yearly - Residual chlorine test daily	Increase frequency of bacteriological test if situation demands

3.1.1.1. Water Quality for Handpumps/Tubewells

10. From the records submitted, it appears that the Water quality monitoring and testing for a large number of handpumps has never been carried out, forget about regular monitoring and surveillance at a desired frequency every year for every handpump/tubewell installed.

11. It may be noted that there are a claimed 1284 Handpumps and Tubewells at all the R&R sites. Considering 4 tests annually, there had to be a minimum of 5136 tests per year. However, against this, for the duration 1999-2012 (14 years) only 468 samples have been claimed to be tested thus far, implying an average of only 39 tests per year, which is not even 1% of the tests that should have been conducted.

12. The test results for analysis of Handpump/tubewell water quality were available only for 76 sites. Thus, apparently, the water testing for handpumps/tubewells has never been carried out at the 12 R&R sites, and the handpumps/tubewells at these sites have been installed and are being used without any idea of the safety and suitability of their water qualities, in complete violation to all acceptable norms.

13. Even at the 76 sites where the testing has been carried out, the water quality of every handpump that forms a drinking water source has not been determined in a majority of cases. It also appears that even where testing has taken place, the same handpump/tubewell has never been tested again so that the quality assessment appears to be essentially a single one-time event for a wide majority of cases.

14. Of the 76 sites where handpump/tubewell water testing were carried out, sometimes or the other, a total of 100 test reports were found in the records ranging from year 1999 to 2009. These 100 test reports comprise test results for 468 samples in all for a period of 14 years from 1999 to 2012 (Table 3.1.2).

15. The Water quality tests have been conducted in State Research Laboratory – Bhopal (12 Reports), District lab Khargone (67 reports), District lab Barwani (16 reports), and District water lab Dhar (5 reports). In 18 of the test reports, a mandatory entry-the date of sampling, was not mentioned. Similarly, in 27 of the reports, the mandatory date of testing was not mentioned, although the date of despatch of report has been mentioned in several cases.

16. Except for the 18 reports where dates of sampling have not been mentioned, the sampling seems to have been carried out for just 39 days spread over a period of 14 years from 1999 onwards.

17. During the site inspection, a large number of handpump platforms were found damaged. Vide letter क्र 855 / प्र.अ. / मां नि. / स्टेनो / 9, of the E-In-C, PHED, MP, Bhopal, dated 25.01.99 (Annex 3.1-B), it was notified that in all such cases extensive water testing was necessary as the pollution may have reached the water source. These directives seem to have been completely flouted, and no

mandatory, regular monitoring of water quality has been assured even when the handpump platforms have had severe damages.

Table 3.1.2. Numbers of handpump/tubewell water quality samples tested per year

S. No.	Year	Total Number of Samples tested at all the R&R sites
1	1999	26
2	2000	10
3	2001	0
4	2002	7
5	2003	6
6	2004	322
7	2005	14
8	2006	63
9	2007	0
10	2008	6
11	2009	14
12	2010	0
13	2011	0
14	2012	0
	Total	***468***

Table 3.1.3. Water quality sampling details for all years except 2004 and 2006

Year	Total Number of Samples tested	Numbers of R&R sites Sampled	Number of days of Sampling in the entire year	Month of Sampling
1999	26	5	4	One day in June, 3 days in August
2000	10	5	2	One day each in June & September
2001	0	0	0	-
2002	7	3	2	July
2003	6	6	1	July
2005	14	3	1	February
2007	0	0	0	-
2008	6	1	1	July
2009	14	14	4	December
2010	0	0	0	-
2011	0	0	0	-
2012	0	0	0	-
Total	***83***	***37***	***15***	

18. No water quality tests seem to have been conducted after the year 2009 (Table 3.1.3) indicating gross carelessness in ensuring safe water supplies, in violation to all prescribed norms and rules. Thus, after 2009, the resettled inhabitants are drinking waters whose qualities remain completely undetermined and un-tested. This is an extremely serious observation in view of non-existent practice of even chlorinating the drinking water supplies, and employing de-fluoridation wherever Fluorides are present.

19. Except for the years 2004, 2006, and 2009, the number of samples tested each year did not even exceed two digits, and were all less than 7 (Table 3.1.3).

20. In 2003, only 6 samples were tested from 6 handpumps at 6 different R&R sites, all collected on a single day in the entire year. In 2006, 14 samples collected on 4 day in the entire year were tested for 14 handpumps at 14 R&R sites (Table 3.1.3).

21. Clearly, the entire exercise had no basis for randomly choosing a handpump each at every site. Choosing randomly one handpump/tubewell at each site makes it appear that testing has been carried out at larger number of sites, when actually the water quality testing should have been carried out for every single handpump/tubewell at prescribed frequency as per the existing rules and norms.

22. From 1999 to 2012,except for the years 2004 and 2006, over a 12 years period, a mere total of 15 days were devoted for water sampling collecting 83 samples from 37 R&R sites in all over these 12 years (Table 3.1.3). Evidently, at virtually every site, most handpumps were never subject to water quality testing.

23. Even the timing of water quality testing appears random: December, July, February, September, June, August (Table 3.1.3). There were no criteria for carrying out tests pre- or post-monsoon as is necessary, and the testing was adhoc.

24. Of the mandatory set of parameters on which testing should have been consistently carried out in all reports, not even one parameter existed that was always and regularly subject to test. Each test report randomly tested some parameters to the exclusion of different sets of parameters each time (Table 3.1.4).

Table 3.1.4.Water Quality parameters not Reported for Tested water samples

S. No.	Drinking Water Parameter	Number of test reports not testing the parameter out of a total of 100 Reports	% of Reports testing the water quality parameter
1	Total/Faecal Coliforms	80	20%
2	Nitrates	79	21%
3	Sulphates	89	11%
4	Chlorides	32	68%
5	Fluorides	17	83%
6	Iron	67	33%
7	Arsenic	100	0%
8	Total Dissolved Solids	66	34%
9	Total hardness	3	97%

25. Of all the parameters of significance, the single most important parameter that reflects the bacteriological water quality, and which needs to be assessed mandatorily both during the usage of handpumps, and also before the installation and usage of handpump for getting the raw water source approved, the Total/Faecal Coliforms, a parameter that reflects the possibility of pathogens in water, was not

tested in as many as 80% of the test reports available (Table 3.1.4). Even in those reports where some testing was carried out, the testing of Total/Faecal Coliforms was not carried out for all the samples in violation of the directives of E-In-C, PHED, MP letter क्र. 2293 / प्र.अ./ मोनी/ जगुस / लो.स्वा.यां.वि. / 04 Bhopal dated 25.03.2004 (Annex 3.1-C). This violation attracts initiation of action against erring officers as the letter clearly states:
इस अत्यंत महत्व दिया जावे। आदेशों के पालन न किये जाने पर यदि कोई घटना घटित होती है तो इसके लिए संबंधित कार्यपालन यंत्री व्यक्तिगत रूप से स्वयं जबाबदार होगे एवं उनके विरूद्ध कड़ी से कड़ी कार्यवाही की जायेगी।

26. In all, just 26 samples out of a total of 468 samples were subject to the necessary test for Total/Faecal Coliforms. The year-wise break-up of microbiological testing was as follows: 1 sample tested in year 1999, 6 in 2003, 5 in 2004, and 14 in 2009. Of these 26 samples, as many as 18 samples tested positive (MPN range 2 per 100 ml - 43 per 100 ml) for Total/Faecal Coliforms, indicating that large numbers of handpump waters tested had microbiological contamination (18/26=69.23%). But, regrettably, even this alarming fact did not prompt the Engineers to carry out the test regularly, and extend it to all the borewells.

27. Despite the fact that large number of handpumps had likely contamination, the testing of handpump /tubewell waters for coliforms remained at best sporadic, and ignoring this most significant drinking water quality parameter remained a common occurrence.

28. The action taken in case of reported occurrence of Coliforms is also not known. No chemical consumption records were seen at any R&R site that maintained any records of use of bleaching powder etc. that should have been mandatorily applied at least for the tubewell supplies in such cases.

29. Similarly, another very important ground water quality parameter, Fluoride, was not tested in as many as 17 reports of the 100 reports available (Table 3.1.4). It may be noted that as per the Integrated Management Information System (IMIS) of the Ministry of Drinking Water and Sanitation, GoI, Kukshi, Nisarpur , Dhar, Jhabua , etc. are known to have villages where excessive fluorides have been found in groundwaters.

30. Of the samples tested for fluoride, 8 samples reported excess Fluoride in the range 1.93 mg/l to 4.53 mg/l, indicating possible threat of mottling of teeth and even Fluorosis. This assumes special significance in view of Fluorides becoming an endemic problem in groundwater particularly when deeper strata are tapped as has been the case with several handpumps.

31. It is also significant that the finding of Fluoride in certain samples did not prompt all the handpumps of the entire district (including the same and nearby R&R sites) to be monitored, flouting the mandatory testing requirements as compiled in the letter 67 /04/ प्र.अ./ मॉनी/ लो.स्वा.या.वि. of the E-In-C, PHED, MP , Bhopal, dated 03.01.04 (Annex 3.1-D) from his earlier letters issued on the subject, and the letter क 308 001–59/ सला/ प्रौमि/ चायो/लोफ.स्वा.यां.वि. in Annex 3.1-E: Bhopal dated 02.03.2000. The letters of E-In–C also stipulates the cross-checking of fluoride levels in suspected water samples in such cases from the State Research laboratory, Bhopal which were again not found in the records, and neither did the reports have intensive monitoring test results of pre- and post-monsoon monitoring at such sites and nearby sites. The corrective action taken in these instances is also not known. During site visits, the inspection team did not find even a single defluoridation treatment unit installed anywhere.

32. Similar cases hold for important parameters like Nitrates and Arsenic despite their paramount importance in mandatory testing as outlined vide E-In-C, PHED, MP letter Bhopal क्र. 2293 / प्र.अ./ मॉनी/ जनुस / लो.स्वा.या.वि. / 04 dated 25.03.2004 (Annex 3.1-C). Nitrates in drinking waters lead to blue-baby disease, but were not tested in as many as 79 test reports out of 100, while Arsenic was never ever tested!

33. The gross negligence remained consistent with respect to other parameters also. Chloride was not tested in 32% of the test reports, Iron was not tested in 67% of the test reports, and Sulphates were not tested in 89% of the test reports etc. (Table 3.1.4). The data indicates gross negligence in testing of water qualities to determine if the hundpump/Tubewell waters were suitable for drinking.

34. Thus, there have either been no tests conducted to ascertain the quality, or if tested the testing has been a random one-time event and a hence a denial of possibility of pollution at all future times. Furthermore, the Testing parameters that ought to have been mandatorily determined have been randomly given a pass. And even when the samples have tested positive for a number of parameters such as Fluoride and Coliforms, no efforts have been undertaken to have large-scale testing of water of the entire district and of the nearby sites, flouting all provisions set up by the various government agencies: Ministry of Rural Development, Ministry of Urban Development, GoI, and of the MP PHED itself, an organisation from which NVDA had drawn specialist Engineers.

35. It is evident that water quality testing and surveillance on handpumps and tubewells, mandatory as per the various rules and norms, has been a sham and there has been no real intent of ensuring water qualities of acceptable levels to the rehabilitated people across the R&R sites.

3.1.1.2. Water Quality for Piped Distribution System (Through Cisterns/ Handposts/ Domestic Connections)

The water source in such cases would be either Surface water supply from River Narmada, or Groundwater through Tubewells or a Combination of Surface and Groundwaters. The supply is made through Overhead Tanks/Cisterns/Handposts/piped network with or without House Connections in varying combinations.

36. Two water treatment plants have been provisioned for catering to a select few sites (Dharampuri, Nisarpur I, II, III, Gehalgaon and Chikalda), but both these treatment plants were found non-functional. One of them at Dharampuri has handing over issues, while the other meant for Nisarpur, Gehalgaon and Chikalda had incomplete works carried out.

37. No water testing at present is carried out at any of these water treatment plants, and no lab equipped with any water quality testing instruments, as is mandatory at treatment plants, was found at either of the two water treatment plants. In any case, both plants remain dysfunctional/incomplete as of now.

38. For a very wide majority of sites (nearly 84), no water treatment facilities or even a provision thereof exists.

39. Thus, essentially raw water is being supplied at all sites through the distribution system/decentralised water sources. In such a scenario, regular monitoring and surveillance of water quality becomes all the more essential to ensure safe supply of potable water, more so because no chlorination is carried out for water stored in overhead tanks (Annex 3.1-F, Point No. 13), cisterns etc.

40. As per the information provided by NVDA, even the overhead tank waters qualities remain un-tested (Annex 3.1-F, Point No.13).

41. Apparently, large numbers of Bore-Wells from where water is being drawn at several sites also go without any testing of water qualities. The water qualities need to be tested once a week at each mechanised Bore-Well as per the Ministry of Drinking Water and Sanitation, Government of India, in its "Operation and Maintenance Manual for Rural water Supplies" (2013). No such records of water quality testing were found available.

42. The records also did not show any test reports pertaining to water quality tests at Cisterns, handposts, consumer end, etc., all of which should have been carried out periodically.

43. Thus, it appears that the piped water supply system has never been subject to water quality assessment, and the water quality control is not practiced, indicating gross negligence and violation of all mandatory and acceptable requirements.

3.1.1.3. Concluding Remarks on Water Quality

44. It is thus evident that despite the large known adverse impacts on public health, despite the norms and standards existing, and warranting regular quality assessment, monitoring and control, no efforts whatsoever have been made by NVDA to assess and determine the quality of water being made available to the inhabitants of the R&R sites.

45. This despite the fact that government own records show Jhabua, Dharampuri, Kukshi, Manawar, Nisarpur, Maheshwar etc have groundwaters that are infested with Fluoride (Reference: Ministry of Drinking water and sanitation Website :National Rural Drinking Water Programme (Rajiv Gandhi National Drinking Water Mission, Available online: (http://indiawater.gov.in/IMISReports/NRDWPDistrictMain.aspx?APP=IMIS&IState=017&StName=MADHYA%C2%A0PRADESH).

46. This is also despite the fact that meagre tests got conducted by NVDA indicate existence of Fluoride, Coliforms etc in several samples.

47. Ignoring the water quality has significantly led to ignoring opting for treatment options including disinfection/chlorination of water supplied to inhabitants, violating all norms (Details spelled out later).

48. Ignoring the water qualities has also led NVDA to supply raw untreated water universally at all the R&R sites, including the cases where raw water is drawn from near stagnant backwaters of River Narmada, without even determining raw water quality in complete violation of all rules and norms.

49. Such blatant violation of all prescribed norms and standards needs to invite most severe action against the officers responsible for field assessment of water qualities, as well as against their superiors who have completely failed in their duty to Plan, oversee, supervise, and monitor the mandatory regular assessment of water qualities in order to ensure that appropriate quality control interventions take place, preferably before the infrastructure handing over takes place, wherever the water quality mandated by various standards gets breached.

3.1.2. The State of Water Supply Infrastructure

Visits to the various R&R sites revealed the following observations about the individual components of water supply Infrastructure:

3.1.2.1. Handpumps (HPs)

50. A very large number of HPs seen in the field apparently do not work and stand defunct. Many others work only for 6-10 months a year, and get dry in summers/or their yield gets highly impacted in summers, creating supply scarcity for inhabitants during the hot summers when the water demand is at the peak.

51. Except for very rarely seen cases (Plate 3.1.1) where some HPs had a washing platform constructed, most of the HPs did not have a separate washing platform. It may be noted that at several R&R sites like Ekalwara, separate provision for Washing, Bathing Platform in Cement Concrete of specified size has been kept in the Estimates of Technical Sanctions (Annex 3.1-G), and yet these have not been found constructed at Site.

52. Even more serious was the fact that a large number of handpumps at several R&R sites were found without the platforms that are to be cast mandatorily (Plate 3.1.2). Not casting the mandatory platform denies the users a safe and assured working area making it inconvenient to be used, and leading to random flow of spill-over water that pools up and stagnates with the consequential insanitary conditions and health consequences by way of vector insects including mosquitoes, and threatens the contamination of the groundwater and of the handpump water itself. This is in complete violation to the standard HP design of UNICEF which is adopted by the PHED. Handpumps without Platforms cannot be regarded as technically acceptable and complete, and no financial payments ought to have been made for such HPs. Without Platforms, Handpump cannot be treated as complete work (Annex 3.1-G).

53. It was very common to find Handpump having platforms that were cracked (Plate 3.1.3). Cracks in platforms indicate poor execution, and can lead to contamination of groundwaters (and hence the handpump waters) through the cracks. It may be relevant to point out here that limited test results conducted have already shown that large numbers of the sampled handpump water have positive presence of coliform bacteria.

54. In large number of cases, the cracks were extensive leading to large damage of the platform (Plate 3.1.3). Such damaged platforms are of no use, and are essentially user inconvenient, besides being a source of insanitary conditions, as spilled water tends to flow at random. There were apparently no attempts made to maintain, make repairs or to recast such platforms, indicating poor maintenance also.

55. Such extensive Platform cracks/ damages were not limited to Black-Cotton soils and existed even when the strata was hard. For example, at Barahmangaon

(Theekri), Chichli (Kasravat) etc. where the strata are rocky/hard, a number of platforms were seen having cracks (Plate 3.1.4). This indicates poor execution, besides being reflective of the possibility of poor quality of construction material.

56. It is noteworthy that no records on mandatory tests like cube tests, test of cement etc employed in platform casting were made available for any of the handpump platform cast across any of the 88 R&R sites. Thus, the initial concrete quality itself was not assessed and assured at the time of construction.

Kaisur: Two different Handpumps with Bathing, Washing platforms- A very rare occurrence despite provisions at several sites. One on top appears recently constructed.

Plate 3.1.1. Handpumps with Washing Platforms

Awalda

Borlai II

Bhilkheda

Kalyanpura

Eklera

Dehar: Two different Handpumps

Panya

Urdana

Urdana: Another case

Plate 3.1.2. Handpumps without the mandatory Platforms (Typical)

Kadmal

Vishwanath Kheda

Nimbola

Khedi

Kaisur: Two different Handpump Platforms

Dharamrai

Kikarwas

Plate 3.1.3. Typical Damaged Handpump Platforms: A running story across sites....cont.

Khedi: Also the HP platform slope is defective

Chandankhedi

Khalbujurg: Case of Two Platforms

Gawla I

Khujawan

Saita

Sala

Plate 3.1.3.Typical Damaged Handpump Platforms: A running story across sites.....cont.

Khajuri

Sirsani

Jalkoti

Kaisur

Jalanpur Dhalkheda

Kavanthi

Amalali

Kikarwas

Plate 3.1.3. Typical Damaged Handpump Platforms: A running story across R&R sites

Brahmangaon: 3 different Handpump platforms

Chichli (Kasravad)

Plate 3.1.4. Typical Cracked HP platforms even in hard strata.

57. At few places, HP assembly installations (mechanical components) were found missing in parts or whole, and hence these HPs were also not functional.

58. The approach to the Handpumps was often not provided, and it was not ensured that HPs be approachable with ease, safety, and around the year, including the rains. Approach assumes special significance as often females/ children carry load of water from the HPs, and need a safe, assured, convenient, and easy passage.

59. The HPs in most cases have inadequate drainage. The HPs discharge often to open grounds, compounding the problem of residents who already have a non-working surface drainage system. The stagnant pooled up drainage water (Typical Plate 3.1.5) would have had massive consequences for health of residents had these R&R sites fully developed, as such waters provide breeding grounds to mosquitos and insects, causing diseases like Malaria and Dengue and leading to insanitary conditions in general. The condition becomes more significant in the rural context as the Livestock is often attracted to such pools, and defecation therein further exaggerates the insanitary conditions.

60. The HP drainage has also not been planned and executed properly in the directional sense. The drainage was often seen randomly directed towards the roads, tree platforms, houses etc. (some photos in Plate 3.1.6) rather than be channelized towards drains or aligned with natural drainage. Insanitary conditions due to poor/ non-existent drainage were common.

61. The locations of HPs were another sore point. One could locate HPs amongst thick bushes, nallahs, in front of culverts, electricity poles etc, (Plate 3.1.6) thereby compromising free and safe usage, and having implications on water qualities and on user convenience. Important issues were not addressed while locating such HPs. For instance, while locating HPs in front of culverts, questions should have been asked if such HPs would serve the residents in Rains. Will these be conveniently approachable during rains? Would the water quality of the HPs not get adversely affected due to surface runoff carrying impurities? Similarly, public HPs in front of the individual houses would intrude upon privacy of the owners and may lead to insanitary water pondages in vicinity of such houses. Likewise, the HPs located in the Nallah imply chances of platform erosion, flooding in rains, and compromises upon the ability of people to take water from HP at least during the monsoons. Additionally, it poses risk to life if flash floods occur in the Nallah during monsoons. In all such cases, it is apparent that the planning and execution did not exhibit the sensitivity needed, and gave such issues a complete pass.

62. Sometimes inappropriate HP locations led to damage of HP Platforms. For instance, drainage water from hillocks would overrun the HP Platform, and would erode these away, as neither the training of natural drainage water has been adopted, nor any protection measures taken to ensure that HP platform concrete does not erode by gushing natural drainage (Plate 3.1.7).

63. Planning/execution issues were also observed for Handpumps located right below the hilly topography leading to user inconvenience as the loaded water vessels would have to be carried up the hilly terrain day after day mostly by females and children. Similarly, locations on slope making HP Platforms susceptible to erosion from gushing surface water, poor approaches, faulty sloping of platform /drainage channels resulting in random spillage of drainage/spilled water (Plate 3.1.8) were some other relevant issues.

64. Then there were site-specific issues like safety taking a back-seat in the entire planning process at some sites. To illustrate this using an example, at Sala, a HP exists right next to a primary school (Plate 3.1.9). Note the primary school in the background does not even have fencing and gate arrangement, giving the schoolchildren ample of opportunity to dwell around. Nearby handpump would be a favourite place due to availability of drinking water here, but the disposal arrangement for HP drainage is pathetic and fraught with danger as water has been allowed to pool up in a deep ditch. Such adhoc disposal of HP spill over, near the primary school poses safety concerns for school-children, besides giving ample opportunity for vector-carriers like mosquitos to develop in the stagnant waters.

65. The locations of Handpumps at the overall sites sometimes also left much to be desired. For example, at Dharamrai, a handpump was seen more than half-a-kilometre from the nearest plots (Plate 3.1.10-Satellite imagery of the R&R site) which would limit the use of the HP. The HPs in this sense were not always distributed to minimise the carrying/walking distance for the habitants. It may be noted that that resistivity survey results and available land often limit the choice of locating HPs optimally, yet since the resistivity surveys are conducted at select locations, far away locations may prove a source of public inconvenience. Better spatial distribution of HPs would invariably have made the life of residents easier.

66. A vast majority of the Handpumps that have been installed were found unmarked. This is a serious flaw, as water samples need to be taken periodically, and HPs need to be marked for identifying the precise handpump from where sample has been tested and for knowing which all handpumps are contaminated. Furthermore, absence of marking does not enable recognition as to which handpumps have been installed by respective Panchayats or by private individuals or by some other agency, as against the ones provided officially to the oustees by NVDA. Also, the mandatory/customary marking of date of installation/last sampling date etc., were not seen marked on the HPs at the R&R sites.

Bhilkheda: Drainage spilling over Road

Bhilkheda: Another HP

Mandwada: drainage towards road, HP Platform damaged

Sirsani

Chichli Kasrawad

Borlai –III

Eklera

Kirmohi

Plate 3.1.5. Improper HP spill-over drainage and ponding at R&R Sites (Typical).....cont.

Perkhad: Two scenarios at the same handpump

Kaisur

Umda

Sirsani

Bijasan

Kathora

Chichli Kasrawat

Kathora

Plate 3.1.5. Improper HP spill-over drainage and ponding at R&R Sites (Typical) (*Note: All photographs taken in Dry Season*).

Kirmohi: Two different handpumps located in front of culverts.

Kalyanpura: electrical pole prevents opearation

Balkhad: HP in front of a house.

Vishwanath Kheda: Drainage on the road

Nisarpur: No approach

Kikarwas: Spillage on the road

Chichli Kasrawat: Spillage has no place to go

Plate 3.1.6. Typical Poor HP Locations: Insensitive planning and execution.....cont.

Kikarwas: Two views of the same Handpump. The HP is located in the Nallah trough. This implies likely erosion, flooding in rains, and an inability of people to take water from HP in rains. It also poses risk to life if flash floods occur in the Nallah during monsoons.

Borlai II: Objectionable HP Location—Right in front of a House. Problem for the Plot owner as public will visit the house at all times, and spills will create havoc and disputes.

Musapura: HP located next to plot, and drainage directed to Platform/Road

Plate 3.1.6. Typical Poor HP Locations: Insensitive planning and execution

Brahmangaon: Two different Handpumps

Kirmohi

Plate : 3.1.7. Eroded platforms/undercuts due to flash waters (Typical).

Chenpura: No drainage, no approach-Residents need to carry water load all the way up

Balkhad: Two different HPs with drainage flow in all directions - the Slope of drainage channel is actually upwards, water finds its own path to drain towards opposite direction. Also, no engineered Approach to the HP seen.

Plate 3.1.8. Poor HP Planning/Execution (Typical)

Sala (Dharampuri) : A HP near Primary School. The primary school in the background does not have any fencing and gate arrangement, giving schoolchildren ample opportunity to dwell around. HP would be a favourite place due to availability of drinking water here. But the disposal arrangement in a deep ditch for HP drainage is essentially unsafe and adhoc, and the collected water would stagnate to breed mosquitoes.

Plate 3.1.9.Safety Issues- Site Specific

Dharamrai-Satellite imagery: Note the position of the Handpump (extreme Right-Blue mark with whitish centre) which lies more than half-a- kilometre from the nearest plots. The Centre has a Red Balloon which represents the civic buildings. On the far tpo the two blue balloons represent the two over-ground sumpwells, whereas the tubewell supplying them water is the bottom blue balloon in the centre.

Plate 3.1.10: Satellite imagery of Dharamrai R&R Site, and the location of a handpump outside the R&R site.

3.1.2.2. Tubewells, Power Pumps and Pumphouses

The Tubewells supply waters which are pumped by the nearby located power pumps housed in the pumphouses in the vicinity of respective tube-wells for supplying water to the OHTs/ Cisterns/ distribution system.

67. The borewells with relatively higher yields (but not necessarily having the highest yield at a given R&R site) have been converted into tubewells by installing pumps to draw water and housing these pumps in pump-houses in the vicinity of the tubewells.

68. The tube-wells have not been provided at all sites. For example, there were no tube-wells at Bhavati II, Sondul, Bhavariya, Bhilsur, Jalkheda, Jalkoti, Khajuri, Umda, Saita, etc.

69. Non-providing tube-wells at such sites is not only discriminatory by not allowing people of such sites access to uniform amenities, but is also a technical flaw as Cisterns and Halaos cannot be filled by handpumps in the absence of tubewells and OHTs.

70. Even at all the places where tubewells are contemplated, many of the borewells are not being operated currently, and no pumps/motors have been installed yet on the plea that currently some of the sites are hardly habitated. Under such circumstances there is a risk that the borewells will not remain functional if operated a few years later, as in the absence of regular drawl of water, pores will clog out, adversely affecting water yields from such borewells.

71. The water quality of the tubewells at various R&R sites are not monitored regularly and even periodically, and remain largely uncertain and undetermined, and untested. No test reports for water samples tested periodically were seen available at any of the pump-houses or anywhere in the records submitted. Thus, the water qualities supplied through the tube-wells are not known, and the consideration of important parameters like coliforms, fluorides, etc has been given a pass.

72. In some cases, like Chichli, there were complaints of tube-well water having odours, and yet the water quality remained untested even as supplies were still being made.

73. No disinfection/chlorination is practiced at the tube-wells, and the raw water is being supplied without any treatment.

74. No service schedule records and logs for running schedules, running time, maintenance carried out etc. were found at pump-houses at any of the sites for the tube-wells. Thus, there is no way to ascertain, if the tube-wells are being run at all, and if so, then whether these are run regularly for the requisite time, at pre-decided

frequencies, and at pre-decided times to supply the Overhead Tanks/Cisterns/distribution system etc., and if they are at least being regularly maintained.

75. Large numbers of tube-wells have been rendered dysfunctional for a variety of reasons:

- In some cases, the tube-well itself had no water (example, Chakeri, Raswa Deb, Nisarpur I)
- In some other cases, the tubewells had insufficient water yields, and hence were seasonal and not perennial (example, Mehgaon, Lakhangaon, Gawla-I, Jalanpur Dhalkheda,Sharikpura,Morekatta, Kalyanpura, Jamda).
- In some case like Malangaon, the tube-wells had apparently collapsed (It is likely that in the sandy soil gravel pack may not have been used, and hence this could be an Engineering planning fault) and hence were defunct.
- In other case, the borewell and the yields may have been ok, and even though the pump houses existed, but either the Pumps or the Panels etc were missing (example, at Nalvai, Anjad Barda, Takiyapur, Balkhad, Brahmangaon, Balwara, Jalkheda, Bhawariya, Kadmal).
- In some cases Pumps or the Panels were present but were not working and were dysfunctional (example, Talwai Khurd, Dharampuri), thus effectively making the tubewell also dysfunctional.

76. Standby diesel arrangements were not seen at these pumphouses in the vicinity of Tubewells, and therefore, the operations of Tubewells are totally dependent on electric supply, whose availability in the rural context is limited and unreliable.

77. At the tubewells, the power pump motors mostly of 5 HP and 10 HP capacities, would often burn, posing inconvenience, and water shortages. It was not uncommon to find that the infrastructure created was not in use, and defunct at least for the time being, because a motor was burnt, repair of which would take at least a few days or weeks. This was a common occurrence, requiring large maintenance expenditure around the year, and leading to huge public inconvenience.

78. Much of this expenditure on repair of motors, as well as the large inconvenience to consumers, could have been avoided had additional overload protection and earth fault protection including modern MCBs or installation of other appropriate Technology been made to make the system more robust. However, this has not been thought of, and recurring repairs get preference over prevention by one time technological application.

79. In a few cases pumphouses were found abandoned. For example, at Dharampuri, Pumphouse No. 3 was found abandoned. It does not make sense as to why these structures were constructed, and if these were needed for installing pumps etc, why they were left abandoned, leading to unnecessary lock-up of capital.

80. In large numbers of cases, the Pumphouses at the tubewells were constructed using pre-cast panels/slabs. However, these were of extremely poor quality, and have given way in a wide majority of cases with large damages being common. Large numbers of these pump-houses stand damaged: some have completely collapsed, while others need urgent repairs/replacement of pre-cast panels (Plate 3.1.11).

81. Inside these Pump-Houses, it was common to find poor connections in the electrical panels comprising the assembly of starters, fuses etc, or panels and electric meters lying randomly on ground or tucked to windows instead of being neatly and safely attached on to the wall on a board (Plate 3.1.12). It appears that proper arrangements have not been made to house the electrical panels and meters, and adhoc practice is in vogue, making the entire operation unsafe, more so as the pump-house outer structures have collapsed allowing unhindered access to passer-bys, children and even animals in large number of cases, even as electrical circuitry often lay on the ground.

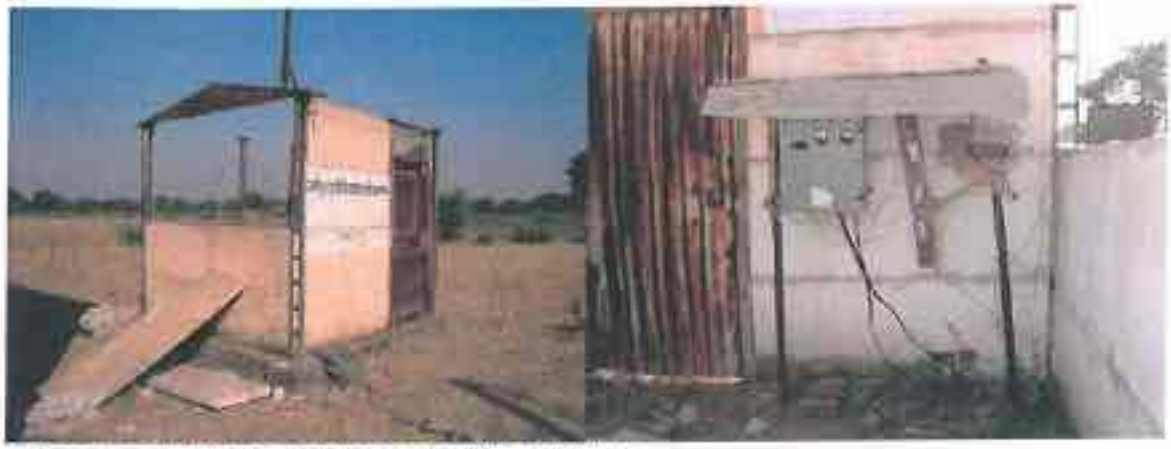
82. Despite the fact that in most cases, water supplies are still being handled by NVDA, there have not been efforts to repair and maintain these pumphouses, and instead the electric panels have been often housed in open.

83. In several cases, one could see pump-house structure replaced by a small box in the open, thankfully, with a lock and key arrangement (Plate 3.1.13). However such metal boxes may not be entirely safe and may lead to current leakages and danger of electrocution to the operator or passer-bys especially during rains.

84. Then there were cases where all safety norms and acceptable engineering practices have been thrown off, and electrical assembly installed in the open (Plate 3.1.14), inviting unlimited risks, and making the entire assembly vulnerable to theft, and to short-circuiting due to environmental factors, especially during monsoons.

85. Significantly, the poor state of maintenance at pump-houses ensures that water supplies remain far from reliable and robust

- inviting widespread public discontentment,
- resulting in large annual maintenance budgets,
- perpetuating the dependency on use of Tankers for supply of water in the name of water crisis management.



Kalyanpura: Outside and Inside the Pump House

Dharampuri

Kadmal

Bhavati – I: Remnants of a Pump House

Borlai II: Part of the roof missing

Talwai Khurd

Brahmangaon (Theekri)

Plate 3.1.11. Typical damaged Pump Houses

Chenpura Gawla II

Borlai II Gawla I

Mehgaon Jamda

Moregadhi: Panel Tied to window Ratwa Ganpur Sirsi:Meter thrown on floor & direct connection made

Plate 3.1.12. Typical Electrical Installations inside the Pump-Houses.

Bhawati-I Mohipura

Sala Bhilkheda

Bhavati I

Plate 3.1.13. Makeshift pumphouse arrangements (Typical)

Khedi: View at Two different Pump Houses

Vishwanath Kheda

Takiyapur

Chichli (Kasravad)

Nalvai

Sirsani

Jalanpur Dhalkheda

Bhilkheda

Plate 3.1.14. Electrical panels with Open Air Arrangements (Typical): Neglect of all Safety Norms

3.1.2.3. Overhead Tanks (OHTs), Sump-Wells & Pump-Houses

The main function of Service Reservoirs (SRs), including the Overhead Tanks (OHTs), is to cater for daily water demands and especially the peak demands of water.

Based on the R&R site visits, the following observations about the OHTs can be made:

86. Overhead Tanks were not present at all the R&R sites. Various R&R sites had a total of 25 OHTs (Annex 1-A) constructed to supply waters to limited numbers of rehabilitation sites. Besides, there were also some large overhead sumps akin to OHTs at places like Dharamrai.

87. The OHTs were mostly intact, found in satisfactory structural condition, and the structures were not dilapidated. However leakages and base erosions were witnessed in a few instances.

88. In some cases where the OHTs were evidently functional, there were signs of water leakage/seepage which were mostly plugged as per the standard practice. However, sometimes, as in Sala and Sirsani (Plate 3.1.15) this seepage, despite efforts to plug, was extensive and to an extent that the structure appeared rather endangered unless remedial steps are taken.

89. Despite the provision of OHTs, several of them were not seen functioning and were evidently not operational (Plate 3.1.16). Thus, capital intensive OHT structures have been built, but little or no efforts have been made to make use of the infrastructure in place. Some examples typically are listed below:

- At Chikalda, no pumphouse and no tubewell was seen. No rising main was seen that could bring water to fill the OHT. Connections to the laid piped distribution system were also not found present.
- At Khalkhurd (Manavar), the massive 290 KL OHT is to be filled by a single Tubewell which was capped and not installed. No pumps and panels were seen, not even the electric connections were found to exist.
- At Kadmal, the OHT did not have pumps installed, and pipeline from Tubewell to OHT was missing, and hence OHT was not functional.
- At Brahmangaon, the OHT was not in use: no pumps were seen, and valves were found damaged.
- At Khedi, 3 OHTs have been constructed of capacities 30 KL, 40 KL and 50 KL, and yet none of them was under operation during the site visit, and the water supply was completely dependent on handpumps.
- At Awalda, no pumps were seen, and hence the OHT was not under operation.
- Similar was the case at Kasravad where 154 KL OHT was defunct as no pump-motors were seen.

90. Making provision of a capital intensive structure like an overhead tank, and not ensuring that it is functional, does lead not only to public inconvenience and to water scarcity and crisis, but significantly also wastes the infrastructure, and sinks the capital investment made. It further leads to the use of water tankers at some sites for supplies despite the massive water supply infrastructure created.

91. It is possible that several more OHTs may not be functional as during the site visits it could not be completely ascertained if the infrastructure created was in the working state due to limited and uncertain supply timings of electricity in rural context, and also because OHTs have their own schedule for running. It therefore cannot be said if the pumps installed and connected were all in operating state, and if the OHTs constructed at various sites indeed are all being deployed to provide water supply services.

92. In fact, pumps/standby pumps at a number of places like Khujawan, Sala etc were under repair (as told to the inspection team) affecting normal operations. At some other sites like Khedi (30 KL OHT), Pumps did not seem to have been installed, and even the Electrical panels were missing.

93. There has been a provisioning of standby motors at the OHTs, which often comes in handy as the motor burns are common, posing inconvenience and uncertainties, as the repair would take its own time. This was a common occurrence, requiring recurring maintenance expenditures, as well as leading to large public inconvenience due to stoppage of supplies as repairs take their own time. Much of this expenditure on repair of motors, as well as the large inconvenience to consumers, could have been avoided had additional overload protection and earth fault protection including modern MCBs or installation of other appropriate Technology been made to ensure that the system becomes robust.

94. Addition of protection technology is essential particularly because once the infrastructure is handed over to the Gram Panchayats, they would not have enough finances and expertise to cater to the recurring and frequent maintenance needed because of frequent motor burns.

95. Standby diesel arrangements were not made at these pumphouses in the vicinity of OHTs, and the operations of OHTs were dependent on electricity supplies whose availability in the rural context may be limited and unreliable.

96. Then there were a number of overwhelming safety concerns. It was common to find incomplete/damaged railings, provision of railing only on one side, missing gate and lock arrangements to prevent unhindered access to the tank top, etc.. (Plate 3.1.17). Thus safety of personnel and of the intruding individuals including children, has not been given due consideration at large.

97. The OHT premises were also sometimes found without fencing, thereby not secluding the premises from public intrusion including those of children and animals (Plate 3.1.17). This is a serious security lapse.

98. Another planning lapse has been the neglect over the safe and engineered disposal of drained water (during cleaning/emergency) from the OHTs, a parameter that has often not been given the due importance that needs to be assigned during planning and execution. To illustrate by way of an example, at Nisarpur where there exist two OHTs, in one case the OHT scour/sluice valve discharges on to the main Highway road across which lies the premises of Hospital (Plate 3.1.18). In the second case, the discharge is in Primary School premises (Plate 3.1.18). One can imagine what kind of situation this would lead to if, in case of any emergency, the water needs to be spilled or even when dirty tanks that are to be supposedly cleaned regularly, are cleaned and dirty waters are scoured. The absence of proper disposal for drained water also indicates that possibly the tanks are not being periodically cleaned otherwise such problems would have come to the notice of the tank operators by now. This incidentally puts the supply water quality being supplied under suspicion, as it is likely that tanks are not being cleaned.

99. The drainage provisions for the overflow from the sump-wells were again unplanned and not given any consideration, and similar to those of OHTs (Plate 3.1.19 typically).

100. A very significant omission at few R&R sites like Gehalgaon, Chikalda, Kasravad (Note: The sump well at Eklera is dysfunctional), Dharampuri, Dharamrai (Note-At Dharamrai, Tanks have been called "sumpwells" of capacities 100 KL and 50 Kl, but in reality these are akin to overhead tanks, being filled directly by a single Tubewell located very far off and supplies made directly from these overground "sump-wells" located on a hillock), etc, was the non-provisioning of a sump well (Plate 3.1.20). While at some of these sites, the argument for not having a sump-well may be that supplies will be from Treatment plant, the fact remains that most OHTs will also additionally be filled up by tubewells, and sometimes by multiple tubewells. Such an omission is therefore technically inappropriate, and has a number of implications:

- No sumpwell implies that the OHT will be filled directly, and in case of emergencies/uncertainties at the raw water inlet source/rising main, no buffer water storage would be available to rely upon.
- After regular cleaning operation when the OHT is empty, its filling by tubewells will not be easy, leading to disruptions in water supplies for days.
- Meeting demands particularly when demands are at peak or where supplies are made through multiple tubewells/other sources will be difficult.

- Furthermore, the absence of sump implies that the demand-supply equilibrium will not be easily met, with the result that the OHTs may either run dry or overflow.
- Technically also, a non-provisioning of sumps demands unrealistic reliabilities for the pumps which would have larger power ratings in the absence of a sump-well, as water has to be directly filled to OHT height. Such motor reliabilities do not occur in the field as motor burnouts were common and frequent.

101. Significantly, the omission of sump-well from the OHTs is in violation to the letter of the Chief Engineer (PWD), NVDA vide 377/NVDA/PHE/2003 dated 30/05/2003 (Annex 3.1-H) directing provisioning of a capacity of sump-well equal to 20% capacity of the OHT. Yet, for unknown reasons, this directive was ignored at a number of R&R sites.

102. Another serious lapse in the entire planning process was often inappropriate and unacceptable locations of OHTs (Plate 3.1.21). In several cases safety norms were blatantly thrown off:

- OHTs lay next to Primary Schools (example Sala), or other buildings (example Sirsani).
- At Sirsani, the OHT was located just below a hillock which had plenty of loose boulders that may roll down at the slightest of tremors.
- At Moreghadi, OHT was constructed in the same premises where a public tree platform and a handpump were constructed. OHT premises are fenced to ensure that premises remain secluded and out of reach of general public, but at Moreghadhi, tree platform and handpumps inside the fenced area are an open invitation to general public throwing safety norms to wind.
- In case of Eklera (OHT belonging to Kasrawad) , the OHT not only lies within 10 m of a Primary School Building (Plate 3.1.21), but notably has no fencing for seclusion, and has its base platform eroded probably due to poor water drainage (Plate 3.1.22), posing grave risk to the school-children and staff and nearby inhabitants.

Thus, the planning process seems to have overlooked the essential safety and security aspects related to OHTs.

103. Then there were some issues related to the design and construction of the OHTs. It appears that designs are based on assumed safe bearing capacities of underlying strata, implying under-safe/over-safe approximate construction.

104. Base platform erosion for OHTs at Eklera (OHT for Kasrawad) and for OHT at Kadmal (Plate 3.1.22) were seen, indicating poor execution and supervision.

105. There were also certain operational issues of the OHTs that were rather serious. Many of the OHTs had multiple input connections, with raw water drawls from a number of Tubewells, Narmada water or a combination of these. Despite the fact that untreated, raw water is finding its way into the OHTs, no provision of Chlorination existed at any of the OHTs. This implies that disinfection is not being practiced, and essentially raw waters are being supplied (Annex 3.1-F, Point No. 13). This is a serious lapse because raw water gets stored in these tanks for significant time, and is likely to have growth of micro-organisms of all kinds. Thus, ensuring delivery of safe water quality has been completely neglected. The relevant officers need to be held accountable for such gross negligence.

106. It may be noted that records and logs are to be kept and maintained mandatorily with regard to chlorination/disinfection at the OHTs/Sumps. No such Records however, could be found at any of the OHTs at various R&R sites during the site inspections, reflective of the fact that no chlorination is being practiced violating the mandatory operational requirements.

107. It is also noteworthy that no records of periodic cleaning of the OHTs/sumps were found at any of the sites, indicating the possibility that the OHTs, wherever operative, are not being regularly cleaned as is mandatory.

108. No service records/logs including the running schedule as practiced on each day were found at any of the OHTs, so that it is not known if the supplies are being made by the operators, and if so, then for how much time and at what intervals.

109. It requires a lot of effort to create infrastructure, but operating and maintaining this infrastructure requires an equal, if not more, amount of effort. As outlined above, there were several maintenance and operation issues of serious concern observed pertaining to the OHTs at various R&R sites. All responsible officers need to be made answerable for such gross shortcomings and negligence on their part.

Sala: Signs of extensive leakage/seepage: Poor condition

Sirsani: Extensive Seepage despite earlier efforts (whitish marks) at plugging the leakages

Plate 3.1.15. Typical Seepages from the Overhead Tanks

Chikalda: OHT Constructed, but not connected to Network.
An Investment for Future?

Awalda: Missing pumps imply OHT is defunct

Khalkhurd Manavar: OHT built, but has missing Connections and Pumps

Kadmal: OHT stands tall, but missing Pumps, Connections imply defunct Infrastructure

Plate 3.1.16. OHT Infrastructure rendered defunct and useless (Typical)

Nisarpur

Khedi

Railing only provided on Outer-side

Versus

Sirsani

Anjad Barda

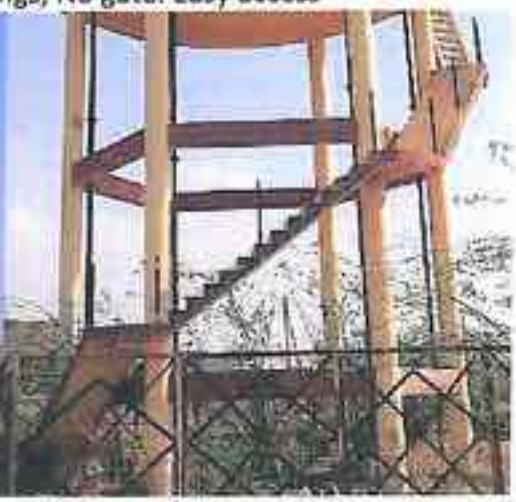
Railings on both sides

Plate 3.1.17. Neglect of essential Safety and Security Measures (Typical).....cont.

Ganpur (Manavar): No fencing and isolation of OHT Premises. OHT railing also partly damaged and missing in the lower steps: Poor maintenance

Khalkhurd (Manavar): Completely missing Railings, No gate: Easy access

Borlai II: Premises fenced, and gate present on steps to prevent easy access to the top. And yet, the railing is only on one side of the steps.



Gehalgaon: Missing Gate on steps and Railings

Plate 3.1.17. Neglect of essential Safety and Security Measures (Typical)

Nisarpur: scour/sluice valve discharges water to highway, crossing which it would enter hospital.

Nisarpur: For second OHT, discharge is directed into premises of Primary School (Pipe mouth seen in the photograph)

Plate 3.1.18: Lack of any Planning for Drain water from the OHTs (Typical)

Sirsani: Adhoc Sumpwell Overflow provisioning

Plate 3.1.19: Typical overflows from Sump Wells: Lack of engineered drainage.

Gehalgaon : No provision of a sump for 150 KL OHT. Also note the missing railing.

Chikalda: No provision of a Sump for 280 KL OHT. Also railing absent in part.

Plate 3.1.20.: No provision of a Sump (Typical)

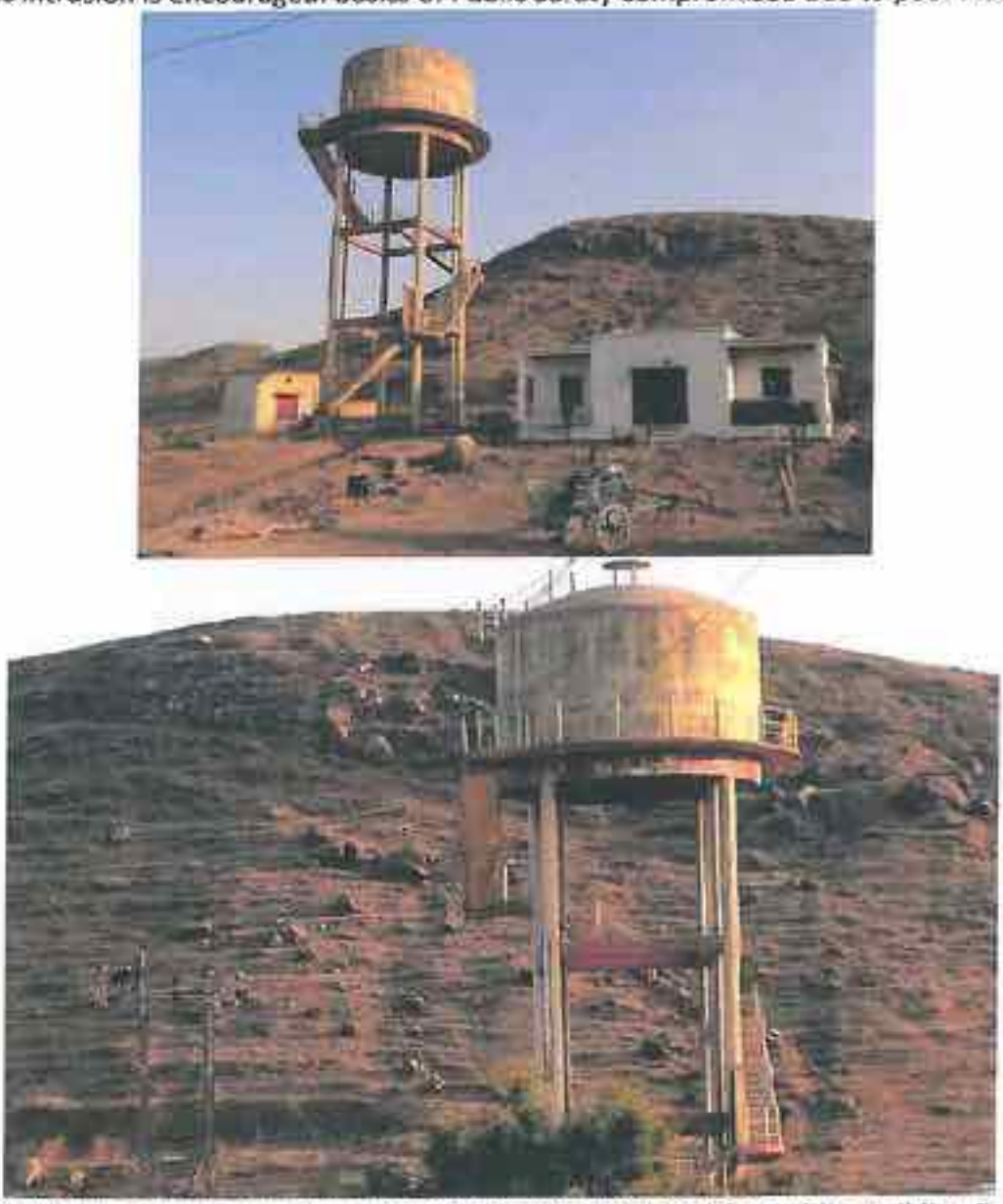
Eklera: OHT located in the premises of Primary School. No fencing present either for the school or the OHT, implying free access for the school children.

Sala: OHT in front of Primary School. No fencing in either the school, or in the OHT premises, and so school children/anti-social elements have free access to high rise OHT.

OHT premise not secluded. Gross callousness, negligence, poor planning and flouting of mandatory safety provisions.

Plate 3.1.21. Serious Planning Flaws in OHT locations.....cont.

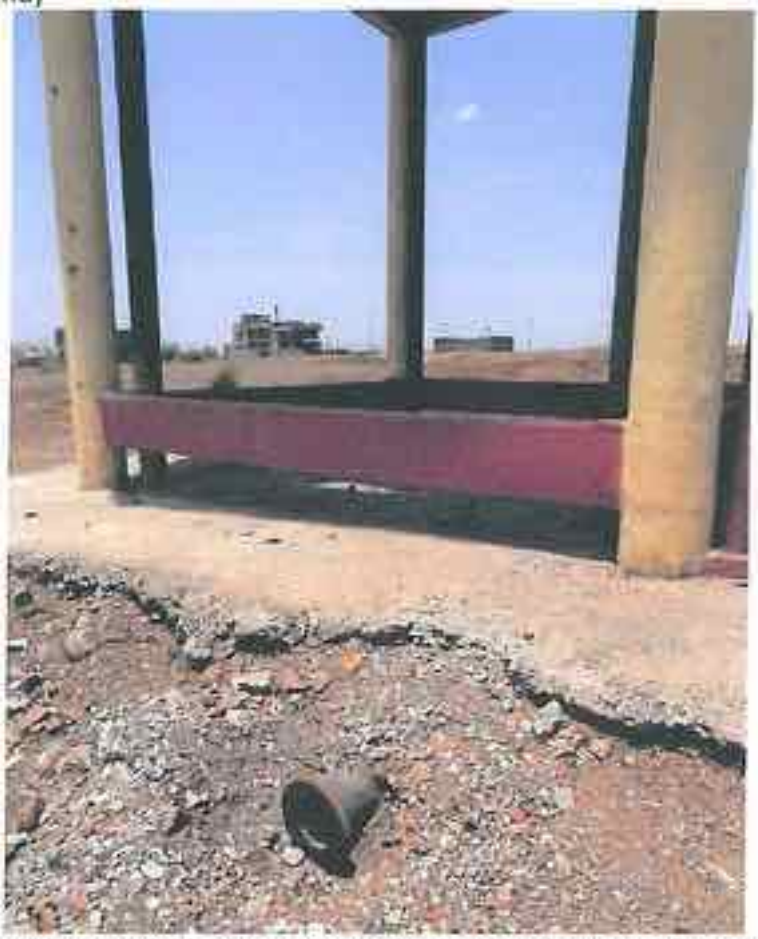
Moreghadi: A Tree Platform (Left) and a handpump (Right) inside the OHT premises, despite the fact that both amenities are of public use. Rather than seclude OHT premises, public intrusion is encouraged. Basics of Public Safety compromised due to poor Planning.



Sirsani: Missing fences, premises not marked and prohibited for public. Building lies too near. The OHT is located just below a hill where boulders lie loose, and may roll down damaging the OHT and risking the lives of people.

Plate 3.1.21. Serious Planning Flaws in OHT locations

Eklera : Damaged Base Platform for an OHT located within 10 m of a Primary School (seen in the background)



Kadmal: Base platform erosion. Also seen is an unconnected pipe indicating that the OHT is not connected with the Network, despite the structure having been built.

Plate 3.1.22: Safety Issues with respect to OHTs - Erosion of Base Platforms

3.1.2.4. Cisterns

Under the spot source water supplies, water is provided to R&R sites with the help of power pumps, pipelines and Cisterns.

110. The 276 claimed Cisterns employed at various R&R sites were of following types: HDPE (4000 l), Pressed Steel/Mild Steel (4000 l), and Cement Concrete RCC tanks (5000 l). These receive water from Overhead Tanks/tubewells through a piped network.

111. While the directive of the Chief Engineer (PHE), NVDA vide letter 377/NVDA/PHE/2003 dated 30/05/2003 (Annex 3.1-H) was explicitly to have only the "MS, HDP or Pressed Steel" Cisterns of 4000 l capacity each, in reality, RCC cisterns/tanks were also constructed at several R&R sites. Inexplicably, these RCC tanks, which were to be constructed at site, were built of larger capacities of 5000 l rather than 4000 l in contravention to the directive that cistern capacities be kept 4000 l. This has resulted in not just increased costs per tank, but more significantly it is reflective of the typical violations that have happened in the laid out planned norms set up by the top officers of the NVDA itself.

112. Large numbers of Cisterns were found Missing, throughout many of the R&R sites (Plate 3.1.23). This was rather peculiar as the water supply infrastructure has not yet been handed over at a wide majority of sites, implying that the maintenance is still with the execution agency (NVDA). Thus, any missing cisterns should have been replaced.

113. Some of the Cisterns (probably the damaged ones) were found stacked at Bhilkheda. It is however not clear if these cisterns were found damaged at the time of purchase, or have been removed from various R&R sites after installation in view of damage.

114. Notably, no records and logs on numbers of damaged/ removed Cisterns have been kept and maintained for various R&R sites, as no such records were found either at the R&R sites or in the records submitted to this Inquiry Team. Not keeping records is a serious irregularity and indicates possibilities of misappropriation and malpractices in view of large numbers of cisterns missing at various R&R sites.

115. Besides the missing Cisterns, a large number of cisterns lay abandoned/out of use at several sites (Plate 3.1.24). Sometimes Cisterns were kept, but no connections were made, some of them had defunct inlet connections leaving them dry, others had no taps making the cisterns defunct, and some were not charged with water due to various reasons. Some cisterns were defunct due to damaged plumbing, while some others were even displaced from their platforms and lay randomly scattered. Such instances were aplenty with the result that cisterns were defunct in very large number of cases for some reason or the other.

116. It was actually rather uncommon to find a working Cistern with all arrangements in place: cleaned regularly, well-maintained, and having good inlet connections, working taps without leakages, undamaged platforms and proper drainage arrangements, as well as good convenient Approach for the people, as expected from a team of professional, qualified, and experienced field Engineers. The infrastructure may also have further deteriorated with time, more so due to non-usage of infrastructure, making it defunct at a number of places.

117. At a number of places like places like Amalali, Bhawati-II, Bhilsur, Khajuri, Jalkheda , Jalkoti, Umda etc no overhead tanks were present, neither were any tube-wells/power-pumps present. Without a source to fill up the cisterns, it was no point in even keeping the cisterns at such sites as these would only comprise wasted resources. Yet the cisterns have been kept and are naturally defunct and ageing, without fulfilling any purpose. Responsible officers in such cases need to be made accountable for wastage of public money, for not taking due care in spending the public money, and in failing to provide requisite functional amenities to the displaced people.

118. In fact, large number of defunct cisterns is also reflective of the lack of maintenance with regard to up-keep of the overall distribution system as a whole. Cisterns without taps affecting the usability, cracked platforms devoid of repair work, improper connections, unplugged leakages, dysfunctional valves etc. are maintenance issues exacerbated by not handing over the infrastructure created to appropriate local agencies.

119. The drainage from the cisterns was similar to un-engineered drainage from handpumps. When both inlet and taps existed and were functional, and the cistern worked, many times there were no proper drainage arrangements in place leading to pooling of water and insanitary conditions (Plate 3.1.25). Drainage was often inappropriate, and was unplanned and adhoc, with water made to flow randomly or just pool up all around to stagnate and provide a breeding ground for mosquitos etc.

120. Valves that could stop water inflow when the tanks were full were often missing or dysfunctional. The result is that despite water being in shortage, spills could be seen, resulting in waste of precious water due to over-filling (Plate 3.1.26).

121. The Approach to the cisterns was often not planned, so that during rains etc. they may not always remain conveniently accessible. Some of the cisterns were located amongst thick bushes, or appeared too remote largely due to missing habitation, and their use was therefore limited.

122. In some cases, the cisterns were located in remote areas, or at the highest points in a given topography (Plate 3.1.27) with the result that there was unnecessary cost increase for the larger pipe lengths, greater electricity required for pumping, higher pump ratings and costs, and resulting in more losses and more maintenance.

Besides, this is extremely inconvenient for users, as women and children have to walk all the way, sometimes even carrying water load for large distances.

123. No arrangements for cleaning of Cisterns were found in place at the R&R sites. By and large, there did not exist any provision of an inspection ladder by which one could have access to the tank top for cleaning. The cisterns also did not have any date marked over them/notice pasted, indicating the date of last cleaning. Huge infrastructure has thus been created, but there has hardly been any maintenance, and public health remains insecure due to essential periodic non-cleaning of cisterns.

124. During the site visits, no records pertaining to cistern maintenance and upkeep were found at any of the R&R site. Apparently these are not kept, and are reflective of the fact that the claimed periodic cleaning is actually not carried out.

125. Even later, no records could be made available for cleaning of cisterns showing the date of last clean-up, the intervals between cleaning, cleaning frequency, manpower engaged, expenses incurred on cleaning, due date for next cleaning etc..

126. However, when asked specifically in writing, there has been a claim vide the letter 23/RR Sites/09/2013 of the Karyapalan Yantri NVDA (Annex 3.1- F, Point No 16), that cisterns are being cleaned time to time by the department.

127. However, vide the same letter (Annex 3.1- F, Point No 16), inexplicably the expenses incurred on cleaning cisterns have been shown to be nil by stating that no cost has been incurred for clean-up of cisterns. This is bizzare as cleaning hundreds of cisterns periodically presumably using brushes, tools, chemicals etc. should logically imply incurred expenses. Also, no log books/ or any other records were found maintaining the dates of last cleaning, next cleaning due date etc. During site visits also, cleaning was not seen underway at any site, at any of the cisterns. All the facts indicate that it is more likely that periodic cleaning of cisterns is not practiced.

128. Mild Steel (MS) or Pressed Steel Cisterns in most cases have been rusted out to a large extent (Plate 3.1.28), and need to be replaced immediately in the interest of public health. Many of these cisterns are either already out of use, or if in use, pose grave health hazards to those who drink water stored or even for other usage such as washing of cloths. It appears that the Cisterns are also not duly maintained and no periodic painting etc. is carried out to ensure durability and freedom from corrosion and rust (Annex 3.1- F, Point No 16).

129. It was rare to find out Mild/Pressed Steel tanks that were duly painted and maintained. This is in violation of the recommendation that steel tanks be painted once in a year, a recommendation made by the Manual on "Operation and Maintenance of Water Supply Systems" (2005), prepared by the Expert Committee

Constituted by the Government of India, and published by the Central Public Health and Environmental Engineering Organisation (CPHEEO), MoUD, Government of India, and the World Health Organisation (WHO). Thus maintenance and upkeep have been poor and violate the standard practices, to say the least.

130. The RCC cistern tanks were often damaged, and had leakages/cracks or had other execution faults (Plate 3.1.29) and these went unplugged several times due to which large pooling up of water could be seen. At some R&R sites, instead of plugging these leakages attempts were made to apply lime to hide the elaborate cracks/ leakages (Plate 3.1.29).

131. It also appears that even the RCC cisterns are not being externally painted with waterproof cement paint once in 5 years as is recommended by the above CPHEEO Manual. No such records of periodic maintenance were again made available, neither did the cisterns have any date marked over them/notices pasted over indicating the last date of painting. In fact, NVDA has admitted that Cisterns are not being whitewashed (painted) (Annex 3.1- F, Point No 16).

132. No test records for the testing of cement and concrete employed for casting of cement concrete tanks and the concrete platforms were found available.

133. The need to replace many of these rusted/leaking/dilapidated/ cisterns would have been established, had the water qualities been regularly monitored and tested at Cisterns. Unfortunately, the mandatory provision of monitoring water quality in distribution system including the cisterns has not been followed, and no such test records for water quality at Cisterns were found available.

134. No disinfection/chlorination seems to be provided at any of the cisterns.

135. Cistern Concrete Platforms often had cracks (Plate 3.1.30), though these were not as extensive as were in the case of handpumps, and the platform damage was limited. The cracks are obviously a hindrance to use, but no attempts were seen to plug these cracks/rebuild the damaged platforms, despite the maintenance still being with the execution agency for most of the R&R sites.

136. Thus Cisterns are not being chlorinated, maintained, cleaned, and painted violating prescribed norms and set standard procedures. Despite the fact that large numbers of Cisterns are found missing at various R&R sites, even the logs are not being maintained for the numbers of cisterns damaged and removed from the sites. Large numbers of cisterns are also dysfunctional, most unfortunately in cases where cisterns have been installed at sites without tubewells or OHTs so that there exists no way of filling cisterns resulting in wastage of public money. It is strongly recommended that appropriate action be taken against all erring officers who have failed in their duty in maintaining infrastructure and in protecting public spendings.

Dehar Sondul

Kikarwas: Two cases of missing Cisterns

Musapura Borlai II

Dharamrai (Kukshi) Bhilkheda

Plate 3.1.23. : Missing Cisterns at R&R sites (Typical)

Khalbujurg

Bhilkheda

Mandwada

Khajuri

Saita

Sala

Khalbujurg

Plate 3.1.24.: Typical Abandoned Cisterns at several Sites: Infrastructure wasted

Gangli Nimbola

Moreghadi Sirsani

Khedi Khujawan

Plate 3.1.25: Typical water leakages and ponding at Cisterns (*Note: All photographs taken in Dry Season*)

Vishwanath Kheda: Waste of precious water, a commodity in shortage at most sites.

Plate 3.1.26. No stop valves/valves not functioning (Typical) to prevent overflows

Nalval: Two views of a cistern located in far flung area of hillock top. One can fathom how much line had to be laid, and how much electricity would be required for pumping water all the way. Heavier pumps would have to be used, and more maintenance would be needed. Inhabitants also need to carry the water load for large distances.

Plate 3.1.27. Inappropriate Cistern Siting (Typical)

Musapura (Himmatgarh)

Jamda

Musapura

Kaisur

Chandankhedi

Ratwa

Dharamrai

Kaisur

Bijasan

Plate 3.1. 28. Highly Rusted Mild Steel/Pressed Steel Cisterns (Typical): Unfit to store drinking water - Lack of regular painting work and poor general maintenance

Raswa Deb

Chichli (Kasravad)

Jalkoti

Nisarpur

Malangaon

Kathora

Plate 3.1.29. Typical damaged RCC Cisterns. Also noteworthy is the condition of the external paint work. Shoddy Maintenance.....cont.

Lakhangaon Kathora

Bhawati-II: Mindless execution- the drain outlet channel lies at the base ring portion, while the opening of the ring portion does not drain into the drainage channel.

Vishwanath Kheda (Left) & Shakirpura (Right): Whitewash to hide massive cracks?

Plate 3.1.29. Typical damaged RCC Cisterns. Also noteworthy is the condition of the external paint work. Shoddy Maintenance.

Lakhangaon

Sala

Kukra

Khalbujurg

Plate 3.1.30. Typical Cracks/Damages in Cistern Platforms

3.1.2.5. Cattle Troughs/Halavs/Halaos

"What could be more disturbing than to have halaos next to cisterns and yet see them dry, and see the livestock suffer silently"....A resident during the site visit.

The halao designs and shortcomings have been separately dealt under Civil construction Section 2.4. However, with respect to their usage as spot drinking water sources for the livestock, the following observations are relevant:

137. The NWDT award of providing 1 Halao for every 50 families has not been adhered to, and a large number of sites either did not have any halao (example, Jalkheda, Shakirpura, Ratwa, Talwai Khurd, Balwara,Bhawaria, Bhilsur, Gehalgaon , Gangli, Brahamangaon , Kaisur , Khajuri, Nisarpur I, Nisarpur II& III, Borlai II ,Amlali etc) or the halaos were constructed in lesser numbers than that prescribed by the NWDT Award (example, Khedi, Kasravad, Ganpur (Narmada Nagar), Semalda, Anjad Barda, Bijasan etc.).

138. What is equally serious is the fact that most of the Technical Sanctions for PHE related works at various R&R sites show approvals with regard to construction of Halaos at almost all sites. Yet, inexplicably the money allocated was not used to construct the halaos despite approvals. This implies that there should have been savings at every site, yet NVDA has issued certificates with claims of No Deviations at every R&R site. Thus, the money approved and sanctioned appears to have been deployed elsewhere, and its usage remains a matter of investigation that needs to be taken up by a specialized agency such as the CBI. This aspect is dealt with in more details in a later Section of this Chapter.

139. Thus, despite approvals and finance allocation, making minimum adequate arrangement for drinking water for livestock even as per the NWDT Award was not ensured. This may be contrasted with the huge infrastructure created for water supplies over and above the provisions of the NWDT Award. Thus, making provision of water for Livestock has apparently been low on the priority of NVDA.

140. Not providing water adequately for the livestock has been a huge Planning lapse, more so because lives of oustees are intractably linked with their livestock.

141. Where constructed, in large number of cases the halaos were found dry and defunct (Plate 3.1.31) because of the failure of the distribution system which also has incidentally led to the failure of cisterns often located near the halaos.

142. A wide majority of constructed halaos were also found bereft of any plumbing connections whatsoever, and were left dry throughout most of the 88 R&R sites (Plate 3.1.31). It was found that several times the halaos did not even have any inlet connection to fill them. As a result, a wide majority of constructed halaos were not functional at most R&R sites, impacting the availability of water for the livestock.

143. In fact, Halao inflow as well as outflow connections were both unsatisfactory (Plate 3.1.32). Halaos had no preventive mechanism against spills and overflows for saving precious water and to maintain sanitary conditions at the halao vicinity. A stop valve or a float ball or any other appropriate mechanism could have done the task.

144. Similarly, the drainage from halaos was mostly not in place, and no provisions were made to drain the water to nearest drains in an engineered fashion, so that even if halaos are emptied for cleaning once in a while or their platforms cleaned and washed, water will pool up and create insanitary conditions all around. This then implies that once the R&R sites are fully operational, there would be large spills at virtually every halao, as is evident from few of the functional halaos having heavy waterlogging around them even currently.

145. More serious would be not just the waterlogging around the halaos, but the fact that this would also have the animal waste/ faeces mixed up as the livestock would often approach the halaos. One can imagine the kind of environmental insanitation this may lead to, besides leading to the spread of water related vector diseases at the R&R sites. Hence, the policy of locating these halaos in the immediate vicinity of Cisterns that have large public access should have been given a second thought, and planning related to locating the halaos at various R&R sites should have been a little more insightful.

146. The halao locations were not appropriate due to other reasons at several sites (Plate 3.1.33). In some cases, the halaos were located too close to individual plots, implying that insanitary conditions would prevail and create nuisance for individual plot holders. Sometimes these were located too near or in front of culverts in low lying areas indicating the possibility that the drainage would carry the pollution (animal sewage). In some other cases, these were located too near to the main roads leading to adverse road safety and possibility of accidents due to frequent approach by livestock, as well as possibility of insanitary conditions such as the spillages mixed with animal sewage flowing on the road. Thus siting of halaos has not been appropriate in several cases.

147. As a passing reference with details already spelled in Chapter 2.4, it is noteworthy that the halao sizes, and especially the halao heights were not standardised. With wild and arbitrary fluctuations in halao heights from 45 cms to more than 1 m witnessed in the field, no criterion seems to have been adopted in deciding halao heights, a parameter which is supremely important in enabling comfortable postures for the cattle while drinking. As a result, it is very likely that higher heights above halao platforms will hinder convenient use by Livestock, and even prevent usage for animals that are not fully grown. Large heights exceeding 70-75 cms. would make halaos functionally compromised as the larger cattle may just be able to quench their thirst (although it is possible that even they may not be able to

utilize the halaos), smaller animals like goats, calves etc would find it impossible to consume water, unless the halao water level stands full all the time, defeating the purpose for which these halaos have been built.

148. Such adhocness in halao construction and designs, and the fact that there exists non-provisioning of halaos at large numbers of R&R sites is reflective of the grossly careless attitude that planners had, alongwith possibly a complete non-understanding of the daily lives of the oustees whose lives and welfare are inextricably linked to the livestock they possess.

149. In fact, what is worse, is the fact that water supply designs at R&R sites did not explicitly incorporate the very significant livestock demand, and it appewars that the livestock demand has not been fully and adequately met. It is therefore possible that halaos may actually never fill up, especially when rehabilitation sites get fully rehabilitated and peak water demands occur. This aspect has been dealt with more elaborately under a separate section in this Chapter.

Barda Manavar

Borlai III

Mohipura

Bhilkheda

Plate 3.1.31. Defunct/Dry Halaos : A result of defunct cisterns, and missing inlet connections. Also missing are engineered drainage systems, and stop valves etc. to prevent overflows.

Vishwanath Kheda: Wastage of precious water
No protection mechanism against overflows

Bhilkheda Datwada
Waterlogging all around: improper drainage: What would happen when animal faeces gets mixed up, and pollution spreads?

Plate 3.1.32. Spills from the Halaos (Typical): An outcome of absence of a stop mechanism against overflows. Also note the poor drainage.

Achoda: Typical Poor Location of a Halao: Right next to a Plot and not far away from a culvert having two drain pipes. The surface drainage water will get contaminated with animal faeces/urine in all likelihood.

Bijasan: A Halao on the Main Approach Road. Detrimental to road safety in view of the likelihood of accidents on the main road as animals will often approach the road.

Plate 3.1.33. Inappropriate Halao Siting (Typical)

3.1.2.6. Handposts/Standposts

A claimed 448 Handposts/Standposts intend to deliver water through the distribution system to the public/user end.

150. The handposts (along with cisterns and handpumps at some civic buildings) intend to deliver potable water to the public users in the buildings such as the Primary and Secondary Schools, Panchayat Bhawans, Aaganwadi, Primary Health Centres etc. at select R&R sites.

151. One of the shortcomings of providing water through handposts is that it can deliver water only when flows exist in the distribution network, and obviously the network has not been designed to have continuous flows. Intermittent supplies with fixed supply timings imply that even if the handposts are functional, they would deliver water for limited time and at a limited frequency which may not always suit the users.

152. Where handposts receive waters directly from a tube-well, the time of supply would also be dependent upon the availability of electricity, and hence, it is not always that users including the school-children would get water at their desired timings.

153. The handposts where provided, were in a wide majority of the cases not working as water supply services themselves have failed at most R&R sites, and also because the taps and necessary connections to handposts were mostly found missing, and a very large number of these handposts were therefore dry and defunct (Plate 3.1.34).

154. No mandatory water quality test results for water delivered by the handposts were found available in the records provided. In all likelihood, the water samples at the handposts have never been collected and analysed, and apparently the water qualities at the handposts remain undetermined and untested, flouting the mandatory requirement of water quality monitoring at desired frequencies at the consumer/user end.

Amlali

Musapura

Kirmohi Panchayat Bhawan

Ganpur Sirsi Primary School

Semalda Primary School

Mirzapur Aganwadi

Lakhangaon Seed Godown

Vishwanath Kheda Panchayat Bhawan

Plate 3.1.34. Missing/Dysfunctional/Defunct/Dry Handposts (Typical).....cont..

Urdana

Lakhangaon

Amlali

Kaisur

Semalda Middle School

Shakirpura Primary School

Rekti Primary Health Centrel

Musapur (Dhar) Primary School

Plate 3.1.34. Missing/Dysfunctional/Defunct/Dry Handposts (Typical)

3.1.2.7. The Distribution System and Rising Mains

The Distribution system and Rising Mains (Pressure Pipeline) comprise a claimed 430.59 Kms of pipeline (Annex 1-A) of various materials such as ACP, PVC, Ductile Iron, Mild Steel, GI, etc, through which water is intended to be conveyed.

155. The distribution system was not present at most of the R&R sites. Overall 30 R&R sites have been provided with piped distribution system network (Annex 3.1-F). However, Rising Mains (Pressure Pipeline) in the form of GI pipes of various sizes connecting Tubewells to the Cisterns/OHT were present at majority of the R&R sites.

156. Out of the 30 R&R sites where distribution network has been laid, 4 have been handed over to the respective Panchayats (Annex 3.1-F), while NVDA still has possession of distribution networks at 26 sites.

157. Of these 26 R&R sites where distribution network exists in the possession of NVDA, only 7 (Nisarpur, Semalda, Barda Manawar, Khedi, Barda Anjad) are operational (Annex 3.1-F).

158. It appears that the remaining distribution networks at the 19 R&R sites where pipes have been laid and huge investments made, are non-functional as of now. It is noteworthy that not operating the networks will surely make them defunct over time.

159. In a most telling and bizarre revelation, it appears that at some R&R sites like Sirsani (Annex 3.1-I), Dharamrai and Kadmal (Annex 3.1-J) etc., the capital intensive distribution system has been laid without any designs. This is rather surprising and speaks volumes about the professional competency and sincerity with which the project has been executed.

160. It is noteworthy that water demands, water availabilities, yields, population densities, geographic spread of population, topography including pumping heads and bends etc. vary from site to site, and hence each site mandatorily requires unique design for the distribution system. The designs cannot be copied for a number of sites, in any case. No wonder that the un-designed distribution networks were destined to fail from the beginning, thus explaining the widespread discontentment with the water supply services at large number of R&R sites.

161. It may be noted that the records submitted by NVDA have designs of water supply distribution networks for 23 R&R sites only, of which 7 designs have been carried out by WatSanCad Solution Bhopal, while the remaining 16 designs have been carried out by M/S Aqua Consultants, Bhopal.

162. Even the designed distribution network designs do not inspire any confidence. The designs begin abruptly with Tables without any design assumptions and design data, without assigning any reasons for choice of particular pipe material, without even mentioning what standard formulae have been used for the design work etc., (Annex 3.1-K - the first 2 pages of a typical design booklet, and the drawing submitted for a randomly chosen R&R site at Barda Manawar), with drawing which is signed neither by the Consultants, nor by any departmental officers. Even the Drawing Scale and Drawing number have been left blank. To seek clarity on the matter queries were raised vide Annex 3.1-L, Point No 5, but no response was forthcoming from NVDA.

163. Furthermore, it does not appear that these designs have been vetted by NVDA or by any third party before their acceptance for implementation.

164. Also, the procedure of appointment of private Consultants not known. It may be noted that NVDA were specifically asked in writing vide letter CE/63 dated 14.05.2013 of Dr. Mukul Kulshrestha (Annex 3.1-L, Point No 4) to provide "information regarding vide publicity process adopted for awarding the work to the above consultancy firm i.e. Expression of Interest, NITs, News-paper cuttings for the published Eol/NIT etc including documentation of NVDA that awarded the work, total proposals received, the process of Award of the work to the aforesaid private firm, amount of contract, and proof of financial payments made to Aqua Consultants. The above also applies to any private party/consultant other than M/S Aqua Consultants who have been awarded design work at any other RR site/sites", with specific reference to design of Water supply distribution systems.

165. It is regretted that the above sought information was not provided to this Inquiry team, in the absence of which it is difficult to make comments on regularity of the procedure followed on appointment of consultants and other related aspects. However, there is a certain suspicion particularly in view of the irregularities observed for case of half-round drain designs at Khalkhurd where M/S Aqua Consultants were involved, and this suspicion is reinforced by not providing the documents asked for. It is possible that the consultants may have been appointed only as an afterthought or by a questionable procedure or may have once again obliged the department by just giving some designs for the sake of formality so that NVDA can make claims of having followed all due procedures.

166. The information on award of distribution network design works to consultants, the eligibility of consultants, their previous relevant work experience, and the possibility of piece-meal award of design work to consultants of choice on a site to site basis rather than appointing consultants of repute chosen through proper process of Technical and Financial bidding in response to an Expression of Interest for design of distribution systems under the combined R&R works etc are some of

the aspects that need to be probed by a specialized agency such as the CBI/Lokayukta/CAG etc.

167. It is also noteworthy that the Rising Mains (Pressure Pipelines) from Tubewells to Cisterns, OHTs etc. appear not to have been designed (Annex 3.1-I), and this includes the ratings of the pumps and motors at the tubewells. It is rather strange that while such Rising Mains exist at a wide majority of the R&R sites, and that variation in pipe sizes have been observed from site to site, there have been no designs backing up the variations. Thus for instance, Bijasan had GI pipeline of 50, 25 and 15 mm (MB No 63), while Amlali had GI Pipeline of 50, 32 and 15 mm (MB No. 93), Jamada had GI Pipeline of 50,40 and 25 mm (MB No. 63), Morekatta had GI Pipeline of 50,32,25,15 mm (MB No 93), while Jangarwa had GI Pipeline of 50 and 25 mm (MB No 63) only. Thus, various pipe combinations have been used, all without any rational design basis, and probably at the arbitrary discretion of the site incharges, who need to be held accountable for the casual attitude towards public spendings.

168. Also notable is the fact that at a number of R&R sites like Bijasan, Kalyanpura, Jamda, Jangarwa, etc, the pipelines are being used without the mandatory completion and testing certificate (Annex 3.1-I, Point No 4) in violation to the standard practices and norms.

169. The presence of distribution system at select sites, to the exclusion of other sites is discriminatory and arbitrary. While the instructions of the Chief Engineer (PWD), NVDA vide 377/NVDA/PHE/2003 dated 30/05/2003 (Annex 3.1-H) stating that piped water supplies are to be provided for sites with population exceeding 2000 was specific and categorical, in reality this order has been violated time and again. Thus, Sirsani (population=295) has a distribution system, Eklera has a distribution system even with population of 710), while Bhilkheda has a population of 1175, Barda (Manawar) has a population of 1770 and Perkhad has a population of 1185, etc., and yet all of these have piped distribution systems.

170. In fact, analysis of data indicates that population exceeds 2000 (400 Plots) at only 17 R&R sites of the total of 88 R&R sites. Even in these sites like Ekalwara does not have a distribution network, and there exist 14 R&R sites that have been provided with capital intensive piped Distribution networks despite their populations being less than 2000. Similar, data exists for provisioning of OHTs which too are capital intensive works.

171. Thus, inequities exist amongst a large number of sites, with some sites having been arbitrarily provided with elaborate distribution networks, while others have been denied this amenity for no known reason, despite their populations being larger in many cases.

172. There were also inequities witnessed at the same R&R sites in the distribution of water supplies. At sites like Barda (Manawar), it was found that only a limited number of houses had access to the distribution network laid, while other houses remained unconnected. Thus access to water supplies was not guaranteed despite the existence of water distribution system.

173. At a number of R&R sites like Awalda, Kadmal, Kikarwas, Nainpura Tarlai (Sondul), etc., the Pipelines were seen missing in certain patches (Plate 3.1.35). These lines appear to have been stolen, an outcome of the fact that most of such lines were not charged, and were not under use. Defunct / not-under-use pipelines are easy targets, more so because the pipelines have been laid out along the roads sometimes without even adequate cover, as it is easy to locate and take away the underground pipelines.

174. In any case, it remains the duty of the maintaining authority to maintain all such lines. This also underlines the need for NVDA to immediately handover the infrastructure it has created to appropriate authorities, as NVDA is still in charge of majority of the distribution systems at various R&R sites.

175. The valves of various types were often seen dysfunctional and lying defunct (Plate 3.1.36). The valve chambers were often seen chocked- indicating that regular servicing of the valves is not being carried out. In several cases, valves were missing, or were non-functional, chambers filled with debris indicating lack of periodic inspection, regular cleaning and maintenance as is mandatory. Apparently, little efforts have been made to keep the distribution system operational.

176. Significantly, no records pertaining to periodic maintenance of valves in the distribution system were found available, so that it appears that regular maintenance and upkeep is not being practiced.

177. The Valve chamber covers were also sometimes found missing. In any case, the metallic Covers are likely to get stolen particularly when the R&R sites are not yet fully habitated. Stone slabs/Precast Cement-Concrete covers may have been more appropriate: equally effective, more economical, and less prone to thefts.

178. At some R&R sites illegal connections tapping into the distribution lines/rising mains, tube-wells, sumps, etc. (Plate 3.1.37) were commonplace. While, this highlights the water supply shortages outlining the need for assured water services to the consumers, failure to curb such consumer behaviour manifests into large leakages and losses, as well as drop in pressure head of the line resulting in failure to supply water to the consumers at the tail-end. Thus, few individuals illegally tapping into the line (obviously the more powerful and rich enough to afford pumps, risk illegal connections etc), often deprive large number of people of much needed water, as the water fails to fill up the public cisterns at the tail end, or to just reach the poor at the tail end.

179. It is again the duty of the maintaining authority, NVDA in most cases, to rid the illegal connections, confiscate illegal pumps, lodge police complaints and taking legal action against those responsible for the pilferages. No such efforts seem to have been made at the sites, resulting in water crises at several places. Thus, the operating agency has failed to maintain the infrastructure against pilferages and thefts of water through illegal connections. Such inaction prevents equitable distribution of water and deprives a majority at the cost of few, creating artificial scarcity of water. Herein lies the role of both- the agencies responsible for water supplies in getting rid of illegal connections and taking action against erring consumers, and the NGOs in educating people to use the provided resources responsibly, equitably and wisely.

180. Then there were issues related to execution of work, which was often found lacking and was sometimes outrightly poor. In several cases (Plate 3.1.38) the pipeline did not even have adequate cover, and was visible in patches along the road. This enhances the chances of theft, and is rather an invitation to theft. Significantly, inadequate cover along the road side increases the risk of breakage of the laid out line due to passing vehicles on the road. It also greatly increases the chances of damage of the pipeline due to exposure to temperature changes, and to the vagaries of weather. Exposed pipelines indicate careless execution and poor supervision, as sufficient cover needs to be provided over the pipeline to prevent damages due to vehicular and other loads and due to vagaries of changing weather, including changes in temperatures and exposure to sunlight.

181. In some cases, not just the inadequate covers prevailed, but the execution was so poor that the bare pipelines actually could be seen thrown on the ground (and not laid over it) and overhanging in air in patches, and all this without any supports having been provided (Plate 3.1.39). At other times, the execution and supervision were sometimes so lax that pipelines were laid on the chocked culverts, over the deposited silt (Plate 3.1.39), without bothering to find the actual ground levels to lay the pipelines.

182. The instances of grossly poor execution and supervision need to be reprimanded appropriately by the executing department.

Jalkheda

Kadmal

Kikarwas: Two different locations

Khalkhurd

Plate 3.1.35. : Missing Pipelines in Patches (Typical)

Dharampuri: Missing valve Bhavati I and Vishwanath Kheda: Leaking valves

Brahmangaon Theekri (left) and Nisarpur(Right): Defunct, unmaintained, rubble inside

Amlali: Missing valves Lakahangaon: Missing valves Sondul: No cover, no valve

Bhilkheda: Inside of a Valve Chamber

Awalda: Missing valves, broken connections, rubble inside Takiapur: Vegetation inside

Plate 3.1.36. Typical Status of Valve Chambers at R&R sites

Kirmohi : A private halao, fed by illegal connection from nearby 50 mm GI pipeline running from tubewell to cistern. Halao has no taps and stop valves, so water keeps overflowing and wasted. Such connections are routinely overlooked by authorities, and prevent majority of users from getting water at tail end and through cistern. Glaring lawlessness.

Nalvai: Extensive illegal connections from Tubewell outlet pipe taken by individuals. Even a private motor was found running on electricity drawn from the Pumphouse itself, so the cost of pumping goes into government account. Such illegal tapping would result in major loss of pressure and water leakages, making water unavailable at tail-end cisterns, and houses. Poor suffer as a result of deeds of few, even as authorities turn a blind eye.

Mandwada: Sumpwell punctured to get water. Bijasan

Plate 3.1.37. Illegal Connections: Inability of the maintaining authority to act even as people suffer at large.

Jaikheda

Talwai Khurd

Achoda

Talwai Khurd

Achoda

Brahmangaon

Visible Pipelines with Inadequate Covers make the pipeline vulnerable to theft and liable to damage due to passing vehicles, and because of Temperature changes.

Plate 3.1.38. Poorly laid Pipelines: Inadequate Covers along the road

Jalanpur Dhalkheda

Brahmangaon

Tawlai Khurd

Chakeri

Pipelines overhanging in Air: Pipes vulnerable to theft and liable to damage

Borlai II: Pipeline laid over a culvert which is half seen as silt has deposited over the culvert drain pipe. While laying, little attention has been paid to retrieve the culvert and make it functional, and lay the pipeline over the actual ground.

Plate 3.1.39. Poorly laid Pipelines: Careless execution (Typical)

3.1.2.8. Water Treatment Plants (WTPs)

183. Currently, all 88 R&R sites receive raw water supplies without any water treatment prior to supplies whatsoever.

184. Only 2 Water Treatment Plants (WTPs) have been provisioned to supply treated water to Dharampuri, Nisarpur I,II,III, Gehalgaon and Chikalda R&R sites (Annex 1-A).

185. Thus, by design a vast majority of R&R sites are left to do with raw water supplies without any provision of treated water. This even when several of these sites like Khedi, Perkhad etc will continue to receive raw surface waters from the near stagnant backwaters of the Sardar Sarovar Dam on River Narmada, which would mandatorily need treatment prior to consumption, and the other R&R sites will get untreated tubewell waters which are not always safe (as illustrated by a few test reports available which show tubewell waters with fluoride/coliforms).

186. This implies that a wide majority of the R&R sites will in perpetuity get untreated raw waters, till local bodies make their own arrangements for water treatment.

187. From the planning perspective, it is completely discriminatory to provide residents of only a select few R&R sites (6 sites in all) with the provisioning of supply of treated waters. Uniformity in terms of amenities provided should have been consistent for all the oustees as they are being dislocated for no fault of their own, and have equal or near equal right of access to various services and facilities.

188. From a Public Health Engineering perspective such a scenario of supply of near stagnant backwaters of River Narmada, without any treatment whatsoever, is unacceptable. Even the untreated raw waters from tubewells, whose water qualities remain untested and undetermined, cannot be supplied to the R&R inhabitants. Yet, this is being done overlooking all norms, guidelines, and practices.

189. Site inspections revealed that currently even the two WTPs are not yet operational (Plate 3.1.40). One of the WTPs near Ganpur (Manavar) is still incomplete, while the other at Dharampuri was not found working during inspection, and has apparently never worked as the mandatory lab equipment that decides the dosages of chemicals to be added as per the incoming raw water quality at treatment plant (a mandatory feature for testing supplied and raw water qualities) were found non-existent.

190. It may be note that the water treatment plant at Dharampuri, despite being claimed as complete, has still not been handed over to the appropriate authorities. On the other hand, NVDA also does not operate it. It is rather bizarre that such infrastructure already in place is not operated, when water supply arrangements at the site in any case, are being made by NVDA. The only related infrastructure in

use at the Dharampuri treatment Plant are the two I-Type Quarters made for the PHE Staff.

191. The WTPs represent capital intensive infrastructure, and these have so far been wasted and lying defunct/incomplete/non-functional, unable to serve the inhabitants of the R&R sites, and resulting in locking of large capital without fulfilling the purpose for which these were constructed.

Ganpur (Manavar): Incomplete Water treatment plant works

Dharampuri: Plant not working, lab was not found equipped, Treatment Units found empty and dry.

Plate 3.1.40: The two Water Treatment Plants at R&R sites - Massive Infrastructure lying defunct.

3.1.2.9. Use of Tankers for Water supply

NVDA has been supplying water to select R&R sites through number of water tankers despite the provisioning of Intakes, Water treatment plants for some sites, Overhead Tanks, Tubewells, Cisterns, huge distribution networks, and Handpumps.

192. A total of 5 department owned tankers have been deployed to take care of consumer demands to a limited extent.

193. A claimed 13 number of sites are supplied with tankers, not just during the summers but almost around the year. These sites are Borlai I, II, Khedi, Bhilkheda, Sirsani, Bhawati I, Lakhangaon, Mehgaon, Panya, Takiyapur, Gawla I,II, and Anjad Barda.

194. Of these, sites like Sirsani, Borlai II, Anjad Barda, Khedi etc. have distribution network with Overhead Tanks. Yet, in an obvious reflection of failure of the massive infrastructure built, water has to be still often supplied by Water Tankers.

195. The criterion for supply of water by tankers is not known. Several R&R sites, like Panya, Takiyapur, Beganda, Rekti etc. where severe water crisis exists, are not supplied through the water tankers. It is not known as to why all such sites with water crises are not provided water supply by Tankers, while only a select few are recipients of the facility of supply by water tankers.

196. No test records for water qualities supplied through tankers were made available, and it is not known if this water supplied is fit for human consumption. In fact, the water qualities of tanker waters remain un-tested and undetermined, posing risk for the consumers, more so because disinfection of this water is also not practiced.

197. The log books for supply by water tankers are not maintained as per MPWD Manual, 1983. The log books were neither maintained in prescribed formats, nor were checked and signed by sub-Engineer /competent authorities, and may have been maintained by the drivers of the tankers. Undesirable information was found recorded on the log books regarding expenditure incurred on food and liquor. More details on this are spelled out in a separate section in this chapter.

198. The supply by water tankers has its own limitations and is no substitute to the services that the large infrastructure in place should have provided. The various limitations of supply by Tankers can be enumerated as :

- limited capacity in terms of water volumes supplied
- limited capacity to reach people at desired time of their convenience, and during Peak demand
- limited capacity for equitable distribution of water including meeting the needs of Livestock
- limitation with regard to maintaining water qualities supplied through tankers.

199. Despite such limitations, the dependence on water tankers irrespective of huge water supply infrastructure created is reflective and indicative of the state of infrastructure which is clearly not dependable, besides implying that the system created has not worked forcing the NVDA to supply water often through water tankers

200. This entire system of water supply by tankers needs to be controlled and limited and water dependency on tankers need to be immediately stopped. This would ensure that there is accountability and greater responsibility in running the huge water supply infrastructure created, and would bring about greater transparency and better system efficiencies, besides also ensuring that people get served by the huge infrastructure that has been built for them which otherwise if left unused would get progressively defunct in the absence of it being operational.

201. In any case, water supply by Tankers is at best a temporary arrangement, and is not a sustainable solution to problem of water crises at various sites. One wonders as to how dependable and reliable water supplies will be made available to R&R site inhabitants, if water crisis persists at the present scale, and if temporary arrangements like supply by water tankers continue to be reckoned as ready solution to the problem of wide scarcity of drinking water.

3.1.3. Complete Neglect of Water Quality and Public Health: Raw Water Supplies

202. A very serious operational flaw has been that the Water is currently being supplied raw and untreated at all places.

203. What is worse is that the quality of the raw water being supplied is not being assessed and tested anywhere in the entire distribution system including the handpumps, violating the mandatory requirements, and setting up a completely unacceptable and unheard of practice, even by the standards of PHED department itself. It may be noted that for the past few years (starting the year 2010) not even the handpump water qualities have been monitored and tested.

204. Despite claims of periodic cleaning of cisterns, lack of any logs/records whatsoever, and no expenditures booked on this account clearly indicate that cisterns are not being cleaned. Similarly, no records for periodic cleaning of overhead tanks are available, and no chlorination/disinfection etc. is carried out anywhere in the distribution system despite the fact that raw waters for drinking purposes are being supplied.

205. Thus, water is not just being supplied raw, the storage media like Cisterns and OHTs etc. are not being cleaned. On top of it, quality of the drinking water is not monitored and assessed at all, and such raw water are supplied in violation of all acceptable rules, codes, norms, and practices. Such gross irresponsibility needs to invite stringent action against erring officers who have blatantly violated all concerns towards public health issues.

206. Such blatant overlooking of water quality is despite the fact that in several cases, the raw water sources in themselves are often of dubious nature as elaborated in subsequent sub-sections.

3.1.3.1. Raw Water Supplies from adhoc sources

207. While wasteful investments have been made at some sites in the name of "future planning" and into creating infrastructure that lies unutilized, at several other sites residents have to do with raw water sources of dubious qualities.

208. The adhocness in the planning and execution is apparent from the fact that sometimes when infrastructure was created based on water demand but where enough yields were not found, rather than opting for long-term permanent and technically sound solutions, adhoc arrangements have been made, even though such arrangements are clearly unacceptable, fire-fighting short-term measures and unsustainable for supplying water to the inhabitants over longer periods.

209. The case of Perkhad is an example, where raw and untreated Narmada water has been brought though a 4.55 Kms line, only to be put into an open well before supply to a distribution system. The raw water quality did not seem fit for human consumption when even seen visually (Plate 3.1.41). Yet, this raw and untreated water from the open well is supplied devoid of any treatment including disinfection/chlorination, with no test sampling available in the records.

210. Similar raw water supplies are found at sites like Raswa Deb where tubewell yields being inadequate, especially in summers, the supply takes place from an acquired open well (Plate 3.1.42), and even minimal disinfection is not practiced. Such arrangements are temporary and unacceptable solutions for their failure to address water quality concerns. These are not sustainable solutions to the problem of water crises at such sites.

211. Another case in point is that of Semalda, where a 130 KL capacity Overhead Tank has been constructed, but the tubewell meant to fill the OHT does not have enough yield. Hence, an adhoc arrangement has been made (Plate 3.1.43), which obviously cannot be sustained. An open well already existing has been acquired and raw water is pumped from here to the OHT by a special line after placing the electrical panels in open and tied on to a Pipal tree. The open well is susceptible to surface overflow contamination since well-boundary (railing) was highly damaged and does not exist in most parts. Despite such a well being used for drinking water supply, no efforts have been undertaken to even fortify the well boundary to prevent ingress of surface pollution. And yet, this raw water is being provided to the inhabitants, even as the well water quality remains untested, and no treatment including disinfection/chlorination etc. is practiced.

212. If the water supply is to ultimately depend on such sources which are liable to receive surface contamination, and if these sources are to fill the OHTs constructed or if such waters are to flow into the distribution system, untreated and raw, then the whole purpose of constructing massive infrastructure in the form of OHT, Tubewells, Rising Mains etc. goes waste.

213. Supplies from such sources are unacceptable even as temporary solutions since raw water is being supplied for drinking without even chlorination, and through OHTs/Cisterns/ distribution system that are hardly ever cleaned or maintained. Such emergency firefighting operations, being essentially adhoc, unplanned and unreliable, are not sustainable solutions to the problem of water crisis at these sites, and are likely to act as a detriment in handing over created infrastructure to Gram Panchayats.

214. It is highly recommended that at all such sites sustainable sources of water supplies be developed with provision of adequate treatment as necessary, and only then the infrastructure be handed over. This is crucial as the Gram Panchayats may later on

not find budgets and technical expertise to create safe and robust water supply services/sources at their respective R&R sites. This also holds true for cases where such infrastructure with adhoc arrangements has already been handed over without developing technically appropriate raw water sources that deliver water on sustainable basis.

After the failure of the tubewell, Narmada water from 4.55 Kms has been brought into the above open well. For Distribution, a new 110 mm PVC distribution network (700 m) for supply has been laid. Under an obviously unsustainable arrangement NVDA pays for the electricity bill of the pumping scheme while the distribution infrastructure has been handed over to the local body which collects tariffs for supply. Water quality remains untested, and the water put into the open well is supplied raw without any chlorination or any other treatment. Even visually, the raw water quality in the open well does not seem appropriate for drinking.

Plate 3.1.41. The case of Perkhad : Adhoc and Wasteful Water Supply Arrangements

Plate 3.2.42. The case of Raswa Deb: Open well acquired for raw water supplies in summers.

Semalda: Overhead Tank is mostly filled up by an Open Well acting as the raw water source, and having adhoc pumping arrangements. Note that the water quality is not tested, and no chlorination or any other treatment of the Open well water is undertaken. If the water supply is to ultimately depend on such sources, then the whole purpose of constructing massive infrastructure in the form of OHT, Tubewells, Rising Mains etc. goes waste, and the supply arrangements remain essentially adhoc, unplanned and unreliable.

Plate 3.1.43. Raw water supplies from Open wells: Adhoc Arrangements (Typical)

3.1.3.2. Raw Water supplies from River Narmada

215. While water supplies from dubious sources is in vogue at some R&R sites, it was truly shocking to find raw water being supplied from River Narmada directly into the Overhead tanks (OHTs) at Nisarpur and elsewhere at some other sites, and Narmada Pipelines being brought to fill the OHTs directly (as at Khedi) without any treatment whatsoever. This from an organisation that has professional, experienced engineers, who ought to understand the linkages between water qualities and public health better than anyone else.

216. It may be noted that Pipelines bringing Narmada water to R&R sites have been laid for a number of R&R sites like Borlai II, III, Khedi, Chakeri, Mohipura, Nalvai, Sala, Perkhad, Kavanthi, Nisarpur, etc.. As claimed in Annex 3.1-F, point No. 3, these lines have been laid for construction of houses and other domestic usage (except drinking), yet the claim is actually not true, and the fact is that most sites face water scarcity and are dependent on supplies from the Narmada line even for drinking purposes, irrespective of the fact that such water is being supplied untreated and raw.

217. The fact is that recurring Electricity expenses have been shown for supply of water from River Narmada for the above sites vide Annex 3.1-F, Point No. 5, as Rs 8000/- per month for Electricity usage (strangely averaging same for all sites!) in pumping River Narmada water to these sites using Electric Pumps (except at Nisarpur where diesel pumps are employed consuming Rs 1.21 Lakhs per month for pumping raw Narmada waters to Nisarpur). This indicates that the river water usage is significant, and since there is nothing to prevent the usage of supplied water for drinking (raw pumped water is actually directly put into OHTs as at Nisarpur, Khedi and Borlai II, and into a well at Perkhad to be supplied from this well), the raw untreated water is employed for drinking purposes also.

218. In India, most Rivers no more carry safe drinkable raw waters, and in the present case the raw waters are not even being drawn from a running river - it is mostly the near stagnant backwater of the dam on River Narmada from which water is drawn often from several meters below the surface where water qualities deteriorate due to lack of sunlight and aeration.

219. Even this near stagnant backwater is also not supplied fresh. It spends time in conveyance during few kilometres in the pumping main, followed by storage in an OHT and subsequent conveyance into distribution system before reaching the consumer end. For example, the Koteshwar Ghat Intake Diesel Generator (DG) sets run only 3-4 times a month, indicating that supplies to the OHT at Nisarpur I are made at a frequency of nearly 7-10 days, and this supply lasts at least for an entire week or more.

220. It will also be relevant to point out that extensive agriculture with use of chemical fertiliser in the adjoining fields of submerged area is being practiced. Such non-

point sources will bring in pollutants that would accumulate in the sediment at the bottom of the almost stagnant waters as the river water is no more running to be able to dilute the impact of chemical fertilizers on water quality. Yet, no efforts have been made to even determine the raw water quality as is mandatory by various rules and norms, what to say of treatment that is necessitated before supplying such water.

221. The water quality being supplied is therefore in all likelihood much inferior to the raw water qualities that the villagers may have been consuming from a running Narmada river for long. This stored water comprising the backwaters of a large dam needs treatment and cannot be fit for consumption without any treatment.

222. Thus, the issue of supplying safe water has completely been ignored and given a pass, and effort has only been on making provisioning for water demand, which again has apparently not been met adequately.

3.1.3.3. Raw Water supplies from Water Tankers

223. Raw water is supplied to inhabitants of 13 R&R sites through Water Tankers through much of the year, even as the water qualities of tanker remain unknown and not even disinfection of this water is practiced, prior to supply by tankers.

3.1.3.4. Summing Up the Water Quality Aspect

224. It is strongly recommended that adequate arrangements be immediately made to ensure that those rehabilitated do not end up drinking raw waters from the pooled up backwaters of the Dam/raw tubewells waters of unknown water qualities/Tanker waters being supplied currently without any treatment including disinfection.

225. Where adhoc sources (such as open wells, Water Tankers etc.) are being employed for supplying waters necessary raw water sources need to be developed at the earliest possible, so that water supply schemes attain some degree of sustainability.

226. Appropriate stringent action needs to be initiated against all responsible officers in this case who have allowed and approved supplies of raw untreated waters from adhoc sources, and from pooled up dam backwaters to the R&R sites, without even bothering to carry out mandatory testing of supplied water, thereby violating all prescribed guidelines, norms, code provisions and engineering practices. Under the circumstances, it appears very likely that the mandatory testing and monitoring of water quality has been completely abandoned and given up so that adhoc operations may continue unhindered without any glitch, and without anyone claiming that water supplies do not confirm to drinking water standards.

227. NVDA has failed to ensure the basic right of access to safe water to those resettled, and provisions should be made now to ensure that R&R sites get waters of acceptable quality and in required minimal quantities at the least.

3.1.4. Water Inadequacy at Large Numbers of R&R Sites

228. The water supply system on field essentially comprises a combination of number of Cisterns to be filled either by Overhead Tanks (OHTs), or through one or more tubewells by a Rising Main/pipe network laid for the purpose. The OHTs constructed at select sites were also to be filled in most cases by Tubewells, and in some cases by a varying combination of tubewells and water drawn from River Narmada either with treatment (2 Water Treatment Plants are envisaged to cater to 6 R&R sites (Annex 1-A), but both are dysfunctional currently), or mostly without involving a water treatment plant (ie., by raw water). The pipelines to Cisterns are also supposed to fill the nearby halaos meant for the domesticated animals. A number of Handpumps (HPs) at each site, have also been provided to supplement any water deficit. At a claimed 30 R&R sites (Annex 3.1-F), there also exists a distribution system intended to supply water to individual households. Provision also exists at several sites for supply of water to Primary Schools and other Civic Buildings etc via a standpost to be supplied through the laid network. Thus, the provisioning for water supply appears robust at the first sight.

229. The NWDT Award had made the provision of One well (Handpump/tubewell (HPs/TWs)) per 50 displaced families, thereby requiring a provision of 570 HPs/TWs in the 88 R&R Sites (Table 1.3). As against this, the actual number of HPs stands higher at a claimed 482 HPs and 802 TWs at all the sites combined together. Thus there appears to be an overprovisioning, more so considering the fact that NVDA has improved upon the Award by making provision of piped water supplies in a number of R&R sites which include a gamut of Overhead Tanks (OHTs), piped networks, Cisterns etc., provision for which did not exist in the Tribunal Award.

230. Such massive provisioning obviously required massive investments, so that the total cost of water supply infrastructure became large. Thus, elaborate water supply distribution networks including overhead tanks have been created at several sites (costing Rs 31.3289 Crores in the current R&R works) (Annex 3.1-M) over and above the recommendations of the NWDT Award which endorsed only the provisioning of Handpumps (costing Rs 5.8254 Crores in the current R&R works) (Annex 3.1-M), the overall cost of the water supply thus becoming several times. Yet, this significant cost could have been very-well justified if the massive investments had resulted in proportionately significant increase in quality of life for the rehabilitated families and in public satisfaction with regard to the lifeline water services at the R&R sites. This, most unfortunately, has not happened, massive investments notwithstanding.

231. This Inspection team was amazed to find out that despite such massive provisioning, most R&R sites had apparently very high level of dissatisfaction and the residents were facing undue hardships. During site inspections, the Water

Services were the most complained about services at a large number of sites. The anguish was natural, for water constitutes the basic need, and without adequate water, the quality of life is likely to be rendered inferior/unliveable even with the best of the buildings and infrastructure around.

232. It would be relevant to point out here that the people who have been displaced do not belong to desert communities. These are the people whose ancestors have lived along the perennially flowing River Narmada for ages, and these communities would not have seen water shortages. For this reason, the lifestyles of these communities are likely to be such that they and their livestock would need assured adequate quantities of water.

233. What however, was particularly appalling was not only the massive public dissatisfaction, but also the technical systemic failure of almost the entire water supply infrastructure.

234. Table 3.1.5 presents a typical summary of water supply scenario across 25% of the 88 R&R sites (ie, at 22 R&R sites), with respect to the infrastructure related to water supply. Most other sites have similar issues and problems related to water supply services.

235. The massive failure in Planning is evident from several cases like Khajuri, Umda, Dehar, Bhamta Jangarwa, Jalkoti, Musapura etc., wherein no Overhead Tanks or Tubewells have currently been provided/made functional, and yet Cisterns with GI pipelines have been placed at significant costs. This despite the fact that there is no way of filling these Cisterns in the absence of water that could be supplied from the Overhead tank or tube-wells. Several R&R sites face similar issues.

236. In several other instances like Mohipura, Nalvai and Chakeri etc., water has been brought by specially pumping raw water from River Narmada through pipelines of several Kms in length laid all the way to R&R sites, but the absence of any Overhead tanks and piped Distribution systems, it is not possible to systematically utilize this water for drinking purposes in times of crises of water/water scarcity.

237. For the same reason of water source from OHT/Tubewell being non-existent or non-functional, and also because large numbers of halaos often have no water supply connections, the halaos mostly remain dry and defunct. This creates a situation wherein there scarcity of water supplies for humans is compounded vastly by scarcity for the livestock. In the absence of working halaos, the livestock sometimes needs to be taken to a few kilometres to River Narmada, and evidently this takes much effort and time. In other cases, water has to be transported on bullock-carts (Plate 3.1.44) from distances of several kilometres, rendering undesirable hardships. And all this, even as ample infrastructure exists.

238. What is even worse is that at large number of sites like Jalkheda, Shakirpura, Ratwa, Talwai Khurd, Balwara, Bhawaria, Bhilsur, Gehalgaon , Gangli , Brahamangaon , Kaisur , Khajuri, Nisarpur I, Nisarpur II& III, Borlai II, Amlali etc. no halaos were constructed for animals, thus giving no priority to the needs of livestock despite the known dependence of oustees on Livestock. In several other sites, the provisioning fell well short of numbers required as per the NWDT Award. Thus, water adequacy for livestock has not been ensured, and the norms of the NWDT Award were thrown to the wind while making provisioning. This despite the fact that water supply infrastructure has been over-provisioned with respect to NWDT Award at massive capital cost.

239. In fact, the failure of halaos as well as of supply schemes for humans was almost a foregone conclusion as demand for the livestock (which can be significantly large) as well as technical losses in distribution system (which can be as large as 50% and more for rural water supply schemes due to limitations in terms of execution, operation and maintenance) etc. were not even partly/fully implicit and incorporated in the design figures of the water supply schemes as elaborated in subsequent sub-sections.

240. For the above reason, once the water demands reaches the peak when the R&R sites become fully functional and habitated, there is no way water supply demands can actually be met by the current system which is a source of widespread dissatisfaction and discontentment even now when most sites are heavily underpopulated.

241. The poor current state of infrastructure (Plate 3.1.45) in which it is common to see large number of tubewells lying defunct, Pumps and motors and Panels missing or out of order, Overhead Tanks not connected or lying defunct, missing and defunct/dry Cisterns, missing/dry/defunct handposts , missing taps, missing pipes in distribution system, distribution system not present to supply to houses, valves not working etc, all the factors combine to compound scarcity of water at several R&R sites. All of the above factors further create a dependence on handpumps in several cases, even as the handpumps themselves are not all working or perennial, forcing one to ponder if there really has been a justifiable usage of huge infrastructure created additionally to the provisions of NWDT Award.

242. And the greatest testimonial of the failure of water supply infrastructure (and failure to supply adequate water) is most reflected and is implicitly evident in the fact that by their own admission, despite the huge infrastructure created over and above the NWDT Award, the NVDA is still forced to supply water using Tankers (details in a separate sub-section), with the annual provisioning in 2012 for tankers supplying water to select sites being as much as Rs 15,65,551/- on diesel alone. And these expenses have been incurred throughout the year (including the rainy season), every month to varying degrees, and not just in dry hot summers.

Obviously, this system of supply by water tankers is not sustainable, as once the infrastructure is handed over to appropriate local agencies such as the Gram Panchayats, they will not be able to afford additional supply by tankers.

243. The system would indeed turn completely dysfunctional much before the design period as the time passes since the not-in-use tubewells will chock/clog from inside as soil voids do not develop in the absence of regular drawls, the valves will get aged and rusted due to lack of any maintenance, the pipes would get aged and stolen in patches, cisterns would rust or age, and intake structures may lose their relevance due to silting in the absence of continued pumping, leading to wastages of treatment plants, and the handpumps would have lesser and lesser water availability as private borewells start to operate because the water supplies are not dependable or as per the requirement. All of this would lead to massive wastage of investments made, which otherwise wisely spent could have alleviated the quality of life of R&R residents.

244. What is therefore needed is to strengthen the infrastructure in place and make it workable to justify the investments already made to give immediate relief to R&R inhabitants, and to immediately handover this strengthened working infrastructure to local bodies for operation and maintenance. This strengthening is also needed because of a gamut of design and planning lacunae that need redressal.

3.1.4.1 Arbitrariness in calculating/estimating water demand at R&R sites

The criteria to be used for design of water supply schemes and calculations of water demand were quite specific.

245. Vide letter of the Chief Engineer (PWD), NVDA vide 377/NVDA/PHE/2003, Bhopal, dated 30/05/2003 (Annex 3.1-H), piped water supplies were to be provided only at R&R sites where the present Population were to exceed 2000 (family size of 5). These piped schemes were to be designed at 70 litres/ per person/day (lpcd), with 20% additional for "Other works".

246. Supplement and with reference to the letter cited as Annex 3.1-H above, another letter was issued in 10 days again by the Chief Engineer (PWD), NVDA vide 403/NVDA/PHE/2003, Bhopal dated 09/06/2003 (Annex 3.1-N) directing that all schemes be designed as per the present Populations of the sites. This was logical and necessary as normally designs are made for some future projected population but the case of R&R sites was different, with fixed numbers of plots envisaged at each R&R sites without assumptions of future growth, and all amenities including the schools, primary health centres, and all other civic buildings, tree platforms, halaos etc. provided in numbers as per the present population. Thus water supplies were to be no exception, and were to be provided on basis of current population.

247. Summing up, the criteria used were:

A. Piped Water supply schemes were to be provided only at R&R sites with populations exceeding 2000 (ie, 400 plots with family size of 5)

B. The OHTs were to each have a capacity of 50% of the daily water requirement (Annex 3.1-H), with sumpwell capacity being 20% of the capacity of the respective OHTs.

C. Piped water supply schemes were to be designed for the present population, with water demand for humans fixed at 70 litres per person per day and a provisioning of extra 20% for "Other Works". The "Other works" remained undefined and are discussed later.

248. In what is most revealing about the working of the PHE Engineers and planners each of the criterion adopted was breached and blatantly disobeyed in some cases while designing schemes that were completely adhoc and arbitrary in such cases.

249. **Criterion A**: Capital Intensive Piped water supplies were often provided at R&R sites which had populations less than 2000. There were only 17 Sites where numbers of plots exceed 400 (implying a population of more than 2000 with family size of 5). On one hand, sites like Ekalwara (envisaged population 2450) with populations exceeding 2000 have not been provided distribution systems, on the other hand at least 14 R&R sites were provided piped water supplies despite their individual populations being less than 2000 without considering the fact that this is discriminatory to the residents of R&R sites who are deprived of such essential services. And even in this, some very populated sites like Nimbola (Population 1960) were left off, while sites like Sirsani (Population 295 only) were provided Piped water supplies.

250. **Criterion B**: The capital intensive OHTs were to have a capacity of 50% of the requirement. Niasrpur is a case in point, whose water supply scheme documents (part of Technical Sanction) were not provided, but the calculations are fairly straight forward. Nisarpur I, II, and III have a combined numbers of 3214 Plots, equivalent to a population of 3214*5 = 16070 to be served. Thus, at 70 lpcd, the daily water requirement is 16070*70 litres= 1124900 litres. At 20% extra this comes out to be 1349880 litres, 50% of which (=674940 litres=0.675 Million Litres). Thus, at Nisarpur there ought to have been OHT with capacity of 0.675 Million litres per day (MLD). Yet in reality there are two OHTS that exist at Nisarpur, and each has a capacity of 1 MLD, ie, a combined capacity of 2 MLD, implying 3 times the capacity provisioning of what was needed. In fact, the entire R&R site of Nisarpur needed water quantity of only 1.35 MLD, which is far less than the total capacities of the OHTs (2 MLD), indicating massive over-provisioning.

251. **Criterion C**: At bigger sites, where works had higher Estimates, the calculations for water demand were highly skewed, despite clear directives on calculating the water demand, leading to higher provisioning. Thus for instance, at Dharampuri R&R site, the Water Supply Scheme (Annex 3.1-O) which is a part of the documents of Technical Sanctions obtained vide TS No. 247 dated, 20.01.2005, mentions "the numbers of families to be rehabilitated at the site are 2000 Nos.", and calculates the population of oustees to be 10000 (Annex 3.1-O). Considering the Census data, it then estimates the present population of unsubmerged original Dharampuri Village as 19624. Subsequently, arbitrary calculations are made. The population of the Rehabilitation site is made not based upon 2000 plots, as earlier quoted, but on basis of 4000 plots, and population of oustees thus doubled at 20000, instead of 10000 quoted a page earlier (Annex 3.1-O). This when even the population of the entire unsubmerged Dharmuri village was less than 20000! Not just this, the population of the rehabilitation site and unaffected part of Dharampuri town to be supplied water is computed as 31310 for calculating water demand, whereas the present population was estimated to be just 19624 just a few lines before in the document on water supply scheme! Since, it has been claimed by NVDA (Annex 3.1-P) that the Dharampuri R&R site comprised resettlement only from original Dharampuri village at a distance of 0.5 Kms (it is interesting to note that this document shows neither 2000 nor 4000 families forming the basis of water supply scheme at Dharampuri R&R site, but rather 4173 families as being displaced at Dharampuri R&R site, an entirely different figure that implies populations larger than that of unsubmerged original Dharampuri village in 2005) , it is evident that even if the entire original village was to be resettled with a total population of 19624, it would not make up for the infrastructure planned for a population of 31310. To top such absurdities, arbitrary calculations then follow assuming that 80% of the population of the rehabilitation site and unaffected part of Dharampuri town is supplied water at 70 lpcd, and remaining 20% at 40 lpcd, to calculate total water demand as 2 MLD. Notably, the 20% extra provisioning mandatory vide Annex 3.1-H, is not made at this site, despite the Technical Sanctions having a provision of 20 Halaos at Dharampuri R&R site vide Technical Sanction TS No. 247 dated 20.01.2005 (Annex 3.1-Q), as well as overlooking the fact that the 30-bedded hospital at Dharampuri will exert Institutional demand.

It is noteworthy that even if the entire original village of Dharampuri were given water supply @70 lpcd, the supplies would not have exceeded [19624 (present total population of Dharampuri in year 2005) *70]= 1.374 MLD. Yet the water demand at Dharampuri has been assessed as 2 MLD (Annex 3.1-P), and infrastructure designed accordingly. Thus supply calculations were inflated considerably, resulting in very large estimates and hugely costlier water supply scheme.

252. Such gross anomalies and blatant violations of prescribed directives having huge financial implications went unnoticed/were overlooked by the competent authority when approving the Technical Sanctions. Equally serious is the role of Engineers who proposed schemes with arbitrary calculations and managed to get approvals in gross violation to the prescribed directives. And all of this resulted in massive infrastructure, and huge lock-up of capital at some sites.

253. It is noteworthy that this huge provisioning and lock-up of capital was made without ascertaining if the R&R site at which provisioning was being made had enough water yields to justify usage of the huge infrastructure. Resistivity Surveys that may indicate the amount of water yields possible at a site were undertaken after the Technical Sanctions based on inflated demands in some cases were approved and money was thus sanctioned. In fact, in some cases Resistivity survey was conducted after the works got already executed or started. Thus huge risks were taken up on public money, with hardly any accountability observed with respect to spendings.

3.1.4.2. Planning and Design Failure in Making Provision of Adequate Drinking Water for the Livestock

254. Provision of drinking water for the Livestock has tremendous implications in the rural context where the livestock sustains the daily average human life, and like humans, need assured drinking and washes. While water supplies for human usage are scarce, the water shortages have huge impact on animals in terms of disease and reduced productivity, putting the livestock owners into deep inconvenience with regard to making arrangements for their domesticated animals

255. The criteria for providing halaos to fulfil the water demand of Livestock has been compromised and thoroughly diluted officially vide the letter of the Chief Engineer (PWD), NVDA No. 377/NVDA/PHE/2003 dated 30/05/2003 (Annex 3.1- H), arbitrarily diluting the NWDT criteria of 1 Halao per 50 families to 1 Halao per 500 population (ie, 100 families). The reason and logic behind such gross dilution and blatant violation of NWDT Award is not known.

256. But, in practice, even the criteria set by NVDA itself, has been violated by not having even a single halao at as many as 28 of the 88 R&R sites as elaborated in Chapter 1. Such violations ought to have invited official action, yet nothing in the records suggest any reprimands or corrective actions initiated in this regard.

257. Thus making provision of drinking water for the Livestock was not accorded the priority it deserved, and minimum arrangements for drinking water for livestock even as per the NWDT Award/letter of the Chief Engineer, NVDA, were not ensured, despite the huge water supply infrastructure created for water supplies over and above the provisions of the NWDT Award.

258. This has been a huge Planning lapse, more so because lives of oustees are intractably linked with livestock, which remains the lifeline for the rural oustees.

259. What is even worse is that despite Technical Sanctions, PHE, NVDA did not construct Halaos, and the money allocated was used elsewhere as no deviations have been reported. This very significant lapse/misappropriation has been discussed in details in a separate section.

260. The domesticated animals have been at the receiving end even in cases where 13 R&R sites are being provided water through water tankers, and yet these water tankers do not fill the halaos (Annex 3.1-F, Point No. 9 in response to query vide Annex 3.1-R, Point No 9) caring a damn about the minimum needs of the livestock and welfare of their owners.

261. What is even more disappointing is the fact that the entire water supply infrastructure created has been designed mostly to take care of drinking water needs of humans. Thus, the criterion for adopting piped water supplies was solely based on human population (number of families), and Livestock population was not even considered a decisive factor. There has been absolutely no effort on part of NVDA to even assess the livestock populations that would need water.

262. It may be noted that water supply schemes require apriory assessment of human population and on similar lines of the livestock population, the latter was completely given a miss even when these numbers were required not only to assess water demands but also to estimate charnoi bhoomi sizes. Thus, the demand of water for Livestock took a complete neglect even in the planning criterions, despite the fact that livestock demand for water may be as large and comparable to humans in the rural context. Thus, no surveys were deemed essential to find out the population distribution of livestock amongst the oustees originating from various villages under submergence.

263. This implies that the drinking water demand for livestock (which is often significant in the rural context) has not been explicitly a design parameter!, and no assessments on demand of livestock have been seen at any of the R&R sites.

264. Even the letter of the Chief Engineer (PWD), NVDA vide 377/NVDA/PHE/2003, Bhopal, dated 30/05/2003 (Annex 3.1-H), provides a provision of a mere 20% extra over and above the demand by human population (70 lpcd), implying a provision of 14 lpcd for "Other uses".

265. However, when one peruses the various documents as approved by the competent authority and mentioned specifically in the Water supply schemes of R&R sites (only a few of these water supply schemes were made available in the documents submitted) as parts of their Technical Sanctions, it is observed that the "Other Works" comprise either of the following:

A. Institutional water needs of "Government Institutions like Schools, Post Office, Dispensary, Panchayat Bhawan, Society, Anganwadi etc will also require water so 20% additional is made with per capita" in several cases like Khujawan (Annex 3.1-S), Anjad Barda, Moreghadi, Bolai III etc.

B. Need for Livestock ("Apart from it (water @70 lpcd) adequate water for the live stock is also required") in other cases like Kathora (Annex 3.1-T), Nimbola, Umda, Ekalwara etc., without assessing the actual quantum of need of livestock.

266. Thus, 20% extra for "Other Works" meant either the Institutional water demand at some R&R sites, and demand for Livestock at some other R&R sites.

267. This implies that at several sites like Khujawan, Anjad Barda, Moreghadi, Borlai III etc., there was no provision for Livestock demand whatsoever in the water supply infrastructure constructed.

268. At other sites such as Kathora, Nimbola, Umda, etc., Livestock demand has been approximated within 20%, implying a maximum of 14 lpcd. However, this appears petty and insignificant considering that livestock need large quantities of water.

269. It may be noted that the demand of water for the livestock is usually very large. Washing of the animal sheds as well as bathing needs of the animals add upon to the large drinking requirement. For buffaloes this may even be higher as they not only drink more water, but also need water to cool them ("*Generally, buffaloes require more water than cattle under the same circumstances and should have access to clean cool water and libitum. A restricted water intake leads to a decrease in dry matter intake and thus affects milk production and growth negatively*" - Animal Husbandry, Tamil Nadu Agricultural University, Coimbatore, Available online: http://www.agritech.tnau.ac.in/animal_husbandry/animhus_buffalo%20feeding.html).

270. While the water requirement of foreign breeds of cows is very large (upto 180 litres/day), for the Indian Cows and Buffalos, experts like Dr PA Deore suggest for 20 animal size (10 cows+10 buffaloes), a minimum of 2000 litres of water requirement exists (Vet Helpline India (P) Ltd: Available Online: http://www.vethelplineindia.co.in/starting-a-dairy-farm-india/) ie, water @100 litres per cowhead, a demand that exceeds the water demand by humans. It is very likely that the current water supply infrastructure is not designed for supplying water to fill halaos at the above rate of 100 l per cowhead or even a fraction of it. Thus, in reality adequate provisioning has not been made for drinking and bathing needs of cattle at the R&R sites, not to forget the massive under-provisioning in the numbers of halaos provided.

271. Thus, actually provisioning of halao structures has been a farce as these cannot be filled through the current piped water schemes, which have not been designed to fulfil the livestock demand. A mere 14 lpcd of provisioning (20% extra for other works), is completely insufficient to fulfil Institutional needs as well as Halaos.

272. This has been a major planning lapse. When the R&R sites are habitated there does not arise any chance that water will suffice to fill up the halaos in the requisite quantities. Non-provisioning of Halaos at as many as 28 R&R sites, and massive under-provisioing of halaos at other sites as evident from Table 1.3 further illustrates the low priority allocated to welfare of Livestock.

273. At the R&R sites, a wide majority of halaos were often seen lying dry and defunct. It was not just a matter of missing inlet connections. Dry and defunct halaos are actually reflective of the fact that the water supply schemes, as a matter of planning, are not actually designed to cater to the demands of Livestock, and if it is attempted to use the halaos at their full demand, extremely severe water crisis is likely to occur at most sites.

274. Water scarcity takes its toll on humans who may manage by arranging water from tankers, from far-fetched Handpumps, and from private Narmada agricultural lines, but the plight of the animals is difficult to fathom. In the rural context, absence of working halaos spells havoc for inhabitants who have to walk miles along with their domesticated animals each day to make drinking water available to them. *The single factor of absence of water for livestock may in due course of time become one of the major disincentives to keep livestock, thereby significantly affecting the lifestyles of rural inhabitants in these R&R villages, and this may result in tremendous socio-economic consequences.* This under-provisioning has been a major planning lapse on part of NVDA.

3.1.4.3. Planning and Design Failure in Making Provision of Institutional Demand at some sites

275. A related aspect has been the non-provisioning of Institutional demands at several sites. Thus, at sites like Kathora, Nimbola, Umda, Ekalwara etc, no provisioning has been made in the water supply schemes for Institutional demand.

276. Even if one arbitrary assumes the extra 20% for other works to be fulfilling both the livestock demand as well as Institutional demand, then this provision of 14 lpcd appears rather too insignificant.

277. Thus, civic amenities like Schools, Post Office, Dispensary, Panchayat Bhawan, Society, Anganwadi etc. may face water crisis at several sites.

278. Fulfilment of Institutional demands as well as demand by Livestock will tend to actually cut down and dilute the overall water demand at most R&R sites, resulting in water scarcity.

279. However, there exists yet another factor that actually stands unaccounted in the Planning of water supply schemes: the technical losses, which will further constrict water availabilities including the Institutional and Livestock water demands.

3.1.4.4. Planning and Design Failure in Accounting for water losses in Distribution Networks

280. Amazingly, the provision for distribution losses that occur even in the best of the distribution systems world-over, have not been accounted for anywhere in the designs. While the letter of the Chief Engineer (PWD), NVDA vide 377/NVDA/PHE/2003, Bhopal, dated 30/05/2003 (Annex 3.1-H), defining the calculation of Water Demands is silent over the issue, the successive Water Supply Schemes that were part of the Technical Sanction, have all chosen to ignore the losses that are often very large.

281. It may also be noted that in Indian water supply schemes, in reality it is common to have more than 40-50% of distribution losses.

282. Even the Ministry of Drinking Water and Sanitation, Government of India, in its "Operation and Maintenance Manual for Rural water Supplies" (2013), puts the figures for losses of water in pipelines, valves, public taps, unauthorised service connections etc. in the range 30-55%. Yet, water supplies have been planned and designed overlooking such massive losses, implying that in reality R&R inhabitants will get only 31.5- 49 lpcd after accounting for water losses, and this water availability will need to satisfy the demands of Livestock as well as demand from Institutional Civic amenities like Schools, Health centres and Anganwadis.

283. Other important GoI documents indicate similar range of losses. The Manual on Operation and Maintenance of Water Supply Systems, CPHEEO, Ministry of Urban Development, GoI, 2005 is explicit: "Several pilot studies conducted in the country have shown water losses in the distribution systems to be of the order of 20 to 50% of the total flow in the systems", indicating that with a water supply provisioning of 70 lpcd, the expected losses in water supply will stand at 20-50% implying a net water supply of nearly 35-56 lpcd only at the consumer end.

284. In fact, considering the fact that these are rural water supply schemes, where level of maintenance is always a degree lower, the losses will be larger than normal. Add to it the fact that water quality infrastructure, even at this stage is poor with leaking cisterns, halaos etc commonly seen at R&R sites, and pilferages in the form of illegal water tapping, implies that actual losses could be on the higher side.

285. Thus, in reality, even the R&R inhabitants will not get effectively the minimum designed 70 lpcd of water at the R&R sites, forget about the needs of the livestock and the Institutional needs. The situation will only get worse as these sites become more populated. Inability to assess water demands and neglect of water losses has been a major Planning and Design lacuna in the water supply schemes at R&R sites which contributes to water inadequacies.

Table 3.1.5. Water Availability and Adequacy: Case of some R&R Sites

R&R site	Water Availability
Beganda	Severe water problem exists at this site. Overhead Tank (OHT) or Tubewells (TWs) are not provided at this site which may act as water source for filling the cistern provided. Inspection team was told that water from Khalkhurd OHT may be used for filling cistern. But OHT at Khalkhurd itself was found dysfunctional. Hence cistern, as well as, nearby halao also remain dry. Animals have no drinking water facility, while humans depend on Handpumps (HPs). HPs have little water - become dry in summers when water is needed most. Tankers do not supply water here. Water often got in buckets from Private Wells of farmers, free or after making payments.
Bhawariya Kukshi	No OHT exists here. A Tubewell exists, but the pumps are not present. Thus, there is no way to fill the cisterns. Out of two cisterns, one was found lying abandoned while the other was dry. No halao has been constructed, so animals have no facility to look for. Dependence on Handpumps as no supply is made here by tankers.
Bhilsur Kukshi	Here also no Overhead Tank exists. There is no Tubewell also. Hence the Cistern provided lies unused and dry. No supply by tankers is made. No halaos have been constructed to supply water for livestock.
Rekti	Severe water crisis exists at this Site. There is no Overhead Tank. Also no tubewells are provided, although a pumphouse exists here, which had no pumps and was empty. 3 out of 4 Handpumps did not have water during site visit. Tankers also do not provide water here. A halao has been constructed but has no water connection, and lies dry and deserted. So there is problem for the Livestock. Only 1 Handpump works - difficult to get water for Humans and Livestock. Cattle get some water from a private halao filled by a farmer by pumping from well
Panya	No OHT at this site. I TW works but motor burns are very common, and unauthorised tapping of water is common. Of the 3 cisterns , 2 were defunct , and 1 had massive leakage. Out of 3 Handpumps, 2 were defunct and had no water.
Chakeri	No OHT Exits here. 1 tubewell is provided, but it does not work as there is no water. 2 Cisterns therefore lie abandoned and were dry. Out of 3 Handpumps, one does not work as it has no water, so dependence is on just 2 Handpumps in a hilly terrain which compels women to carry water load on head for large distances.

Chilkalda	No pumphouses have been made here and no rising main exists to carry water. Yet, without any water source, a large (280 KL) Overhead Tank has been provided, that too without any sumpwell! The OHT lies defunct & dry. Despite dry OHT, and no water available, distribution system of more than 10 kms length has been provided in patches for the houses! No cisterns have been placed here, and No tankers supply to this site. Dependence is on Handpumps. No Halaos were found constructed for Livestock, so their water needs are left unplanned.
Kadmal	Massive wastage of infrastructure and investments made (Plate 3.1.46). Overhead Tank (120 KL OHT and 24 kl sumps) is built here, but lies unused- No valves, no pumps, and no panels were found. The Tubewell constructed here also lies defunct / dysfunctional. Pipelines have been stolen in patches. Hence, all 4 cisterns installed also were dry. No supply by tankers is made.
Jalkoti	At this site there is no tubewell, and no Overhead Tank. One Cistern is installed with GI line, but it lies dry and defunct. No tankers supply water here. Dependence is on two Handpumps, but of them one did not have any water
Musapura	At this site, No Tubewell or Overhead Tanks exist. There are 2 cisterns with GI pipeline, both lie defunct, dry and abandoned. No water supply takes place by tankers. Reliance only on one Handpump provided.
Jalanpur Dhalkheda	No OHT exists. Tubewell has inadequate yield in summers when Cisterns runs dry. Dependence mostly on private Narmada Line to Agricultural fields for which payments need to be made, which at least the poor can't afford easily (upto Rs 200 /- per month as told by residents). Animals have to be taken to River Narmada 1.5-2 kms away.
Khajuri Jhabua	Neither the Overhead Tank, nor the Tubewells exist. One Cistern has been placed which lies dry in the absence of water source
Umda Alirajpur	Overhead Tank does not exist, nor does any Tubewell exist. A Cistern has been placed which lies dry. Dependence is solely on 2 Handpumps provided at the site.
Dehar	Here there is no Overhead Tank, and no tubewell either. The 2 Cisterns with GI pipeline claimed to have been installed were both found missing.
Kasrawad	OHT had no pumps, so was not in use. Out of the 3 Tubewells none was under use. A special line has been laid from the River Narmada. The Narmada Pipe line (Mild Steel) of 2.575 Kms (MB 49,67) has been laid "for future planning". Hence despite massive infrastructure, and future planning reliance is on Handpumps. Cisterns lie unused, and 5 halaos constructed also lie dry and defunct.

Bhamta Jangarwa	No Overhead Tank exists here, and there is no tubewell either. The 2 Cisterns lie dry and useless, and the halao was also defunct and dry.
Bhawati-II	No Tubewells or Overhead Tank exist here. A RCC Cistern has been constructed, but no connections exist, and lie dry. Missing connections imply halaos are dry depriving livestock drinking water
Amlali	No Tubewell or Overhead Tanks exist. Hence the Cistern with GI Pipeline lies defunct. No halao has been constructed here for the livestock.
Gawla I	No Overhead tank exists here. Tubewell supplies inadequate water with limited seasonal availability. Cistern with GI Line lies defunct and abandoned. Out of the 2 Handpumps, one did not have water. Dependence on alternate day supply by water tankers - Not a sustainable solution to water crisis.
Saita	No Overhead Tank and tubewell exist. 2 handpumps are provided, but both were found dry and non-working. 2 Cisterns and halaos had no water source for filling, and lie dry & defunct.
Tawlai Khurd	No OHT exists here. I Tubewell exists , but was not under working condition and appeared defunct as there were no pump-motors and Electrical Panels found. It was told that water yields have gone down. Yet, next to the tubewell, water intensive brick making was seen (Plate 3.1.47) on large scale (It takes approximately 600L of water to produce 1000 bricks), taking water from a nearby well. This excessive drawl from private well itself may just be responsible for no water availability in Tubewell. As a result of defunct TW, cisterns had become defunct. Cisterns were not even found on the platform structures made to house the cisterns. Two Handpimps had no water, while one appeared to have very less yield, and may at best be seasonal. Dependence was mostly on one handpump for the entire site. No water tankers supply water here. Some water is tapped illegally from air valve of private Narmada Line brought by farmers. A source of conflict.
Khedi	Major water supply crisis existed at this site, despite site having as many as 3 Overhead Tanks, and a dedicated 4.5 Kms pipeline from River Narmada. No Pumps and Electrical Panels were found installed in Pumphouse, and hence 30KL OHT was defunct. It may be noted that a specially laid 4.5 Kms long PVC Narmada pressure Pipeline (MB No. 223) ought to be delivering water to this OHT. At the time of visit, second OHT (40 KL) was lying defunct for very long due to pending repair work of a sluice valve. Local residents complained that the OHT has almost never been working. The 3rd OHT (50 KL) was operational and supplied only to a part of the site. Most Cisterns were found defunct, some had plumbing problems including missing taps. Others were dry as a result of defunct OHTs. Reliance was on Handpumps. Despite massive infrastructure, supply by tankers had to be resorted to - Not a sustainable solution to water crisis.

Nalvai: Water being transported by a bullock Cart from an Agricultural Tubewell as pump was out of order.

Sirsani: Water for human use transported on bullock Carts, but animals themselves have little facility

Plate 3.1.44. Water Crisis Management by locals (Typical).....cont..

Golata

Chakeri: Reliance only on 2 working Handpumps in a hilly terrain which implies women have to carry water load on head for large distances (The tubewell and 2 cisterns lie defunct, a handpump also had no water)

Kathora

Plate 3.1.44. Water Crisis Management by locals (Typical)

Deteriorating infrastructure, typical of most R&R sites.

Plate 3.1.45. Status of Water Supply infrastructure at Dharampuri (Typical)

Plate 3.1.46. The State of Infrastructure at Kadmal (Typical)

Plate 3.1.47. Tawlai Khurd: Brick making next to public TW, making it defunct (Typical)

3.1.5. Major Procedural, Planning, Design, and Operational Flaws: The Root causes for Unsatisfactory Services

Having examined the status of Water Quality related aspects and the status of the Infrastructure Created at R&R sites, and from a synthesis of field observations and the Records submitted by NVDA, the following noteworthy issues emerge:

3.1.5.1. Duplicity with regard to provisioning of Cattle Troughs: Non-Construction of Halaos despite Technical Sanctions and disappearance of resultant Savings

286. Ensuring safe and adequate drinking water supplies to Human inhabitants and their Livestock was the responsibility of the PHE division of NVDA.

287. To meet the water demand of the Livestock, the water supply infrastructure in place was to be merely extended to connect to Halaos. This very significant extension of services in terms of its importance was therefore technically a minor and essentially a low-cost extension of services.

288. Yet, if the numbers of Halaos constructed at various R&R sites are examined (Table 1.3), there is a massive shortfall in the construction of halaos with only 145 Halaos constructed as against the required 570 halaos, and no halaos (implying no drinking water arrangements for livestock) at as many 28 R&R sites.

289. In what is completely inexplicable, halaos apparently have not been constructed by PHE, NVDA at any of the R&R sites. This despite provisioning, Technical Sanctions and money allocation specifically in the name of Cattle trough/halao construction at R&R sites.

290. The case of Cattle Troughs is thus extremely bizarre. While on field the PHE Division does not appear to have constructed halaos for taking care of drinking water needs of the Livestock and it is the PWD Division of NVDA which has probably gone ahead to construct halaos, in reality Technical Sanctions were obtained by PHE, NVDA also to construct Halaos.

291. Thus, against the same Administrative Approval, the Technical Sanctions were separately obtained by the PWD and PHED Divisions of NVDA for Cattle troughs at large number of R&R sites. Not just were the Technical Sanctions for Halaos taken separately by the two divisions, these sanctions were obtained for different

Halao numbers for the same R&R site, and with cost Estimates which were very different despite the fact that both Divisions were employing the same Schedule of Rates (SOR) to prepare Estimates. This fact in itself is reflective of the adhocness with which Estimates were prepared by Engineers and amenities of standard dimensions were planned by the Planners. Government Estimates for the same amenity (per unit of cattle trough) at the same site, calculated on basis of the same SOR, cannot be ideally swinging wildly. Yet, facts point out to the contrary.

292. To illustrate by way of a few examples, barely expressive of a much larger numbers of cases:

- At Ganpur (Manawar) Technical Sanctions were taken for cattle troughs 6 numbers @12000/- vide TS No 256 dated 6.8.2005 (Annex 2.7-I). Surprisingly, for the PWD Division of NVDA, the Additional Direction (Rehab)/SE, NVDA, Indore also accorded the Technical Sanction, but for 4 numbers of cattle troughs @16500/- each (Annex 2.7-J). The latter 4 cattle troughs sanctioned by the PWD Division seem to have been actually constructed by EE, PWD, NVDA, whereas those 6 troughs approved by PHED were ostensibly never constructed as only 4 cattle troughs were found at the site during the site visits.

- At Kavathi, 3 Nos of Cattle Troughs @ Rs 12000/- each had approval of PHE, NVDA vide TS no. 118 dated 24/12/2001. For the same R&R site, PWD, NVDA obtained Technical Sanction for 2 Troughs @ Rs 10200/- each vide letter of Additional Director (Rehabilitation), NVDA, letter No. 2252/R-64, Indore dated 24/10/2002 (SER No. 42/2002-2003), and 2 more troughs vide CE SER No. 6/05-06. The latter 4 cattle troughs were constructed by PWD, NVDA, whereas 3 Cattle troughs sanctioned by PHE, NVDA never came up.

- Similarly, for the Kadmal R&R site the TS was accorded vide No 250 dated 06.08.2005 wherein provision for cattle trough was made 6 nos. @12000/- each by the PHE, NVDA. Again, for the PWD Division TS was accorded vide letter 2252/R-64 dated 24/10/2002 and SER No. 42/2002-2003 for 2 cattle troughs @Rs 10200/- each. In reality, only 2 of the latter troughs were found constructed at the site, and the fate of approved halaos by PHE, NVDA is not known.

293. Thus, large numbers of Halaos were approved vide the respective Technical Sanctions by the PHED, and subsequent to the financial allocation, these were never constructed by the PHE division of NVDA.

294. It is not known on whose instructions, their construction was not undertaken, but what is even more serious is the fact that when these Halaos were not constructed, there should have been savings reported on the money allocated for construction of Halaos. Yet, at all places no deviations have been reported and certificates have been issue to this effect by the PHE Division of NVDA.

295. It therefore appears that the financial allocations made in the name of constructing halaos have been diverted elsewhere, so that respective financial budgets have been shown exhausted.

296. It is therefore important to have specialized investigations as to why the approved works were not always undertaken for construction? Who ordered that sanctioned constructions were not to be carried out, and where the approved and allocated funds have been consumed as no resultant savings have been reported and no deviations are certified. Such instances are not isolated and are widely prevalent at several sites, reflecting a lack of monitoring and control and coordination of apex authorities. It also reflects possible swindling and foul play to cover up the actual deviations, and it is recommended that such malpractices and possibilities of misappropriation be investigated in details possibly by specialized agencies like CBI/Lokayukta/CAG etc.

3.1.5.2. Non-Usage of Created Infrastructure: Inconsistent supply policies

297. Despite the existence of a distribution system at 30 odd sites, there are only Seven R&R sites where water is supplied using the laid distribution system: Nisarpur I, II, III, Barda (Manawar), Barda (Anjad), Khedi, and Semalda (Annex 1-A). This water is supplied free of cost.

298. Under such situation it is natural for inhabitants of other R&R sites where distribution network exists, to ask if water distribution could be planned and made for a few sites why similar provisioning should not be made for other sites which also have distribution systems.

299. It may be noted that, while 7 R&R sites are being supplied water through the distribution network, several other sites like Borlai II, Bhilkheda, Sirsani etc. despite having capital intensive distribution network have to depend upon supplies by Water Tankers as the distribution system remains non-functional.

300. Then there are sites, where distribution networks exist but are not used and supplies are not even made by water tankers, implying a complete dependence on Handpumps supplemented by cisterns in some cases. Thus, sites like Ganpur (Narmada Nagar) having huge infrastructure in the form of a 120 KL OHT, a 24 KL sump, connection with 9 cisterns with 5 HP pumps +5 HP pumps standby, and a Distribution system laid out, still has no supplies, notwithstanding the significant habitation at the site. There are several other sites like Kukra etc., where despite significant degree of habitation and the presence of a distribution network, the supplies are neither made through the distribution network, nor through tankers.

301. It therefore appears that discriminatory practices exist with regard to water supplies at sites having distribution networks. Supplies to the consumer end are apparently being made at the whims and fancies, rather than have a consistent supply policy throughout the R&R sites. Such discriminatory practices and inconsistent policies become a major cause for complaints and dissatisfaction.

302. While inconsistent supply policies exist amongst various R&R sites, inconsistencies were witnessed sometimes at the same site. For instance, at sites like Barda (Manawar), only a limited number of houses had access to the distribution network laid, while other houses remained unconnected. Thus access to water supplies was not guaranteed for all houses despite the existence of water distribution system at the site.

303. Giving benefits to chosen R&R sites, to the exclusion of a wide majority of sites, or to certain individual houses to the exclusion of others, is often a cause of heartburn amongst those who are the "Not Haves". Such policies are clearly discriminatory as there needs to be consistency and equity in provisioning of various facilities to the inhabitants of various R&R sites. The inconsistent policies are likely to breed nothing but ill-will, and a sense of injustice amongst those who are deprived of the special considerations compared to those who have special privileges.

304. It is also noteworthy that such unacceptable practices of not using the infrastructure created may result in massive wastage and faster depreciation of infrastructure, as with time the unused distribution system will become defunct faster, as well as the tubewells etc. may face decreasing yields in the absence of regular drawls of water that leads to their development and stability. The handing over issues therefore need to be immediately resolved to put into usage an infrastructure that is liable to turn defunct as time progresses, and to stop artificial reliance on water tankers at some R&R sites despite the laid out distribution network.

3.1.5.3. Wasteful Planning: Excessively large distribution networks with tortuous Rising Mains and Superfluous Pipelines sometimes for Future Use

305. The Planning involved in the water supply layouts and in envisaging pipelines appears far from optimal, and has been sometimes clearly wasteful.

306. While it is understandable that distribution system pipes are laid along the road, even the Rising Main Pressure Pipes have been taken out mostly along the roads, when it would have often taken much shorter pipe lengths had the pipes been laid directly by employing a shorter route.

307. It may be noted that in any water distribution system, the pipe cost, along with the cost of excavation and laying is often amongst costlier items, and the present arrangement of taking rising main pressure line along the road has possibly resulted in significantly bloated capital cost of infrastructure.

308. Many times, example at Kikarwas (Plate 3.1.48), it was easily possible to lay the rising-main directly from Tubewell to Cistern. For instance, in case of Kikarwas length could have been significantly curtailed (to around 60% of the presently laid line) by laying an over-ground line with pedestal supports directly up the hillock, rather than take a tortuous route all along the road around the hillock. This would have very significantly shortened the rising main pipe length and excavation costs in a hilly terrain resulting in large capital savings.

309. In some cases if shorter routes were planned, the rising main may have had to cross the area demarcated for the plots and all that was needed in such cases was the provisioning of a dedicated corridor for maintaining the line in case of any emergency. Similar provisioning, in any case, has already been made where the natural drainage system crosses sometimes from between the plots. It was thus possible to significantly reduce the force (rising) main pipeline lengths at several sites.

310. In fact, if appropriately integrated in the initial planning stage, the plots themselves could have been cut/marked such that the water supply rising mains/ natural drainage etc. would not have needed to cross from amongst the plots. This was possible as R&R sites were entirely new developments on uninhabited lands, and appropriate planning could have ensured shortest routes for pipelines by earmarking the plots accordingly.

311. It is apparent that the Overall Planning was not cost-effectiveness oriented and was not sensitive to unnecessary and wasteful expenditures in project costs. Proper planning would have resulted in

- lesser initial capital expenditures including less cost of excavation and laying
- lesser pipe costs
- lesser losses in a shorter pipe length comprising near straight reach rather than having greater pipe length along tortuous roads, and bends along the road that further amplify the losses
- lower pump ratings and hence cheaper pump-motors
- lesser pumping costs for all times to come,
- lesser recurring electricity bills,
- lesser water leakages, and
- lesser maintenance requirements for all times to come.

312. Similarly, in several cases, it appears that the distance of Tubewell to the Overhead tank/Sumps was too large, again resulting in large initial capital expenditures, higher losses, higher pumping costs, higher electricity bills, and higher maintenance requirements. Such factors may also have resulted in increases in the overall costs of the water supply schemes. Sometimes, this could be unavoidable, but at times it appeared that little efforts were made to cut down and optimize the project costs, as has happened in case of Awalda, where resistivity surveys to determine tubewell locations were conducted later, while OHT was built first. The overall planning could have been micro in nature and more site-specific, and that possibly could have not just reduced initial costs, but also would have made the entire schemes more effective and efficient to operate.

313. To illustrate the above point, one can see Tubewell and pumphouses located on one extreme of the R&R site while OHT/sumps would be located on the other extreme. Dharamrai (Plate 3.1.49), a site virtually un-habitated, but having significant pipe network is a case in point, where the tubewell lying outside the habitated area and amongst the crop fields is so remote that a separate electricity line had to be drawn with a number of poles to provide electricity to the pumps to operate and put water into two over-ground sumps that lie at the other extreme, again outside the habitated area. Other cases include sites like Eklera where the OHT has contributing tubewells located at another R&R site Kasravad, while one of the tubewells at Eklera itself lies completely defunct and unutilized.

314. It may however, be noted that the locations of tubewells and OHTs are not always in one's hands, and NVDA appears to have tried to follow some of the basics as spelled in Annex 3.1-A. Yet, resistivity surveys could have been conducted at larger numbers of spots to evaluate the possibility of locating tubewells as near to the OHTs as possible, or by conversely locating the OHTs nearer to tube-wells, or centrally to the habitation for better distribution (assuming safe/higher strata were available)). Unfortunately, the available records indicate that in some cases, like

that of Awalda, infrastructure was first laid and executed as desired, and even the resistivity surveys took place later to determine the positioning of tubewells, so that the possibility of cost optimization was completely given a pass.

315. The case of Perkhad also illustrates how wasteful the entire planning has been in some cases. Apparently, the distribution system was laid (GI Pipeline of 1.394 Kms length MB No. 88), but the tube well on which supply was dependent failed (even initially, it just had a yield of 2 inches). The reasons for this failure are not known, but in general, capital intensive distribution systems should be laid only after ascertaining yields. Even if the failure is attributed to a latter day development such as another private tubewell nearby, it has to be assured by the authorities that such private developments are not allowed to hamper the public supplies. Instead of taking steps to assure the yield, a new Distribution system was laid. NVDA has now brought water from nearly 4.55 Kms away using a 110 mm PVC line from Narmada, deploying 10 HP pumps. This obviously has been a costly proposition, and to add more, the NVDA puts this raw water in an acquired open well (Plate 3.1.41) and has laid a new 110 mm PVC distribution network (700 m) pressure pipe line for supply (MB No 223). The new distribution system is handed over to Panchayat which charges nearly 100/- per month for each of its connections under an arrangement in which the electricity bill is still paid by NVDA, leaving one to wonder if this arrangement of paying electricity bills by NVDA is sustainable, and if Gram Panchayat will ever be able to pay this bill, when NVDA withdraws. While the efforts to provide water at sites like Perkhad may be laudable, no such efforts are made to ensure quality of water, since the water put into the open well is supplied raw (Plate 3.1.41).

316. Then, there have been a number of instances of wasteful investments made in creating superfluous infrastructure, resulting in unnecessary lock-up of precious capital that could have been more prudently utilized instead for strengthening the infrastructure already created.

317. Thus for instance, at Mohipura, a PVC Pipe 110 mm diameter, 2 Kms length has been laid (MB No 208) to bring Narmada water by pumping water by a 10 HP Mono Block Pump to a site where no OHT and no piped distribution network to supply this water exists, and the Cistern is supplied water from a tubewell. Similarly at Nalvai (MB 188 AND 191), a line has been laid to bring Narmada water by a 110 mm PVC Pipe of length 3.01 kms, by pumping water by a 15 HP Mono Block Pump, yet there is no OHT and no distribution network at this site. Again, at Chakeri, (MB No 188, 191) a line has been laid to bring Narmada water by a 110 mm PVC Pipe of length as much as 8.012 kms , by pumping water by a 15 HP Mono Block Pump, and yet again there is no OHT and no distribution network at this site.

318. It is difficult to fathom as to why there is no provision to utilize such pipelines and investment made for purposes of supplying water to the R&R site through a piped system even when water supply crisis exist at some of such sites? In such cases, it has been claimed by NVDA that these piped water supplies are not being used for drinking water supplies (Annex 3.1-F, Point No 3) (although in reality at sites like Perkhad it is being employed for drinking water supplies) despite the huge capital expenditures incurred, and despite massive drinking water shortages at some of the R&R sites like Chakeri. At Chakeri, the only tubewell provided does not work as it has become dry and defunct, and hence 2 Cisterns provided lie abandoned and were found dry during site inspection. Out of 3 Handpumps at Chakeri, one does not work as it has no water, so dependence is on just 2 Handpumps in a hilly terrain which compels women to carry water load on head for large distances. It is noteworthy that as per the National Water Policy, 2002 as well as the National Water Policy, 2012 of the GoI, safe drinking water is to be always accorded the first priority. Thus, capital expenditures made on laying pipelines do not seem justified till safe drinking water is made available in adequate quantities to the PAFs at sites like Chakeri.

319. Similarly, huge expenses have been incurred in bringing raw water from River Narmada at sites like Khedi, where, as per MB No. 223, a PVC line of 100 mm diameter and 4.5 Kms length has been laid from River Narmada to OHT with excavations ranging from 0.5 m to 0.93 m below ground, even as the 30 KL OHT to which this water is brought has apparently never operated. Again, at Dharampuri an extra Pump house was found housing no motors and no electrical panels. Such instances of unused infrastructure are aplenty.

320. The case of Kasravad, Barwani is yet another example illustrative of wasteful expenditures made. As per MBs 49 and 67, a Mild Steel line 200 mm diameter of length 2575.11 m has been laid as pressure line "for future planning" (Annex 3.1-U) . This Narmada Pipe line includes capital expenses incurred in making pumping arrangements and expenses including excavation (0.7m -1.0m) below earth as per NVDA. This at a site which has 14 successful Handpumps and 3 Tubewells, which are still not utilized because of lack of demand. Thus, laying extra pipelines for bringing raw Narmada water "for future planning" at such sites which already have ample provisioning does not justify the expenditures locked up.

321. It is also noteworthy that such provisioning "for future planning" is in absolute violation of the directive of the Chief Engineer (PWD), NVDA vide 403/NVDA/PHE/2003, Bhopal dated 09/06/2003 (Annex 3.1-N) directing that all schemes be designed as per the present Populations of the sites.

322. It is not understandable as to why investments have been made in the name of "future planning" and into creating infrastructure that lies unutilized. Such arbitrariness in Planning is entirely unjustified, and those responsible for wasting resources need to be held accountable for utilizing the public expenditures in wasteful manner.

323. Such instances reinforce the assertion that on one hand no worthwhile efforts were made to curtail the infrastructure costs by appropriately choosing shorter pipe lengths and by not always making sure that sufficient yields were present to justify the capital expenditure before executing large and costly networks. On the other hand, superfluous infrastructure has been created that lies unused, and sometimes labelled as made "for future use".

324. This team is limited in its scope to investigate such matters any further, but it is suggested that detailed inquiries on the scope of misappropriation, if any, and the loss of public money be duly investigated by a specialized agency. While sub-optimality of the distribution network will always be difficult to establish, such cases, especially where Narmada pressure Pipelines have been constructed and which lie completely unused and unutilized, and where raw water has been brought but no provisions for supply after treatment exists even when drinking water is scarce, and where lines have been laid in the name of future planning, need to be investigated by a specialized agency such as the CAG, CBI or Lokayukta etc. for possible misappropriation of finances and irresponsibility in utilization of public money.

325. In the above context, the information on award of distribution network design works to private consultants, the eligibility of consultants, their previous relevant work experience, and the possibility of piece-meal award of design work to consultants of choice on a site to site basis rather than appointing consultants of repute chosen through proper process of Technical and Financial bidding in response to an Expression of Interest for design of distribution systems under the combined R&R works, the vetting process followed by NVDA to approve the distribution system designs etc are some other aspects that need to be probed by a specialized agency such as the CBI/Lokayukta/CAG etc.

326. Also, the criteria used for execution of rising mains from tubewells to cisterns/OHTs including the use of arbitrary pipe sizes and of pumps and motors of specific capacity at each tubewell, all apparently carried out without any designs (no such designs were found available in the records submitted) needs to be probed and responsible officers need to be made accountable for carrying out execution without designs, and for being grossly careless in spending public money.

Kikarwas

The pipeline does not go directly up the slope over the hillock following a short path to save upon the pipe cost and the pumping cost (as losses are proportional to the pipe length), but the pipeline follows the path along the road, going around the hillock, following a gentle gradient needed for the vehicles to ply on road, but not required for the force-main pipeline.

Kikarwas: Pressure pipeline laid from tubewell (bottom Blue mark-at the bottom of hillock) to Cistern (Top Right Blue Mark- on Hillock top). The yellow pipeline as laid goes around the hillock, along the road to reach Cistern. The dashed (broken) yellow line from tubewell to Cistern over the hillock could have saved a lot of capital expenditure, and with curtailed length (no more than 60% of the presently laid line) could have resulted in lesser losses, lesser pumping costs, lesser electricity bills and lesser maintenance.

Plate 3.1.48. The Case of Kikarwas: Excessively costly water supply scheme?

Dharamrai: The remote located tube-well (bottom Blue mark) (note the large distance from the nearest rectangular plot area-the pumphouse lies in crop fields far away from intended habitation) pumps water all the way up to the two sumps (two blue marks on top of imagery) located on another extreme end of the R&R site again outside the plot area, through pipelines laid along the roads of the central area (Red mark at centre) where buildings are located.

Dharamrai: Tubewell, pumphouse (bottom), the buildings (right top), and the far away two over-ground sumps (extreme right top dots). Huge distances for which water needs to be pumped, crossing entire site and even more as the tube-well lies in the crop fields outside the rehabilitation area.

Separate electric line laid for pumphouse.

Huge Pipeline network for sumps

Plate 3.1.49. The Case of Dharamrai: Disproportionate and Excessively costly scheme?

3.1.5.4. A Note on Resistivity Surveys and Wasteful Planning

327. There have been instances where the planning has been so adhoc that cart has been put up before the horse quite literally in some cases. Though this may not have occurred at all sites, yet it speaks volumes about the planning of water supply schemes. The case of Awalda illustrates such a planning lapse.

328. At Awalda, a 100 KL RCC OHT with a 20 KL Sump-well and a pump-house, were constructed vide work order number 205 dated 16/02/2005, and the work got completed on 15/08/2005 after time extension (MB Number 115) (Annex 3.1-V).

329. Simultaneously another costly system, the distribution system work (PVC Pipe network exceeding 11 kms in length) was started vide work order no. 1248 dated 20/10/2005. This work was to be completed by 01/05/2006 (MB Number 184,185) (Annex 3.1-V).

330. Thus, capital intensive infrastructure was planned and investments were made in construction work of an overhead tank of capacity of 100 KL, a sump-well of 20KL capacity, a Pump House for housing the pumps, and a distribution system of length 11.198 kms based on the demand for water.

331. What is shocking is that the above massive investments were all made without even trying to explore if enough water yields were possibly present to pump water to the sump-well in order to fill the OHT of constructed size and use the distribution system as envisaged!

332. The Resistivity surveys that may give an idea of possible yields were undertaken at Awalda only on 29/04/2006 (Annex 3.1-V), when OHT, sump-well, pump house were all already constructed, and the distribution system work was underway.

333. Such mindless Planning and execution appears completely arbitrary, and amounts to taking questionable and very objectionable large risk with respect to public money. Such irresponsibility should have invited departmental enquiries and actions, but appear to have gone unnoticed due to poor coordination and lack of monitoring by senior officers.

334. In part, such planning flaws may also explain as to why despite massive investments and construction of water supply services, adequate water has not been guaranteed at several R&R sites.

335. Thus in cases like Awalda, even if yields were met by chance, the fact remains that OHT location was finalized without even knowing as to where a possible tubewell may come up later, and if so, whether it will have the required yield. It was not

even thought necessary to first know the tubewell location and yields, and then choose an OHT location (along with other parameters) so that pressure pipeline length and cost of pumping would get minimised. Such poor planning may have resulted in very significant Capital expenditure increases by way of large distance of tubewell and OHT (for Awalda this length was 526 m as per MB no. 107) entailing large pipeline lengths and sometimes higher capacity pumps and motors, and would also result in higher operation and maintenance costs for all times to come.

3.1.5.5. Absurd Planning: Construction of Infrastructure based on theoretical Demand without ascertaining water Yields- Public Investments subject to Huge Risk.

336. In what construes as another typical example of absurd planning, in some cases, theoretical demands were assessed at 70 lpcd, with 20% extra for "Other Works", and accordingly Technical Sanctions were obtained by PHE, NVDA. Subsequently the capital intensive works like OHT and laying of distribution system were taken up. Thus, infrastructure was designed based on theoretical Demand at the R&R site.

337. Design and execution of such infrastructure required massive investments of public money, which were duly made.

338. Yet, for supplies to be effected at the site, there needs to be assured water quantities available at the site. Thus, yield has to be ensured before making investments in constructing the infrastructure. This yield/ water availability was not ensured beforehand in several cases, and was explored subsequent to construction of capital intensive infrastructure such as OHT and Distribution system.

339. Thus expenditures on building the infrastructure were made taking a huge and undue risk on public spendings.

340. The case of R&R site at Kadmal is illustrative of such typical absurd planning that took place.

341. At Kadmal, As per MB No. 108, Laying and Jointing of ACP Pipeline has been undertaken vide Agreement No 9/06-07, and work was to be executed against the Work Order No. 615 dated 17/04/06 (Annex 3.1-W). Similarly, construction of 120 KL Overhead Tank and the associated sumpwell vide Agreement No. 17/2006-07 with Work Order No. 1009 dated 03/06/2006 was undertaken. The OHT work was to start on 08/07/2006 and was to be completed in 3 months (Annex 3.1-W).

342. As against the work of Pipeline and OHT, the Drilling of tubewells at Kadmal was taken up much later vide Agreement No. 08/2008-09 with Work Order No. 1259 dated 014/10/2008 and 1323 dated 20/10/2008 (Annex 3.1-W), ie, at difference of more than 2 years from release of work orders for OHT and pipelines. This latter work of tubewell drilling included carrying out the Resistivity survey work also.

343. Thus, at places like Kadmal, the capital intensive infrastructure such as OHT and pipeline came up first, completely based on theoretical demand, when water yields were unknown and which would have become known only after execution of Tubewells.

344. Hence, instead of assessing theoretical demands first and then meeting these demands by drilling tubewells with required yields and only then subsequently constructing the OHTs and pipelines, an extraordinary sequence was followed: OHTs etc were first built, and then efforts made to find out if the OHT can be filled at all.

345. In such cases there was no question of locating the OHT optimally and in near vicinity of tubewells so that pumping costs and costs of Rising Mains could be minimised, as the location of tubewells with required yields was not in one's hands. Thus, PHE, NVDA did not make efforts to optimize costs in such cases and achieve reductions in public spendings.

346. Not just that the Infrastructure created has become hugely sub-optimal with respect to cost in such cases, but also the Planners and Engineers took huge undue risks with respect to public money spent on creating infrastructure without ascertaining if there was enough water available to fill up the OHT etc.. Ultimately, this may be one of the factors manifesting in water crisis at a number of R&R sites, despite the presence of large-scale infrastructure at these sites.

347. Such brazen carelessness and unprofessionalism in making public expenditures needs to be appropriately reprimanded. All responsible officers in such cases need to be made aptly accountable.

3.1.5.6. Planning Failure in Utilizing Failed Borewells: Lost Opportunity and Violation of mandatory Directives

348. A very large number of Borewells (258 borewells at all the sites) have been unsuccessful at the time of initial installation. Thus, for nearly every 2 successful borewells almost 1 borewell has failed at the initial stage only (Table 3.1.6).

349. Some failures of the borewells are indeed expected, but at some sites the failure rate was large. Table 3.1.7 illustrates some of these cases. At Khalkhurd, Nisarpur III, Barda etc, the numbers of failed borewells have been 2 to 3 times the number of successful bores.

350. Such failure rates despite the carrying out of resistivity surveys at the sites, are reflective of the possible poor qualities and reliabilities of resistivity surveys carried out.

351. Except for a few places like Eklera, the failed borewells were mostly seen left abandoned.

352. This was in violation to the directive of the Chief Engineer, PHED, क्रमांक 2583/ भू जल संवर्धन /प्र0अ0/ लो0स्वा0यो0/भोपाल,दिनांक 04.04.2005 (Annex 3.1-X) clearly stating that the numbers of non-useful Handpumps (HPs) after 30th June 2005 should be Zero. In accordance with the above letter, the failed HPs (as also those handpumps that did not supply adequate water) had to be actually disassembled and utilized for groundwater recharging.

353. Such mandatory recharging may actually have alleviated problem of drinking water, by helping the groundwater levels go up for other HPs and Tubewells.

354. This rather serious violation took place overlooking the contents of the letter that ordered strict mandatory adherence, violation of which was to be met with action against the erring officers. Unfortunately, the directive as well as the direction to take action in case the directive were both violated, as no action against the erring staff appears to have been reported as per the records submitted.

355. Thus, an opportunity to utilize the wasted borewells as precious resources to recharge groundwaters has been conveniently been frittered away. It may be noted that recharging groundwaters may have significantly made a difference by transforming the seasonal HPs to perennial ones at R&R sites.

356. Besides the large number of initially failed Handpumps, a number of handpumps may have now become defunct due to decreasing yields, impacting the availability of drinking water at the R&R sites.

357. Payments for the resistivity survey of failed handpumps/borewells seem also to have been made. This despite the clear directives of E-In-C of PHED to the contrary vide कमांक 644 प्र. अ. लो.स्वा.या. विभाग 2002 भोपाल दि. 21/1/ 2003 (Annex 3.1-Y) to make payments only for successful soundings.

358. Accordingly, necessary appropriate action against all erring officers needs to be taken for all cases where payments have been made for unsuccessful soundings.

Table 3.1.6. Borewell status at the time of Boring (Tehsil-wise)

Tehsil	No of R&R sites	Total HPs	Successful Borings	Unsuccessful Borings	Success %
Barwani	18	174	116	58	66.67
Theekri	21	178	121	57	67.98
Kukshi	13	168	121	47	72.02
Manavar	15	116	76	40	65.52
Dharampuri	9	106	71	35	66.98
Kasravad	6	42	28	14	66.67
Maheshwar	1	5	2	3	40
Dhar	2	8	4	4	50
Jobat	1	2	2	0	100
Thandla	1	2	2	0	100
Total	87	801	543	258	67.79

Table 3.1.7. Borewell Status at some R&R sites at the time of Boring

R&R Site	Number of Borewells	
	Successful	Unsuccessful
Khalkhurd	5	11
Niasrpur III	4 (14)	13 (5)
Barda	3 (4)	8 (7)
Chakeri	4	5
Datwara	6	6
Nisarpur I	10 14	11 10
Khedi	15 16	14 13
Borlai II	7 (9)	7 (5)
Anjad Barda	7 (8)	8 (7)
Kavanthi	4 (5)	5 (4)
Ganpur Sirsi	6 (7)	7 (6)
Semalda	7	7
Beganda	3	4
Jalkoti	2	3
Musapura	2	4
Nalvai	5	7

3.1.5.7. Lack of monitoring of groundwater levels

359. Despite the majority of the R&R sites being dependent on groundwaters through handpumps / tubewellls, no efforts have been undertaken by PHE, NVDA to monitor the groundwater levels at the R&R sites either themselves or by requesting an appropriate authority.

360. This is irrespective of the fact that groundwaters are generally known to be depleting in several areas of India as acknowledged by various International agencies like World Bank as well as by the GoI in their numerous documents.

361. Negligence in monitoring groundwaters is also despite the fact that NVDA itself had to look for alternative sources of waters at R&R sites like Perkhad, and has to supply water through Tankers due to due to poor yields in tubewells and handpumps at several R&R sites.

362. Yet, the apathy has been so much that Groundwater depletion rates have not been monitored and recorded anywhere, far from such recordings being made a regular feature. No drawdowns and recharging studies have been apparently undertaken and hence the current yields of borewells remain undetermined.

363. While, a majority of R&R sites still sparsely populated face water crises, in the absence of regular monitoring and assessment of groundwaters, NVDA has not been able to ascertain which are the sites where strengthening of water supplies are needed, and to what extent. It may be noted that the water supply schemes are still with NVDA for a vast majority of the R&R sites which have not been handed over to local bodies thus far, and therefore ensuring fulfilment of water demands is still the responsibility of NVDA.

364. Any future water supply strengthening/augmentation work, greatly required at several R&R sites in view of prevailing water crises at these sites, will have to be based on current actual borewells yields to assess the degree of strengthening required. It is strongly recommended that NVDA should take up such works to strengthen the water supply sources as per the requirement at each R&R site where water crisis exists.

3.1.5.8. Planning, Design and Operational flaws with respect to the Overhead Tanks

Planning Flaws

365. The criterion for providing OHTs at select sites is not clear, and appears rather adhoc and discriminatory. The MP PHEDs website (http://www.mpphed.gov.in/scheme.html#top1) clearly states that "Piped water supply schemes are normally provided for villages having population above 2000". This is also confirmed by the letter of the Chief Engineer (PWD), NVDA vide 377/NVDA/PHE/2003 dated 30/05/2003 (Annex 3.1-H) stating that piped water supplies are to be provided for sites with population exceeding 2000 (@ 5 persons per family). Thus at sites where number of plots were less than 400 there should not have been any OHTs existing.

366. Yet these massively capital intensive structures, requiring skilled operations which Gram Panchayats may not always be able to afford, have been built at a number of smaller sites (Table 3.1.8). So an OHT exists each at sites even where number of plots are less than 400 like Barda (354 Plots), Moreghadi (342 Plots), Gehelgaon (338 Plots), Kadmal (330 Plots), Semalda (323 Plots), Awalda (283 Plots), Mandwada (267 Plots), Ganpur-Sirsi (240 Plots), and even Sirsani with a mere 59 Plots.

367. Thus, clearly there have been no norms observed in provisioning the facilities. A number of larger sites like Khlabujurg (769 Plots), Ekalwara (490 Plots), Nimbola (392 Plots) etc. have been omitted and very small sites like Sirsani (59 plots) have been provided with OHTs much to the discrimination in making uniform and equitable provisions for the oustees.

368. It is possible that some of these schemes of having OHTs at sites with less than 2000 Population may have come up before 2003 when the directives of Chief Engineer (PWD) (Annex 3.1-H) came into force. However, in such cases, OHTs would have existed at all smaller sites where work was undertaken before 2003. Apparently, even that has not been the case.

369. In fact, at Sirsani, the smallest site with an OHT, the date for start of work has been 03/07/2004, much later to the directive of the Chief Engineer (PWD), NVDA vide 377/NVDA/PHE/2003 dated 30/05/2003 (Annex 3.1-H) and yet the water supply scheme was not modified completely violating the directives envisaged in Annex 3.1-H.

370. Thus it appears that the norms set up by NVDA itself have been blatantly violated, and that there has been an undue enthusiasm in bringing up capital intensive

infrastructure, even at sites not falling within the specified norms. There has not only been a violation of the directives of the highest officials of NVDA, but significantly, also a complete failure of the monitoring and feedback mechanism that should have reported, checked, and amended such violations in time.

371. It is also noteworthy that large capital investments over and above NWDT awards may have been acceptable and justified if they provided oustees with functional assets. However, several of the OHTs were seen non-functional as also evident from the fact that several of these R&R sites with piped network and OHTs still rely upon supplies by water tankers, Sirsani being amongst them.

372. Furthermore, there is little chance that such small sites will be able to find resources (financial and technical) to afford skilled supervision and maintenance of OHTs, once the infrastructure is handed over to their respective Gram Panchayats.

373. For the same reason, that ultimately the infrastructure needs to be handed over to the respective Gram Panchayats who may not have the expertise and resources to maintain the OHTs with all the skilled supervision and operation required, should have discouraged even the combined water supplies at R&R sites where two or more sites get the supplies from the same OHT. Absence of a clear policy framework and need of mutual understanding between various Panchayats puts such combined arrangements at great risk. Any such arrangement encompassing multiple R&R sites and Panchayats is very likely to later on suffer from disputes and problems related to division of tariff payments, operation and maintenance expenditures, and balance of water demands and supplies to individual sites, and will not be easily workable when a particular Panchayat takes over the Infrastructure from NVDA.

Design Flaws

373. No trial pits for OHTs and sumpwells were obtained to determine the underlying soil characteristics (Annex 3.1- I, Point No.1). Thus, for the design purpose adhoc assumptions were applied.

374. The safe bearing capacity of the underlying strata constitutes the most important parameter that ensures the safety and economy of the construction. These capacities were not determined for civil structures. It again appears that, safe bearing capacities have not been determined even for important loaded structures like the OHTs, and have been assumed to be mostly 15 t/m^2 or 20 t/m^2 (Table 3.1.8), indicating the arbitrariness of designs employed.

375. These assumptions of safe bearing capacities are rather vague. For instance, the Moreghadi site with very conspicuous Black-cotton soil and having all pile structures, is not likely to have the same safe bearing capacity as most other sites

having safe bearing capacities of 15 t/m^2 like Dharampuri, Mandwada, Gehalgaon, Kadmal, Sirsani, Sala, Khujawan, and Borlai III.

376. Similarly, safe bearing capacity for design of sumps at Dharamrai (Hard Rocky starata) have been taken as > 10 t/m^2, which is rather vague as at the minimum it is even less than the safe bearing capacity at Moreghadi which has premium classic black-cotton soil.

377. The safe bearing capacities assumed for design are approximated rather than experimentally determined, all except in just one case of Borlai II (Table 3.1.8) where a test report was available in the records (Annex 3.1-Z).

378. Strangely, for Borlai II, the test report indicated safe bearing capacity to be 40 t/m^2 specifically for the OHT. Yet, inexplicably and very surprisingly, even this lab determined value has been discarded, and design has been made for a safe bearing capacity of only 25 t/m^2 (Annex 3.1-Z), indicating gross adhocness and arbitrariness in overall designs of OHTs.

379. Working with vague assumed safe bearing capacities implies that the OHTs would be subject to undue risk/ uneconomical designs.

Operational Flaws

380. The Manual on "Operation and Maintenance of Water Supply Systems" (2005), prepared by the Expert Committee Constituted by the Government of India, and published by the Central Public Health and Environmental Engineering Organisation (CPHEEO), MoUD, Government of India, New Delhi, and the World Health Organisation (WHO), in chapter 7, lays down the procedures for operation and maintenance which are summarised in Table 3.1.9, presenting comparison of these recommended provisions vis-à-vis the actual on-field status.

381. It is evident from Table 3.1.9 that in violation of mandatory norms, no records pertaining to running schedule, cleaning schedules, maintenance schedules, chlorination performed etc. were found at the OHTs, indicating gross callousness and adhoc approach in running and maintaining the OHTs. This is reflective of similar approach in handling the entire water supply infrastructure at various R&R Sites.

382. It is further evident from Table 3.1.9 that the current status of operation and maintenance is extremely poor, and no mandatory procedures are followed. With the kind of operation and maintenance currently in practice, the infrastructure created is likely to become inefficient and defunct, while also leading to large public inconvenience.

383. All responsible officers need to be made accountable for significant breach of recommended procedures with respect to running, operation and maintenance of the OHTs which are capital intensive structures needing rigorous upkeep as prescribed.

Table 3.1.8. Safe Bearing Capacities for OHT designs at various R&R sites.

R&R site	Envisaged Number of plots at Site	OHT Capacity KL	Sump Capacity KL	Safe Bearing Capacity (t/m^2) adopted for design	Safe Bearing Capacity (t/m^2) as per test conducted
Dharamrai	234	-	100*, 50*	>10	NA
Mandwada	267	100	20	15	NA
Gehalgaon	338	150	-	15	NA
Kadmal	330	120	24	15	NA
Sirsani	59	100	20	15	NA
Sala	474	110	22	15	NA
Moregadhi	342	120	24	15	NA
Khujawan	652	144	29	15	NA
Borlai III	525	120	25	15	NA
Eklera	142	-	50	15	NA
Semalda	323	130	26	20	NA
Khedi	730	50	10	20	NA
Khedi		40	8	20	NA
Khedi		30	6	20	NA
Ganpur Narmada Nagar	700	120	24	20	NA
Khalkhurd, Manavar	1119	290	58	20	NA
Barda Manavar	354	100	20	20	NA
Barda Anjad	1032	180	36	20	NA
Kasravad	900	154	-	20/ 25	NA
Borlai II	556	225	40	25	40 t/m^2 as per test report from Govt. Polytechnic, Khandwa
Nisarpur I	598	1000	200	Design not made available	
Nisarpur III	1728	1000	200	30	NA
Awalda	283	100	20	35	NA
Brahmangaon	459	120	24	35	NA
Chikalda	700	280	-	Design not made available	

* These large structure have been designated as sumpwells, but practically these are akin to Overhead tanks being filled directly by a tubewell.

Table 3.1.9. A Comparison of GoI recommendations vs Field status with regard to Operation and Maintenance of OHTs at various R&R sites.

Recommended procedure	Observation on Field at R&R Sites
All valves need to be inspected and operated regularly, and valves maintained (applying oil and removal of rust etc.) as well as valve chambers and covers thereupon need to be cleaned and maintained.	No such records pertaining to inspection, operation & maintenance found at any Site.
The OHTs also need to be inspected regularly for any leakage, protection against corrosion etc.	No such records found at any Site. Leakages visible.
Procedure for regular cleaning of service reservoirs (OHTs in the present case), in which water levels need to be reduced (or drained completely), followed by cleaning and washing. This involves Collecting samples of water and silt/mud accumulated in the Tank and getting the biological analysis and for presence of snails and worms. If snails and worms are found find the source and elimnate it.	No records for cleaning of OHTs found at any Site. No such test records available (Note: (In the present case chlorination is not practiced in OHTs, and hence there are large chances that snails/worms/insects /microbes/development of Bio-Films may happen inside.)
Personnel Recommended minimum O&M staff for Service Reservoirs (SRs) is contained in the Manual on Water Supply and Treatment. The required personnel have to be trained in the maintenance of the valves, flow meters, water level indicators etc; training to include fault location, dismantling and assembling after repairs and replacement of the parts of the valves, flow meters and water level indicators. The supervisory personnel (managerial staff) have also to be trained in supervision of the maintenance.	Staff shortages and unavailability seen at sites. It is not known if the staff is adequately trained, but the poor conditions of valves, valve chambers, and related equipment is a fair indicator.
External painting with waterproof cement paint for exteriors of RCC Tanks once in 5 years is usually done. The inside of painted SR shall be disinfected before putting into use for a period sufficient to give chlorine residuals of at least 0.2 mg/l.	No such records made available
A list consumables such as gland rope and list of spares such as spindle rods or stems, check nuts or wedge nuts and a list of suggested Tools (Key rods for operation of all sluice valves, Hooks for lifting covers, Pipe wrench of appropriate sizes (200, 300 or 450 mm), DE spanner set, Ring spanner set, Screw Drivers, Pliers, Hammers, Chisels, Excavation tools such as crow bars, spades, iron baskets and Housekeeping accessories such as long brooms and coir brushes) available at each Service Reservoir (SR) site shall be prepared and shown in the premises of each SR.	No such list seen in the premise , nor any such tools seen at any OHT

For each Service Reservoir (SR) compilation shall be made which contains the information about the equipment used in the SR such as sluice valves, Butterfly (BF) valves, air valves, water level indicators, pressure gauges, flow meters, water level indicators etc. The information for the equipment shall include manufacturer's name, address telephone number etc. and also the technical information furnished by the manufacturers. The test certificates, inspection reports and warranty certificates of these equipment shall also be kept along with the manufacturer's information.	No such compilation and certificates were available at any OHT
A record system has to be developed which should be realistic and apply to the operating problems involved at the particular Service Reservoir (SR) site.	No Record system available at any site
Records to be kept on the Operations Note the following: • Water levels in the Service Reservoirs (SRs) (for all compartments) at hourly intervals. • Time and relevant operation of control valves with time of opening and closure or throttling position of the valves. • Hourly flow meter readings both on the inlets and outlets. • Hourly residual chlorine readings of inflow water and outflow water. • The man-hours spent on routine operations at the SR in previous year and the cost thereof.	None of these records were kept noted down as required.
Maintenance Records Maintain record on each of the following maintenance/repair works along with the cost of materials and labour. • When the gland ropes of the valves at the Service Reservoir (SR) were changed. • When the spares of the valves were changed. • When the manhole covers were changed/replaced. • When the water level indicator was repaired or replaced. • When the reservoir was last cleaned. • When the out-fall drain for scour and overflow was last cleaned. • When the ladder was changed. • When the structure of the reservoir was last repaired to attend to structural defects or arrest leakage. • When the reservoir was last painted. • When the piping at the reservoir was last painted. • Total cost of repairs and replacements at the SR in previous year along with break-up of material cost and labour cost with amount spent on outside agencies for repairs and replacements.	No such maintenance records were found available

Checks to be Carried out at the Service Reservoir (SRs)

A programme has to be prepared for each SR which shall contain procedures for routine tasks, checks and inspections at intervals viz. Daily, weekly, quarterly semi-annually or annually.

This plan shall fix responsibility, timing for action, ways and means of completing the action as to when and who should take the action and mention the need to take this action. Simple checklists for use by the managerial staff can be prepared to ensure that the O&M staff have completed the tasks assigned to them.

No checks found recorded.

No checklists of any kind available.

7.9.1 CHECK LISTS FOR CLEAR WATER SUMP AND RESERVOIR

S. No.	Checks required/undertaken	Status	Frequency of reporting*
1.	Proper closure of washout valves; any abrupt stoppage during operation.		
2.	Proper operation of inlet valves; any abrupt stoppage during operation.		
3.	Proper operation of outlet valves; any abrupt stoppage during operation.		
4.	Proper operation of bye pass valves; any abrupt stoppage during operation.		
5.	Does any valve pass water even after closure.		
6.	Leaks through valves; glands and bolts and nuts.		
7.	Leaks through pipes and joints at SR.		
8.	Status of valve chambers and their covers.		
9.	Status of finial ventilators; fly proof mesh intact or is to be replaced.		
10.	Status of manhole covers; are they corroded?		
11.	Functioning of water level indicators.		
12.	Functioning of flow meters.		
13.	Status of ladders and railing; are they corroded?		
14.	Check whether quality of the water in the SR is OK.		
15.	Possibility of SR water getting polluted.		
16.	Check for the need for cleaning and disinfecting the SR.		
17.	Check for the presence of residual chlorine in the water stored in SR.		
18.	Check for signs of corrosion of interior of roof due to chlorine.		
19.	Check for structural damages of the SR.		
20.	Check for Leaks through the structure of the SR.		
21.	Status of interconnecting pipe work? Is it corroded?		
22.	Status of lightning arrester.		
23.	Status of out-fall drains of scour and overflow at SR.		
24.	Availability of:		
	Spares		
	Consumables		
	Tools		
25.	Check for need for painting.		
26.	Check for availability of drawings and designs of the SR.		

*To be decided by the respective water utilities.

3.1.5.9. Diversion of R&R Funds to finance Intake Structure not meant for Oustees?

384. Intakes are highly capital intensive works, with Intake structures drawing the surface waters from River Narmada for possible supply after treatment, though in the present case supplies also seem to be made even without any treatment.

385. When asked about the numbers of Intake wells at various R&R sites, vide the letter No. 983/Punarvas/MANIT/13 dated 17/9/13 of Adhikshan Yantri, NVDA duly Forwarded by the Commissioner NVDA vide 5285/30/punarvas/MANIT/13, Indore dated 26/09/2013 (Annex 1-A), it was informed by NVDA that there were 2 Intake wells.

386. However, from the observations during inspections of Sites by this Team, the numbers of Intake wells is suspected to be more.

387. From the site Inspections as well as the records submitted, there is certainty about an Intake well–cum approach bridge at Dharampuri, approved vide TS No. 247 dated 20.01.2005 with a sanctioned Estimate of Rs 1.2 Crores (Annex 3.1-Q), excluding the cost of Rising Main etc, and work recorded in MB No. 145 with total amount of work done recorded as Rs 1.3391254 Crores.

388. During the site visits, 1 more Intake structure was found located at Koteshwar Ghat near Nisarpur, while 2 more Intake well structures were seen located in close proximity on the two ends of the Narmada Bridge near Kasrawad, State Highway No 26. One of these supplies water to City of Barwani, while the other supplies water to Nisarpur/ Chikalda/Gehalgaon.

389. While the Records of these last two Intake structures were not made available (it is possible that these may have been constructed by PHED, MP under the deposit work scheme), these intake structures on River Narmada Bridge, State Highway No 26 were large structures, with each costing, may be a few crores, and from the information that this Inspection team could informally gather, there is a suspicion that the expenditures for both of these Intake wells have also been booked under the R&R works, even as one of these supplies water not to any R&R site, but to the City of Barwani.

390. This suspicion gets further reinforced in view of the letter of the Commissioner (Rehabilitation/Field) 3936/Punarvas/30/MANIT/13 Indore dated 16/07/2013 (Annex 3.1-ZA) wherein it is acknowledged that nearly Rs 13.5 Crores were spent on water supply to Barwani City. Since, this comes from Commissioner

Rehabilitation/Field, it is apparent that this provisioning for Barwani City was made out of the budgetary allocation for the R&R sites.

391. This therefore, raises a few queries and concerns:

- It is not known as to how water supplies to Barwani City can be justified to have been provisioned out of the expenditures allocated and meant strictly for the welfare of the oustees of the Sardar Sarovar Project?

- It is also not clear as to why there exist two separate Intake wells located within a few meters. Why was their capacity not combined and one of the wells not augmented to achieve major cost reductions during construction (as well as possible reduction in cost of personnel during all future operations)?

392. Non-availability of essential records, Technical Sanctions, MBs, Designs etc. prevents this team from making further observations on the issue, but it would suffice to state that NVDA needed to be prudent with the money allocated for the exclusive welfare of the oustees. Any diversion of this money into welfare schemes for other citizens, no matter how pressing and essential, should be subject to scrutiny in terms of underlying legalities involved, and all responsible officers must be made answerable and accountable, if such a lapse has indeed occurred.

3.1.5.10. The Case of Intake Structure at Koteshwar Ghat : Flawed Planning & Poor and Dubious Upkeep of Records

393. An Intake structure located at Koteshwar Ghat draws water to be supplied to Nisarpur I site. This structure finds a mention in the records submitted and was also inspected during the site visits. Vide TS No 138 dated 06/07/2002 (Annex 3.1-ZB), an Intake system, a ramp structure, at Koteshwar Ghat near Nisarpur was approved under Phase I works with an Estimate of Rs 3.18 Crores including the costs of Pumps, Rising Main etc. However, the MBs of even this work were not found submitted in the Records made available to this Inspection Team, so that the Final payments made etc., and deviations if any, are not known.

394. However, for the above Intake structure at Koteshwar Ghat, there appear to be some valid concerns:

- From a perusal of the diesel consumption records, it appears that Koteshwar Ghat comes under the submergence/flood area. If this is so, it is not clear as to why a capital intensive structure was created in the submergence zone unmindful of the impending wastage of public money, and that too as recently as after the year 2002. And it is not just the expenditure for Intake well construction, that is likely to sink, but even the Rising Main Pipeline would become dysfunctional as well.
- While the Estimates provided for Rs 5 Lakhs to extend electric lines upto the control room of the Intake system (Annex 3.1-ZB, Point No 6), in reality as seen during the site visit, it was found that the a mammoth diesel generator powers the pumps (Plate 3.50).

395. This Diesel Generator (DG) appeared aged and inefficient, though poor maintenance and poor quality of diesel can rapidly deteriorate even a new machine.

396. At the time of the visit (03 October, 2012), inexplicably, diesel was not available at the Intake site, despite claims of regular usage to pump water to OHT at Nisarpur - I, and only after arranging the diesel from outside could the generator be started.

397. Very surprisingly in this case, during the site inspection the diesel consumption log-book was not found at the Intake nor at the Nisarpur site. No such mandatory records were apparently kept and maintained at the site, neither was a record of running schedule available which could have thrown some light on how much diesel is being consumed per running shift, and how much is the pump running time and its schedule. Also, the logs of the service schedule, and the notes by the operator were all found missing from the site during the site inspection.

398. Strangely, and against all common-sense, the Inspection team were told that the records are kept at Barwani. This in itself left many doubts as to how log entries were being made for DG sets running time and schedules at site in the centralised offices at Barwani.

399. However, when records for diesel consumption were sought at Barwani, these were not made available. The records were requested for after reaching Barwani in the night, but these were not provided to the Inspection team on the oral communication that copies of the records would be provided only through the Honourable Commission. Finally, the matter had to be pursued in writing vide letter of Dr. Mukul Kulshrestha No. 333 dated 14.01.2013 (Annex 3.1-R, Point No. 5), and it was only later in mid April 2013, that copies of records of diesel consumption were provided with an inordinate delay of more than 6 months after the site visit.

400. Even this record made available with much delay was for just one year (year 2012).

401. The annual yearly expenditure on Diesel for DG sets was Rs 14.43314 Lakhs for the year 2012 (January 2012 to December 2012) becoming 1.5 times from an amount of Rs 86680/- in January 2012 to 126948/- in December 2012 (Annex 3.1-ZC).

402. It is noteworthy that this diesel consumption for the Nisarpur site averaging as much as Rs 1.21 Lakhs per month was with DG set running only 3 times in some months and 4 times in some others. Such expenses have been incurred as against other pumping stations for Narmada line averaging only Rs 8000/- per month of Electricity consumption at several sites (Annex 3.1-F, Point No 5). And Koteshwar Ghat Intake runs on this high diesel dose when actually the Intake well had an Estimated sanction of Rs 5 lakhs for extension of a dedicated Electric line (Annex 3.1-ZB, Point No 6).

403. Strangely, as per the records submitted, the opening balance of diesel in January 2012 appears as nil. Thus, the year 2011 apparently ended with even the last drop of diesel standing consumed at the year end. In January 2012, 2000 litres of diesel was issued and the month end balance was nil. In February 2012, 2400 litres of diesel was issued and balance was again nil. March 2012 saw an issue of 2800 litres of diesel, and balance at month end stood nil, April 2012 had an issue of 2000 litres with balance again nil. Thus, strangely very calculated and exact amount of diesel was meticulously issued for several months. However, from May 2012 onwards till December 2012, every month end shows a more logical numeric balance other than zero being carried forward to the next month.

404. There are other factual mistakes: July 2012 shows a closing balance of 15 litres, but August 2012 opening balance appears as 70 litres. Again, November 2012 shows a month-end balance of 440 litres, as against an opening balance of 460 litres in December 2012.

405. Remarkably, January 2012 saw 2000 l consumed for a running of 65 hours (ie., 30.76923 l/hr for January), February shows 2400 l consumption for running of 78 hours (30.76923 l/hr for February), March shows 2800 l consumed for running 91 hours (30.76923 l/hr for March), April shows 2000 l consumed for a running of 65 hours (30.76923 l/hr for April), May shows 2600 litres of diesel for running 84.5 hours (30.76923 l/hr for May) etc.. Thus, the DG set needed 30.76923 litres/hr (more accurately, 30.769230769230769230769230769231 l/hr for every month) for running month by month in stretches spread over several months, with wide variation of ambient temperatures (ie, transition from winters to summers) and changes in water qualities (that change fluid properties) notwithstanding. Such precise averages do not exist in the real world, and it is hugely remarkable that the DG sets always consume same amount of diesel to 29 decimal places (shown rounded off month-wise). And such precision irrespective of the change in environmental temperatures from January to May when in summers every machine becomes less efficient due to high ambient temperatures. Such precisions in real world machines are never encountered and are most amazing, and it is only when records are prepared not at site but sitting in offices, that such precisions become real.

406. This team is not an expert in evaluating the genuineness of records. However the circumstantial evidence, including the fact that diesel consumption records were not being maintained at the Intake structure where the pumping is scheduled, and even the pumping logs were missing, leaves a lingering doubt over the authenticity of the Records being maintained. It is noteworthy that diesel consumption and running logs are maintained even for the government owned vehicles and are available in vehicles to be inspected at any time, and yet despite significant spendings on diesel records including the running logs were missing at the site in the present case. It is therefore recommended that this case of Intake at Koteshwar Ghat may be investigated by a specialized agency like CBI to verify the authenticity of the Records, as well as to verify if this structure represents assets built in submergence area. There are possibilities of large scale misappropriation of finances and swindling by way of diesel consumption shown in the records.

Plate 3.1.44. The Intake Structure and Equipment at Koteshwar Ghat, Nisarpur

3.1.5.11. Supplies by water tankers and non-maintenance of proper Records and Log books.

407. It is noteworthy that under the PHE services for R&R sites, elaborate water supply distribution networks including overhead tanks have been created at several sites (costing 31.3289 Crores in the current scheme-Annex 3.1-M) over and above the recommendations of the NWDT Award which endorsed only the provisioning of Handpumps (costing 5.8254 Crores in the current scheme-Annex 3.1-M), and where this provisioning has increased the overall cost of the water supplies by several folds for a network that is barely functional.

408. Such investments could have been acceptable and justified, had these led to an improvement in the quality of lives of the oustees. This apparently has not been the case, and the problem of water crisis infests a wide majority of sites.

409. In what constitutes a clear testimony of failure of the water supply services at several R&R sites, a total of 5 department owned tankers supply waters at a claimed 13 number of R&R sites not just during dry, peak summers, but during all times of the year in varying quantities. Of these, sites like Sirsani, Borlai II, Anjad Barda, and Khedi have elaborate distribution networks with Overhead Tanks. Yet, in an obvious reflection of failure of the massive infrastructure built, water is still often supplied by Water Tankers to these sites all-round the year.

410. One is therefore left wondering as to what was the need of creating elaborate and costly infrastructure, if the dependence still had to be on water supplies through tankers despite massive investment of public money?

411. Significantly, such a temporary arrangement of supplies by Tankers also raises a question mark over the sustainability of water supply schemes. What would happen if the current water supply schemes are handed over to the local Panchayats? Would the Gram Panchayats have enough resources to afford to supply houscholds and fill halaos with water purchased from Tankers? Clearly supplies by tankers are not a sustainable solution to the problem of water crisis at several R&R sites.

412. The water supplies at departmental cost by Tankers also raise the natural query as to why in such cases infrastructure created cannot be operated and run by NVDA rather than the department preferring to supply water through tankers. Thus, it is natural to ask as to why supplies cannot be made through already laid distribution network, when expenses are anyway being incurred on water tankers?

413. Water supplies through created infrastructure will additionally help keep the infrastructure in running shape and well-maintained, whereas the Supply by Water

tankers will only ensure that created infrastructure is not run and maintained, and would hasten the infrastructure to become defunct in due course of time (there is a possibility that some of it may already have turned defunct, including the tubewells that have not been used for drawing the water supplies), thereby sinking all the investments made.

414. However, despite such benefits of keeping the infrastructure in running state for ready hand-over, the preferred route adopted has been that of supplies by water tankers, notwithstanding the severe limitations of an uncertain water quality of supplied tanker water. It is noteworthy that no tests for water qualities on water supplied through tankers are made, and no disinfection/chlorination is performed at any stage before or after supply. Besides, delivery by water tankers also has other limitations in terms of limited water quantities supplied, timing of supply not matching the peak demands, and limited capacity of tankers to ensure equitable distribution of water including that for the needs of Livestock.

415. The preference to Water supply by tankers despite the massive infrastructure created, and the scenario of likely misappropriation of diesel at Koteshwar Ghat Intake, led to a similar suspicion of misappropriation in water supplies through Tankers. Accordingly, queries were raised in writing vide letter of Dr Mukul Kulshrestha No. 333 dated 14.01.2013 (Annex 3.1-R, Point Nos. 6-11), regarding the conditions which led to supplies by Tankers despite infrastructure created, and details for water supply Tankers and associated expenditure Records and Logbooks.

416. Three months later the queries were answered and copies of log books and expenditure details were provided for a period of one year ie, for the year 2012 only.

417. As per the information provided by NVDA (Annex 3.1-F), insufficient water yields in handpumps/tubewells have prompted NVDA to supply water through Tankers as per demand and needs of people. While supplies by Tankers may be a short-term temporary solution incurring recurring cost throughout the year, no efforts have been apparently undertaken to provide a sustainable solution to water crisis by developing new sources of water, something that will need to be done before handing over the infrastructure to Gram Panchayat. But apparently, handing over the infrastructure has not been the priority/has not been possible due to a variety of factors.

418. Furthermore, it is rather strange that only 13 R&R sites (Annex 1-A) are supplied water through Tankers when actually a wide majority of R&R sites need water in view of near universal water scarcities.

419. It is noteworthy that no water is provided by Tankers to fill the Halaos. Thus, remarkably, the water demand of the Livestock remains completely unsatisfied. One may easily imagine the crises that the rehabilitated families face on a daily basis due to hardly any water availability for their domesticated animals.

420. As per the Records provided (Annex 3.1-ZD), a total expenditure of Rs 15.65551 Lakhs was incurred on Diesel and Oil for the 5 tankers belonging to NVDA deployed for R&R sites for the year 2012.

421. In the year 2012 (January to December, 2012), there was no month when diesel expenditures on water tankers were not incurred (Annex 3.1-ZD), implying that water was supplied using water tankers throughout the year and not just during the peak dry summers when shortages arise. *It is therefore self-evident that water supplies have failed at least at 13 R&R sites by NVDA's own admission, several of which are large sites.*

422. The minimum expenses incurred were in the month of October 2012 (Rs 82408/-), whereas the monthly expenses averaged Rs 130463/-.

423. Even during July, 2012, when water shortages should subside as handpumps and tubewells get recharged due to rains, the total expenses were Rs 1,83,610 /- which was surprisingly much more than even the average monthly expenditure of Rs 1,30,463 /- ! Excessive demands/supplies in monsoons are inexplicable.

424. For years other than 2012, the records were not made available and hence no comments are possible on seasonal pattern of usage.

425. An examination of the Log books provided for the year 2012 was even more revealing. Pages after pages appear to have been entered in similar handwriting!

426. The records in the form of photocopies of log books made available only for a single year are maintained far from standard practice that needs to be adopted as per Madhya Pradesh Works Department (MPWD) Manual, 1983.

427. Kept on a register for each Tanker, the photocopies of the records do not show the date of issue of the Register by any authority and bear no official Number or identity, and are not signed by any authority, including a verifying officer. A trip is shown on a particular date (example, Barda to Lakhangaon : "3 Trip") (Annex- 3.1-ZE), without recording the time of trips, and Names and Signatures written down sometimes with some Numbers which may be plot numbers. It is noteworthy that no distances of running (Kms and Meter reading of water tanker) is noted anywhere, and no amount of water delivered to any locality is mentioned. Thus it is

impossible to know the amount of water delivered on a particular date, and the amount of diesel spent on the services.

428. The time of supply and the distances covered by tankers to reach the consumers and back are also not recorded in the logbooks. Neither is the source of this supply by tankers known and recorded. It may be noted that if this water comes from Tubewells/OHTs, then such a claim will remain unsupported by any records, as water demand/supply records are not maintained at any of the OHTs.

429. It is important to note that logbooks are like cash books as they record the public expenditure and they are to be maintained very cautiously by the responsible officers and duly inspected and verified by the superior officers.

430. The stamp seen in Annex 3.1-ZE is only the verification that certified True Copy of records have been provided to this Inquiry Committee. In reality there are no signatures of anyone on the claimed log books, neither a date and number of issue of tehse claimed log-books by NVDA.

431. The log books for supply by water tankers are clearly not maintained as per MPWD Manual, 1983, and the log books are neither maintained in prescribed formats, nor appear to be checked and signed by competent authorities, and apparently may have been maintained by the drivers of the tankers, although even the drivers have also not signed the records. In any case, records do not seem to be kept officially as Registers have no official number, date of issue etc, and no verification of entries by any officer.

432. What further erodes its official status is for instance most ridiculously, the opening first page of the log register for Water Tanker Number CPZ 7833 that has a bill of liquor and Chicken consumption (Annex 3.1-ZE), with true copy duly verified by the Assistant Engineer. This is to say the least, is unacceptable and most irresponsible way of keeping records of public expenditure, and all concerned officers need to be held accountable.

433. This matter of supply of water by Tankers instead of usage of infrastructure created, non-maintenance/unacceptably poorly maintained records, and the expenditures incurred in Water tanker operations all need to be appropriately investigated by a specialized agency such as the CBI, Lokayukta or CAG as this appears to be a prima facie case of misappropriation with records most crudely kept, if at all.

3.1.5.12. A Note on Impacts of Free Water Supplies to R&R sites having Distribution System

434. Water is supplied by NVDA free of cost across various R&R sites where the supplies are yet not handed over to respective local bodies (Gram Panchayats) (Annex 1-A). This also holds true of the sites with functioning distribution networks, where water is supplied to households free of cost.

435. One needs to peruse if providing free water to individual houses is really a sustainable practice.

436. Various documents of the GoI, including those of the Planning Commission, as well as the stated policies of various PHE departments, clearly lay down that at least the operation and maintenance costs should be recovered from the consumers. Despite these directives, populist measures of free supplies have been extended at select chosen sites which may only act as cosmetic measures to improve public perception, but are fraught with unforeseen consequences regarding the long-term consumer behaviour.

437. It is also noteworthy that free water supplies will train the consumer behaviour by making them spendthrift and irresponsible in usage of water supplied as is true of all free commodities, as no incentives exist to use water frugally with responsibility.

438. The wastage and high usage of water will also induce a long-term usage pattern into consumers who will complain if water is charged later when sites are handed over to respective Gram Panchayats or when the sites become more habitated and water availability becomes limited.

439. It would be relevant here to ask if free of cost supplies would be possible when water supply infrastructure is handed over to the local Gram Panchayats who are limited in their resources. People who have gotten used to free supplies may not be easily pliable to agree to pay for water. Thus sustainability and rationality of free water supplies is questionable as a Planning strategy.

440. Free water supplies will also prompt the respective populations and their representatives in Gram Panchayats not to take over the infrastructure despite complaints and misgivings, and force NVDA with making free supplies. Huge maintenance budgets and water supplies by Tankers, with associated non-transparent record maintenance as exists currently may prompt NVDA as well to keep operating the system. This may just be one of the reasons that water supplies still exist with NVDA at a vast majority of the R&R sites.

3.1.5.13. Poor state of Maintenance despite Large Annual Expenditures: The likelihood of misappropriation and Urgent Need to handover the Infrastructure to Local Bodies

441. It is rather intriguing that despite significant expenditures (Rs 1.65-1.70 Crores each year) (Annex 1-A, Enclosure 2) on operating and maintaining the water supplies at the R&R sites notwithstanding the dissatisfaction that still persists with regard to level of level of services provided, as well as the massive deployment of manpower and administrative hassles undertaken, much of the water supply infrastructure developed and executed by NVDA still lies in the possession of NVDA, whose PHE wing still operates and maintains the water services at most of the R&R sites.

442. So far only 11 of the 88 R&R sites: Mandwada, Mohipura, Kavanthi, Perkhad, Mirzapur, Khujawan, Dharampuri, Nimbola, Sala, Beganda,and Kaisur have been handed over to the respective Gram Panchayats (Annex 1-A, enclosure 3).

443. Even at these 11 sites, mostly the day-to-day running operations have been transferred, the infrastructure as such has not necessarily been necessarily transferred partly or completely, and expenses are still incurred by NVDA under several heads including the maintenance (Annex 3.1-A, Point No. 13).For instance, at Perkhad, NVDA still gets water pumped from River Narmada and puts it into a well at the cost of the department.

444. Thus years after the infrastructure was created, it is still being handled by NVDA for a vast majority of the R&R sites, when this should not have been the job of NVDA, and when a mechanism had to be in place to handover the water supply services within time limits.

445. Intriguingly, and unfortunately, the infrastructure was not handed over immediately after it was built. It may be noted that successful testing is a precondition for the release of final payments and Security Deposits to the Contractors. Once this condition was met, the working infrastructure ought to have been immediately handed over to the Panchayats. The responsible officers in this case need to be held accountable for the fiasco in not ensuring immediate handover.

446. However, as of now, the current status of the infrastructure is such that the local Panchayats will obviously have reluctance in taking over. Once a poorly maintained and often dysfunctional asset is taken over, it would remain a liability for all times to come, and Gram Panchayats will not have resources to maintain and operate the inefficient services.

447. Free water supplies being made by NVDA at select sites are also an incentive that would not encourage the Gram Panchayats to take over the infrastructure as taking over the services will entail raising tariffs from consumers.

448. This reluctance of Panchayats to accept and manage the infrastructure may thus arise due to the lure of free water supplies as well as the fear of accepting a deficient infrastructure. The deficiencies with regard to regular cleaning and maintenance of cisterns and OHTs have already been pointed out. Large numbers of missing Cisterns, rusted cisterns, leakages around the cisterns despite water shortages, missing cistern taps, missing and damaged railings in OHTs, frequent motor burns at the tubewells and OHTs, large numbers of damaged and unrepaired handpump platforms, defunct valves, illegal tapping and thefts in the distribution system, missing periodic maintenance of valves, cisterns etc,. missing handpost taps, unconnected and dry halaos, electrical panels often lying in open at the tubewells, damaged and unrepaired pumphouses (especially the precast panel types), Electrical panels installed in open, are all reflective of the very poor state of water supply infrastructure, as well as its state of maintenance.

449. Water supplies to select sites through the water tankers despite creation of huge water supply infrastructure are also reflective of the poor state of health of the infrastructure.

450. This failure of NVDA in ensuring sound operations and in maintaining the infrastructure has been rather astounding as large financial provisioning has been made.

- Technical Sanctions envisaged specific expenditures such as 10% of the total Estimates for "Running and Maintenance (R&M) of handpump, powerpums and pipes" (Annex 3.1-ZF for a typical R&R site). This was pretty large for some of the sites such as at Khujawa (Rs 5.4232 Lakhs), Khedi (Rs 7.666 Lakhs), Niasarpur-I (Rs 6.297 Lakhs), Chikalda (Rs 5.2465 Lakhs) etc.
- Separate Annual Maintenance Charges in the name of Heads like Pump Operator-cum Plumber, Energy Charges, Repair and Maintenance of Power Pumps, , handpumps, and pipelines, as well as cost of Bleaching powder per Tubewell etc.(Annex-3.1-ZG for a typical R&R site).These expenses have also been significant for sites like Dharampuri (Rs 2.08 Lakhs), Chikalda (Rs 3.16 Lakhs) etc.

451. The Total annual recurring expenditures incurred on maintenance including those for daily wages employees, Handpump maintenance and operations, electricity for pumping, tanker repairs and diesel expenses, Motor pump maintenance etc. are to the tune of Rs 1.65-1.70 Crores (Rs 172.78 Crores in 2010-11, Rs 166.23 Crores in 2011-12, and Rs 165.70 Crores in 2012-13 as per the information provided by NVDA-Annex 1-A, Enclosure - 02).Thus the expenses to operate and run the water supply system have been very significant.

452. However, despite such large expenditures, there have been large numbers of instances of gross failure to properly maintain the system (Broken /damaged

handpump platforms, inadequate drainages, defunct/missing cisterns/ unpainted Cisterns/ defunct halaos/ OHTs not being maintained, pipeline valves defunct and not maintained, damaged pumphouses etc) and this reflects into the level of widespread dissatisfaction witnessed at large numbers of R&R sites with respect to water supply services amongst those rehabilitated.

453. There has also been a complete failure in ensuring quality supplies, and even in monitoring the qualities supplied, as also reflected in usage of raw water sources such as open wells that are unacceptable. Site Inspections did not find the usage of Bleaching Powders at any of the tubewells across the R&R sites even though a provisioning of Rs 1000/- per Tubewell exists in the Annual Maintenance budgets (Annex-3.1-ZF).

454. It is a serious apprehension that large-scale recurring operating and maintenance costs, and non-compliance with upkeep of necessary records as was seen with respect to diesel consumption at Koteshwar Ghat, Water Tanker operations and ill-maintained logs, and non-usage of Bleaching Powder etc. as well as the extremely poor maintenance and monitoring status despite large spending is reflective of non-transparent operations wherein financial misappropriations are extremely likely.

455. In view of the apprehension, as well as NVDA's inability in giving details of breakup of its yearly expenditures on operation and maintenance etc. (Annex 1-A, Point No 16 on the PHE Information sheet: "एकीकृत जानकारी विभाग द्वारा दी जा रही है, प्रथक् से दी जाना संभव नहीं है"), it is strongly recommended that the spendings be further probed by a specialized agency such as the CBI/Lokayukta/CAG etc. as may be deemed fit by the Honourable Commission.

456. The facts also unfortunately convey an impression that there exists a lack of commitment and enthusiasm in handing-over the infrastructure and in persisting with somehow managing water supply services despite large public dissatisfaction and despite the extremely poor level of maintenance, operations and services.

457. Accordingly, it will be in the best interest of everyone including the PAFs that NVDA be directed to immediately handover created infrastructure to Local Bodies. However, this will not be an easy job as current state of infrastructure is pathetic.

458. It is therefore suggested that special drive be undertaken to see site-wise that the infrastructure is rendered healthy and running, followed by demonstration of the running services to local panchayat, and immediate handing over. This will induct transparency and efficiencies in the system, will render the infrastructure into desirable condition, and will allow people to manage their own resources. This would also rid NVDA of unnecessarily carrying on the burden of managing services despite low efficiencies, and seemingly low public perception and acceptability.

3.1.6. Concluding Remarks

459. In complete defiance of all prescribed norms and regulations, the Water qualities at all the 88 R&R sites remain unmonitored and untested since 2010 onwards.

460. Even earlier qualities were tested very rarely for HPs/TWs many times even excluding important parameters like fluoride, presence of microorganisms etc.. This despite a number of samples testing positive for fluoride and coliforms etc., indicating serious instances of pollution.

461. Water qualities in distribution system have never been subject to any tests.

462. Such gross carelessness in monitoring water qualities has been despite the fact that in several cases raw water sources are open wells, or surface waters from pooled up and near stagnant backwaters of the Sardar Sarovar Dam, and despite the fact that not even chlorination is practiced at OHTs etc.

463. Severe action is warranted against erring officers for flouting of mandatory norms with respect to monitoring the water quality.

464. The State of Infrastructure created remains poor. Poor approaches at HPs and Cisterns, Poor drainage, damaged platforms, missing taps and connections in cisterns, missing cisterns, rusted and un-painted cisterns were common occurrence. HP yields appeared often inadequate as many of these would dry up in summers. The handposts were mostly found defunct and non-functional. No maintenance records for Cisterns etc were found at any site, and it appears that maintenance records are not kept.

465. The two Water treatment Plants envisaged only for 6 R&R sites still remain non-functional, and one of them is incomplete.

466. Not all Overhead tanks were functional. Service logs and records of maintenance were not present at any of the OHTs, and no disinfection is practiced before supplies. Their premises are not secured, and inadequate safety measures exist. Even the locations of some of the OHTs remain undesirable from safety viewpoint.

245. The distribution systems remain non-functional and hence defunct at wide majority of the sites where these have been laid. Rising main designs (Tubewells to OHT/Cistern etc, and sometimes even the Narmada Lines) were not found available in the records for any of the site. The procedure of appointment of private Consultants for design of capital intensive piped distribution network available at 30 R&R sites is not known. It is apprehended that designs have been awarded in piecemeal manner and site-wise to consultants of choice instead of following elaborate process of technical and financial bidding to award work to a reputed consultant. The maintenance of distribution network also remains very poor. Pipelines were at times found stolen, and valve chambers were often filled with debris. As time progresses the unused infrastructure will become defunct.

246. Despite huge infrastructure created, as many as 13 R&R sites still depend upon supply by water Tankers, a fact reflective of the failure of water supply schemes at these sites. Proper records including the logs etc for water tankers are not maintained as per MPWD Manual, 1983. The copies of Log Registers provided do not bear any official number and date of issue, nor have these been signed and verified by any NVDA officer anywhere. Thus, the logs actually have no meaning despite expenses of several lakhs incurred on water tankers annually. Appropriate action/further enquiries are warranted.

467. Large numbers of R&R sites do not have any halaos. Where these exist, they are mostly dry and defunct with connections missing. When working, poor drainage are often prevalent. PHE, NVDA has not constructed any halaos (these appear to have been constructed by PWD, NVDA) despite obtaining Technical Sanctions at wide majority of the sites. Thus huge amount of money was allocated for construction of halaos, and has been diverted to other unknown uses as no savings are reported and no deviation certificates are issued for each site. It is also not known on whose directives this construction did not take place and where the money has been deployed and by whose permission. Appropriate action/further enquiries are warranted.

468. Planning has been far from satisfactory. In several instances infrastructure has been constructed and public money has been spent without even ensuring if water sources would have adequate yields to fill up the OHTs and satisfy the theoretical demand of water. In several instances directives of the top officers were blatantly violated to provide capital intensive infrastructure such as OHTs and piped distribution networks even where populations of the R&R sites did not warrant such heavy investments.

469. Water demand calculations were bizarre, and do not take into account the water losses or Unaccounted for water. No efforts were undertaken to assess the cattlehead numbers while designing the water supply schemes. The provision of 20% extra over 70 lpcd is insufficient for meeting demands like institutional demands and demand of water by livestock, even when losses are expected to be very high, and not less than 50% considering the state of infrastructure and its poor maintenance.

470. The running and maintenance expenditures are huge, and yet the state of infrastructure is very poor. The records of maintenance need to be sought from NVDA, and need to be scrutinized for possible likely misappropriation.

471. Even the records for diesel consumption were not found available at the Koteshwar Ghat Intake. Provided with much delay, the analysis of these records indicates that these are spurious and counterfeit. Appropriate action/further specialized enquiries are warranted for determining the extent of misappropriation.

472. It also appears that R&R funds have been probably diverted for water supplies to Barwani city. This needs to be further probed and ascertained.

473. Water supplies at only 11 R&R sites have so far been handed over to local bodies. Even at these sites, NVDA still continues to incur various expenditures as only running and operation has been handed over in most cases. Free water supplies being made by NVDA to sites in its possession in contrast to the expenses incurred by residents at R&R sites already handed over (for instance at Perkhad) is a certain incentive for the local Panchayats not to take over the amenities created. Besides the current poor state of infrastructure is a sure impediment in any efforts of handing over the infrastructure to local Panchayat bodies.

474. Large running and maintenance expenditures, poor state of maintenance on field, and largely non-transparent operations and extremely poor record keeping suggest possibilities of large-scale misappropriations, partly explaining why handing over efforts have been so unsuccessful.

475. It is suggested that infrastructure created be immediately brought into running state and made functional, due maintenance work should be diligently undertaken at each site with proper record upkeep, regular monitoring of water qualities be undertaken, and then the real water crisis, if any, be assessed at each R&R site. This should be followed by strengthening/augmentation of water supply sources wherever real crisis for water supplies still exists. It may be pertinent to note that today's crisis is partly a reflection of combination of factors like non-transparent record keeping despite huge expenditures that still do not ensure proper maintenance and upkeep.

476. The working, functional and adequate water supply infrastructure at each R&R site should then be demonstrated in running condition to the local Panchayats, third party evaluators, and general public, and be immediately handed over to the local bodies/Gram Panchayats as appropriate. Unless mandated by the Government, NVDA should not have any further role in running and maintaining this Infrastructure with huge budgetary provisions.

Chapter 3. Status of Water, Sanitation and Environment at R&R Sites

3.2. Wastewater Disposal and Treatment

Piped sewerage system has not been provided for the individual plots at any of the R&R sites with the sole exception of Dharampuri. At these sites, the public toilets that exist in buildings such as Panchayat Bhawans and Schools etc., have been connected to nearby small septic tanks for decentralised treatment of wastewater generated in small quantities from the toilets.

At the Dharmpuri site, sewers haves been laid to collect sewage from buildings and individual plots, and these are connected to a number of very large septic tanks for sewage treatment.

3.2.1. Status of Infrastructure

3.2.1.1. Public Toilets in Buildings and the Decentralized Small Septic Tanks

At the R&R sites, Toilets, connected to decentralized septic tanks, have been provided in buildings such as Panchayat Bhawan, Primary Health Centre, Seed Godown etc., but the most used ones would be those located in the Primary and Secondary Schools.

1. The public toilets provided with the buildings like Primary and Middle Schools, Panchayat Bhawans, etc., were mostly found unusable and defunct (Plate 3.2.1).
2. In a few cases, the toilets were put to alternate uses like storing junk, example, at Dharamrai, or were just found locked up, and obviously out of reach of the general intended user such as the school-children (Plate 3.2.2).
3. Where in use, these toilets had insanitary conditions, were mostly obnoxiously stinking, and appeared to be in use only because of lack of any alternative (Plate 3.2.1).
4. The W/C seats were also seen defunct/ damaged in several toilets (Plate 3.2.1).
5. No water arrangements for washing/flushing were seen inside the toilets.
6. Arrangements for Handwashing, washbasins, Urinals, Soaps, Flushing, Lighting, and sometimes locking from inside, etc were mostly non-existent for almost all the toilets.

7. The toilets discharge wastewater to sceptic tanks located within a few meters using connecting pipes that were mostly found damaged and sometimes even non-existent. The connections from toilets though may have been provided originally.

8. Decentralised common/separate Septic tanks connecting the toilets at Primary Schools, Panchayat Bhawan etc., lay invariably defunct in very large numbers at almost all R&R sites (Plate 3.2.3). Several septic tanks were seen even without a ventilation pipe or with damaged ventilation pipes near the connections.

9. Large numbers of septic tanks had missing covers on the access manholes meant for inspection and maintenance (Plate 3.2.3) raising safety concerns for passer-bys and especially for the schoolchildren particularly as such septic tanks were mostly located in the vicinity of the primary Schools.

10. The septic tanks tops were not seen covered with mosquito proof wire meshes anywhere, raising concern of spread of vector diseases at R&R sites, if these tanks were functional.

11. The construction quality of these septic tanks was also not appropriate in several cases (Plate 3.2.4), and there were execution faults. In some cases like Beganda, for a septic tank behind Primary School, it was found that the tank top goes as much as 60 cm above the inlet pipe, implying large wastage of space as water will not fill above the inlet pipe, resulting in unnecessary bigger size and consequent undesirable increase in cost of construction.

12. In several cases septic tank upper slabs had been cast fully and an inspection /maintenance opening was added only as an afterthought by cutting the slab/ by breaking a part of the slab and rebuilding a part using bricks (Plate 3.2.5). In few cases, this provision of an opening for inspection and cleaning was not made at all, not even as an afterthought (Plate 3.2.5), and sometimes even the whole upper slab of the tank was found missing, and may not have been cast (Plate 3.2.6). Such instances of poor and careless execution and supervision were not very uncommon.

13. Many of the septic tanks at several sites were often seen filled with bricks, stones etc., including all kind of rubble/debris that may have been left at the building site after the construction work was complete (Plate 3.2.4). Probably, the contractors thought septic tanks to be an appropriate place to dump the debris. This indicates that septic tanks may not have been tested for functionality right from the beginning and even before making final payments.

14. Septic tanks were mostly found constructed to discharge their very foul effluents directly over the ground (Plate 3.2.7), in contravention to the provisions of IS: 2470 (Part 2) -1985 (Code of practice for septic tanks: Secondary treatment and disposal of septic tank effluent). This is a major design and execution flaw as the effluent from the septic tanks is quite foul, and in any case, cannot be discharged on the

surface and that too within the school building /panchayat building/other buildings premises.

15. Worst still was the fact that the water supply sources such as the handpumps were sometimes in the near vicinity of septic tanks discharging effluents on the ground surface within a few meters of distance from the handpumps (Plate 3.2.8). It is difficult to fathom as to how such gross slip-ups were made in the planning and execution stages.

16. The fact that most of the septic tanks were defunct, actually comes as a boon, because if these septic tanks were in a working state, the life of those utilising the civil amenities including the school children, would have been miserable, as these septic tanks were constructed to discharge directly on to the surface, without any soak-pits/dispersion trenches/secondary treatment etc.. One can imagine the plight if the very foul septic tank effluent flowed on surface emanating obnoxious odours and creating insanitary conditions and public health hazard in the form breeding of insect vectors. Besides, this would have posed a certain risk of contaminating by overflows into the nearby drinking water sources such as the Handpumps.

17. The Central Public Health and Environmental Engineering Organisation (CPHEEO), the technical wing of Ministry of Urban Development, Government of India, had provided initial recommendations on septic tanks laying out technical guidelines related to sewerage, in its technical Manual on Sewerage & Sewage Treatment, 1977, covering the technical requirements of septic tanks in great details. Further additions and updates have been made to the Manual in 1993 in its second edition. A comparison between the recommendations from these Manuals and actual field observation is illustrated in Table 3.2.1. It is evident that the recommendations, far from being followed, have actually been clearly flouted in most cases.

Table 3.2.1. Septic tanks: Comparison of Field Observations with Technical Requirements

Recommendation of CPHEEO Manual on Sewerage & Sewage Treatment, Govt. of India	Observation on Field at R&R Sites
"In rural areas and the fringe areas, and also for case of isolated buildings such as Hotels, hospitals, schools, small residential colonies, underground sewerage system with complete treatment of sewage may be neither feasible nor economical. In such cases, the generally accepted method of treatment and final disposal of domestic sewage without giving rise to public health hazard or nuisance is by the use of septic tanks followed by subsurface disposal of effluent."	Combined/Separate Septic tanks provided for isolated civil buildings for Schools, Panchayat Bhawan, Public Health Centre, Seed Godown etc. followed by Surface disposal of effluent
"Leading the septic tank effluents into open drainage system is not at all satisfactory as it would cause health hazards, nuisance and mosquito breeding."	The effluent led into open ground, what to say of avoiding drainage system.
"The subsoil dispersion system shall be at least 20 m away from any source of drinking water"	No subsoil dispersion system present. Effluent dispersed on surface without secondary treatment. Drinking water source, like Handpumps seen within 10 m in some cases (Plate 3.2.8).
"The effluent although clarified to a large extent, will still contain appreciable amount of dissolved and suspended putrescible organic solids and pathogens. Therefore the septic tank effluent disposal merits careful consideration"	Disposal given no consideration at all. Sometimes, even surface disposal seen towards an in-use water source (Plate 3.2.8)
"The septic tank effluent will be malodourous, containing sizeable portion of dissolved organic content and pathogenic organisms , and hence need to be treated before its final, safe disposal.....secondary treatment facility can vary from the most conventional land disposal methods like soak pits or dispersion trenches to additional secondary biological treatment systems"	No secondary treatment of septic tank effluents adopted. Effluent mostly left to flow freely on surface adjacent to the tanks.
"Septic tanks should be located as far as possible from the exterior of any building"	Septic tanks often located within building premises, within few meters of building exteriors (Plate 3.2.8)
"It should also be as far as possible from the nearest dwelling but not close than 7 m to avoid any corrosive effect due to tank gases vented into atmosphere."	Institutional buildings were within 2-3 m in several cases. .....Cont..

"In areas with porous soils this method gives satisfactory results.....should not be located in swampy areas or areas prone to flooding. In clayey, non-porous soils or where houses are closely spaced, suitably designed leaching pits may have to be used if septic tanks cannot be avoided"	Large number of sites had clayey, non-porous soils, sometimes even Black Cotton Soils; but the Septic tanks had no provision of Leaching pits or dispersion trenches etc.
"For the septic tanks to function satisfactorily, a fairly adequate water supply is a prerequisite".	No provisioning of water in toilets even inside the schools existed. There exists little chance that septic tanks would have run successfully even if connections existed. Running such under-watered septic tanks may have actually led to serious public health concerns and nuisance. Thankfully, invariably most septic tanks are defunct.
"Every septic tank should be provided with ventilation pipes, the top being covered with suitable mosquito proof wire mesh"	Ventilation pipes were often missing or were found damaged. Strangely these were sometimes provided just near the toilets on the connecting pipeline. This implies that odors and tank gases will impact the users as well as the children in the school buildings. No mosquito proof wire meshes seen anywhere, implying that R&R residents including the schoolchildren will be vulnerable to vector diseases such as Malaria in case the septic tanks were functional.
"All septic tanks shall be provided with watertight covers of adequate strengths. Access manholes of adequate size shall also be provided for purpose of inspection and desludging of tanks"	Access manhole covers mostly found missing. Sometimes these access manholes were constructed only as an afterthought by cutting the upper slab.

Gawla II Khalbujurg Dehar

Chandankhedi Dharamrai Amlali

Urdana Khalbujurg

Nisarpur

Plate 3.2.1. Dirty/stinking/unmaintained/unhygienic/defunct/out-of-use toilets without any provision of water and light. Typical for most buildings including Schools.

Borlai II: Locked Toilet

Kavanthi: One of the toilets is locked

Dharamrai: Two different Toilets

Plate 3.2.2. Toilets locked or put to alternative uses (Typical).

Dharamrai: Two different Open septic tanks

Amalali

Morekatta

Gangli Primary School

Achoda Primary School

Gangli Primary Health Centre

Perkhad Aaganwadi

Plate 3.2.3. Typical Septic tanks. Mostly defunct with missing gas pipes & without access manhole covers--posing safety concerns.

Morekatta

Dharamrai

Moreghadi: 2 Different Septic tanks

Khalbujurg

Typical Wastage (example, Beganda)

Plate 3.2.4.Inside of typical septic tanks: Poor construction qualities and rubble inside (Typical)

Beganda: No proper cover at the top—inspection and cleaning made very difficult

Beganda: Callousness in Construction: Septic tank Inspection/Entry chamber made as an afterthought after cutting the slab.

No trace of work to complete later.

Barda Manavar: No outlet seen. Post-construction correction in the form of inspection/maintenance opening. The construction carried out later as a patchwork is itself is of very poor quality, not likely to last. Noticeably, Bricks are visible in the new part.

Plate 3.2.5. Opening on septic tank made later as an afterthought to enable septic tank inspection and cleaning. Poor execution and poor quality of concreting work.

Chichli (Theekri) : Upper slab cast without any inspection opening. Inspection and Cleaning made impossible

Golata: the whole upper slab of the septic tank not cast/not found

Plate 3.2.6. Septic tank Upper slabs (Typical)

Urdana Borlai II

Takiyapur Morekatta

Beganda: Discharge on ground (right hand bottom corner) Moreghadi

Nisarpur...The toilet pipe discharges to footsteps!!... Chakeri
Thankfully, the toilets are defunct.

Plate 3.2.7. Septic tanks built to discharge directly on the ground surface in the building premises (Typical)

Jalkoti: A septic tank located 1-2 m from the building has non-existing pipe connection with toilet (Top). Effluent from septic tank is left to flow on ground in building premises, with a drinking water source, the handpump, only a few meters away (Bottom).

Golata: The toilet, septic tank, and Handpump lie only a few meters away.

Plate 3.2.8. Poor locations of Septic tanks with respect to drinking water source

3.2.1.2. Sewerage System: Piped Sewers, Sewage Treatment, and Effluent Disposal at Dharampuri

Dharampuri is the only R&R site that has a sewerage system with sewer pipes conveying wastewater to 5 exceptionally large Septic Tanks for possible treatment.

18. Some of the typical observations with regard to execution and design of the sewer lines/manholes constructed at Dharampuri are as below:
    - The sewerage network comprises RCC Hume Pipes, Class NP2, of various diameters such as 150 mm, 200 mm, 250 mm, 300 mm.
    - Some of the manholes were huge and even 9-10 ft above ground (Plate 3.2.9). In some of these cracks could be seen, and the general workmanship was not satisfactory indicating poor execution and supervision.
    - The manholes had precast RCC heavy/light duty Covers.

19. Several of these large manhole structures were located near the septic tanks (Plate 3.2.10). Large manhole structures may be needed if the area is low lying and is prone to flooding. It is noteworthy that in case these sewers do come under flooding, it is very likely that even the septic tanks may get flooded, a situation that may lead to massive insanitary conditions.

20. Some manholes were found above the nearby road level rather than flush with the roads (Plate 3.2.11), and this may lead to accidents once the vehicles start plying these roads. Even the persons walking on the road-side may sustain injuries, particularly because street lights have not been provided, and so road safety, especially during nights, stands compromised.

21. This compromise is associated with increased cost of construction, increased inconvenience for inhabitants, spoiled aesthetics of surroundings, and has brought in risk for vehicles, for those walking or travelling on road, as well as risk for the cattle strolling on the roadside, including the bulls/oxen who ply the bullock carts in the rural context jeopardizing safety, and posing a definite risk.

22. Several manholes were placed almost in front of culvert pipes (Plate 3.2.12) This implies a possibility of water intrusion into sewers resulting in increased flow into sewers and increase in hydraulic load of the septic tanks with dilution of wastewater BODs etc. that may significantly and advesely affect the performances of the septic tanks.

    Equally seriously, there would also be possibility of sewage flowing in the open through the culvert drains if the sewer lines becomes clogged, chances of which are fair if a number of manholes remain without covers, as was the case at the site. Such flows leading to mixing of sewage with drainage water will invariably lead to insanitary conditions and would create significant public health nuisance.

23. Also in such cases, house connections from across the road to manholes near the culverts may sometimes have to come through the drain pipe which would be very inappropriate.

24. Several sewer manholes were found without Covers, which may have been probably stolen, and have not been replaced by the maintaining agency. Coverless manholes not only facilitate mixing of drainage waters with sewage and vice versa, but significantly compromise upon safety of children and animals who are vulnerable to falling down, more so as some of the seweres are deep enough to prove fatal.

25. The above aspects become more serious in view of the fact that open manholes without covers are likely to have an influx of polythenes, solid waste and garbage, resulting in clogging of sewer pipelines, and conveyanvce of the solid waste into the septic tanks.

26. In a serious violation of acceptable norms and practices, Hospital Toilets and Wards have been connected to discharge into public sewers. This is likely to raise public safety issues as hospital wastewaters carry very infectious pathogens, and need to be isolated and treated separately. Thus, when isolated Septic tanks were the norms elsewhere at all sites, at Dharampuri the wastewater from 30-bedded Hospital was not isolated, but rather put into public sewers in complete disregard to public health and safety norms.

27. In another probable serious violation of standard engineering practices, it is likely that in some cases (Plate 3.2.13), for instance near Plot Number 1626, the water pipe line lies in very close proximity, and below the Sewer line manhole. This is a serious execution and supervision fault and is essentially a blunder and negligence as there exists public health risk of intrusion of sewage in water pipes which lie close nearby. The CPHEEO Manual, 1993 under section 3.5.3 clearly states that "Sewers as a rule are not located in proximity to water supplies", and this provision seems to have been violated.

28. In fact, it was common to find other provisions of the "Manual on Sewerage & Sewage Treatment, 1993", published by the Central Public Health and Environmental Engineering Organisation (CPHEEO), the technical wing of Ministry of Urban Development, Government of India, being violated. For example, the MS/CI footsteps to be provided in manholes properly staggered and in due numbers at proper spacing centre-to-centre as prescribed were mostly not found as per the provisions, and just one or two footsteps randomly put were seen. This indicates not just a violation of technical requirements needed for maintenance, but also a gross disregard to essential feature needed to get down the manhole and to the safety of the personnel maintaining and cleaning the sewers.

29. Some of the manholes were unduly deep. For instance, in the Zone 5, for manhole behind Culvert 80, Node 52-51, the depth was 6-7 ft. even at the starting of the sewer line, with line likely to go deeper as it progresses. Even with so much of depth just one CI/MS Rung (footstep) was seen provided (Plate 3.2.14), indicating callousness in construction. Significantly, deep lines make maintenance difficult, and result in increased costs due to larger excavation.

30. Another very serious violation of the provisions of the above CPHEEO Manual was the excessive drops in the ordinary manholes without making the due provision of a drop pipe inside the manholes. While the Manual prescribes Drop Manholes whenever the drop between the service and the main line exceeds 60 cm, in reality it was common to find very large drops in the range of 70-180 cm. For example, manhole 53/6 had a depth of 1.9 m (6.23 ft) and was 10 cm to 50 cm above ground (undulating soil around). It had a 70 cm fall, for nearby line, and 90 cm fall for service line across the road. Similarly, near Plot 921-922, a service manhole was found 3.05 m (10 ft) deep, with a drop of as much as 1.83 m (6 ft)! Such drops in ordinary manholes without providing proper drop connections were in complete disregard to all prescribed technical norms.

31. Such massive drops in normal types of manholes also indicates that the lines have been laid too deep resulting in unnecessary increase in costs as well as making the lines almost unserviceable and difficult to maintain when the lines become charged by flowing sewage.

32. Then there were some technical issues with regard to the large septic tanks constructed at Dharampuri and the following are some of the pertinent observations:

- In the septic tank number 4, for the two Inspection Boxes, near baffle walls no ladders were seen, neither any steps/rungs were found provided. This implies that for inspection and maintenance, it would not be easy to go down or come up, thus compromising with the very essence of the inspection boxes, and jeopardising with the safety of the personnel.
- No gas pipes were seen in tank 4, but two holes were seen that may act as gas outlets. It is possible that either the gas pipes were not installed indicating poor execution, or maybe they did not stand the test of time and were not replaced indicating poor maintenance.
- Similarly for Septic tank no. 5, there were remnants of gas pipe 150 mm diameter PVC pipes that were seen, but the encasing was found damaged, indicating lack of maintenance.
- No wire meshes were seen to prevent outbreak of mosquitos breeding in the septic tanks

33. Even the location of septic tanks remains suspicious. If the nearby sewer line encased in cement concrete box, and large manholes over the ground (upto 9-10 ft high) are constructed to take care of low lying area which is prone to flooding, then even the septic tanks in near vicinity (Plate 3.2.10) will come under deep flooding, and therefore not just become dysfunctional at times, but would create extreme insanitary conditions at much of the R&R sites due to sewage mixing with storm waters and backflow of sewage into the sewers due to flooding of septic tanks, resulting into major public hygiene hazard. Dilutions and washing of microorganism cultures will further not allow the septic tanks to work efficiently for months even after the floods.

34. It may be noted that the Indian Code of Practice for Installation of Septic Tanks IS: 2470 (Part 2), 1985 under Section 3 (Preliminary data for Design), warrants "fullest possible information on nature of the soil and subsoil conditions, as well as the approximate water table and any available records of flood levels or information as to the variation, seasonal or otherwise, in the water table". The code further recommends trial bores or boreholes to determine soil type and the position of trial bores/boreholes to be "shown on the Plans together with sections showing the strata found and the dates on which water levels were recorded". This becomes supremely important because of the extraordinary and abnormally large sizes of septic tanks and the huge discharges expected from them in the present case, as well as because of the fact that septic tanks are in close proximity to Nallah/River which creates flooding of sewer lines.

35. Yet, no studies for water discharges and flooding in the area, as well as no soil characteristics and trial bore records have apparently been a part of either the hydraulic designs undertaken by NVDA or the structural designs undertaken by Aqua Consultants.

36. In a complete and blatant violation of IS:2470 (Part 1)-1985, clause 3.3 specifically ordaining that "Under no circumstances should effluent from a septic tank be allowed into an open channel drain or body of water without adequate treatment", the Septic tanks massive effluent discharges drain into surface waters, without any secondary treatment and polishing.

37. This act would in all times to come lead to extreme insanitary conditions and will have immense public health impacts. Such adhoc, arbitrary and negligent planning, design, and execution need to invite exemplary action against those responsible, besides initiation of immediate and urgent remedial measures. This issue has been dealt with in greater details in Section 3.2.2.4.

Plate 3.2.9. Dharampui: Typical Huge sewerage manholes presumably in the low-lying area prone to flooding. Note the large Longitudinal Cracks, and extensive damage. Very poor execution and work supervision.

Plate 3.2.10. Dharampuri: One of the five massive septic tanks. In the front lies an encased sewerage line, and a big manhole, designed for low-lying area under flooding. If this sewer line gets flooded, it is very likely that the septic tank may also get flooded as well.

Plate 3.2.11. Dharampuri: Typical Manholes rising above road level. Safety jeopardised.

Plate 3.2.12. Dharampuri: Typical Manhole Locations with respect to Culverts. Note also the missing cover in one case.

Plate 3.2.13. Water supply line aligned with sewer line (Typical)

Plate 3.2.14. Dharampuri: Inside a Typical Deep Manhole – Sometimes just one or two footsteps provided even for deep manholes.

3.2.2. Planning and Design Aspects

3.2.2.1 Public Toilets in Buildings and the Decentralized Small Septic Tanks

Research studies and surveys conducted in India and elsewhere reveal that if toilets are poor, children are reluctant to use them, with many, particularly the females, trying to hold on all day until they get home. Repeated toilet avoidance can lead to chronic constipation and cause or exacerbate incontinence and urinary infections. Children also fail to drink adequately at school if they do not want to use the toilets.

Thus, School toilet issues continue to cause children and parents concerns in nursery, primary and secondary school settings. Broken/damaged toilet seats, no water inside, no soaps, no lighting, broken locking system on doors, no sanitary bins, locked toilets etc. are relevant issues that have been already dealt. From Planning and Design perspectives the following issues are noteworthy:

38. No separate toilets existed for girl students both at the Primary or the Secondary/Middle school levels.

39. Common toilets were provided despite the fact that at most sites two compartments were seen. It is not clear as to why only one of these compartments had a lavatory. The use of the second toilet is not clear as bathrooms are not needed in schools and Panchayat Bhawans etc.. The absence of urinals and WC-seats, as well as the absence of any plumbing inside imply that one of the compartments had no use. A second lavatory would have greatly helped, and especially the cause of the girl students and female users.

40. Not only were the toilets common, the planning of toilets in general was such that in most cases, the facilities did not offer privacy when entering and using the sanitation services i.e., a separation wall in the front of the toilets was often not present. This was a certain planning and design lapse as it discourages especially the girl students, from attending the call of nature.

41. The planned locations and designs of septic tanks leave a lot to be desired. These tanks were located too close to the buildings, and the vent pipes were often found at the junction of toilets and connecting pipes to septic tanks. Thus, if the septic tanks were functional the obnoxious gases would certainly invade and enter the buildings and would affect free usage in a number of cases. Furthermore, the often seen surface discharge of offensive effluent from the septic tanks would also have led to nuisance as far as public health and hygiene is considered. In some cases, proximity to water supply sources such as the Handpumps was further an issue that should have been avoided.

42. It is noteworthy that no provision for water has been made in any toilet, and several times the water was not available even in the building premises. For this reason, there was no water as well as flushing arrangement inside the toilets. This would not only prove to be a major user inconvenience and an issue of public hygiene, but also because the toilets are connected to septic tanks which require minimal quantities water to function, it would very adversely affect the functionality of the septic tanks provided for toilet effluents and would make them defunct.

43. The septic tanks in the building premises are not likely to be functional. IS:2470 (Part I)-1985 (Reaffirmed 2001) –Code of Practice for Installation of Septic Tanks, published by the Bureau of Indian Standards, in Section 0.3 clearly states that "In unsewered areas, if adequate water supply is available for flushing, treatment of the liquid waste in septic tanks is recommended." In the absence of adequate water supplies, septic tanks cannot function. Thus, expenditure on septic tanks has been nothing short of wastage of public money, as the toilets do not have water supply in the present case, and the septic tanks will become defunct, as has been seen as the R&R sites.

44. The above choice was a major planning and design lapse despite the fact that for more than a decade now, pit latrines (Pour-flush latrines with leach pit) have been usually the appropriate choice in areas facing water shortages, including the rural areas. It may be noted that under the Total Sanitation Campaign (initiated in 1999), Ministry of Rural Development of the Government of India (now called Nirmal Bharat Abhiyan under the Ministry of Drinking Water and Sanitation), pit latrines have been the recommended option, eligible even for financial incentives in situations where water is in dearth inside the lavatories.

45. What is even more appalling is the fact that prior to around the year 2008, this programme of pit latrines was with the PHE Department in the State of Madhya Pradesh (it has now been undertaken by Madhya Pradesh Panchayat and Rural Development Department and linked to schemes like NREGA), and yet this appropriate choice was overlooked, and a costlier and highly inappropriate choice was adopted. Normal toilets with septic tanks were a poor and unworkable choice due to lack of water, as is evident at the field where toilets as well as septic tanks lie defunct and out of use.

46. Thus, the planners and designing authorities chose a technology that was a complete misfit in situations where water was not being made available in the toilets, and even its availability was not ensured in building premises including the schools where handposts, assuming they were available and working, would supply running water only for very limited timing when tubewell would be pumping (unless overhead tank exists at the R&R site). This when an appropriate and recommended option of pit latrines was available and widely known.

47. It is also not known as to how the present type of latrines will be flushed especially by the school children, in the absence of provision of water in the toilets, and inadequate water facilities in vicinity of the buildings.

48. The toilets in the Primary Schools were not children friendly/sensitive to the needs of the children. Inside the toilets of the Primary School, the WC-seats installed were of the same size as in other buildings meant for adult users. It was necessary that in Primary Schools the squatting seats should have been of reduced size as would be required for primary school children. This was a significant violation of the requirements envisaged in "School and Anganwadi toilet designs: Norms and Options – a technical note", developed and published by the Department of Drinking Water and Sanitation, Ministry of Rural Development (MoRD), GoI, with support from the United Nations Children's Fund (UNICEF), released in January 2004, which calls for appropriate diameter of the squatting hole "due to needs as well as the psychological considerations because of fear of falling through".

3.2.2.2. Sewerage System at Dharampuri - Planning and Design Aspects

49. Oddly, piped Sewerage system has been laid only at the Dharampuri site where 37.64444 Kms of piped network collects sewage and discharges it to 5 large Septic tanks for treatment. At the remaining 87 R&R sites, no provision, whatsoever, has been made for collecting wastewaters generated from the individual plots allotted to oustees, and there has been a complete absence of any effort to provide a community sewage treatment plant for safe and scientific disposal of sewage that would be generated from individual houses.

50. At these remaining 87 R&R sites not even a provision of land earmarked and allocated for a future community Wastewater/Sewage Treatment Plant has been made.

51. Making provision of sewerage infrastructure at only one site, as against a total disregard to generated sewage at all other R&R sites raises valid concerns:

- This is discriminatory to a wide majority of oustees, denying most of them the privilege of essential sanitation, and access to equal infrastructure. Residents at 87 R&R sites will have to raise their own sewage treatment system/sewerage network, and somehow establish treatment plant after finding suitable land, at either personal costs or find appropriate funding from some GoI scheme, which may not always be easily forthcoming.
- Significantly, a non-provision of sewerage system also leaves a bleak future scenario for residents of these remaining 87 R&R sites, where individuals may have to spend a lot on making arrangements for disposal of sewage. Individual septic tanks may be constructed: but it would essentially involve cost burden, part loss of allotted plot area, and a risk of contamination of groundwater due to large numbers of septic tanks in close vicinities. Furthermore, Black-Cotton soils conspicuously present at several R&R sites may not allow the septic tanks to function well both structurally as well as from the viewpoint of final disposal of the septic tank effluents in BC-soils.
- Non-provision of sewerage system may encourage open defecation, especially amongst those who have lesser affordability or lesser willingness to construct their own individual septic tanks.
- There exists a large risk that a non-provision of sewerage system at these R&R sites may lead to insanitary conditions, which may happen in due course of time after the residents build their houses and the sites get fully occupied.
- It is noteworthy that at several sites, plots have been earmarked which are more than even 1 m below the immediate road level, and hence laying an effective sewerage system may remain a technically challenging task.

52. On raising the issue of differential treatment to Dharampuri, vide letter No. 301/Karya/2012-13, Barwani dated 24/03/13 (Annex 2.5-A, Point No. 7), NVDA has forwarded the argument that Sewerage system has been provided only at Dharampuri, because out of 88 R&R sites developed, only the Rehabilitation site of Dharampuri comes under urban area while the remaining 87 R&R sites come under rural areas. Therefore, in view of facilities accorded in urban areas, the sewerage system has been provided only at Dharampuri.

53. However, the argument that R&R site of Dharampuri has a sewerage system in place as compared to the rest of the R&R sites due to its urban characteristics appears counterfeit due to a number of reasons. These reasons exhibit that NVDA itself has not followed its own argument of urban characteristics for Dharampuri in letter and spirit, and that such an argument has only been forwarded to justify the sewerage system and the related extra investments made (and probably also to justify smaller plot sizes allotted to oustees at Dharampuri).

- At Dharampuri, NVDA itself has not made provisioning of road side Drainage and other municipal facilities like Solid waste collection bins etc. as are associated with urban characteristics. In fact, drainage works were even seen at a number of non-"urban" sites, even as these were non-existent at Dharampuri R&R site.
- The actual design requirement for water supply in the NVDA's Water supply Scheme (a Note of Technical Sanction) has been placed at 70 lpcd for the rehabilitated part of the population at Dharampuri, a figure that is at par with all the other rural R&R sites. This indicates that even the water supply scheme, linked closely to provisioning of piped sewerage infrastructure at any place, has not been designed as per the urban criterion. It may be noted that IS: 1172-1983 (Code for basic requirement for water supply, drainage and sanitation), the National Building Code, India, as well as the CPHEEO Manual for Water Supply, 1999, published by the Ministry of Urban Development, GoI, recommend that for urban places where sewers exist the water supply should be at least 135 litres per capita per day (lpcd).
- The Water supply Scheme (a Note of Technical Sanction) at Dharampuri for Dharmpuri Village partially coming under submergence, clearly states that "After execution and settlement of oustees the water supply scheme will be handed over to the respective Gram Panchayat for running and maintenance....."(Annex 3.1-O).
- The Dharampuri R&R site will have a developed population below even 25000, and no Nagar Palika Bhawan has been constructed at the R&R site
- Vide Technical Sanction No. 247 dated 20.01.2005, as many as 20 Cattle troughs have been provisioned for the "urban" area in the Estimates (General

Abstract-Water Supply Scheme, Dharampuri) (Annex 3.1-Q). It is a different matter that in violation to their own Technical Sanction, Halaos have actually not been constructed even after approvals in the form of Technical Sanctions, and the money allocated (Rs 2,40,000/-) as per the Estimates probably diverted to other works.

- The recommendations of the Task Force Team vide Commissioner Field NVDA Indore dated 17.11.2003 has recognised the area under submergence as rural (Annex1-C), and has nowhere in the document recommended for construction of a sewerage system at Dharampuri R&R site.
- Even for water supplies, the Task Force Team has clearly recommended (Annex1-C) that water supply pipe line will be merely extended to the rehabilitation area, and no new large construction such as Overhead Tank etc. shall be carried out. If needed, then in some area handpumps will be provided. Thus, the emphasis of even the Task Force team was clearly not on creation of an urbanised R&R site at Dharampuri, but rather at maintaining status quo for displaced residents of Dharampuri "village". And yet, Sewerage system costing Rs 651.16 Lakhs has been provided at Dharampuri R&R site, an infrastructure that is often used to justify even the smaller plot sizes provisioned at Dharampuri.

54. Thus it appears that the provisioning of sewerage system at only one site to the complete exclusion of the facility at all other 87 R&R sites, is discriminatory and unjustified. Furthermore, reduced plot sizes at Dharampuri justified in the name of urban area, are also discriminatory for the same reasons.

55. Urbanized or otherwise, the additional investments at Dharampuri for sewerage system may have been still welcome, if this promised to improve sanitation at the R&R site. In reality, it turns out to be just the opposite.

56. In what is rather astounding and appalling as well, the entire sewerage system built at Dharampuri is not likely to be functional at all, and it appears that the entire investments on sewerage system are nothing but irresponsible wastage of public money due to the following reasons:

- By allowing water supply at a maximum of 70 litres per capita per day (lpcd) (Annex 3.1-O) for the resettled persons, rather than at the prescribed requirement of minimum 135 lpcd, it has been ensured that the sewerage system will not work, as it will not have adequate sewage conveyance. This is a huge planning and design flaw in violation of provisions of IS: 1172-1983 (Code for basic requirement for water supply, drainage and sanitation), the National Building Code, India, as well as the Ministry of Urban Development's CPHEEO Manual for Water Supply, 1999.

- There exists no chance that the sewerage system will work with a water supply provisioning of 70 lpcd, out of which expected losses in water supply stand at 20-50% ("Several pilot studies conducted in the country have shown water losses in the distribution systems to be of the order of 20 to 50% of the total flow in the systems" – Manual on Operation and Maintenance of Water Supply Systems, CPHEEO, Ministry of Urban Development, GoI, 2005) implying a net water supply of nearly 35-56 lpcd at best at the consumer end. As nearly 80% of the water supplies return as sewage, the likely actual sewage in the designed piped networks at Dharampuri would stand at 28-45 lpcd. It may be noted that the sewerage system has been designed at 100 lpcd as per the minimum criterion recommended by CPHEEO (Annex 3.2-A), after arbitrarily assuming that water supply is made at 135 lpcd for 70% of the population (Annex 3.2-A).
- Thus a highly disproportionate infrastructure has been created: piped networks that have been designed for 100 lpcd of sewage, but would actually carry no more than 28-45 lpcd of sewage. In every possibility, this system will not work because in reality even the minimum cleansing velocities will not exist with the kind of meagre actual flows. This would create extreme putrid conditions inside pipes and manholes, defeating the purpose of sanitation, and leading to massive public health and hygiene issues as and when the sewer lines get charged through the house connections.

57. However, what possibly comprises the greatest and most absurd of Planning lapses, reducing the provisioning of the entire sewerage system at Dharampuri to nothing more than a sham is the fact that while water supplies at Dharampuri for the rehabilitated population of the oustees are designed at no more than 70 lpcd of supply (which would further undergo significant 20-50% losses before reaching consumers) (Annex 3.1-O), the sewerage system has been designed at 100 lpcd of sewage!(Annex 3.2-A). Thus, NVDA Planners and Technical Engineers expected 2-3 times more water to return into sewers than the water supplied!

58. It may be noted that this gross absurdity in design parameters was not a case where different authorities and officers were involved so that the right hand did not know what the left hand was doing. The Technical Sanctions for both, the water supply as well as the sewerage system, were obtained within 45 days, and it were the same set of authorities proposing and sanctioning the two approvals, without bothering to notice the glaring anomalies. Thus, the Technical Sanction for the Sewerage project was obtained vide TS No.242, dated 07/12/2004 (Annex 3.2-B), whereas for Water supply works it was obtained vide TS no. 247, dated 20/01/2005 (Annex 3.1-Q), with the same Executive Engineer, ND PHE Division, Barwani, proposing the two works, and the same Chief Engineer (PWD), NVDA approving the two works by signing the General Abstracts of the two Estimates, the same individual officers not bothering to notice grave anomaly that water supply per capita was only a fraction

of the designed flows per capita into the sewers, something that would obviously sink the entire investments made into constructing the sewerage system.

59. It is inconceivable that such errors/blunders can be made by qualified and experienced professionals that result into sinking of massive investments and wastage of public money. All responsible officers, planners and engineers in this case need to be made answerable and appropriate exemplary actions including possible recoveries needs to be initiated.

3.2.2.3. Sewage Treatment and Disposal at Dharampuri - Planning and Design Aspects

60. A set of 5 exceptionally and extraordinarily large septic tanks have been provided to treat the sewage generated at Dharampruri Site. Notwithstanding, the discussion below, all of these were destined to remain non-functional for the same reason as elaborated above in Section 3.2.2.2 with water supplies being only a fraction of sewage volumes for which the sewers and Sceptic Tanks have been designed.

61. Even this choice of the set of 5 very large septic tanks (Typically Plate 3.2.1) provided at Dharampuri site, the only one to possess a sewerage system with sewage treatment facilities, remains rather inexplicable. Approved with total Estimate of nearly Rs 122.4 lakhs shown in the Technical Sanction no, 242 dated 07/12/2004 (Annex 3.2-B), these five tanks have been designed for ultimate populations of 5730, 6533, 5768, 5955 and 5618 respectively.

62. Oddly, these ultimate design populations for which the 5 Septic tanks have been designed far exceed the values generally recommended by various codes/Manuals in making septic tanks preferred treatment options.

63. "Manual on Sewerage & Sewage Treatment, 1993", published by the CPHEEO, the technical wing of Ministry of Urban Development, Government of India for usage of septic tanks as a sewage treatment option reads "Because of the unsatisfactory quality of the effluent and also the difficulty in providing a proper effluent disposal system, septic tanks are recommended only for individual homes and small communities and Institutions whose contributory population does not exceed 300. For larger communities, septic tanks may be adopted with appropriate effluent treatment and disposal facilities". In the present case this contributory population exceeded 300 by a huge margin, all the way to 5600-6500, even without any "appropriate effluent treatment and disposal facility" as mandated.

64. In fact, the 1977 edition of the CPHEEO Manual without any assumption of "appropriate effluent treatment and disposal facilities", clearly limited the maximum population served by septic tanks: "For larger communities, provision of septic tanks should be avoided as far as possible, but may be extended to a

population of 500 in undulating topography". In the present case, while "appropriate effluent treatment and disposal facilities" were missing, even the mandated upper limit of 500 as contributory population was flouted by more than 10-12 times.

65. Similarly, IS: 2470 (Part I)-1985 (Reaffirmed 2001) – Code of Practice for Installation of Septic Tanks, published by the Bureau of Indian Standards, covering "the design and construction of septic tanks for small installations (upto 20 persons) as well as large installations", while recommending septic tanks for "unsewered areas", limits the users (contributory population) to 300 for even the residential colonies and Hostels and Boarding Schools in its Tables 3 and 4.

66. Thus, septic tanks are usually provided in unsewered areas to cater to populations of a few hundreds and not for sewerage systems with populations exceeding 5000, and certainly not without "appropriate effluent treatment and disposal facility". The choice of septic tanks has been clearly inappropriate in the present case.

67. Like the sewerage system, the septic tanks have also been designed for sewage generated at 100 lpcd of sewage inflow (plus 20% infiltration), even when the actual water supplies are designed at 70 lpcd of which 20-50% would be losses which would not convert into sewage, and of the actual water supplied only 80% would be retuning as sewage as per the norms. Thus, disproportionately large infrastructure in the form of huge septic tanks has been created, and investments have been made which are wasted.

68. The Dharampuri site possesses Black cotton soil in areas where septic tanks are located, and such massive septic tanks in all likelihood may not auger well in such soils, both functionally and structurally.

3.2.2.4. Effluent Disposal from Septic Tanks at Dharampuri

69. The main purposes of a septic system are to remove solids from the raw sewage and only allow liquid effluent to discharge into the soak-away/dispersal system, which soaks/disperses the effluent into the ground. The natural soil and associated bacteria then destroy the microorganisms including bacteria and viruses present in the effluent before they can contaminate groundwater.

70. IS:2470 (Part I)-1985 (Reaffirmed 2001) –Code of Practice for Installation of Septic Tanks, published by the Bureau of Indian Standards under Section 3 clearly mandates that the septic tank effluent " should be given secondary treatment either in a biological filter, upflow anaerobic filter, on the land or in a sub-surface disposal system".

71. However, conspicuously the septic tank designs at Dharampuri are silent over the immensely important issue of septic tank effluent disposal. No secondary treatment

option has been undertaken and designed either in the Hydraulic designs or in Structural designs in complete violation of provisions of IS: 2470 (Part I)-1985.

72. In practice, the septic tank effluent disposal blatantly violates the provisions of IS: 2470 (Part I)-1985, National Building Code, India, as well as the provisions of the CPHEEO "Manual on Sewerage & Sewage Treatment, 1993", all of which mandate that "Under no circumstances should effluent from a septic tank be allowed into an open channel drain or body of water without adequate treatment".

73. At the Dharampuri Site, the septic tanks have been constructed in very close vicinity to surface water bodies. Plate 3.2.15 shows the satellite imagery of R&R site at Dharampuri, with 3 septic tanks visible, two of them lying within 25-30 m from River Khuj, while one tank discharges into a Nallah that drains into River Khuj after a distance of 60-75 m. Thus, in all possibilities, effluent discharges from the septic tanks have been disposed into nearby surface water bodies, violating every acceptable principle and guideline.

74. The Central Public Health and Environmental Engineering Organisation (CPHEEO), the Technical wing of Ministry of Urban Development, Government of India, providing technical guidelines related to sewerage, in its technical manual "Manual on Sewerage & Sewage Treatment, Second Edition, 1993" observes: "The effluent although clarified to a large extent, will still contain appreciable amount of dissolved and suspended putrescible organic solids and pathogens. Therefore the septic tank effluent disposal merits careful consideration." Discharging the foul effluent in surface waters without any further polishing treatment/Secondary treatment is technically inappropriate and unacceptable.

75. In every likelihood, the septic tank discharge will also violate the standards deemed for discharge of effluents into inland surface waters as spelled in Environment (Protection) Rules, 1986 under Schedule-VI, Rule 3A, which prescribe maximum values for BOD as 30 mg/l and Suspended Solids as 100 mg/l. Septic tank effluents loaded with "dissolved and suspended putrescible organic matter" cannot meet these stringent statutory requirements, and there is hardly any chance that discharges will be within the stipulated limits, particularly during the dry season when dilution from Nallah/River water will be minimal, if any.

76. From the 5 septic tanks combined, the effluent at designed ultimate population will be 29604 (Population) x100 lpcd sewage (design sewage flow adopted by NVDA) = 2.96 MLD (Million litres/day). Add to this 20% infiltration as has been adopted in designs, the septic tanks are designed to daily discharge an average of 3.552 MLD of sewage into the River Khuj. With a peak factor of 3 as adopted in the sewer designs, the peak hour (morning/evening) treated discharge will be a gargantuan 10.656 MLD, an amount which is equal to 10656 water tanks kept on the roofs of our houses of 1000 litres capacity each. Such large discharges can in

no way be easily absorbed even by River Khuj, and may possibly lead to massive floods and spills in the adjoining areas comprising very foul discharges, not to forget the monsoon season, when the Nallah/River etc. will have their own floods as evident by the large sewer manholes constructed above ground to take care of flooding of sewer lines during monsoons.

77. It may be noted that no study of capacity/discharge of Nallahs/River Khuj appears to have been made, and no such records have been submitted to this Inquiry Committee. Thus there has been no consideration given to the practicality of the entire notion of illegal discharge into the Nallah/River, indicating a very casual attitude to public health and hygiene and to public spendings.

78. Table 3.2 summarises some of the issues related to septic tanks and effluent disposal at Dharampuri.

Table 3.2.2.: Comparison of Field Observations with Technical Requirements for Sewerage System at Dharampuri

CPHEEO Manual on Sewerage & Sewage Treatment, Government of India Recommendation	Observation on Field at Dharampuri R&R Site
"Because of the unsatisfactory quality of the effluent and also the difficulty in providing a proper effluent disposal system, sceptic tanks are recommended only for individual homes and small communities whose contributory population does not exceed 300. For larger communities septic tanks may be adopted with appropriate effluent treatment and disposal facilities"	Septic tanks adopted for populations exceeding 5600, and even without any consideration of effluent treatment and disposal.
"In areas with porous soils this method gives satisfactory results.....should not be located in swampy areas or areas prone to flooding. In clayey, non-porous soils or where houses are closely spaced, suitably designed leaching pits may have to be used if septic tanks cannot be avoided"	At Dharampuri septic tanks were located in swampy areas prone to flooding in all likelihood
"For the septic tanks to function satisfactorily, a fairly adequate water supply is a prerequisite".	Water supply was much less than the sewage quantities assumed in the designs.
"Septic tank effluent disposal merits careful consideration"	No consideration given, and direct effluent discharge into surface waters violating all norms. This without evaluating if Nallah /River do actually have adequate capacity to absorb massive discharges from septic tank, including during monsoons.
"Septic tank effluent will be malodourous, containing sizeable portion of dissolved organic content and pathogenic organisms and hence needs to be treated before its final safe disposal."	At Dharampuri septic tank effluent has not been treated prior to disposal.

Plate 3.2.15. Satellite Imagery for Dharampuri R&R site

Location of 3 of the 5 septic tanks at Dharampuri shown in blue baloons. Note their proximity to the Khuj River. Two of the septic tanks are barely 25-30 m from the river while, one of the tank lies 60-75m away, discharging into the Nallah that drains into the River Khuj.

At the left hand bottom corner lies the Community Health Centre. Note also a number of trees along the River Khuj , and across its other side opposite to the R&R site. And yet, no Trees have been officially felled to develop any of the 88 R&R site as has been the official NVDA stand on the matter (Annex 1-A).

3.2.3. Design Aspects of the Septic Tanks

79. Very strangely, neither the Hydraulic Designs carried out by NVDA (PHED) Engineers, nor the Structural designs, yet again assigned to M/S Aqua Consultants (the same consultants who obliged NVDA with designs for Drain pipes that were already purchased and laid at Khalkhurd) say anything about how and where the liquid effluent from the septic tanks is to be finally disposed.

80. The Estimates used in Technical Sanctions do not indicate cost provisioning for secondary treatment of the effluent from septic tanks. The MBs also do not appear to indicate any construction of an appropriate secondary treatment arrangement that should have been mandatorily been made.

81. Only the Consultant's structural Drawing shows the treated effluent from manhole marked with an arrow labelled "To Soak Pits" (Annex 3.2-C), but still gives no design for soak pits.

82. It may be noted that NVDA were specifically asked in writing vide letter CE/63 dated 14.05.2013 of Dr. Mukul Kulshrestha (Annex 3.1-L , Point No 4) to provide "information regarding vide publicity process adopted for awarding the work to the above consultancy firm i.e. Expression of Interest, NITs, News-paper cuttings for the published EoI/NIT etc including documentation of NVDA that awarded the work, total proposals received, the process of Award of the work to the aforesaid private firm, amount of contract, and proof of financial payments made to Aqua Consultants" with specific reference to sewerage system and septic tanks.

83. It is regretted that none of the above sought information was provided to this Inquiry team, in the absence of which it is difficult to make comments on regularity of the procedure followed on appointment of consultants and other related aspects. However, there is a certain suspicion particularly in view of the irregularities observed for case of half-round drain designs at Khalkhurd where the same consultants were involved, and this suspicion reinforced by not providing the documents asked for, that the consultants may have been appointed only as an afterthought or by a questionable procedure or may have once again obliged the department by just giving some designs for the sake of formality so that NVDA can make claims of having followed all due procedures.

84. The above suspicion gets enhanced when one reviews and encounters various inconsistencies in the designs provided by M/S Aqua Consultants relative to other documents/actual construction at site.

85. For, instance, the structural designs of septic tanks provided by M/S Aqua Consultants, begin by assuming septic tank sizes (internal dimensions of septic tanks) that are not even consistent with the dimensions of septic tanks calculated

and finalized in the hydraulic designs carried out by NVDA in seeking Technical Sanctions and based upon which cost Estimates were prepared by NVDA. Thus for instance, for Septic Tank number in Zone - 4, the NVDA hydraulic designs finalize internal tank size of 34.9 m x 17.4 m (length x width) (Annex 3.2-D), while M/s Aqua consultants assume these internal dimensions as 37 m x18.5 m (Annex 3.2-E) for carrying out structural designs, thereby increasing the dimensions and costs by more than 9%.

86. It may further be noted that in their design, for instance for Septic Tank in Zone – 4, M/S Aqua Consultants have provisioned for a retaining wall 4 m in height and construction of upper slab 1.25 m below ground level (Annex 3.2-C). In reality, Septic Tanks were found constructed on/above ground level (Plate 3.2.10). Thus clearly, even the consultants designs have not been followed while constructing the septic tanks, and probably these designs were only got done to convey an impression that constructions were duly designed, and due technical processes were followed by NVDA. But in reality, the public money was wasted on obtaining the consultant designs, which were not even followed in practice.

87. What is even more bizarre is the fact that as per the Estimates of NVDA forming the basis of Technical Sanction, for instance for Septic Tank in Zone - 4, the Earthwork warranted was 1921.08 m^3 (Annex 3.2-F), whereas as per the Consultant's designs, this became approximately 2882.09 m^3. Quiet inexplicably, in reality as per MB No. 204 for construction of Septic Tank No. 4, the actual Earthwork that has happened has been recorded in the Final Bill stands at a much larger figure of 4206.204 m^3 (Annex 3.2-G), which implies that the actual construction has either been inexplicably large or has been shown and recorded inflated, following neither the designs of NVDA nor that of the Consultant. It also represents a very major not-justifiable increase in the quantities and scale of construction carried out probably only to exhaust the allotted budgets so that the reported deviations remains zero. There also exist strong possibilities of financial misappropriation by recording and paying much larger quantities than should have actually happened.

88. While No Deviations have been claimed by NVDA (Annex 3.2-H), in reality deviations seem very likely. Thus for instance again for Zone – 4 Septic Tank, the Technical Sanction was obtained for an Estimate amount of 24.6 Lakhs (Annex 3.2-B, 3.2-F). Against this, as per MB No. 204, Page no. 26, the total value of the work done has been shown as 29.36818 Lakhs (Annex 3.2-G), implying a variation (increase) of 19.38%. Even if one were to account for additional 3.78% above SoR as per Agreement, the deviation still exceeds 15%. This significant variation (exceeding 15%) ought to have been mandatorily reported to competent authority and needed to invite prior review and approval by the Competent Authority (SE/Chief Engineer) as per the MPWD Manual, 1983. However, no such reviews

and approvals have been found in the records submitted to this Inquiry team, indicating gross irregularity in construction work.

89. These deviations should have been actually a natural outcome of the fact that Estimates prepared by NVDA were in reality not based on detailed structural design, but only on approximation. It may also be noted that the structural designs for septic tanks at Dharampuri R&R site by M/S Aqua Consultants, appear to have been carried out much later (probably March 2006), relative to obtaining the Technical Sanctions in December, 2004 (Annex 3.2-B). Thus the Estimates prepared by NVDA (PHED) were approximate (example, cost of steel reinforcement in RCC assumed as "1% of RCC work" (Annex 3.2-F)), and based upon such approximations/thumb-rules the Estimates were prepared, and Technical Sanctions were awarded.

90. It is entirely possible that large variations of similar nature exist for several other constructions/contracts, and have gone completely unreported to competent authority and not placed for review and necessary approvals, while the work was executed and paid for, and the No Deviation certificates issued.

91. This serious matter needs special dedicated investigations by an agency like CBI/Lokayukta/CAG, and appropriate actions need to be taken against all the responsible officers. Probes also need to focus on the role of consultants, the manner of appointment of consultants, design blunders, Technical approvals, No deviation claims, misappropriation, and wastage of public money.

3.2.4. Concluding Remarks

92. Sanitation at R&R sites is in pathetic state.

93. The Institutional buildings have been provided decentralized sceptic tanks, even as no water arrangements have been made in the toilets, which remain stinking and filthy and poorly designed. The decentralized septic tanks are all defunct as septic tanks cannot work without adequate water needed for flushing and treatment of the liquid waste in tanks. The treated effluents from the septic tanks have often been left to flow on surface in the premises of the Institutional buildings.

94. No other site except Dharampuri has the privilege of a sewerage system. Yet, the designs have been absurd, leading to a situation where the system is certain to fail.

95. At Dharampuri the sewers are designed for 100 lpcd of wastewater, even when water supply system is designed for no more than 70 lpcd of water of which 20-50% losses will occur before water reaches the consumer end. Technical Sanctions were surprisingly awarded despite such grave anomalies. Under such a situation, there is hardly any chance that sewerage system will remain functional.

96. In fact, when sewers will be connected by house connections, it is very likely that severe putrid conditions will prevail inside pipes and manholes as minimum self-cleansing velocities will not be attained, and the solids will not be transported in the pipes, causing widespread serious public hygiene issues.

97. The choice of mammoth septic tanks as treatment options has been equally absurd, with no mandatory secondary treatment option adopted for the septic tank effluent. Surface discharges of malodourous septic tank effluents into surface water bodies are clearly illegal and completely unacceptable, and if the septic tanks become operational, public health and hygiene will take a huge hit because very large quantities of the obnoxious septic tank effluent will overflow into surface water bodies, which may not even have adequate discharge capacities to take the effluent.

98. Thus, Rs. 651.16 lakhs spent on Sewerage Networks and treatment has literally gone down the drain. Faulty and carelessness planning and design unbecoming of professional and experienced Planners and Engineers have been responsible for this huge wastage of public money. Appropriate exemplary action is warranted against all those who have been responsible for this situation.

99. The mechanism of award of design work to consultants, and the role of Aqua Consultants also need to be probed. It appears that consultant's designs were not implemented in reality.

100. The large up-scaling of work in the septic tanks including above estimated earthwork etc , as well as more than 15% deviation that has occurred in reality without the approval of Competent Authority in some cases, also needs to be probed particularly in light of No Deviation certificates issued by NVDA.

Chapter 3. Status of Water, Sanitation and Environment at R&R Sites

3.3. General Environmental Issues at R&R Sites

3.3.1. Missing Solid Waste Collection and Disposal Facilities

1. An issue of considerable importance concerning public hygiene and health is the Solid waste collection and disposal system. This important issue has been a complete miss at all the 88 R&R sites.

2. In fact, if a sewerage system was built at Dharampuri considering its "urbanised" nature; one wonders why Solid waste management was not given the same priority even at Dharampuri. This has been a lacuna in the overall planning process.

3. At none of the sites, provision of even common public solid waste bins has been made. This despite the fact that at large numbers of R&R sites water supply distribution networks have been provided. Sanitation however has not been accorded similar priority.

4. Not just the lack of bins and collection system, but significantly, even the disposal of solid waste that would be generated in any case, has not been thought about and planned for. No land at individual R&R sites or for groups of sites located in close proximity was found earmarked for disposal/collection of solid waste, and for its treatment, or for further transportation of garbage for its ultimate disposal. This illustrates a major shortcoming in the overall Planning process, and is likely to create insanitary conditions at R&R sites, once these sites are fully occupied.

5. In fact, the problem of Solid Waste is intense in nearby urban centres and it was found that the solid waste from other places is being dumped at Khalkhurd (Manavar) (Plate 3.3.1), creating unhealthy environs. The R&R sites do not have any planned provision for solid waste dumping, and may either become dumping grounds for wastes from other habitations along with their own and will have insanitary conditions prevalent as in Khalkhurd, or will end up polluting other places by their solid waste. This issue therefore needs to be urgently taken care of.

Plate 3.3.1. Khalkhurd (Manavar): Dumping ground for Solid waste from outside

3.3.2. Lack of Provisioning of Land for Wastewater Treatment

6. Similar to the lack of concern towards Solid waste collection/disposal, the provisioning for wastewater has also not received the attention of Planners. While Dharampuri has been provided with sewerage system including the sewage treatment by use of massive septic tanks, all other R&R sites have been developed without even a provision of land earmarked specifically for future wastewater Treatment Plant.

7. This is rather strange, considering the fact that large numbers of sites have been provided cost intensive piped water distribution systems, while the necessary provision of ensuring sanitation and public hygiene at these sites has been given a pass. And wastewater treatment does not require much area, if only the provisioning of earmarked land dedicated for wastewater treatment were to be made at R&R sites.

8. The absence of wastewater treatment is likely to spell two scenarios:

   - It is likely that plot owners who can afford toilets and sceptic tanks, would come up with large numbers of sceptic tanks constructed in near vicinity to each other. This latter alternative would entail additional initial capital expenditure followed by nominal maintenance costs to the individuals.

   - It is also likely that the absence of public sewers may encourage open defecation, especially amongst those who have less affordability to construct toilets and septic tanks on individual basis.

9. Risk of Groundwater contamination, odours, spread of vectors, etc should have been the relevant environmental issues that should have discouraged the planners to force oustees to practice open defecation or come up with large numbers of individual sceptic tanks. In the interest of the overall environment, at least land should have been identified and earmarked for a community based sewerage system that may possibly come up in future as the R&R sites get progressively populated and developed.

10. It is noteworthy that at a number of R&R sites, the plots lie low as compared to the roads around the plots. In such instances either the future sewer lines would have to be laid very deep which will make the sewerage system very costly besides inviting technical challenges such as pumping sewage, or the plinths will have to be raised appropriately by oustees entailing additional financial burden on filling up the plots. The latter seems more likely since the drainage along the roads would also lie higher if plinths are not raised. Thus, financial burdens on plot filling are likely if wastewater and drainage services have to be made to work.

11. It is suggested that the possibility to earmark land for future community wastewater treatment plant be explored at various R&R sites, and a provision thereof be made even at this stage, if possible.

3.3.3. Lack of Plantation/Compensatory Plantation

12. No Plantations or Green belts have been raised anywhere at the 88 R&R Sites. In large projects of this size, it would have been appropriate to come up with plantation to improve the overall aesthetics and environment. This has been another major miss as far as the Planning process goes.

13. It is noteworthy that provision of Plantation was made initially at the time of taking Administrative approvals (Typically, Annex 1-D). Thus provisioning of expenditure for Plantation was actually made right from the initial stages.

14. Proposal for Plantations were also further discussed and approved in at least some of the internal meeting of NVDA (Typically, Annex 1-E), the proceedings of which formed basis for obtaining Technical Sanctions.

15. Notably, at some R&R sites like Bhawati II, Plantations were approved even in Technical Sanctions vide the Technical Sanction approved by Additional Director (Rehabilitation)/SE, NVDA (Annex 1-F).

16. Yet, inexplicably, plantations never came up. It is not known as to how this dilution occurred - on whose instructions, and under what decision-making. It is also not known as to where the allocated money in cases like Bhawati II was diverted and used, as no deviations are reported (Annex 1-G).

17. It has been informed by NVDA vide letter no. 983/Punarvas/MANIT/13 dated 17/9/13 of Adhikshan Yantri, NVDA and forwarded by the Commissioner NVDA vide 5285/30/punarvas/MANIT/13, Indore dated 26/09/2013 that "No expenditure has been incurred since last 5 years for plantation work" (Annex 1-A) . During the site visits also plantations were not seen.

18. When specific queries on number of trees cut for developing the R&R sites were raised, the numbers of trees cut in acquired land to develop the R&R sites were claimed as Zero vide the above letter (Annex 1-A).

19. It may be noted that as per the provisions of the Ministry of Environment and Forest (MoEF), Compensatory Plantation is mandatory and the Honourable Courts of India have taken up the issue in several cases. This is not just true for forest areas where compensatory afforestation is in vogue, but holds even for laying pipelines in non-forest areas the MoEF stipulates planting of 10 trees for every tree cut. Similar practices are followed when Bus Rapid Transit System (BRTS) are built in urban areas. Delhi has been an example, where plantation was done to compensate all the trees cut that fell in the way of the bus stops, bus lanes, cycle tracks etc..

20. Accordingly Compensatory Plantation should have mandatorily been carried out against the trees cut at the acquired lands.

21. However, the numbers of trees cut in acquired land to develop the R&R sites has been officially claimed as Zero, and hence even the necessity of compensatory plantation work has been dispensed off.

22. At the scale of development that has taken place at the 88 R&R sites, and considering the fact that the sites are located in fertile environs, and also the fact that even the present day satellite imageries sometimes show plentiful numbers of trees in proximity to some of the R&R sites, it is nearly impossible that not even a single tree was cut for developing R&R sites. It rather appears probable that no records have actually been kept for trees cut, and the timber/wood thereof has been misappropriated leading to financial loss for the government. This possibility may be probed by a specialized agency that may use GIS imagery of the region prior to development of R&R sites to evaluate the numbers of trees cut, and the extent of misappropriation, if any.

23. Plantation work can even be undertaken now. If this can be taken up in and around the R&R sites, it would greatly enhance the quality of life for the residents at R&R sites, improve the local soil characteristics and water tables, as well as bolster NVDA's claimed objective (NVDA website: http://www.nvda.nic.in/obj.htm) of taking "all necessary measures to ensure planned settlement and rehabilitation".

3.3.4. Lack of Necessary Amenities at R&R Sites

24. Several important amenities have been given a pass in the Planning process or even at later stages. Provision for proper Playgrounds in Schools, Children Park, Water Ponds, Temples, Shamshan Ghats, Charnoi Bhoomi, Street Lights etc. has not been made uniformly across all sites. Some sites have some of the amenities to their complete exclusion at other sites or at all the sites. Some amenities like Temples have only the land area earmarked, while some others like Shamshan Ghats and water ponds, and Street Lights are completely missing at all the R&R sites, indicating not just a breach of commitment towards fulfilment of the provisions of the NWDT Award in some cases, but also a complete lack of concern towards striving to provide wholesome physical, aesthetic and social environment at R&R sites right at planning stage.

25. Lack of above amenities, despite initial planning as evident in some Administrative Approvals and even later in Minutes of the NVDA Meetings, and certain Technical Approvals has already been discussed in Chapter 1.

26. It is noteworthy that the Administrative approvals sought by NVDA had not just the provision for the above amenities, but additionally the provisions of Dharamshalas, Khalihans, Cattle sheds/Tin sheds, Plantations etc, all of which were diluted in due course of time after making provisioning for the expenditure in the name of such amenities.

27. Provisioning of Land for fodder (Charnoi bhoomi) has been sorely neglected , with NVDA claiming that "no separate Charnoi Bhoomi has been provided at R&R sites. The rehabilitated PAFs will be eligible to use village charnoi land" (Annex 1-A). Strangely, the requisite grass land area is also not estimated in proportion to Livestock population, the latter remaining an unknown figure. Similarly, there have been other notable omissions: for instance, the sites with rocky strata such as Brahmangaon may not produce adequate grass to meet requirements of Livestock population. Such assessments of livestock populations as well as the potential of charnoi bhoomi at nearby villages to produce requisite amount of additional fodder for the PAFs has simply not been made, and needs to be made now to provide adequate Charnoi Bhoomi for PAFs, considering that the Livestock happens to be an integral part of the lives of the oustees.

28. The same holds true even for Tree Platforms and Halaos , which have been missing at a large numbers of R&R sites. In particular, the Halos, have not been constructed at as many as 28 R&R sites, despite the overwhelming requirement for the livestock in the rural context. Furthermore, large under-provisioning exists in the numbers of Tree platforms and Halaos, even at sites where these have been

provided as their numbers remain inadequate relative to numbers commensurate as per NWDT Award.

29. The same also holds true for civic Buildings housing Community Halls cum Panchayat Bhawans, Primary Health Centres, Seed Godowns etc., where severe underprovisioing exists, as has been discussed in Chapter 1.

30. Drainage facilities at majority of R&R sites were absent, and where present, the drainage infrastructure stood in shambles. Poor drainage has large socio-economic and health impacts, and it adversely affects the quality of lives at R&R sites.

31. Discharge of collected stormwater through the culverts into the crop field also has significant adverse impacts, and affects social harmony at the R&R sites.

32. At those R&R sites which face severe water crisis, or where the tubewells and handpumps have insufficient yields in summers, it is suggested that water harvesting measures be encouraged to raise groundwater tables. While the borewells abandoned at R&R sites need to be converted to recharging wells mandatorily as per the directives of PHED, other supplementary measures could include encouraging people and Civic buildings to resort to rain water harvesting. Such policies need to be integral part of such project schemes to ensure better all-round environment and for improved quality of life for the inhabitants as severe water crisis already exists at several R&R sites.

3.3.5. Environmental Ambience at R&R sites

33. The state of Environmental ambience at several sites was extremely poor. At large number of R&R sites, whether inhabited or not, the Babool (American Babool) was found all-round. This is a highly thorny shrub with thick thorns, and has virtually no use. It has overgrown and has invaded the habitats at R&R sites (Plate 3.3.2) by way of material brought for the development works of these sites from outside. It has now spread over large areas, resulting in interference with free usage of the site including of the roads, tree platforms, halaos, handpumps, cisterns etc., loss of aesthetics, hindering the motion of vehicles on roads, and creating trouble for those walking due to hard long thorns. Immediate steps need to be taken to counter and limit this menace; else there are chances that the specie would spread all over the area, creating havoc at not just the R&R sites, but at other villages and possibly in the entire region.

34. Lack of Plantation and Trees, Water ponds, Tree platforms without any Tree whatsoever, Missing Street lights, Missing paint on Electric poles, pooling of drainage water around working halaos/ handpumps/cisterns/ on streets, poor road shoulders, cracked/damaged handpump/cistern/halao platforms, Poor maintenance of created infrastructure also further mar the general ambiance at the R&R sites.

3.3.6. Lack of Elaborate Stakeholder Consultation and Environmental Impact Assessment (EIA)

35. The selection of R&R sites has been made on the recommendation of the Task Force Team, which appears to have had feedback from the Punarvas Adhikari (Point no 12, Annex 2.5-A), who ought to have interactions with the general public. However, the extent of interaction with the project affected persons is not known, and has strangely, not been recorded or made available to this Inquiry team. It is likely that the Punarvas Adhikari may have been accessible to public complaints and suggestions from those who approached him, rather than arranging direct interactions, and reaching out to people for their suggestions. In any case, elaborate stakeholder consultation studies and surveys ensuring wide people's participation have apparently not been undertaken, and have not been found in the records submitted.

36. Many of the problems related to lack of appropriate Planning, non-provisioning of essential amenities, as well as reluctance of oustees to occupy R&R sites as evident by the numbers of sites which are still barely habitated and by the sparsely inhabited populations at most R&R sites, would have been avoided had proper stakeholder consultations been carried out during the planning process.

37. Elaborate and well-designed People's participation through detailed Stakeholder consultations would have brought in wider acceptability and would have improved the quality of the lives of the oustees. Such a Stakeholder Consultation would have also ensured that situation on sites like Brahmangaon (Theekri), where the entire infrastructure has gone unutilized because oustees are not keen on settling in, would have been avoided, and rehabilitation could have been much smoother and widely acceptable.

38. Similarly, the lack of an effective Environmental Impact Assessment (EIA) program has prevented the evaluation of the impacts (environmental, socio-economic, and cultural) on the lives of displaced oustees on being rehabilitated. Claims and counter-claims on the amenities provided and on the well-being of oustees that these amenities and services have brought about, cannot be resolved by piecemeal evaluation of infrastructure. A proper EIA study was needed to delineate the possible negative issues of significance, and evolve steps on how these could have been mitigated during the various stages of rehabilitation. Unfortunately even an EIA was not a part of the Planning process.

Ganpur Sirsi

Urdana

Gangli

Bhavariya Kukshi

Saita

Moreghadi

Saita

Plate 3.3.2. Extensive American Babool: Endemic problem at most R&R Sites

3.3.7. Socio-Cultural Issues

39. An important issue that should have been tackled right at the planning stage was the manner of allotment of plots to ensure social-economic-cultural harmony and community gelling of oustees.

40. New Social and community relations and affable neighbourhoods do not emerge easily when unrelated, unknown people are randomly allocated plots. This leads to anxieties amongst individuals on who prospective neighbours would be, and often creates a reluctance to leave the original homes with all the existing comfort of a known neighbourhood, more so in the rural context where social bonding is strong.

41. Unfortunately, it has not been ensured that old neighbourhoods be allotted plots together. People from differing social backgrounds, differing cultural and social practices, and even differing religion have been rehabilitated together leading to a complete collapse of the older well-developed social system which may lead to social conflict and social insecurities within the newly established R&R sites.

42. New social bonding and coherence will take time to emerge and strengthen, and in the meantime there will be much mistrust and anxieties amongst the neighbours, often bringing in pain and adding to the reluctance of those rehabilitated to accept new realities, thus adversely affecting quality of their lives.

43. The above factor must mandatorily constitute the basis of allotment of plots in rehabilitation projects, and has been another miss by the project Planners in the SSP project. This Committee is not sure if any corrective steps are still possible in the present project.

3.3.8. A Comparison of Water and Sanitation Status at R&R sites with Temporary Labour Camps

44. PHED, Indore Zone, Indore (M.P.), Government of Madhya Pradesh under the Standard tender Document – form 'A' for the work "Extension of Independent feeder main 33 KV high tension line Under group water supply scheme for 439 fluoride affected Habitation of 78 villages of block grid of M.P.P.K.V.V Co. Ltd to PHED substation at village Dogawa (224 KVA) T.P. Site,Village Chandankhedi (162 KVA) Intake Well and village Ajgaon (224 KVA) Sump well site all work as per schedule", has in its Annexure-"A" defined ***"Model rules relating to water supply and sanitation in labour campus"*** (Available online: http://phed.mpeprocurement.gov.in/tnduploads/phed/ PressNotices/PRSN28.pdf).

45. These model rules lay down the minimum desirable standard which should be adhered to in labour camps. Water and Sanitation facilities at R&R sites which are permanent habitations for the osutees should obviously be much higher than facilities in these temporary labour camps. Table 3.3.1 presents an interesting bit of comparison between water and sanitation rules for labour camps versus the status at R&R sites. It is evident that even the water and sanitation requirements needed in labour camps have not been met at R&R sites. Hopefully, it is still not too late to refine/add upon missing services and amenities provided at R&R sites.

Table 3.3.1. A Comparison of Water and Sanitation facilities in labour camps vs those at the R&R sites

Model Rules for Labour Camps	Status for oustees at the R&R Sites
1. LOCATION : The camp should be located in elevated and well drained ground in the locality.	Plots often located in low lying areas as compared to the immediate inner roads. R&R sites are not well-drained. Drainage absent for large number of sites. Where present, it is in shambles.
2. Labour huts to be constructed for one family of 5 persons each. The layout to be shown in the prescribed sketch. 3. HUTTING: The huts to be built of local materials. Each hut should provide at least 20 sqm. of living space.	No layout and model houses have been built anywhere such that these could act as standardised models for villagers to construct their houses cheaply within the money allotted to them for the purpose, particularly in strata rich in BC soils.
4. SANITARY FACILITIES : Latrines and urinals shall be provided at least 15 meters away from the nearest quarters separately for men and women and specially so marked.....	Latrines provided in the buildings within 5-10 m in a majority of cases. No urinals have been provided. No separate toilet provision made for males and females, not even in the Primary and Secondary Schools.
5. LATRINES : Pit provided at the rate of 10 user or families per seat. Separate are required as the privacy can also, be used for this purpose.	Latrines were not of pit type, but connected to sceptic tanks despite no provision of water in toilets. Number of school-children per Latrine is large(>100). Privacy not ensured as latrines were common and even the entrance to latrines was often in public view.
6. DRINKING WATER: Adequate arrangements shall be made for the supply of drinking water : practicable filtered and chlorinated supplies shall be arranged when supply is from intermittent source overhead storage tank shall be provided with a capacity of five liters a person per day. Where the supply is to be made from a well ..... The well should be effectively disinfected one every month and the quality of the water should be got tested at the Public Health Institution between each work of disinfecting.	Inadequate arrangements for drinking water even in Primary Schools. Filtered and Chlorinated Supplies not arranged. Disinfection not practiced for any water source. This even when at least at two sites, supplies were seen from Open Wells. Quality of water never tested periodically at any water source, including where wells are used. Large numbers of water sources have unknown/undetermined water qualities.
8. WASTE DISPOSAL: Dustbin shall be provided at suitable places in camp and the residence shall be directed to throw all rubbish into those dustbins. The dustbin shall be provided with cover. The contents shall be removed every day and disposed off by trenching.	No dustbins provided anywhere at any of the R&R sites. No arrangement made for removal and disposal of waste/garbage generated at R&R sites. Also, no land has been earmarked anywhere for disposal of Solid Waste.

CHAPTER 4

Chapter 4. Status of Electrical Services at R&R Sites

Table of Contents

Chapter 4. Status of Electrical Services at R&R Sites

The Electrical Services at various R&R Sites comprise distribution network/supply line carried out through HB/RS Joists/PCC poles, including an array of more than 500 Transformers of various ratings such as 25 KVA, 63 KVA, 100 KVA, 200 KVA, High Tension (HT) and Low Tension (LT) electric lines measuring a total of more than 750 Kms and comprising mostly uninsulated conductors carried over more than 17800 Electric Poles of PCC and Metallic (RS Joist and HB poles) types (Annex 1-A). The Electric works also include 14 sub-stations, Power Transformers, and additional Phase II works at 17 R&R sites.

The salient features of the observations on Electrical Services are surmised as below:

4.1. Transformers, LT- Boxes and Accessories

1. The precise lack of amenities meant for R&R sites may prove to a major detriment for the oustees to occupy such allotted sites, and would be against the spirit of the NWDT Award that warrants specific infrastructure in place at the R&R sites.

2. A total of 519 Transformers have been claimed as installed at the R&R sites. At almost every site, large numbers of transformers were found missing (Plate 4.1). Few of the missing transformers at some R&R sites (14 in Manavar Tehsil) have been taken off by the Electricity Company and kept in their "safe custody" for fear of being stolen, while some have actually been stolen (7 in Kukshi) as per the information provided by Madhya Pradesh Paschim Kshetra Vidut Vitran Co. Ltd, (MPPKVVCL) Dhar Circle (Annex 4-A). Despite the numbers in "safe custody", and the stolen transformers, the number of missing transformers remains very large.

3. It is noteworthy that no records pertaining to the removed transformers are kept and maintained officially by the electric company, as has been informed by the MPPKVVCL, Dhar Circle (Annex 4-A). This is an extremely serious folly, and is very perplexing as records need to be mandatorily maintained for all installed infrastructure, including their maintenance and periodic test records as mandated by the Indian Electricity Rules, 1956. Not maintaining records for transformers removed implies possibility of misappropriation.

4. What is even more bizarre is the fact that there exist not just the differences in the number of transformers, but even their ratings have changed from what is available in the MBs relative to what has been verified at the R&R sites. Table 4.1 shows few of such typical variations at some R&R sites. There have been significant

deviations from what was supposedly installed, and what is found in the field. The ratings of several transformers have become lower, which implies transformers of much less cost are found on R&R sites as compared to equipment of much higher cost that was to be installed.

5. It may be noted that the ratings of transformers cannot be changed after the agreement, design and execution as the system is designed for specific load requirements. Such a practice of having lower rating transformers appears to be arbitrary, and no technical study has come under the notice of this Inquiry Committee that justifies deployment of lower rated transformers.

6. The fact that transformers of lower ratings were found having replaced the costly ones of higher ratings recorded in MBs is indicative of possible serious misappropriation. As per the information provided by the MPPKVVCL, it is not within the company policy to change transformers and accessories through purchases (Annex 4-A). Therefore, how transformer ratings have changed, remains unknown.

7. Another related issue was the consistent pattern throughout much of the R&R sites of having large numbers of unconnected transformers. The transformers were often left intact on their supports, but the necessary connections were not seen, and were cut-off (Plate 4.2). This team had no way to assess if these unconnected transformers were either kept just prior to inspection (and could not be connected and installed properly in time), or have been lying disconnected for long. In the latter case, disconnected transformers left on the poles are open invitations for possible thefts and become completely vulnerable to theft/damage, and hence their prevalence is illogical besides being objectionable. The only reason that appears to explain presence of such unconnected transformers is to apparently boost the numbers of available transformers during site visits of this Inquiry Team.

8. The large numbers of missing transformers, unconnected transformers, and under-rated transformers also imply that large areas under the R&R sites remain un-charged / un-electrified even after so many years of electrification work, and this would effectively lead to inconveniences for the residents of R&R sites, besides proving to be a sure dampener as far as rehabilitation work goes, effectively hindering the process of rehabilitation, and denying relief to oustee families.

9. With the numbers and ratings of transformers under serious suspicion, records were sought for Tests certificates of transformer, and other accessories. Each Transformer has a specific unique serial number, and is supposed to undergo well-defined tests (Routine and Type tests). The manufacturers mandatorily issue these certificates for each transformer purchased. The tests need to be performed in the presence of the representative of the purchaser, who signs these as a witness. These mandatory test certificates for distribution transformers for Routine tests and Type

certificates not provided.

tests as spelled in the REC specifications, and to be carried out as per IS: 1180 (Part II) and IS:2026 on parameters like measurement of winding resistance, impedance voltage, no-load loss, insulation resistance, Air pressure test, Oil test etc. before the final sealing of the transformer at the manufacturer's works, are routinely and mandatorily supplied by manufacturers on purchase of transformers.

10. Intriguingly, while the individual files of each R&R site as provided by NVDA, had large numbers of test certificates, on closer scrutiny it was found that copies of the same transformer (Last column of Table 4.2) were shown in files of several R&R sites. For example, copies of test certificates for Transformer serial number TTL/PP/27116 were found in the files of Amlai, Bijasan, Borlai-III, Sirsani, Borlai-II Ph-I, Borlai-I, Bhilkheda, Kalyanpura, Kasrawad, Bhawria Bhilkheda, Nisarpur-II, Nisarpur-III, Nisarpur-I, Dehar, Chikhalda, Ganpur Ph-I, Gehalgaon, Rekti, and Kadmal (20 sites). Similarly, copies for Transformer Serial Number TTL/PP/27071 were found in files of Chenpura, Vishwanath Kheda, Kirmohi, Nalvai, and Mohipura. Again, the copies of test certificates for Transformer serial number 506/2003-04 were found in the files of Urdana, Sharikpura, Jalkoti, Chichli- Kasrawat, Saita, Dhalkheda, Balkhad, and Khalkhurd (Kasrawat). Thus, manufacturer Certificates shown at various R&R sites were often actually the certificates for the same Transformer.

11. Accordingly, the test certificates were sorted for individual serial Numbers of Transformers, and it was found that in the Record files submitted, there existed test certificates for only 180 serial numbers of Transformers (Details in Table 4.2). This against claimed 519 Transformers of various ratings. It is also noteworthy that as many as 96 of these 180 certificates (i.e. more than 50%) did not have contractor signing as a witness, indicating callous attitude even in assuring the qualities of the transformers at the time of purchase.

12. Thus, test certificates were not found in the records for a wide majority of the transformers claimed to have been installed.

13. Since these numbers were highly disproportionate, information was sought again 2-3 times in various forms to reassure and confirm, so much so that vide Letter 792/का.या.वि./यॉं/झा.आयोग/बडवानी dated 03/06/2013 it was even informed by the NVDA that they had proofs that the same queries were being asked again and again (Annex 4-B). Therefore, it appears that the 180 certificates from Manufacturers are the only test certificates available with NVDA, which comprises only 35% of the claimed purchases made.

14. It may be noted that at a few sites, the work may not have been got executed by NVDA, and has been carried out as deposit work by MPPKVVCL, and even the MBs of some of these sites were not found available. Yet, since the financial

payments were made by NVDA, it was their onus to check infrastructure quality including mandatory quality certificates, and hence all certificates needed to be in the records available with NVDA. In any case, there are only 8 such sites, and these do not have numbers of transformers to account for the missing 339 transformer test certificates.

15. Large numbers of missing transformers, unconnected transformers, under-rated transformers, missing certificates from manufactures all combined together raise a suspicion towards possibility of serious misappropriation of large-scale in the purchases of transformers and related accessories and other equipment (It may be noted that other equipment and transformer accessories have been subject to tests to an even lesser and almost negligible extent).

16. In order to further confirm the suspicion, the records sought out and submitted by NVDA regarding certification by the Electrical Inspector were reviewed. Established under the Central Government's Electricity Act 2003 (earlier Indian Electricity Act 1910), the MP Electrical Inspectorate constitutes an independent third party of which the Electrical Inspector is appointed and mandated by the Indian Electricity Rules, 1956 to provide approvals for all High Voltage/Extra High Voltage Establishments.

17. As per the records submitted, spread over 102 certificates, a total of only 425 transformers had approvals from the Executive Engineer (Electrical Safety) and Divisional Electrical Inspector, a tally that still misses out the claimed total number of 519 transformers at various sites. Thus, apparently 94 transformers claimed to have been purchased have not been verified by even the Divisional Electrical Inspector, a third party whose certification is mandatory under the Indian Electricity Rules, 1956.

18. It may be noted that many of these certificates have been issued by the Executive Engineer (Electrical Safety) and Divisional Electrical Inspector subject to the condition that the missing AB switches will be installed (Typical examples, Annex 4-C, 4-D) within time-limit (mostly a month). But apparently, the infrastructure has been handed over and charged without complying with the condition in the remarks of the Electrical Inspector as confirmed from our observations at various Sites on missing AB switches, and also by the fact that MBs do not indicate any AB switches installed, thus effectively turning the approval certificates as null and void.

19. At least in one case, even the certificate issued by the Divisional Electrical Inspector, Ujjain (Annex 4-D) appears dubious. The Electrical Inspector's certificate has been completely typed contrasting the prescribed printed format for all other certificates (typically Annex 4-C). This single certificate has the approvals of infrastructure not at one single R&R site, but rather at as many as 11

R&R sites. The certificate is issued vide 504 dated 27.09.2003 (Annex 4-D) in contrast to other certificates issued by the same Ujjain division that have despatch numbers such as typically नि-२/वि०मं०/पो०मा०/धार/१०२/कार्य०यंत्री०/उज्जैन dated 15/04/2004 (Annex 4-C), and has been issued on 27.09.2003 in response to the request of the NVDA on the same day 27.09.2003 (Annex 4-D). It appears that on the single day inspection was completed for the 11 sites with details as below:

- Nisarpur Phase I: 3x100 KVA+2x100KVA+4x100KVA Transformers +7 Kms of 11KV line
- Ganpur: 3x100KVA Transformers + 1.5 Kms of 11KV line
- Dehar : 2x63 KVA Transformers + 3.9 Kms of 11KV line
- Kadmal : 2x100 KVA+1x63KVA Transformers +1.9 Kms of 11KV line
- Bhawariya: 3x100 KVA Transformers +2 Kms of 11KV line
- Gangli: 2x100 KVA Transformers +1.6 Kms of 11KV line
- Gehalgaon: 5x100 KVA Transformers +2 Kms of 11KV line
- Kavanthi: 1x100 KVA+1x63KVA Transformers +2.25 Kms of 11KV line
- Rekti: 1x100 KVA Transformers +1.4 Kms of 11KV line
- Achoda: 2x100 KVA Transformers +1.35 Kms of 11KV line and
- Musapura: 2x100 KVA Transformers +2.5 Kms of 11KV line

Thus in a single day, 34 Transformers, and 27 Kms of 11 KV lines were accorded approval after due checking at as many as 11 different R&R sites geographically spread apart, a task which is a near physical impossibility. And even the report was typed and also despatched on the same day!, and not in the prescribed form and with a different type of dispatch number format. Such records need to be verified for their authenticity.

20. What is further suspicious is the change in the handing-over format for electric infrastructure at several R&R sites, which originally had specific entry with reference to the "permission of the Electrical Inspector for charging" at Point No. 9 out of a total of 11 points in the format (typical format Annex 4-E). Significantly, this entry (Point No.9) was expunged and omitted in handing-over certificates at sites like Semalda so that the handing-over certificate now had a total of 10 points as per the format (Annex 4-F), thus allowing the handing over to MPEB to be completed even without a mention of the mandatory certificate reference of the Electrical Inspector, the blatant violation indicating the collusion between various agencies.

21. It is noteworthy that at Semalda, Electrical Inspector's approval in two separate certificate mentions only 3 Transformers (Annex 4-G), while the handing over

Report mentions 8 Transformers (Annex 4-G), none of them having a matching serial number as were approved by the Electrical Inspector! Notably, the handing-over certificate does not even mention the Reference to the Electrical Inspector's approval as the entry detail was expunged from the format itself (Annex 4-G).

22. Even assuming that these were unmotivated lapses, and that the dubious records turn out to be authentic, in perhaps what constitutes a clinching irrefutable evidence of malpractices and corruption is rendered by the fact that in some cases the same transformers were deployed multiple times to procure Electrical Inspector's certificates at different sites, and the same approved transformers were subsequently shown handed over to MPEB (Distribution company) at more than one R&R site. Some such typical cases are listed in Table 4.3.

23. Thus, for instance, Transformer serial number TTL/PP/27096 (Annex 4-H), underwent Inspector's approval vide certificate 1527 dated 13.12.2005 for the R&R site of Mehgaon, and was Handed Over to MPEB vide handing-over Report of electrical infrastructure at Mehgaon on 15.12.2005 (Annex 4-H). The same transformer TTL/PP/27096 was again used to obtain Electrical Inspector's certificate granted vide 993 dated 25.08.2006, and was once again shown handed over in Handing Over Report to MPEB on 28.02.2007 for the site of Awalda this time (Annex 4-H).

24. Similarly, transformer serial number TTL/PP/27067 (Annex 4-I) had Electrical Inspector's approval vide 1810 dated 25.03.2004 for the site of Brahmangaon, and the transformer was subsequently Handed over to MPEB at Brahmangaon with the date of charging on 15.07.2004 (Annex 4-I). The same transformer then was once again installed at Khujawan by taking approval of the Electrical Inspector vide Ni-2/poma/Dhar/05-06/384/Ka Yantri Ujjain dated 28.02.2006, and Handed over to MPEB at Khujawan on date 28.02.2006 (Annex 4-I).

25. There were other cases, some of which are typically shown in Table 4.3, where the same transformer (matching serial number) appears at more than one site.

26. It may be noted that these are some of the cases that could be identified because transformers were reused amongst various R&R sites. There is also a likelihood of the possibility that transformers from nearby villages/towns in the region, may have been deployed and shown handed over at R&R sites after obtaining approval of the Electrical Inspector. However, such investigations are beyond the scope of the present Inquiry as data on transformer deployment in the region is not available. A dedicated wider probe is separately needed in view of the malpractices observed in duplicity of Transformer handing over at various R&R sites and in the larger purchases of Transformers.

27. The available test records, certificates by Electrical Inspectors, and the site visits confirming large numbers of missing and unconnected transformers thus strongly indicate that purchases may have been rather murky, and there may have been a possible collusion between NVDA/ MPEB/ MPPKVVCL /Contractor. This matter of probing and quantifying financial misappropriation lies beyond the scope and competence of the present Inquiry. It is however, strongly recommended that a specialized agency like CBI/Lokayukta/CAG etc. may scrutinize this matter further as prima-facie this is a fit case for further investigation, possibly having significant financial implications.

28. For the present Inquiry it will suffice to say that suspicion exists on the amount of purchases made, and the quality of the electrical services has not been assured. The quality essentially remains poor due to inexplicably large numbers of missing/unconnected/under-rated transformers, and may be a possible detriment in convincing the oustees to settle at the R&R Sites.

Table 4.1. Typical anomalies in the Numbers & Ratings of Transformers at select sites

R&R Site	MB No./Pages	Transformer Numbers & Ratings at field vs as per MB
Moreghadi Ph-I	124/141-151	One Transformer found missing. Two old Transformers with corrosion found present. Provision of three transformers made in MB.
Moreghadi Ph-II	163/33-42,62-64	Two Transformers were missing, only one 63 KVA Transformer found. According to the MB data 3 Transformers each of 100 KVA should have been present at the site.
Balwada	124/129-139	All 4 Transformers of 100 KVA were missing at site
Sala	66/84-90	6 Transformers of 63 KVA each were found at the site as against 6 Transformers of 100 KVA each as per MB.
Khalkhurd, Kasrawat	124/85-94	3 Transformers found missing. Only 2 Transformers found. As per MB, 5 Transformers (four of 100 KVA and 1 of 63 KVA) should have been in place at the Site.
Khedi	31/17-20	One 100 KVA Transformer was missing at the site. Three 200 KVA Transformers found. As per MB, 3 of 200 KVA and 1 of 100 KVA had been placed at the Site.
Khedi Ph-II	157/39-46	Out of the total 14 nos of 25KVA Transformers placed at the site, two Transformers were found brand new and appeared to have been recently kept. These were not bolted to mounting channel, and not fed with the supply, as well as not connected from their bushings.
Awalda	155/75-82	3 Transformers were missing, while only 2 Transformers were found at the site. Out of 2 Transformers found, one was rated 63 KVA, while the other was rated 100 KVA. As per MB, 5 Transformers each of 100 KVA had been placed at the R&R Site.
Sondul	30/24-27, 129/27-46	All five Transformers were found missing. As per MB a total of five Transformers each of 100 KVA were in place at the site.
Dharamrai	MBs not made available ("Deposit work by MPPKVV Co. Ltd.")	Two transformers found present at site were of 63 KVA each, while 3 were rated 100 KVA. As per data provided, 5 Transformers each of 100 KVA should have been in place.
Kikarwas	MBs not made available ("Deposit work by MPPKVV Co. Ltd.")	1 transformer was rated 63 KVA, while the other 2 were old Transformers whose rating were not readable. One of these appeared charred & burst. As per data provided, 3 Transformers each of 100 KVA should have been in place.
Eklera	MBs not made available ("Deposit work by MPPKVV Co. Ltd.")	2 Transformers of 63 KVA were found at site. As per data provided on field, both Transformers should have had a rating of 100 KVA each.
Khalkhurd Dharampuri	94/77-85	3 Transformers along with their entire structures were not found at the site. Only 13 DP structures seem to have been constructed at this site, while MB had provision of 16 Transformers.
Ekalwara I & II (Ph I & II)	33,81,194	Out of 10 Transformers, as many as 8 were found missing.

Table 4.2. Details of Transformers for which Manufacturer's Certificates were Issued as per the Records made available.

Transformer Serial Nos.*	Transformer Numbers	Certificate Issues by	R&R Site files in which copies of same certificates were found
TTL/PP/25806-08	3	Tesla Transformers	Chichli,Takiyapur, Kukra Ph-II
TTL/PP/27071	1	Tesla Transformers	Chenpura,Viswanath Kheda, Kirmohi, Nalvai, Mohipura
TTL/PP/27070	1	Tesla Transformers	Gawla-II,Panya,Gawla-I, Ratwa/Manawar
814/2004-05	1	Mamta Transformers	Lakhangaon/Theekri
SDTL/45/2004	1	Star Delta Transformers	Lakhangaon/Theekri
DT/24441-46	6	Star Delta Transformers	Mandwada/Theekri,Morekatta
506/2003-04	1	Mamta Transformers	Urdana,Sharikpura/Manawar, Jalkoti, Chichli Kasrawat, Saita/Kasrawat, Dhalkheda, Balkhad, Khalkhurd/Kasrawat
TTL/PP/27129	1	Tesla Transformers	Ekalwara, Bijasan, Khedi
DT/22630-36	7	Star Delta Transformers	Ekalwara,Musapura,Khedi,Jamda Achoda,Bijasan,Gangli,Kawanthi
DT/24429-40	12	Star Delta Transformers	Brahmangaon, Chenpura,Vishwanath Kheda, Kirmohi,Nalvai,Mohipura
TTL/PP/27067	1	Tesla Transformers	Brahmangaon
DT/24463-69	7	Star Delta Transformers	Brahmangaon, Gawla-II/ Thikri, Panya/Thikri, Gawla-I/ Thikri, Ratwa/Manawar,Barda-Anjad
504/2003-04	1	Mamta Transformers	Tavlai Khurd/Manawar, Nimbola, Khajuri,Kathora
TTL/PP/27139-42	4	Tesla Transformers	Bhamta
TTL/PP/27116	1	Tesla Transformers	Amlai, Bijasan, Borlai-III, Sirsani Borlai-II Ph-I, Borlai-I, Bhilkheda, Kalyanpura, Kasrawad, Bhawria Bhilkheda, Nisarpur-II, Nisarpur-III, Nisarpur-I, Dehar/ Kuksi, Chikhalda, Ganpur Ph-I, Gehalgaon, Rekti, Kadmal
TTL/PP/27111	1	Tesla Transformers	Lohara/Thikri,Nisarpur-III, Bhilsur/Kuksi
TTL/PP/27082	1	Tesla Transformers	Mehgaon/Thikri,Khujawa,Ganpur Ph-II
TTL/PP/27089	1	Tesla Transformers	Khujwa,Ganpur Ph-II
859/2004-05	1	Mamta Transformer	Jalkheda/Manawar, Sondul-II
TTL/PP/27101	1	Tesla Transformers	Kukra
NI/12/51 – 74	24	Mayur Industries	Dharampuri-I, Dharampuri-II
MI/06/18 – 31	14	Mayur Industries	Dharampuri-III

MI/02/15-30	16	Mayur Industries	Dharampuri –IV
TTL/PP/27096-27100	5	Tesla Transformers	Awalda
TTL/PP/2278 (1.6 MVA)	1	Tesla Transformers	Mohipura-Chakeri, Datwada
02/13-27 (25 KVA)	15	Power Batteries	Borlai-li Ph-II
EPT103-104, EPT-108	3	Electro Power Transformers	Ganpur Sirsi Ph-II
DT/136/01- 14	14	Star Delta Transformers	Kadmal Ph-II
VI-577-582	6	Vinayak Industries	Dharampuri-III
TTL/PP/27078-79, 27081, 27085-86	5	Tesla Transformers	Sala/Dharampuri
EPT-85,86,87,88	4	Electro Power Transformers	Sala Ph-II
EPT-113,114	2	Electro Power Transformer	Kawanthi Ph-II
SDT/104/01	1	Star Delta Transformers	Semalda
DT/24447-53	7	Star Delta Transformers	Semalda
EPT-107,109,111	3	Electro Power Transformer	Moreghadi Ph-II
858-863/04-05	6	Mamta Transformers	Khalbujurg
952/05-06	1	Mamta Transformers	Khajuri

*As recorded on manufacturer test certificates

Table 4.3. Some Repeated Serial Numbers of Transformers at more than one R&R Site as per the Records of Electrical Inspector and Handing over certificates (Typical).

Transformer Serial Number	Certificate Number of Electrical Inspector	Site for which Transformer was awarded Certificate
DT/24060	672 dated 15.09.2003 of Electrical Inspector Handing over report to MPEB dated 26.06.2004 with permission from Electrical Inspector for charging as "Submitted".	Kasravad Lohara
DT/24096	614 dated 15.09.2003 of Electrical Inspector 504 dated 27.09.2003 of Electrical Inspector	Borlai II Gangli
DT/22641	614 dated 15.09.2003 of Electrical Inspector 504 dated 27.09.2003 of Electrical Inspector	Borlai II Kadmal
TTL/PP/27096	993 dated 25.08.2006 of Electrical Inspector And Handing Over Report to MPEB on 28.02.2007 1527 dated 13.12.2005 of Electrical Inspector and Handing over Report to MPEB on 15.12.2005	Awalda Mehgaon
DT/24059	607 dated 15.09.2003 of Electrical Inspector Handing over report to MPEB dated 20.03.2004 with reference to permission from Electrical Inspector for charging left as blank.	Borlai III Lohara
TTL/PP/27069	1455* dated 31.01.2004 of Electrical Inspector and handing over report to MPEB dated 21.02.2004 285 dated 05.05.2008 of Electrical Inspector	Panya Mandwada
DT/24468	1609 dated 23.02.2004 of Electrical Inspector 1810 dated 25.03.2004 of Electrical Inspector	No Site Name Mentioned Brahmangaon
TTL/PP/27067	1810 dated 25.03.2004 of Electrical Inspector And Handed over to MPEB vide date of charging on 15.07.2004 Ni-2/poma/Dhar/05-06/384/Ka Yantri Ujjain dated 28.02.2006 of Electrical Inspector And Handed over to MPEB vide date 28.02.2006	Brahmangaon Khujawan
DT/24056	504 dated 27.09.2003 of Electrical Inspector Ni-2/vi.ma./poma/Dhar/102/Ka Yantri Ujjain dated 15.04.2004 of Electrical Inspector	Musapura Chikalda
* Number Entry Not very clear		

Balwara Kavanthi Jalanpur Dhalkheda

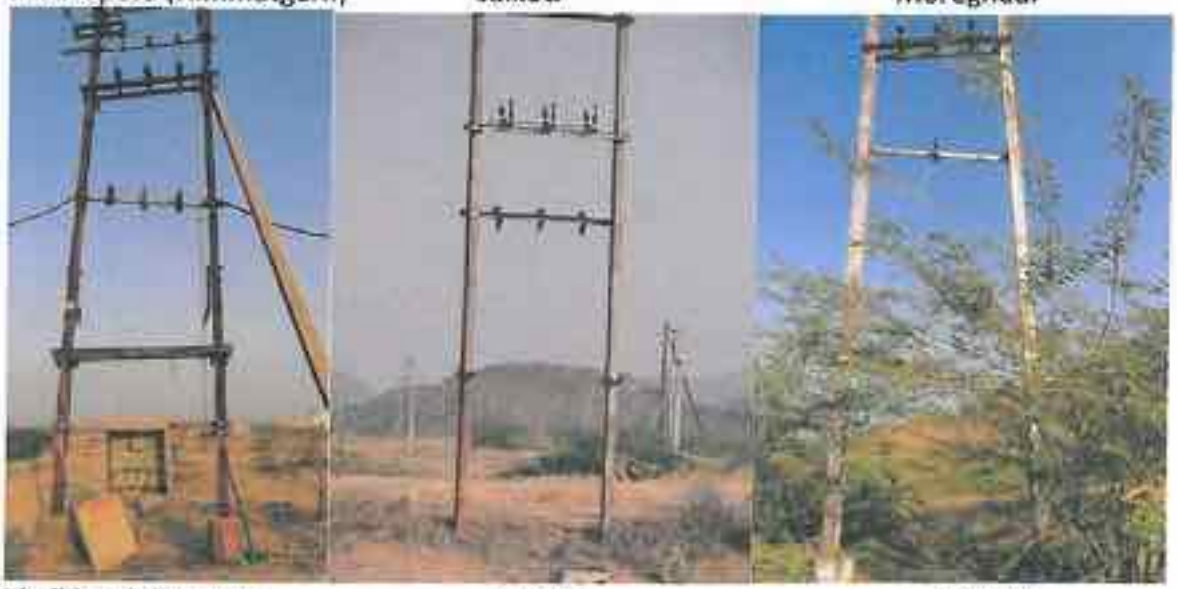
Khal Bujurg Khujawan Nimbola

Golata Lohata Kasravad

Plate 4.1. Typical Missing Transformers.....cont.

Khajuri (Jhabua) Umda Nisarpur

Moosapura (Himmatgarh) Jalkoti Moreghadi



Khalkhurd Kasravat Awalda Sondul

Plate 4.1. Typical Missing Transformers

Kavanthi

Kadmal

Gawla I

Ganpur Sirsi

Nimbola

Kikarwas

Khalbujurg

Khujawan

Khedi

Plate 4.2. Transformers without Connections (Typical)

29. In almost all cases of transformers (Plates 4.1 and 4.2) it was found invariably that the transformer belting (Iron angle of specified size for providing support to transformer on poles) was not present. This necessary safety provision was dispensed away, even when the approved drawing by Chief Engineer (Electrical Safety) and Chief Electrical Inspector (Plate 4.3) provided by NVDA to this team, had clear provision of belting, thus flouting mandatory provisioning, and compromising with safety.

30. In a number of instances, arrangements were made to connect the lines directly to the poles hoisting the transformers in complete violation of approvals by the Chief Engineer (Electrical safety) and Chief Electrical Inspector (Plate 4.3). Thus, no separate pole was sometimes found to connect the LT lines, or if present, was rendered defunct, and the mandatory triple pole arrangement was done away with (Plate 4.4).

31. In certain cases, the Transformers were found hoisted on PCC pole supports (Plate 4.5), instead of the usual metal supports found almost throughout the R&R sites. While this may be permitted, in some cases this led to reduced height of conductors implying safety concerns when the third pole was not used, and connections were directly carried out from poles hoisting the transformers.

32. Significantly, deviations were noticeable in the form of reduced Pole widths/heights on which transformers were hoisted (Plate 4.6) at sites like Jalanpur Dhalkheda, in violation of widths as specified by the Chief Engineer (Electrical safety) and Chief Electrical Inspector (Plate 4.3). Narrow widths obviously constrict the arrangement of various accessories, bringing them nearer, which is detrimental to safety, thereby significantly increasing the risks.

33. The Anti-Climbing devices and Danger Boards/Caution Boards/Notices mandatory under provisions of The Indian Electricity Rules, 1956, and IS:732 (Part III) -1982 for Transformers and HT supports, present sporadically, were mostly found missing, indicating a lack of concern towards safety aspects.

34. A major compromise with safety was missing/no provisioning of AB switches at very large number of R&R sites. The air break switches are gang operated devices to isolate the Transformer, Overhead lines, System or Cables from distribution network when necessity arises. At large number of R&R sites (nearly 65), AB Switches were not provided. At other sites, these were either completely missing, or were found without operating handles and so not likely to operate, or were simply found damaged with upper part placed on MS-channel. Finding appropriate AB switches was not a common occurrence, and constituted a major breach of safety requirements (Plate 4.7).

35. Another safety device, the Lighting Arrestors (LAs) were also sometimes found missing, or inappropriately placed (in contravention to drawing approved by Chief Engineer (Electrical safety) and Chief Electrical Inspector: Plate 4.3), or damaged and burst or bypassed (Plate 4.8). Arresting the natural Lightning is essential for the protection of electrical network, transformers and public utilities including appliances from the surge voltages that may happen during the cloud lightning. If the Lighting Arrestors are not working and available, electrical surge of excessively high amplitude would reach the network and may lead to widespread damage of electrical network and appliances at the consumer end. Not providing the Arrestors is a violation of rule 92 of the Indian Electricity rules, 1956 and also of the design approved by the Chief Engineer (Electrical safety) and Chief Electrical Inspector (Plate 4.3) and is an essential compromise with the safety of the designed network and safety at the consumer end.

36. The test records/ manufacturer's certificates pertaining to the quality of Lighting Arrestors were often not found present in the Records. Test Records were found available for less than 3% of these devices, indicating near complete lack of quality assurance of these significant safety devices. Thus, it is not known if the remaining Lighting Arrestors comply with the mandatory provisions, including those specified in IS: 3070 (Part I)-1974 for 11 KV nominal voltages.

37. The Drop-Out (swing out) fuse protects costly Transformers in distribution networks, and is therefore an important safety device whose quality needs to be assured. Just 3 test certificates were found in the records made available for nearly 515 DO fuses at various sites. Thus, quality of essential safety devices – the DO fuses in accordance with IS: 5792-1970, remained largely unascertained.

38. Another safety concern was inappropriate placement of the LT Distribution boxes. Several times these were not installed correctly, and rather than placing these in the centre of two poles on proper supports (angles/channels), supports were not seen provided, and box was mounted on a single pole itself (Plate 4.9). This compromised the safety, as such placements reduce the mechanical strength against lateral forces, and such placements are in violation of layout design approved by Chief Engineer (Electrical safety) and Chief Electrical Inspector (Plate 4.3)

39. Similar to large number of missing transformers, the Switchboards and Switchgears were also missing frequently. The panel boxes were sometimes absent entirely (Plates 4.10), or were often merely present as empty boxes with missing Switchgears (Plate 4.11).

40. It may be noted that unlike transformers, the LT Boxes, Panels, Switchgears etc have not been removed and taken into safe custody as per the information provided by Madhya Pradesh Paschim Chetra Vidut Vitran Co. Ltd.

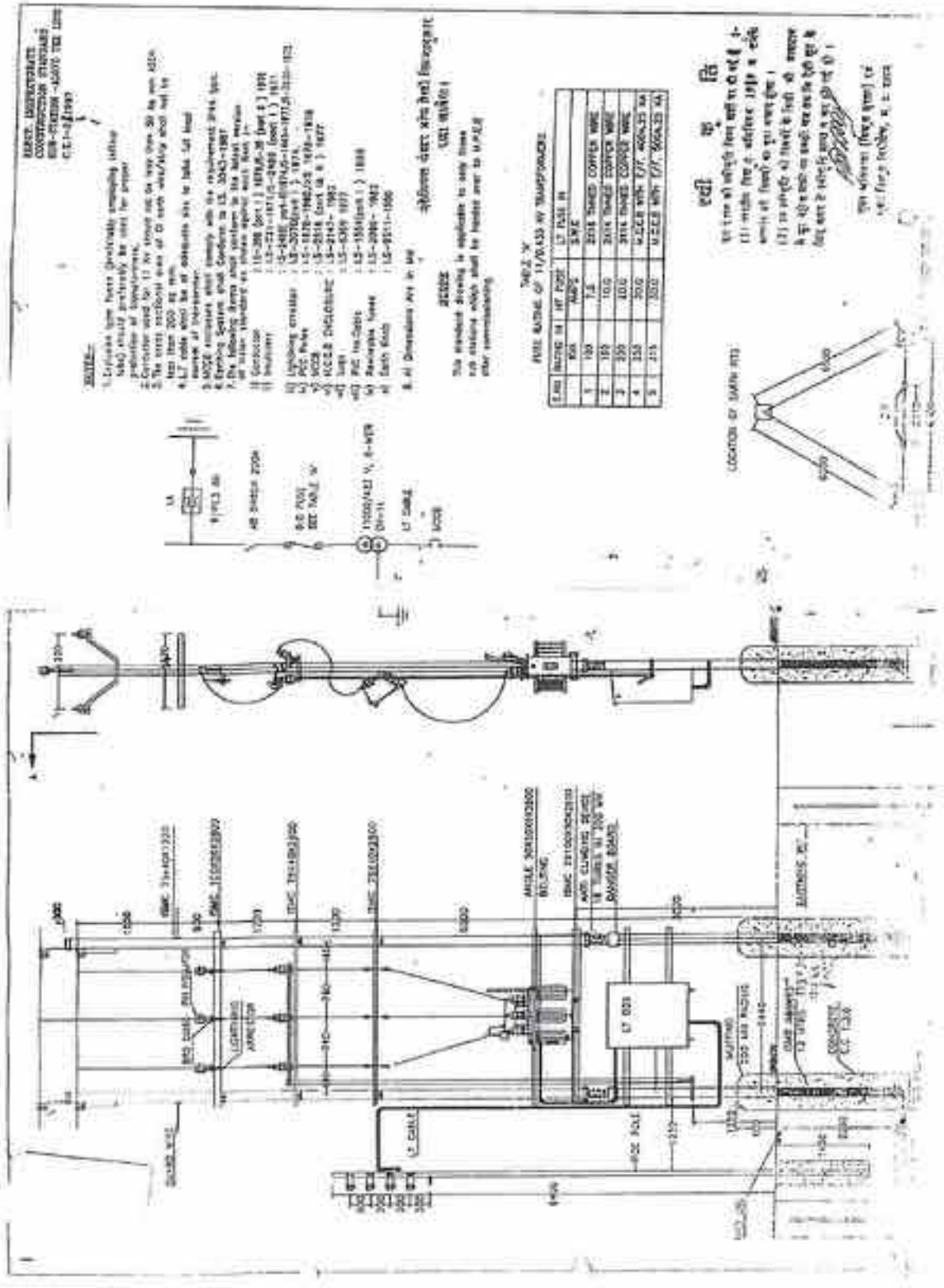


Plate 4.3 Design of transformer and Pole supports as approved by the Chief Engineer (Electrical safety) and Chief Electrical Inspector.

Bijasan

Nisarpur

Khujawan

Golata

Sondul

Anjad Barda

4.4: Transformers poles connected directly to the conductors. The Third pole is either defunct or does not exist (Typical). Blatant Violation of safety Standards.

Kaisur (Ramnagar) Dharamrai

Plate 4.5. Transformers on PCC poles (Typical)

Lakhangaon Jalanpur Dhalkheda

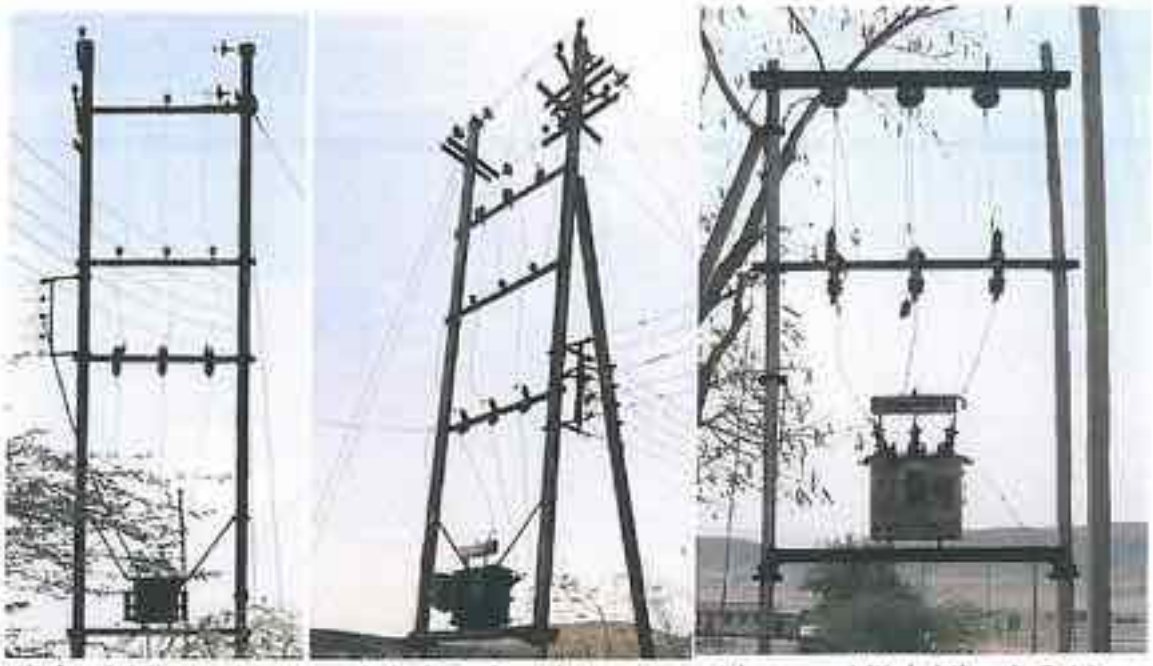
Plate 4.6. Typical Noticeable Deviations in Heights and Widths.

Typical Absence of AB Switches (Left-Moosapura(Dhar) and Right Kesur (Ramnagar))

Jalkoti: Only the handle of AB Switch remains

Awalda: AB switches present in two cases-Not a very common occurrence

Plate 4.7. AB Switches not seen at a large number of sites: Compromise with safety



Kadmal: Missing LA | Anjad Barda: Missing LA | Dharamrai (Kukshi):only 2 LAs present, 1 seems burst, Also Placed Inappropriately

Plate 4.8 . Missing/ Inappropriately placed Lighting Arrestors (Typical)

Umda | Kaisur (Ramnagar) | Chandankhedi

Eklera

Plate 4.9. Typical Inappropriate placement of Distribution Boxes on single poles. Compromise with Safety and Security.

Kadmal Nisarpur Kikarwas

Plate 4.10. Missing Switchboards (Typical)

Dharamrai Kukhshi Awalda Chandankhedi (Kukshi)

Kikarwas Beganda Barda Manavar

Balwada Moreghadi Khalkhurd

Plate 4.11. Missing Switchgears: Just the Boxes remain, mostly without even covers (Typical)

41. The LT boxes and the Switchgears, when present, often had poor quality which in itself was a cause of concern at several sites, with adhoc connections visible at large (Plates 4.12).

42. With the exception of Khajuri where 6 MCCB Panels were subject to mandatory tests, no other R&R site had even one unit of LT-boxes/switchgears that was subject to mandatory testing. Thus, it appears that the quality of the switchgears at the time of purchase/installing was not ascertained. This coincides with large-scale damaged, sub-standard and unsafe switchgears found at various sites during the field visits.

43. The Covers of LT-boxes were mostly found either missing or just wide open. No lock and key arrangements were seen to prevent/prohibit the access to passerbys, children, and animals. Neither was the area cordoned off/isolated by barbed fencing etc.

44. The safety was further compromised as a large number of switchgears had no fuses, and had direct connections, and /or no switches were present to cut the supply for remaining fuses or for replacing fuses during maintenance (Plate 4.13). While the other components of the LT box may have been present at the time of handing over the infrastructure to MPEB, at a significant number of sites, MCCB/MCBs, Switches etc. were found missing and non-existent, while at some sites these parts were found busted or damaged. This indicates that these parts were either of poor quality, or were not installed properly, or not maintained later. This is a serious safety lapse as the security of the maintenance personnel is jeopardised, and there remains little one can do at the time of accidents due to inability to switch off.

45. There were instances where at the same site, the panels had MCCB and Switches, while some others had no such safety provision. Plate 4.14 indicates one such instance at Nisarpur. Thus, there did not exist a universal template across the R&R sites, and even amongst the same site, indicating adhoc planning and execution.

46. A number of LT-boxes/Panels were even found lying on ground, often without covers, without fuses, MCCB and Switches. This obviously poses risk to inhabitants of R&R sites, and is reflective of poor quality and poor maintenance, and lack of safety concerns at these sites.

47. Besides the above lapses with regard to safety, one more widespread and significant security lapse has been the height of the LT box above the ground. This has been a matter of negligence at large number of sites, where significant number of panels were almost at the ground level, just 25 - 40 cm above (Plates 4.15), allowing the children and animals unrestricted access, more so when the switchboard cover boxes were found missing as has often been the case, and even

when covers were intact, the absence of lock and key arrangement to guard against possible intrusion was not in place. Switchboards at this height act as attractive items for investigation for innocent children and stray animals, more so in the rural context where domesticated animals are aplenty. Low heights also subject the Switchgear to flooding/wetting during the monsoons, posing additional risk. It may be noted that as per the Chief Engineer (Electrical Safety) and Chief Electrical Inspector (Plate 4.3), height at the of the panel box from the ground should be nearly 125 cms, which is upto 5 times the panel heights witnessed in the field.

48. Such lapses were not limited to remote and smaller sites. Large R&R sites and even the recently installed infrastructure had similar quality concerns. Niasarpur is a typical case (Plate 4.16) where sometimes even the transformers are accessible to passer-bys (Plate 4.17). Similarly, at Borlai II, under phase II where the work has been carried out in 2009 (Plate 4.18) the quality remained what it has been throughout for a majority of the sites. The repeated mistakes indicate callousness in planning, design and execution by the concerned agencies, and an inability to learn and improvise upon itself with passing time and experience.

Sala: Highly dangerous and unsafe adhoc connections

Plate 4.12. Adhoc & Poor LT-Box Arrangements and Connections: Safety Compromised.....cont..

Khalbujurg

Kaisur (Ramnagar)

Bijasan

Sala (Dharampuri)

Barda

Bhawati II

Jamda

Jalkheda

Bhavariya Kukshi

Nisarpur: Two LT-Boxes

Plate 4.12. Adhoc & Poor LT-Box Arrangements and Connections: Safety Compromised

Moreghadi

Dharamrai

Khalkhurd Kasravat

Khedi

Morekatta

Lohara

Bhilkheda

Nisarpur

Plate 4.13: Safety Compromised: Missing Switches, Missing/unlocked covers, and Poor quality of switchgears.

Plate 4.14. Two Panel boxes at the same site: Nisarpur, One without covers and Switch, and the other with covers, but lying on the ground, open, but with Switch. Thus differences in Panel quality were observed even at the same site.

Bhilkheda Dharamrai Umda

Khalbujurg Moreghadi Khalkhurd (Kasravat)

Morekatta Nisarpur Jalkoti

Amlali Jamda Gawla I Dharamrai

Plate 4.15. Safety Hazard: Inappropriate ground clearances for panel boxes. Additionally, the Switchboards often have missing/open covers without locking arrangement whatsoever, and hence are easily accessible (Typical). Also poor qualities.

Plate 4.16. Three cases at Nisarpur : No lock and key arrangement, and No fencing around. Note the height of panel boxes in each case. Children would be tempted to open the boxes, and animals can be intrusive. Poor planning, execution, and workmanship.

Plate 4.17. Nisarpur: Here even the transformer can be touched, little space left for installing a panel

Plate 4.18. Borlai II, Phase 2: Inappropriate Ground clearances even in 2009 construction. Also seen are the missing muffings in the left photograph.

4.2. Conductors

49. The conductors and even the brackets were sometimes seen missing in patches, with bare poles standing alone. It cannot be ascertained whether these conductors were not installed initially or have been stolen later, thus denying electrical services to certain areas.

50. In the records submitted, no certificates on conductor quality from any manufacturers or for tests got done by the purchaser or any field tests etc. were found on parameters such as breaking load test, Resistance test, Wrapping test, electrical conductivity etc.., indicating that the conductor quality was never ensured. It is therefore not known if the Conductors used actually comply with the Indian Standard Specifications IS: 398-1976, and apparently no efforts were made to ensure the quality of the conductors despite the fact that distribution lines spanned as much as 766 Kms (279.7 HT+486.3 LT), with total claimed running conductor length nearly 3200 Kms.

51. The conductor length as claimed does not seem to be verifiable from the Electrical Inspector's certificates as made available to this Inquiry Committee at least for the High Tension conductor lengths, and falls short of claimed figures. Thus, a total of 102 certificates of approval from the Electrical Inspector sums up as 204.827 Kms of High Tension (HT) Conductor line length as against 279.7 Kms of HT Line as claimed. This shortfall of 26.8% in Conductor length is serious and further specialized enquiries for possible financial misappropriation, including a probe into LT length, also may be taken up by a specialized agency if deemed appropriate by the Honourable Commission.

52. Conductor wires were very often seen loose and sagging at several sites (Typical Pictures: Plate 4.19).

53. Related safety concerns are mostly left unaddressed, as clashing of loose conductors cannot be ruled out resulting in interruptions of supply to consumers, increased maintenance problems, and reduction in the useful life of electrical infrastructure including distribution transformers.

54. Furthermore, loose conductors lower the ground clearances for vehicles passing under them, thereby increasing the risk of accidents.

55. Also, such loose conductors are likely to touch one another, causing short circuiting and resultant fires. Such fires pose immense risk not just to the farmers and their livestock, but significantly even to the agriculture produce in rural areas which is likely to catch fire.

56. Despite loose and sagging conductors, the Spacers were not seen at sites. Sometimes, like at Chikalda for instance, the requisite gaps between loose conductors were sought to be compensated by hanging weights in the form of bricks (Plate 4.20). While, it is evident that the bricks could not be hung on charged lines by general public, it speaks volumes of the state of maintenance by the Supplier and maintenance authority at R&R Sites.

57. The likely reasons for loose conductors could be surmised as:

- Inappropriate work execution
- Inappropriate quality of Conductors
- Inclined poles at several places

4.3 Pole Inclinations

58. At certain sites, the loose hanging/sagging wires could also be a result of Inclined poles (Plates 4.21). This problem of inclined poles was endemic at several sites.

59. Table 4.4 gives an account of inclined poles at select number of sites. This list is not exhaustive, but typically illustrates the kinds of problems encountered.

60. It is evident from Table 4.4 that the problem of inclined poles is more prevalent for PCC poles, than the metallic poles. This goes on to show that even at the same R&R Site, where greater care had to be been taken in due to concerns of High/Extra High Voltages, better execution and better results have been obtained as is the case of HB poles that carry higher voltages. LT lines were the most neglected ones, and PCC poles have evidently suffered far wider execution problems which have manifested in significant and endemic pole inclinations.

61. Due to problem of inclined poles being rampant and endemic, it was decided to investigate the reasons behind this. The possible explanations can be surmised as :

- Missing/Inappropriate Muffings
- Foundation Issues

Table 4.4. Inclined Poles at Select Few R&R Sites

Type of Poles	Extent of poles found Inclined	Typical R&R-Sites Reporting bent/Inclined poles
PCC Poles	Few Poles	- Mirzapur - Tavlai Khurd - Moosapura(Dhar) - Bhilkheda
	Larger numbers	- Urdana :Some even uprooted/broken - Sharikpura : large numbers susceptible to shaking by wind blow/ manual push - Ratwa - Barda - Beganda: More than 50% poles found inclined, with some poles swinging during wind blow/manual push - Khalkhurd - Khajuri : some poles even found uprooted/broken - Umda - Nisarpur(II & III): More than 50% poles found bent with some uprooted/broken - Nisarpur(I): some poles even found uprooted/broken Moreghadi Ph-I : More than 50% poles found inclined with nearly 20% bending to large extent. Several poles found inclined towards the allotted plots with line conductors almost touching walls of houses - Moreghadi Ph-II - Khalkhurd-Kasrawat: some poles even found uprooted / broken - Khalbujurg - Eklera - Khedi : some poles even found uprooted/broken - Bhamta-Jamnagar: More than 20-30 poles found inclined - Awalda : More than 50% of the poles found inclined - Borlai-II,Ph-I: some poles even found uprooted/broken - Kikarvas: More than 50% PCC mostly constructed at the corner of the drains found bending. - Chikalda
HB Poles	Few Poles	- Urdana - Khalkhurd - Umda - Jalkoti
	Larger numbers	- Beganda - Moosapura(Dhar)

Urdana

Moregadhi

Nisarpur

Nisarpur

Ekalwara (Manawar Tehsil)

Chikalda

Kaisur (Ramnagar)

Moosapura (Himmatgarh)

Plate 4.19. Loose Hanging Wires (Typical)

Plate 4.20. Chikalda: Loose Hanging Wires, absence of necessary gaps amongst the conductors compensated by hanging Bricks.

Urdana | Gehalgaon | Beganda (Khalhkurd)

Moreghadi | Borlai I

Plate 4.21. Inclined poles: A generic problem at several sites.....cont

Nisarpur HB Poles

Nisarpur LT Poles

Kaisur (Ramnagar)

Khalbujurg

Bhilkheda

Chikalda

Bhawati II

Ganpur (Narmada Nagar)

Plate 4.21. Inclined poles: A generic problem at several sites

4.4. Muffings

62. While Muffings need to be compulsorily provided as per the Chief Engineer (Electrical Safety) and Chief Electrical Inspector (Plate 4.3, cropped as Plate 4.22 below) for poles hoisting transformers, these were found missing in large number of cases (Plate 4.23). The necessary provision of concrete 1:3:6 put up 600 mm above ground, and much more below the ground level so that it is well entrenched into the ground as in Plate 4.22, and a radius of 200 mm was flouted at large. Similarly, the Muffings were also found missing for a large number of HB poles carrying High Voltages.

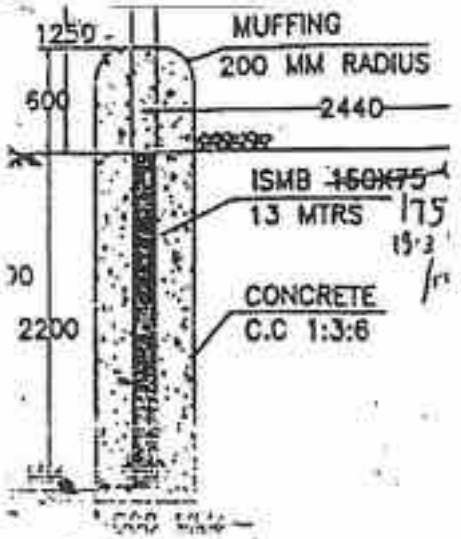


Plate 4.22. Muffings and Typical Concrete foundations as they should be (Source: Chief Engineer (Electrical Safety) and Chief Electrical Inspector, MP)

63. In several cases, where some kind of Muffings were found, quality of concreting left much to be desired (Plate 4.24). While, the quality of cement and concrete should have been regularly tested, no reports related to quality tests for cement, concrete etc. employed for construction of muffings at any R&R site were found in the records. Evidently, the quality of concrete was never determined.

64. Also, while Muffings are intended to be entrenched deep into the earth (Plate 4.22), it was seen that they were largely present cosmetically over the earth (in case they existed at all),with little or no protrusions below ground level, defeating the very purpose of putting them on field for providing strength against disruptive forces. It appears that even where muffings were put up, it was more for providing a cosmetic assurance, rather than for purpose of being a necessary functional element providing support.

Not provided in the contract

Nisarpur: Missing Muffings for two different poles

Dehar Chikalda Borlai I

Kaisur (Ramnagar) Khalbujurg Khedi

Eklera Awalda Kikarwas

Plate 4.23. Missing /Barely Visible and Substandard Muffings

Very Poor concrete quality: 3 different poles at Nisarpur

Kalyanpura Bhilkheda

Borlai II (Phase II) : A recent 2009 Construction Chikalda
Note that the nearby pole has no muffing at all.

Borlai I Khedi
Cosmetic Muffing above the ground: Technically Ineffective

Plate 4.24. Muffings: Sub-Standard, Not-Upto Specification Work, Often Cosmetic, Very Poor quality of Concrete

4.5. Inappropriate Pole Foundations

65. When foundations of Poles were investigated, the single largest cause responsible for wide inclinations of poles emerged. It was absolutely revealing and shocking that poles could be laid with such gross carelessness and shoddy work, and such shoddy work can be accepted, approved and made payments for. Some of the typical pole foundations as seen on the field are exhibited in Plate 4.25.

66. Foundation issues were particularly severe for PCC poles which comprised a wide majority of the total inclined poles over various R&R Sites.

67. PCC Poles ought to have foundations either of boulder packing or of concrete, with sizes being 600 mmx900 mm extending inside the earth to a depth $1/6^{th}$ of the total pole length. For HB Poles, the sizes ought to be 600 mmx1200 mm extending inside the earth to a depth $1/6^{th}$ of the total pole length.

68. In the field it was found out that the Packings were invariably and consistently not upto specification.

69. In several instances, Packing/concrete was not present at all.

70. When present the Packing/Concrete depth was insufficient, and far from extending to depths of $1/6^{th}$ of the total pole length it extended to 20-30 cms at most, and was more than 100 cm short of the requisite depth.

71. In large number of cases the concrete used was of very poor quality so much so that it outrightly appeared unacceptable. No Test results for test of cement and concrete were made available in the Records. Neither was the concrete depth anywhere even remotely near the specified depth needed.

72. In certain instances, it was observed that some small quantity of concrete was poured around to provide a semblance of resistance against inclination (Plate 4.26). However, quite obviously this was shoddy work, and in no way could compensate for lack of proper packing/concreting of appropriate depth.

73. In case of boulder packing, several times the Packing comprised only 2-4 boulders, and it was most common to find that instead of boulders randomly chosen stones of any sizes comprising pebbles to plot marking stones were employed. Thus, the packing material was mostly not boulders, but rather any available stone/pebbles, nor was the packing depth maintained beyond 20-30 cms. This Stone Packing was more for the namesake with 4-5 randomly chosen stones and sometimes some small pebbles put around in only one layer, thus making the packing depth equal to size of a single stone. These were not boulders, and there is no way such packing would even remotely serve to prevent poles from getting

inclined due to even small unbalanced forces. This in large part explains the pole inclinations seen widely across R&R sites.

74. The foundations were so poor that of the nearly 25 sites picked randomly to assess of pole foundations, not one sample yielded packing upto required specifications or anywhere even remotely near the acceptable levels.

75. There were, in fact, instances where even the marking stones showing the plot numbers were found stacked randomly (Plate 4.27 and Plate 4.28), indicating that stones were picked up at the nearest convenient point, and then just thrown in without forming a pack. In one instance (Morekatta R&R site) a plot marking stone was the only piece of stone found as packing!

76. When foundations are poor, the poles will invariably incline, causing hazards to residents and their domesticated / other animals. In a number of cases, the poles would even swing because of the wind pressure (Table 4.4). For the same reason, a number of fallen poles were also seen at several sites.

77. Supports in the form of guy wires (Plate 4.29) can sometimes be of some help, but these cannot compensate for weak foundations. Completely inadequate foundations normally have to be reinforced underground by digging carefully and providing support till adequate depth.

78. For reasons of weak foundation strengths, the numbers of guy wires used were sometimes excessive (Plate 4.29), and exceeded the numbers prescribed by REC Specifications & Construction Standards (G5-G9).

79. No test certificates from manufacturers/other test labs on parameters like Ultimate Strengths, Permissible Tension etc. were available for guy wires in the Records submitted, indicating that even the quality of the guy wires was not assured.

80. The types of foundations of poles that have been provided do not appear to be mere cases of poor execution. There have been instances where under the metallic poles mandatorily requiring Concrete foundations as also recoreded in MBs, had actually just 1 or 2 large stones underlying as foundations (Pate 4.30). Such malpractices appear to be very common, wherein payments have been made for concrete foundations and in practice not even a proper boulder filled foundation has been provided.

81. Wide prevalence of malpractices related to pole foundations indicates that this was a part of deliberate, clear and acceptable malpractice as not even attempts were made to provide foundations to some significant fractions of requisite depths and of specified size and material. There are likely large and significant financial fallouts due to such misappropriation, and this forms a fit case to be referred to a specialized agency such as the Lokayukta/CBI/CAG etc..

Nisarpur

Moospura (Himmatgarh)

Borlai II

Borlai I

Khedi

Awalda: No traces of any packing whatsoever

Morekatta

Plate 4.25. Typical Foundation Packings at some R&R Sites.....cont..

Bijasan

Awalda

Packing unearthed: Meagre quantity of stones of arbitrary sizes picked up at random to complete formality of packing. Complete absence of packing boulders.

Sondul

Dehar: Pebbles/aggregate as packing stones

Sirsani: No trace of pack around a fallen pole

Jamda: Absence of any packing

Plate 4.25. Typical Foundation Packings at some R&R Sites.....cont.

Dharamrai: Inappropriate poor Packing

Kikarwas : The Pole And the pack

Eklera: Packing size and depth.

Plate 4.25 . Typical Foundation Packings at some R&R Sites.

Bhilkheda Khedi: Concreting for a HB Pole

Plate 4.26. Cosmetic Concreting: No effort to ensure strength against pole inclination

Plate 4.27. Borlai I: Improper random packing, even readily available marking stones for plots (here plot no. 43 as evident) used as pole base packing

Plate 4.28. Morekatta: (Left) Readily available Plot marking stone stacked in pole base, (Right same pole after removal of this marking stone – No semblance of packing below

Plate 4.29. Vishwanath Kheda: When foundations are poor this is what may happen: As many as 10 guy wires seen supporting poles above which hardly has any load attached.

Plate 4.30. Borlai II Phase II - Metallic poles with recorded Concrete Foundations in MBs actually do not have even proper boulder foundations: Typical rampant malpractices – In some cases, muffings have been done away with (top photograph), while Cosmetic muffings provided in other cases to give an impression that concrete foundations lie underneath.

4.6. Quality of Poles

82. As many as 12620 numbers of PCC/RCC poles and another 5190 Metallic Poles (HB and RS Joists) have been deployed at various R&R sites.

83. At a number of R&R sites, the quality of PCC poles was not upto mark. The PCC was not laid smooth, honeycombing was visible, edges were blunt in patches, and damaged, aggregate visible, and sometimes the poles did not have a straight profile and were bent (Plate 4.31).

84. It was often observed that the earthing wires were mostly not cast inside the PCC poles, rather they were mostly seen loosely wrapped around the poles (typically some poles in Plate 4.31). This constitutes a flaw in the pole design ("Earthing shall be provided by having a length of 8 SWG GI wire embedded in Concrete during manufacturing...": REC Specifications and Construction Standards,15/1979-7.9) and substantiates the assertion of poor pole qualities. In any case, the un-insulated external earth wires pose a risk to passerbys, especially the children and animals, and the danger of electrocution remains during faults, implying a compromise with safety.

85. In fact, no certificates of random testing on a number of poles of each lot/sub-lot tested adequacy of cover, overall length, cross-section and uprightness from the manufacturers or certificates for tests conducted in presence of purchaser and supplier were found available, nor any records of poles failing the tests seem to have been kept, indicating violation of REC Specifications and Construction Standards as well as of IS:2905-1989 which defines the Methods of test for concrete poles and IS:7321-1974 which is the code of practice for selection, handling, and erection of concrete poles. Under such a situation, it is not sure if the provisions of IS: 1678, 1998, on specifications for Prestressed Concrete poles were complied with.

86. The only test certificates for PCC poles that were found available in the records submitted were 5 in numbers issued by PCC pole manufacturing Units, wherein a single pole each has been tested for 5 lots. These tests detail transverse strengths, with load-deflections measured. These tests appear not to have been carried out in the presence of the purchaser/MPEB/NVDA representatives, and only three of these certificates bear the lot sizes of 100 poles, 150 poles and 200 poles. The remaining two certificates mention neither the lot sizes, nor any date of conduct of the test. In any case, since there are a claimed 12620 numbers of PCC/RCC poles at all sites, it is evident that a wide majority of the lots were accepted without subjecting even a single pole to mandatory testing for Transverse Strengths.

87. Similarly, for the Metallic poles (5190 in numbers), there exists only one test report, and it gives the chemical analysis for an HB Pole. Thus different lots have not been tested for most parameters including the determination of strengths. No tests seem to have been conducted on RS joists.

88. The physical appearance of the poles and absence of mandatory test certificates raises the suspicion that quality of the poles may not be upto specifications.

89. Most Metallic Poles were seen un-painted (Plate 4.32). The metallic poles were often seen even rusted indicating poor maintenance. It is possible that when the infrastructure was first commissioned, the poles may have been painted. However, even at recently commissioned sites such as Borlai II (Phase II), where pole erections have taken place in 2009, the HB poles were found un-painted, indicating that even the initial paint work may not have been carried out at some places. At some sites, though, it was possible to see traces of original paint still remaining.

90. The mandatory Markings like the month and year of manufacture, Transverse strength of poles, Maker's serial number and mark were either missing in large number of poles at sites, or the information was often partly provided. This is again a violation of the provision of the REC Specifications and Construction Standards, 15/1979 – 10, which states "The pole shall be clearly and indelibly marked with the following particulars either during or after manufacture but before testing at a position so as to be easily read after erection in position.....".

91. Barring some exceptions, one would not find the mandatory provision for Danger Notices confirming to IS:2551-1963 (Plates 4.1,4.2,4.33) on High voltage / transformer carrying poles at several sites, indicating a lack of concern to the necessary safety stipulations as per rule 35 of the Indian Electricity Rules 1956.

92. It was not always that anti-climbing barbed wires were found present on Poles carrying High Voltage lines or at all transformers (Plates 4.1, 4.2, 4.33). A provision of this, though, existed in MBs, and it is possible that either these were not installed since beginning, or some of these may have been lost with passage of time. It may be noted that the ends of the barbed wire are normally secured to poles by means of suitable iron clamps, and even these were seen missing most of the times. In any case, the anticlimbing devices should have been replaced and replenished by the maintaining authority. This is therefore also reflective of poor maintenance/lack of safety concerns by the supplying/maintaining authority at R&R sites, and is a breach of Rule 91(ii) of the Indian Electricity Rules, 1956 which pointedly asks for "Whether anticlimbing devices have been provided for each of the high voltage and extra high voltage supports?---Form III, Inspection Report under Rule 46".

93. Often the same poles were seen carrying two lines of differing voltages. While this may be permitted if the pole length is adequate, the risk in such cases gets accentuated particularly because of oft seen sagging conductors, the absence of guardings, damaged guardings, inclined/fallen poles, and lack of proper earthing etc.. The parallel set of wires on the same pole may save some cost, but is an essential compromise with the safety of the residents, their property and their domesticated animals if the quality of work is poor, as was often witnessed.

Nisarpur (A fallen Pole)

Khajuri Jhabua

Borlai I

Jalkoti: 3 Poles – poor qualities, missing Paint & external earthing wires wrapped around

Chikalda

Kikarwas

Borlai I: base crack & external earthing

Poles not having straight profile: bent visible Kikarwas (Left) and Moosapura (Right)

Plate 4.31. Poor PCC Pole qualities

Borlai II(Phase II): Year 2011 construction, and yet the paint is missing

Awalda

Khedi

Bijasan: Two Rusted pole, one had remnants of paint work

Jamda

Amalali: some signs of earlier paint remain along with rust

Moosapura (Dhar)

Plate 4.32: Poor maintenance: Missing Paint on Poles

Borlai I

Perkhad

Plate 4.33: It was not always that such danger signs were found, as well as anticlimbing barbed wire wrapped around: No paint still though, and signs of rusting.

4.7. Safety Hazards due to Inappropriate Pole Positioning & Unsafe Location of Electric Lines

94. There were instances at several R&R sites (Plate 4.34) where poles were located on road shoulders posing safety hazard to passerbys, and to vehicles, including tractors and Bullock Carts. This becomes more serious when one considers other factors such as the R&R sites having no provision of street lighting for easy travel in nights, poles having inadequate foundations and therefore likely to incline on the road, and lines have insufficient brackets etc. and likely to sag on road crossings. Such electric lines need to be relocated proactively.

95. Another set of faulty pole locations was observed where the poles/transformers were located on culvert, or too close to culvert mouths (Plate 4.35) implying compromise on safety, increased danger of electrocution (more so in view of poor earthlings), likely pole instabilities as erosion of soil takes place due to gushing waters in rains. The low heights of transformer LT-boxes, further accentuate the associated risks. Besides, the poles may act as impediments to the free flow of water through the culverts, and the flowing water may erode the meagre pole foundations provided. In all such cases, and there were plenty of them, the Electric poles/transformers need to be relocated.

4.8. Safety Hazards due to Inappropriate Conductor Clearances and Guardings

96. At a number of sites, electric lines were observed violating minimum clearances and posing safety hazards. For example, mandatory minimum clearances clude Plots 49, 50 etc. which fall under the HT line (33 KV) at Khedi. Similarly, at Nimbola, some plots have been cut almost under an 11 KV line. In such cases, minimum clearances as envisaged in rules 79 and 80 of the Indian electricity Rules, 1956, are not likely to be met, and the inappropriate clearances will pose grave safety risks to any future constructions.

97. Under such situations, relocation of lines is the only possible solution, but even to get lines relocated is not easy for the inhabitants. The lines need to be shifted before construction can be undertaken, but this has a cost associated as the Electricity Supplier may ask for a certain prescribed fee to shift poles under rule 82 of the Indian Electricity Rules, 1956, breach of which would invite a penalty under rule 140 on the person and the contractor building the houses. This therefore, puts unnecessary burden on the oustees who already are aggrieved having lost their houses in submergence. And even if it is found by the supplier that the laid line was not lawful, and is to be relocated at no cost, it does involve inconvenience, construction delay, and avoidable disputes.

98. Such problems/disputes with regard to electric lines posing risks are likely to intensify as more and more people would get relocated into the R&R sites, and would start finding out that some line or the other passes in close proximity (Plate 4.36). It is therefore necessary to take proactive action in this regard and take steps officially to relocate the lines as per the provisions for ensuring safety

99. At a number of sites such as Nisarpur, Kukra, Khedi etc., it was seen that the electric lines, sometimes even the high voltage ones, were too close to the houses already constructed (Plate 4.37) or to the plots, violating rules 79 and 80 of the Indian Electricity Rules, 1956 which specify the minimum clearances to be maintained for various types of lines, thus compromising the safety of occupants of buildings.

100. There were also safety concerns regarding conductors at different voltages on the same support (Plate 4.38). There were numerous instances at large numbers of sites where sets of High Tension and Low Tension wires were seen located on the same Pole. The Indian Electric Rules, 1956 as per provision 77 read out as follows: "Where conductors forming parts of systems at different voltages are erected on the same supports, the owner shall make adequate provision to guard against danger to linesman and others from the lower voltage system being charged above its normal working voltage by leakage from or contact with the higher voltage system and the methods of construction and the clearances between the conductors of the two systems shall be subject to the prior approval of the Inspector". Such prior approvals of the Inspector were not found in the records submitted.

101. In several instances, where the lines were in proximity to another line, the mandatory Guarding between two lines were seen completely missing (some pictures in Plate 4.38) indicating casual attitude to observance of safety aspects. This is in violation of the rule 88 and 87 (3) of the Indian Electricity Rules 1956: "Where an overhead line crosses or is in proximity to another overhead line, guarding arrangements shall be provided so as to guard against the possibility of their coming into contact with each other".

102. Where provided, Guardings were sometimes seen damaged/broken and sometimes even touching LT lines (some pictures in Plate 4.38)).

103. There were also instances of violation of minimum clearances needed as per the provisions of the Indian Electricity Rules, 1956. Rule 77 (Clearance above ground of the lowest conductor), and Rule 87 (3) (Minimum clearances between lines crossing each other) were both violated in instances like those depicted in Plate 4.39, enhancing risks, more so as wires sagged at places. Accentuated risks exist in case the wires fall over, a likely occurrence due to inclined poles, and poor bracketing.

Sirsi Ganpur: Pole on road between road-side drain and road

Kavanthi

Dharamrai (Kukshi) Two different Poles encroaching upon Road shoulder/Road

Bijasan

Khedi

Plate 4.34. Electric poles on road shoulders: Safety concerns for drivers and for road travellers –Poor Planning (Typical)

Amalali: Part on road, another part In front of culvert mouth

Bhilkheda: Distribution box in front. What if culvert gets chocked?

Chikalda: Two different poles PCC and HB constructed in front of Culvert

Dharampuri: Pole placed on Culvert

Beganda

Plate 4.35. Typical Pole locations in close proximity to Culverts: Safety Compromised

Nisarpur

Moreghadi

Plate 4.36. Safety issues will intensify in future as people realize risks after the construction starts on their plots.

Nimbola: The electric lines need to be relocated.

Kukra (Badwani) Khedi

Two cases at Nisarpur

Plate 4.37. Accentuated safety Risks for R&R Inhabitants due to Electric Lines in close proximity unable to maintain prescribed minimum Clearances.

Balwara

Barda

Khalbujurg

Khedi

Barda:Two cases

Plate 4.38. Multiple lines on the same Pole (Typical): Sometimes Missing/damaged Guarding between the two lines (Typical) and Loose Conductors.....cont ..

Broken Guarding wires touching LT conductors at Beganda (left) and Moreghadi (Right)

Nimbola Lakhangaon

Khedi Moregadhi

Plate 4.38. Multiple lines on the same Pole (Typical): Sometimes Missing/damaged Guarding between the two lines (Typical) & Loose Conductors.

Nisarpur: Violation of Rule 87 (3) of the Indian Electricity Rules, 1956, which requires 2.44 m (at the very minimum) or more of the minimum clearance depending upon the system voltages of the line crossing each other.

Nisarpur: Typical violation of minimum clearances above ground for the lowest conductors. Rule 77 of the Indian Electricity Rules, 1956, specifies a minimum clearance of 5.5 m for lines of medium and low voltages along any street (as is the case illustrated in photograph), 5.8 m across a street, and 4.6 m minimum for lines anywhere else.

Plate 4.39. Typical Violation of Minimum Clearances mandatorily required

4.9. Other Safety Issues: Poor Execution and Maintenance

104. Poor execution and maintenance violate the Rule 29 of the Indian Electricity Rules, 1956 which requires "all electric lines and apparatus to be constructed, installed, protected, and maintained in such a manner as to ensure the safety of human beings, animals and of the property". Thus poor execution and maintenance akin to poor infrastructure quality have implications that spread beyond the financial ones.

105. The State of maintenance of the Infrastructure at R&R sites is far from acceptable. It was common to find Distribution LT-Boxes fallen on ground, Transformers lying on ground, Poles lying on ground, Tree clearances are not maintained, Earthing wires broken and hanging loose in air (Some Typical cases in Plate 4.40) Missing switchboards (Plates 4.10, 4.11), Missing transformers (Plate 4.1), etc. indicating an attitude of absolute neglect and apathy towards the infrastructure.

106. While the infrastructure has witnessed poor maintenance, even the created infrastructure has not been upto mark. The execution, workmanship, and level of skill needed have often been found lacking.

107. For instance, it was not uncommon to find that the Ds used for the purpose of making safe connections were made, but stood bypassed, loose jumpers existed, and no earthings found for cross arm and other metallic fittings. Similarly, 5 pin Cross arms placed for LT lines had missing shackle insulators at some places (conductor running on a pin), and at a number of sites Aluminium Bobbin were found absent. Again at some sites like Balwada, instead of split insulators, shackle insulators have been employed at LT line turnings (Some pictures in Plate 4.41).

108. Similarly, the quality of something as important as Earthing was often inappropriate. Charcoal packings were often found missing, and sometimes even the GI Rods were not found present (Some pictures in Plate 4.41). As per Indian Electricity Rules 1956, the earthing systems shall be tested to ensure efficient earthing, before the electric supply lines are energised. No such test records for pre-energised state or at the time of Commissioning, including test records for mechanical strength and earthing efficiency were found available in records, indicating lack of sensitivity towards ensuring consumer safety.

109. Lightening Arrestors were often found missing, rendering the infrastructure vulnerable to the strokes of Natural lighting, and compromising with consumer safety. Cables were seen without metallic bearer wires, conductors were often loose, and cable armouring were often seen missing. Such issues are also highlighted in Plate 4.41.

110. Thus, it appears that poor work execution, and lack of supervision has compromised with the overall expected safety norms and standards. Some of such breaches are illustrated in Plate 4.41.

Tree clearances not maintained: Chilkalda(Left) and Khalbujurg (Right)

Nisarpur: Pole lying on Ground

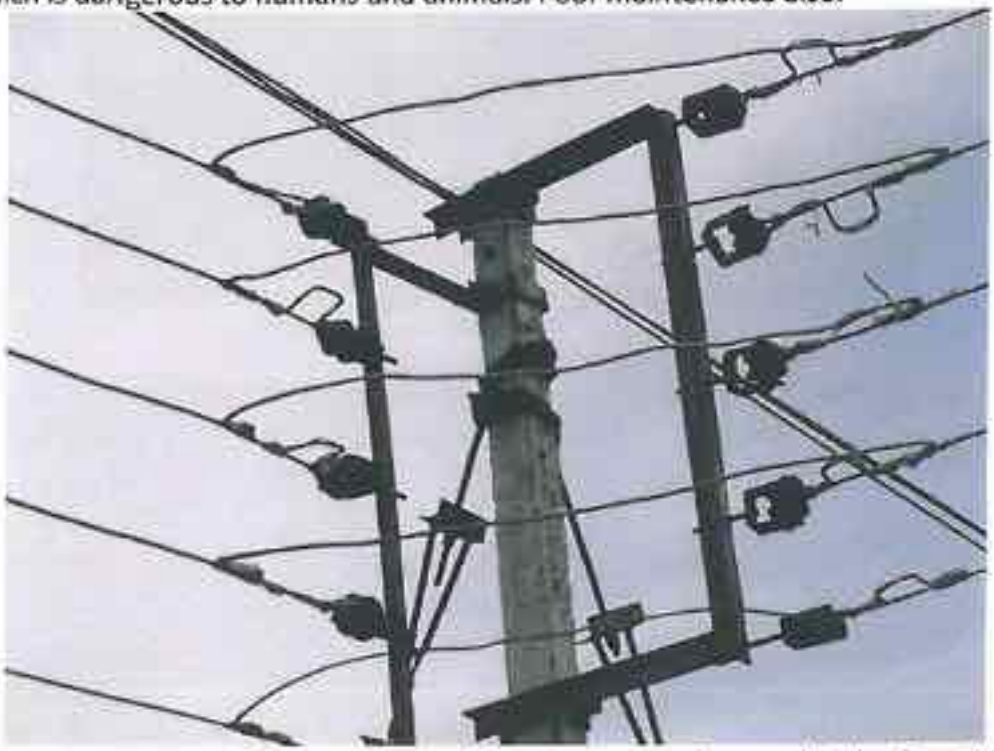
Khalkhurd (Dharampuri): Transformer lying abandoned on Ground

Beganda

Niasarpur : LT-box on Ground Kavanthi: Broken Earthing Barda: Dangerous wiring

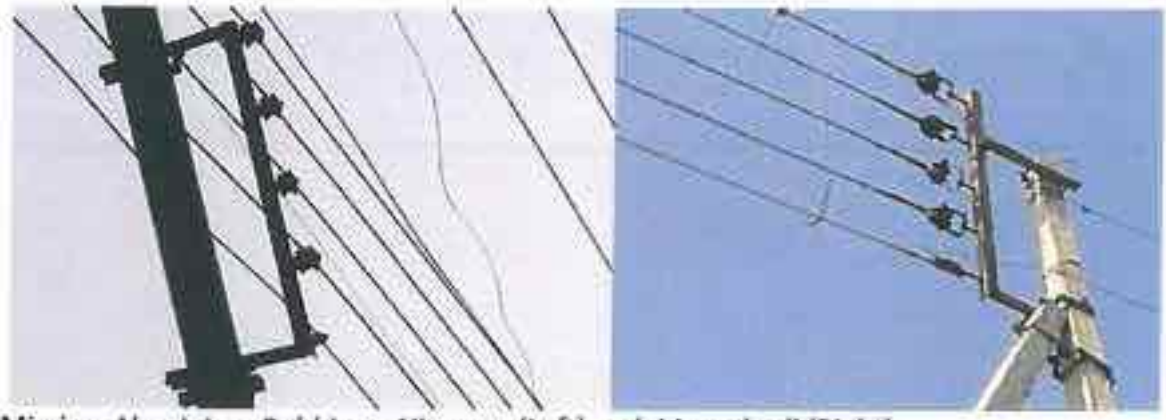
Plate 4.40. Typical Photographs reflective of poor maintenance at R&R sites

Tavlai Khurd : Poor pole location in front of culvert, Dangerous random spread of cables. Cable should be armoured and here armouring is missing. Cable found open which is dangerous to humans and animals. Poor maintenance also.

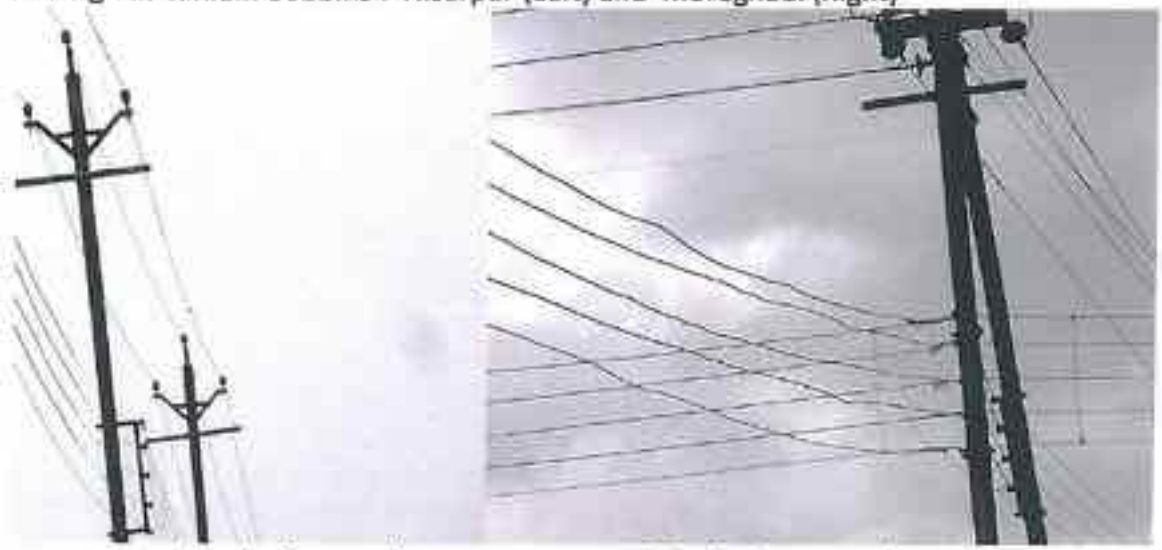


Mirzapur : Ds not used for connections, loose jumpers exist , and lack of earthing for cross arm and other metallic fittings

Plate 4.41. Poor Work Execution and Supervision (Typical).....cont..



Missing Aluminium Bobbins : Nisarpur (Left) and Moreghadi (Right)



Barda: No guardings

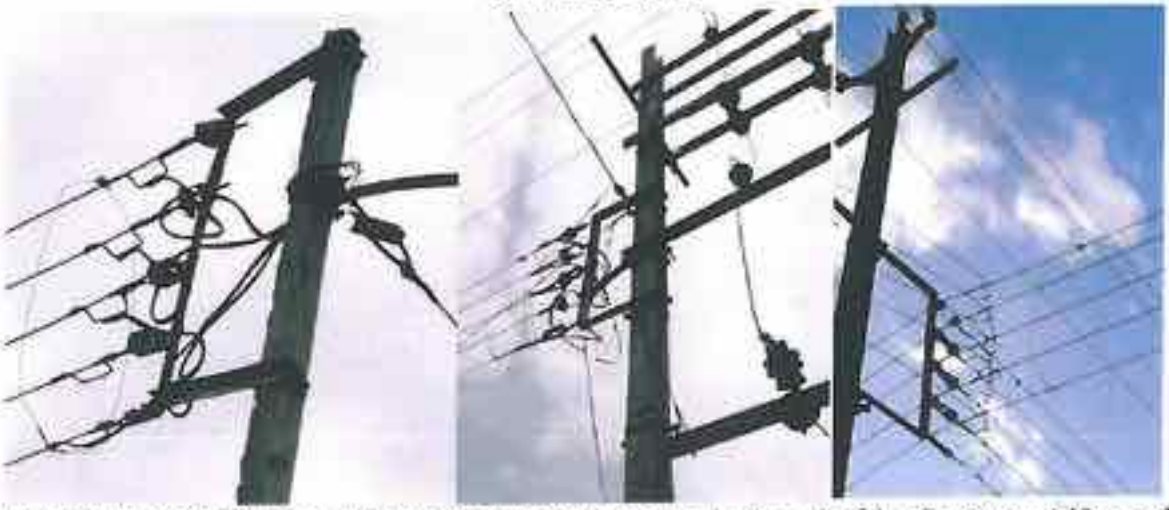
Barda: Loose conductors

Balwada: Shackle insulators provided at turning instead of split insulators

Plate 4.41. Poor Work Execution and Supervision (Typical).....cont..

Mirzapur: Conductors directly tied

Khajuri: No earth knob (neutral directly tied to the clamp).Also note the how close line is to the tree cover



Aluminium Bobbins not used in Neutral Conductor at Urdana (Left), Dharampuri (Centre) and Moregadhi (Right). No Earthing arrangement for pole and its metallic part found.

Plate 4.41. Poor Work Execution and Supervision (Typical).....cont..

No Charcoal Seen in Earthings Typically at Jamda (Left) and Dharamrai(Right). Earthing connections not made according to IS:3043-1987.

Dehar: Earthing wires without GI rod

Missing Lighting Arrestors (Typical) at Dharamrai (Kukshi), Kadmal & Anjad Barda resp.

Plate 4.41. Poor Work Execution and Supervision (Typical).....cont..

Poor execution and work quality-Clearance between conductors not as per safety norms

Missing Metallic Bearer wire to support cable: Poor work execution in violation of Rule 79 (2) of Indian Electricity Rules 1956

Plate 4.41. Poor Work Execution and Supervision (Typical).....cont..

Nisarpur: One channel is missing above the Transformers, one of which is unconnected. AB Switch and Lighting Arrestors are missing. There is no LT Pole to separate out the 11 KV network from the LT Line. The cable is not seen supported by Metallic Bearer Wire.

Poor mechanical strength of the Pole, Loose wires, Improper tightening of the overhead Conductors.

Plate 4.41. Poor Work Execution and Supervision (Typical).....cont..

Semalda: Link Switch with Fuse and a Circuit Breaker Needed as per Rule 50 of the Indian Electricity Rules, 1956

Nisarpur: LT Line taken from the 11 KV structure, which is not allowed as per safety norms. There should be separate LT pole so as to not energise the LT Circuit from the 11 KV Voltage due to leakage of current.

Plate 4.41. Poor Work Execution and Supervision (Typical)

4.10. Miscellaneous Issues Including Planning & Execution

4.10.1. Complete Absence of Street Lighting across R&R Sites

111. During the site visits, Street Lights were not seen at any of the R&R site. This is a gross violation of the provision of the NWDT Award that exclusively mentions "Electrical distribution lines and street lights" to be provided for rehabilitation in Madhya Pradesh. It is noteworthy that as per MB records, a provision for the fifth conductor exists in some, but not all, cases, and yet no street lighting has been provided, with the result that and people have either to live in inconvenience or have to make personal makeshift arrangements at places (Plate 4.42).

112. Such Planning flaws at best indicate a complete lack of sensitivity to the needs of those who are located into the new and unfamiliar environs. What about the safety of residents in the changed social and cultural context which is likely to be laden with insecurity and anxiety? And safety not just from thieves or burglars, but also from insects, snakes and scorpions, who have recently lost their habitat to construction, and are lurking out in the open as was evident by our sighting of numerous snakes and scorpions at several sites even during the daytime. The absence of street lights has virtually ensured that getting emergency medical aid etc, and going to a hospital also would be tough at night-time for the habitants of R&R sites. While success stories such as provision of solar powered street lighting in off-grid Indian villages as decentralised but costlier option is fast emerging as popular options, it is a matter of regret that despite the availability of electric lines along the streets, the provisioning of street lights has not been made across the rehabilitation sites. This gross negligence on part of planners needs to be amended by making street lights available across the sites.

113. It is noteworthy that making the provision of street lighting would have comprised only a negligible fraction of the overall cost of electrical services as the distribution network, including the electric poles and lines, along the streets is already in place. Sensitive Planning and adherence to NWDT Award could have made people's life easier, safer and convenient.

Plate 4.42.Lakhangaon: Makeshift arrangements to get streets lighted by hanging bulb

4.10.2. Illegal Connections

114. At a few R&R sites like Lakhangaon, large number of illegal electricity connections to houses were seen (Plate 4.43). While the behaviour of consumers is very important in maintenance and upkeep of infrastructure, the avoidance of such illegal acts is highly desirable as the same is now a punishable offense for which one can be prosecuted under the provision of Section 5.4.13 of National Electricity Policy 2005 that provides for stringent measures against theft of electricity, directing the States and distribution utilities to ensure effective implementation and permitting the State Governments to set up Special Courts as envisaged in Section 153 of the Indian Electricity Act, 2003. It may be noted that under Section 135 of the Indian Electricity Act 2003, the theft of Electricity is punishable with imprisonment for a term which may extend to three years or with fine or both with the offence being cognizable and non-bailable.

115. The power conections can be provided by the supplier with a simple process of application, and proper motivation needs to be given to consumers so that they take new connections.

116. It is here that consumer awareness becomes necessary, and it is in such instances where NGOs active in the area can also raise their voices to educate the inhabitants on appropriate use of services at the R&R sites.

117. Equally, the prevalance of large scale theft also reflects lack of initiative as well as apathy on part of electricity supplier to take tough measures as per law and get rid of illegal connections.

Plate 4.43. Illegal Connections thriving at Lakhangaon (Typical)

4.10.3. Incomplete Works: Absence of Electricity Distribution lines

118. In odd cases such as at the R&R site Datwada, no electrical line were observed in the vicinity of Middle School etc., implying lack of electricity distribution line to the constructed public utility building (Plate 4.44). What is bizzare is that the building possesses internal electrification despite the missing distribution lines, and to provide electricity external line will have to be first laid. This is in violation to the provisions of NWDT Award, and is reflective of poor planning/execution. Clearly, the works seem to be incomplete in such instances.

119. Also, at sites like Nisarpur, the coverage of Electrical Services was not 100%. At Nisarpur, for instance, there were a number of plots where electrical services (LT conductors/lines, and transformers) were not yet provided. Such plot areas not still covered fully need to be provided with electricity lines in order to fulfil the mandate of the NWDT Award.

Plate 4.44. No Electric lines in the near vicinity of Middle School building at Datwara. Classes expected to run without fans and lighting.

4.11. Massive Infrastructure: Huge Wastages and Lock-up of Capital in Phase II Works?

120. At some R&R sites, particularly under the Phase II works, massive infrastructure has been created. This despite the fact that at several of these sites even the Phase I works (original site) stood heavily unutilized/ underutilized, and Phase II work sites still stand almost deserted. Yet, this investment would have been justifiable if it was to meet the needs of the oustees.

121. It would be pertinent to note here that although the numbers of displaced families stands at 21447, the claimed numbers of plots developed stand much higher at 25478, i.e., an increase of 4031 plots comprising an additional 18.8% plots. In all likelihood, much of the later additions in the form of Phase II works fulfil this additional development, over and above what was actually needed for the oustees. It is for this reason that Phase II sites lie almost completely deserted.

122. Some Phase II works have been undertaken even in the year 2009 and 2010, and final bills being cleared even in 2011 (Table 4.5, Plate 4.45) after setting up of Honourable Jha Enquiry Commission.

123. While Phase II sites are mostly deserted (Plate 4.46), even the main/adjoining sites along with phase II work sites show scarce habitations. As evident from Table 4.5 even at the start of year 2014, none of the overall Sites (including phase I and II works) are yet even 50% habitated, and as many as 9 sites out of 14 Main sites have habitations less than 20%, with Sondul even showing 0% habitation. Thus, even the Phase I sites were still very sparsely occupied/almost completely unoccupied, and yet the Phase II works have been undertaken in excess of the desired number of plots needed for displaced families.

124. What is striking is that these Phase II sites also happen to be the most financially intensive ones.

125. Some of them like Borlai II Phase II (16 Transformers), Khedi II (14 Transformers), and Kadmal II (20 Transformers) comprise grids of larger numbers of smaller transformers of 25 KVA each (Table 4.5) with PVC Insulated armoured cables etc. (but without any street light conductor), resulting in large costs.

126. Others like Borlai II Phase II, Khedi II, and Ekalwara II-Phase II have only the costlier metallic poles (Table 4.5), while some other sites like Sondul II have very large numbers of metallic poles (222) vs the PCC poles (111), again reflecting in large costs of the infrastructure.

127. It is noteworthy that at some of these sites like Borlai II Phase II (177 poles), Khedi II (146 poles), and Ekalwara II Phase II (162 poles), inexplicably, all poles used were Metallic (HB +RS Joists), and no PCC poles were used at the entire sites. It is relevant to point out that these sites, like their phase I / Main site counterparts in close adjoining vicinity, have similar soil characteristics and do not have any specific urban feature that may have warranted the use of all Metallic poles, and yet 100% Metallic poles have been provided (Table 4.16) at these phase II sites.

128. Thus, for instance, as evident from Table 4.6, nearby main site Borlai II had only 20.8% metallic poles, while Borlai II phase II has 100% metallic poles, Khedi had 12.1% metallic poles while Khedi II has 100% of its poles comprising metallic ones. Similarly, Ekalwara II had 26.6% Metallic poles, but Ekalwara II Phase II has 100% of its poles as metallic. And all this, when the soil characteristics were similar, and the area did not exhibit urban characteristics.

129. Thus, despite the contiguous Main site having a healthy mix of PCC and Metallic poles, with the economic PCC poles dominating in numbers, this provisioning of exclusively providing metallic poles at Phase II counterparts in some cases has resulted in significant increase in costs by way of not just greater pole costs, but also by way of pole foundations because metallic poles require costlier concrete foundations rather than cheaper boulder-filled ones.

130. It is also noteworthy that at select sites where pole foundations were excavated, none of the pole foundation was found as per specifications, the misappropriation being obviously larger in case of concrete foundations. Thus, increased metallic pole costs not only imply costlier purchases and costlier foundations, but also imply possibly of larger misappropriations.

131. The cost expenditures at Phase II Electrical works were so huge that out of the total of Rs 3,845.68 Lakhs spent on all Electrical Works at all sites (including Phase II works), the 17 Phase II sites had a total cost of Rs. 948.58 Lakhs (Table 4.5) which is nearly one-fourth (24.67%) of the cost of all Electrical infrastructure in the SSP rehabilitation project, and one-third (32.7%) of the cost of remaining works at all other sites combined together. And all this at sites which are virtually deserted, and for developing the plots that are in excess to the displaced oustee families numbers.

132. Massive infrastructure implies not just unnecessary capital investment and wasteful lock-up of precious capital, but also continued power losses in unused circuits including transformers and lines, as well expenditure on maintenance, and the risk of theft as well. Since each component of the network has defined life tenure, depreciation continues even if we do not utilize the infrastructure.

133. From Table 4.5, it also appears that in several cases large time gap exists in completion of work, and date of final payment. Thus at Sondul, the delay was as much as 3.5 years, at Anjad Barda II, the delay was more than 1 year and 8 months, at Borlai II Phase II the delay exceeded 1year and 9 months (Plate 4.45), and at Kukra II the delay exceeded 3 years and 4 months. These delays are significant and raise suspicion.

134. It further appears that the measurements were entered in the MBs (Typically Measurement MB Nos. 109, 60, 43, 57 etc.) in back date and payments were made much after the end of time extension (for example, in Abstract MB No. 59, the payments were released on 22/02/2008 as against the time extension available till 31/12/06). It therefore appears that large scale back dating in entering measurements may have occurred. This is a malpractice and could have been a result of either forcing the contractors to accede to desired underhand deals in order to get the measurements entered and payments made, or a result of giving extensions unofficially without penaltics for exchange of undue favours and officially showing the work as completed in an earlier date.

135. It is very relevant to point out that there is evidence on record (photocopies of MBs show marked stamp of Commissioner, Deptt. Enquiry) that certain MBs like Kukra Phase II works, Ganpur (Narmada Nagar) Phase II etc., Kawathi II, Ekalwara Phase II, Khedi Revised, Sala Phase II, etc. pertaining to Electric works are already with Commissioner Enquiry, Government of MP which further adds to the suspicion.

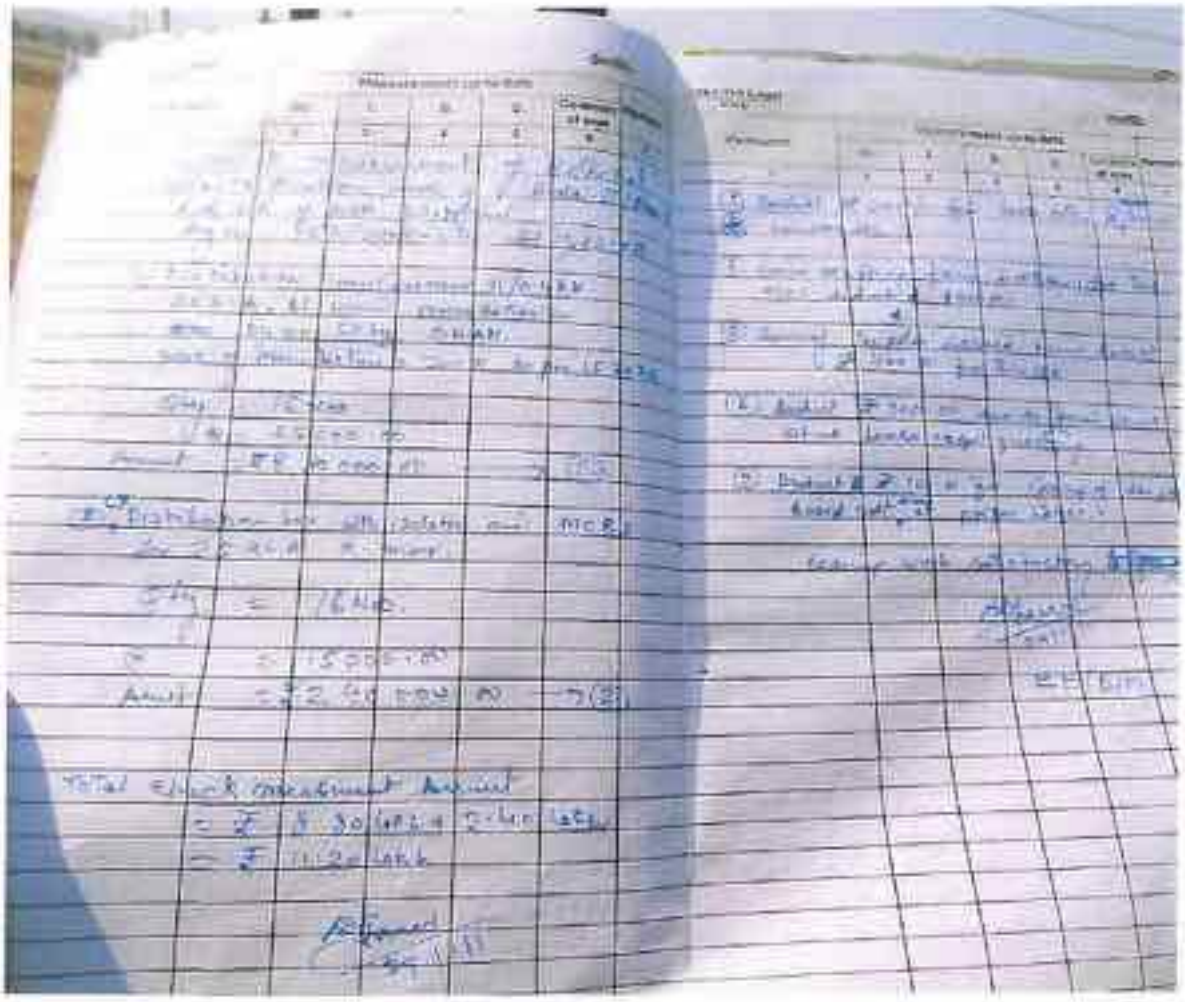
136. The data for Phase II works is compiled in Table 4.5, and indicates rather huge lock-up of finance and possible mis-utilization of public money. This inquiry team however, is limited by its scope to further confirm the apprehensions of malpractices and in raising further aspersions on this capital intensive infrastructure part of which was created so late when Honourable Jha Enquiry Commission was already in place, and when there were no users who needed this infrastructure, as is evident from much larger numbers of plots developed compared to requirement of oustee families with the resultant often completely deserted Phase II areas. It is suggested that further enquiries may be conducted separately by a specialized agency on the aspects outlined in this section, if the Honourable Courts deem it appropriate.

Table 4.5 . Electrical Works Under Phase II: Massive Capital Lock up

S. No.	R&R Site and Phase	% Occupancy at R&R site including Phase I part (As on 01.01.2014)	MB. No.	Numbers and Ratings of Transformers	Numbers of Concrete Poles	Numbers of Metallic Poles	Cost of Phase II works Rs (Lakhs)	Date of Completion of Phase II works	Date of Final payment for Phase II Works as per MB	Date of Handing over to MPPKVV Co Ltd/date of charging
1	Sondul II	Nil	130	4 @100KVA 1@3.15MVA	111	222	141.84	20/01/2006	24/07/2009	14/03/2006
2	Anjad Barda II	15.6%	29	16@100KVA 1@3.15MVA	445	110	141.79	25/12/2004	13.09.2006	25/12/2004
3	Ganpur Narmada Nagar II	17.9%	161	9@100 KVA 1@3.15MVA	275	96	111.09	21/10/2007	19/02/2008	31/10/2007
4	Borlai II Phase II	28.1%	212	16@25 KVA	Nil	177	92.00	15/04/2009	31/01/2011	Undated handing over certificate
5	Kadmal II	2.01%	192	20@25KVA	129	102	90.63	Not mentioned	07/11/2009	10/06/2009
6	Khedi II	Combined figures with Kheri Revised		14@25 KVA	Nil	146	76.09	29/01/2009	09/03/2009	Undated handing over certificate
7	Ekalwara II Ph II	4.76%	195	5@100KVA	Nil	162	64.10	28/01/2009	24/02/2009	Undated handing over certificate
8	Khedi Revised	34.88%	102	5@100KVA	159	80	40.46	03/05/2005	15/12/2006	Undated handing over certificate
9	Sala II	35.9%	175	4@100KVA	173	32	34.46	25/09/2006	28/05/2007	07/10/2006
10	Moreghadi Ph II	9.06%	163	3@100KVA	86	25	27.78	31/12/2009	28/01/2010	Not available
11	Urdana II	17.33%	123	1@100KVA	182	19	27.66	30/09/2006	27/02/2007	30/09/2006
12	Kukra II	49.4%	59	4@100KVA	133	28	23.37	01/10/2004	20/02/2008	04/10/2004
13	Ganpur Sirsi II	12.9%	134	3@100KVA	114	28	22.73	20/02/2007	22/02/2008	09/04/2007
14	Ekalwara II	Combined figures with Ekalwara II Ph II	82	3@100KVA	85	25	19.69	01/09/2006	29/08/2007	23/09/2006
15	Kawathi II	39.7%	158	2@100KVA	77	20	18.43	25/12/2006	06/07/2007	31/12/2006
16	Perkhad II	14.9%	215	1@100KVA	41	13	12.24	24/02/2010	19/07/2010	26/02/2010
17	Kukra 60 Plot	Combined figures with Kukra II	193	1@100KVA	24	3	4.22	30/06/2007	28/07/2007	12/07/2007

Table 4.6. Unusually large numbers of Metallic poles at Phase II sites relative to adjoining Main Site having similar soil and rural characteristics

Site	MB. No.	Numbers of PCC Poles	Numbers of Metallic Poles	Metallic pole (%)
Borlai II	52	365	96	20.8%
Borlai II Phase II	212	0	177	100%
Ekalwara	33	69	15	17.9%
Ekalwara II	81	69	25	26.6%
Ekalwara Phase II	194	0	162	100%
Khedi	31	210	29	12.1%
Khedi Phase II	157	0	146	100%



Borlai II Phase II: Work undertaken in 2009 and billed in 2011.

Plate 4.45. The case of Borlai II, Phase II

Ekalwara II (Manavar Tehsil)

Ekalwara II Phase II (Manavar Tehsil)

Borlai II , Phase II

Sondul Phase II

Plate 4.46. Huge Capital Intensive Infrastructure in deserted Phase II works: Capital Investment for whom?

4.12. Quality Concerns: State of Quality Assurance Test Records

137. Test Certificates are issued by manufacturers ensuring that the products like Conductors, Transformers, Switchgears, Lighting Arrestors, etc. which they are supplying comply with the stipulated code requirements. Such tests may sometimes to be performed in the presence of the purchaser or its representatives. Alternatively, the purchaser may get the equipment tested on his own level before making payments. Besides these certificates, a large number of tests are carried out on site during construction, installation, or commissioning. This then is followed by another set of tests to be carried out on a regular basis, at stipulated frequencies, to indicate the health of the infrastructure and to ensure safety of consumers during the maintenance phase. Thus mandatorily, large numbers of test certificates are to be available in the Records.

138. When the records submitted for various R&R sites were scrutinised, no test reports were found for any of the equipment except Transformers, at all the R&R sites, with the exception of merely 3 sites: Khalbujurg, Khajuri and Raswa. Thus, with the exception of these 3 sites, equipment like Lightning Arrestors, Switchgears, DO Fuses, AB Switches, Insulators, Earthings, Poles, Conductors etc. had no quality assurance certificates, indicating the gross insensitivity, callousness and adhocness in the electrical works that have been carried out. It may be noted that this violates various codes, norms and Rules and it is not clear as to how such equipment without quality and safety assurance were purchased, accepted, paid for and installed.

139. Table 4.7 sums up the numbers of equipment undergoing tests as per the Records submitted to this Enquiry Committee. It is evident that a majority of equipment/accessories were never tested and their quality never determined even when these were installed in large numbers/quantities, and that the equipment/accessories were tested for namesake only. This is indicative of gross irresponsibility in ensuring the quality of the infrastructure created at the R&R sites, and forms a fit case where action should be initiated against concerned responsible officers and competent authorities, who have compromised on mandatory testing violating prescribed norms and standards that ensures safe and sound infrastructure.

Table 4.7. Quality Test Status for Equipment as per the Test Records Made Available

S. No.	Apparatus/Appurtenance	Numbers of Items subject to Test as per certificates made Available	Total Numbers of Items at 88 R&R sites as claimed	% Testing Conducted
1	Transformers	180	519	34.68%
2	Lightning Arrestors	35	538 sets of 3 each= 1614	2.17%
3	DO Fuses	21	515	4.08%
4	Gang Operated AB Switches	2	290	0.69%
5	LT-Boxes/Switchgears/MCCB Panels	6	519	1.16%
6	Pin Insulators	2	12563	Negligible (0.016%)
7	Disc Insulators	2	6555	Negligible (0.031%)
8	Other Insulators (Split /Shackle)	0	Several thousands	0%
9	Guarding Wire	0	44806 Kg	0%
10	PCC/RCC Poles	5*	12620	Negligible (0.039%)
11	Metallic Poles (HB/Joists)	1*	5190	Negligible (0.019%)
12	Earth Knobs	0	15407	0%
13	Earthing	0	493 Sets +Lump Sum Amounts	0%
14	Conductors-Uninsulated	0	3194.65 Kms	0%
15	Conductors-Insulated	0	32.3 Kms	0%
16	Tests for Cement /Concrete/ Boulders deployed in pole foundations and Muffings	0	Quantity Not Known	0%

* Only One Test Conducted against a set of required tests

4.13. Compliance with Mandatory Code Provisions

140. The non-compliance with regard to Test reports, raised apprehensions if the various provisions envisaged in a number of IS Codes etc have been adhered to or have been violated. Accordingly, the data has been compiled as Table 4.8, which illustrates the adherence (or rather the non-adherence) to codes.

141. It is immediately apparent from Table 4.8 that the mandatory code provisions have not been observed with regards to the tests conducted, and there have been substantial violations of the code provisions. It appears that the aim was only to execute the work rather than to also verify and assure quality by observance of mandatory Indian Standards.

Table 4.8. Mandatory Code Provisions versus Their Compliance

S. No.	Description of item/ Provision Required	Field Observation / Test Certification
1.	**Prestressed Cement Concrete Poles** IS Codes applicable: IS: 1678-1978, IS: 2905-1966, IS :7321-1974	
	The cover of concrete measured from outside of prestressing tendon shall be normally 20 mm	No manufacturer's test certificates available for Cover.
	Earthing shall be provided by having a length of 8 SWG GI wire embedded in Concrete during manufacture.	External Earthing wires on Poles seen. Earthing was mostly not embedded in the poles.
	The tests have to be conducted on number of poles selected at random (as per procedure laid down) and selected from a lot or sub-lot. REC Specifications and Construction Standards 1971 (and amended upto 1983), under chapter 15/1979 for prestressed cement Concrete Poles , section 9.2 specify that poles selected as above be tested for overall length, cross-section and uprightness. Furthermore a number of poles are to be subject to transverse strength tests.	None of these tests results /certificates could be found in the records provided. Only 5 poles out of 12620 poles subject to transverse strength tests
	Furthermore, REC Specifications and Construction Standards 1971 (and amended upto 1983), under chapter 15/1979, section 10 specify that the poles must have Month and year of manufacturing, marked transverse strength of poles in Kg, and Maker's serial No. and mark.	No markings seen/Sometimes partial information was seen in the Field .....cont..

2.	**Conductors/ Aerial Bunched Cables** Hard Drawn Stranded Aluminium and Steel-Cored Aluminium Conductors for Overhead Power lines: IS:398 (Part I and Part II)-1976, provides for tests at manufacturer (for at least 10% of steel wire coils and 10% of Aluminium wire spools. The Al wires used need to comply with Breaking load tests, Wrapping tests, and Resistance tests, while the steel reinforced Al wires need to additionally comply with Ductility test and Galvanising Test. The Aluminium alloy stranded conductors shall comply with IS:398 (Part IV)-1979 for tests of Breaking load, elongation test & Resistance test. Aerial Bunched Cables (ABC system): Tests such as <u>Type tests</u> - Tensile test (IS:8130), - Wrapping Test(IS:8130), - Conductor resistance test (IS:8130) - Test for thickness of insulation (IS:6474) - Insulation Resistance test (IS:6474) - High Voltage test including water immersion test (IS:1596) - Physical test for polyethylene insulation (IS:6474) - Test for bleeding and blooming of pigment (IS:6474) <u>Acceptance tests (All tests above minus the last two)</u> <u>Tests for Messengers (IS:398-part IV):</u> Breaking test, Elongation test and Resistance test. All cables also need to confirm to tests as per IS: 1255-1967.	None of these tests results /certificates from manufacturer or otherwise could be found in the records provided. None of these tests results /certificates could be found in the records provided. None of these tests results /certificates could be found in the records provided.
3.	**Transformers** <u>All transformers</u> shall be subjected to the following <u>Routine tests</u> at the manufacturer's works in accordance with IS:2026 & IS:1180 (Part I): - Measurement of winding resistance - Measurement of Voltage ratio and check of voltage vector relationship - Measurement of impedance voltage /short-circuit impedance and load loss - Measurement of no-load loss and no-load current - Measurement of insulation resistance - Induced over-voltage withstand test - Separate-source voltage withstand test <u>Type tests</u> for (representative) Transformer as per IS:2026 - All of above tests - Lightning impulse test - Temperature-rise test - Short-circuit test - Air pressure test	Neither the manufacturer's certificate nor any certificates of tests carried out by purchaser were found except for 180 transformers of a total of 519 transformers. Most of the certificates were for Routine tests.

	- Unbalanced current test	
4.	**Switchboards** Dielectric test as per IS:8623-1977	Just 6 MCCB panels were tested, all at one site. At no other site, not even a single unit was subject to mandatory testing as per the records made available.
5.	**Porcelain Insulators and Insulator fittings for 11 KV overhead Power lines** The Insulators shall comply with following tests as per IS :731 <u>Type Tests:</u> - Visual Examination - Verification of dimensions - Impulse voltage withstand test - Wet power frequency voltage withstand test - Temperature cycle test - Electro-Mechanical failing load test (for strain insulators units only) - Mechanical failing load test (for pin/post insulators) - Puncture test (for strain insulators only) - Porosity test - Galvanising test <u>Routine tests:</u> - Visual Examination - Mechanical routine test (for strain insulators only) - Electrical routine tests <u>Acceptance tests:</u> After Routine tests the test samples shall be subjected to : - Verification of dimension - Temperature cycle test - Electro-Mechanical failing load test (for strain insulators units only) - Mechanical failing load test (for rigid insulator only) - Puncture test (for strain insulators only) - Porosity test - Galvanising test	No Test results were found available for insulator fittings at all sites with exception of one site where 2 insulators were subject to tests.
6.	**Insulator fittings for 5 above** Insulator Pins shall comply with the following tests as per IS:2486 (Part I) <u>Acceptance Tests:</u> - Checking of threads on heads - Galvanising test - Mechanical test <u>Routine tests:</u> Visual Check	None of the test results were found available

7.	**Porcelain Insulators and Insulator fittings for 415/240 V overhead Power lines** Insulators shall comply with following tests as per IS :1445 <u>Type Tests:</u> - Visual Examination - Verification of dimensions - Wet power frequency voltage withstand test - Temperature cycle test - Mechanical failing load test - Power-frequency Puncture withstand test - Porosity test <u>Routine tests:</u> - Visual Examination <u>Acceptance tests:</u> - Verification of dimension - Temperature cycle test - Mechanical failing load test (subject to agreement) - Porosity test	No Test results were found available for insulator fittings at all sites.
8.	**Insulator Fittings for 7 above** Insulator Fittings shall comply with the following tests as per IS :7935 <u>Type Tests:</u> - Visual Examination - Verification of dimensions - Checking of threads on heads - Galvanising /Electroplating tests - Mechanical strength tests (for pin insulator fittings) <u>Routine tests:</u> - Visual Examination <u>Acceptance tests:</u> - Checking of threads on heads - Galvanising test	No test results found available in the records provided
9.	**11 KV Lightning Arrestors** Manufacturer's certificates for the tests as below: Tests: The following test as laid down in IS:3070 (Part I) shall be carried out: <u>Routine Test</u> : Dry Power-frequency Sparkover Test <u>Type tests</u>: - Voltage withstand tests of arrestor insulation - Power-frequency Sparkover Test - Hundred per cent 1.2/50 microsecond impulse Sparkover Test - Front of wave impulse Sparkover Test - Residual voltage test - Impulse current withstand tests - Operating duty tests	A mere 35 Lightning Arrestors were tested against 1614 numbers installed in the field. Thus less than 3% of the Lightning Arrestors carried the mandatory test certificates. Quality for others remains unknown, subjecting the precious infrastructure to high risk.

	- Temperature cycle test on porcelain housing - Porosity test on porcelain components - Galvanising test on metal parts	
10.	**Earth Knobs for LT Lines** **IS Codes applicable: IS: 9511-1980** As per REC specification -31/1983, the following tests to be carried out at least on one Knob for every 1000 Nos. - Electrical Resistance - Mechanical strength	Earth knobs found missing in large number of cases. None of the test certificates found in records provided.

4.14. Compliance with Provisions of the Indian Electricity Rules 1956

142. Table 4.9 illustrates the compliance with the relevant provisions envisaged in the Indian Electricity Rules, 1956. A cursory look at the Table again confirms that even these mandatory compliances have been compromised upon.

Table 4.9. Compliance with Select Provisions of the Indian Electricity Rules, 1956

S. No.	Section Number and Provision of the Indian Electricity Rules, 1956	Compliance Status
1.	35. **Danger Notices-** The owner of every medium, high and extra-high voltage installation shall affix permanently in a conspicuous position a danger notice in Hindi or English and the local language of the district, with a sign of skull and bones 1[of a design as per the relevant ISS No. 2551] on – a) Every motor, generator, transformer and other electrical plant and equipment together with apparatus used for controlling or regulating the same	Part Compliance: Large numbers of Transformers did not have the mandatory Danger Notices
2	**At Sub-stations:** 43. Provisions applicable to protective equipment- (1) Fire buckets filled with clean dry sand and ready for immediate use for extinguishing fires, in addition to fire extinguishers suitable for dealing with electric fires, shall be conspicuously marked and kept in all generating stations, enclosed sub-stations and switch stations in convenient situation. The fire extinguishers shall be tested for satisfactory operation at least once a year and record of such tests shall be maintained.	Fire buckets and extinguishers/ First-aid boxes/ Instructions for restoration from electric shocks/ artificial respirators sporadically available, were not always seen at every sub-station. Records pertaining to satisfactory operation of equipment not made available.
	43. Provisions applicable to protective equipment- (2) First-aid boxes or cupboards, conspicuously marked and equipped with such contents as the State Government may specify, shall be provided and maintained in every generating station, enclosed sub-station and enclosed switch station so as to be readily accessible during all working hours.....	
	44. Instructions for restoration of persons suffering from electric shock- (1) Instructions, in English or Hindi and the local language of the district and where Hindi is the local language, in English and Hindi for the restoration of persons suffering from electric shock, shall be affixed by the owner in a conspicuous place in every generating station, enclosed sub-station, ...	
	44.(4) In every manned high voltage or extra-high voltage generating station, substation or switch station, an artificial respirator shall be provided and kept in good working condition	

<table>
<tr><td>3</td><td>61. Connection with earth (for low and medium voltage supply lines)
61. 1 (e) In the case of an alternating current system, there shall not be inserted in the connected with earth any impedance (other than that required solely for the operation of switch-gear of instruments), cut-out or circuit-breaker, and the result of any test made to ascertain whether the current (if any) passing through the connection with earth is normal shall be duly recorded by the supplier.</td><td>No such records were made available</td></tr>
<tr><td></td><td>61 (2) The frame of every generator, stationary motor, portable motor, and the metallic parts (not intended as conductors) of all transformers and any other apparatus used for regulating or controlling energy and all medium voltage energy consuming apparatus shall be earthed by the owner by two separate and distinct connections with earth.</td><td>2 connections not seen in most cases. Earth Pit and Earth Electrode not made separately and with distinct connections so as to connect the neutral of the transformer, body of the Transformer, Lightning Arrestor etc</td></tr>
<tr><td></td><td>61. (4) All earthing systems shall
(c)Be mechanically strong, withstand corrosion and retain electrical continuity during the life of the installation. All earthing systems shall be tested to ensure efficient earthing, before the electric supply lines or apparatus are energised.</td><td>No such tests for pre-energised state including test for mechanical strength and earthing efficiency found in records</td></tr>
<tr><td></td><td>61. (5) All earthing systems belonging to the supplier shall in addition, be tested for resistance on dry day during the dry season not less than once every two years.</td><td>No such test records made available</td></tr>
<tr><td></td><td>61. (6) A record of every earth test made and the result thereof shall be kept by the supplier for a period of not less than two years after the day of testing and shall be available to Inspector or any officer appointed to assist the Inspector and authorised under sub-rule (2) of rule 4A when required.</td><td>No such test records provided by supplier</td></tr>
<tr><td>4.</td><td>64. (2) The following provisions shall be observed where energy at high or extra high voltage is supplied, converted, transformed or used:
2(a) (ii) The following minimum clearances shall be maintained for bare conductors or live parts of any apparatus in out-door substations, excluding overhead lines, of HV and EHV installations: -
<table>
<tr><th>Voltage Class</th><th></th><th>Ground clearance (Metres)</th><th>Sectional clearance (Metres)</th></tr>
<tr><td>Not exceeding</td><td>11KV</td><td>2.75</td><td>2.6</td></tr>
<tr><td></td><td>33KV</td><td>3.7</td><td>2.8</td></tr>
<tr><td>-do-</td><td>66KV</td><td>4.0</td><td>3.0</td></tr>
<tr><td>-do-</td><td>132KV</td><td>4.6</td><td>3.5</td></tr>
<tr><td>-do-</td><td></td><td>5.5</td><td>4.3</td></tr>
<tr><td>-do-</td><td>220KV</td><td>8.0</td><td>6.5</td></tr>
<tr><td>do</td><td>400KV</td><td></td><td></td></tr>
</table></td><td>Minimum clearances violated in a few cases. Pole shifting etc. needs to be carried out in some of the cases.</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

	64 A (2) Protection- All systems and circuits shall be so protected as to automatically disconnect the supply under abnormal conditions. The following protection shall be provided, namely: - (a) Over current protection to disconnect the supply automatically if the rated current of the equipment, cable or supply line is exceeded for a time which the equipment, cable or supply line is not designed to withstand; (b) Earth-fault/earth leakage protection to disconnect the supply automatically if the earth fault current exceeds the limit of current for keeping the contact potential within the reasonable values.	Instances of violation against necessary protection: No circuit breakers found - only cut-outs found, No main Switches found.
5.	65. Testing, Operation and Maintenance- (1) Before approval is accorded by the Inspector under rule 63, the manufacturer's test certificates shall, if required, be produced for all the routine tests as required under the relevant Indian Standard.	Compliance appears doubtful, as test records only for few Transformers found available. No manufacturer's certificates for Poles, Conductors etc. found available in records provided.
	65. Testing, Operation and Maintenance- (2) No new HV or EHV apparatus, cable or supply line shall be commissioned unless such apparatus, cable or supply line are subjected to site tests as per relevant code of practice of the 1[Bureau of Indian Standards].	No such site tests reported/ no reports available in the records provided
	65. (5) All apparatus, cables and supply lines shall be maintained in healthy conditions and tests shall be carried out periodically as per the relevant codes of practice of the 1[Bureau of Indian Standards].	No records of any periodic tests made available
	65. (6) Records of all tests, trappings, maintenance works and repairs of all equipment, cables and supply lines shall be duly kept in such a way that these records can be compared with earlier ones.	No such records made available
6.	67. **Connection with earth** (for HV/EHV voltage supply lines) (5) (b) Every earthing system belonging to either the supplier or the consumer shall be tested for its resistance to earth on a dry day during dry season not less than once a year. Records of such tests shall be maintained and shall be produced, if required before the inspector or any officer appointed to assist him and authorised under sub-rule (2) of rule 4 A.	No such test records made available
7.	74. **Material and strength-** (1) All conductors of overhead lines other than those specified in sub-rule (1) of rule 86 shall have a breaking strength of not less than 350 kg. (2) Where the voltage is low and the span is of less than 15	Breaking strength test certificates /manufacturer's records not made

	metres and is on the owner's or consumer's premises, a conductor having an actual breaking strength of not less than 150 kg may be used.	available
8.	75. **Joints-** Joints between conductors of overhead lines shall be mechanically and electrically secure under the conditions of operation. The ultimate strength of the joint shall not be less than 95 per cent of that of the conductor, and the electrical conductivity not less than that of the conductor.	No such test records found available in the records submitted.
9	76. **Maximum stresses: Factors of safety-** (1) (a) The owner of every overhead line shall ensure that it has the following minimum factors of safety:- (i) For metal supports 1.5 (ii) For mechanically processed concrete supports 2.0 (iii) For hand-moulded concrete supports 2.5 (iv) For wood supports 3.0.	No such test records found available in the records submitted.
10	77. **Clearance above ground** of the lowest conductor- (1) No conductor of an overhead line, including service lines, erected across a street shall at any part thereof be at a height of less than- (a) For low and medium voltage lines 5.8 metres (b) For high voltage lines 6.1 metres (2) No conductor of an overhead line, including service lines, erected along any street shall at any part thereof be at a height less than- (a) For low and medium voltage lines 5.5 metres (b) For high voltage lines 5.8 metres (3) No conductor of in overhead line including service lines, erected elsewhere than along or across any street shall be at a height less than- (a) For low, medium and high voltages lines upto and including 11,000 volts, if bare 4.6 metres (b) For low, medium and high voltage lines upto and including 11,000 volts, if insulated 4.0 metres (c) For high voltage lines above 11,000 volts 5.2 metres (4) For extra-high voltage lines the clearance above ground shall not be less than 5.2 metres plus 0.3 metre for every 33,000 volts or part thereof by which the voltage of the line exceeds 33,000 volts. Provided that the minimum clearance along or across any street shall not be less than 6.1 metres.	Minimum Clearances breached in a few instances.
11	79. **Clearances from buildings** of low and medium voltage lines and service lines- (1) Where a low or medium voltage, overhead line passes above or adjacent to or terminates on any building, the following minimum clearances from any accessible point, on the basis of maximum sag, shall be observed: - (a)For any flat roof,open balcony,verandah roof & lean-to-roof	Minimum Clearances breached in a few cases. Rectification needed at all such places where clearances are

	(i) When the line passes above the building a vertical clearance of 2.5 metres from the highest point, and (ii) When the line passes adjacent to the building a horizontal clearance of 1.2 metres from the nearest point, and (b) For pitched roof- (i) When the line passes above the building a vertical clearance of 2.5 metres immediately under the lines, and (ii) When the line passes adjacent to the building a horizontal clearance of 1.2 metres. (2) Any conductor so situated as to have a clearance less than that specified in sub-rule (1) shall be adequately insulated and shall be attached at suitable intervals to a bare earthed bearer wire having a breaking strength of not less than 350 kg.	inadequate.
	80. **Clearances from buildings** of high and extra-high voltage lines- (1) Where a high or extra-high voltage overhead line passes above or adjacent to any building or part of a building it shall have on the basis of maximum sag a vertical clearance above the highest part of the building immediately under such line, of not less than- (a) For high voltage lines upto and including 33,000 volts 3.7 m (b) For extra-high voltage lines 3.7 metres plus 0.30 metre for every additional 33,000 volts or part thereof. (2) The horizontal clearance between the nearest conductor and any part of such building shall, on the basis of maximum deflection due to wind pressure, be not less than- (a) For high voltage lines upto and including 11,000 volts 1.2 m (b) For high voltage lines above 11,000 volts and up to and including 33,000 volts 2.0 metres (c) For extra-high voltage lines 2.0 metres plus 0.3 metre for every additional 33,000 volts for part thereof. Explanation- For purpose of this rule "building" shall be deemed to include any structure, whether permanent or temporary.	
12	81. **Conductors at different voltages on same supports**- Where conductors forming parts of systems at different voltages are erected on the same supports, the owner shall make adequate provision to guard against danger to linesman and others from the lower voltage system being charged above its normal working voltage by leakage from or contact with the higher voltage system and the methods of construction and the clearances between conductors of the two systems shall be subject to prior approval of the Inspector.	No such prior approvals of the Inspector found in the records submitted

13	87. **Lines crossing or approaching each other-** (3) Where an overhead line crosses or is in proximity to another overhead line, guarding arrangements shall be provided so as to guard against the possibility of their coming into contact with each other. Where an overhead line crosses another overhead line, clearances shall be as under: - [2][Minimum clearances in metres between lines crossing each other.	Guarding arrangements sometimes found missing/damaged/ inadequate Minimum Clearances breached in certain cases

Sl. No.	Nominal System Voltage	11-66 KV	110-132 KV	220 KV	400 KV	800 KV
1	Low & Medium	2.44	3.05	4.58	5.49	7.94
2		2.44	3.05	4.58	5.49	7.94
3	11-66 KV	3.05	3.05	4.58	5.49	7.94
4		4.58	4.58	4.58	5.49	7.94
5	110-132 KV	5.49	5.49	5.49	5.49	7.94
6	220 KV	7.94	7.94	7.94	7.94	7.94
	400 KV					
	800 KV					

	(6) Where two lines cross, the crossing shall be made as nearly at right angles the nature of the case admits and as near the support of the line as practicable, and the support of the lower line shall not be erected below the upper line. (8) All work required to be done by or under this rule shall be carried out to the satisfaction of the Inspector.	Rule not always followed-Breaches to this rule observed. No such certificates made available.
14.	88. **Guarding-** (2) Every guard-wire shall be connected with earth at each point at which its electrical continuity is broken. (3) Every guard-wire shall have an actual breaking strength of not less than 635 kg and if made of iron or steel, shall be galvanised.	Guard wires sometimes found missing. No breaking strength or galvanisation test records made available.
15	90. **Earthing-** (1) All metal supports and all reinforced and prestressed cement concrete supports of overhead lines and metallic fittings attached thereto, shall be permanently and efficiently earthed. For this purpose a continuous earth wire shall be provided and securely fastened to each pole and connected with earth ordinarily at three points in every km., the spacing between the points being as nearly equidistance as possible. Alternatively, each support and the metallic fitting attached thereto shall be efficiently earthed. 1[(IA) Metallic bearer wire used for supporting insulated wire of low and medium voltage overhead service lines shall be efficiently earthed or insulated.]	No continuous earth wire connected with earth at three point in every km found as earthing to the neutral of the LT line.

	(2) Each stay-wire shall be similarly earthed unless insulator has been placed in it at a height not less than 3.0 metres from the ground. 1. Subs. By GSR 732, dt. 18.6.1985, w.e.f. 3.8.1985.	Stay-wire often found loose or found where stay insulation not utilised
16	91. **Safety and protective devices**- (1) Every overhead line, (not being suspended from a dead bearer wire and not being covered with insulating material and not being a trolley-wire) erected over any part of street or other public place or in any factory or mine or on any consumers' premises shall be protected with a device approved by the Inspector for rendering the line electrically harmless in case it breaks.	No records of such devices along with Inspector's necessary relevant approval made available.
17	92. **Protection against lightning**- (1) The owner of every overhead line [1][sub-station or generating station] which is so exposed as to be liable to injury from lightning shall adopt efficient means for diverting to earth any electrical surges due to lightning. [2][(2) The earthing lead for any lightning arrestor shall not pass through any iron or steel pipe, but shall be taken as directly as possible from the lightning- arrestor to a separate earth electrode and/or junction of the earth mat already provided for the high and extra-high voltage sub-station subject to the avoidance of bends wherever practicable. Note- A vertical ground electrode shall be connected to this junction of the earth mat.] 1. Ins. By GSR 466, dt. 18.7.1991, w.e.f. 17.8.1991. 2. Subs. By GSR 1050, dt. 9.11.1985.	Lightning Arrestors often found missing
18	93. **Unused overhead lines**- (1) Where an overhead line ceases to be used as an electric supply line, the owner shall maintain it in a safe mechanical condition in accordance with rule 76 or shall remove it. (2) Where any overhead line ceases to be used as an electric supply line, an Inspector may, by a notice in writing served on the owner, require him to maintain it in a safe mechanical condition or to remove it within fifteen days of the receipt of the notice.	Though it appears that all lines may not be in use due to missing transformers, lack of inhabitants at site etc., no records of electric supply lines not in use were found/provided, nor any comments of Inspector known.

4.15. Acceptance and Regularisation of Sub-standard/Below Specification work, and Release of Payments where work ought to have been rejected for Rectification--Misuse of the Right to Impose Penalties

138. It is not that it was not known to the NVDA engineers that the executed work was actually sub-par and not upto specifications. The qualified and vastly experienced engineers had the knowledge that for instance poles were inclined, muffings were sub-par, and mandatory provisions to be complied as outlined in earlier sections were being flouted. But far from rejecting such works, the NVDA Engineers chose to find ways of letting the contractor get away by imposing measly penalties, and thereby blatantly regularised the work of unacceptable qualities.

138. The penalties imposed were often completely arbitrary. For instance, under the Agreement No. 1 of 2002-03, MB No. 23 Page 196 (Annex 4-J) mentions the name of 20 specific sites under the agreement. The EE after making the mandatory 10% Check measurements as per MPWD Manual 1983 at sites of Gangli, Achhoda Kawathi, Talur Sub-station, Borlai I, Khedi-I, Kalyanpura, Jamda, and Kukra-I (Pages 197-198 - Annex 4-J), finds various measurements "within permitted tolerance limit" (Page 198) and further makes the following remark on page 199 (Annex 4-J): "The quality control observer has also given all good remarks. The work was taken up even 2/3 years earlier. No complaint found..... ". And immediately after this quality assurance, imposes penalties (Page 199, Annex 4-J): "However, Rs 1000/- for Bhilsur site may be deducted from Bill as Penalty & also Rs 1000/- for stay found loose....". What is remarkable, is the fact that for Bhilsur no reason has been given to impose Rs 1000/- as penalty, and there could not have been any reason as the Bhilsur site was not amongst the R&R sites where 10% check measurements were conducted by the EE! And yet arbitrary penalty was imposed for this site without conducting any checking at the site. Further Rs 1000/- penalty for loose stay is also arbitrary as no site and location has been specified, and actually sub-standard work not falling within permitted tolerance limit has been accepted.

139. Similarly, under Agreement 02/2002-03 for external electrification work of 11villages + 2 sub-stations of Dhar and Barwani, as per the MB No 117, page 176 (Annex 4-K), the rates for Nisarpur Sub-station and 33 KV line, and Borlai II including 33 KV line are quoted as a lump-sum with the Grid. Thus, the contract was awarded on lump-sum basis, with minimum requirement of fixtures and fittings provided in G schedule. During measurements, Conductor quantities were found less in numbers, whereas stay set and strain hardware were in excess relative to G schedule quantities. On the argument that net savings were occurring for the department, the quantities found in short and in excess were mutually adjusted.

This is objectionable, as in lump-sum contract quantities shown in G schedule cannot be treated as final and are indicative and approximations, and there remains no way on assessing shortages and excess fittings, and wherever conductors are required they ought to be in place. Less or missing provisions in electrification will lead to operational and safety issues, and shortages in one item cannot be adjusted against arbitrary excesses in other items. The shortages, if any, have to be made up before accepting the work.

140. In the same case, MB No 117, page 176 (Annex 4-K), a capacitor Banking was not installed by the contractor, and yet the contractor has been let away by accepting the incomplete work after deducting an arbitrary and a mere 10% (Rs. 47000/-) of estimate rate for the item in the Final Bill, as against non-installation of Capacitor Banking. It is again rather amazing that incomplete work was accepted by imposing arbitrary 10% deduction on estimated cost of missing item. It may be noted that in lump-sum contract, incomplete works cannot be accepted even if it is by a 1% margin, as the remaining 99% investment made and work completed also becomes non-operational and non-functional implying wastage of the entire investment made. Thus, it has to be ensured in lump-sum contracts that work is completed fully and that the infrastructure is fully functional and operationally running uninterrupted for certain period of time during the testing period as specified in the contract. Hence in such lump-sum contracts incomplete works should only lead to rescinding of contract, and not into its manipulated acceptance after making arbitrary deductions.

141. There is further irrefutable evidence on record that sub-standard works in construction and laying of electrical electrification works was also in full knowledge of NVDA Engineers, and yet it was accepted by the qualified and experienced Engineers. For instance, for works undertaken at Borlai II Phase II R & R Site, much of which was sub-standard (Plate 4.47), the MB. No. 212 page 105 (Plate 4.48), establishes the fact that officers knew fully that poles were inclined, carpet guarding were loose at some place, stay and insulators were loose, danger boards were not fixed at proper height to caution as per mandatory provisions etc..

142. From the total Final bill "check measurement Amount" of Rs 11.20 Lakhs, signed by EE (E/M) on 29.01.2011, on MB. No. 212, Page 105 (Plate 4.48) the following deductions were made from Final Payment :

- "Deduct Rs 2000/- for loose stay and loose some insulators etc"
- "Some Muffing found broken for this a/c deduct Rs 900/-"
- "Some of the poles inclined, hence deduct Rs 400/- for this a/c"
- "Deduct Rs 300/- due to found somewhere loose carpet guarding"
- "Deduct Rs 100/- for fixing of danger board not found at proper height"
- "Remaining work satisfactory"

Signed by EE(E/M)

143. Thus EE (E/M), chose to deduct marginal, insignificant and paltry amounts as penalties (sometimes shown as part of "other recovery") against very serious and unacceptable sub-standard works like loose insulators (Rs 2000/-) etc., damaged muffing (Rs 900/-), inclined poles (Rs 400/-), inappropriately placed danger boards (Rs 100/-) etc. And such measly penalties on works were imposed as recently as the year 2011.

144. What is remarkable is that penalties were imposed on "some" poles inclined, and "some" broken muffings etc. without even identifying which muffings and which poles etc. are in contention. This arbitrariness has its own advantages, as identification in future Enquiries is avoided, and if for example, any pole is now being castigated for being inclined, it will be labelled as already identified by the department and imposed penalty thereupon.

145. It is a matter of deep concern and regret that this has happened in external electrification works, where sub-standard and below Specification works can lead to danger of life and property, and there is no taking away the fact that public safety remains jeopardised and heavily compromised because of the acceptance of such works. The safety aspects for electrification works should have been on top priority during execution, and yet the well qualified and experienced E&M Engineers chose to ignore the basics.

146. The above case of Borlai II Phase II Works (Plate 4.48) is yet another illustrative example that shows the kind of serious malpractices that exist. Similar penalties for bent poles, broken insulators etc have been imposed in other cases such as Kukra 60 Plots. It may be noted that small penalties (sometimes shown part of "other recoveries") were common in making Final payments at large numbers of R&R sites, though their break-up is not always known.

147. Similarly as per Agreement No. 2 of 2005-06, in the MB No. 143 Page 112 (Annex 4-L) for external electrification at the R&R site at Dharampuri (Group No. 4), a penalty has been proposed for difference in sizes of poles used than that of G schedule RS Joists. Thus, 21 nos. of poles and 10 nos. of RS Joist struts were regulated and work authorised by imposing a penalty of Rs. 46273/-, and this sub-standard and below specification work was accepted, notwithstanding the technical requirement of the Electrical infrastructure as per the design.

148. What is amazing is that the above penalty at Dharampuri has been proposed in the Final Bill. Thus, it is natural to ask if the pole sizes were examined with foundations exposed fully to determine pole sizes, and since final payments are made after the line is charged and found working satisfactorily, how was this examination of pole sizes with exposed foundations, actually executed in case of charged lines? Thus, evidently, the sub-specification lengths of poles was a known fact even before the poles were laid in the foundations, and the work was allowed

to proceed with a tacit understanding that some penalties will be imposed to regularise use of inappropriately sized poles.

149. It is also noteworthy that the above remark of penalty on MB 143, page 112 (Annex 4-L), does not again identify the 21 poles found to be of inappropriate sizes, so that if any pole is today investigated and found below-specification for its size, the NVDA's stand would be that the below-specification work has already been identified and penalised. An investigating team will have to now actually prove that there exist more than 21 poles where sizes have varied, which is a tall task for any Inquiry team. However, in every likelihood, very large numbers of poles may actually be violating the prescribed sizes as EE performs only 10% check measurements. This therefore, seems to be another case where serious misappropriations are likely.

150. The NVDA Engineers evidently abused the discretion allowed in accepting a certain level of permissible tolerance in the work quality, wherein minor deviations such as poor workmanship in painting of poles (this does not imply no painting of poles, but only poor workmanship in application of paint) etc, can be acceptable with imposition of penalties. However, there cannot be tolerance with respect to life threatening deviations wherein the health of the infrastructure and public safety is compromised. Such blatant instances of unacceptable work quality such as inclined poles, short pole lengths, inappropriate affixing of danger notices where they cannot be read by passerbys etc., do not lie in the purview of permissible tolerances, and such works needed to have been outrightly rejected until rectified and made good.

151. Safety requirement notwithstanding, work that should have been outrightly rejected until it was rectified and made good, was accepted, billed for, and payments made after imposing paltry penalties for namesake. Thus, this shoddy work was regularised.

152. Not only were the works accepted with minor penalties like Rs 300/- for "inclined poles", no efforts were actually undertaken to investigate the underlying reasons for such gross error in erecting poles etc.. Thus investigations leading to excavation of foundations where poles were inclined were evidently not undertaken, as poles did not have specified foundations almost invariably wherever this team excavated the foundations.

153. Select excavations at the same site (Borlai II, Phase II) reveal that foundations just did not exist, and even the metallic HB Poles had loose 2-3 stones randomly put in the name of providing some support (Plate 4.47). This when actually the HB poles are supposed to have Concrete foundations as per the Specifications as well as the Measurement Books.

154. Thus, actually much of the concrete foundations recorded in MBs for the Metallic poles for which payments have been made, were never laid. Far from initiating Enquiries and rejecting such works, in a case of clear financial misappropriation, these works were paid for as Concrete foundations, and the manifestation of such gross irregularities in the form of inclines poles was passed on with Rs 300/- penalty imposed on account of "inclined poles", thereby regularising poles without having appropriate foundations.

155. Similarly, "damaged" Muffings were accepted and imposed a penalty of Rs 900/-, when in the field the quality of muffings when constructed was far from acceptable. The muffings were also often found not constructed for the HB Poles, as well as for the Transformer poles, and all this was overlooked and the bill passed for payment with very minor penalty.

156. Again, rather than ensuring that danger notices were at re-fixed at proper heights to forewarn passerbys, a penalty of mere Rs 100/- was imposed, and work accepted notwithstanding the high risk to lives of people.

157. Such criminal callousness, incompetence, unprofessionalism, and non-serious attitude needs to be severely castigated, and should invite most severe action against all those responsible for accepting, and making payments for such works that ought to have been rejected outrightly until made good.

158. Such malpractice reflects a near certainty of serious financial swindling and inappropriation. It is also indicative of gross carelessness in execution and supervision, and a failure of higher officers to monitor the works executed and to monitor payments that were being released with paltry penalties/recoveries despite unacceptable shortcomings. This very serious matter may be referred to a fuller probe comprehensively covering all R&R sites, by a specialized agency such as the CBI / Lokayukta / CAG etc..

4.16. Concluding Remarks

159. Large numbers of Transformers, LT-Boxes, AB Switches etc were found missing at R&R sites. This is despite the fact that in a number of cases, permission was granted by the Electrical Inspectors subject to installation of AB-Switches etc. And yet, these were not installed, and the infrastructure handed over blatantly violating the necessary conditions of permissions.

160. There also exists noticeable poor skilled-ness in fitting and installation of various works, reflecting poorly on work execution and supervision. The maintenance remains equally poor. All of this has made the entire infrastructure rather unsafe breaching several safety provisions.

161. There has been significant violation of Rules and provisions given in various Indian standards. Furthermore, there have been significant breaches with respect to code provisions, quality determination and tests, and even provisions envisaged in Indian Electricity Rules, 1956. The result is that the infrastructure provided is not-upto-mark, and unsafe at several places.

162. The qualities of the material used has not been ascertained, and the mandatory testing of various components of the electrical infrastructure has either not been carried out, or has been carried to a negligible extent only.

163. Thus, the safety provisions for human beings, property, and animals have not been followed in most instances.

164. There is apprehension that serious technical and financial irregularities and malpractices may have taken place where large numbers of poles are inclined, muffings are missing or substandard, foundations are non-existent or nowhere near the specification, equipment including LT panels is sub-standard, and safety equipment like Lightning Arrestors and AB switches are often missing/not installed.

165. Phase II works have been capital intensive and are rather dubious, particularly where 100% metallic poles have been deployed at some R&R sites, even as corresponding phase I works in nearby vicinity comprise 10-20% of metallic poles only. Further misappropriations seem to have occurred in metallic pole foundations which are supposedly the concrete ones for metallic poles, and which appear not to have been provided at all in several cases despite making financial payments.

166. In several cases, irregularities were known to NVDA Engineers, and they have chosen to regularise the sub-standard works by deliberately imposing paltry penalties of a few hundred of Rupees, completely disregarding the financial fallouts, the technical requirements, and the consequent compromise with safety provisions. Appropriate exemplary action on all responsible officers is warranted.

167. Pole foundations are invariably not upto mark and are extremely poor. Massive irregularities seem to have taken place with likely financial misappropriation and loss of public money, notwithstanding a permanent compromise with the quality of infrastructure (inclined poles, loose conductors, breach of minimum clearances, chances of short-circuiting and fires etc.). The foundations (both concrete and boulder types) are missing in most cases and one or two boulders have been randomly thrown in the name of pole foundations which are essentially sub-standard and not acceptable.

168. Similarly, the Muffings are also often missing or have only above ground level superficial presence for cosmetic appearance, without actually serving any purpose.

169. There also have been large misappropriations in purchases, particularly those of transformers. In several cases, the same transformer has been deployed at more than one R&R site, permissions have been taken from the Electrical Inspector, and the same transformer has then been shown handed over at various sites. In such cases, there does exist a certainty of swindling over purchases of transformers. It is also very likely that transformers from outside the R&R sites may have been deployed and handed over and later may have been removed from the R&R sites. However, it is beyond the scope of the current enquiry, to carry out such specialized investigations which may be conducted separately by CBI/Lokayukta/CAG or some other specially appointed authority to fix up the quantum of misappropriations and identify all those who are involved in misappropriation of public money.

Very Poor quality of concrete in Muffings

Another Muffing: Poor concreting and very poor underlying material in foundation

Muffings claimed damaged & regularised with small penalties were actually sub-standard

Pole inclinations not investigated, but regularised by paltry penalties.

Missing Muffings in 3 cases, 2 of which (left and middle photographs) are of HB Poles, with poor foundations. These HB Poles are recorded to have Concrete foundations as per MB Records. But even a boulder packing was missing. Just 1-2 stone pieces found as "foundation". The third photograph (Right) is of a Transformer with 3 pole configuration. Muffings again not constructed in any of the three poles. No Danger Board seen.

Missing/Poor quality Muffings passed off as some "broken muffings"(Penalty Rs 900/-), Inclined poles were passed off with minor penalty of Rs 400/- without investigating foundations. Rather Foundations were recorded as of Concrete for HB Poles in the MBs, when actually these were sorely missing. Missing Danger Boards were regularised with penalty of Rs 100/- for "not fixing at proper height".

Plate 4.47. Borlai II, Phase II: Acceptance and Regularisation of Sub-standard works that ought to have been outrightly rejected, until made Good.

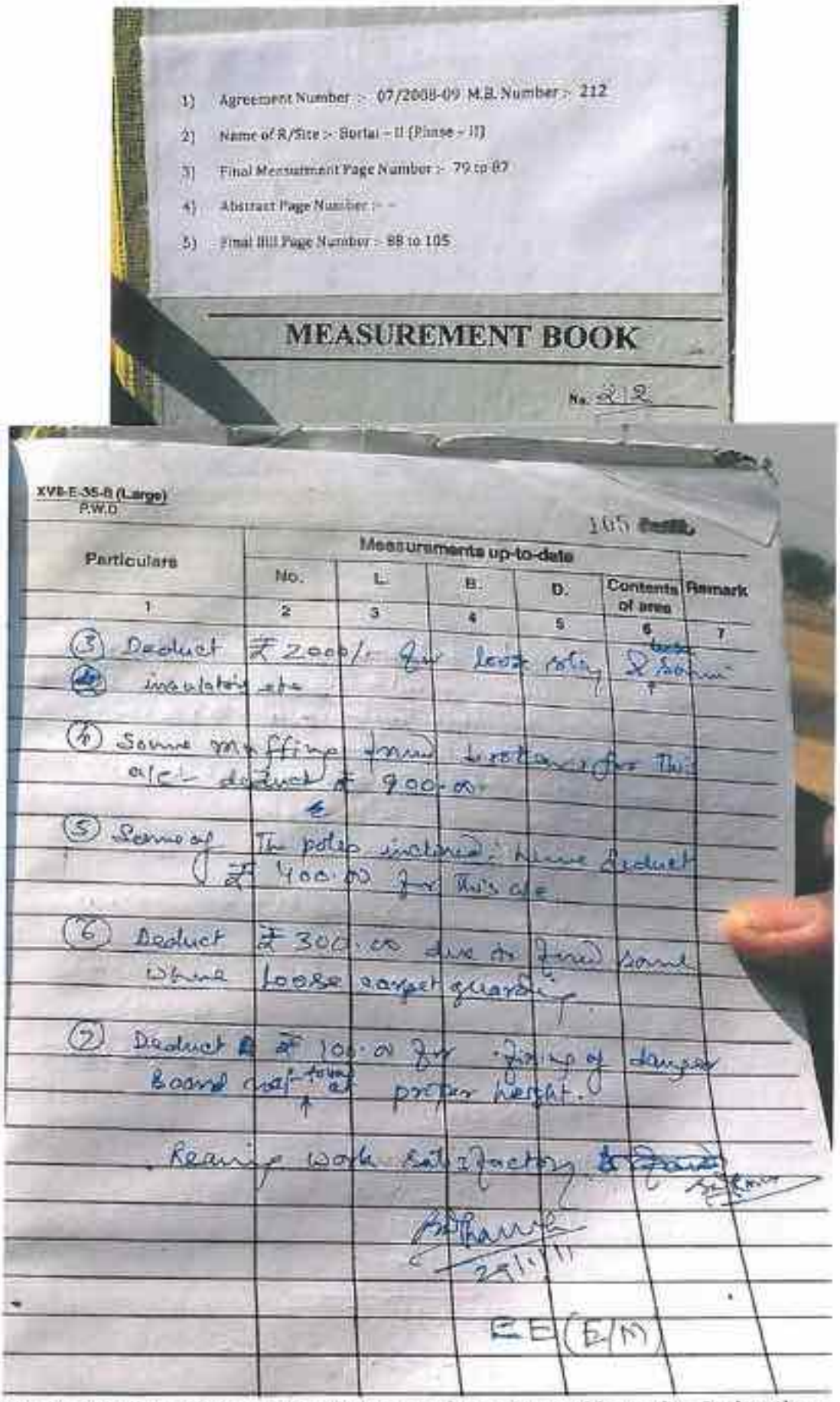


Plate 4.48. Borlai II-Phase II: Paltry deductions for unacceptable works. Rather than rejecting such works until rectified, these were accepted, paid for, and regularised.

CHAPTER 5

Chapter 5. Concluding Remarks & Some Suggestions

Table of Contents

Chapter 5. Concluding Remarks & Some Suggestions

While a lot of suggestions have been made throughout the Report, additionally a few more suggestions are being made in this chapter from the viewpoint of the overall R&R project.

5.1. Expand Infrastructure to meet Minimum Provisions of NWDT Award

1. The resettlement and rehabilitation of the submergence affected oustees of Sardar Sarovar Project has been endeavoured to be undertaken at the 88 R&R sites. However, the provisioning falls well short of that spelled in the NWDT Award, and this shortfall in amenities have been identified in Chapter 1. It appears that inadequate infrastructure has been provided thus far reflecting poorly on the Planning aspect of the R&R works.

2. Unless there exists a good reason behind the apparent lack of infrastructure with reference to the NWDT Award, it is necessary that the shortages be made good, and minimum required infrastructure be provided at all the sites.

3. Thus, NVDA needs to focus on various shortfalls with regard to civic buildings, Tree Chabutras, and especially the Halaos, and provide these in adequate numbers. The same holds true for supplementary amenities such as Charnoi Bhoomi, Shamshan Ghats, Temples etc., whose provisioning needs to be made.

4. Other supplementary works must include making adequate provisions for School Playgrounds, Drinking water amenities in Schools, and Toilets in the premises of the Civic buildings, particularly the Primary Schools.

5. In the context of toilets, the NVDA also needs to have a rethink over the method of sewage disposal using septic tanks, all of which lie defunct currently, and which appears a non-viable solution in view of inadequate provisioning of water supplies at the civic buildings.

6. Drainage facilities need to be extended to all R&R sites. Presently, drainage is non-existent at a majority of R&R sites, and where it exists, it is mostly in shambles.

7. NVDA also needs to do a rethinking on drainage using half round pipes as this method appears to have failed at most sites.

8. Culverts also need to be integrated with the drainage system.

9. Provisioning of land for fodder (charnoi bhoomi) needs to be assessed based on livestock population surveys, and the grass yield expected at the site. Such assessments have not been made, and need to be made now to earmark appropriate areas for providing fodder to the livestock. Surveys on livestock would also help identify their drinking water demands, and provisioning of halaos then needs to be made in adequate measures at all R&R sites, including the 28 odd R&R sites where halaos have not been constructed.

10. The Tree Platforms need to have a tree at the centre, mostly not found in the current scenario, and provisioning needs to be made for watering the saplings in the initial stages at least.

11. Community ponds for recharging groundwaters, water storage, and for enhancing the aesthetics at each R&R site need to be constructed. It should be endeavoured to construct water ponds that assimilate collected drainage water so that this water is used as a resource rather than a waste to be disposed even if it spoils crops of local farmers, as is often the case in the current scenario. All that is to be done here would be to drain the last culvert/drainage network into the pond.

12. Conductors for Street lights are already in place. However, the street lights are missing. Since, as per the NWDT Award Street lights were to be provided, NVDA needs to make such arrangements to provide night lighting, something that would incur not much expense, and would go a long way in improving quality of life for the oustees in their new environs.

5.2. Extend Additional Facilities

13. Site inspections have revealed that with minimal investments, a few more things are possible which if undertaken would greatly enhance the quality of life of the constructed habitations. Some of such additional facilities are listed below.

14. New additional water sources need to be urgently developed to mitigate the water supply crises at most R&R sites. This would however, require an assessment of current needs (including water needed to fill OHTs/Cisterns/Halaos etc.) and actual current yields available in tubewells / handpumps.

15. Provision of solid waste collection bins with appropriate arrangements for sanitary disposal of collected waste needs to be in place.

16. Provision for community toilets with adequate arrangements of water necessary for required sanitation may be explored for extending sanitation services at the R&R sites.

17. If possible, land for community based wastewater treatment plant at every R&R site may be earmarked and provided.

18. Plantation work needs to be undertaken to improve overall environs and to make the R&R sites green.

19. Clean-up the R&R sites from the current invasion of American Babool which seems to infest large number of sites. This will not be a one-time effort as clean-up has to be synchronised with the germinating season for a period of 3-4 years on a regular basis to get rid of seeds that may germinate in each life cycle.

5.3. Revive Abandoned/Unoccupied Sites

20. There are a number of R&R sites like Bhilsur, Sondul etc. which appear to have been abandoned for some reason or the other, and which lie completely deserted.

21. This has led to massive deterioration of infrastructure quality as has happened at Sondul (Plate 5.1), where even the doors and windows of the buildings are missing, and the buildings lie in shambles even as cisterns and pipes are missing. It is noteworthy that Electrical Services at Sondul even have Phase II works which is the single most costliest work under all Phase II works, costing as much as Rs 141.84 Lakhs. Unfortunately, there are no users.

22. In case like Bhilsur, the site has been abandoned in a hurry with no Tree Platforms, no halaos and not even the culverts provided (it is the only R&R site not to have even the culverts) after constructing buildings like Primary School, Panchayat Bhawan, Seed Godown and Primary Health Centre.

23. Under all such cases, irrespective of the reasons for which the sites stand abandoned, significant investments have been made, and hence NVDA needs to identify all such sites, and revive the sites and its infrastructure to make it usable if appropriate, so that public money does not go waste. In case, the oustees are not going to occupy R&R sites, NVDA needs to find out ways to put the R&R sites to some productive alternative use.

24. In fact, NVDA needs to come out with concrete plan on other sites also that are completely deserted till date like Bhawati II, Jalkheda, Dharamrai, Kikarwas, Dehar, Umda, Kahajuri, Musapura, Keisur etc., and explore if these are going to be occupied, in which case infrastructure strengthening may be needed. Else, NVDA needs to find out ways to put such R&R sites to some productive alternative use, rather than leave all infrastructure to decay and deteriorate with time.

Plate 5.1 Abandoned Infrastructures at Sondul. The entire site, including the capital intensive Phase II Electrical Works, appears abandoned.

5.4. Restore Damages, Collapses and Poorly Planned/Executed Construction

25. From the preceding Chapters, it is evident that the quality of Civil, PHE, and Electrical works leaves much to be desired. Poor planning, inadequate provisions, civil infrastructure development without proper technical design and estimation, lack of quality control, inappropriate monitoring and surveillance, and violation of prescribed norms as laid down in MP state Government's own Manual etc, have all contributed to the present day lacklustre and much wanting, and sometimes even sub-standard, infrastructure quality as visible in the field.

26. Therefore, it is essential that NVDA reassess and revaluates all executed works at all R&R sites, without any prejudice, and initiates corrective steps so as to alleviate the lives of the occupants of these R&R sites, and to make good whatever damage has already occurred.

27. It is suggested that major area which should be under the scanner of a review may comprise (*but not necessarily be limited to*) the following listed suggestions:

28. Many NVDA constructed buildings, roads, culverts, tree platforms and halaos were found with settlement cracks on several sites. Electric poles were seen bent despite being embedded 1/6 of their total length as claimed in the MBs. Poor packing carried out regardless of underlying soil strata has been another issue responsible for inclined poles. Similarly, most of the handpump platforms were found damaged irrespective of the underlying soil type. Considering all such deficiencies, it is suggested that all civil, electrical and water supply works must be subject to comprehensive review in the light of the findings presented in Chapters 2-4 of this report, and be re-examined, reviewed and restored appropriately. Wherever necessary, structures may need to be reconstructed.

29. Several Buildings constructed by NVDA were seen with severe cracks in walls and foundations to exposed ceiling reinforcement, settlement of floors, poor roof-drainage arrangements, poor/missing internal electrification, poor toilets without water and flushing arrangements, disconnected and non-functional uncovered sceptic tanks, inadequate and often missing drinking water arrangements etc. Thus, it is necessary to undertake inspection of each of these building utilities, possibly by senior officials, and restore them to make them functional and safe.

30. All damaged buildings need to be repaired and restored. In a few cases (example, Chikalda Primary School No. 2), the buildings may need to be demolished and reconstructed. Special attention needs to be given to their toilets, and sceptic tanks

which are mostly dysfunctional, and to drinking water supply arrangements at these building premises.

31. Roads at several sites have outlived their useful lives and are in poor state, despite the fact that most R&R sites are not yet fully habitated. These need to be rebuilt / renovated to acceptable levels with proper grading, cambers, turning radii etc. and then handed over to appropriate authority.

32. Several roads may have unequal top widths/shoulders, and this has no explanation. Roads were seen 5 m to 12 m top widths without any basis. R&R sites are not where land limitation can be accepted as a plausible reason for variations in road widths. In new habitations, unless traffic studies have been forecast/conducted, unequal road widths indicate adhoc works and liable to be treated as below specification/unplanned works. All such matters should be reviewed and if possible the roads need to be restored in desirable consistent profile.

33. Similarly, the Roads were often seen constructed with high embankments, creating problems for the plot owners in certain sections, who will need to raise the plinths and incur additional costs in order to avoid flooding of their houses for no mistake of their own. In all such cases, NVDA needs to make amends/compensate people made to suffer unnecessarily due to engineering faults.

34. Provision of extra width on road curves/intersections for smooth turning of vehicle has not been made. The culverts are mostly provided so as to render the road turns at right angles, making the turnings difficult to negotiate. All such cases need to be reviewed to ensure proper curves at turnings.

35. Tree platforms constructed by NVDA were seen damaged at large numbers of sites. Few tree platforms had trees planted, though it was not clear as to how these trees will be watered. Tree platforms of varying dimensions indicated adhoc unjustified planning, and the heights of these tree platforms was a variable that varied at random. The locations of tree platforms were also adhoc. Therefore, it is suggested that necessary review be undertaken by senior authorities and rehabilitation/reconstruction work be undertaken in consultation with affected people as per their requirements.

36. Troughs (Halaos) were provided in inadequate numbers not meeting the requirement of the livestock in accordance with the NWDT norms. Considering the importance of the livestock in the rural context, appropriate numbers of halaos need to be constructed. Furthermore, these have to be constructed with standardised heights that would be convenient to the animals. A reduction in halao heights may also facilitate filling up of halaos with lesser water, and would prevent unnecessary stagnating of the residual waters in the halao. Furthermore, the existing and new

halaos need to be connected to an assured water supply source as currently a vast majority of these halaos remain dry, and the necessary connections are all missing. The drainage aspects of these halaos also need to be given due consideration and mechanisms needs to be installed that prevent undue spills. Halaos with damages/cracks/exposed bricks needs restoration.

37. Inappropriate Drainage has been a major shortcoming in the entire project. At very large number of R&R sites, no drainage has been provided, and wherever it exists, it is essentially in shambles. Properly designed drainage facilities need to be extended to oustees across all R&R sites, with drains in BC soil needing additional precautions. It is suggested that in view of the current near-complete failure, any more experiments with half round semi-circular pipes acting as drains be dispensed away, and properly designed drainage system be provided. This would greatly solve the problem of flooding at sites during monsoons, and would enhance the quality of life of the oustees to a great extent.

38. Large numbers of Culverts have been rendered defunct due to changes in topography. All such culverts need to be reviewed for their continued existence, and new once need to be reconstructed in view of changes in topography. Since, the culverts have not been subject to hydraulic designs, there are several situations which result in accumulation of discharges due to pipe under-provisioning, and all such culverts also need to be rebuilt for catering to the discharges.

39. Culverts were often seen with large headwall damages. Damaged culverts need restoration or reconstruction as the case may be. Protective pitching on the sides also needs careful consideration.

40. The final disposal of drained water merits careful consideration. Far from regarding this as a liability, options such as water recharge through water ponds which have multiple uses such as aesthetics, use for animals/humans/aquaculture etc. be considered, more so because Ponds at R&R sites were a part of the NWDT Award. It also needs to be ensured that drainage water does not create crop damages.

41. Borewells in the form of failed handpumps/tubewells, discarded due to poor discharges/yields, as well as the unsuccessful bores, need to be used for recharging of groundwater in compliance with the directives of the E-in-C, MP PHED. This would reduce further deterioration in groundwater status at R & R sites.

42. The approach to Handpumps/Cisterns etc. and the drainage provided at such amenities need to be reviewed case by case and made amends for as necessary. Damaged handpump/cistern platforms need to be repaired and restored.

43. The 2 Water Treatment Plants constructed, need to be made functional to justify the investments made and to alleviate water supply problem at some of the R&R sites.

44. It must be endeavoured that for all cases where surface water is being used, the water should be essentially treated prior to supply. For groundwater, such as those from tubewells, if the quality is found satisfactory provision of disinfection at the Overhead Tanks as well as at the tubewells should be made mandatory, and its practice should be ensured.

45. It must be ensured that water supply by Tankers is not needed, except as a matter of exceptional emergency, in view of the massive investments in building water supply infrastructure that is liable to become defunct because of non-usage.

46. Large numbers of Cisterns are missing or stand damaged at most sites. These need to be replaced with the requisite numbers across the R&R sites. Also all Cisterns need to be connected to assured water supply through proper connections. Furthermore, a mechanism for preventing undue spillages need to be in place and in working state so as to save the already scarce water from undue wastages.

47. Cisterns, as well as the Overhead Tanks need to be cleaned periodically and at regular frequencies, and records need to be maintained.

48. Regular water supply testing and monitoring must ensue immediately, and all Fluoride affected, E-coli infested water sources should be dealt with as per existing norms and rules. Regular testing needs to be carried out at Water supply sources, Overhead Tanks, in the distribution system, and at Cisterns/consumer end/handposts etc. Provision of chlorination needs to be made as per recommended spelled out in various Manuals of CPHEEO.

49. Records need to be kept as per MPWD Manual 1983, and supervised regularly by higher officials. It is essential to maintain all records in transparent manner. The service logs also need to be meticulously maintained. The current log book maintenance/ practices were seen clearly violating provisions envisaged in MPWD Manual 1983. Log books as per the standard norms need to be strictly maintained, as the current operations are, to put it mildly, non-transparent. This would also plug the chances of any future malpractices.

50. Elaborate Water supply system created for distribution of drinking water through Piped network, Overhead Tanks, Tubewells, and Cisterns, have remained non-functional in large number of cases. Due to such massive infrastructure mostly remaining idle for a number of reasons including extremely poor maintenance despite huge budgetary provisions and large expenditures incurred, there is a crisis situation for drinking water for humans and livestock, which indicates massive failure of the built water supply infrastructure. Under such circumstances, one way of dealing with this situation is to take corrective steps as necessary, followed by a test of the entire created infrastructure in the presence of independent experts and

stakeholders such as the affected people. Once the system is operational it should be immediately handed over to relevant authority, as at present NVDA is managing the rather very massive infrastructure with only a few PHED Engineers, and the present water supply management is far from satisfactory.

51. The wastewater sewage network including massive septic tanks provided at Dharampuri need special review. Despite massive investments, as of now there is no chance that the system will work in the absence of adequate water supplies at the site. Besides, the execution of the network and the reliance on septic tanks needs to be reviewed. The septic tanks effluent disposals also need careful consideration to ensure compliance with the mandatory BIS stipulations.

52. The electrical infrastructure was often seen in very poor condition. Loose conductors, inappropriate clearances, bent/inclined poles, missing transformers and panels, panels without covers and lock and key arrangement, poor quality of LT-boxes, lack of safety fittings like missing AB switches etc, are the critical problems that plague the infrastructure created. All such shortcomings need to be reassessed and re-examined by independent quality monitors/experts and restoration/renovation work be undertaken to ensure a robust, efficient and sustainable infrastructure.

53. The foundations of electrical poles are far from satisfactory and need to be strengthened to avoid accident and damage of the electrical network.

54. The Electrical transformers need to be in place with a transparent mechanism and record keeping in case these need to be removed from the site for some reason.

55. The general aesthetics need to be improved and massive babool at these sites need to be carefully unplanted.

56. Proper signages/display boards with facilities provided at each R&R site and necessary details *as per actual* need to be in place.

57. Procedures as envisaged in various Manuals and BIS codes need to be strictly adhered to and followed, at least for the renovation and new construction work. Proper geotechnical investigations, Estimates, Technical Sanctions etc. need to be in place, and As Built Drawings need to be prepared for all the works mandatorily.

58. It is strongly recommended that the strengthening works/new construction may be monitored/ vetted by an independent agency to ensure greater transparency and to prevent any further disputes with NGOs and the public.

5.5. Handover all created infrastructure without any further delay to Appropriate Agencies

59. Infrastructure that is not used degrades and deteriorates with passing time. Besides, unhanded infrastructure offers chances of malpractices as has been feared in water supplies in the present project, as indicated by operations of water tankers despite huge water supply infrastructure provisioning, and further reinforced by the large annual budgets on running, operation and maintenance etc. even as record keeping remains sub-standard, and actual maintenance in the field remains abysmally poor.

60. It is therefore, necessary that infrastructure created be immediately handed over to the appropriate agencies so that it is put to use, and the resettled families get ownership and due benefit of the infrastructure created for them. The handing over will also curb unwarranted controversies due to poorly maintained and deteriorating infrastructure quality.

61. In particular, water supply schemes need to be handed over immediately in view of mismanagement, non-transparent operations and significant financial fallouts. This will not be an easy task given the fact that R&R residents have been dosed with the addictive free water supplies, and the infrastructure is not in good shape to be taken over by a local body.

62. It is suggested that infrastructure created be immediately brought into running state and made functional, due maintenance work should be diligently undertaken at each site with proper record upkeep, regular monitoring of water qualities be undertaken, and then the real water crisis, if any, be assessed at each R&R site. This should be followed by strengthening/augmentation of water supply sources wherever real crisis for water supplies still exists. It may be pertinent to note that today's crisis is partly a reflection of combination of factors like non-transparent record keeping despite huge expenditures that still do not ensure proper maintenance and upkeep.

63. It is strongly suggested that the working, functional and adequate water supply infrastructure at each R&R site should then be test run in presence of independent third party evaluators/specialized personnel, as well as in the presence of the local Panchayats, interested NGOs etc., and be immediately handed over to the local bodies/Gram Panchayats as appropriate.

5.6. Punitive Actions/Further specialized Inquiries Needed

64. The earlier Chapters of this report have already identified the areas/issues where appropriate punitive actions need to be taken against gross irregularities etc. In several other cases, specialized Inquiries may further be needed to be initiated as prima-facie there exists a reason to believe wide misappropriations/irregularities.

65. Appropriate action/Specialized enquiries will be needed in several instances that have been reported in earlier chapter, some of which are listed below, though the list is not exhaustive:

- Supply of raw untreated waters for drinking without bothering about public heath
- no mandatory regular water quality monitoring and testing being conducted at R&R sites
- Non-upkeep of proper records for diesel consumption of DG sets and Water tankers
- Non-transparent running and maintenance : large annual maintenance spendings even when water supply infrastructure lies in shambles
- Non-usage of created water supply and sewage infrastructure
- Creation of Sewerage network and septic tanks at Dharampuri after assuming sewage flows of 100 lpcd even when water supplies are designed at less than 70 lpcd
- Choice of usage of extraordinarily huge septic tanks for wastewater treatment at Dharampuri even without proper effluent discharge from these tanks
- Inappropriate and grossly sub-standard and non-acceptable electric pole foundations
- Poor quality of Electrical infrastructure: Missing Transformers, Missing/sub-standard LT-Boxes, Missing AB Switches etc.
- Approval and regularisation of sub-standard/below specification works after imposing paltry penalties in case of Electrical works putting at risk life of the inhabitants,
- Deployment of same transformers at more than one site as per records clearly indicating misappropriation and financial swindling in purchases of Transformers etc.
- In fact, while swindling in purchases of Transformers has been established in this report, there is also an apprehension in the purchases of Conductors, Poles

and other Electrical equipment. All purchases made should be comprehensively inquired upon by some specialized agency.

- Appointment of private Consultants, particularly M/S Aqua Consultants for drainage works, water supply works and sewage works
- Prior purchase of drain pipes and execution of drainage system in some cases even before consultant designs were sought
- Role of consultants in providing murky sub-standard designs and their acceptance by NVDA even without vetting in several cases
- Execution of drainage works at more than 20 R&R sites without any design whatsoever
- Construction of much of the Civil Infrastructure without geotechnical investigations, proper designs and estimates
- Duplicity in reporting "No Deviations" and no savings even when halaos etc were not constructed by PHE, NVDA despite financial allocation in Technical Sanctions, etc.
- Similar disappearance of savings in Civil Works as No deviations are reported despite large savings expected in foundations etc.
- Instances of poor execution and supervision in Civil , PHE, and Electrical works as already identified in this Report
- Non-compliance with set standards and procedures, IS-Codes, manuals etc for Civil, PHE and Electrical Works
- Possible diversion of R&R funds into other works not meant for PAFs (such as the Water supply scheme/Intake structure for Barwani City)
- Likely development of Plots in areas under submergence at some R&R sites like Nisarpur etc., and creation of infrastructure in submergence area (example, possibly the Koteshwar Ghat Intake) leading to waste of public money and investments made.
- Significant Overprovisioning of Plots at R&R sites relative to the number of oustee families, and the consequential financial fallout of developing extra infrastructure
- Non-Compliance with the mandatory provisions of NWDT Award etc.

5.7. Provide Appropriate Technical Know-how to occupants of R&R sites to build up their Houses

66. Soil strata at certain sites like Moreghadi, Khalbujurg, Khalkhurd etc. wherein particularly the BC soils dominate, has been causing serious problems for the engineered infrastructure in place such as the buildings, tree platforms etc., which have all been constructed under the supervision of specialized personnel and have needed pile foundations in several instances. In such a situation where even the engineered construction has been failing en-mass, the technical guidance for low-cost houses to be built needs to be provided to the PAFs, as such soils are not suitable for building construction, and building houses will remain a challenge for those being resettled.

67. Model houses in such tricky strata may be built to suggest the oustees as to how their structures can survive the massive onslaught of BC soils, and other strata types. Similar facilities in the form of low-budget housing models may be extended for other strata including very hard rocky strata (example, at Brahmangaon.

68. It is also suggested that besides the Model houses, the technical knowhow, guidance and advise should also be available to the PAFs to build low-cost houses in such difficult strata.

69. It would be further advisable to review the economics of constructing houses, at least in the difficult geologies. If the cost of such Model houses is more than what is being paid in compensation, difference of the cost may be reimbursed as an additional aid to affected oustees for construction on allotted plots at such sites. This would result into justified compensation being provided to cover up additional expenses due to the disadvantages posed to a section of PAFs who have been allotted plots by relocation into technically difficult strata, where construction of houses requires specific technical knowhow and additional expenditure (for example, technical requirement of costlier pile foundations in BC Soils).

5.8. Carry out An Environmental Impact Assessment study including the socio-economic aspects for the R&R Works

70. Present R&R project works have focused on Technical development of sites and amenities with hardly any significant concern for social and environmental matters, which have by and large remained a neglected lot.

71. For that matter, even the Technical amenities have often neglected to integrate such concerns. Missing Halaos, Missing Tree Platforms, poor drainages, culverts discharging to plots, Poor approaches to Cisterns and Handpumps, lack of water and sanitation in Schools and other civic buildings are only some of the issues that highlight the neglect of social and environmental concerns.

72. An Environmental and Social Impact Assessment for the Rehabilitation and Resettlement of affected people would have inevitably identified most of the shortcomings of the rehabilitation project, and through their rectification, may have minimized the unrest among affected people.

73. Even now, there exists a need for Environmental and Social Assessment in the post-R&R development scenario, and to integrate its outputs into supplementary works likely to be undertaken to alleviate the quality concerns and to fulfil the obligations towards the NWDT Award.

74. This Assessment also needs to be properly documented for other similar future projects where necessary lessons learned from this project should be gainfully employed to mitigate the avoidable impacts.

5.9. Way Forward to Future R&R Projects - Suggestions for Similar Upcoming Projects

One of the significant contributions of this R&R project could be to preserve the experience of resettlement and rehabilitation and carry the lessons from the failings and successes of this project to other similar upcoming and future projects. Given a large numbers of constraints, the skills and experiences gained on one project do not usually get transferred to another, and the invaluable experience is thus often lost. However, in this case, NVDA happens to play a large role at least in the State of Madhya Pradesh, for carrying out Water Resources Projects in the Narmada valley and in thus, handling future R&R projects for similar projects. It is therefore imperative that lessons be learned and steps be taken to at least preserve the learning, prevent damages, and mitigate the pain of rehabilitation, and prevent future Litigations and Inquiries that consume a whole lot of time and energy. Some suggestions are therefore being made for similar upcoming R&R works in other projects.

5.9.1. Need of Strong and Appropriate Institutional Arrangement

75. NVDA appears to have a weak institutional set up. For instance, the organisation did not have a ready reference to an accurate asset inventory and expenditures record, as evident by a number of communications that cited varying expenditures and asset statistics to this Inquiry Committee. Similarly, the checks and balances often appeared lacking so that violations of the orders of superior authorities was not entirely uncommon, the Civil and PHE divisions were working in such a manner that the left hand was not knowing what the right hand was doing (example, award of duplicate Technical Sanctions with respect to construction of halaos), and even the same division was not knowing what was being planned in one scheme relative to another (example sewage system at Dharampuri was approved with sewage flow of 100 lpcd whereas water supply was designed for 70 lpcd). The superior officers also failed in ensuring that proper geo-technical investigations were carried out to evolve detailed Estimates, and in observing the compliance with provisions of MPWD Manual including setting up of Test laboratories etc. Nor was a mechanism established to oversee if the purchases being made were transparent, and swindling in Transformer purchases as established in this report is an illustrative example. Thus large numbers of gross anomalies went unnoticed due to lack of effective mechanisms of control and checks.

76. It is therefore important to evolve an appropriate Institutional framework to facilitate proper resettlement and rehabilitation after plugging the various loopholes.

77. This will also allow experience and learning from every resettlement project to be consolidated and lessons to be applied effectively, resulting in better resettlement practices. An effective Institutional and Organisational set-up of each project should account for the social and political context in which it is located and should ensure participation/feedback/review from all the adversely affected people. The extent to which project-specific Institutional arrangements allow for the participation of negatively affected people is critical to the efficacy of any resettlement programme, and herein lies the need for A] Wide Stakeholder Consultation, and B] Sensitization of the project staff to the apprehensions, fears and expectations of the rehabilitated people.

5.9.2. Encourage People's Participation through wide Stakeholder Consultation

78. Resettlement must aim to improve the quality of life of the people by raising living standards beyond the pre-project levels, and this needs to be perceived so by the rehabilitated people through active community participation at planning, development, and review stages of any project.

79. However, in the present SSP project, serious trust deficit exists between Implementing Agency and affected people as was witnessed by this Inquiry Committee during field visits, reflective of a lack of consultative approach.

80. As of now, there has been significant non-existence of stakeholder consultation at various stages of project implementation, with NVDA mostly working in isolation, and the Task Force taking into account only the limited observations of the Rehabilitation Officer (Punarvas Adhikari).

81. A wide consultative approach with all stakeholders could have led to build-up of mutual trust and acceptance, and into avoidance of trust deficit that exists now.

82. Guidelines for such stakeholder consultations are freely available from International lending agencies such as the World Bank and the Asian Development Bank etc., and there ought to be clear guidelines from NVDA on similar lines.

83. A participatory approach in all future works including renovations would hopefully, alleviate some of the accumulated dissatisfaction among the affected people, and may lead to better acceptability amongst them. This implies that steps be taken to ensure that people participate in the decision-making process not just as negatively project-affected oustees but as primary actors who contribute to the socio-economic changes being brought about by the project through their acceptance of project. Widely used popular strategies such as Public Hearings and Reviews are suggested as to enable people to participate in the decision-making process, and to build up trust and ownership amongst the rehabilitated persons.

5.9.3. Need of Training and Staff Capacity Building

84. Though much of the staff may be proficient and very capable of specialized water resources development works, it appeared that staff was not very adept and specialized in developing infrastructures of various types needed at R & R sites.

85. In the present R&R works under the Sardar Sarovar Project, the Staff deployed for R & R development was not properly sensitized to the special and specific needs of the oustees and their apprehensions over the project work, nor did it appear to be trained or sensitized for rehabilitation and resettlement works. For instance, the Staff responsible for infrastructure development had no idea as to why tree platforms and halaos of differing dimensions, particularly in terms of the height above ground, were constructed. Similarly, it was also not clear as to what impacts will the high road embankments result into. The staff was also not aware of the immense importance of the livestock and their needs in the rural context. How to deal with specific needs of the oustees having rural/tribal background was something that needed prior sensitization in order to build up a feeling of mutual trust between the implementing Agency and Resettled PAFs. Much of the present day adhocness could have been avoided by sensitizing and training the staff on technical and social front.

86. All of this ultimately reflects in development of a rather frail mutual trust with those who are being resettled and rehabilitated, and between those who execute the R&R schemes. The best of resettlement and development plans may collapse if they are not backed up by strong and appropriate Institutional arrangements, and a trained staff. The training and capacity building of organisations involved in resettlement is extremely critical to the effectiveness of any R&R project.

5.9.4. Need of an Accountability Mechanism

87. Accountability mechanisms are required wherein construction can be halted in case negotiated agreements on resettlement, rehabilitation, and other types of compensation and mitigation are not being respected. As has been the present case, non-compliance of NWDT provisions is a serious lapse of no-accountability provision. Similarly, the necessary procedures have been violated, by granting Technical Sanctions based on adhoc Estimates, and in the absence of Engineering designs based on proper geo-technical investigations. An effective accountability Mechanism would have thwarted such a scenario.

5.9.5. Need of Transparency to Check Fraud, Corruption and Irregular Procedural Approvals

88. Any misappropriation in bidding for contracts, tender procedures, granting of contracts and Approvals and purchases etc. would invariably result into reduction in funds available for resettlement and rehabilitation, besides resulting into inferior work quality. A regulatory mechanism that ensures transparency in the project works and leads to avoidance of misappropriations would undoubtedly result into large internal savings and efficiencies in the project work.

5.9.6. Need of Monitoring Committee

89. To provide Regulation over R&R works, it is necessary that either an independent third party monitoring be ensured, or at least an internal mechanism be built that ensures regular monitoring of the R&R works, including overseeing if the Technical and Administrative approvals are proper.

90. Absence of an appropriate monitoring mechanism may lead to poor infrastructure, inadequate provisions, and unplanned development at R & R sites.

91. As has happened in the present case, this R&R project was monitored neither from technical angle nor from the administrative angle. In absence of social and environmental impact assessment study, no baseline indicators were available. In future, it would be worthwhile to have committees that monitor implementation of such large projects of National importance.

5.9.7. Need of Mandatory Quality Monitoring at Project Level

92. In order to avoid compromises in the quality of the developed infrastructure, and in preventing the dilution of the provisions in the Contracts, and in ensuring that provisions of the codes, Manuals and Works Department stipulations, are all followed and strictly adhered to, there has to exist proper monitoring of the work quality by either a third party or through independent quality monitors on a regular basis. Laboratory facilities required for such monitoring also need to be established.

5.9.8. Encourage Transparent Public Hearing and Redressal of complaints

93. It is suggested that a portal/appropriate forum to address or register complaints be made available, and their compliance be also recorded and made public. This would make the system more transparent and responsible.

94. Furthermore there should be a mechanism to see grievances being addressed, and clear time lines should be available for resolving the complaints, failing which responsible officers be held accountable.

95. The redressal authority should have a clear well-defined mandate and powers to act. This is necessary in view of the observance of the Honourable High Court of Madhya Pradesh, Jabalpur, in its Order dated 21.08.2008 on Writ Petition No. 14765 of 2007 Narmada Bachao Andolan vs State of Madhya Pradesh and others. The writ petition was filed as a PIL alleging various irregularities and corruption in implementation of measures for resettlement and rehabilitation (R&R) of the PAFs of the Sardar Sarovar Project in the State of Madhya Pradesh. The Honourable Court had observed that "*Despite the fact that GRA (Grievance Redressal Authority) under the Chairmanship of a Retired High Court Judge has been functioning, there are more than 600 complaints of fake registrations of sale deeds under the SRP (Special Rehabilitation Package) and also allegations of other irregularities committed at the time of implementation of R&R measures stipulated in the Narmada Award .....Had the GRA been dealing with those complaints it would have not been necessary for the NCA (Narmada Control Authority) to ask the State Government to look into the complaints and take necessary action in accordance with law. Presumably, the GRA may not have entertained the complaints with regard to fake registration and corruption and irregularities on the ground that these complaints are outside its authority and it does not have the powers to deal with such complaints*". Thus clear mandate and powers to act need to be assigned to the redressal authority.

5.9.9. Need of Special Development Plan for Tribals

96. In Sardar Sarovar Project where tribes had also been displaced, it was observed that there is no such special plan is in existence.

97. Dam projects often affect Tribal groups in a number of specific ways. They loose not just their habitations, but also the forests with which their lives are inextricably linked.

98. Resettlement into alien environments, changes of lifestyles and cultures can be much more traumatic to isolated groups of tribals, than to others. Accordingly, distinctive considerations need to be conferred upon in the form of a Special development plan for Tribal groups by undertaking a special drive beginning from land acquisition that focuses on programme for development of alternate fuel, fodder and non-timber forest produce resources on non-forest lands.

99. Furthermore, such communities which otherwise are socially and culturally bonded rather strongly, must be rehabilitated as a group without intrusion of outsiders, and in the form of a compact block so that they can retain their ethic, linguistic and cultural identity and their lifestyles.

5.9.10. Need for judicious Site Selection

100. In the current R&R project, it speaks volumes of negligence in site selection, when sites containing premium agriculture land such as Moreghadi and Khalbujurg are selected without assessing feasibility of construction work at sites having such rich BC soils, so much so, that even the Engineered structures built and monitored by specialized Technical staff, and provided with specially designed pile foundations cannot survive. In such cases, inappropriate site selection would only lead to massive damages not just in public buildings and amenities like roads, tree platforms and halaos, inclined Electric poles and lines, drainage problems etc, but even the private houses built are likely to suffer extensive damages, affecting the quality of life of the occupants.

101. It is therefore necessary that in all R&R projects, site selection be made not just on the basis of land available, but rather a feasibility study be conducted to assess a number of factors that include the distance of R&R site from original village, the geo-physical factors, drinking water sources available, groundwater profile, and particularly the underlying soil strata, and general topography.

5.9.11. Need of Compensation as per Site Specific Cost of Construction and Display of Model Houses

102. In the Sardar Sarovar R&R Project a lump-sum compensation for building houses has been awarded irrespective of the site strata and other factors. This is strange as underlying soil strata (like at Moreghadi and Khalbujurg) dictates the cost of constructing houses. In such soils open foundations are not advisable, whereas Pile foundations are a costly solution.

103. Also, internal roads constructed in the vicinity of plots were found abnormally raised to more than 1 meter in several cases, making the construction cost rise in such cases, thus putting at gross disadvantage those plot owners who face high road embankments in front of their plots.

104. It is for this reason that equal compensation given to oustees to whom plots allotted in different soil strata cannot be justified.

105. Thus prior to payment of compensation at individual site, the implementing agencies should develop a mechanism that provides a fair construction cost based on the above factors.

106. Also, no model houses have been displayed to indicate as to how in varying strata safe and affordable houses can be constructed within the compensation awarded. Site-specific and cost-effective models for houses that may be constructed within the compensation awarded, need to be exhibited in all such future R&R projects.

107. This would also pave way for transfer of Technical knowhow on construction of individual houses in all types of varying strata at R&R sites, including the difficult strata encountered at certain sites, and would go a long way in facilitating the oustees to build their own safe and reliable houses, and in generating trust and a sense of ownership amongst the PAFs.

5.10. Closing Remarks

108. This report has been strictly about the Sardar Sarovar Project - R&R works and amenities provided at the R&R sites. NVDA has already identified and developed the R&R sites, though the amenities provided still need further strengthening and even additional provisioning in most cases.

109. Notwithstanding, what have been the findings of this Inquiry, it is urged that this Report should not become a tool in hindering the process of completion of the Sardar Sarovar Project. This Inquiry Committee realizes that huge Investments have already been made in the Project, and the Dam has already been constructed. This team neither has the necessary data at its disposal, nor has the necessary mandate, nor would it like to enter into the debate at this late stage if the inception of the project itself was justified or not. However, considering the fact that enormous investments of capital, resources, manpower and expertise have already been made, it is time for the society to reap the benefits of its investments.

110. In our view the process of strengthening the services and creation of additional services at the R&R sites should not be linked anymore to the Commissioning of the SSP Project, including the installation of Gates. The Strengthening of R&R works/Punitive Inquiries and actions can all be carried out even if these R&R sites are occupied by the PAFs. The findings of this report therefore, should not be used as a tool to stall the process of completion of the Sardar Sarovar Project at this stage in view of this Inquiry Committee.

If the misery of the poor be caused not by the laws of nature, but by our Institutions, great is our sin.

~ Charles Darwin
in
Voyage of the Beagle

Evaluation of the Quality of Civic Amenities at Rehabilitation Sites of the Sardar Sarovar Project

BOOK OF ANNEXES

(To be Read in conjunction with the Inquiry Report)

Submitted to

Sardar Sarovar Project - Fake Sale Deeds and Rehabilitation Sites Irregularities Inquiry Commission

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April, 2014

Book of Annexes

Table of Contents

Annex 1-A

PUD - (2)

आवक क्रमांक 124
दिनांक 23/9/2013

कार्यालय आयुक्त (पुनर्वास/फील्ड) नर्मदा घाटी विकास प्राधिकरण
बी.जी. 74 सी, नर्मदाभवन, विजयनगर, इन्दौर

पत्र क्रमांक: 545 /30/पुनर्वास/सीनिट/13 इन्दौर,दिनांक: 16 /09/2013

प्रति,

सचिव,
सरदार सरोवर परियोजना,
फर्जी विक्रय पत्र एवं पुनर्वास स्थल,
अनियमितता जांच आयोग, इन्दौर

विषय :- सरदार सरोवर परियोजना के अन्तर्गत पुनर्वास स्थलों पर किए गए निर्माण कार्यों की गुणवत्ता की जांच के संबंध में ।

सन्दर्भ :- आपका पत्र क्रमांक 219/आरआरसाईटस/09/2013 दिनांक 13/08/13

विषयांतर्गत संदर्भित पत्र का अवलोकन करें जिसके द्वारा मॉनसून मानाद राष्ट्रीय प्रौद्योगिक संस्थान (सीनिट) भोपाल से प्राप्त पत्र की छायाप्रति संलग्न कर निर्देशित प्रारूप में जानकारी चाहते हुई थी ।

इस संबंध में अधीक्षण यंत्री (सीनिट) नर्मदा घाटी विकास प्राधिकरण,सरदार सरोवर परियोजना मण्डल बड़वानी से पत्र क्रमांक 983/पुनर्वास/सीनिट/13 दिनांक 17/9/13 से सिविल/सीएचई/विद्युत घटकेवार फर्जीवाड़े जानकारी प्रेषित की है । अधीक्षण यंत्री से प्राप्त जानकारी मय उनके पत्र की छायाप्रति के संलग्न प्रेषित है ।

संलग्न - उपरोक्तानुसार

आयुक्त (पुनर्वास/फील्ड)
नर्मदा घाटी विकास प्राधिकरण,
इन्दौर

Annex 1-A

कार्यालय अधीक्षण यंत्री, लो.नि.वि.
नर्मदा घाटी विकास प्राधिकरण, सरदार सरोवर परियोजना मण्डल बड़वानी म.प्र.

पत्र क्रमांक 983...../पुनर्वास/मैनेट/13. दिनांक 17/9/13

प्रति,

आयुक्त (पुर्नवास एवं पीएम)
नर्मदा घाटी विकास प्राधिकरण,
विजय नगर, इंदौर म.प्र.

विषय: सरदार सरोवर परियोजना के अन्तर्गत पुर्नवास स्थलों पर किये गये निर्माण कार्यों की गुणवत्ता की जाँच के संबंध में।

संदर्भ : आपका पत्र क्रमांक 4825/30/पुनर्वास/मैनेट/13, दिनांक 03/09/2013. एवं मैनेट का पत्र क्रमांक C.E. 185 dated 12/08/2013.

उपरोक्त विषय में मैनेट संस्थान भोपाल द्वारा सभी 88 पुनर्वास स्थलों की सिविल / पीएचई / विद्युत सप्लाई की एनजाई जानकारी मांगी गयी है, जो आपकी ओर विभागीय कार्यालय में जमा कर संलग्न प्रेषित है।

अधीक्षण यंत्री,
लो.नि.वि. न.घा.वि.प्र.
स.स.प. मण्डल बड़वानी म.प्र.

संलग्न : उपरोक्तानुसार

Annex 1-A

General

1	Total Number of Sites	88
2	Total Numbers of Families displaced	2141
3	Total Number of Plots Envisaged	2138
4	Total Cost of the Infrastructure Under Enquiry	8843.3
5	Total Cost of Infrastructure diverted from the R & R Sites & used for some other purpose	NIL
6	Total Expenditure on Operation and Maintenance each year (For Last 5 years only year-wise)	NIL
7	Total Number of Trees cut for all kinds of Construction work and other demolition activities at all the R & R Sites	NIL

Civil - I : Total Number of Buildings

A	Primary School	109
B	Middle / Secondary School	11
C	Panchayat Bhawan	07
D	Social Welfare	04
E	Primary Health Centre	08
F	Post Office	08
G	Hostels	06
H	Anganwadi	11
I	Hospital Dispensaries	01
J	Veterinary Hospital	01
K	All Types of Residences (Nos)	11

Contd. 2....

Civil – II :

1	Total Numbers of Toilets	319
2	Total Numbers of Habits	145
3	Total Numbers of Tree Platforms	311
4	Total Numbers of Concrete Culverts	1804
5	Total Numbers of Rubble Culverts	1223
6	Total Numbers of Rapras (Causeway)	02
7	Total Length of Pipe Drainage provided (Kms)	301.24
8	Total Length of RCC Drainage Provided (Kms)	85.92
9	Total Length of Approach Roads (Kms)	59.313
10	Total Length of Internal Roads (Kms)	513.40
11	Total Length of Asphalted Roads (Kms)	186.903
12	Total Length of Concrete Roads (Kms)	00.00

MISCELLANOUS:

1. Total Numbers of Village Ponds – No new pond created by N.V.D.A. but 3 ponds are existing at Unit R & R Site.

2. Total Numbers of Cremation Ground – No Separate provision has been made. The existing cremation ground will be used by the Rehabilitants also.

3. Total Numbers of Religious Place – Space provided at each R & R Site.

4. Total Number of Children Play ground – In every layout, some space will be used as play ground.

5. Total Numbers of trees – No expenditure has been incurred since last five years for a plantation work. Though at some site plantation work has been done voluntarily by various agencies.

6. Total Numbers of Grass land – No separate Charnoi Bhoomi has been provided at R & R Site. The rehabilitated PAF's will be eligible to use village charnoi land.

Executive Engineer
PWD - N.V.D.A. / Mandsaur
Division Kukdeshwar (Distt.)

Executive Engineer
PWD - N.V.D.A. / SSP
Division Barwani

Executive Engineer
PWD - N.V.D.A. / SSP
Division No. 2
Dhanajpura (Distt.)

Superintending Engineer
PWD - N.V.D.A. / SSP
Circle - Barwani

Annex 1-A

लोक स्वास्थ्य यांत्रिकी प्रकोष्ठ से संबंधित जानकारी

सामान्य :-

बिन्दु क्रमांक–5 से संबंधित उत्तर निम्नानुसार है :-

पुनर्प्रेषणाधीन ग्रामों की जल प्रदाय व्यवस्था से संबंधित अतिरिक्त जानकारी हेतु कार्यालय आदेश [illegible] की शेष अन्य जानकारी एकत्रित की जा रही है। उपरोक्त जल प्रदाय योजना [illegible] की गई है।

बिन्दुवार जानकारी

S.No.	बिन्दु क्रमांक	कुल
1	[illegible]	402
2	पूर्वरत	803
3	स्वजलधारा टंकी	25
4	हापडेरा	25
5	बिजली	270
6	[illegible]	440
7	पुल संख्या	60
8	पाय लेटर [illegible] पुनर्योजित स्थापनाएं	जानकारी संलग्न है।
9	[illegible] बिन्दु संख्या-5 में कुल संख्याएं की कुल संख्या	45456 फीट
10	जल वितरण संख्या	कुल-02 1) सरपुरी हेतु 2) रिंगसपुरा-123 गैरसणा एवं सिंदरा हेतु
11	[illegible]	02
12	[illegible] हेतु [illegible] जल वितरण	वर्तमान जल स्रोत [illegible] 2 जेटी [illegible]
13	[illegible]	5
14	[illegible]	[illegible]
15	[illegible]	[illegible]
16	[illegible]–स्थापना पर भार	एकीकृत जानकारी विभाग द्वारा दी जा रही है। पृथक से जानकारी संलग्न नहीं है। जिलापरी [illegible]
17	कुल वार्षिक स्थापना व्यय जल प्रदाय योजनाओं के लिये	जानकारी बिन्दु क्रमांक 9 में दी गई है।
18	कुल वार्षिक राजस्व वसूली पर	जानकारी बिन्दु क्रमांक 9 में दी गई है।
19	कुल एकत्रित व्यय जिसकी जल प्रदाय योजना [illegible] की गई है।	11 पुनर्प्रेषण ग्रामों की योजना [illegible]
20	कुल पुनर्प्रेषण ग्रामों जहां से जिला कुल [illegible] प्रभारी से व्यवस्था में नियुक्त [illegible]	सभी पुनर्प्रेषण ग्रामों से जल विभाग के [illegible] द्वारा नियुक्त जल प्रदाय किया जाता है। [illegible] जेटी पर जल वितरण [illegible] व्यवस्था है। जिसकी संख्या 02 है। जिसके जल [illegible] रिंगसपुरा-123 गैरसणा, बरडोलाखुर्द, सिंदरा [illegible]

Note :- That all the data as mentioned are not directly mentioned anywhere in [illegible] But they are compiled and generated from the records as desired and [illegible] available with us presently.

कार्यालय [illegible]
गंगेदा निकास जो [illegible]
[illegible]

Annex 1-A

संलग्न-02

पुनर्वास स्थलों पर जल प्रदाय व्यवस्था के अन्तर्गत किये जाने वाले व्यय का वर्षवार विवरण

क्र. क्र.	कार्य का नाम	वर्ष	व्यय (रु.लाख में)	रिमार्क
1	जिला बड़वानी, खरगौन, एवं अलीराजपुर एवं झाबुआ में विभिन्न पुनर्वासाहट स्थलों की जल प्रदाय योजनाओं के संचालन-साधारण कार्य पर विगत 05 वर्षों में किये गये व्यय की जानकारी।	2008-09	95.56	पारीक्षण व्यय में पानी टैंकर ट्रैक्टर का डीजल का वेतन मोटर पम्प संचालन सामग्री एवं संचालन-साधारण आदि एवं टैंकरों की मरम्मत एवं डीजल / पी.ओ.एल. पर किया गया व्यय तथा अन्य आकस्मिक व्यय शामिल है।
		2009-10	152.89	
		2010-11	172.78	
		2011-12	166.23	
		2012-13	165.70	

कार्यपालन यंत्री
नर्मदा विकास [illegible]
[illegible]

Annex 1-A

विभाग द्वारा की गई जल प्रदाय व्यवस्था को संबंधित ग्राम पंचायत/नगर पंचायत को हस्तांतरित पुनर्वास स्थलों की सूची

स.क्र.	पुनर्वास स्थल
तहसील-टॉकरी	
1	मण्डवाड़ा
2	मोहीपुरा
तहसील-मनावर	
3	कलवी
4	पेरखड़
5	सिलांपुर
तहसील-धरमपुरी	
6	खुजावा
7	धरमपुरी
8	निम्बोला
9	मालवा
10	वेगन्दा
तहसील-धार	
11	केसूर

OFFICE OF THE EXECUTIVE ENGINEER N.D.E/M DIVISION BARWANI

(Vide letter no. CE/185 dated 12.08.2013 of manit Bhopal

S.No.	Question	Answer	
1	Total length of HT Line Combinedfor all sites	275.70 KM	
2	Total length of LT Line Combinedfor all sites	496.30 KM	
3	Total Numbers of Transformers (Total Separate for each ratings at all sites	200 KVA	07 Nos
		100 KVA	452 Nos
		63 KVA	40 Nos
		25 KVA	90 Nos
4	Total Numbers of RCC poles at all sites		17523 Nos
5	Total Numbers of Metallic poles (MS/Steels) at all sites		5150 Nos
6	Total length of conductors (Total separate for uninsulated and insulated) at all sites	Insulated	32.50 KM
		Uninsulated	459.20 KM
7	Total Numbers of sub stations		24 Nos
8	Total numbers of phase II sites (Please provide names also)	Sunda Anjad II, Borlai II, Ekalvara II, Sawada II Pat II, Ganpur Narmada Nagar II, Ganpur, Sirsi II, Kadmal II, Kavthi II, Nunta II, Nunta 66 dist. Khargone, Revised,Khed II, Moighari Pat II, Pachama II, Sale II, Sondul II, Urdana II, [illegible]	
9	(Total Numbers of Phase III sites (Please provide names also)	Nil	

Note: That all the data as mentioned are not direct by maintained anywhere in original record but they are computed & generated from the records as desired and hence certain mistake may be possible.

S.D.O
N.D. E/M Sub. Division No.II
Barwani.

Executive Engineer
N.D. E/M Division Barwani

Page 8 of 174

Annex 1-A

INFORMATION NEEDED FOR F&P SITES WITH REGARD TO PHASE II OR III WORKS

(vide letter no. CE/ 185 dated 12.08.2013 of mane Bhopal)

Name of sub-station / Feeder	MB No.	No of inhabitants/ families actually residing in corresponding phase - I till date	No of inhabitants/ families actually residing in phase II/III till date	Numbers and ratings of transformers in Phase- II/III	Number of Concrete poles in Phase- II/III	Numbers of Metallic poles in Phase- II/III	Total cost of work for Phase II/III	Last date of Technical sanction issued (till as per MB
1	2	3	4	5	6	7	8	9
Dedla Anand II	99/p 95 to 122	-	10	100 KVA-16 No. & 15 MVA-01 No.	447 No	110 Nos	141.79	31/03/2005
Borlai- II PH II	212/p 88 to 103	-	276	25 KVA-16 No.		177 Nos	92.00	30/06/2009
Ekalwara II	82/p 65 to 79	-	40	100 KVA-3 No.	85 No	25 No	18.69	31/01/2007
Ekalwara-II Pt. II	105/p 31 to 43	-	-	100 KVA-5 No.		162 Nos	64.10	31/01/2009
Gahnur Narmada nagar II	161/c 107 to 126	-	125	100 KVA-09 No. & 15 MVA-01 No.	375 No	96 No	111.05	28/12/2007
Gahnur Singh II	134/p 43 to 61	-	49	100 KVA-3 No.	114 No.	28 No	22.73	31/12/2007
Kalmal II	191/p 177 to 195	-	156	25 KVA-10 No.	124 No	102 No	60.63	04/09/2009
Kawthi II	156/p 27 to 41	-	66	100 KVA-2 No.	77 No	20 No	18.43	31/12/2006
Kukra II	68/p 121 to 137	-	66	100 KVA-4 No.	133 No	28 No	23.37	31/12/2005
Kukra 60 plot	193/p 7 to 19	-	-	100 KVA-1 No.	28 No	03 No	4.22	27/06/2009
Khedi Revised	202/p 79 to 97	-	232	100 KVA-5 No.	159 No	80 No	40.46	31/08/2009
Khedi-II	158/p 79 to 96	-	-	25 KVA-14 No.		146 Nos	76.09	29/01/2009
Marghat Pt II	163/p 88 to 105	-	10	100 KVA-3 No.	86 No	25 No	27.78	31/12/2009
Parkhad II	215/p 64 to 80	-	56	100 KVA-1 No.	41 No	13 No	12.24	24/02/2010
Sala- II	175/p 51 to 65	-	213	100 KVA-4 No.	173 No	32 No	34.46	25/09/2006
Sondul II	130/p 93 to 117	-	-	100 KVA-04 No. & 15 MVA-01 No.	111 No	222 No	141.84	30/05/2006
Undona- II	123/p 77 to 92	-	39	100 KVA-1 No.	181 No	19 No	27.66	21/02/2007

Note 1 - That all the data as mentioned are not direct available/maintained any where in original records but they are computed & calculated from the records as desired and hence certain mistakes may be possible.

2. The datas as mentioned in coloumn no 3 & 4 are as per information collected from the Civil Division.

S.D.O (M) Sub Div. No. II Burhanpur

S.D.O (M) Division Burhanpur

Page 9 of 174

Annex 1-A

Name of R & R Site :- Anjad Barda

Name of Submergence Village/Tehsil/R&R Site : Barda, Datwada, Amlali, Bhamta, Jangarwa, Borkhedi, Kari, Tuwarkheda, Ghongsa, Kuli, Morkatta, Bijasan/Thikri

1. Number of displaced families at FRL : 1084, 597, 183, 81, 328, 326, 56, 64, 53, 47, 461, 445.

2. Distance of RR Site from Original Habitation : 5 Km., 6 Km., 42 Km., 42 Km., 42 Km., 36 Km., 86 Km., 83 Km., 80 Km., 75 Km., 41Km., 37 Km.

3. Land Acquired (ha) for RR Site

Private	Government	Total
79.59 Ha.	25.334 Ha.	104.924 Ha.

4. **Facilities as per Task Force: As per Annex-1: Filled proforma is attached.**

5. Material stacked unutilized at site

Useble	Non-Usable
..... Nil	..... Nil .....

EXECUTIVE ENGINEER
(P.W.D.) N.V.I.A. S.P.
Revenue Unit Barwani

(Signature & Official Stamp)

Page 10 of 174

Annex 1-B

1/53

Annex 1-C

डूब ग्राम धरमपूरी के पुर्नवसाहट स्थल हेतु भूमि का चयन

सरदार सरोवर परियोजना की डूब से प्रभावित ग्राम धरमपूरी के जिला धार के विस्थापितों के पुर्नवसाहट स्थल हेतु भूमि चयन की कार्यवाही द्वारा दिनांक 17/11/03 को की गई ।

स्थल निरीक्षण में उपस्थित अधिकारियों की सूची संलग्न है ।

पुनर्वास अधिकारी, धरमपूरी ने टास्क फोर्स समिति को अवगत कराया कि ग्राम धरमपूरी (कस्बा) के डूब प्रभावित मकानों की संख्या 958 सम्बन्धित कार्यपालन यंत्री द्वारा बताई गई है, इस आधार पर यह अनुमानित है कि विस्थापितों की संख्या मुखिया एवं बालक पुत्रों सहित लगभग 2000 होगी । अंतिम विस्थापित परिवार सूची को अंतिम रूप दिये जाने की कार्यवाही प्रगति पर है ।

पुनर्वास अधिकारी ने इस के अतिरिक्त अवगत कराया कि चूंकि धरमपूरी इस क्षेत्र का एक मुख्य वाणिज्यिक केन्द्र है, तथा इस ग्राम में मुख्यतः आबादी ही बेक वाटर के डूब से प्रभावित हो रही है, इसलिए सभी विस्थापित वर्तमान धरमपूरी से बहुत दूर पुर्नवसाहट में इच्छुक नहीं है एवं विभिन्न माध्यम से उनका यह मांग भी रही है कि उनका पुर्नवसाहट स्थल धरमपूरी से खलघाट जाने वाले मार्ग के बायीं ओर यथा संभव वर्तमान बसाहट के नजदीक विकसित की जावे । इसी आधार पर प्रस्तावित पुर्नवसाहट स्थल हेतु ग्राम धरमपूरी एवं कतौरा आबादी विहिन ग्राम की कृषि भूमि वर्तमान मार्ग के बाईं ओर का प्रस्ताव प्रस्तुत किया गया है ।

चूंकि चाक्षित क्षेत्र में कोई शासकीय भूमि उपलब्ध नहीं है, इसलिये निजी भूमि का अर्जन अपरिहार्य है ।

पूर्व में प्राधिकरण की ओर से लगभग 13 कि. मी. दूर ग्राम सरदारपुर की निकट शासकीय भूमि का प्रस्ताव पुर्नवसाहट स्थल धरमपूरी के लिये विचारार्थ रखा गया था तथा एप्रोच रोड का निर्माण भी विकल्प के रूप में विचारार्थ शामिल किया गया था, लेकिन उच्चस्तरीय बैठक दिनांक 04-09-03 में यह निर्णित हो चुका है कि धरमपूरी के विस्थापितों के पुर्नवसाहट हेतु विस्थापित की मांग अनुसार धरमपूरी से लगे हुए निकट के क्षेत्र पर पुर्नवसाहट स्थल के भूमि चयन की प्रक्रिया की जावे ।

उपरोक्त तथ्यों के परिप्रेक्ष्य में टास्क फोर्स समिति ने पुर्नवसाहट स्थल हेतु निम्नांकित [illegible] भूमि का निरीक्षण किया ।

सत्यप्रति लिपि

[illegible]
S.S.P., [illegible] S.S.P. Div. No. 1
Dhar [illegible] (M. P.)

टास्क फोर्स समिति ने प्रस्तावित भूमि का निरीक्षण करते हुए यह निर्देश दिये कि –

1 धरमपुरी खलघाट मार्ग की सीमा से लगकर तथा उत्तर दिशा में दसौंडा, देगाव सीमा पर बहने वाले नाले के 100 मीटर दूर तक के क्षेत्र में पुनर्बसाहट स्थल विकसित किया जाय जबकि नाले के किनारे की 100 मीटर तक की जमीन को पुनर्बसाहट स्थल में शामिल न किया जाय ।

2 यदि प्रस्तावित क्षेत्र में कोई फल उद्यान पूर्व से लगा हुआ है तो उसे भू-अर्जन में शामिल न किया जाय ।

3 यदि इस क्षेत्र में कोई मकान पूर्व से बना है, तो उसे भू-अर्जन में न शामिल किया जाय ।

4 चूंकि वर्तमान धरमपुरी में डूब क्षेत्र से ऊपर सभी उच्च स्तरीय नागरिक सुविधाएं जैसे उच्चतर माध्यमिक विद्यालय, महाविद्यालय, विभिन्न शासकीय कार्यालय इत्यादि स्थित है । इसलिये प्रस्तावित पुनर्बसाहट स्थल में इन सुविधाओं के विकास करने की कोई आवश्यकता नहीं होगी एवं प्रस्तावित पुनर्बसाहट स्थल को सह धरमपुरी के वर्तमान आबादी के सहवर्ती क्षेत्र के विस्तार के रूप में विकसित किया जाना उचित होगा ।

5 डूब क्षेत्र में दो पाठशाला, एक अस्पताल, एक नगर पालिका भवन, एक राजस्व निरीक्षक कार्यालय, एवं चार कमरे का शासकीय आवास गृह स्थित है । इनके लिये भूमि एवं पुनर्निर्माण हेतु नीति अनुसार पृथक से प्रावधान किया जायेगा ।

चूंकि प्रस्तावित स्थल हेतु पृथक से पहुंच मार्ग निर्माण की आवश्यकता नहीं है इसलिए आवश्यकतानुरूप आंतरिक मार्ग विकसित किये जावेंगे । इसी प्रकार धरमपुरी की वर्तमान पेय जल व्यवस्था प्रस्तावित पुनर्बसाहट स्थल तक बढ़ायी जाकर पेयजल व्यवस्था की जायेगी, क्योंकि जो मकान डूब में आ रहे हैं उनकी वर्तमान पेयजल व्यवस्था के स्थान पर ही नई बसाहट क्षेत्र में पेयजल व्यवस्था की जावेगी । अतः सिर्फ नये क्षेत्र में सह पाइप लाईन बिछाना होगा ।

True copy

Annex 1-C

किसी भी प्रकार के वृहद निर्माण जैसे उच्च स्तरीय टंकी आदि निर्माण नहीं की जावेगी । यदि आवश्यकता होगी तो कुछ क्षेत्र में हेण्ड पंप की व्यवस्था की जावेगी ।

चूंकि प्रस्तावित पुनर्वासाहट स्थल पर पुख्ता आकलीय भू-खण्डों का नियोजन हो गया है इसलिए प्रस्तावित 147.582 हैक्टर भूमि में लगभग 2000 भू-खण्ड निर्माण किये जा सकेंगे, तथा अतिरिक्त भूमि की आवश्यकता होने पर पूर्व दिशा में ग्राम धुलेटी की भूमि ली जा सकेगी ।

टास्क फोर्स समिति ने कार्य पालन यंत्री बड़वानी को प्रस्तावित भूमि के भू-अर्जन प्रस्ताव शीघ्र तैयार कराने के निर्देश दिये ताकि आगे की कार्यवाही समय हो सकेंगे ।

Sd/-
अति. संभा. (पुन.) अधिशाषी यंत्री,
नर्मदा घाटी विकास प्राधिकरण,
इन्दौर

Sd/-
संयुक्त संचालक
नर्मदा घाटी विकास प्राधिकरण,
इन्दौर

Sd/-
भू-अर्जन एवं पुनर्वास अधिकारी,
सरदार सरोवर परियोजना,
सनावद

Sd/-
कार्यपालन यंत्री
नर्मदा विकास संभाग क्र. 22
बड़वानी

Sd/-
कार्यपालन यंत्री (लो.नि.वि.)
नर्मदा घाटी विकास प्राधिकरण,
बड़वानी

Sd/-
राजस्व निरीक्षक
कृत- धरमपुरी

True Copy

Annex 1-D

ESTIMATE FOR REVELOPMENT RANTI VILLAGE CHUTIAO TEHSIL DISTT. RARWANI

-GENERAL - ABSTRACT -

No.	PARTICULARS	AMOUNT
(A) BUILDING WORK		
1	Primary School - 1 nos	Rs [illegible]
2	Middle School	[illegible]
3	Panchayat Bhawan	[illegible]
4	Ayurvedic Dispensary	[illegible]
5	Seed Store	Rs [illegible]
	Total (A)	Rs.2365400=00
(B) ROAD WORK-		
1.	Const. Of approach & internal road- 3.5 km	Rs 37[illegible]
2.	Side Drain U Shape	Rs 2435200=00
3.	Hume pipes, Culvert -18 nos	Rs 652000=00
	Total (B)	Total 6528200=00
(C) OTHER-		
1.	Temple- 1 no	Rs [illegible]
2.	Tree Platform- 3 nos	Rs 35700=00
3.	Children park- 1 no	Rs 197000=00
4.	Arboriculture	Rs 22500=00
5.	Water trough- 3 nos	Rs 9000=00
6.	Tin shed - 15 nos	Rs [illegible]
7.	Plot Demarkation Stone	Rs 6120=00
8.	Boundary stone-	Rs [illegible]
9.	Water Supply	Rs 150000=00
10.	External Electrification	Rs [illegible]
11.	Survey Work	Rs [illegible]
12.	Shamshan Ghat	Rs 35000=00
13.	Land Shapping	Rs. [illegible]
14.	Grazing Land	Rs. 70300=00 L.S.
15.	Khalihan	Rs. [illegible] L.S.
	Total (C)	Total 1902910=00
		G.Total(A+B+C) = 10934510=00

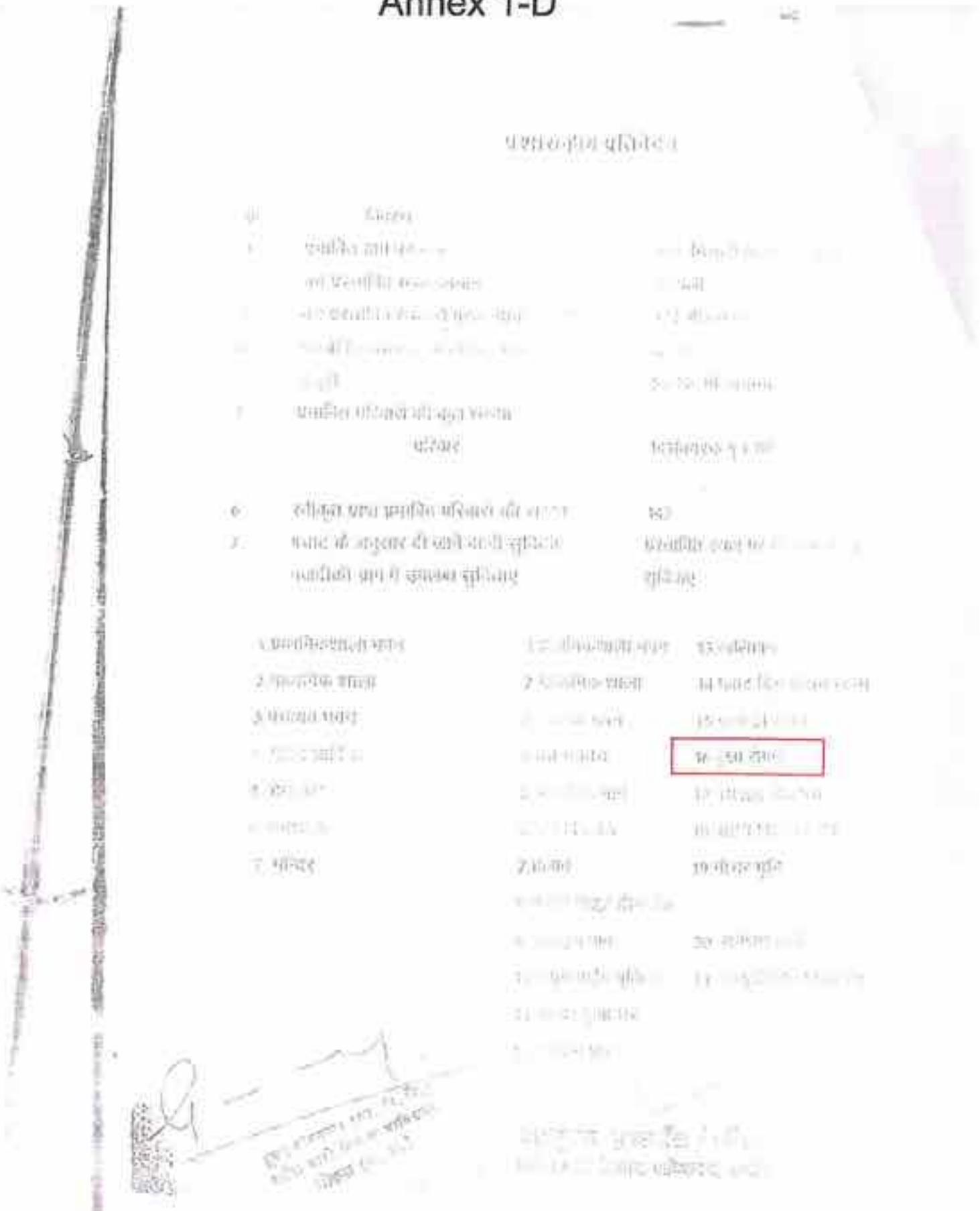
Sub Engineer
P.W.D.N.V.D.A
Reh Sub Dn No-I Barwani

S.D.O.
P.W.D.N.V.D.A
Reh Sub Dn No-I Barwani

Executive Engineer
P.W.D.N.V.D.A
Reh Dn No-I Barwani

Additional Director / S.E.
(Reh.) / Superintending Engineer
N.V.D.A., E.E.P., BARWANI (M. P.)

Annex 1-D



Annex 1-D

9	मंदिर निर्माण	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
13	आरसीसी रोड	15 nos	2540100
15	स्लाट डिसमेंशन स्टोन		95520.00
16	गारण्डी स्टोन		153600.00
17	जल प्रदाय व्यवस्था		150000.00
18	मानव विद्युतीकरण प्रकाशन		[illegible]
19	सार्वजनिक		[illegible]
20	पगडण्डी घाट		[illegible]
21	भूमि समतलीकरण		[illegible]
22	बरसोई भूमि एकमुश्त		70000.00
23	खलियान		70000.00
		योग	11034510.00

ग्राम सिमली, तहसील डीकरी पुनर्वास स्थल के विकास हेतु रू. 110.34 लाख का प्राक्कलन नर्मदा घाटी विकास प्राधिकरण के समक्ष स्वीकृति हेतु प्रस्तुत है।

मुख्य अभियन्ता
सी.पी.सी. / न.घा.वि.प्रा.
नर्मदा भवन, भोपाल

सदस्य (पुनर्वास)
नर्मदा घाटी विकास प्राधिकरण
नर्मदा भवन, भोपाल

मध्यप्रदेश शासन
नर्मदा घाटी विकास प्राधिकरण

नर्मदा घाटी विकास प्राधिकरण की 110वीं बैठक दिनांक 15-6-2004 का कार्यवृत्त

नर्मदा घाटी विकास प्राधिकरण
नर्मदा भवन तुलसी नगर, भोपाल

(23)

110.04 सरदार सरोवर परियोजना के तहत जिला धार (प्रथम चरण) में विभिन्न कार्यों का प्रशासकीय अनुमोदन ।

उपाध्यक्ष नर्मदा घाटी विकास प्राधिकरण द्वारा प्रस्ताव पर प्रकाश डाला एवं स्पष्ट किया कि सरदार सरोवर परियोजना के अंतर्गत ग्राम धरमपुरी आर.एल. 121.92 मीटर पर डूब से प्रभावित हो रहा है। टास्क फोर्स समिति की रिपोर्ट के अनुसार ग्राम धरमपुरी के मुखिया एवं वयस्क पुत्रों सहित लगभग 5000 परिवार डूब से प्रभावित हो रहे है। जिनमें से लगभग 2000 परिवारों को प्रथम चरण में बसाया जाना प्रभावित है। पुनर्वास स्थल पर दी जाने वाली सुविधाओं का विवरण एवं अनुमानित लागत निम्नानुसार है–

क्र0	विवरण	मात्रा	अनुमानित लागत
1.	प्रायमरी स्कूल	2 नग	9,10,000.00
2.	न्याय पालिका भवन	1 नग	90,00,000.00
3.	30 बिस्तरों का अस्पताल	1 नग	1,18,00,000.00
4.	राजस्व निरीक्षक भवन	1 नग	2,75,800.00
5.	एच.टाईप क्वार्टर	4 नग	12,00,000.00
6.	मंदिर	1 नग	15,00,000.00
7.	मस्जिद	1 नग	15,00,000.00
8.	पहुँच मार्ग	1 नग	13,34,500.00
9.	टांतरिक मार्ग	लम्बाई 1.0 कि.मी.	3,32,82,000.00
10.	हयूम पाईप पुलियाँ एन.पी. 3	200 नग	78,00,000.00
11.	वृक्षारोपण		2,00,000.00
12.	चिल्ड्रन पार्क		7,68,000.00
13.	हलाव	4 नग	40,800.00
14.	शमशान घाट	2 नग	70,000.00
15.	कब्रिस्तान	1 नग	70,000.00
16.	बाउन्ड्री स्टोन	3575 नग	6,11,300.00
17.	सेन्टर लाईन स्टोन / डिमार्केशन स्टोन	4000 नग	8,04,000.00
18.	भूमि समतलीकरण		1,00,000.00
19.	जल प्रदाय व्यवस्था		1,54,00,000.00
20.	वहाय विद्युतीकरण		3,75,00,000.00
21.	सर्वे कार्य		10,36,000.00
		योग	12,49,04,800.00
	12522400/—	कुल अनु. लागत	12,37,17,600.00 लाख रुपये

वर्मा उपाध्यक्ष प्राधिकरण द्वारा उपरोक्त प्रस्ताव अनुसार रूपये 237.176 करोड़ के प्रस्ताव को सैद्धांतिक अनुमोदन किया गया।

(अनर्थपाही सदस्य पुनर्वास / मु.अभि.लो.नि.वि. नर्मदा)

minutes-110

Annex 1-E

नर्मदा घाटी विकास प्राधिकरण को दिनांक 15/6/2004 को सम्पन्न 110 वीं बैठक में पुनर्वासित स्थल धम्मपुरी (प्रथम चरण) के विकास कार्यों हेतु रूपये 1237.00लाख की स्वीकृति प्रदान की गई है।

उक्त डिपाजिट वर्कअस सब हेड के परियोजना उपबन्ध 23: में वर्णित प्रावधानों का उपयोग करते हुए पुनर्वास स्थल के विकास कार्यों हेतु रूपये 5067: लाख की तकनीकी स्वीकृति प्रदान की जाती है।

इस कार्य का व्यय मात्र संख्या 45-4501 सरदार सरोवर परियोजना के मूल से प्रभावित क्षेत्र का भू-अर्जन तथा अन्य कार्यों पर खर्च के मद में निकलनीय होगा।

मुख्य अभियंता (तो.नि.)
नर्मदा घाटी विकास प्राधिकरण
भोपाल

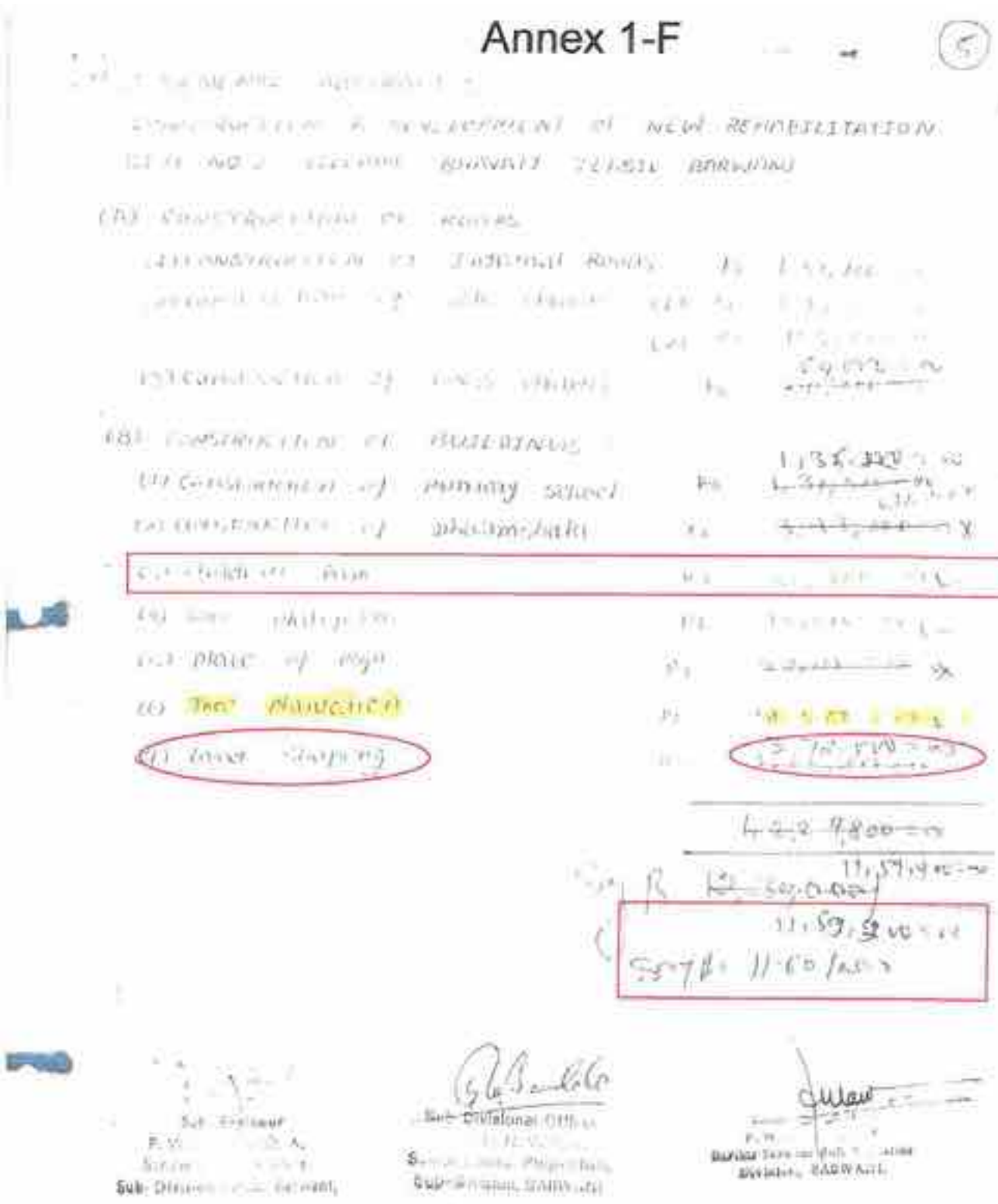
मुख्य अभियंता (तो.नि.)
नर्मदा घाटी विकास प्राधिकरण
भोपाल

ANNEXURE-2A

(1)
(18)

Page 20 of 174

Annex 1-F



TRUE COPY

// प्रमाण पत्र //

प्रमाणित किया जाता है कि पुनर्वास स्थल **भवती–2** तहसील **बड़वानी** जिला **बड़वानी** के विकास कार्य प्राक्कलन की प्राप्त तकनीकी स्वीकृति के अंतर्गत किये गये है। विकास कार्यो में कोई डेविएशन नहीं हुआ है।

कार्यपालन यंत्री,
लो.नि.वि.,न.घा.वि.प्रा.,स.स.प.,
पुनर्वास संभाग, बड़वानी

Annex 2.5-A

कार्यालय अधीक्षण यंत्री (लोनिवि),
नर्मदा घाटी विकास प्राधिकरण, सरदार सरोवर परियोजना,
मण्डल, बड़वानी (म.प्र.)

पत्र क्रमांक ८८१ / कार्ये / 2012–13 बड़वानी, दिनांक 24/3/13

प्रति,

संचालक (पुनर्वास / फिल्ड),
नर्मदा घाटी विकास प्राधिकरण,
स्कीम नं 74–सी, बीजी सेक्टर,
नर्मदा भवन, विजय नगर,
इन्दौर (म.प्र.)

विषय: पुनर्वास स्थलों की जांच हेतु माननीय इा आयोग को वांछित जानकारी / दस्तावेज उपलब्ध करवाये जाने के सम्बन्ध में।

सन्दर्भ: (1) आपका पत्र क्र. 6195 / मैनिट / पुन / 12 / इंदौर, दिनांक 29.09.2012
(2) **मान. जांच आयोग इंदौर का पत्र क्रमांक 429 दिनांक 08.08.2012**

उपरोक्त विषयान्तर्गत आपके सन्दर्भित पत्र के साथ प्रेषित मान. जांच आयोग के **आप क्र. 429 दिनांक 06.08.2012** में उल्लेखित बिन्दुओं की पुनर्वास स्थलवार जानकारी निम्नानुसार प्रस्तुत है :–

बिन्दु क्र (1) Already complied :-
इस बिन्दु के परिपालन में पुनर्वास स्थलों के विकास कार्यों की माप पुस्तिकाओं का परीक्षण मान. जांच आयोग के तकनीकी असेसर मैनिट भोपाल को कराया जा चुका है एवं मैनिट द्वारा चाहे गये प्रपत्रों में समस्त निर्माण कार्यों की माप पुस्तिकाओं सम्बंधी जानकारी प्रस्तुत की जा चुकी है।
विवरण निम्नानुसार है :–

विभाग	परीक्षण दिनांक
लो.नि.वि.	11.11.2012,
	16,17,28 एवं 29.12.2012
	5,9,12 एवं 13.01.2013
	10 एवं 24.02.2013
	03.03.2013
विद्युत / यांत्रिकी	16.11.2012
	02.02.2012
	13, 19 एवं 25.01.2013
ली.स्था.नि.	02.12.2012
	03.02.2013
	03.03.2013

बिन्दु क्र. (2) Already complied :-
उल्लेखित किये गये सभी 88 पुनर्वास स्थलों के निर्माण कार्यों की [illegible] दिनांक 12.12.2012 [illegible]

बिन्दु क्र. (3) complied :-

निर्धारित किये गये सभी 88 पुनर्वास स्थलों के कन्टूर सर्वे का नक्शा संलग्न प्रस्तुत है, एवं स्वीकृत अभिन्यास (Approved Layout Plan) आयोग के पूर्व पत्र क्रमांक 694 दिनांक 12.12.2011 के बिन्दु क्र. (2) में प्रस्तुत किया जा चुका है। (संलग्न नस्ती क्रमांक–1)

बिन्दु क्र. (4) (1) रेसिस्टीविटी सर्वे की पुनर्वास स्थलो की तहसीलवार जानकारी संलग्न है (संलग्न नस्ती क्र. 2 पृष्ठ संख्या 997)। जिन पुनर्वास स्थलों पर उच्चस्तरीय टंकियों का निर्माण किया गया है, उनके स्थल के चयन निम्न बिन्दुओं को ध्यान में रखते हुए किया जाता है :–

(अ) पुनर्वास स्थल के नक्शे मे स्थान खुला हो।

(ब) पुनर्वास स्थल में वह जगह ऊंचाई पर हो।

(स) उच्चस्तरीय टंकी के फाउण्डेशन हेतु ठोस सतह हो।

इसी प्रकार हैण्डपम्प के स्थल का चयन भी निम्न बिन्दुओं को ध्यान में रखते हुए किया जाता है :–

(अ) हैण्डपम्प की जगह खुले स्थान पर हो।

(ब) रेसिस्टीविटी सर्वे के आधार पर।

इसी प्रकार सिस्टर्न के स्थल का चयन भी निम्न बिन्दुओं को ध्यान में रखते हुए किया जाता है :–

(अ) सिस्टर्न की जगह खुले स्थान पर हो।

(ब) सिस्टर्न का उपयोग अधिक से अधिक हो सके।

इस बिन्दु में कार्यों की मांगी गई ड्राईंग डिजाईन की छायाप्रति पुनर्वास स्थलवार संलग्न सूची अनुसार संलग्न है (संलग्न नस्ती क्र. 3 पृष्ठ संख्या 1562)।

बिन्दु क्र. (5) पुनर्वास स्थलों पर निर्मित की गई सुविधाएं N.W.D.T. अवार्ड, पुनर्वास नीति एवं टास्कफोर्स समिति की अनुशंसा एवं स्थल की आवश्यकता अनुसार निर्मित की गई है। साथ ही लोक स्वास्थ्य यांत्रिकी विभाग से सम्बंधित निर्मित की गई सुविधाओं के निर्धारित मापदण्ड हेतु पत्र की छायाप्रति संलग्न है। (संलग्न नस्ती क्र. 4 पृष्ठ संख्या 3)।

विद्युत / यांत्रिकी विभाग द्वारा निर्मित सुविधाएँ म.प्र. विद्युत मण्डल द्वारा तैयार किये गये स्वीकृत प्रावधानन के अनुसार दी गई है।

बिन्दु क्र. (6) N.W.D.T. अवार्ड अनुसार सभी पुनर्वास स्थलों पर नालियों का निर्माण किया जाना है, जिन पुनर्वास स्थलों पर वर्तमान में नालियाँ नहीं बनाई गई है वहां पर भविष्य में बनाई जावेगी।

नाली की टाईप का निर्धारण स्थल की स्थिति के अनुसार किया गया है।

Annex 2.5-A

बिन्दु क्र. (7) सरदार सरोवर परियोजना के अंतर्गत विकसित किये गये 88 पुनर्वास स्थलों में एकमात्र पुनर्वास स्थल धरमपुरी नगरीय क्षेत्र के अंतर्गत आता है एवं शेष 87 पुनर्वास स्थल ग्रामीण क्षेत्र के अंतर्गत आते है। अतः नगरीय क्षेत्र हेतु दी जाने वाली सुविधा को देखते हुए पुनर्वास स्थल धरमपुरी में सीवरेज व्यवस्था की गई।

बिन्दु क्र. (8) कुछ पुनर्वास स्थलों पर निवासरत विस्थापितों की मांग अनुसार टैंकरों के माध्यम से जलप्रदाय किया जाता है।

बिन्दु क्र. (9) घूलियाओं की संख्याओं का निर्धारण पुनर्वास स्थल की टोपोग्राफी एवं जल निकासी की आवश्यकतानुसार किया गया है।

बिन्दु क्र. (10) कुछ ही पुनर्वास स्थलों पर केबल वायरिंग सिस्टम का प्रावधान वर्ष 2008 में वि.वि.कं.लिमि. द्वारा उनके प्रस्तुत स्वीकृत प्राक्कलन में किये गये प्रावधान के अनुसार किया गया है।

बिन्दु क्र. (11) पुनर्वास स्थल का चयन टास्कफोर्स समिति की अनुषंसा के आधार पर किया गया है।

बिन्दु क्र. (12) पुनर्वास स्थल के चयन के पूर्व पुनर्वास अधिकारी द्वारा सामान्यतः सम्बंधित विस्थापितों से सहमति ली जाती है। प्रत्येक पुनर्वास स्थल से सम्बंधित टास्कफोर्स समिति की रिपोर्ट की छायाप्रति आयोग के पूर्व पत्र क्र. 694 दिनांक 12.12.2011 के बिन्दु क्रमांक 8 पर प्रस्तुत की जा चुकी है।

बिन्दु क्र. (13) भवनों के हस्तान्तरण सम्बंधी जानकारी निर्धारित प्रपत्र में संलग्न प्रस्तुत है। जिन भवनों का हस्तान्तरण शेष है उन भवनों के रख-रखाव पर कोई भी व्यय न.घा.वि.प्रा. द्वारा नहीं किया गया है। विद्युत/यांत्रिकी विभाग द्वारा हस्तान्तरित किये गये कार्यों की जानकारी संलग्न है।

(नस्ती क्रं 5 कुल पृष्ठ संख्या 378.) । साथ ही लो.स्वा.यां. विभाग द्वारा तहसील धरमपुरी के पुनर्वास स्थल शाला खुजाया, धरमपुरी, बेगनदा, निम्बोला एवं तहसील मनावर के पुनर्वास स्थल मिर्जापुर, कलठी व पेरखड़ एवं तहसील डोकरी के पुनर्वास स्थल मण्डवाड़ा व मोहीपुरा एवं तहसील धार के पुनर्वास स्थल केसूर की जलप्रदाय योजनाएं संबंधित ग्राम पंचायत/नगर पंचायत को कार्य संचालन हेतु हस्तांतरित की गई है तथा संधारण कार्य इस कार्यालय द्वारा किया जाता है। इसके अतिरिक्त शेष रहे पुनर्वास स्थलों पर किये गये कार्यों को संबंधित ग्राम पंचायतों को हस्तांतरित करने के प्रयास किये गये किन्तु उनके द्वारा अपने अधिपत्य में नहीं लिया जा रहा है। पुनर्वास स्थलों पर जलप्रदाय व्यवस्था संबंधी कार्य, जैसे विद्युत देयकों का भुगतान मोटरपम्पों एवं हैण्डपम्पों इत्यादि के संचालन संधारण के कार्यों पर व्यय विभाग द्वारा वहन किया जाता है।

बिन्दु क्र. (14) डिस्पेंसरी की जानकारी संलग्न है। नस्ती क्र. 6 कुल पृष्ठ [illegible]

बिन्दु क्र. (15) सरदार सरोवर परियोजना के विस्थापितों की शिकायतों के निराकरण के लिए म.प्र.शासन द्वारा शिकायत निराकरण प्राधिकरण गठित किया गया [illegible] जिसमें से विस्थापित परिवार की ओर से शिकायत निराकरण [illegible]

Annex 2.5-A

बिन्दु क्र. (16) लोक स्वास्थ्य यांत्रिकी विभाग द्वारा 88 पुनर्वास स्थलो में से 76 पुनर्वास स्थलो के हेण्ड पम्पों के जल परीक्षण की जांच की गई है जिनकी जल परीक्षण रिपोर्ट संलग्न है। (नस्ती क्र. 7 कुल पृष्ठ 108) शेष रहे 12 पुनर्वास स्थलो की हिण्डमम्पों के जल परीक्षण की जांच की पृथक से की जाना प्रस्तावित है।

संलग्न— (कुल नस्ती 7 — कुल पृष्ठ ~~3189~~ 3189

नोडल अधिकारी / अधीक्षण यंत्री
लो.नि.वि.न.पा.वि.प्रा.स.स.प.
मण्डल, बड़वानी

पृ.क्रमांक / / कार्य / 2012–13 बड़वानी, दिनांक 21/3/13

प्रतिलिपि—

(1) कार्यपालन यंत्री (लोनिवि),न.पा.वि.प्रा.,स.स.प.पुनर्वास संभाग, बड़वानी / मान जोबट संभाग, कृषी / इन्दिरा सागर परियोजना संभाग क्र. 2, धरमपुरी / (विद्युत / यांत्रिकी) संभाग बड़वानी एवं म.वि. लो.स्वा.यां. खण्ड बड़वानी की सूचनार्थ एवं आवश्यक कार्यवाही हेतु।

संलग्न— (0)

नोडल अधिकारी / अधीक्षण यंत्री,
लो.नि.वि.न.पा.वि.प्रा.स.स.प.,
मण्डल, बड़वानी

कार्यालय कार्यपालन यंत्री, (लो.नि.वि.) न.घा.वि.प्रा.
मान जोबट संभाग, कुक्षी जिला–धार

पुनर्वास स्थल निसरपुर– द्वितीय एवं तृतीय तहसील–कुक्षी, जिला–धार के संबंध में चाही गई जानकारी

क	कार्य	विवरण
1	पुलिया निर्माण :–	इस पुनर्वास स्थल पर कुल 308 पुलियाएं बनाई गई है। सभी पुलियाएँ 600 मि.मी. डाया की निर्मित की गई है जिसकी तकनीकी स्वीकृति सक्षम अधिकारी द्वारा दी गई है, तकनीकी स्वीकृति पत्रक पूर्व मे ही प्रस्तुत किया जा चुका है। इन समस्त पुलियाओं के मेजरमेंट एम.बी. मे दर्ज है। कार्यालय मे उपलब्ध अभिलेख अनुसार इन पुलियाओं की कोई स्ट्रक्चरल डिजाईन नही की गई है और न ही इस पुनर्वास स्थल का कोई ड्रेनेज प्लान रिजर्व मे पास्त गया है। तथापि क्षेत्र के स्वरूप को ध्यान मे रखते हुए मौके पर 308 पुलियाएँ 600 मि.मी. डाया की सिंगल लाईन / डबल लाईन की बनाई गई है, जिसके कारण पुनर्वास स्थल पर जल भराव की कोई शिकायत प्राप्त नही हुई है।
2	ड्रेनेज सिस्टम :–	इस पुनर्वास स्थल हेतु ड्रेनेज प्लान तैयार किया गया है। स्थल पर साईड ड्रेन मुअ द्वारा दी गई तकनीकी स्वीकृति अनुसार इस पुनर्वास स्थल पर 300 / 600 मि.मी. डाया के हाफ राउण्ड पाईप के माध्यम से ड्रेनेज व्यवस्था स्थापित की गई है।
3	ट्रायल पिट :–	भवन कार्य :– इस पुनर्वास स्थल पर विभाग द्वारा 30 भवन यथा– पंचायत भवन बीज गोदाम, छात्रावास भवन 1 मंजीला, छात्रावास भवन 2 मंजीला तथा आवासीय गृह (लो.एच.आई एवं एल टाईप अपूर्ण कार्य) बनाये गये है। उपलब्ध रिकार्ड मे ट्रायल पिट खोदे जाने का उल्लेख नही पाया गया है। तथापि विभाग द्वारा सभी भवन आरसी फाउन्डेशन पर निर्मित किये गये है, सभी भवन पहाड़ी एवं हार्ड स्ट्रेटा पर निर्मित किये गये है। अभिलेख अनुसार हार्ड स्ट्रेटा तक खुदाई कर नींव रखी गई है। माप पुस्तिका के अनुसार भवनों की नींव की खुदाई औसतन 1.00 मी. से 1.50 मी. है।
		कल्चर्ट कार्य :– कार्यालयीन अभिलेख अनुसार किसी भी कल्चर्ट के लिये ट्रायल पिट नही खोदे गये है किन्तु पुलियाओं की औसतन खुदाई 0.90 से. की गई है।
4	वाटर सप्लाई	इस प्रकोष्ट से संबंधित नही है।
5	पी.व्ही.सी.टेंक	इस प्रकोष्ट से संबंधित नही है।
6	टेस्टिंग प्रमाण–पत्र	इस प्रकोष्ट से संबंधित नही है।
7	अंतिम विद्युतीकरण	आंतरिक विद्युतीकरण कार्य भवन कार्य के साथ संलग्न है।

उपरोक्तानुसार माप–पुस्तिकाएँ क्रमांक 2326,2370,2351,2353,2352,2128,2283,2189,2324,2263,2323,2185,2186,2264,2188,2181, 2281,2187, 2221, 2262,2267,2272, 2271, 2207 एवं 2209 मूलतः संभागीय (पुन / पिल्हे) नर्मदा घाटी विकास प्राधिकरण, इन्दौर के कार्यालय मे प्रस्तुत की गई है।

कार्यपालन यंत्री
लो.नि.वि.न.घा.वि.प्रा.मान जोबट
संभाग कुक्षी जिला धार

Annex 2.7-A

ANNEXURE – 8D

75

290

XVII-35 B
P.W.D.

P.W.D. From No 73

Kharampuri Division

Kharampuri Sub - Division

MEASUREMENT BOOK

No. 75

(Each set of Measurement must be signed by the contractor concerned before his bill is prepared)

पु. स्था. खलीकुई मे नाली निर्माण कार्य

EXECUTIVE ENGINEER
P.W.D., N.V.D.A., I.S.P. Div. No. 2
Ghaziabad, Distt. Ghaz. (U.P.)

Annex 2.7-B

(i) Name of work: Supplying and laying of 1 Kilometer 300 mm dia MS and 350 mm dia MS Pipeline

(ii) Situation of work: Khatkhera Distt

(iii) Agency by which executed: Executive Engineer, A.E. Road Gazetted Mavi Distt Khargone

(iv) Name of contractor:

(v) Date of commencement:

(vi) Agreement Number:

(vii) By whom (or the authorised Officer): M/S Gajanand Infra Projects

Annex 2.7-B

XVII-E-35-B (Large)
P.W.D. 70

Overtik

Particulars	Measurements up-to-date					Remarks
	No.	L.	B.	D.	Contents of area	
1	2	3	4	5	6	7
		Key sheet				
1) Name of Work :-		Design of open side drain at R/side Khalwa to Kharpani				
2) Name of Agency		Aqua Consultants Bhopal				
3) Agt. No.		21 / 2007-08				
4) I.W.C. No.		593 / dt 11-3-07				
5) Period allowed		15 days.				

225189
Dated 24/5/07

EXECUTIVE ENGINEER
P.W.D. Division
Khandwa (M.P.)

Annex 2.7-B

313

Measurements up-to-date

Particulars	No.	L	B	D	Contents of area	Remarks
1	2	3	4	5	6	7

Annex 2.7-C

XVII-E-35-B (Large)
P.W.D.

34

Particulars	Measurements up-to-date					Remark
	No.	L.	B.	D.	Contents of area	
1	2	3	4	5	6	7
Bill received for payment of Subdivision Construction A.C. Road Gadmali Mori BSF Shajapur for supply of 300mm dia NP3 half round RCC hume pipe 300 Rm for NP3.						
EE Supdy order No. 1323 dt 22.6.06						
M/s LION order no. C-609318 dt. 13.7.06						
bill No. 03/EE-05 dt. 7.8.06						
1) R.C.C half round pipe (o/e) with M.S plat.						
		250 Rm. @	@ 240/- Rm		7,00,000/-	✓
		Vat - @ 4%			28000/-	✓
		Cabin with one @ 1%			7000/-	✓
Upto section		Transportation @ 22%	20%		(154000/-)	✓
		Service tax @ 3.09%			(474/-) 4284/-	✓
				Total -	(8,93,912/-) 893912/- 893912/-	✓
Bill accepted		Sub Divisional Officer (P.W.D.) N.V.D.A. Upper Indira Project Sub Div. No. 1 Sharadhan		Bill recorded by me		

Annex 2.7-C

Particulars	Measurements up-to-date					Remark
	No.	L.	B.	D.	Contents of area	
1	2	3	4	5	6	7

Received Rs for Payment of Rs 8,74,284/- (Rupees Eight Lac Seventy Four Thousand Two Hundred Eighty Four Only)

By Sundry

(A) C/F. Net Rs 28000.00 } 1,46,000/-
(B) C/F. Tax Rs 7000.00 }

By Cheque Rs. 8,74,284=00

Paid vide Cheque No. AF 5077 dated 14/03/24

Executive Engineer
P.W.D. Division
Bhubaneswar

Annex 2.7-D

M.B. No (144)

XVII-35 B
P.W.D.

P.W.D. Form No. 23

DHARAMPURI Division

DHARAMPURI Sub Division

MEASUREMENT BOOK

No. (Pkg)

(Each set of Measurement must be signed by the Contractor concerned before M.B. No. is prepared)

Allotted

EXECUTIVE ENGINEER
P.W.D., R.&B. Br. No. 1
Dharmpuri, Salem Dist. (M.S.)

(i) Name of work: Laying and fixing of half round & full round RCC R.P NP3 300mm ϕ RV surface drain

(ii) Situation of work: Kheltkhud R/side

(iii) Agency by which executed: Contractor

(iv) Name of contractor: Sudarshan Construction Mohali

(v) Date of measurement:

(vi) Agreement Number:

(vii) By whom the the measurement taken:

EXEN
P.W.D., B&R Divn. L.P. (H) No. II
Bhawanigarh, Distt. Sirsa (Hr. P.S.)

Annex 2.7-D

C.35-B (Large)
P.W.D.

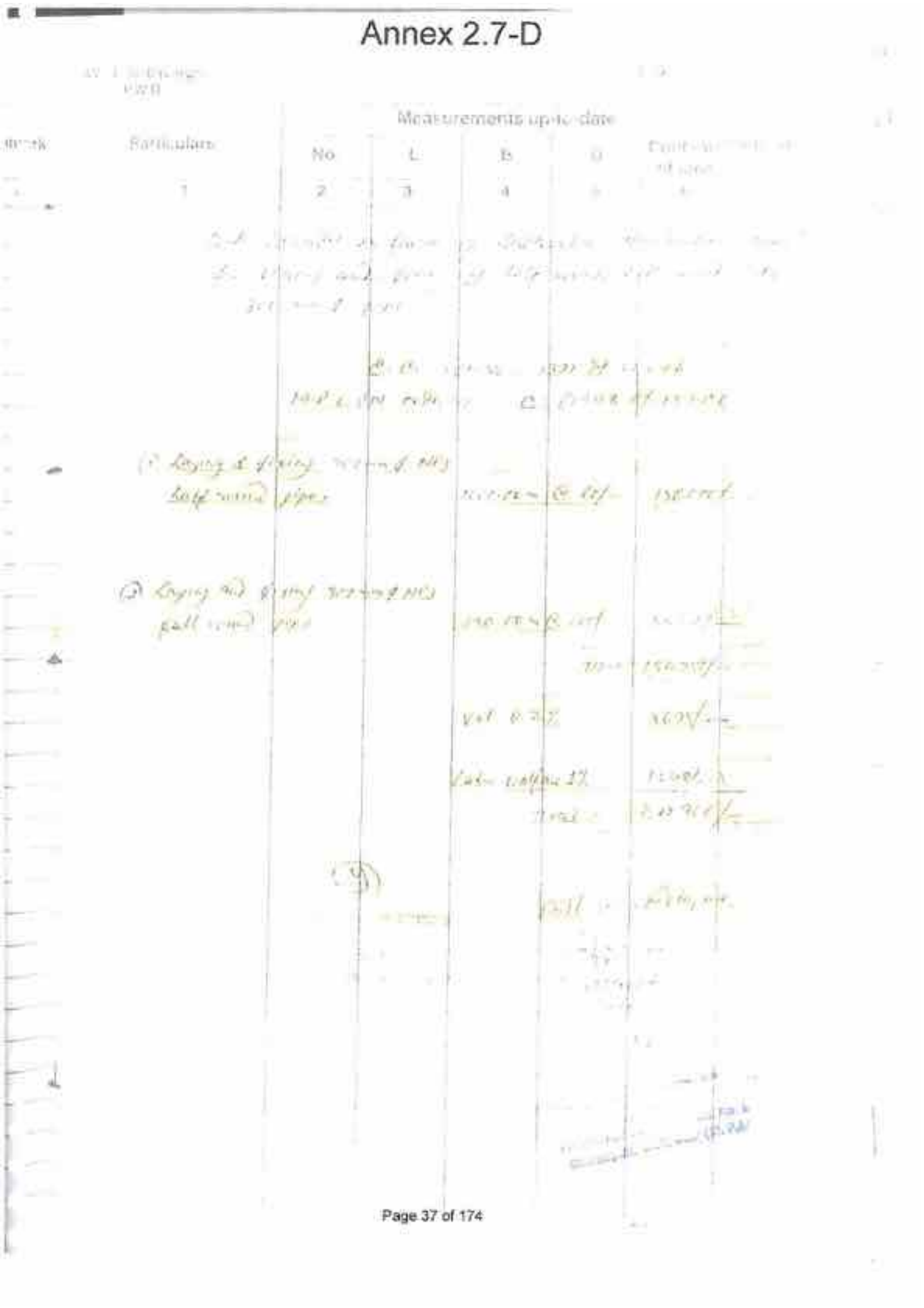
Sankom

Particulars	Measurements up-to-date					Remark
	No.	L.	B.	D.	Contents of area	
1	2	3	4	5	6	7
Measurements recorded in favour of Sudarshan Const Mahindra for laying and joining of 7.5 cm dia/ dwell water pipe work in NH-5						
		E.E's Memo No. 1321 dt 23.6.08				
		MB. Lr No. 07/24 No. C-60 9318 of 13.7.08				
	Plot No.		Width etc.			
	195-198		53			
	161-194		105			
	169-180		92			
	1-18		178			
	19-24		91			
	110-125		138			
	44-55		132			
	28-43		160			
	56-69		132			
	136-141		136			
			1356 @ 2.00 m long = 2597.92 m			
				Say	2600.00 m	
					M/s Mahindra & Co	

Allowed

Page 36 of 174

Annex 2.7-D



विभाग :-

XV-OR-15

विषय :- इमामपुरी तहसील के विभिन्न पुनर्वास स्थलों पर आर.सी.सी. ड्रेन पार्श्व नाली निर्माण के एवार्डिंग का कार्य ।

-=: 00 :-

इमामपुरी तहसील के विभिन्न पुनर्वास स्थलों पर आर.सी.सी. ड्रेन एवं पार्श्व नाली निर्माण के एवार्डिंग कार्य हेतु इस कार्यालय द्वारा निविदा फार्म "ब" में निविदा सूचना क्रमांक 01/2006-07, 02/2006-07 एवं 03/2006-07 दिनांक 27/02/2007 को आमंत्रित की गई थी ।

उक्त निविदाओं में एवार्डिंग कार्य की दरें निम्नानुसार प्राप्त हुई :-

क्र.क्र.	कार्य का विवरण	निविदादार का नाम	दर	प्रकार	राशि
1.	2	3	4	5	6
1.	पुनर्वास स्थल मोरखली सिम्बोला एवं बलवाड़ा में नाली निर्माण के एवार्डिंग का कार्य । लम्बाई 13.0+15.0+8.0= 36.0 कि.मी. निविदा सूचना क्रं 01/2006-07	1. एस.के. बिल्डर्स सुदर्शन अपार्टमेंट प्रोफेसर कालोनी भोपाल	1200/-	कि.मी.	43200/-
		2. रमेश कॉन्ट्रेक्टर ई-34-35 आनंदी नगर भोपाल	1050/-	कि.मी.	37800/-
2.	पुनर्वास स्थल खजूरी में नाली निर्माण के एवार्डिंग का कार्य । लम्बाई 39.0 कि.मी. निविदा सूचना क्रं 2/2006-07	1. ---तदैव---	1200/-	कि.मी.	46800/-
		2. ---तदैव---	1050/-	कि.मी.	40950/-
3.	पुनर्वास स्थल खजूरी, खुरावां में नाली निर्माण के एवार्डिंग का कार्य । लम्बाई 25.0+15.0 = 40.0 कि.मी. निविदा सूचना क्रं 3/2006-2007.	1. ---तदैव---	1200/-	कि.मी.	48000/-
		2. ---तदैव---	1050/-	कि.मी.	42000/-

शेषांश... 2/पर

Annex 2.7-E

XV-OR-15

-=: 02 :=-

उपरोक्त निविदाओं में एक्वा कन्सलटेंट भोपाल की दरें 1050/- प्रति किलो मीटर न्यूनतम पायी गई। अतः नाली निर्माण कार्य की इकाई विवरणे अनुसार पूर्ण करने हेतु एक्वा कन्सलटेंट भोपाल की दरें 1050/- प्रति किलो मीटर स्वीकृत करने हेतु प्रस्ताव अनुमोदनार्थ प्रस्तुत है। पुनर्वास संभाग बड़वानी के अन्तर्गत पुनर्वास स्थल अंजड़ बड़वा एवं बोरलाय में ल० 22.50 B.M. एवं 11.00 B.M. हेतु दरें क्रमशः 977/- एवं 1045.45/- प्रति B.M. स्वीकृत की गई हैं।

कार्यपालन यंत्री
नर्मदा घाटी विकास इकाई

अतिरिक्त संभागीय पुनर्वास
अधीक्षण यंत्री नर्मदा घाटी विकास संगठन

मुख्य अभियंता
नर्मदा घाटी विकास भोपाल

- Site wise दरें भी।

- दरें
13/3/17

सं क्र०	पुनर्वास स्थल का नाम	ल०	दर	कार्य	राशि
(1)	मोगरटी	13.0 B.M.	1050/-	K.M	13650=00
(2)	निसरपुर	15.0 B.M.	1050/-	K.M	15750=00
(3)	बलवाड़ा	8.0 B.M.	1050/-	K.M	8400=00
(4)	अमलीखुर्द	39.0 B.M.	1050/-	K.M.	40950=00
(5)	अमलीखुर्द	25.0 B.M.	1050/-	K.M	26250=00
(6)	बड़वानी	15.0 B.M.	1050/-	K.M	15750=00

S/E EE

Annex 2.7-E

कार्यपालन यंत्री,
लो0नि0वि0 नर्मदाघाटी विकास प्राधि0
ईं0सा0परि0 संभाग क्रमांक 2 धरमपुरी जिला-धार(म0प्र0)

क्रमांकः 593 /को0नि0वि0/2006-07 धरमपुरी, दिनांकः 14-3-07

प्रति,

अनुबंधित प्रति

रचना कन्सलटेंट,
"ए" 34-35 जानकी नगर
भोपाल (म0प्र0)

विषयः- धरमपुरी तहसील के विभिन्न पुनर्वास स्थलों पर आर.सी.सी.ब्लूम पाईप नाली निर्माण के रूपांकन का कार्य ।

संदर्भः- निविदा सूचना क्रमांक 02/2006-07 दिनांक

-:: 00 ::-

उपरोक्त विषयांतर्गत आपकी निविदा अनुसार पुनर्वास स्थल कसूर्डी में नाली निर्माण के रूपांकन का कार्य लम्बाई 3.0 किलो मीटर हेतु आपके द्वारा दी गई न्यूनतम दर 1050/- प्रति किलो मीटर कुल राशी रूपये 3,150/- की स्वीकृति प्रदान की जाती है ।

उक्त कार्य कार्यादेश जारी होने की दिनांक से 15 दिवस में अनुविभागीय अधिकारी के परामर्श से पूर्ण किया जाना है ।

अनुबंध क्रमांक 21 /06-07/दि-14-3-07

साईट प्लान भेज दिया है

कार्यपालन यंत्री
लोनिवि नर्मदाघाटी विकास प्राधि0
ईंसा0परि0 संभाग क्र0 2 धरमपुरी

क्रमांकः 594 /को0नि0वि/2006-07 धरमपुरी, दिनांकः 14-3-07

प्रतिलिपिः-

(1) मुख्य अभियंता, लोक निर्माण विभाग नर्मदाघाटी विकास प्राधिकरण 59 अरेरा हिल्स जेल रोड भोपाल की ओर संदर्भित निविदा सूचना के क्रम में सूचनार्थ सम्प्रेषित कर निवेदन है कि दिनांक 13/03/2007 को धरमपुरी प्रवास के समय इन कार्यों को पूर्ण कराने हेतु प्रस्तुत नोट शीट में किये गये निर्देशानुसार संबंधित को कार्यादेश प्रदान किया गया है । कृपया तदनुसार अनुमोदन करने का कष्ट करें ।

(2) अतिरिक्त संचालक (पुनर्वास)/अधीक्षण यंत्री, नर्मदाघाटी विकास प्राधि0 ईं0सा0परि0 इकीस नंबर 74 सी विजयनगर इन्दौर की ओर सूचनार्थ प्रस्तुत ।

(3) अनुविभागीय अधिकारी लोनिवि नर्मदाघाटी मानवीकृत परियोजना उपसंभाग क्र0 1 धरमपुरी/लोनिवि नर्मदाघाटी ईंसापरि उपसंभाग क्र0 6 धरमपुरी की ओर सूचनार्थ अग्रेषित ।

संलग्नः- नोट शीट की छाया प्रति ।

कार्यपालन यंत्री
लोनिवि नर्मदाघाटीविकास प्राधि0
ईंसा0परि0 संभाग क्र0 2 धरमपुरी

/शर्मा/

Annex 2.7-F

कार्यालय कार्यपालन यंत्री,
लो0नि0वि0 नर्मदाघाटी विकास प्राधि0
ई0ना0परि0 संभाग क्रमांक 2 हरदा (धार) म0प्र0

क्रमांकः 595 /को0नि0वि0/2006-07 हरदा, दिनांकः 14-3-07

प्रति,

एक्का कन्सलटेंट,
"ए" 34-35 मा0ग0नगर
भोपाल (म0प्र0)

अनुलग्नक प्रति

विषयः- हरदा तहसील के विभिन्न पुनर्वास स्थलों पर आर0सी0सी0 झूम पाईप नाली निर्माण के रूपांकन का कार्य ।

संदर्भः- निविदा सूचना क्रमांक 03/2006-07 दिनांकः

-:: 00 ::-

उपरोक्त विषयांतर्गत आपकी निविदा अनुसार पुनर्वास स्थल कमलपुर, खुजावां में नाली निर्माण के रूपांकन का कार्य लम्बाई 25.0+15.0 = 40.0 मि0 मीटर हेतु आपके द्वारा दी गई न्यूनम दर 1050/- प्रति किलो मीटर कुल रूपये 42,000/- की स्वीकृति प्रदान की जाती है ।

उक्त कार्य कार्यादेश जारी होने की दिनांक से 20 दिवस में अनुविभागीय अधिकारी के परामर्श से कार्य पूर्ण किया जाना है ।

अनुबंधित 3522/06-07/14-3-07

कार्यपालन यंत्री
लोनिवि नर्मदाघाटी विकास प्राधि0
ई0ना0परि0 संभाग क्र0 2 हरदा

क्रमांकः 596 /को0नि0वि0/2006-07 हरदा, दिनांकः 14-3-2007

प्रतिलिपिः-

(1) मुख्य अभियंता, लोक निर्माण विभाग नर्मदाघाटी विकास प्राधिकरण, 59 अहेरा हिल्स जेल रोड भोपाल की ओर संदर्भित निविदा सूचना के क्रम में सूचनार्थ सम्प्रेषित कर निवेदन है कि दिनांक 13/03/2007 को हरदा भ्रमण के समय इन कार्यों को पूर्ण कराने हेतु प्रस्तुत नोट शीट में दिये गये निर्देशानुसार संबंधित को कार्यादेश प्रदान किया गया है । कृपया तदनुसार अनुमोदन करने का कष्ट करें ।

(2) अतिरिक्त संभागीय (पुनर्वास)/अधीक्षण यंत्री, नर्मदाघाटी विकास प्राधि0 ई0ना0परि0 स्कीम नंबर 7-ए तीन विजयनगर इन्दौर की ओर सूचनार्थ प्रस्तुत ।

(3) अनुविभागीय अधिकारी लोनिवि नर्मदाघाटी मानवोदय परियोजना उपसंभाग क्र0 1 हरदा/लोनिवि नर्मदाघाटी ई0ना0परि0 उपसंभाग क्र0 6 हरदा की ओर सूचनार्थ अग्रेषित ।

संलग्नः- नोट शीट की छाया प्रति ।

कार्यपालन यंत्री
लोनिवि नर्मदाघाटी विकास प्रा
ई0ना0परि0 संभाग क्र0 2 ह

/शर्मा/

Annex - ①

- 17 -

V.No- 17 Dt. dtd 24/3/07

Final payment must in variably to pirated on yellow paper with should not be used for intermediate payment

P.W.D

Form 27 Running Account Bill C.

(See chapter X paragraph's 348 and 289)

For Contractors of Suppliers, This only For payment For Work or suppliers

Cash Book Voucher No. D/R7 Dated 24/3/07 899

Name of contractor or supplier - Apna consultants Jamki Nagar Bilaspur.

Name of work- Designs & Drawing of storm water

Purpose of supply ✱ Risle khal tuning stock to Contractor

Serial No. of this bill 1st R.B. 2 purpose for issue

No. & Date of this for his work for

Reference to agreement as per Agreement 22 date 14.3.07 as per Actual

Work order No - 595 Account of work done of supplies

[1]

Unit	Quantity executed or supplied up to date per measurement book	Item of works or supplies group under sub head & sub-work's or Estimate	Rate Rs. P.	Amount Upto Date Rs. P.	Amount Since previous bill (total) for each sub-head	Remarks
1	2	3	4	5	6	7
Rm	~~Designs~~	Designs & Drawing				
	Par	of storm water				
	30940	drain for Risle	1.05	32487 =00	32487 =00	
		khal tuning Against				
		Work order No 595				
		Agg No. 22 dated				
		14.3.07				
	Attached					
				32487 =00	32487 =00	

1. The work full name of the as given in the estimate should be entered here except in the cash of bill for materials.
2. The purpose of applicable to the case should be filled in and the rest should.
3. If the supply on the work is recorded by sub-head that the to a for each sub-head should be shown in column 5 and the total should be on case on column 6 also in another case should any entries be made in column 5

Annex 2.7-F

Unit	Quantity executed or supplied up to date per measurement book	Item of work or supplies group under sub head & sub-work's or Estimate	Rate Rs. P.	Amount Upto Date Rs. P.	Amount Since previous bill (total) for each sub-head	Remarks
1	2	3	4	5	6	7
				32437=00	32437=00	
				32437=00	32437=00	

Total value of work done or supplies made to date Deduct value of work supplies shown on previous bill Net value of work supplies since previous bill Figure (F) in word Rupees

32437=00 32437=00

32437=00 32437=00

II-CERTIFICATE AND SIGNATURE

The measurement were made by S. P. Pandey on 23/3/07 and recorded at Page No. 57 of measurement Book No. 21 advance pay ment has be made previously without detailed measurement

Dated Signature of officer S. P. Pandey SE 23/3/07

Thumb Impression's preparing

Dated Signature of * Signature of Office

(Rank) Sub-Divisional Officer

Sub Divisional Officer
(PWD) NVDA Sub-Division
Man/Jebat Project
Su Div No 1 Dharampur Division

Contractor

Authorising payment

P.W.D., N.V.D.A., Lay P. Co.
Chikalpan, Dist. Dhar (M.P.)

The Signature of accessory only when the officer who prepares the bill is not officer who authorised the payment in such a cash to signature an estimate

SURANCE ... Annex 2.7-F

TE FROM ALL

BILL

III-MEMORANDUM OF PAYMENT

1 Total value of work done as per Account I, Col. 5 entry (A) — Rs. 32487=00

2 Deduct amount with paid

	Rs.	P.

(Item 1—2) K — 32487=00

(a) From previous Bill as per last running Account bill

(b) From this bill

3 Balance i.e. upto date last Running A/c. bill No. forwarded with A/c for 20

5 Payment new to be made as detailed below-

Rs.

By recovery amount creditable this work

Value of Stock supplied in this

715=00 @ 2.20% IT

100=00 Cess

31672=00 By Cheque

(a) Leader in Pittagin Port Harm Ditto in

Total 2(b) + 5 (a) (G)

E recovery of amounts creditable

(I) works or heads of accounts (b)

Deposit's

32487=00 Total 6(b) _ (e) -- [H]

Rs.	P.
815=00	
31672=00	
32487=00	32487=00

Pay Rs. Thirty one Thousand SIX hundred Seventy Rupees only by Cheque

Dated initials of Disbarring Officer

Received Rs. 4

EXECUTIVE ENGINEER
P.W.D., N.V.D.A., I.S.P. Dn. No. 2
Dharampuri, Distt. Dhar (M. P.)

As per above memorandum

Amount vemacaler

on account

Dated the EXECUTIVE ENGINEER Rt hand Thumb impression of

P.W.D., N.V.D.A., I.S.P. Dn. No. 2

withDharampuri, Distt. Dhar (M. P.) Full Signature of Contractors

Paid by me Vide Cheque No 47A048[illegible] 4741 Dated 24/3/17

Dated initials of person actually Marking the Payment

EXECUTIVE ENGINEER
P.W.D., N.V.D.A., I.S.P. Dn. No. 2
Dharampuri, Distt. Dhar (M. P.)

This figures be tested with the totals of items 4&5 if the net amount to be paid is less them Rs. 1ot and if can not be included in a cheque this payment should be made in cash this entry already adjustable and the alteration attested by dated initials

Here specify the net amount payable, any time 5 (c)

The payable acknowledgment should be for the gross amount paid as per Item 5 (i.e a+b+c)

Payment should be attached by some known person when the passes acknowledge the Needy required in the cash of bill supplier.

Attested
ASSISTANT ENGINEER

True Copy

EXECUTIVE ENGINEER
P.W.D., N.V.D.A., I.S.P. Dn. No. 2
Dharampuri, Distt. Dhar (M. P.)

IV REMARKS

The Space received for remarks which the disbursing of the divisive Officer may with of ... record of the work measurement of the state of congregate docket.

Annex 27-F

Design & Final Bill of Storm water drain for Risite - Khuzama. Annex-(4)

Final payment must in variably to pirated on yellow paper with should not be used for intermediate payment

P.W.D.

Form 27 Running Account Bill C.

(See chapter X paragraph's 348 and 289)

For Contractors of Suppliers, This only For payment For Work or suppliers

Cash Book Voucher No. 14/on Dated 24/3/07 839

Name of contractor or supplier - Aquo consultant & Engineers, Dimapur

Name of work- Design & Drawing of storm water drain for risite - Khuzama.

Purpose of supply stock to Contractor

Serial No. of this bill Final (only Bill)

No. & Date of this for his work for ~~supplies~~ 535

Reference to agreement 33 Date - 14-3-07

2 purpose for Issue

as per Agreement

Account of work done of supplies [1]

as per Actual work completed.

Unit	Quantity executed or supplied up to date per measurement book	Item of works or supplies group under sub head & sub-work's or Estimate	Rate Rs. P.	Amount Upto Date Rs. P.	Amount Since previous bill (total) for each sub-head	Remarks
1	2	3	4	5	6	7
		Design & Drawing of storm water drain for Risite Khuzama Against work order No-535 Agg No-33 Date				
LM	20865	14-3-07.	~~Lump~~			
LM	30540	Qty of previous Bill			21908 = 00	
	₹ 51805 - 00		1-05	54395-00	32487 = 00	
				54395 = 00	21908 = 00	

1. The Work full name of the as given in the estimate should be entered here except in the cash of bill or a materials.
2. The purpose of applicable to the case should be filled in and the rest should.
3. If the supply on the work is recorded by sub-head that the to a for each sub-head should be shown in column 5 and the total should be on case on column 6 also in another case should any entries be made in column 6

Annex 2.7-F

Unit	Quantity executed or supplied up to date per measurement book	Item of work or supplies group under sub head & sub-work's or Estimate	Rate Rs. P.	Amount Upto Date Rs. P.	Amount Since previous bill (total) for each sub-head	Remarks
1	2	3	4	5	6	7
		B.F		54395=00	21908 = 00	
		Bl. to Sub		54395=00	21908 = 00	
		Total value of work done or supplies made to date Deduct value of work supplies shown on previous bill Net value of work supplies since previous bill Figure (F) in word Rupees		54395 32487 21908	21908 = 00 — 21908 = 00	

II-CERTIFICATE AND SIGNATURE

The measurement were made by R.K. Mandal on Various Date and recorded at Page 27 of measurement Book No. 57 No. advance pay ment has be made previously without detailed measurement

Dated Signature of officer
Thumb Impression's preparing
Dated Signature of * Signature of Office

Contractor

(Rank) Sub-Divisional Officer

Sub Divisional Officer .....Sub-Division
(PWD) NVDA
Manjebat Project .....Division
Su Div No 1 Dharampur

Authorising payment
EXECUTIVE ENGINEER

* The Signature of accessory only when the officer who prepares the bill is not officer who authorised the payment in such a cash to signature are essential.

Annex 2.7-F

III-MEMORANDUM OF PAYMENT

		Rs.	P.
1	Total value of work done as per Account I. Col. 5 entry (A)	54395=00	
2	Deduct amount with paid — Dad I R Bill	32487=00	
	(a) From previous Bill as per last running Account bill		
	(b) From this bill	2 21908=00	
3	Balance i.e. upto date (Item 1—2) K		
	last Running A/c. bill No. forwarded with A/c for 20		
5	Payment new to be made as detailed below-		
	Rs.		
	By recovery amount creditable this work	Rs.	P.
	Value of Stock supplied in this		
(a)	Leader in — (a)		
	Ditro in —		
	Ditro in —		
	Total 2 (b) + 5 (a) (G)		
	Nil — recovery of amounts creditable works or heads of accounts (b) — Security Deduct Tax	582=00	
	482=00		
	100=00 Bill Tax		
	Deposits	21326=00	
	21326=00 By Cheque		
	Total 5(b) — (e) — [H]	21908=00	21908=00
	21908=00		

Pay Rs. 21326/- (Twenty one Thousand Three hundred twenty Six) only — By Cheque

Dated Initials of Disbarring Officer

Received Rs. *

EXECUTIVE ENGINEER
P.W.D., N.V.D.A., I.S.P. Dn. No. 2
Dhamnpuri, Distt. Dhar (M. P.)

As per above memorandum

Amount vemacaler

on account

Dated the 20 Left hand Thumb impression of

**with EXECUTIVE ENGINEER P.W.D., N.V.D.A., I.S.P. Dn. No. 2 Dhamnpuri, Distt. Dhar (M. P.) Full Signature of Contractors

Paid by me vide Cheque No Dated 20

Dated Initials of person actually Marking the payment

** This figures be tested she that is at agrees with the total of items 4&5 if the net amount to be paid is less them Rs. lot and it can not be included in a cheque this payment should be made in cash this entry already adjustable and the alteration attested by dated initials

Paid vide Cheque No. 023107

* Here specify the net amount payable. any time 5 (c)

Dated. 22/5/07

** The payable acknowledgment should be for the gross amount paid as per item 5 (i.e a+b+c)

*** Payment should be attached by some known person when the passes acknowledge the Needy required in the cash of bill supplier.

EXECUTIVE ENGINEER
P.W.D., N.V.D.A., I.S.P. Dn. No. 2
Dhamnpuri, Distt. Dhar (M. P.)

IV. REMARKS

The Space received for remarks which the disbursing of the divisive Officer may with of

Executive Engineer

Annex 2.7-G

पार जिले में विभिन्न पुनर्वास स्थलो पर निम्नानुसार निर्माण कार्य

क्र.	पुनर्वास स्थल के नाम	पुलिया (शासकिय मार्ग)	पुलिया (ग्रामीण मार्ग)	सार्वजनिक भवन	ग्रामीण मार्ग
1	2	3	4	6	7
1	अमलोरी	20 नग		4.00 कि.मी	
2	सिलोधा	83 नग		9.00 किमी	1.50 किमी
3	खलघुघुरी	55 नग		10.00 कि.मी	
4	पोरगढी	45 नग		5.00 कि.मी	0.50 किमी
5	जरातलाव	8 नग		0.50 कि.मी	1.00 कमी
6	सोहर	70 नग		7.10 कि.मी	0.50 किमी
7	खुजावा	26 नग		10.00 कि.मी	0.50 किमी
8	बेगनदा	78 नग		5.50 किमी	3.50 किमी
9	बलवाडा	21 नग		4.20 किमी	1.00 किमी
10	इलाकिया बुजुर्ग	12 नग			
11	सिलवाडिया	2 नग			
12	दुलेरी	-			
13	खलघुर्द	100 नग		10.00 कि.मी	
	योग	518 नग	-	73.30 कि.मी	12.50 कि.मी
		@ 31000/-	@ 47,000/-	@ 10,72,000	@ 12,76,500
	योग	1,60,58,000/-	47,000/-	10,85,53,500	1,11,98,250
14	पुनर्वास स्थल सागोटा से कुल ग्राम अमोरा पहुँच मार्ग 3 कि.मी		1 नग		1,23,000/-
	योग	1,60,58,000/-	47,000/-	10,85,53,500	1,13,21,250

अंक शब्दों में 12 करोड़ 98 लाख 74 हजार 750 रुपये

Grand Total Rs. 12,98,74,750

TRUE COPY

Executive Engineer

Page 48 of 174

ANNEXURE 3B

कार्यालय मुख्य अभियंता,(लोनिवि)
नर्मदा घाटी विकास प्राधिकरण,59 अरेराहिल्स,भोपाल ।

क्र0मु0अ0/लोनिवि/नघाविप्रा/त/90/05/155 भोपाल,दि0 13/1/06

प्रति,

अति0 सचालक (पुनर्वास)/अवीक्षण यत्री,
नर्मदा घाटी विकास प्राधिकरण,
स्कीम न0 78, सी विजय नगर,
इन्दौर

विषय –धार जिले के पुनर्वास स्थलो पर आतरिक मार्ग, पहुच मार्ग एव पुलियाओ का निर्माण कार्य हेतु पुनरीक्षित तकनीकी स्वीकृति बाबत् ।

सन्दर्भ –आपका पत्र क0 1604/त/धरमपुरी/05–06/इन्दौर, दिनाक 7/12/05

— 00 —

नर्मदा घाटी विकास प्राधिकरण की 89 वी एव 90 वी बैठक मे उपरोक्त पुनर्वास स्थलो के विकास हेतु रु0 1312.40 लाख की स्वीकृति प्राप्त हुई थी ।

मध्य प्रदेश कार्य मेन्युअल की भाग–II की अपेडिक्स 4.10 के से0क0 113 मे प्रदत्त वित्तीय अधिकारो का उपयोग करते हुये निम्नलिखित शर्तो पर रु0 959.60 लाख की पुनरीक्षित तकनीकी स्वीकृति एतद द्वारा प्रदान की जाती है –

1. स्वीकृत राशि से अधिक का व्यय न किया जावे ।
2. कार्य की ड्राइंग एव डिजाइन सक्षम अधिकारी से कार्य करने के पूर्व स्वीकृत आयोजना रूप से करवाय एव एम0ओ0एस0टी0मे दिये गये निर्देशो का पालन करे ।
3. पूर्व मे कय किये गये पाईपो का समुचित उपयोग किया जाना सुनिश्चित करे ।

इस कार्य पर व्यय मद सख्या 45–4801 सरदार सरोवर परियोजना के पुन: अर्जन तथा [illegible] मदो पर खर्च की मद से निकलनीय होगा ।

स्वीकृत प्राक्कलन
की एक प्रति

मुख्य अभियंता (लोनिवि)
नर्मदा घाटी विकास प्राधिकरण भोपाल

(2)

पृ0क0 मु0अ / लोनिवि / नघाविप्रा / त / 90 / 05 भोपाल,दिनांक / 1 / 2006

प्रतिलिपि –

1 सदस्य (पुनर्वास) नर्मदा घाटी विकास प्राधिकरण, नर्मदा भवन, भोपाल
2 सदस्य (अभियांत्रिकी) नर्मदा घाटी विकास प्राधिकरण, नर्मदा भवन, भोपाल
3 महालेखाकार, मध्य प्रदेश, भोपाल
4 कार्यपालन यंत्री, संभाग क0 2 खरगपुरी की ओर सूचनार्थ ।

सहपत्र–जनरल अबस्ट्रेक्ट की प्रति

–सही–
मुख्य अभियंता (लोनिवि)
नर्मदा घाटी विकास प्राधिकरण,भोपाल

T/C Attested
Officer
Sub Divisional Officer
(P.W.D.) N.V.D.A. Unit
Sub Div. No.5, Sendhwa

Annex 2.7-I

OFFICE OF THE EXECUTIVE ENGINEER,
NARMADA DEVELOPMENT P.H.E.DIVISION, BARWANI.(M.P.)

GENRAL-ABSTRACT

REVISED WATER SUPPLY SCHEME FOR REHABILITATION SITE : GANPUR - II

TEHSIL : MANAWAR DISTT. DHAR

HEAD B-LAND SARDAR SAROVAR PROJECT HEAD 48-4801

S.No	Particulars	Qty.	Rate/Unit	Amount	Remarks.
1	2	3	4	5	6
1	Drilling of 165mm dia 160 M. deep vertical tube well as per specification				
	Proposed	8 Nos	94000.00	752000.00	Sub Estt 'A'
2.	Providing and installation of India mark-II deep well hand pump and construction of platforms as per NIRCEF Design etc complete				
	Proposed	6 Nos	10000.00	60000.00	Sub Estt 'B'
3	Providing and installation of 1 No Submersable pump of HP including cable control panel stabilizer etc complete				
	Proposed	2 Nos	45000.00	90000.00	L.S
4	Providing laying & jointing of pumping main (A) excavation refilling of trenches in installation of wall specials etc complete comprising following				
	80 mm G.I pipe	2000 M			
	50 mm G.I pipe	700 M		662000.00	Sub-Estt 'E'
5	Providing laying & jointing of distribution network (A) excavation refilling of trench installation of valves of specials				
	200 mm dia P.V.C pipe	500 M			
	180 mm dia P.V.C pipe	500 M			
	160 mm dia P.V.C pipe	100 M			
	110 mm dia P.V.C pipe	2000 M			
	90 mm dia P.V.C pipe	8000 M			
	Stand Post	20 Nos		2985000.00	Sub Estt 'D'
6.	Construction of RCC OHT 15 Mt. Staging capacity 120000 Lt.	1 No	7 P/Lt	840000.00	L.S
7.	Constructions of RCC sump well 24000 Lt. capacity	1 No	4 P/Lt	96000.00	L.S
8.	Providing & installation of 2 Nos of 5 to 10 H.P. centrifugal pumps against a head of 50 M (One stand by)	30 HP	3500.00	105000.00	L.S
9.	Construction of 5000 Lt. capacity cisterns	6 Nos	24000.00	144000.00	Sub Estt C.1
10.	Cattle trough	6 Nos	12000.00	72000.00	Sub Estt E1
11.	Power Connection	2 Nos	15000.00	30000.00	L.S

Annex 2.7-I

5

S.No	Particulars	Qty.	Rate/Unit	Amount	Remarks.
1	2	3	4	5	6
12.	Providing and fixing prefabricated pump house (2.4m.x2.4m.x2.4m.)	2 No	40000.00	80000.00	L.S.
8	Provision of Temporary Water Supply arrangement for construction of houses by oustees at R/site.			50000.00	
			Total :-	6972000.00	
	Add 10% for R & M of hand pumps, power pump and pipeline			697200.00	
			Total :-	7669200.00	
	(Total Rs. Seventy Six lacs Sixty Nine thousand only)		Say Rs.	76.69 Lacs	

ASSISTANT ENGINEER,
N.D.PIPE SUB DIVISION,
BARWANI (M.P.)

EXECUTIVE ENGINEER
N.D.P.I.C.E. DIVISION
BARWANI (M.P.)

T. S. No. 202 Date 6.8.2015

Technical Sanctioned for Rs. 76.69 lakhs

Rupees Seventy six lakhs &
sixty nine thousand only

Ch. to Civil

Chief Engineer (W.R.D.)
Narmada Valley
Bhopal

Assistant Engineer
N.D.P.I.C.E. Division
Barwani

(2)

GENERAL - ABSTRACT

FOR CONSTRUCTION OF MIDDLE SCHOOL - 1 No. TREE PLATFORM - 10 No. WATER TRUFF - 4 No. AT R/SITE - GANPUR II TEHSIL - MANAWAR DISTRICT - DHAR

S.No.	Particulars	Amount
1	Middle School - 1 No.	754,200=00
2	Tree Platform - 10 No.	295,600=00
3	Water Truff - 4 No.	66,000=00
	Total Rs.	11,17,800=00
	Say Rs.	11.18 Lacs

Sub Engineer
PWD NVDA S.S.P(R)
Sub Div. Kukshi (Dhar)

PWD NVDA S.S.P(R)
Sub Div. Kukshi (Dhar)

Executive Engineer
PWD NVDA MANAWAR
Division Kukshi (Dhar)

अतिरिक्त संचालक (तृ.वि.) अन्वेषण संभाग
नर्मदा घाटी विकास प्राधिकरण
इन्दौर

TRUE COPY

Annex 2.7-K **FORMAT NO. : F - TD - 01**

निरीक्षण प्रतिवेदन

मध्यप्रदेश लघु उद्योग निगम मर्यादित

तकनीकी विभाग

जी.टी.बी. काम्पलेक्स, टी.टी. नगर
भोपाल – 462 003

46784

क्रमांक : टी

दिनांक 22.8.05

1- क्रेता विभाग का नाम Executive Engg. NVDA (P:D) MANJOBAT DN. KUKSHI DHAR

2- इकाई का नाम व पता Balaji Swpun Pipe & Cement Ind.Barwani.

3- लाट संख्या ..... निरीक्षण दिनांक : 22.8.05

4-

क्र.	प्रदाय आदेश क्रमांक/दिनांक	उत्पादों का विवरण	सामग्री की मात्रा				विवरण
			आदेशित	प्रस्तुत	स्वीकृत	अस्वीकृत	
	RCC HALF ROUND SPUN PIPES (P/F) WITH M.S. FLAT & LAYING FIXING S'CI 1237						
1.	D: 346 27.1.06	SMM 123780 RCC half round pipe 300mm NP-3 with M.S. Flat Length of pipe 2.0mtr. each	1240 rmt	1240 rmt	1240 rmt	Nil	Visual and dimensional inspection as per LUN specification declaration given by unit for reinforcement of steel and quality & quantity of steel.
		SMM123783 RCC full round pipe 300mm NP-3 as per IS:458-2003	270 rmt	270 rmt	270 rmt	Nil	
	Note :- 1. This inspection carried out by technical section, Bhopal. 2. Laying and fixing of abovesaid pipe will be carry out by unit at site. 3. Consignee may do inspection at site. 4. Each abovesaid pipe stamped with 'D' mark rubber seal.						

5- मैं प्रमाणित करता हूँ कि उपरोक्त सामग्री मैंने अपने ज्ञान एवं विवेक के अनुसार म.प्र. लघु उद्योग निगम के संबंधित स्पेसिफिकेशन के अनुसार निरीक्षित की है।

6- यह निरीक्षण प्रतिवेदन निम्नलिखित नियम एवं शर्तों के अंतर्गत जारी किया गया :-

- क्रेता विभाग निरीक्षण दिनांक के एक माह पश्चात् सुपुर्दगी नहीं लेगे।
- क्रेता विभाग को सामग्री की गुणवत्ता एवं स्पेसिफिकेशन बाबत् कोई शिकायत हो तो इसे सुपुर्दगी लेने के बाद 7 दिन में समस्त विवरण सहित लघु उद्योग निगम को लिखना होगा।
- क्रेता विभाग सुपुर्दगी लेने से पूर्व परिवहन में हुई संभावित टूट-फूट को अच्छी तरह देखकर सामग्री प्राप्त करे तथा यह भी देखे कि सामग्री की गुणवत्ता संतोषजनक है।
- किसी भी परिस्थिति में अगर अवमानक स्तर की सामग्री प्रदाय होती है, चाहे वह निरीक्षित हो अथवा अनिरीक्षित, गुणवत्ता बाबत इकाई की पूर्ण जवाबदारी बनी रहेगी।
- क्रेता विभाग माल की सुपुर्दगी लेने से पूर्व यह सुनिश्चित कर ले कि प्रत्येक सामग्री/पैकिंग पर इकाई का नाम व पत्र माह संलग्न अंकित है। यह अंकन यथासंभव मेटलिक स्टीकर अथवा स्टेन्सिल अथवा पेपर स्टीकर अथवा निरीक्षक द्वारा अनुमोदित किसी अन्य तरीके से हो सकता है।

7- प्रतिलिपि : (1) क्रेता विभाग (2) प्रदायकर्ता (3) महाप्रबंधक (वित्त) (4) कार्यालय प्रति

8- टीप :

निरीक्षणकर्ता के हस्ताक्षर नाम एवं दिनांक

A.K. JAIN
Asst. Manager (Tech.)
M.P. Laghu
Udyog Nigam Ltd. BHOPAL

R. SITE - KATHORA

TEH - KASRAWAD

(Panchyat Bhawan)

FRONT ELEVATION

SECTION AT AA

PLAN

CENTRE LINE PLAN

PROPOSED OFFICE OF PANCHAYAT

Sub Divisional Officer
P.W.D. N.V.D.A. S.S.P.
(Reb) Sub Divn, Thikri

Annex 3.1-A

कार्यालय कार्यपालन यंत्री, नर्मदा विकास लोक स्वास्थ्य यांत्रिकी, खण्ड–बड़वानी

(दूरभाष क्र.07290-224912)

पत्र क्र.मोई/145 दिनांक 08.08.2012 से संबंधित बिन्दुवार जानकारी निम्नानुसार है :--

(1) पुनर्वास स्थलों पर किये गये कार्यों की मूल माप-पुस्तिकाएं संलग्न सूची अनुसार प्रस्तुत हैं। किये गये कार्यों में उपयोग की गई माप-पुस्तिका का क्रमांक एवं पृष्ठ क्रमांक पूर्व में आयोग को दिये गये बस्तों में संलग्न फार्मेट में वर्णित है।

(2) मांगी गई जानकारी पूर्व में जमा किये गये पुनर्वास स्थल संबंधी जानकारी के बस्ते में संलग्न है।

(3) इस शाखा से संबंधित नहीं है।

(4) रेसिस्टोविटी सर्वे की पुनर्वास स्थलवार संबंधी जानकारी पूर्व में जमा किये गये पुनर्वास स्थलवार बस्तों में संलग्न है। जिन पुनर्वास स्थलों पर उच्चस्तरीय टंकियों का निर्माण किया गया है, उनके स्थल के चयन निम्न बिन्दुओं को ध्यान में रखते हुए किया जाता है :-

(अ) पुनर्वास स्थल के नक्शे में स्थान खुला हो।

(ब) पुनर्वास स्थल में वह जगह ऊंचाई पर हो।

(स) उच्चस्तरीय टंकी के फाउण्डेशन हेतु ठोस सतह हो।

इसी प्रकार हैण्डपम्प के स्थल का चयन भी निम्न बिन्दुओं को ध्यान में रखते हुए किया जाता है :-

(अ) हैण्डपम्प की जगह खुले स्थान पर हो।

(ब) रेसिस्टोविटी सर्वे के आधार पर।

इसी प्रकार सिस्टर्न के स्थल का चयन भी निम्न बिन्दुओं को ध्यान में रखते हुए किया जाता है :-

(अ) सिस्टर्न की जगह खुले स्थान पर हो।

(ब) सिस्टर्न का उपयोग अधिक से अधिक हो सके।

इस बिन्दु में मांगी गई अन्य जानकारी पूर्व में जमा किये गये पुनर्वास स्थलवार बस्तों में संलग्न है।

(5) नर्मदा घाटी विकास प्राधिकरण भोपाल द्वारा निर्धारित मापदण्ड के आधार पर जलप्रदाय व्यवस्था संबंधी सुविधा पुनर्वास स्थलों पर दी गई है, जिसकी छायाप्रति अवलोकनार्थ संलग्न है।

(6) इस शाखा से संबंधित नहीं है।

(7) सरदार सरोवर परियोजना के अंतर्गत विकसित किये गये 88 पुनर्वास स्थलों में एकमात्र पुनर्वास स्थल धरमपुरी नगरीय क्षेत्र के अंतर्गत आता है एवं शेष 87 पुनर्वास स्थल ग्रामीण क्षेत्र के अंतर्गत आते हैं। अतः नगरीय क्षेत्र हेतु दी जाने वाली सुविधा को देखते हुए पुनर्वास स्थल धरमपुरी में सीवरेज व्यवस्था की गई।

(8) कुछ पुनर्वास स्थलों पर ग्रीष्मऋतु में जहाँ पर हैण्डपम्पों एवं ट्यूबवेलों (पॉवरपम्पों) का जलस्तर कम होने एवं जल आवक क्षमता कम होने से/पॉवरपम्प में खराबी आने की स्थिति में वहाँ पर जलप्रदाय व्यवस्था शासकीय टैंकरों के माध्यम से की जाती है।

(9) इस शाखा से संबंधित नहीं है।

(10) इस शाखा से संबंधित नहीं है।

(11) इस शाखा से संबंधित नहीं है।

(12) इस शाखा से संबंधित नहीं है।

(13) तहसील धरमपुरी के पुनर्वास स्थल माला, खुजावा, धरमपुरी, वेगन्दा, निम्बोला एवं तहसील सनावद के पुनर्वास स्थल भिर्जापुर, कवडी व पेरखड़ की जलप्रदाय योजनाएं संबंधित ग्राम पंचायत/नगर पंचायत को संचालन हेतु हस्तांतरित की गई है तथा संधारण कार्य इस कार्यालय द्वारा किया जाता है। इसके अतिरिक्त शेष रहे पुनर्वास स्थलों पर किये गये कार्यों को संबंधित ग्राम पंचायतों को हस्तांतरित करने के प्रयास किये गये, किन्तु उनके द्वारा अपने अधिपत्य में नहीं लिया जा रहा है। पुनर्वास स्थलों पर जलप्रदाय व्यवस्था संबंधी कार्य, जैसे विद्युत देयकों का भुगतान, मोटरपम्पों एवं हैण्डपम्पों इत्यादि के संचालन-संधारण कार्य पर व्यय किया जाता है।

(14) पुनर्वास स्थलों पर किये गये कार्यों से संबंधित धरोहर राशि की जानकारी संलग्न है। ऐसा कोई भी प्रकरण इस शाखा से संबंधित नहीं है, जिसमें धरोहर राशि आंशिक एवं पूर्ण रूप से जब्त की गई हो।

(15) इस शाखा से संबंधित पुनर्वास स्थलों में किये गये कार्यों के गुणवत्ता के संबंध में किसी भी प्रकार की शिकायत नहीं है।

(16) हैण्डपम्पों के जल की गुणवत्ता संबंधी टेस्ट रिपोर्ट जांच उपरान्त प्रस्तुत की जावेगी। हैण्डपम्प के जल की गुणवत्ता के संबंध में आज तक कोई भी शिकायत इस शाखा को प्राप्त नहीं हुई है।

कार्यपालन यंत्री,
नर्मदा विकास लो.स्वा.यां.,
खण्ड-बड़वानी

Annex 3.1-C

Water Testing / Water Quality

कार्यपालन प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकी विभाग
मध्य प्रदेश भोपाल

क्र. 2293 / प्र.अ. / मॉनी / जगुस / लो.स्वा.यां.वि. / 04 भोपाल दिनांक 25.03.04

प्रति,

कार्यपालन यंत्री
लोक स्वास्थ्य यांत्रिकी विभाग
खण्ड ..... समस्त

विषय :– सभी नलकूपों के जल का सहयोग पूर्व परीक्षण किये जाने बाबत्।
संदर्भ :– इस कार्यालय का पत्र क्रमांक 67 दिनांक 03.01.2004 एवं पत्र क्र. 697 / दिनांक 24.01.2004 एवं पत्र क्रमांक 500 / दिनांक 15.01.2004

इस कार्यालय द्वारा समय समय पर निर्देश दिये गये है कि समस्त नवीन श्रोतों को पेयजल के लिए चालू करने के पूर्व जल नमूनों का परीक्षण किया जावे एवं उपयुक्त पाये जाने पर ही जल प्रदाय प्रारम्भ किया जावे। विशेष रूप से फ्लोराइड खारापानी एवं बैक्टिरियोलोजीकल जैसे महत्वपूर्ण परीक्षण अवश्य किये जावें। इसके साथ ही साथ पूर्व से स्थापित श्रोतों का भी परीक्षण किया जावे किन्तु मैदानी अधिकारियों से जो कि परीक्षण रिपोर्ट का प्रगति प्रतिवेदन प्राप्त हो रहा है उसके आंकडों से प्रतीत होता है कि कार्यवाही नहीं की जा रही है। क्योंकि प्रगति प्रतिवेदन में आंकड़े नवीन प्रारंभ किये गये श्रोतों से भी कम दर्शाये गये हैं।

खनन किये गये सभी नलकूपों के पानी में फ्लोराईड खारेपानी आर्सेनिक नाइट्रेट तथा जीवाणु परीक्षण सभी श्रोतों में अनिवार्य रूप से तत्काल करवाकर सूचित किया जावे ऐसे सभी श्रोत जो उपयोग में लाये जा रहे हैं किन्तु जिनका परीक्षण अभी नहीं किया उनका भी परीक्षण करवाया जाकर इस कार्यालय को सूचित किया जावे।
इस अत्यंत महत्व दिया जावे। आदेशों के पालन न किये जाने पर यदि कोई घटना घटित होती है तो इसके लिए संबंधित कार्यपालन यंत्री व्यक्तिगत रूप से स्वय जबाबदार होगे एवं उनके विरूद्ध कड़ी से कड़ी कार्यवाही की जायेगी।

प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकी विभाग
सतपुड़ा भवन भोपाल

क्र. 2293 / प्र.अ. / मॉनी / जगुस / लो.स्वा.यां.वि. / 04 भोपाल दिनांक 25.03.04
प्रतिलिपि–

मुख्य अभियंता लोक स्वास्थ्य यांत्रिकी विभाग परिक्षेत्र भोपाल / इंदौर / ग्वालियर / जबलपुर की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु ।

प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकी विभाग
सतपुड़ा भवन भोपाल

Annex 3.1-D

Water Testing / Water Quality

कार्यालय प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकी विभाग
मध्य प्रदेश भोपाल

क्र. 67 /04/ प्र.अ./ मॉनी/ लो.स्वा.यां.वि. भोपाल दिनांक 03.01.04

प्रति,

मुख्य अभियंता,
लोक स्वास्थ्य यांत्रिकी विभाग
परिक्षेत्र भोपाल / इंदौर / ग्वालियर / जबलपुर

विषय :– पेयजल स्त्रोतों में फ्लोराइड की अधिकता बाबत्।

संदर्भ :– इस कार्यालय का पत्र क्रमांक 534 दिनांक 16.04.96, क्रमांक 144 दिनांक 25.01.96, क्रमांक 250 दिनांक 09.02.96, क्रमांक 308 दिनांक 02.03.2000 एवं क्रमांक 9406 दिनांक 08.12.2003

उपरोक्त विषयांतर्गत संदर्भित पत्रों का अवलोकन करें, जिनके द्वारा समय समय पर आपको उक्त विषय संबंधी निर्देश दिये गये हैं। फ्लोराइड अधिकता की समस्या के निराकरण हेतु निम्नानुसार कार्यवाही करें:–

1. नलकूप खनन के पश्चात पानी में फ्लोराइड हेतु परीक्षण कराये । फ्लोराईड की मात्रा निर्धारित सीमा के अंदर पाये जाने पर ही उस पर हैण्डपंप या पावरपम्प स्थापित किया जाये।
2. फ्लोराईड की मात्रा निर्धारित समय सीमा से यदि अधिक पाई जाती है तो उसे बन्द कर दिया जाये ।
3. जिन ग्रामों में फ्लोराइड की अधिकता पाई गई है उन ग्रामों के सभी पेयजल स्त्रोतों का फ्लोराइड हेतु तत्काल परीक्षण कराया जाय।
4. वर्तमान में अपरिक्षित स्त्रोतों का तत्काल परीक्षण कराया जाय।
5. साथ ही साथ आसपास के ग्रामों के समस्त जल श्रोतों का भी शत प्रतिशत परीक्षण कराया जावे एवं यदि फ्लोराइड का प्रभाव पाया जाता है तो जिले के समस्त पेयजल श्रोतों का तत्काल परीक्षण कराया जाय।
6. फ्लोराइड की अधिकता पाये जाने पर स्त्रोत को बंद कर दें एवं हैण्डपंप पर पीने के लिए अयोग्य सूचना लगायें उसे रंग से पोत दें।
7. फ्लोराइड प्रभावित ग्रामों में शुद्ध पेयजल प्रदाय हेतु वैकल्पिक व्यवस्था करें एवं आवश्यक हो तो तत्संबंधी प्रस्ताव बनाकर इस कार्यालय को प्रेषित करे।
8. प्रभावित स्त्रोतों में फ्लोराइड की मात्रा हेतु स्थानीय या निकटतम प्रयोगशाला में नियमित परीक्षण कराकर मोनिटरिंग करें। किये जा रहे परीक्षण कार्य की क्रास चैकिंग विभागीय प्रयोगशाला भोपाल में करायें।
9. अधीनस्थ खण्ड कार्यालयों को निर्देशित करें कि खण्ड कार्यालय में एक रजिस्टर रखा जावे जिसमें प्रभावित स्त्रोतों की समय समय पर किए गये परीक्षणों के आकड़े रखे जावें।
10. परीक्षण में फ्लोराई की मात्रा में बार बार अंतर आये तो ऐसे स्त्रोतों का वर्षा पूर्व वर्षा के दौरान एवं वर्षा के पश्चात सघन परीक्षण किया जाय।
11. परीक्षण कार्य हेतु परीक्षण सुविधा प्रयोगशाला में तत्काल विकसित की जावे।
12. प्रयोगशाला अमले को परीक्षण हेतु समुचित प्रशिक्षण दिलाया जावे।

Annex 3.1-D

13. परीक्षण हेतु तात्कालिक व्यवस्था फील्ड टेस्टिंग किट के माध्यम से की जाये। किट के उपयोग पर प्रशिक्षण देकर स्थानीय पंचायतों को वितरित की जावें।
14. यदि ग्राम की प्रभावित जनसंख्या 500 से कम हो तो प्रति परिवार वितरण हेतु घरेलू फ्लोराइड निवारक छन्नों की मांग बाबत प्रस्ताव इस कार्यालय को प्रेषित करें ताकि तदनुसार यूनिसेफ से मांग की जा सके।
15. फ्लोराइड्र्ड की अधिकता से स्वास्थ्य पर पड़ने वाले कुप्रभावों की जानकारी ग्रामवासियों को देने हेतु जन जागृति कार्यक्रम आयोजित किये जावे।
16. प्रभावित ग्रामों मे फ्लोरोसिस रोग का पता लगाने हेतु स्वास्थ्य सर्वेक्षण कराने केलिए स्थनीय स्वास्थ्य विभाग से निवेदन करें।

उक्त संदर्भित पत्रों की छायाप्रति सुलभ संदर्भ हेतु संलग्न है।
उपरोक्तानुसार कार्यवाही करने हेतु अधीनस्थ कार्यपालन यंत्रियों को तत्काल निर्देश जारी करें तथा निर्देशों का कड़ाई से पालन किया जाना सुनिश्चित करें।

प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकी विभाग

पृ. क्र. 67 /04/ प्र.अ./ मॉनी/ लो.स्वा.यां.वि. भोपाल दिनांक 03.01.04

प्रतिलिपि :–
सचिव, म.प्र.शासन सामान्य प्रशासन विभाग भोपाल की ओर सूचनार्थ।

प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकी विभाग
भोपाल म.प्र.

Annex 3.1-E

कार्यालय प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकी विभाग, भोपाल

क्र 308 001–59/ सला / प्रौमि / बायो / लोक.स्वा.यां.वि., भोपाल, दिनांक 02.03.2000

प्रति,

कार्यपालन यंत्री
लोक स्वास्थ्य यांत्रिकी विभाग,भोपाल /
बैतूल / राजगढ़ / रायसेन / सीहोर / विदिशा /
झाबुआ / शिवपुरी / मंडला / धार / देवास / उज्जैन /
मंदसौर / नीमच / शाजापुर / मंडला / एवं डिंडोरी / सिवनी / ग्वालियर /
दुर्ग / दतेवाड़ा / कोरबा / छिंदवाड़ा

विषय :– पेयजल में फ्लोराइड की अधिकता की पुष्टि हेतु पानी के नमूनों की जांच की क्रास चैकिंग बाबत्।

उपरोक्त विषयान्तर्गत आपके खण्ड के अधीनस्थ ग्रामीण / नगरीय क्षेत्रों के पेयजल स्त्रोतों में पूर्व में फ्लोराइड के आधिक्य की जानकारी इस कार्यालय को उपलब्ध कराई गई है। अतः इस कार्यालय में उपलब्ध अद्यतन जानकारी संलग्न की जा रही है। (देखें संलग्न प्रपत्र) इस संबंध में निर्देशित किया जाता है कि :–

1.0 विभिन्न स्त्रोतों में प्राप्त फ्लोराइड की मात्रा यदि क्रास चैकिंग अभी तक नहीं कराई हो तो 2 या 3 नमूने भोपाल भेजकर इसे तत्काल करावें।

2.0 उपरोक्त पुष्टि परीक्षण के उपरांत भी यदि इन नमूनों में फ्लोराइड की मात्रा निर्धारित मात्रा से अधिक मिलती है या पूर्व में ही उक्त कार्यवाही की जा चुकी है तो निम्नानुसार कार्यवाही करें।

2.1 प्रभावित पेयजल स्त्रोतों को तत्काल बंद करना एवं वैकल्पिक शुद्ध जल प्रदाय हेतु प्रस्ताव तैयार करना।

2.2 ग्राम वासियों में इसके महत्व की जानकारी देने बाबत् जन चेतना, शिक्षा कार्य करना।

2.3 स्थानीय स्वास्थ्य विभाग को प्रभावित क्षेत्रों में फ्लोरोसिस हेतु स्वास्थ्य सर्वेक्षण व स्कूली बच्चों में दंत सर्वेक्षण का सुझाव देना।

2.4 प्रभावित ग्रामों को व आसपास के ग्रामों में समस्त स्त्रोतों का फ्लोराइड परीक्षण करना।

2.5 जिले के सभी स्त्रोतों का शत प्रतिशत फ्लोराइड परीक्षण युद्धस्तर पर करने की कार्यवाही तत्काल करना।

वर्तमान में तत्काल निम्न बिन्दुओं पर जानकारी इस कार्यालय को प्रेषित करें :–

3.1 जिले /खण्ड में कुल आबाद ग्रामों की संख्या ।
3.2 जिले /खण्ड में कुल स्थापित एवं कार्यरत हैण्डपंपों, नलजल योजनाओं व अन्य पेयजल स्त्रोतों की संख्या।
3.3 फ्लोराइड हेतु परीक्षित कुल ग्रामों की संख्या।
3.4 फ्लोराइड हेतु परीक्षित
3.41 कुल हैण्डपंपों की संख्या

Annex 3.1-E

3.42 कुल नलजल योजनाओं की संख्या
3.43 कुल अन्य स्त्रोतों की संख्या
3.5 फ्लोराइड के आधिक्य से प्रभावित पाए गए ग्रामों की संख्या।
3.6 फ्लोराइड के आधिक्य से प्रभावित
3.61 पाए गए कुल हैण्डपंपों की संख्या।
3.62 कुल नलजल योजनाओं की संख्या
3.63 कुल अन्य स्त्रोतों की संख्या ।

उक्त जानकारी की अद्यतन स्थिति (संलग्न प्रपत्रानुसार) प्रतिमाह की 5 तारीख तक इस कार्यालय को नियमित रूप से प्रेषित की जावे।

फ्लोराइड प्रभावित ग्रामीण स्त्रोतों में शुद्ध पेयजल प्रदाय हेतु केन्द्र शासन द्वारा 75 प्रतिशत एवं राज्य शासन द्वारा 25 प्रतिशत राशि वित्तीय सहायता का वहन किया जाता है। अतः इस राशि का समुचित उपयोग किए जाने हेतु जिले के समस्त पेयजल स्त्रोतों के सर्वेक्षण पश्चात् आवश्यक एकीकृत योजनाएं तत्काल तैयार करने की कार्यवाही करें।

सलाहकार
लोक स्वा.या. विभाग
सतपुड़ा भवन भोपाल

संलग्न :– उपरोक्तानुसार
1. देवास, शाजापुर एवं कोरबा
हेतु इस कार्यालय का पत्र क्र.112/ दि. 01.02.2000

पृ.क्र. 309 / सला/ प्रौमि/ लो.स्वा.या.विभाग / भोपाल दिनांक 03.03.2000

प्रतिलिपि :– मुख्य अभियंता, लो.स्वा.या.वि. भोपाल / इंदौर/ ग्वालियर/ रायपुर को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित

संलग्न उपरोक्तानुसार

सलाहकार (प्रौमि)
लोक स्वास्थ्य यात्रिकी विभाग
सतपुड़ा भवन, भोपाल

Annex 3.1-F

पत्र क्र.23/आर.आर.साईट्स/09/2013 इन्दौर, दिनांक 15.01.2013 का प्रतिउत्तर

विगत वर्ष में बड़वानी, धार एवं खरगौन जिलों में अल्पवर्षा होने के कारण उन जिलों के पुनर्वास स्थलों में स्थित नलकूपों की जल आवक क्षमता एवं जलस्तर कम होने के कारण पुनर्वास स्थलों में वर्तमान समय में जल प्रदाय व्यवस्था में बाधा उत्पन्न हो रही है। जिन पुनर्वास स्थलों पर वर्तमान में नलकूपों की जल आवक क्षमता एवं जलस्तर कम होने के कारण नलकूपों से पर्याप्त पानी उपलब्ध नहीं हो रहा है, उन पुनर्वास स्थलों के विस्थापितों को जल प्रदाय हेतु शासकीय टैंकरों के माध्यम से जल प्रदाय किया जा रहा है। विभाग द्वारा कुल 30 पुनर्वास स्थलों में जल वितरण प्रणाली बिछाई गई है जिसमें से 04 पुनर्वास स्थल संबंधित ग्राम पंचायत/नगर पंचायत को हस्तान्तरित हो चुकी है एवं वर्तमान में इन पुनर्वास स्थलों में स्थानीय संस्था जल वितरण प्रणाली के माध्यम से जल वितरण किया जा रहा है तथा 26 पुनर्वास स्थलों की जल वितरण प्रणाली अभी भी विभाग के पास है जिसमें से 07 पुनर्वास स्थलों में आवश्यकता एवं पर्याप्त संख्या में विस्थापितों के आने के कारण जल वितरण प्रणाली, जैसे- निसरपुर, सेमल्दा, बड़दा (मनावर), खेड़ी, बड़दा (अंजड़) में भी विभाग द्वारा जल वितरण प्रणाली से जल वितरण किया जा रहा है।

चाही गई जानकारी बिन्दुवार निम्नानुसार है :--

(1) सरदार सरोवर परियोजना के अन्तर्गत जिन पुनर्वास स्थलों पर नर्मदा घाटी विकास प्राधिकरण द्वारा जल प्रदाय व्यवस्था संचालित की जाती है, की जानकारी संलग्न है (संलग्न क्र.1(ए)कुल पृ.सं.3) एवं जिन पुनर्वास स्थलों पर संबंधित ग्राम पंचायत/नगर पंचायत द्वारा जलप्रदाय व्यवस्था संचालित की जाती है, की जानकारी संलग्न है (संलग्न क्र.1(एए पृ.सं.1)। विभाग के आधिपत्य में पुनर्वास स्थलों पर जलप्रदाय व्यवस्था की अधो- संरचना संबंधी जानकारी पुनर्वास स्थलवार संलग्न है (संलग्न क्र.2 कुल पृ.सं.3)।

(2) पुनर्वास स्थल पर भवन निर्माण कार्य के दौरान जल प्रदाय किये जाने संबंधी जानकारी नर्मदा घाटी विकास प्राधिकरण के पत्र क्र.290.141/सचिव/नघाविप्रा/कार्य/07/141.एस.4/398 भोपाल, दिनांक 30.04.07 में है, जिसकी छायाप्रति संलग्न है। (संलग्न क्र.3 कुल पृ.सं.1)

(3) भवन निर्माण एवं अन्य घरेलू कार्य (पेयजल छोड़कर) जो पाईप लाईन डाली गई है, वह पुनर्वास स्थलवार निम्नानुसार है :-

स.क्र.	पुनर्वास स्थल का नाम	लागत (रु.लाख में)
(1)	बोरलाय-द्वितीय एवं तृतीय	10.71
(2)	खेड़ी	09.02
(3)	चकोरी	17.23
(4)	मोहीपुरा	04.51
(5)	नलवाय	06.51
(6)	साला	02.49
(7)	पेरखड़	07.59
(8)	कवठी	03.96
(9)	निसरपुर-प्रथम, द्वितीय एवं तृतीय	15.65
(10)	अंजड़ (बड़दा)	11.08

निरन्तर-2 पर.....

(4) बिन्दु क्रमांक-4 में चाही गई जानकारी के संबंध में कोई पत्र नहीं है।

(5) बिन्दु क्रमांक-5 में चाही गई जानकारी निम्नानुसार है :-

स.क्र.	पुनर्वास स्थल का नाम	मासिक औसत व्यय रुपये	रिमार्क
(1)	बेरलाय-द्वितीय एवं तृतीय	8,000/-	विद्युत पम्प
(2)	खेड़ी	8,000/-	विद्युत पम्प
(3)	चकेरी	8,000/-	विद्युत पम्प
(4)	मोहोपुरा	8,000/-	विद्युत पम्प
(5)	नलवाय	8,000/-	विद्युत पम्प
(6)	साला	8,000/-	विद्युत पम्प
(7)	पेरखड़	8,000/-	विद्युत पम्प
(8)	कवठी	8,000/-	विद्युत पम्प
(9)	निमरपुर-प्रथम, द्वितीय एवं तृतीय	1,21,000/-	डीजल पम्प (संलग्न क्र.4 कुल पृ.सं.50)

(6) जिन पुनर्वास स्थलों पर हैण्डपम्पों एवं पावरपम्पों में जल आवक क्षमता कम होने एवं जलस्तर नीचे होने के कारण पर्याप्त मात्रा में पेयजल उपलब्ध नहीं हो रहा है, वहाँ पर शासकीय ट्रक-टैंकर के माध्यम से जनहित में जल प्रदाय व्यवस्था की जा रही है।

(7) विस्थापितों की मांग एवं आवश्यकता अनुसार शासकीय ट्रक-टैंकर द्वारा जल प्रदाय किया जाता है।

(8) सिर्फ शासकीय ट्रक-टैंकर के माध्यम से ही विभिन्न पुनर्वास स्थलों पर जल वितरण किया जाता है, इसके लिये प्रायवेट टैंकर का उपयोग विभाग द्वारा नहीं किया जाता है।

(9) जी नहीं।

(10) संबंधित टैंकरों की लॉग-बुक में विस्थापितों को जल प्रदाय संबंधी जानकारी संधारित की जाती है। विस्थापितों को जल प्रदाय किया जाता है, उनका दिनांकवार रजिस्टर में नपूना हस्ताक्षर/अंगूठा लिया जाता है, जिसकी छायाप्रति संलग्न है, साथ ही मासिक एवं वार्षिक व्यय संबंधी जानकारी पुनर्वास स्थलवार संलग्न है। (संलग्न क्र.5 कुल पृ.सं.474 एवं 6 कुल पृ.सं.1)

(11) शासकीय ट्रक-टैंकरों पर संचालन एवं संधारण व्यय कार्य की आवश्यकता अनुसार किया जाता है, जानकारी संलग्न है (बिन्दु क्र.10 के अंतर्गत)। जल प्रदाय हेतु नलकूप के जल का उपयोग किया जाता है।

(12) पुनर्वास स्थलों पर विद्युत प्रदाय के शिड्यूल अनुसार जल प्रदाय किया जाता है। पुनर्वास स्थलों को जल प्रदाय व्यवस्था के संचालन-संधारण हेतु विभागीय स्टॉफ निम्नानुसार है :—

स.क्र.	नाम /पदनाम	पुनर्वास स्थल
(1)	श्री मुकेश जैन/उपयंत्री	तहसील बड़वानी, कुक्षी, कसरावद एवं महेश्वर के समस्त पुनर्वास स्थल।
(2)	श्री प्रवीण शर्मा/उपयंत्री	तहसील धरमपुरी, मनावर, डोकरी, धार, जोबट एवं बांदला के समस्त पुनर्वास स्थल।

निरन्तर-3 पर.....

(13) 76 पुनर्वास स्थलों पर हैण्डपम्पों के लिये गये जल की परीक्षण रिपोर्ट आयोग के पूर्व पत्र क्र.429 दिनांक 08.08.2012 के बिन्दु क्र.(16) के उत्तर में पूर्व में प्रस्तुत की जा चुकी है। उच्चस्तरीय टंकी को नलकूपों के जल से भरा जाता है। पृथक से जल परीक्षण नहीं किया गया है। इस कार्यालय में आज दिनांक तक उच्चस्तरीय टंकी से जल प्रदाय में उपयोग किये गये जल के खराब होने की शिकायत प्राप्त नहीं हुई है। उच्चस्तरीय टंकी के जल में पृथक से क्लोरीनेशन नहीं किया गया है।

(14) विभाग द्वारा विभिन्न पुनर्वास स्थलों पर विस्थापितों को निशुल्क जल प्रदाय किया जाता है।

(15) वांछित जानकारी के विवरण, आयोग के पूर्व पत्र क्र.498 दिनांक 26.09.2012 के बिन्दु क्र.(1) में सॉफ्ट एवं हार्ड कापी में जानकारी दी गई है।

(16) विभाग द्वारा स्थापित किये गये सिस्टर्न के पुताई हेतु विभाग द्वारा कोई व्यय नहीं किया गया है एवं सिस्टर्न की सफाई समय-समय पर विभागीय कर्मचारियों से ही कराई गई है, जिसके लिये कोई राशि व्यय नहीं की गई है एवं हैण्डपम्पों का संधारण कार्य समय-समय पर आवश्यकता अनुसार किया जाता है।

(17) सरदार सरोवर परियोजना के अन्तर्गत विकासित 88 पुनर्वास स्थलों में से पुनर्वास स्थल धरमपुरी हेतु एक जलशुद्धिकरण संयंत्र निर्मित किया गया है एवं पुनर्वास स्थल निसरपुर-प्रथम, द्वितीय, तृतीय, गेहलगांव एवं चिखल्दा के लिये एक जलशुद्धिकरण संयंत्र का निर्माण किया जा रहा है। वर्तमान में पुनर्वास स्थल धरमपुरी हेतु निर्मित जलशुद्धिकरण संयंत्र के माप-पुस्तिका अनुसार कार्य प्रारम्भ की दिनांक 19.05.2005 एवं कार्य पूर्ण होने की दिनांक 10.06.2006 है। नगर पंचायत, धरमपुरी द्वारा जलशुद्धिकरण संयंत्र को अधिपत्य में नहीं लेने के कारण वर्तमान में बन्द है। इसी प्रकार पुनर्वास स्थल निसरपुर-प्रथम, द्वितीय, तृतीय, गेहलगांव एवं चिखल्दा हेतु निर्माणाधीन जलशुद्धिकरण संयंत्र के कार्य प्रारम्भ की दिनांक 15.05.2007 है एवं वर्तमान में कार्य चल रहा है। पुनर्वास स्थल धरमपुरी के जलशुद्धिकरण संयंत्र का कार्य पूर्ण होने के कारण अनुबन्ध समाप्त हो गया है एवं पुनर्वास स्थल निसरपुर-प्रथम, द्वितीय, तृतीय, गेहलगांव एवं चिखल्दा हेतु निर्माणाधीन जलशुद्धिकरण संयंत्र का अनुबन्ध वर्तमान में चल रहा है।

(18) पुनर्वास स्थलों की जल प्रदाय व्यवस्था हेतु राइजिंगमेन रोड के समीप निम्न कारणों से डाली गई है :-

(अ) इस हेतु समीप की स्थित शासकीय भूमि का उपयोग किया जाता है, ताकि किसी निजी भूमि का अर्जन नहीं करना पड़े।

(ब) पुनर्वास स्थलों पर वितरीत किये गये भू-खण्ड दुष्प्रभावित न हो।

संलग्न :- उपरोक्तानुसार कुल पृ.संख्या-533
+ [illegible]

कार्यपालन यंत्री,
नर्मदा विकास लो.स्वा.यां.,
खण्ड-बड़वानी

OFFICE OF THE EXECUTIVE ENGINEER, N.D PHE DIVISION, BARWANI (M.P.)

// GENERAL - ABSTRAT //

REVISED WATER SUPPLY SCHEME FOR REHABILITATION
SITE - EKLWARA
TEHSIL - MANAWAR, DISTRICT -DHAR

Sl.No.	PARTICULARS	QTY	RATE	AMOUNT	REMARKS
1	2	3	4	5	6
1	Drilling of 150mm dia 120M. deep vertical tube well as per specification.	6 Nos	48,500/- Each	291000=00	Sub-Estt 'A'
2.	Providing & installation of India mark II hand pump & construction of platform as per UNICEF design etc complete.	5 Nos	9,000/- Each	45000=00	Sub-Estt 'B'
3	Providing and installation of suitable submersible pump set (10 H.P.) including control pannel, cable & voltage stabilizer etc complete.	1 No.	35000/- 10 HP	35000=00	I.S
4	Sopt water supply arrangement.	5 Nos. Cistern	1 Job	324000=00	Sub-Estt 'C'
5.	Washing, Bathing platform in cement concrete				
	(1x0.9x1.5x0.15 M.)	5 Nos	1,100/- Each.	5500=00	Sub-Estt 'D'
6	Cattle through (Brick masonry)				
	3mx1mx0.08 (inner size)	5 Nos	12,000/- Each	60000=00	Sub-Estt. 'E'

Sl.No.	PARTICULARS	QTY.	RATE	AMOUNT	REMARKS.
1	2	3	4	5	6
7	Power Connection	1 No.	10,000/- Each	10000=00	L.S.
8	Providing and fixing of pre febricated foam concrete pump house.				
	2.4mx2.4mx2.4m	1 No.	40,000/- ach.	40000=00	L.S.
	TOTAL Rs.			810500=00	
	Add 10% of total for R & M of hand pump & power pump.			81050=00	
	G TOTAL Rs.			891550=00	
	SAY Rs.			892000=00	

(Total Rs. Eight Lacs Ninty Two Thousand Only)

ASSISTANT ENGINEER,
N.D.P.H.E. SUB DIVISION,
BARWANI(M.P.)

EXECUTIVE ENGINEER,
N.D. P.H.E. DIVISION,
BARWANI(M.P.)

E.E. No. 119 ... 26/12/2011
Amount ... 8,92,000/-
Rupees Eight lakhs Ninety
... two thousand
Ch. 4801

Approved by
CE (Retd.)

BARWANI

Annex 3.1-H

नर्मदा घाटी विकास प्राधिकरण
नर्मदा भवन, भोपाल

क्र0 377 /नपाधिपु/लोरुवापा/2003 भोपाल, दिनांक 30-5-03

प्रति,

कार्यपालन यंत्री,
नर्मदा विकास लोरुवापा/0
खण्ड, बड़वानी

विषय:- पुनर्वास स्थलों पर जल प्रदाय योजना बनाने हेतु नये मापदण्ड ।
संदर्भ :- उपाध्यक्ष महोदय द्वारा दिये गये निर्देश ।

-x-

सरदार सरोवर परियोजना, मान परियोजना व जोबट परियोजना के अंतर्गत विभिन्न पुनर्वास स्थलों पर जल प्रदाय योजना बनाने हेतु नये मापदण्डों का निर्धारण निम्नानुसार किया जाता है :-

क्रमांक	पुनर्वास स्थल की वर्तमान जनसंख्या	नलकूप संख्या	हेण्डपम्प संख्या	पावर पंप	सिस्टर्न की संख्या	सेल्फ टूफ
1.	300 तक	2	1	1	1	1
2.	301 से 500 तक	2	1	1	1	1
3.	501 से 1000 तक	3	2	1	2	2
4.	1001 से 1500 तक	4	3	1	3	3
5.	1501 से 2000 तक	5	4	1	4	4
6.	2001 से 2500 तक	6	5	1	5	5
7.	2501 से 3000 तक	8	6	2	6	6
8.	3001 से 3500 तक	9	7	2	7	7
	[illegible]	10	8	2	8	8

शेष 9 से 12 निर्देश निम्नानुसार हैं :-

सभी पुनर्वास स्थलों की जल प्रदाय योजना के प्रस्ताव नये मापदण्डों के अनुसार तैयार किये जावें ।

जिन स्थलों पर कार्य प्रगति पर है, उनमें उपरोक्त नये मापदण्ड के अनुसार कार्य संशोधित किया जावे । यदि कार्य नये मापदण्ड संशोधन से अधिक हो गया है तो किये गये वास्तविक कार्य तक योजना को संशोधित करते हुये संशोधित किया जावे । प्रारम्भ किये गये किसी भी कार्य को अधूरा न छोड़ा जावे ।

//2//

3) जिन पुनर्वास स्थलों की वर्तमान जनसंख्या 2000 से अधिक है वहाँ नल-जल योजना का प्रस्ताव बनाया जावे, इसमें 5 व्यक्ति प्रति परिवार व 70 लीटर प्रति व्यक्ति प्रतिदिन के अनुसार जल की मात्रा की गणना की जावे । अग्नि कार्यों आदि के लिये जल की 20% मात्रा बढ़ाई जावे । उच्चस्तरीय टंकी की क्षमता कुल जल की आवश्यकता का 50% होगी व उसकी स्टेजिंग उपलब्ध स्थल के तेवर के अनुसार 10 मी0, 12 मी0 या 15 मीटर होगी । सम्पवेल की क्षमता उच्चस्तरीय टंकी की क्षमता की 20% पूर्तिपूरक होगी ।

4) योजनाओं में सिस्टर्न, एम0एस0, एच0डी0पी0 या पेन्ड स्टील के 4000 लीटर की क्षमता के रखे जावें ।

मुख्य अभिकर्ता/लोनिवि
नर्मदा घाटी विकास प्राधिकरण
भोपाल

क्रमांक 376 /नघाविप्रा/लोनिवा/2003 भोपाल, दिनांक 30-5-03

प्रतिलिपि:-

1. उपाध्यक्ष, नर्मदा घाटी विकास प्राधिकरण, नर्मदा भवन भोपाल ।
2. सदस्य/पुनर्वास, नर्मदा घाटी विकास प्राधिकरण, नर्मदा भवन भोपाल ।
3. आयुक्त/पुनर्वास, नर्मदा घाटी विकास प्राधिकरण, नर्मदा भवन भोपाल ।
4. आयुक्त/कीन्हो, नर्मदा घाटी विकास प्राधिकरण, सिख नगर इन्दौर ।
5. अधीक्षण यंत्री/पर्यावरण, नर्मदा घाटी विकास प्राधिकरण, नर्मदा भवन भोपाल ।

की ओर सूचनार्थ ।

मुख्य अभिकर्ता/लोनिवि
नर्मदा घाटी विकास प्राधिकरण
भोपाल

Annex 3.1-I

कार्यालय कार्यपालन यंत्री, नर्मदा विकास लोक स्वास्थ्य यॉत्रिकी, खण्ड बड़वानी

पत्र क. 85 /तक./का.यं./न.वि.लो.स्वा.यां. /2012/ बड़वानी,दिनांक 18/01/2012

प्रति,

आयुक्त (पुनर्वास/फील्ड),
नर्मदा घाटी विकास प्राधिकरण,
नर्मदा भवन, योजना कं. 74,
विजय नगर, इन्दौर (म.प्र.)

विषय :–सरदार सरोवर परियोजना के अंतर्गत पुनर्वास स्थलों पर किए गए निर्माण कार्यों की गुणवत्ता की जॉच के संबंध में अभिलेख/दस्तावेज उपलब्ध कराए जाने बाबत् ।

संदर्भ :–सचिव, सर.सरो.परि.–फर्जी वि.पत्र एवं पुन. स्थल अनि. जॉच आयोग, इन्दौर का पत्र क्र. 24/आर.आर. साईट्स/2011–12 इन्दौर, दिनांक 12.01.2012.

संदर्भित पत्र में दर्शाया पत्र दिनांक 02.01.2012 में चाही गई जानकारी बिन्दुवार संलग्न कर प्रेषित की जा चुकी है । संदर्भित पत्र में चाही गई जानकारी बिन्दुवार निम्नानुसार है:–

1. माननीय आयोग द्वारा प्रत्येक बिल्डिंग एवं पुलिया के ट्रायल पिट के संबंध में जानकारी चाही गई थी, इसलिये इस संबंध में "प्रकोष्ट से संबंधित नहीं " लिखा गया था । पूर्व में प्रेषित 13 पुनर्वास स्थलों में से मात्र अवल्दा–मामटा एवं पिछोड़ी –सिरसानी में उच्च स्तरीय टंकी का निर्माण किया गया है । पुनर्वास स्थल इकलेरा में सम्पवेल का निर्माण किया गया है । कार्यालय के अभिलेखों के अनुसार उच्च स्तरीय टंकी एवं सम्पवेल के लिए कोई ट्रायल पिट –विभाग द्वारा नहीं किया गया है ।
2. 13 पुनर्वास स्थलों में से मात्र 4 पुनर्वास स्थलों पर कमशः भीलखेड़ा, इकलेरा, सोंदुल, अवल्दा भामटा में ही पाईप वाटर सप्लाई स्कीम डिजाईन की गई है । शेष 9 पुनर्वास स्थलों के संबंध में जानकारी निरंक है । जल वितरण प्रणाली के डिजाईन में पुनर्वास स्थल अवल्दा भामटा को छोड़कर शेष पुनर्वास स्थल भीलखेड़ा, इकलेरा, सोंदुल में डिजाईन की छायाप्रति विभाग द्वारा दिनांक 31.12.2011 को प्रस्तुत की गई नस्थी में शामिल की गई है ।
   अवल्दा पुनर्वास स्थल पर निर्मित उच्च स्तरीय टंकी से सोंदुल एवं अवल्दा भामटा में जल वितरण की व्यवस्था की गई है, जबकि इकलेरा बसाहट की पाईप लाइन सम्पवेल से जोड़ी गई है । वर्तमान में भीलखेड़ा, अवल्दा, इकलेरा में स्पाट सोर्स व्यवस्था से पॉवर पम्प को सिस्टर्न एवं स्टैण्ड पोस्ट से जोड़कर जल प्रदाय किया जा रहा है । पुनर्वास स्थल सोंदुल में बसाहट न होने से जल प्रदाय चालू नहीं किया गया है ।
3. बिन्दु कमांक 3 में पी.व्ही.सी. टैंक के संबंध में जानकारी :–
   पुनर्बसाहट स्थल भीलखेड़ा एवं सोन्दुल में पी.व्ही.सी. टैंक रखे गये थे, जिनके संबंध में जानकारी विभाग की ओर से प्रस्तुत अतिरिक्त जानकारी के बिन्दु क. 5 में दी गई है ।

4. वाटर सप्लाई लाईन के टेस्ट सर्टिफिकेट की जानकारी :–

क्र. क.	पुनर्वास स्थल का नाम	टेस्टिंग सर्टिफिकेट की स्थिति
1	मोरकट्टा	संलग्न
2	अमलाली	संलग्न
3	भवती–I	संलग्न
4	भवती–II	संलग्न
5	इकलेरा	संलग्न
6	भीलखेड़ा	संलग्न
7	अवल्दा भागटा	संलग्न
8	सोन्दुल	संलग्न
9	पिछोड़ी सिरसानी	संलग्न
10	बिजासन	अंतिम देयक का भुगतान नहीं होने से कम्पलीशन एवं टेस्टिंग सर्टिफिकेट नहीं है । वर्तमान में पाईप लाईन से जल प्रदाय किया जा रहा है ।
11	जामदा	अंतिम देयक का भुगतान नहीं होने से कम्पलीशन एवं टेस्टिंग सर्टिफिकेट नहीं है । वर्तमान में पाईप लाईन से जल प्रदाय किया जा रहा है ।
12	जांगरवा	अंतिम देयक का भुगतान नहीं होने से कम्पलीशन एवं टेस्टिंग सर्टिफिकेट नहीं है । वर्तमान में पाईप लाईन से जल प्रदाय किया जा रहा है ।
13	कल्याणपुन	अंतिम देयक का भुगतान नहीं होने से कम्पलीशन एवं टेस्टिंग सर्टिफिकेट नहीं है । वर्तमान में पाईप लाईन से जल प्रदाय किया जा रहा है ।

5 भवनों के आन्तरिक विद्युतीकरण की टेस्ट रिपोर्ट:–

इस प्रकोष्ट से संबंधित नहीं है ।

पत्र के अंत में उल्लेख अनुसार अतिरिक्त बिन्दुओं की जानकारी का समावेश विभाग की ओर से प्रस्तुत की गई 25 नई नस्थियों में पृथक से किया जा रहा है ।

कार्यपालन यंत्री
नर्मदा विकास लोक स्वास्थ्य यांत्रिकी
खण्ड बड़वानी

संलग्न क्र.(2)

कार्यालय; कार्यपालन यंत्री, नर्मदा विकास लोक स्वास्थ्य यांत्रिकी, खण्ड–बड़वानी

(1) तहसील-बड़वानी :-

जल प्रदाय योजनाओं की पाईप लाईन डिस्ट्रीब्यूशन ड्राईंग एवं डिजाईन :-

(1) कसरावद, (2) इकलेरा, (3) भीलखेड़ा, (4) कुकरा, (5) खेड़ी, (6) बोरलाय-2, (7) सोन्दुल

उच्चस्तरीय टंकी की ड्राईंग डिजाईन :-

(1) कसरावद, (2) इकलेरा (सम्पवेल), (3) सिरसानी (पिछोड़ी), (4) अवल्दा, (5) बोरलाय-2, (6) सोन्दुल

(2) तहसील-ठीकरी :-

जल प्रदाय योजनाओं की पाईप लाईन डिस्ट्रीब्यूशन ड्राईंग एवं डिजाईन :-

(1) बोरलाय-3, (2) अंजड़ (बड़दा), (3) ब्राह्मणगांव, (4) मण्डवाड़ा

उच्चस्तरीय टंकी एवं सम्पवेल की ड्राईंग-डिजाईन :-

(1) बोरलाय-3, (2) अंजड़ (बड़दा), (3) ब्राह्मणगांव, (4) मण्डवाड़ा

(3) तहसील-कुक्षी :-

जल प्रदाय योजनाओं की पाईप लाईन डिस्ट्रीब्यूशन ड्राईंग एवं डिजाईन :-

(1) चिखल्दा, (2) गेहलगांव, (3) गणपुर, (4) निसरपुर-1 (5) निसरपुर-2, (6) निसरपुर-3

उच्चस्तरीय टंकी एवं सम्पवेल की ड्राईंग-डिजाईन :-

(1) गेहलगांव, (2) धरमराय (सम्पवेल), (3) गणपुर, (4) निसरपुर-3, (5) कड़माल

(4) तहसील-मनावर :-

जल प्रदाय योजनाओं की पाईप लाईन डिस्ट्रीब्यूशन ड्राईंग एवं डिजाईन :-

(1) सेमल्दा, (2) बड़दा

उच्चस्तरीय टंकी एवं सम्पवेल की ड्राईंग-डिजाईन :-

(1) सेमल्दा, (2) बड़दा

(5) तहसील-धरमपुरी :-

जल प्रदाय योजनाओं की पाईप लाईन डिस्ट्रीब्यूशन ड्राईंग एवं डिजाईन (जल वितरण प्रणाली) :-

(1) खलखुर्द, (2) साला, (3) मोरगढ़ी, (4) खलबुजुर्ग, (5) खुजावां

उच्चस्तरीय टंकी एवं सम्पवेल की ड्राईंग-डिजाईन :-

(1) खलखुर्द, (2) साला, (3) मोरगढ़ी, (4) खलबुजुर्ग, (5) खुजावां,

(6) धरमपुरी :-

1. डिजाईन	:	इन्टेकवेल कम पम्प झऊस			
2. डिजाईन	:	ट्रीटमेन्ट प्लान्ट			
3. ड्राईंग-डिजाईन	:	उच्चस्तरीय टंकी			
4. डिजाईन	:	जलवितरण प्रणाली	–	झोन	1, 2, 3
5. डिजाईन	:	सीवर सिस्टम	–	झोन	1 से 6
6. डिजाईन	:	सेप्टिक टैंक	–	झोन	1 से 5

Pipe line

33 12

GOVERNMENT OF MADHYA PRADESH

NARMADA VALLEY DEVELOPMENT AUTHORITY

DESIGN OF DISTRIBUTION NETWORK

FOR REHABILITATION SITE

BARDA (NEW SITE)

TEHSIL: MANAWAR DISTRICT: DHAR

EXECUTIVE ENGINEER
N. D. P.H.E. DIVISION,
BARWANI (M.P)
2005

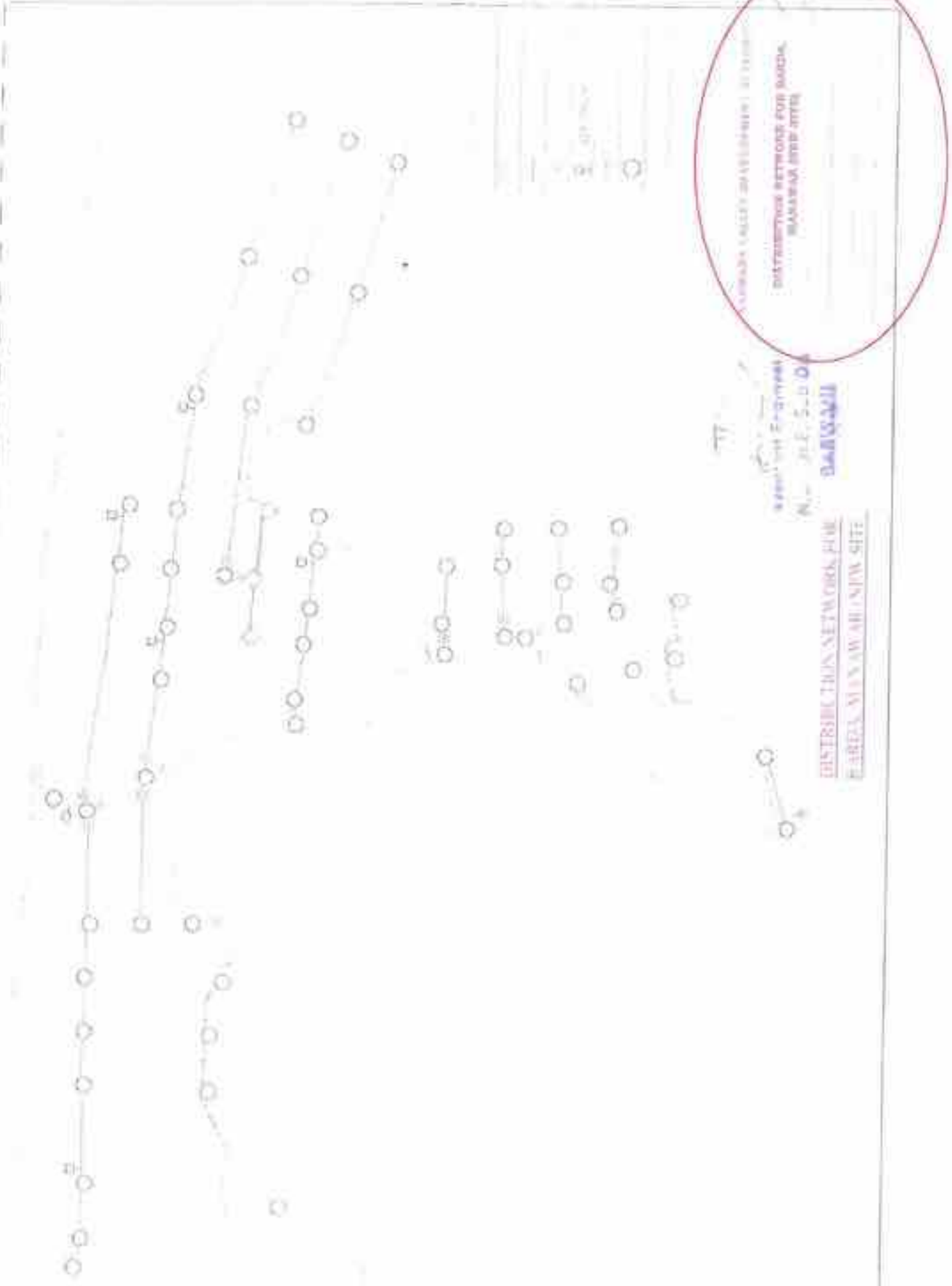
Annex 3.1-K

DESIGN OF DISTRIBUTION NETWORK FOR REHABILITATION SITE
BARDA, TEHSIL- MANAWAR, DISTRICT: DHAR
NEW SITE

No. of Pipes : 62
No. of Nodes : 61
Peak factor : 3

PIPE	NODES		LENGTH	DIA.	TYPE	HWC	PEAK FLOW	VELOCITY	LOSSES	
No.	From	To	(M)	(MM)			(LPS)	(M/Sec.)	(M/KM)	(M)
1	100	62	5.00	90	UPVC	145	6.90	1.07	13.80	0.069
2	62	1	130.00	90	UPVC	145	1.92	0.30	1.32	0.172
3	1	2	90.00	90	UPVC	145	1.66	0.26	1.01	0.091
4	2	3	60.00	90	UPVC	145	0.98	0.15	0.37	0.022
5	3	4	60.00	90	UPVC	145	0.78	0.12	0.25	0.015
6	4	5	110.00	90	UPVC	145	1.03	0.16	0.42	0.046
7	5	6	60.00	90	UPVC	145	0.60	0.09	0.15	0.009
8	6	7	30.00	90	UPVC	145	0.01	0.01	0.01	0.000
9	8	6	200.00	90	UPVC	145	0.19	0.03	0.02	0.005
10	**5**	**9**	**235.00**	**90**	**UPVC**	**145**	**0.19**	**0.03**	**0.02**	**0.007**
11	10	4	90.00	90	UPVC	145	0.48	0.08	0.10	0.007
12	11	3	110.00	90	UPVC	145	0.01	0.01	0.01	0.001
13	2	13	145.00	90	UPVC	145	0.49	0.08	0.11	0.012
14	1	15	45.00	90	UPVC	145	0.14	0.02	0.01	0.001
15	15	14	45.00	90	UPVC	145	0.01	0.01	0.01	0.000
16	15	16	185.00	90	UPVC	145	0.06	0.01	0.01	0.002
17	62	16	60.00	90	UPVC	145	2.92	0.46	2.69	0.173
18	16	17	175.00	90	UPVC	145	1.23	0.19	0.58	0.102
19	17	43	185.00	90	UPVC	145	0.65	0.10	0.18	0.033
20	**43**	**64**	**75.00**	**90**	**UPVC**	**145**	**0.58**	**0.09**	**0.15**	**0.011**
21	64	55	20.00	90	UPVC	145	0.64	0.10	0.18	0.004
22	55	56	65.00	90	UPVC	145	0.47	0.07	0.10	0.007
23	56	57	260.00	90	UPVC	145	0.06	0.01	0.01	0.003
24	62	29	260.00	90	UPVC	145	1.66	0.26	1.01	0.263
25	29	12	60.00	90	UPVC	145	0.67	0.10	0.19	0.011
26	12	61	60.00	90	UPVC	145	0.67	0.10	0.19	0.011
27	16	26	130.00	90	UPVC	145	1.37	0.22	0.71	0.092
28	26	27	75.00	90	UPVC	145	0.77	0.12	0.25	0.019
29	27	28	70.00	90	UPVC	145	0.10	0.02	0.01	0.001
30	**29**	**28**	**60.00**	**90**	**UPVC**	**145**	**0.94**	**0.15**	**0.35**	**0.021**
31	28	61	60.00	90	UPVC	145	0.22	0.03	0.02	0.001
32	61	30	130.00	90	UPVC	145	0.76	0.12	0.24	0.031
33	26	18	170.00	90	UPVC	145	0.39	0.06	0.06	0.014
34	17	18	25.00	90	UPVC	145	0.41	0.06	0.08	0.002
35	18	19	60.00	90	UPVC	145	0.80	0.13	0.26	0.016
36	27	25	110.00	90	UPVC	145	0.43	0.07	0.08	0.009
37	19	25	60.00	90	UPVC	145	0.04	0.01	0.01	0.001
38	25	24	60.00	90	UPVC	145	0.36	0.06	0.06	0.004
39	26	38	60.00	90	UPVC	145	0.70	0.11	0.21	0.013
40	**24**	**38**	**50.00**	**90**	**UPVC**	**145**	**0.03**	**0.01**	**0.01**	**0.001**
41	24	23	100.00	90	UPVC	145	0.26	0.04	0.03	0.003

Annex 3.1-K



Annex 3.1-L

मौलाना आजाद राष्ट्रीय प्रौद्योगिकी संस्थान
भोपाल – ४६२०५१ (म.प्र.) भारत
(मानव संसाधन विकास मंत्रालय, भारत सरकार द्वारा स्थापित)
Maulana Azad National Institute Of Technology
Bhopal - 462051 (M.P.) INDIA
(Estd. by MHRD, Govt. of India)

No.CE/63 dated 14.05.2013

The Secretary,
SSP-Fake Sale Deed & Rehabilitation Sites Enquiry Commission
18/4, Jajli House, South Tukoganj, Indore, MP

14.05.2013

Sir,

With respect to the records submitted to us vide your letter 85/RRSites/09/2013 dated 17.04.2013, the following may kindly be noted:

1. As per the NVDA's letters vide no. 1584 dated 26/03/2013 and 303 dated 24/03/13 para (a), the test results of all 88 sites were submitted by NVDA vide their letter dated 12.12.2011. In this regard, it is clarified that submitted test results were very few, random, and not available for all the sites at desired frequencies. The same record was therefore returned back to NVDA on the directions of Honourable Commission so that complete records could be obtained in one go. To streamline the process a format designed by us was also sent so that record of these test results can be submitted in systematic manner. This was applicable to all Civil, PHE and E&M works. Regrettably, this comprehensive information on the test results has not been provided to us in soft or hard copy as per the Performa format sent by us. However, a few of the test reports have been submitted in the documents, and *we are henceforth presuming that the test results sent to us are the only test results/ certificates available with NVDA, and no more test certificates exist after*
2. A preliminary perusal has revealed that at some sites, for example such as Kadmal / Panya etc. the same test results have been enclosed in three/two copies etc. with copies inserted apart, and for some sites, even the test reports have been submitted for other sites, such that it appears from the table of contents that a larger number of test have been carried out. In view of such observations, the list of contents has lost relevance. Such mixing is also likely to increase our efforts in sorting out the actual test results that were undertaken, more so because test results proformas that were sent to NVDA for filling up, have not been given to us.
3. Vide 301/Karya/2012-13 dated 24.03.13, Point 2 titled "Already Compiled", Completion/As Built drawings have been provided by letter 694 dated 12.12.2011, we would like to make it clear that no such drawings were provided to us at that time, as is evident vide our letter dated 24.01.2012 (3rd point under para 4), wherein we were still asking for "Type Designs and Drawing for each type of building as approved and as built". This matter was furthermore discussed even in the meeting held at the Honourable Commission's office at Indore where

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Email: info@manit.ac.in web.: www.manit.ac.in

Annex 3.1-L

मौलाना आजाद राष्ट्रीय प्रौद्योगिकी संस्थान
भोपाल – ४६२०५१ (म.प्र.) भारत
(मानव संसाधन विकास मंत्रालय, भारत सरकार द्वारा स्थापित)
Maulana Azad National Institute Of Technology
Bhopal - 462051 (M.P.) INDIA
(Estd. by MHRD, Govt. of India)

the top NVDA brass was present, wherein we were specifically told that As Built drawings were not prepared, and do not exist. However, in the documents sent to us, we have found that some claimed "as built/completed drawings" have now appeared, and we are currently in the process of scrutinizing these documents.

4. During scrutiny of submitted record it has been observed that work of designing water supply distribution systems at a large number of sites, and design of sewerage system including structural design of septic tanks at Dharampuri were also given to M/s Aqua Consultants, Bhopal, a private consultancy firm. We need information regarding vide publicity process adopted for awarding the work to the above consultancy firm i.e. Expression of Interest, NITs, News-paper cuttings for the published EoI/NIT etc including documentation of NVDA that awarded the work, total proposals received, the process of Award of the work to the aforesaid private firm, amount of contract, and proof of financial payments made to Aqua Consultants.

   The above also applies to any private party/consulatant other than M/S Aqua Consultants, who have been awarded design work at any other RR site/sites.

5. We also need the documents pertaining to the raw data provided to consultant on the basis of which water supply distribution system designs have been done, as the design booklets from Aqua Consultants provided to us, fail to mention the raw data figures and even the basic design assumptions, on the basis of which designs have been carried out.

6. The Environmental/Hydraulic designs of Sceptic tanks etc. at Dharampuri have yet not been provided to us, although the structural ones prepared by M/S Aqua Consultants have been provided. It is therefore not clear as to how septic tank sizing etc was arrived at. The above designs are awaited as they form the basis for the later structural designs.

7. As against the information sought by us earlier vide our letter CE/333 dated 14.01.2013, in the claimed log book of tankers for water supply, the site-wise expenditure details are not submitted. These are required.

   It is also not clear from record as to how and by whom these log books are maintained, and what exactly is the procedure followed by NVDA for updating/maintaining these logbooks. These details are also required by us.

8. Was there a separate quality control unit established in the project? If yes, then pleases give the details of the circle/divisions/sub-divisions etc.. Also please mention if any field laboratories were also established at each site? If yes, please enclose the details pertaining to

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मौलाना आजाद राष्ट्रीय प्रौद्योगिकी संस्थान
भोपाल – ४६२०५१ (म.प्र.) भारत
(मानव संसाधन विकास मंत्रालय, भारत सरकार द्वारा स्थापित)
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(Estd. by MHRD, Govt. of India)

their functioning (staff deployed), and the details of the equipment purchased, the amount spent on each, and the present status of the laboratory infrastructure.

9. This pertains to Electrical works. We had sought this information while checking of MBs was being undertaken, and the same is awaited. NVDA may kindly provide us details of sites only where Phase II or Phase III works have been carried out in the following format:

Name of site with Phase	No of Inhabitants/ Families in Phase I	No of Inhabitants/ Families in Phase II/III	Numbers and ratings of transformers	Numbers of Concrete poles in Phase II/III	Numbers of HB Poles in Phase II/III	Total Cost of work for Phase II/III	Dates of Execution of work under Phase II/III

10. We are in the process of perusing the various documents submitted to us, and this would shortly lead us to compiling our observations, and further documentation and Reporting. We have been seeking information from NVDA on several occasions, and it is possible that some of the information needed has not been provided/or not provided fully or in a format required by us. Any information sought by us so far, and still not provided shall be henceforth deemed as not available with the NVDA. This is necessary in order to avoid the never ending process of asking for information, waiting for responses and making rebuttals, asking for clarifications etc. all of which will result into inevitable delays in preparing the final Report.

11. During the process of compiling our Report we may further need to make site visits/ seek additional information/clarification as the case may be. If needed, we may also need to inspect the records submitted or otherwise, in original. Any such requests would be made to NVDA through the Honourable Commission at appropriate time, if and when necessary.

We request the Honourable Commission to kindly set up a reasonable time limit for receiving the responses of NVDA to this letter, so that the reporting may take place at the earliest possible.

Dr. Mukul Kulshrestha
Department of Civil Engineering

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Email: info@manit.ac.in web.: www.manit.ac.in

R&R Sites Total cost of Infrastructures

Civil Works			
S. NO.	Prticulars	Expenditure in Lakhs	Total in Lakhs
1-	Buildings, Treeplatforms & Halao	1645.63	
2-	Roads & Culverts	5975.34	
3-	Drainage	1223.28	
	Total	8844.25	8844.25

P.H.E Works			
S. NO.	Prticulars	Expenditure in Lakhs	
1-	Handpumps	582.54	
2-	Water Supply treatment, Storage & Distribution networks	3,132.89	
3-	Sewerage networks & Treatment	651.16	
	Total	4,366.59	4366.59

Electrical works			
S. NO.	Prticular	Expenditure in Lakhs	
1-	Electrical works i/c Power distribution at the R&R sites, Electric sub-station, Poles & Transformers	3,845.68	3,845.68
		Grand Total	17,056.52

Joint Director,
Narmada Valley Development Authority,
Indore

Annex 3.1-N

नर्मदा घाटी विकास प्राधिकरण
नर्मदा भवन, हाईलेवल, भोपाल-3

पत्र क्र0 403 /नघाविप्रा/लोरियावाँ/2003/ भोपाल, दिनांक 9/6/2003

प्रति,

कार्यपालन यंत्री,
नर्मदा विकास एवं स्वास्थ्य यांत्रिकी खण्डस
खंडवा(मा0प्र0)

विषय:- पुनर्वास स्थलों पर जल प्रदाय योजना कराने हेतु नये मार्गदर्शन

संदर्भ:- इस कार्यालय का आदेश क्र0 377/नघाविप्रा/लोरियावाँ/03 दिनांक 30/5/2003

रद्द आदेश में निम्न कंडिकाएं जोड़ी जाती है ।

1) अधिशासी अभियंता,नघाविप्रा0 भोपाल के पत्र क्र0 नघाविप्रा/ भोपा/24/95/208 दिनांक 24/4/1995 द्वारा जल प्रदाय योजना कराने हेतु जो मार्गदर्शन जारी किये थे,उसे निरस्त किया जाता है । अधिक से अधिक पुनर्वास स्थलों के मार्गदर्शन के अनुसार कार्य करें ।

2) सभी योजनाओं को स्थलों की वर्तमान जन-संख्या के आधार पर बनाया जावें ।

मुख्य अभियन्ता(पुनर्वास)नघाविप्रा0
नर्मदा घाटी विकास प्राधिकरण, भोपाल-3

पृष्ठांकन क्र0 404 /नघाविप्रा/लोरियावाँ/2003/ भोपाल, दि0 9/6/2003

प्रतिलिपि:-

1. अधिशासी, नर्मदा घाटी विकास प्राधिकरण, नर्मदा भवन, भोपाल
2. [illegible], नर्मदा घाटी विकास प्राधिकरण, भोपाल
3. [illegible], नर्मदा घाटी विकास प्राधिकरण, भोपाल
4. [illegible], नर्मदा घाटी विकास प्राधिकरण, सिवनी, इन्दौर
5. [illegible], नर्मदा घाटी विकास प्राधिकरण, भोपाल

..... की ओर सूचनार्थ ।

मुख्य अभियन्ता(पुनर्वास)नघाविप्रा0
नर्मदा घाटी विकास प्राधिकरण, भोपाल-3

OFFICE OF THE EXECUTIVE ENGINEER,
NARMADA DEVELOPMENT PIPE DIVISION, BARWANI (M.P.)
WATER SUPPLY SCHEME FOR THE VILLAGE COMING UNDER
SUBMERGENCE OF SARDAR SAROVAR
NAME OF VILLAGE – DHARAMPURI
REHABILITATION SITE : DHARAMPURI

TEHSIL : DHARAMPURI DISTT. DHAR

1. INTRODUCTION :

The village is partially coming under submergence of Sardar Sarovar Dam, under construction on Narmada River in Gujarat State. Therefore residents of this village are proposed to be rehabilitated at this rehabilitation site for providing adequate water supply arrangement at this rehabilitation site. Piped water supply scheme costing Rs. 300 Lacs has been framed.

2. AUTHORITY :

Recommendation of Task Force Committee vide Commissioner Field Narmada Valley Development Authority, Indore on dated 17.10.2000. As per the recommendation of task force, the construction of intake well and treatment plant has been included as per instructions.

3. BRIEF DESCRIPTION OF REHABILITATION SITE :

The rehabilitation site has been fixed near the village Dharampuri from the hillock Plane area for the oustees of the village Dharampuri coming under submergence of Sardar Sarovar.

The number of families to be rehabilitated at the site are 2000 Nos. The plots allotted at the rehabilitation site are 2000 Nos. taking into consideration the sons as separate family.

(9)

The expected population of the clusters at the new site works out to about 10000@5 person per plot. Such fast growth in population is taken in to account due to rehabilitation in a systematic way and better amenities at the place.

4. EXISTING WATER SUPPLY & NECESSITY OF WATER SUPPLY SCHEME

The Dharampuri town is partially coming under submergence of Sardar Sarovar Dam. Therefore some part of population of existing Dharampuri Town is to be rehabilitated at the site, whichis about 2000 families as per the recommendation of Task Force. At present the Dharampuri town is having following water supply arrangements -

1. Two overhead tanks
2. Distribution net work
3. Pumping of raw water directly from Narmada river with the help of few tube well / storage tanks and centrifugal pumps

In the existing Dharampuri town raw water of Narmada river is being supply to the habitants.

As per the recommendation of the Task Force (dated 17.11.03) only distribution network alongwith hand pumps and power pumps is to be provided in the new rehabilitation site. This site will utilize the existing raw pumping arrangement and existing overhead tanks. In the present intake structures there are three Dug wells/storage well at different elevations of Narmada River. These wells will come under submergence due to back water of Sardar Sarovar Dam. Therefore it is decided to have new intake structure. There is a village Bhogam about 3 kms. from Dharampuri towards Khalghat, which is not coming under submergence. The corss section of the river at this village has been prepared and it is proposed of construct Intake well near Bhogam. As per CPHEEO recommendation, raw water cannot be supplied to any community. So it is also

(17)

recommended to construct Treatment plant for this site to cater the need of Rehabilitation site and old Dharampur Town. So work has been executed till date at this rehabilitation site.

Therefore it is very essential to make adequate arrangement for water supply to people at the earliest. Apart from drinking purpose the development of sites will depend upon the source of water supply available.

POPULATION AND WATER DEMAND :

The population of Dharampur town as per census is as below

Year	Population	Growthrate
1981 Census	9063	
1991 Census	11100	(11100-9063) / 9063 = 22.47%
2001 Census	13229	(13229-11100)/11100 = 19.18%

Average growth rate = 20.825%

Present population = $13229 + 13229 \times 1.20825 \times \frac{4}{10}$
= 19624

Considering 6 Souls / Family. Number of families = 3270

Families affected due to S.S.P = 1385

Families left unaffected at Dharampur town = 1885

Population of Unaffected families at Dharampur town = 1885 X 6 = 11310

Population of Rehabilitation site (4000 plots) considering 5 souls / family = 5 X 4000 = 20000

Total population of Rehabilitations site and unaffected Dharampur = 11310 + 20000
= 31310

Water requirement

80% population @ 70 lpcd = 8 x 31310 x 70 = 1.75 MLD

20% population @ 40 lpcd = 0.2 x 31310 x 40 = 0.25 MLD

Total = 2.00 MLD

Considering 20 Hrs. pumping per day
Water requirement = $2.00 \times \frac{24}{20}$

= 2.4 MLD

(11)

SOURCE :

In this region the dug wells are successful. Most of the wells become dry in summer. There is no dependable perennial stream in the vicinity which can be utilized.

The river Narmada is flowing near to the town and rehabilitation site. So the existing raw water pumping arrangement from Narmada river will feed the water to the rehabilitation site.

PROPOSED SCHEME :

For such small requirement of water adequate no. of Hand pumps along with Water Supply scheme for drinking, bathing, washing, gardening and live stock use is the feasible, safe and economical with reference to initial and maintenance cost. Therefore for adequate water supply the following works are proposed to be executed. As per norms fixed by the S.E. (Rtd.) N.V.D.A. Bhopal

1	Intake well come approach bridge	1 No
2	Core Drilling of 5(08)	
3	Treatment Plant	1 No.
4	Clear water and raw water pumps	
5	Rising Main to old & new network	
6	Construction of Residential quarters	
7	Construction of Substation at Intake and T.P site	2 Nos
8	150 mm dia 180 m deep vertical tube well	25 Nos
9	Installation of India Mark-II deep well hand pumps including 32 mm dia G.I. Suction pipe and Construction of platform etc. complete	20 Nos
10	Installation of power pumps of suitable capacity control panel, 4 core cable, voltage stabilizer, 50 mm dia G.I. rising pipe etc. complete	4 Nos

(12)

[illegible]

8. COST :

[illegible]

9. FINANCE :

Since the village is coming under submergence due to construction of Sardar Sarovar Dam by the Central/State Govt. Therefore the expenditure on the scheme will be debited to Head No. 4059 (N.V.P.H.E.) Water Supply Project Head of Account.

10. CHARGEABILITY :

It is a Nodal Scheme of Project Head 4059 (Int).

11. MAINTENANCE :

After execution and settlement of the cost of the water supply Scheme will be handed over to the respective Gram Panchayat for running and maintenance, prior to settlement it will be maintained by the Narmada Development PHE Division Barwani.

ASSISTANT ENGINEER
N.D. PHE Sub Division,
Barwani (M.P.)

EXECUTIVE ENGINEER
N.D. PHE Sub Division,
Barwani (M.P.)

Name of R & R Site :- Dharampuri

Name of Submergence Village/Tehsil/R&R Site : Dharampuri /Dharampuri

1. Number of displaced families at RR : 4173

Distance of RR Site from Original Habitation : 0.5 Km

Land Acquired (ha) for RR Site

Private	Government	Total
142.503 Ha.	1.07 Ha	143.52 Ha.

2. Facilities as per Task Force: As per Annex-1. Filled proforma is attached.

3. Material stacked unutilized at site

Usable	Non-Usable
NIL	NIL

Annex 3.1-P

(Signature & Official Stamp)
EXECUTIVE ENGINEER

Annex 3.1-Q

OFFICE OF THE EXECUTIVE ENGINEER,
NARMADA DEVELOPMENT P.H.E. DIVISION, BARWANI (M.P.)
(DHARAMPURI)** GENERAL - ABSTRACT ** WATER SUPPLY SCHEME DHARA

S.NO.	Particulars	Qty.	Rate/Unit	Amount	Remarks
1	2	3	4	5	6
1	Construction of Intake well with approach bridge	1		12,000,000	
2	Core drilling	1		2,00,000	
3	Construction of Treatment Plant	1		4489000	
4	Providing & Installation of raw water turbine and clear water centrifugal pmpts			800000	
5	Laying of Rising main (including cost of pipes)			4450000	
6	Construction of Residential quarters at Intake well & treatment plant site			1000000	
7	Construction of electric substation at TP & Intake site			1950000	
8	Drilling of 150mm dia 180M deep vertical tube well as per specification	25 Nos	94000	2350000	Sub Estt. "A"
9	Providing & Installation of India mark II deep well hand pump and construction of platforms as per UNICEF Design etc. complete	20 Nos	10000	200000	Sub Estt. "B"

Annex 3.1-Q

(124)

10	Providing and installation of submersible pump of 10 HP including cable panel, stabilizer etc complete	5 Nos	45000	225000	
11	Providing, laying and jointing of distribution network i/c excavation refilling of trenches, installation of valves			11015000	
12	Providing and installation of 4000/5000 Lit capacity HDP MS/RCC asterns	20 Nos	30000	600000	
13	Cattle trough	20 Nos	12000	240000	Sub Estt "C"
14	Power Connection	5 Nos	15000	75000	
15	Providing and fixing pre-fabricated pumps house (2.4m X 2.4m X 2.4m)	5 Nos	40000	200000	L.S.
16	Providing of Temporary Water Supply arrangement for construction of houses by oustees at R/site			50000	L.S.
			TOTAL	39,900,000	

T.S No. 242 Dt. 26.1.15

Technical Sanctioned for Rs. 399.00 lakhs

Rupees Three Hundred & ninety nine only

Ch. to 480/- 551

EXECUTIVE ENGINEER
N.D., PHE DIVISON
BARWANI (M.P.)

Chief Engineer (P.W.D.)
N.V.D.A., M.P. Bhopal

Annex 3.1-R

मौलाना आजाद राष्ट्रीय प्रौद्योगिकी संस्थान
भोपाल–४६२०५१ (म.प्र.) भारत
Maulana Azad National Institute of Technology
Bhopal - 462051 (M.P.) INDIA

Letter No. CE/333 dated 14.01.2013

Subject: Information needed on water supply services for the R&R sites

Subsequent to our recent field visit, as well as from the experience of our earlier visits, we have been witnessing large scale complaints by R&R-Site residents that water availability is scarce, and supply by tankers is also available only in 4-5 days. The NVDA officers informed us at site that they cannot supply water at sites through distribution piped system laid till the system is not handed over to Panchayats. Considering the significance of drinking water for the residents, the following information is needed from NVDA to evaluate the quality of water supply services at the R&R-Sites:

1. Please provide a list of all such R&R sites where NVDA is still responsible for water supply? Please also provide a list of water services related infrastructure still in possession of NVDA (i.e., not yet handed over) at each R&R-site?
2. Was there any provision made for water supply for construction work of houses being made by rehabilitated persons who were officially allotted plots at R&R sites? Please provide a copy of any such letters issued by NVDA (as informed to us during site visit by NVDA officers)?
3. Kindly provide site-wise details of pipelines/distribution system laid, if any, for specific purpose of construction of houses of these individuals, and the total cost incurred on this infrastructure.
4. Has there been any official communication (example, any official letter or notice issued) by NVDA that prevents the use of the above laid pipeline/distribution system for regular water supplies for drinking and other purposes at R&R sites? Please provide a copy.
5. The Supply of water from River Narmada is being done at how many sites? Is it being done by using Electric Pumps or by Diesel Pumps? What are the monthly expenditure break-ups for such pumping? Please provide a copy of Diesel Consumption Records for all such supplies, wherever DG sets are used.
6. What are the conditions that have led to supply by Tankers despite the constructions of Overhead Tanks (OHTs), Cisterns, and Handpumps at R&R Sites?
7. Please provide details of water supply by tankers (number of tankers supplying water to each R&R site and the frequency of water supply by tankers) for each R&R-Site.
8. Do the tankers supplying water belong to NVDA/ PHED or to Private parties (details of all private owners needed), and what is the mode of selection of private tankers, if any, and the mode of making payments by NVDA for water supplies by Tankers?
9. Are these water tankers also supplying water for use by domesticated animals/ livestock through the halaos? If so, please provide necessary records.
10. How are the records kept for supply of water to each R&R site by Tankers? Who verifies the receipt of tankers at the R&R site? Please provide the Records of water supply by Tankers including the expenses incurred month-wise, and annually, for each R&R site.

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Web : www.manit.ac.in Email : info@manit.ac.in

मौलाना आजाद राष्ट्रीय प्रौद्योगिकी संस्थान
भोपाल–४६२०५१ (म.प्र.) भारत
Maulana Azad National Institute of Technology
Bhopal - 462051 (M.P.) INDIA

11. Please provide O & M expenditure incurred each month on NVDA tankers. Are these tankers providing untreated water or treated water for drinking purpose? If treated water is supplied, please provide details of quantity and expenditure on Alum, Chlorine, bleaching power, and other chemicals used.
12. Please provide attested Photocopies of Operator schedules and Operating Records for running of OHTs at each R&R-Site. Also please provide list of staff deployed at each site for operation and maintenance of water supply system.
13. Please provide details of water quality tests being performed for each Handpump, and for raw and treated water being supplied from OHTs. Please also provide photocopy of records of chlorination being done at various OHTs, including the purchase records of chemicals used?
14. What are the tariffs being charged by NVDA at each of the R&R-sites for water supply by OHTs/ Cisterns/Handpumps/ Water tankers etc.?
15. Please provide details of connectivity of each cistern with tube well / OHT with different pipe line arrangements, their type in terms of pressure or Gravity pipes etc. Please provide details on whether each cistern is connected by different tube wells or more than one source such as tube well or Narmada supply or OHT or Treatment Plants etc. The length and types of pipes with sizes and material details may also please be furnished for each R&R-Site.
16. Please provide site-wise schedule and records of expenditure incurred in maintaining Cisterns (example, painting of MS Cisterns, Cleaning of Cisterns etc), and for maintenance of Handpumps at each R&R-Site.
17. Are the water treatment plants (WTPs) constructed, in working state? If not, please provide the dates of start of civil works and the scheduled dates for completion of the work for these treatment plants. What is the present status of contract for the above WTPs?
18. Please provide a copy of any official letter/notice issued that states that the forced mains/rising mains were to be laid along the roads as has been observed at various R&R-sites, and not by the shortest route which would have been financially economical and could have saved transit losses also?

It is requested that the above information be provided at the earliest possible <u>with a copy in the soft form.</u>

Mukulshrestha

Dr. Mukul Kulshrestha
MANIT-Bhopal
e-mail: mukul_kuls@yahoo.com
Mobile: 9425079032

GOVERNMENT OF MADHYA PRADESH

NARMADA VALLEY DEVELOPMENT AUTHORITY

SARDAR SAROVAR PROJECT

REVISED

PIPED WATER SUPPLY SCHEME

FOR

NAME OF REHABILITATION SITE	:	KHUJAWA
TEHSIL	:	DHARAMPURI
DISTRICT	:	DHAR
ESTIMATED COST	:	50.66 LAKH

EXECUTIVE ENGINEER

WATER RESOURCES DEVELOPMENT CIRCLE DIVISION,

KARWANI (M.P.)

YEAR 2003-2004

(7)

OFFICE OF THE EXECUTIVE ENGINEER,
NARMADA DEVELOPMENT P.H.E. DIVISION, BARWANI (M.P.)
PROPOSED WATER SUPPLY SCHEME FOR THE VILLAGE COMING UNDER
SUBMERGENCE OF SARDAR SAROVAR
NAME OF VILLAGE :- KHUJAWA
REHABILITATION SITE :- KHUJAWA
P.C. NO. 112 TEHSIL :- DHARAMPURI DISTT. :- DHAR

1. INTRODUCTION :-

The village is coming under submergence of Sardar Sarovar Dam, under construction on Narmada River in Gujarat state. Therefore oustees of this village are proposed to be rehabilitated at this rehabilitation site. A water supply scheme costing Rs. 8.97 Lacs was technically sanctioned vide Superintending Engineer (Elect.) Narmada Valley Development Authority Bhopal vide their letter No. 115 dated 10.05.99 the scheme has been revised costing Rs. 39.66 Lakh.

2. AUTHORITY :-

Recommendation of Task Force Committee vide Commissioner Field Narmada Valley Development Authority Indore on dated 08.01.2003

3. BRIEF DESCRIPTION OF REHABILITATION SITE :-

The Rehabilitation site has been fixed near the village Mogadla on the hillock/Plane area for the oustees of the village Mogadli coming under submergence of Sardar Sarovar.

The number of families to be rehabilitated at the site are 134 Nos. The plots allotted at the rehabilitation site are 431 Nos. taking in to consideration the major sons as separate family.

The expected population of the oustees at the new site works out to be 2170 @ 5 person per plot. Such fast growth in population is taken in to account due to rehabilitation in a systematic way and better amenities at one place.

(2)

EXISTING WATER SUPPLY :-

No Work has been executed till date at this Rehabilitation Site As per Decision fixed by SSNNL Bhopal vide letter No. 377 dated 30.05.03 scheme for [illegible]

[illegible] PROPOSED WATER SUPPLY SYSTEME

[illegible] water Level of under Ground is 100.51 M. and full [illegible] is 110.64 M above mean Sea Level. All the [illegible] of [illegible] are below the village [illegible] under submergence.

To start with the rehabilitation programme on a Bulock scale is primary need for all construction work such as [illegible], roads and building work.

Therefore it is very essential to make adequate arrangement for water supply to people at the earliest. Apart from drinking purpose the development of area will depend upon the source of water supply available.

8. WATER DEMAND :-

The village coming under effect of submergence having designed population 2170 is proposed to be rehabilitated at one place. For such a population the drinking water requirement worked out to be 2170 x 70 [illegible] Lit. per day @ the rate of 70 liters per capita per day. Along with rehabilitation Government institutions like Schools, Post Office, Dispensary, Panchayat Bhawan, Society, Anganwadi, etc. will also require water so 20% addition is made with per capita. Thus the total designed water demand worked out as 151900 x 1.2 = 182280 ltr. per day.

9. SOURCE :-

In this region the dug wells are not successful. Most of the wells become dry in summer, there is no dependable reservoir/stopdam in the vicinity where water can be utilized.

The river Narmada is flowing about a long distance from the rehabilitation site and may not be considered economical for such a small requirement. Therefore the tube wells can only be the best suited source to meet

(9)

the requirement. There is the possibility to get sufficient water around the proposed site in the tube wells.

PROPOSED SCHEME :-

For each small requirement of water adequate number of Hand Pumps along with Piped Water Supply scheme for drinking, bathing, washing, gardening and live stock use is the feasible, safe and economical with reference to initial and maintenance cost.

The original scheme was prepared for 150 plots where as keep recommendation the number of plots to be developed will be 136 therefore as per norms fixed by the S.E. (Lm) V.N.V.D.A. Bhopal vide Letter No. ... dated 31.8.97 ... the scheme has been revised for adequate water supply to following work ... proposed to be executed.

1	150mm dia 150 M. deep vertical tube well	6 Nos.
2	Installation of India Mark-II deep well hand pumps inclusive 32 mm dia G.I. suction pipe & construction of platform etc. complete.	5 Nos.
3	Installation of power pumps of suitable capacity control panel, 3 core cable, voltage stabilizer, 50mm dia G.I. riser pipe etc. complete.	1 No.
4	40000 Lit capacity M.S./H.D.P. cistern with stand	5 Nos
5	Cattle troughs	5 Nos
6	Washing and bathing platforms	5 Nos
7.	Construction of R.C.C. sump well 20000 Lit. capacity	1 No.
8	Construction of RCC over head service reservoir of 100000 Lit. capacity on 15 M. staging.	1 No
9.	Providing laying and jointing of clear water raising main	
10.	Distribution Network	

11.	Centrifugal pumps	2 Nos
12.	Pump House.	1 No.
13.	Power connection	1 No.

9. COST :-

As per estimate the cost for providing above amenities works out to Rs. 59.66 Lakh on the basis of CSR of Engineer-in-Chief Public Health Department M.P. Bhopal inforce from 1st September, 2002

10. FINANCE :-

Since the village is coming under submergence due to construction of Sardar Sarovar Dam by the Gujarat State Govt. Therefore the expenditure on the Scheme will be debited to Grant No. 48-4801 (N.V.D.) B-Land Sardar Sarovar Project Head of Account.

11 CHARGEABILITY :-

B-Land Sardar Sarovar Project Head 48-4801

12 MAINTENANCE :-

After execution and settlement of the trustees the water supply Scheme will be handed over to the respective Gram Panchayat for running and maintenance. prior to settlement it will be maintained by the Narmada Development P.H.E. Division Barwani.

The Annual maintenance cost of the Scheme works out to Rs. 73000/-.

ASSISTANT ENGINEER,
N.D.PHE SUB DIVISION,
BARWANI(M.P.)

EXECUTIVE ENGINEER,
N.D. P.H.E. DIVISION,
BARWANI (M.P.)

Government Of Madhya Pradesh

NARMADA VALLEY DEVELOPMENT AUTHORITY

SARDAR SAROVAR PROJECT

WATER SUPPLY SCHEME

FOR

NAME OF REHABILITATION SITE	: KATHORA
TEHSIL	: KASRAWAD
DISTRICT	: KHARGONE
ESTIMATED COST	: 13.93 LAKH

EXECUTIVE ENGINEER,
NARMADA DEVELOPMENT P.H.E. DIVISION
BARWANI (M.P.)

YEAR 2003-04

(6)

OFFICE OF THE EXECUTIVE ENGINEER,
NARMADA DEVELOPMENT P.H.E. DIVISION, BARWANI (M.P.)
REVISED WATER SUPPLY SCHEME FOR THE VILLAGE COMING UNDER
SUBMERGENCE OF SARDAR SAROVAR
NAME OF VILLAGE :- KATHORA
REHABILITATION SITE :- KATHORA

P.C. NO. 1 TEHSIL :- KASARAWAD , DISTT. :- KHARGONE

....

1. INTRODUCTION :-

The village is coming under submergence of Sardar Sarovar Dam, under construction on Narmada River in Gujarat state. Therefore ousees of this village are proposed to be rehabilitated at this rehabilitation site. A water supply scheme costing Rs. 10.26 Lacs was technically sanctioned vide Superintending Engineer (Env.) Narmada Valley Development Authority Bhopal vide their letter No. 749 dated 07.09.94. the scheme has been revised costing Rs. 13.93 Lakh.

2. AUTHORITY :-

Recommendation of Task Force Committee vide Commissioner Field Narmada Valley Development Authority Indore on dated 08.04.2003

3. BRIEF DESCRIPTION OF REHABILITATION SITE :-

The Rehabilitation site has been fixed near the village Kathora on the hillock/Plane area for the ousees of the village Kathora, Ghat Badya coming under submergence of Sardar Sarovar.

The number of families to be rehabilitated at the site are 250 Nos. The plots allotted at the rehabilitation site are 250 Nos., taking in to consideration the major sons as separate family.

The expected population of the ousees at the new site works out to nearly 1250 @ 5 person per plot. Such fast growth in population is taken in to account due to rehabilitation in a systematic way and better amenities at one place.

(7)

4. EXISTING WATER SUPPLY :-

No Work has been executed till date at this Rehabilitation Site. As per Norms fixed by N.V.D.A. Bhopal vide letter No. 377 dated 30.05 , scheme has been revised.

5. NECESSITY OF WATER SUPPLY SCHEME :-

The maximum water level of Sardar Sarovar is 140.2 Mt. and full reservoir level is 138.68 Mt. above mean Sea level. All the area near the Bank of River Narmada including this village is coming under submergence.

To start with the rehabilitation programme on a hillock water is primary need for all construction work such as hutment, roads and building works.

Therefore it is very essential to make adequate arrangement for water supply to people at the earliest. Apart from drinking purpose the development of sites will depend upon the source of water supply available.

6. WATER DEMAND:-

The village coming under effect of submergence having designed population 1250 is proposed to be rehabilitated at one place. For such a population the drinking water requirement worked out to be 1250 x 70 = 87500 Lit. per day at the rate of 70 liters per capita per day. Apart from it adequate water for the live stock is also required.

8. PROPOSED SCHEME :-

For such small requirement of water adequate number of Hand Pumps along with Piped Water Supply scheme for drinking, bathing, washing, gardening and live stock use is the feasible, safe and economical with reference to initial and maintenance cost.

The original scheme was prepared for 160 plots where as per the task force recommendation the number of plots to be developed will be 250. Therefore as per norms fixed by the S.E. (Inv.) N.V.D.A. Bhopal the scheme has been revised for adequate water supply the following works are proposed to be executed.

1.	150mm dia 180 M. deep vertical tube well.	4 Nos.
2.	Installation of India Mark-II deep well hand pumps including 32 mm dia G.I. suction pipe & construction of platform etc. complete.	3 Nos.

(8)

3.	Installation of power pumps of suitable capacity around proposed Tubewell, voltage stabilizer, 50mm dia G.I. rising pipe c/w couplings	2Set
4.	40000 Lit. capacity M.S.B.H.D.P. elavted with stand	1 Nos
5.	Cattle trough :-	1 Nos
6	Pump House	1 Nos
7	Power connection	1 Nos

9. COST :-

As per estimate the cost for providing above amenities works out to Rs. 13.93 Lakh on the basis of C.S.R. of PHE Dept. Indore Circle w.e.f. 26.1.06 for drilling of tube well, C.S.R. of Engineer-in-Chief M.P. P.W.D. w.e.f. 1st Nov 99 for civil works & C.S.R. of Engineer-in-Chief M.P. P.W.D. w.e.f. 1st Nov 99 for civil works & C.S.R. Engg.-in-Chief P.H.E. Department M.P. Bhopal in force from 01 Sept. 2002 for pipe line work.

10. FINANCE :-

Since the village is coming under submergence due to construction of Sardar Sarovar Dam by the Gujarat State Govt., Therefore the expenditure on the Scheme will be debited to Grant No. 48-4801 (N.V.D.) B-Land Sardar Sarovar Project Head of Account.

11. CHARGEABILITY :-

B-Land Sardar Sarovar Project Head 48-4801.

(9)

12. MAINTENANCE :-

After [illegible] will be handed over to the respective Gram Panchayat for running and maintenance. prior to settlement it will be maintained by the Narmada Development P.H.E. Division Barwani.

The Annual maintenance cost of the Scheme works out to Rs. 7[illegible].

ASSISTANT ENGINEER
N.D.P.H.E. SUB DIVISION,
BARWANI (M.P.)

EXECUTIVE ENGINEER
N.D. P.H.E. DIVISION,
BARWANI (M.P.)

पत्र क्र.498 दिनांक 26.09.2012 के संदर्भ में

Name of Submergence Village/Tehsil/R&R Site			Kasrawad					Barwani
Facility	MB No.	Page No.	Pipe Material,Pipe dia mm - length m	Flow Type Pressure/Gravity	From	To	Range of excavation max/min (m) ; Negative (-) for above ground	Comment
Water supply Connection & Type			GI,50 mm-	Pressure	TW 23, 24	OHT		
	50 & 67	2, 5, 8, 10, 13, 45, 70, 90 & 9, 124, 126, 148	ACP,80 mm-14538.70 m 100 mm-6321.90 m 150 mm- 7710.40 m, 200 mm-1602.50m	Gravity	OHT	Distribution	0.90/0.40	Detail sheet attached
	67	10, 95, 98, 150, 154	GI,50 mm-180.27 m, GI,50 mm-2591.20m, GI,40 mm-3564.60m, GI,25 mm-650.40 m,	Gravity	OHT	Cistern	0.45/(-)	
	49 & 67	31 & 52, 142	M.S. 200mm - 2575.11	Pressure	Narmada Pipe Line	Sump	1.00/0.70	For Future Planning
Any Other Source (In summer/etc. Supplementary source)			No Provision for Supply by Tankers					
S.no. Facility (Handpump)	MB No.	Page No.	Depth m as per MB	Yield (inch/l per hr for n				Comment/Water level m
1	33	107,108	173.00	2.0/3592 for 4 hrs				
2	40	21,22	200.00	3.0/8133 for 4 hrs				42.60/HP
3	40	23,24	185.00	1.0/518 for 4 hrs				71.00/Unsuccess
4	40	25,26	118.50	2.5/5137 for 4 hrs				122.00/Unsuccess
5	40	27,28	182.00	0.5/100 for 4 hrs				30.50/HP
6	40	29,30	214.00	2.5/5137 for 4 hrs				70.50/Unsuccess
7	40	33,34	197.00	0.5/100 for 4 hrs				13.00/HP
8	40	35,36	190.00	1.0/518 for 4 hrs				128.00/Unsuccess
9	40	47,48	202.00	1.5/1400 for 4 hrs				64.80/Unsuccess
10	40	49,50	185.00	1.5/1400 for 4 hrs				23.00/HP
11	40	115,116	210.00	1.5/1400 for 3 hrs				24.00/HP
12	40	139,140	215.00	1.0/518 for 4 hrs				64.80/Unsuccess
13	25	144,145,146	129.00	1.5/1400 for 4 hrs				80.00/Unsuccess
14	25	147,148	183.00	1.0/518 for 4 hrs				22.00/HP
15	25	149,150	183.00	1.5/1400 for 4 hrs				15.00/HP
16	25	183,184	192.00	1.5/1400 for 4 hrs				10.00/HP
17	25	185,186	197.50	3.0/8133 for 4 hrs				22.00/HP
18	61	134,135	206.00	2.5/1400 for 4 hrs				32.00/HP
19	55	135,136	110.00	6.0/45460 for 4 hrs				31.50/HP
20	51	27,28	201.00	1.5/1400 for 4 hrs				30.50/HP
21	51	28,29,30	150.00	3.0/8133 for 4 hrs				36.00/HP
22	51	30,31,32	197.00	3.5/11910 for 4 hrs				35.00/HP
								37.00/HP

Annex 3.1-V

:: COMPLETION - CERTIFICATE ::

1) Name of Work : Construction of [illegible] R.C.C. cut T, 2 no. Steel [illegible] with Pump House at Kajrin Arnolda

2) Name of Contractor : M/s High-Tech Engineers Jammu

3) Work Order No. & Date 2.5" dated 16/02/2005

4) Agreement No. 04/2004-2005

5) Date of starting - 17.02.2005

6) Due date of completion of work - 15.05.2005

7) Actual date of completion of work - 15.05.2005

8) Time Extension if any, [illegible] by E.E. from dt. 16/5/05 to 15/08/2005

9) Recovery if any - 0 % i.e Rs 225/- as Liquidity Time Extension

10) Remarks regarding of working of contractor satisfactory or any comments of site Incharge of work Construction satisfactorily i/c Testing works

11) M.B.NO. 115 PAGE NO. 01 to 39

Sub-Engineer
N.O., P.H.E. Sub-Division
BARWANI.

Assistant Engineer
N.O., P.H.E. Sub-Division
BARWANI.
11/10/2005

//KORANNE/-

Assistant Engineer
N.D.P.H.E. Sub Dn.
Barwani

:: COMPLETION - CERTIFICATE

Annex 3.1-V

Name of Work : Providing laying & jointing of P.V.C. & H.D. at Alata Akalpda (Del.) (Barwani)

Name of Contractor : Shri Nilesh Khare Contractor Barwani

Work Order No. & Date 1248 Dt. 20/10/05

Agreement No. 14/2005-2006

Date of starting - 01/5/2006

Due date of completion of work - 12/12/2005

Actual date of completion of work - 20/10/2006

Time Extension if any Sanctioned by CE (PHP) NWDA Bpl. vide letter No.

Recovery if any - NO

Remarks regarding of working of contractor satisfactory or any comments of site Incharge of work Work done Satisfactorily

M.B.NO. 184 PAGE NO. 02 to 03

23/10/07

Sub Engineer
N.O., P.H.E. Sub-Division
BARWANI.

Assistant Engineer
N.O., P.H.E. Sub-Divisi
BARWANI.

***

//KORANNE/-

Assistant Engineer
N.O.P.H.E. Sub Dn.
Barwani

VISHNU KUMAR KHANUNGO, BISTAN
M.SC (GEOLOGY.) REG. HYDROGEOLOGIST
DISTT. KHARGONE
Ph. 957282-252218, Mob. 9826323218

1. Name of the Office: A.E. N.D.P.H.E. Sub Dn. Barwani
2. Name of the Client: -
3. Village: Awalda-(2) Site _____ PC No _____
   Block: Barwani District: Barwani
   Date of Resistivity Survey: 29-4-06
4. Method: _____ Use of Method is Schluinoerger.
5. Static Water Level surrounding Dug wells, Winter - mts., Summer - mts
6. Static Water Level surrounding Tube Wells, Winter 22 mts., Summer 30 mts
7. Details of Resistivity Survey pach from 1.5 to 300.00 mts.
8. Geological & Hydrogeological Concept of the Area: Igneous origin Rock of Basalt.
9. Expected starata: Weathered / Jointed / Massive / Fractured / ty. of Strata.
10. Types of Curves :- KH-3 Two / Three / four / Types Layering of Curve
11. Recommendation is
    (i) Casing length may be 20-30 mts
    (ii) Depth to be drilled length may be 200±5 mts
    (iii) Expected yield may be 600-800 GPH
12. Types of Drilled Machine recommended : D.T.H. Recommendation of Ves No. I / II / III

Enclosure :

1. **Reading Chart.**
2. **Depth Probe Curve.**
3. **Location Map.**

Assistant Engineer
N.D.P.H.E. Sub Dn.
Barwani

SIGNATURE
V.K. Khanungo
M.Sc. (Geology)
Reg. Hydrogeologist

Annex 3.1-V

VISHAL KUMAR KANUNGO, BISTAN
M.SC (GEOLOGY) REG. HYDROGEOLOGIST
DISTT.
Ph. 957282-252218, Mob. 9826323218

1. Name of the Office: AE ND PHE Sub Dn. Barwani
2. Name of the Client:
3. Village: Awalda (S) Site: PC No:
   Block: Barwani District: Barwani
4. Date of Resistivity Survey: 29-4-06
5. Method: Use of Method is Schlumberger.
6. Static Water Level surrounding Dug wells, Winter ___ mts., Summer ___ mts.
7. Static Water Level surrounding Tube Wells, Winter 21 mts., Summer 35 mts.
8. Details of Resistivity Survey patch from 1.5 to 300.00 mts.
9. Geological & Hydrogeological Concept of the Area: Igneous Arijenic Rock & Basalt.
10. Expected starata: Weathered / Jointed / Fractured / Massive / ty. of strata.
11. Types of Curves:- H-1-3 Two / Three / four / Types Layering of Curve.
12. Recommendation is
    (i) Casing length may be 10-25 mts.
    (ii) Depth to be drilled length may be 190-150 mts.
    (iii) Expected yield may be 500-800 GPH.
13. Types of Drilled Machine recommended D.T.H. Recommendation of Yes No. ✓ I / II / III

Enclosure:

1. **Reading Chart.**
2. **Depth Probe Curve.**
3. **Location Map.**

Assistant Engineer
N.D.P.H.E. Sub Dn.
Barwani

V. Kanungo
SIGNATURE

Annex 3.1-W MB No 108

XVII-E-35-B (Large)
P.W.D.

Abstract Sheet - 3

N.S.B.

Particulars	Measurements up-to-date No.	L.	B.	D.	Contents of area	Remark
1	2	3	4	5	6	7
Name of work - Laying & Jointing of A.C.P. pipe line						
Situation - Rt side kadwal.						
Agr no - 9/06-07						
W.O. No & Date - 615 dt 17/4/06.						
~~Abstract~~ Recorded by -						
Agency - Shri Nilesh Khare Contractor Dewas.						
Abstract Recorded by - R.S Singh SIE						
Site - Particulars - city - Rate - upto date since Previous - Remarks						
1) Earthwork in excavation for pipe trench in all kinds of soil	5992.04 cum @ 68/-				407734=72	407734=72
2) Earthwork in excavation for pipe trench in all kinds of rock a) with or without blasting	2356.47 cum @ 114/cum				268637=58	268637=58
3) Labour for laying in position following A.C.P pipes						
i) 200 ϕ pipe	3134.75 rmt @ 27/rmt				84622=50	84622=50
ii) 100 ϕ pipe	72.50 rmt @ 20/rmt				1452=00	1452=00
4) Labour for providing & jointing & fixing specials.						
i) 200 ϕ -	115 Nos @ 25/-				2875=00	2875=00
ii) 100 ϕ -	100 Nos @ 28/-				2800=00	2800=00
					32851=50	32851=50

Page 108 of 174

KVII-E-35-B (Large)
P.W.D.

Annex 3.1-W

Contd.

XV

86

Particulars	Measurements up-to-date					
	No.	L.	B.	D.	Contents of area	Remark
1	2	3	4	5	6	7
Name of work	Construction of 12 KL Over head Tank with 5 brick Staging & Surface Sanitary Latrines					
Agency	M/s P.W. Construction Pune					
Situation	R/o Karmal					
Agmt No	17/2006-07					
Lo-No & Date	1009/2 BNVSMB Dt Rs 3606					
Cost of work	7,90,000=00					
Date of Starting	4 weeks	5.7.06				
Time period	3 months ½ rainy season					
Observed & passed by	M.K. Jadhav SDO					

Cost of work = 7,90,000

Total cost including Contingencies = 6,55,000

20% Contingencies = 131000

10% Labour & Supervision = 94000

Padmal

(51)

The MB No 258 From
Page No 01 To 20 Issued
to AE Padmal
on dated 22.11.2021

EE
N.V.D.A.P.H.E.BARWANI

258

(उदाहरण)

XVII-35-B(Large)
P.W.D.

P.W.D. Form No. 24

Executive Engineer NDPHE Division, Barwani
DIVISION

Assistant Engineer
N.D.P.H.E. Sub Dn
BARWANI
sub-Division

MEASUREMENT BOOK

Assistant Engineer
N.D.P.H.E. Sub Dn

No. 258

Name of Office BARWANI

Date of first entry 22.11.21

Date of last entry

EXECUTIVE ENGINEER
N.D.P.H.E. DIVISION
BARWANI

Issued to Shri Pavan Shivmuni

Assistant Engineer
N.D.P.H.E. Sub Dn
BARWANI

(52)

XVII-35-B(Large)
PWD.

47 जलापूर्ति

Particulars	Measurement up-to-date					Remark
	No.	L.	B.	D.	Contents of area	
1	2	3	4	5	6	7
	Dly sheet					
1) Name of work:-	Drilling of 150 mm Tubewell at Vadwa A/c Ho/					
2) Location	Ajanda, Akhada, Amalda, Arduna, Bhandarkhera, Bilgaon, Tawalai, Dimbola, Ajgaon, Khajuri, Wighamak khola, Wheeling Borewell machine					
3) Agency :	Shri Kanhaiya Bhoyar contractor Sawangi					
4) Agreement no:-	02/2008-09					
5) work order no:-	1259 Dt 14/10/08					
	1323 Dt 21/10/08					
6) S-no of Bill :-	1st	R/A	Bill			
Details of abstract no. 22		no.	256	for no. 01 to 25		
			258	for no. 02 to 56		
		Executive Engineer R.E.S. Division BARWANI (M.P.)				

Annex 3.1-X

1. Water recharging / conservation / resistively survey

प्रेषक :–

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आर. के. दुबे
प्रमुख अभियंता

अर्ध शासकिय पत्र कमांक.....

दिनॉक 04.04. 2005

विषय :– अनुपयोगी हैण्ड पम्पों को रिचार्जिंग नलकूपों में परिवर्तित करने हेतु विशेष अभियान।

संदर्भ :– इस कार्यालय का पत्र कमांक 2282 दिनॉक 28.03.2005

प्रिय श्री .....

जैसा की आपको विदित है कि प्रदेश में विगत कई वर्षों से अपर्याप्त वर्षा के कारण गिरतें भू– जल स्तर की स्थिति को देखते हुए पेय जल स्त्रोतों के स्थायित्व हेतु भू–जल संवर्धन के कार्य वृहत रूप से किये जाने की अत्यंत आवश्यकता हैं। जिन क्षेत्रों के हैण्ड पम्प भू–जल स्तर गिरने के कारण स्थाई रूप से बंद हो गए हैं उन नलकूपों को रिचार्जिंग नलकूप में परिवर्तित किया जावे इस संदर्भ में आपको आवश्यक दिशा निर्देश इस कार्यालय द्वारा जारी किये जा चुके हैं।

अतः आप कार्यापालन यंत्रीयों को निर्देश जारी करें कि अनुपयोगी हैण्ड पम्पों से ऐसम्बली निकाल कर तथा पंचनामा बनाकर हैण्ड पम्प एंसम्बली को भंडार में जमा करना हैं। इस संबंध में निर्देशीत किया जाता हैं अनुपयोगी हैण्ड पम्पों के अन्तगर्त ऐसे हैण्ड पंपों के सूची तैयार कि जावे जो पूरे वर्ष के दौरान जल प्रदाय नही करते हैं तत्पश्चात इन नल कूपों से सामग्री निकाल ने एवं उन पर रिचार्जिंग संरथना निर्माण करने पर होने वाले व्यय की जानकारी भी दि जावे। जिससे की अतिरिक्त आवंटन दिये जाने पर विचार किया जा सके।

मैं चाहूँगा की` कार्य एक अभियान चलाकर 30 जून 25 तक पूण किया जावे अर्थात उक्त अवधी पश्चात अनुपयोगी हैण्ड पंपों क संख्या शून्य होगी इस हेतु आपको प्रारंभिक आवटन भी दिया जा रहा हैं अतः कार्य आरंभ करवाए एवं आप स्वंय तथा अधिक्षण यंत्री भ्रमण कर अभियान की गतिविधियों की समीक्षा करेंगे तथा उपरोक्त कार्य

Annex 3.1-X

की साप्तहिक प्रगति संलग्न पपत्रों में इस कार्यालय के पत्र कमाक 2255 दिनॉक 24.03.2005 द्वारा हैण्ड पंप सुधार अभियान 2005 पत्रक के साथ नियमित रूप से भेजने की व्यवस्था करें। मुख्य अभियंता अधिक्षण यंत्री द्वारा ग्रामीण क्षेत्रों के भ्रमण के समय अभियान के साथ ही साथ ग्रामीण क्षेत्र की पयजल व्यवस्था का भी आकलन कर समुचित कार्यवाही की जावे।

उपरोक्त निर्देशों का कढाई से पालन किया जावे अन्था निर्देशों की अवहेलना करने वाले अधिकारीयों के विरूद्ध कठोर कार्यवाही कि जावेगी

भवदीय

(आर. के. दुबे)

प्रति

श्री.....

मुख्य अभियंता

लो0स्वा0यां0विभाग

परिक्षेत्र .....

कमांक 2583/ भू जल संवधर्न /प्र0अ0/ लो0स्वा0यां0/भोपाल,दिनॉक 04.04.2005

प्रतिलिपि :–

सचिव, मध्य प्रदेश शासन लो0स्वा0यां0विभाग मंत्रालय वल्लभ भवन भोपाल।

अधीक्षण यंत्री लो0स्वा0यां0विभाग मंडल.....

कार्यपालन यंत्री लो0स्वा0यां0खंड.....

भवदीय

(आर. के. दुबे)

Annex 3.1-Y

1. Water recharging / conservation / resistively survey

कार्यालय प्रमुख अभियंता
लोक स्वास्थ्य यांत्रिकीय विभाग
मध्य प्रदेश भोपाल

कमांक प्र.अ./भूजल/लो.स्वा.या 02 भोपाल दिनांक

प्रति.

मुख्य अनियंता
लोक स्वास्थ्य यात्रिकी विभाग
परिक्षेत्र जबलपुर

विषय नलकुप खनन हेतु विभाग द्धारा दिनांक 17.5 .02 को जारी यु. ए. ओ. आर. मैं रजिस्टीविटी सर्व की दर ।

संदर्भ. आपका पत्र कमांक 341 दिनांक 9.1.2003 एवं इस कार्यलाय का पत्र क. 8794 मेनि प्र.अ. दिनांक 13.11.02

00

उपरोक्त संदमित विषयान्तर्गत रजिस्टीविटी सर्वे हेतु एस. ओ. आर. में जो दर दी गई है वह प्रति सफल साउडिंग हेतु है इस हेतु संशोधन जारी किया जा चुका है सफल साउण्डिग के लिये किया जावेगा जिसकी रिपोर्ट के आधार पर निर्मित किये गये नलकुप मे हैण्डपंप हेतु पर्याप्त जल उपलब्ध हो यदि नलकुप असफल रहता है तो ऐसी साउण्डिग सफल नही मानी जावेगी एवं उस हेतु कोई भी भुगतन देय नहीं होगा ।

प्रमुख अभियंता
लोक स्वास्थ्य योत्रिकी विभाग
भोपाल मध्यप्रदेश

कमांक 644 प्र. अ. लो.स्वा.या. विभाग 2002 भोपाल दि. 21/1/ 2003

प्रतिलिपि

1 प्रमुख अभियंता लो. स्वा. या. विभाग परिक्षेत्र ग्वालियर इन्दौर भोपाल वि./यां की और आवश्यक कार्यवाही हेतु ।

2. समस्त कार्यपालन यंत्री लोका स्वास्थ्या यात्रिकी खंड .....की और सुचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित ।

प्रमुख अभियंता
लोक स्वास्थ्य योत्रिकी विभाग
भोपाल मध्यप्रदेश

Annex 3.1-Z

OFFICE OF THE PRINCIPAL GOVT. POLYTECHNIC, COLLEGE KHANDWA, M.P. 450001

NO/TEST/SOIL/2002/95 KHANDWA, DATED 25/September/2002

(PUBLIC HEALTH ENGINEERING DEPARTMENT)

1.NAME OF FIRM: EXECUTIVE ENGINEER N.V.D.A.
PUBLIC HEALTH ENGINEERING DEPARTMENT
DIVISION BADWANI (M.P.)

2. NAME OF CONTRACTOR: M/S. NARAYAN WAGHELA
174 TIMBER MARKET RATLAM Phone No.07412-44831 (M.P.)

3. NAME OF WORKS: TESTING OF FOUNDATION SOIL FOR THE CONSTRUCTION OF R.C.C. OVERHEAD WATER TANK OF CAPACITY 225 KL CAPACITY OVER 10 METER STAGING & A SUMP WELL OF 40 KL ALONG WITH SUMP WELL AT VILLAGE" BORLAY -II "(SEGAON) DISTRICT BADWANI (M.P.)
REFERENCE NO: CONTRACTORS /LETTER NO/O1/OHT/NDPHED/20/09/2002

5. DATE OF RECEIVING SAMPLES & DATE OF TESTING: -21/SEPT /2002

TEST REPORT

S NO	IDENTIFICATION & LOCATION OF SAMPLE	TEST RESULTS	REMARKS
1	ONE UNDISTURBED SOIL SAMPLE CORE AT A DEPTH OF 1.5 METER (HARD YELLOW SOIL MIXED WITH (KANKAR) STRATA REPORTED 0.0 TO 0.3 M MURUM 0.3 TO 1.5 M HARD MURAM MIX WITH KOPRA & BOULDERS RE- MOULDED SAMPLE USED FOR TEST	DEPTH =1.5 METER SIZE OF FOOTING =UNIT BULK DENSITY =1.74 g/cc C=COHESION =0.01 ton/sqmeter ø =33 DEGREE FACTOR OF SAFETY =(3) SAFE BEARING CAPACITY = 40 TON/SQ METER	TESTED AS PER IS 2720 PART-XIII C-Ø TEST BY BOX SHEAR TEST GENERAL SHEAR FAILURE

NOTE : 1 THE TESTS ARE CONDUCTED AS PER ISI NORMS
2 THE TEST REPORT SUPPLIED WILL NOT TO BE SUBJECTED TO ANY LEGAL CASES

COUNTERSIGNED BY

(Er ASISH GONGRE)
M.E (STRUCTURE)
PRINCIPAL
GOVT. POLYTECHNIC
KHANDWA

Principal
Govt. Polytechnic
KHANDWA (M.P.)

CHECKED BY

HOD CIVIL

TESTED BY

(Er R.S SISODIYA)
M.TECH (GEOTECHNICAL)
I/C SOIL TESTING LAB
Er R.S SISODIYA
M.Tech (Foundation Engineering)
Govt. Polytechnic Khandwa

RCC DESIGN OF 225KL / 10.0M STAGING OVERHEAD WATER TANK AT BORLAI-II,BARWANI(M.P.)

DESIGN DATA

Capacity	=225KL
Staging	=10.0 m
S.B.C.	= 25.0 ton/m^2
Earthquake zone	= III
Wind velocity	= 39m/s
Foundation depth	= 0.7 to 1.5m
Tank type	=Intze tank
Internal diameter	=8.0 m
Diameter of bottom ring beam	= 4.8 m
Rise of top dome	= 1.0 m
Height of cyl wall	= 4.1 m
Cone angle	= 39.81°
Number of columns	= 6 Nos
Size of columns	= 400 mm dia
Number of Brace	= 3 nos,200mmx400mm

Assistant Engineer

Grade of Concrete:
M30 for top dome, cyl.wall, cone wall, balcony, bottom dome, ring beam
M25 for staging (columns, braces and foundation)
M20 for staircase

कार्यालय आयुक्त (पुनर्वास/फील्ड), नर्मदा घाटी विकास प्राधिकरण,
बी. जी. 74, सी, नर्मदा भवन, विजयनगर, इन्दौर

पत्र क्रमांक 3936 /पुनर्वास/30/सैनिट/13 इन्दौर दिनांक 16/07/2013

प्रति,

सचिव,
सरदार सरोवर परियोजना,
फर्जी विक्रय पत्र एवं पुनर्वास स्थल
अनियमितता जांच आयोग,इन्दौर

विषय :- पुनर्वास स्थलों की जांच के अधीन सामरत निर्माण की लागत बताने के संबंध में ।

सन्दर्भ :- आपका पत्र क्रमांक 175/आरआरसाईटस/09/13 दिनांक 10.07.13

कृपया सदर्भित पत्र का अवलोकन करने का कष्ट करें, जिसके द्वारा मौलाना आजाद राष्ट्रीय प्रौद्योगिकी संस्थान (सैनिट) भोपाल से प्राप्त पत्र दिनांक 10/07/2013 (Annexure-C) अनुसार मदवार संकलित जानकारी चाही गई थी । चाही गई जानकारी संबंधित कार्यपालन यंत्रियों से प्राप्त की गई एवं संकलित जानकारी निम्नानुसार प्रस्तुत की जा रही है :-

Civil Works

1 Buildings,Treeplatforms & Halao
2 Roads & Culverts
3 Drainage

P.H.E Works

1 Handpump
2 Water Supply Tratment,Storage & Distribution
3 Sewerage networks & Treatment

Electrical Works

1 Electrical works i/c Power distribution at the R & R sites,Electric sub-station,poles & Transformers

Annex 3.1-ZA

यहां यह उल्लेखनीय है कि मुख्य अभियन्ता लोक निर्माण विभाग नर्मदा घाटी विकास प्राधिकरण भोपाल द्वारा पत्र दिनांक 24/12/2010 से सिर्फ सिविल कार्यों की लागत रूपये 80 से 90 करोड बतायी गयी थी तथा इस कार्यालय के पत्र दिनांक 27/10/10 द्वारा सिविल कार्य की लागत 86.46 करोड बतायी गयी थी जबकि वास्तविक लागत राशि रूपये 88.44 करोड है ।

इसके अतिरिक्त इस कार्यालय द्वारा जल प्रदाय की कुल अनुमानित व्यय राशि रूपये 56.93 करोड बतायी गयी थी, किन्तु इस राशि मे अवशासी नगर जलप्रदाय की लगभग 13.50 करोड की राशि भी शामिल थी, इस प्रकार पुनर्वसाहट स्थलो पर वास्तविक व्यय राशि 43.66 करोड व्यय की गई तथा विद्युत व्यवस्था पर तत्समय कुल राशि 38.41 करोड बतायी गयी थी किन्तु वास्तविक रूप से इस मद मे व्यय राशि 38.45 करोड रही है।

इस प्रकार पुनर्वसाहट स्थलो पर कुल व्यय की राशि 170.56 करोड की आकलित हुई है जिसका गजट (हार्ड एवं साफ्ट कॉपी मे) इस पत्र के साथ संलग्न प्रेषित है ।

संलग्न – उपरोक्तानुसार

आयुक्त (पुनर्वास/फील्ड)
नर्मदा घाटी विकास प्राधिकरण,
इन्दौर

पृष्ठांकन क्रमांक / पुनर्वास/30/मैनिट/13 इन्दौर,दिनांक /07/2013

प्रतिलिपि

1 उपाध्यक्ष, नर्मदा घाटी विकास प्राधिकरण, भोपाल ।
2 मुख्य अभियन्ता, लोक निर्माण विभाग नर्मदा घाटी विकास प्राधिकरण, भोपाल ।

आयुक्त (पुनर्वास/फील्ड)
नर्मदा घाटी विकास प्राधिकरण,
इन्दौर

Annex 3.1-ZA

R&R Sites Total cost of Infrastructures

Civil Works			
S. NO.	Prticulars	Expenditure in Lakhs	Total in Lakhs
1-	Buildings, Treeplatforms & Halao	1645.63	
2-	Roads & Culverts	5975.34	
3-	Drainage	1223.28	
	Total	8844.25	8844.25

P.H.E Works			
S. NO.	Prticulars	Expenditure in Lakhs	
1-	Handpumps	582.54	
2-	Water Supply treatment, Storage & Distribution networks	3,132.89	
3-	Sewerage networks & Treatment	651.16	
	Total	4,366.59	4366.59

Electrical works			
S. NO.	Prticular	Expenditure in Lakhs	
1-	Electrical works i/c Power distribution at the R&R sites, Electric sub-station, Poles & Transformers	3,845.68	3,845.68
		Grand Total	17,056.52

Joint Director,
Narmada Valley Development Authority,
Indore

Annex 3.1-ZC

Monthly & Yearly Expenditure on Diesel for D.G. Set

MONTH	Amount in Rs.
Jan-12	36672.00
	50008.00
Feb-12	55008.00
	36672.00
	18736.00
Mar-12	55008.00
	73344.00
Apr-12	36840.00
	55260.00
May-12	64470.00
	36840.00
	18420.00
Jun-12	36840.00
	80680.00
Jul-12	55260.00
	73584.00
Agu-2012	36992.00
	59288.00
Sep-12	57976.00
	62952.00
Oct-12	83936.00
	84104.00
Nov-12	63204.00
	84272.00
Dec-12	63204.00
	42676.00
	21068.00
Total:-	**1443314.00**

Executive Engineer,
N.D.P.H.E., Division,
BARWANI

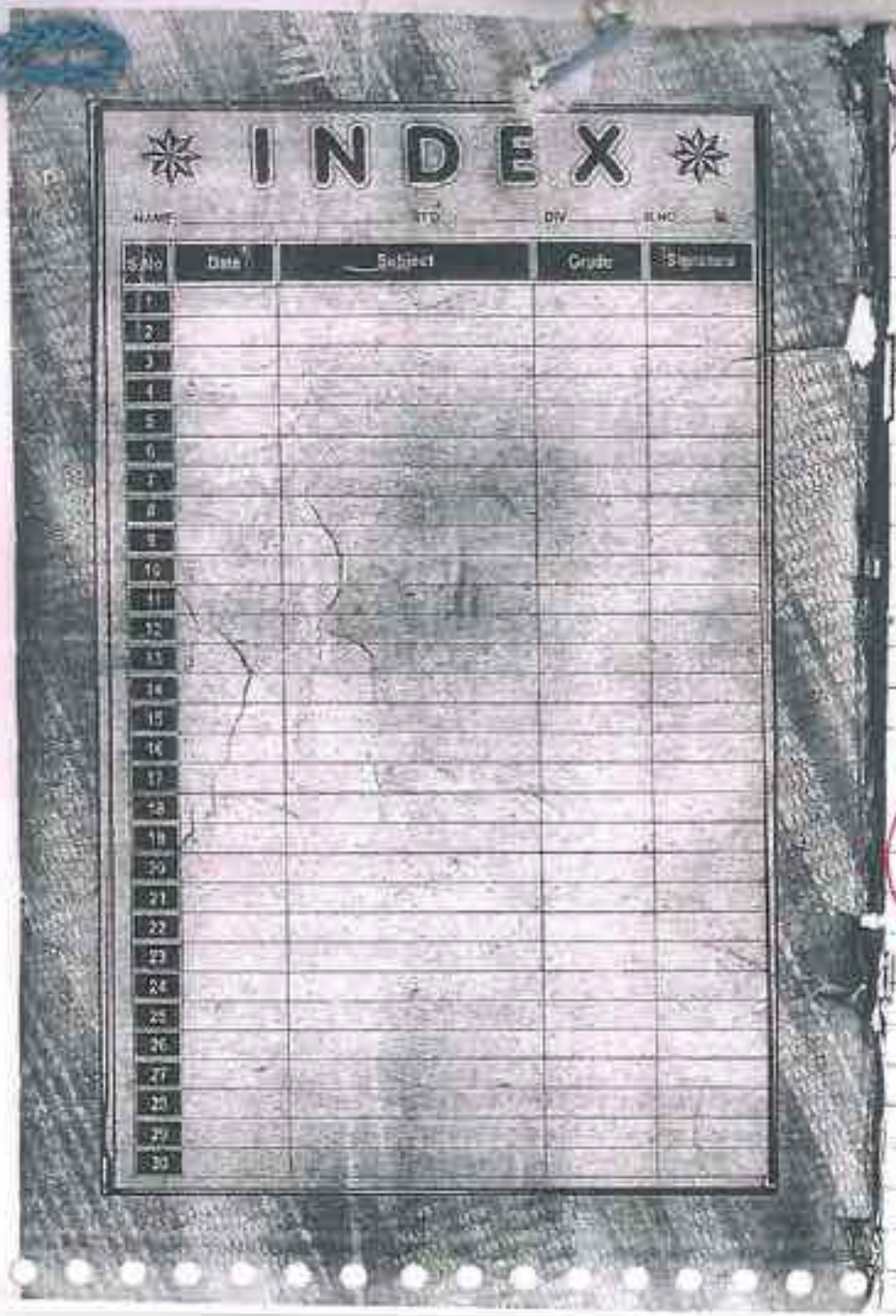
Annex 3.1-ZD

Annexure - G

Monthly &Yearly Expenditur on Diesel & Oil For Govt. Water Truck Tanker

MONTH	CPZ-7833	CPZ-7834	CPZ-7835	CPZ-7836	MP-02-7001
Jan-12	0.00	0.00	0.00	40300.00	0.00
	0.00	0.00	0.00	33409.00	9518.00
Feb-12	0.00	0.00	0.00	27962.00	13927.00
	0.00	0.00	0.00	34272.00	14262.00
	0.00	0.00	0.00	0.00	4584.00
Mar-12	20098.00	0.00	0.00	39947.00	18686.00
	17257.00	0.00	0.00	33515.00	16846.00
Apr-12	22334.00	0.00	0.00	33190.00	14451.00
	20156.00	0.00	0.00	40844.00	13128.00
May 12	30981.00	0.00	0.00	41344.00	19921.00
	23230.00	0.00	0.00	33433.00	23450.00
	0.00	0.00	0.00	0.00	0.00
Jun-12	29131.00	14165.00	0.00	35208.00	17490.00
	29131.00	18420.00	0.00	34713.00	27980.00
Jul-12	17604.00	18595.00	0.00	29306.00	18770.00
	17449.00	23394.00	0.00	35108.00	23374.00
Agu-2012	17895.00	4624.00	0.00	23485.00	14171.00
	11750.00	18686.00	0.00	23500.00	9248.00
Sep-12	18118.00	14427.00	0.00	29265.00	0.00
	13305.00	0.00	0.00	0.00	21364.00
Oct-12	13290.00	0.00	5436.00	0.00	10492.00
	30946.00	0.00	22244.00	0.00	0.00
Nov-12	19751.00	0.00	27668.00	0.00	0.00
	26525.00	0.00	21068.00	6584.00	0.00
Dec-12	26715.00	0.00	26335.00	0.00	0.00
	26715.00	0.00	26510.00	22551.00	0.00
	0.00	0.00	0.00	0.00	0.00
	432381.00	112311.00	129261.00	597936.00	293662.00

Executive Engineer
N.D.P.H.E.Division
Barwani



INDEX

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CPZ = 7833

(1)

2/2/2012

2 ह.प्र.2 बोरवेल

झरडोह

S.D.O साहब सोलन से मिले

2 MP 160

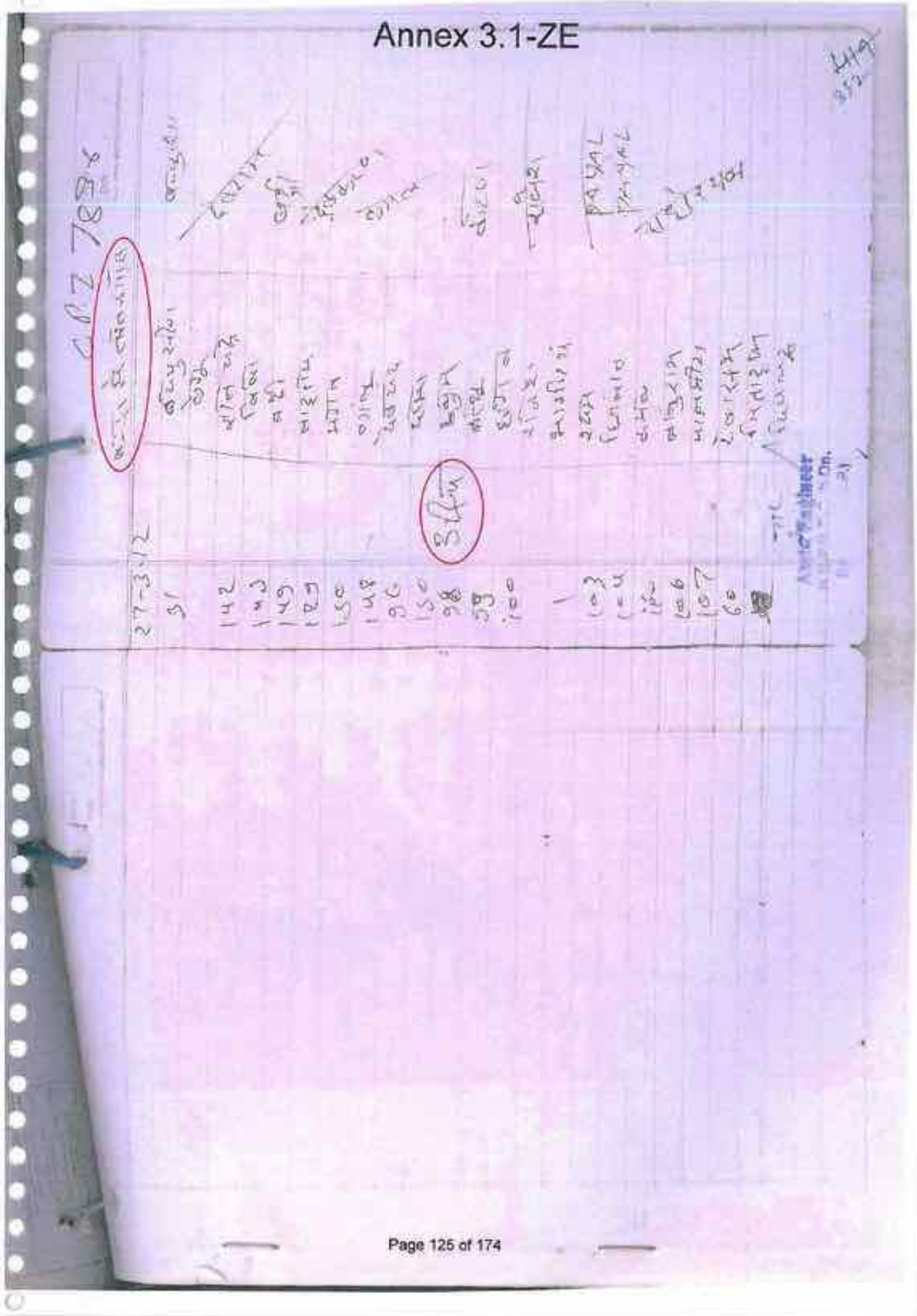
1	सिंगर	100
1	मोटर	150
1	कंडीशनर	50
1	स्टेबलाइजर	100
		610

308

के लिए मुकेश

Asstt. Engineer
H.P.P.H.E. Sub-Dn.
BARMANA (H.P.)

Annex 3.1-ZE



OFFICE OF THE EXECUTIVE ENGINEER, N.D. PHE DIVISION, BARWANI (M.P.)

// GENERAL - ABSTRAT //

REVISED WATER SUPPLY SCHEME FOR REHABILITATION
SITE - CHIKHALDA
TEHSIL - KUKSHI, DISTRICT -DHAR

Sl.No.	PARTICULARS	QTY.	RATE	AMOUNT	REMARKS
1	2	3	4	5	6
1	Drilling of 150mm dia 120M. deep vertical tube well as per specification.	25 Nos.	48,500/- Each	1212500=00	Sub-Estt 'A'
2	Providing & installation of India mark II hand pump & construction of platform as per UNICEF design etc. complete.	20 Nos.	9,000/- Each	180000=00	Sub-Estt.'B'
3	Providing and installation of suitable submersible pump set (10 H.P.) including control pannel, cable & voltage stabilizer etc. complete.	5 No.	3,5000/- 10 HP	175000=00	L.S.
4	Sopt water supply arrangement.	20 Nos. Cistern	1 Job	2187000=00	Sub-Estt 'C'
5	Washing, Bathing platform in cement concrete				
	(1x0.0x1.5x0.15 M.)	20 Nos.	1,100/- Each.	22000=00	Sub-Estt.'D'
6	Cattle through (Brick masonry)				
	3mx1mx0.08 (inner size)	20 Nos.	12,000/- Each	240000=00	Sub-Estt 'E'

Asstt. Engineer
N.D.P.H. Sub-Div.
BARWANI (M.P.)

Annex 3.1-ZF

(2)

S.No	PARTICULARS	QTY.	RATE	AMOUNT	REMARKS
1	2	3	4	5	6
	Construction of 2,80,000 Liters capacity R.C.C. Over head Service reserviour on 10 Mtr. staging.		3.50 Per Lit.	980000=00	L.S.
	Power Connection	5 No.	10,000/- Each	50000=00	L.S.
	Providing and fixing of pre febricated foam concrete pump house.				
	2.4mx2.4mx2.4m	5 No.	40,000/- Each.	200000=00	L.S.
	TOTAL Rs.			5246500=00	
	Add 10% of total for R & M of hand pump & power pump			524650=00	
	G.TOTAL Rs.			5771150=00	
	SAY Rs.			5771000=00/-	

(Total Rs. Fifty Seven Lacs Seventy One Thousand Only)

ASISTANT ENGINEER,
N.D.P.H.E. SUB DIVISION,
BARWANI(M.P.)

EXECUTIVE ENGINEER
N.D. P.H.E. DIVISION,
BARWANI(

T. S. No. 121 ... 24-12-2001
In words: 57.71 lakhs
Rupees fifty seven lakhs seventy one thousand ...
Cs. ... 1801

Approved by CE(Tech.)

24/12/2001

Annex 3.1-ZG

ANNUAL - MAINTANANCE

SPOT WATER SUPPLY AND HAND PUMP FOR REHABILITATION

SITE :- CHIKHALDA

Sr. No.	PARTICULARS	QTY.	RATE	AMOUNT	REMARKS
1	2	3	4	5	6
1	Pump Operator cum plumber.	5x12 Month	@64.43 Per day	11597[illegible]	
2	Energy Charges	5X12 month	1000/- Per Month	60000=00	L.S.
3	Repair & Maintenance power pump annualy.	5 Nos.	5000/- Year	25,000-00	L.S.
4	Petty maintenance of pipe line including labour.	5x12	1500/- Per month	90,000-00	L.S.
5	Maintenance of Hand pump.	20 Nos.	1000/- Per	20,000-00	L.S.
6	Cost of bleaching powder.	5 T.W	1000/-Per TW	5,000-00	L.S.
	TOTAL Rs.			315974=00	
	SAY Rs.(Three Lac Sixteen Thousand Only)			316000=00	

ASSISTANT ENGINEER,
N.D.P.H.E. SUB DIVISION,
BARWANI(M.P.)

EXECUTIVE ENGINEER,
N.D. P.H.E. DIVISION,
BARWANI(M.P.)

(8)

SEWERAGE PROJECTFOR REHABILITATION SITE
DHARAMPURI

DESIGN OF SEWER LINE
ZONE : 4

Number of plots	=	794
Present population	=	3970
Ultimate population	=	5955

Per capita sewage contribution
= (40x0.3+135x0.7)x1.15x0.8
= 98 litres/day Min. 100 lpcd as per CPHEEO

Adopting per capita sewage contribution as
= 100 litres/day

Present sewage flow	=	397000 lpd
Infiltration 20%	=	79400 lpd

Present peak sewage flow (Peak Factor 3)
= 1270400 lpd
= 14.7 lps

Minimum slope for above rate of flow as per Table 3.7 of the Manual
= 2/1000
= 0.002

Ultimate sewage flow	=	595500 lpd
Infiltration	=	119100 lpd

Ultimate peak sewage flow (Peak Factor 3)
= 1905600 lpd
= 22.06 lps

Providing socket-spigot RCC pipes

n	=	0.011
for d/D	=	0.8
v/V	=	1.14
q/Q	=	0.968

From Manning's formula $Q = (1/n)(3.118 \times 10^{-6})\, D^{8/3}\, S^{1/2}$

Diameter of pipe D	=	222 mm
Provide pipe of dia	=	300 mm

Discharge when pipe running full
Q = 51.13 lps

Annex 3.2-A

62

Check for velocity $v = 1.14x(1/n)(3.968x10^{-3})xD^{2/3}xS^{1/2}$

For Present peak flow q/Q = 0.288 v/V= 0.85 d/D= 0.37

v = 0.61 m/sec. >0.6 m/sec.

For ultimate peak flow q/Q = 0.431 v/V= 0.96 d/D= 0.46

v = 0.69 m/sec. <2.4 m/sec.

Hence, provide 300 mm and lower dia. S/S RCC pipe line.

Length of 150 mm dia. S/S R.C.C. PIPILINE	=	4875 m
Length of 200 mm dia. S/S R.C.C. PIPILINE	=	1500 m
Length of 250 mm dia. S/S R.C.C. PIPILINE	=	750 m
Length of 300 mm dia. S/S R.C.C. PIPILINE	=	375 m
Total length of sewer lines	=	7500 m

Assistant Engineer
N. D. P.H.E. Sub Division
Barwani (M.P.)

Executive Engineer
N. D. P.H.E. Division
Barwani (M.P.)

Annex 3.2-B

SEWERAGE PROJECT FOR REHABILITATION SITE DHARAMPURI

GENERAL ABSTRACT OF ESTIMATES

S.No.	Particulars of estimate	Amount (Rs. in lakh)
1	Estimate for the providing and laying of sewer lines in Zone-1	67.60
2	Estimate for the providing and laying of sewer lines in Zone-2	73.20
3	Estimate for the providing and laying of sewer lines in Zone-3	62.40
4	Estimate for the providing and laying of sewer lines in Zone-4	65.60
5	Estimate for the providing and laying of sewer lines in Zone-5	59.20
6	Estimate for 1328 road crossings with 100 mm dia RCC sewer lines in all zones at Rs. 5650/- each	75.03
7	Estimate for the construction of septic tank for Zone-1	23.80
8	Estimate for the construction of septic tank for Zone-2	26.60
9	Estimate for the construction of septic tank for Zone-3	24.00
10	Estimate for the construction of septic tank for Zone-4	24.60
11	Estimate for the construction of septic tank for Zone-5	23.40
	TOTAL Rs.	526.03 Lakh

T. S. No. 242 Date. 7/12/04

Technical Sanctioned for Rs. 526.03 lakhs

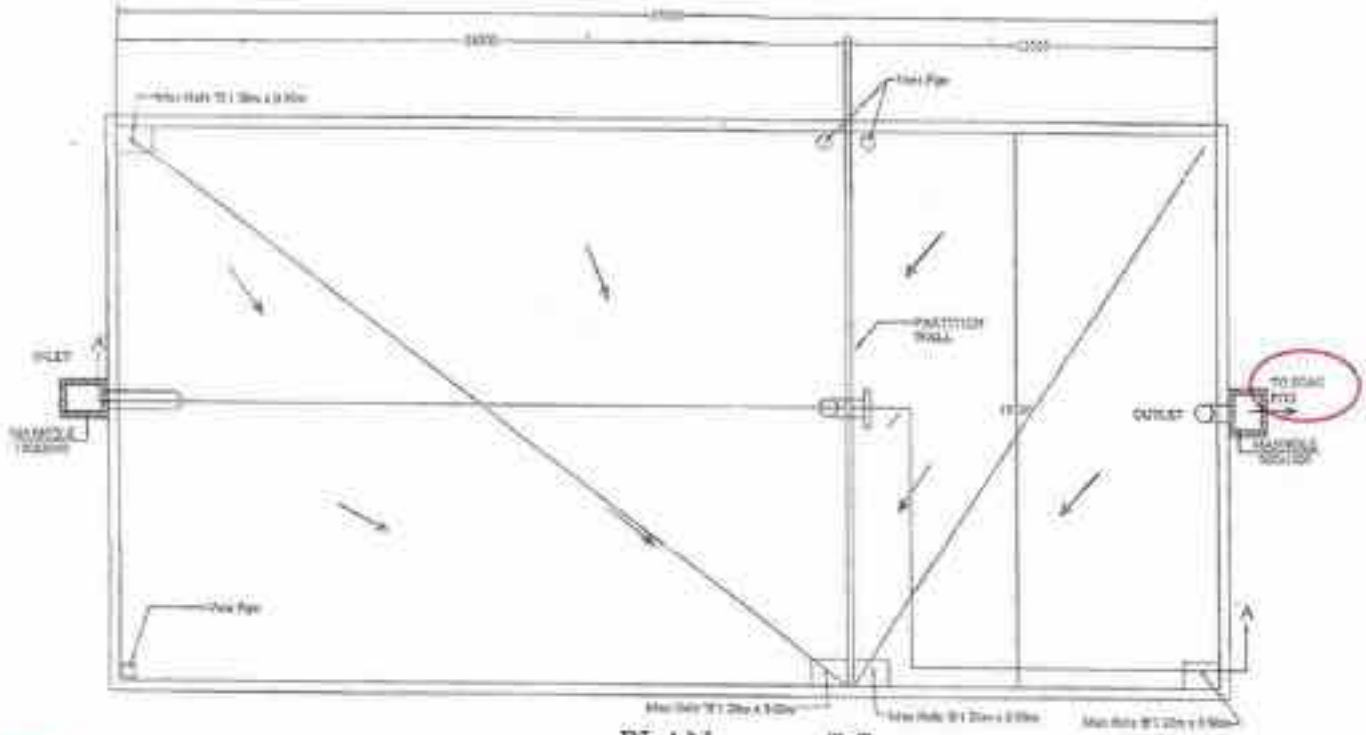
Rupees Five hundred and twenty six lakhs & three thousand only

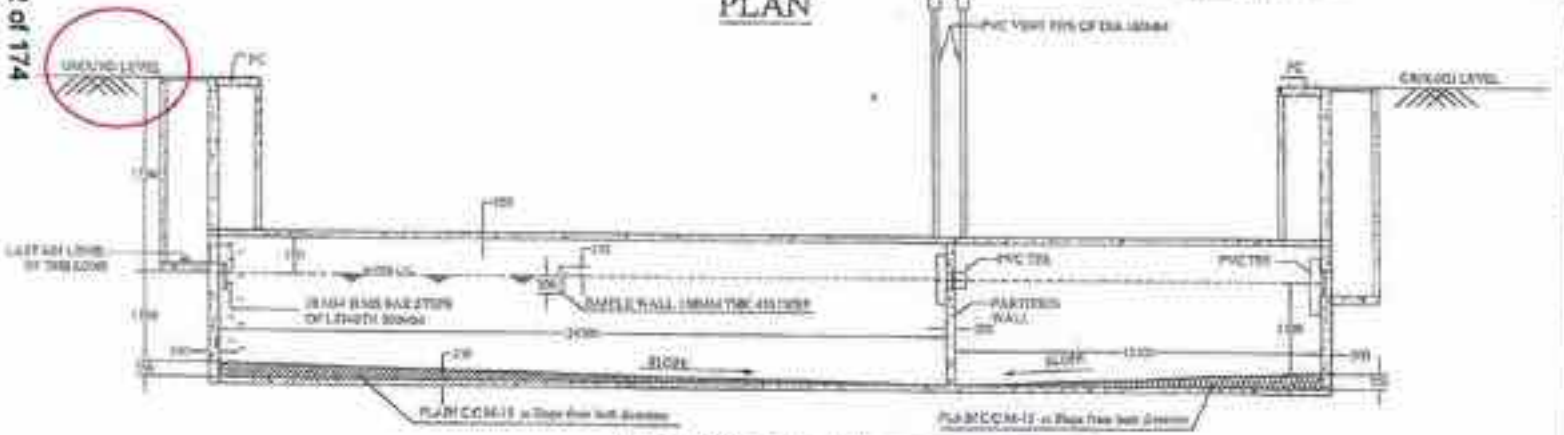
No. 546

Assistant Engineer
N.H.P.I.U. Sub Division
Barwani (M.P.)

Executive Engineer
N.H.P.I.U. Division
Barwani (M.P.)

Chief Engineer (P.W.D.)





SEWERAGE PROJECT DHARAMPURI

CLIENTS

NVDA, BHOPAL

AGENCY

SHEET TITLE

SEPTIC TANK
Zone-4

GENERAL NOTES :-
(1) ALL DIMENSION ARE IN mm UNLESS NOTED OTHERWISE.
(2) REINFORCEMENT SHALL BE HYSD BAR OF GRADE Fe 415 CONFORMING TO IS 1786:1985.
(3) GRADE OF CONCRETE USE SHALL BE M20 CONFORMING TO IS 456:2000.
(4) CLEAR COVER TO REINFORCEMENT SHALL BE
COLUMN 40 mm
BEAM 25 mm
SLAB 20 mm
FOOTING 50 mm
(5) POSITION OF KNOCK CHARGE MESH SCREW UPS TO BRICKWORK.
(6) ALL THE BEAMS AND COLUMN JUNCTION SHOULD HAVE PROPER ANCHORAGEMENT.
(7) PROVIDE DEVELOPMENT LENGTH
COMPRESSION STEEL 25Ø
TENSILE STEEL 47Ø
(8) FOR DISPOSAL OF KNOCK BOX REFER DET.
(9) THE SLAB AREA SHOULD BE FENCED TO AVOID VEHICULAR AND OTHER LIVE LOAD EXCEPT SUM OVERBURDEN OF SOIL.
(10) THE SOIL AROUND THE STRUCTURE SHALL BE OF 1:1 SLOPE, MIN.

SCALE	N.T.S.	NOTES :-

DRAWING NO.

DHRAMPURI-4/1

General Lay out Zone-4

SHEET NO.	REVISION NO.
S - 01	00

CLIENT | CONSULTANT

CONSULTANT

Aqua Consultants
A-34, IT, Jadia Nagar, Bhopal.
Ph : 2424876, 4203121

Annex 3.2-C

DHARAMPURI
ZONE - 4

DESIGN OF SEPTIC TANK

No. of plots		[illegible]
Population (ultimate)		[illegible]
(Considering 5 persons per plot and 50% population growth for ultimate design)		
Dry weather flow 80% of water supply	=	100 lpcd
(Minimum 100 lpcd as per CPHEEO Manual on Sewerage and Sewage Treatment)		
Average flow of sewage		6.69 lps
Sewage flow including infiltration@ 20%		8.22 lps
Total quantity of sewage		710400 lpd
Detention time		24 hours
Capacity of septic tank		710400 litres 710.6 cum
Rate of sludge deposition*		1.30 cum/100persons/year * As per IS:2470 (Pt. 1)-Appendix B
Frequency of cleaning		1 year
Volume of sludge deposition		197 cum
Total capacity of tank		911 cum
Depth of tank		1.50 m
Area of tank		607 sqm
L/B ratio		2.00
Breadth of tank		17.43 m
Say		17.40 m
Length of tank		34.85 m
Say		34.90 m

Provide septic tank of 34.9 m x 17.4 m x 1.50 m liquid depth

Assistant Engineer
P.H.E. Sub Division
Barwani (M.P.)

Executive Engineer
P.H.E. Division
Barwani (M.P.)

SEWERAGE PROJECT, DHARAMPURI
DESIGN OF SEPTIC TANK
ZONE - 4

Internal Dimensions 18.50 m x 37.0m X 1.50 M Water Depth

Depth of Fluid	1.50	
Freeboard	0.30	

Assumptions-

Grade of Concrete	M-20	
Steel	Grade Fe -415	
Tensile strength of steel	230	N/mm²
Compressive stress of steel	190	N/mm²
Depth of soil	4	m

DESIGN:-

1.Design of Slab (S_1)

Load on Slab per meter 4

Live Load on Slab	6	kN
Self Wt of slab	5	kN
	11	kN

Design slab as Two way slab

Assume depth of slab as 200 mm

Consider critical case i.

l_y = 4.65 l_x = 4.65 m

l_y/l_x = 1.00

Max. Co-efficient for ratio 1 0.056

Moment in slab due to load 13.32 kNm

Mu 19.98 kNm

Check for depth of slab 76.10 mm < provided thickness

Provide 200 mm since it slab of septic tank additional cover from corrosion point of view as per IS 3370

Ast	432.32	mm²	
Spacing of 10 d.a Bars	5507	mm	> 3 d
Provide 10mm dia @	150	cm c/c bothways and at top of beams	

2.Design of Beam (RB1)

Load on beam centre from slab = 55 kN

SEWERAGE PROJECT FOR REHABILITATION SITE,
DHARAMPURI
ZONE - 4

ESTIMATE FOR SEPTIC TANK

Sr.	Particulars of item	No.	Length	Width	Depth	Quantity	Unit	Rate	Amount	Remark
1	Earthwork in excavation for pipe trench in all kinds of soils, including dressing watering, ramming and disposal of excavated earth upto 50 m lead and 1.5 m lift.									
	Septic tank	1	35.10	17.60	3.00	1853.28	cum			
	Chamber 1.20m x 0.90m	2	1.40	1.1	1.50	4.62	cum			
						1857.90	cum	68	126372	
2	Earthwork in excavation for pipe trench in all kinds dressing stacking of useful material disposal of unserviceable use upto 50 m lead and 1.50 m lift.									
	a) Soft rock -									
	Septic tank	1	35.10	0.20	0.20	1.40	cum	114	160	
	b) Hard rock requiring blasting-									
	Septic tank	1	35.10	17.60	0.10	61.78	cum	200	12355	
	Providing and laying mechanically mixed cement concrete with 40 mm nominal size graded crushed stone aggregate including centering and shuttering in plinth & foundation upto 1.20 m above GL in RCC									
	Septic tank	1	35.10	17.60	0.10	61.78	cum	1675	103425	

(94)

Sl.	Particulars of item	No.	Length	Width	Depth	Quantity	Unit	Rate	Amount	Remarks
	Providing and placing in position cold twisted steel and hot rolled deformed steel reinforcement for RCC work including cutting, bending, binding etc. complete i/c cost of binding wire and wastage.									USR DNo 12.14 P 130
	Chamber slab	1%	of RCC work			30734	kg	24	737616	
	20 mm thick cement plaster in single coat finished even smooth and curing complete. In cement mortar 1:5									USR DNo 13.26 m P 132
	Chamber	2	5.12		1.15	11.78	sqm	65	763	
	12 mm thick cement plaster in single coat including finishing even smooth and curing etc. complete. In cement mortar 1:5									USR DNo 12.25 iii P 131
	Chamber	2	4.20		1.15	9.66	sqm	47	454	
	Neat cement punning even smooth and curing etc. complete.									PWD SOR V No.5 P 107
	Chamber	2	4.20		1.15	9.66	sqm	10	97	
	Providing & fixing form work i/c centering, shuttering, propping, bracing etc. complete and including removal of form work in foundations, footings, columns etc of any size and shape upto plinth level									USR DNo 12.28 a P 132
	Chamber slab etc.	2	5.64		0.15	1.69	sqm			
	Footings	24	4.80		0.15	17.28	sqm			
						18.97	sqm	63	1195	

Annex 3.2-F

Particulars of item	No.	Length	Width	Depth	Quantity	Unit	Rate	Amount	Remarks
Septic tank									
Chamber									
Providing, laying 110 mm dia PVC pipe for									
Septic tank									
Providing, fixing 160 mm dia PVC tee for									
Septic tank									
Filling available excavated earth in trenches in layers not exceeding 20 cm depth including consolidation of each layer by ramming and watering, lead upto 50 m and lift upto 1.50 m.									
Total excavation									
Septic tank									
Chamber									
Filling (required)									
Total									
Say								Rs. 24.60 lakh	

Assistant Engineer
N. D. P.H.E. Sub Division
Barwani (M.P.)

Executive Engineer
N. D. P.H.E. Division
Barwani (M.P.)

MB No 204

Annex 3.2-G

256

No. 21 1201
Dhaampur
27.2.06

EE

XVII-E 35-B (Large)
P.W.D.

P.W.D. Form No. 3

Executive Engineer
N. D. P. H. E. Division
Barwan (N. P.)
Division

Assistant Engineer
N.D.P.H.E. Sub Div.
DHAMPUR
BARWAN
Sub-Division

MEASUREMENT BOOK

MB No. 204 Barwan No.

Name of Office Executive Engineer NDPHE Division, Barwan

Date of first entry

Date of last entry

Assistant Engineer
N.D.P.H.E. Sub Div.
DHAMPUR

Annex 3.2-G

nts re.	Remark	Particulars	Measurements up-to-date					Remo
			No.	L.	B.	D.	Contents of area	
5	7	1	2	3	4	5	6	7
				Fly - Sheet-				
		Name of work:-		Construction of R.C.C Septic Tank No.4 in Zone No.1 for sewerage arrangement in R/Site Dharampur.				
		Name of Contractor:-		M/s B.B. Agrawal, Dha				
		Work order no:-		~~182~~ 420	Dated	~~10.2.06~~ 28.3.06		
				420	Dated	28.3.06		
		Agreement no		16/2005-06				
		Date of Starting:		10.4.06				
		Date of Completion		2.7.06				

Annex 3.2-G

XVII-E-35-B (Large)
P.W.D.

20

IV th & Final bill

Particulars		Measurements up-to-date					Remark
		No.	L.	B.	D.	Contents of area	
1		2	3	4	5	6	7
IV th and Final bill recorded in favour of M/s R.B. Agrawal, Director of the Co							
MB No. L	Qty		Particulars of Item.				
Page	Executed						
		1/I-12.10 P-128	Earth work in excavation for pipe trench in all kinds of soil i/c dressing, watering ramming and disposal of excavated earth upto 1.5m lead and 1.5m lift.				
197/P-35	3773.664 ~~-932.54~~ 2841.124						
197/P-35	2654.536 2654.536	I/12.9 P-128	Extra for every additional lift 1.50m or part there of over 3m initial.				
		3/I-12.11 P-129	Providing and laying mechanically mixed cement concrete 1:4:8 (1 cement 4 coarse sand 8 graded stone aggregate nominal size 40mm) excluding centering and shuttering.				
197/P-35	81.14 ~~-Nil~~ 81.14		In plinth & foundation upto 1.2m above G.L.				M10
		I/I-12.12 P-129	Providing and laying mechanically mixed cement concrete with 12mm nominal size graded crushed stone aggregate excluding centering and shuttering.				
197/P-35	221.26 ~~Nil~~ 221.26		In plinth foundation upto 1.2m above G.L. in				M15
		5/I-12.13 P-130	Providing and laying mechanically mixed P.C.C. with 20mm graded crushed stone aggregate excluding centering and shuttering and reinforcement in foundation and plinth in				
197/P-35	462.56 ~~-462.56~~ Nil						
		7/I-12.14 P-131	Providing and laying in position cold [illegible]				
197/P-35	3798.69 ~~-3798.69~~ Nil		[illegible]				

Annex 3.2-G

XVII-E-35-B (Large)
P.W.D. 26

Sketch

Particulars	Measurements up-to-date					Remarks
	No.	L.	B.	D.	Contents of area	
1	2	3	4	5	6	7
		Abstract of Payment				
(1) The total value of work done					Rs 2784878.00	
(2) Less payment already received on the bill					Rs 2660440.00	
(3) Less payment to be made on this bill					Rs 124438.00	
(4) Deductions :-						
(1)	0.5%	I.Tax @ 2%		Cr Rs		
(2)	0.5%	Edn Cess @ 1%		Cr Rs		
(3)	5.0%	Deposit @ 1%		Cr Rs		
(4)	2.00%	Works Tax @ 5%		Cr Rs		
	(5)	Fuel Testing Charges		Cr Rs		
				Total Cr Rs		
(5) Payment made by cheque					Rs 124438.00	

16.10.06

Executive Engineer
Water Supply Division
K. Bhatkal

Executive Engineer
N.D.P.C. Division
K. Bhatkal

Annex 3.2-H

(104)

संलग्न :- 2 (ए)

कार्यालय; कार्यपालन यंत्री,
नर्मदा विकास लोक स्वास्थ्य यांत्रिकी,
खण्ड–बड़वानी

–: प्रमाण–पत्र :–

प्रमाणित किया जाता है कि, पुनर्वास स्थल - धरमपुरी, तहसील - धरमपुरी, जिला - धार के विकास कार्य, प्राक्कलन की प्राप्त तकनीकी स्वीकृति के अन्तर्गत किये गये हैं। विकास कार्यों में कोई डेविएशन नहीं हुआ है।

कार्यपालन यंत्री,
नर्मदा विकास लो.स्वा.यां.,
खण्ड–बड़वानी

Annex 4-A

पत्रांक 176/2013
दिनांक 30.11.2013

गप्रप्रभक्षेनिविविकपलि0 (सचा0 / ससा0) वृत्त धार

क्रमांक 4691 /3030 / कार्य / 01 / 13-14 धार, दिनांक 13.11.13

प्रति

सचिव,
(उच्च न्यायिक सेवा)
जांच आयोग,
ए / 4 सरदार पुर्नवास [illegible]

विषय :- सरदार सरोवर परियोजना के अंतर्गत पुनर्वास स्थलों पर किये गये निर्माण कार्यों की गुणवत्ता की जांच के संबंध में ।

संदर्भ :- आपका पत्र क्र0 133 / 5 आयोग / 09 / 2013 दिनांक 28.05.2013

उपरोक्त विषयान्तर्गत आपके संदर्भित पत्र के माध्यम से सरदार सरोवर परियोजना के अंतर्गत पुनर्वास स्थलों पर किये गये निर्माण कार्यों की गुणवत्ता की जांच के संबंध में सही गई सगठसपा0 वृत्त धार के अन्तर्गत आने वाले तह0 मनावर एवं कुक्षी की विस्तृत जानकारी निम्नानुसार आपकी ओर प्रेषित है :-

1. सरदार सरोवर पुनर्वसाहट साईट के तहत मनावर तहसील के 14 नं. ट्रांसफार्मर पुनर्वसाहट साईट के वर्तमान में निर्जन (विरान) होने के कारण होने वाली समाजिक चोरी के डर से संबंधित वितरण केन्द्र कार्यालय की सप कस्टडी में रखे गये है एवं तहसील कुक्षी के 7 नं. वितरण ट्रांसफार्मर जरी हो जाने के कारण साईट पर लगे हुए नही है । अन्य सामग्री यथा पेनल पेनल बाक्सेस / स्वीच बोर्ड एवं स्वीच गेयर उपकेन्द्र पर स्थापित है। कार्योत्तरीय सामान्य प्रक्रिया के तहत उक्त ट्रांसफार्मर पुर्नवास स्थल से लाये गये है ।
2. कुल 21 नं. वितरण ट्रांसफार्मर (तहसील मनावर के 14 नं. एवं तहसील कुक्षी के 7 नं.) संबंधित वितरण केन्द्र कार्यालय की सेफ कस्टडी में रखे गये है ।
3. किसी भी स्थल से निकाली गई विद्युत सामग्री का विवरण वितरण केन्द्र कार्यालय स्तर पर संबंधित रिकार्ड संधारित नही किया जाता है इसलिए प्रमाणित प्रतिलिपि उपलब्ध कराया जाना संभव नही है ।
4. जारी गये 7 नं. वितरण ट्रांसफार्मर की पुलिस एफ.आय.आर. दर्ज हुई जिसकी छायाप्रति संलग्न है ।
5. किसी स्थान विशेष पर ट्रांसफार्मर अथवा सामग्री के बदलने हेतु सामग्री क्रय करने की प्रक्रिया कम्पनी नीति के अंतर्गत नही है ।
6. बिन्दु क्रमांक 1 के अनुसार वितरण ट्रांसफार्मर पृथक पत्र संबंधित वितरण केन्द्र पर सुरक्षित रखे गये है ।

[illegible]

Annex 4-A

7 पुर्नवास स्थलो पर स्थापित उपकेन्द्रो एव ट्रान्सफार्मरो एव अन्य उपकरणो की टेस्टिंग आदि कार्य ड्राय सीजन मे आवश्यकता नही होने के कारण परीक्षण नही किया गया । अत परीक्षण रिपोर्ट प्रस्तुत की जाना सम्भव नही है ।

8 तहसील मनावर एव कुक्षी के 6 नं 33/11 केवी उपकेन्द्रों पर फायर बजेटस एव फायर एक्सटींग्युशर वर्तमान मे स्थापित है । किन्तु गत एक वर्ष के दौरान सबधित उपकरणो का परीक्षण नही किया गया है ।

9 तहसील मनावर एव कुक्षी के 6 नं 33/11 केवी उपकेन्द्रो पर फर्स्ट एड बाक्स वर्तमान मे रखी हुई है ।

10 टेस्टिंग आपरेशन एव मेन्टेनेस आदि का कार्य कम्पनी द्वारा समय समय पर किया जाता है ।

सलग्न – उपरोक्तानुसार ।

अधीक्षण अभियन्ता (सम्भाग/सम्भा)
मप्रपक्षेवितरण कम्पनी धार
धार, दिनाक

पृ0क्र0 अ.अ./कार्य/2013–14

प्रतिलिपि –

01 कलेक्टर जिला धार की ओर पत्र क्र0 11113 दिनाक 24.08.13 के सदर्भ मे सूचनार्थ ।

02 मुख्य अभियन्ता (इ.वे.) मप्रपक्षेवितरण इन्दौर ।

03 कार्यपालन अधि (सम्भा/सम्भा) मप्रपक्षेवितरण राजगढ/मनावर को ओर उनसे प्राप्त जानकारी के सदर्भ मे सूचनार्थ ।

अधीक्षण यत्री (सम्भा/सम्भा)
मप्रपक्षेवितरण धार

Annex 4-B

4/C

कार्यालय कार्यपालन यंत्री

नर्मदा विकास (वि./पा.) संभाग बड़वानी

पत्र क्र. /का.या.वि./पा./झा.आयोग/बड़वानी दिनांक /06/2013

प्रति

अधीक्षण यंत्री (सं.नि.गे.) मॉडल अधिकार (झा.आ.)
नर्मदा घाटी विकास प्राधिकरण,
सरदार सरोवर परियोजना मंडल, बड़वानी

विषय :– सरदार सरोवर परियोजना के अंतर्गत पुनर्वास स्थलों पर किये गये निर्माण कार्यों की गुणवत्ता की जांच के संबंध में।

संदर्भ :– 1. सचिव, झा. जांच आयोग इन्दौर का ज्ञाप क्र. 132/आर.आर.साईट्रा/09/2013 इन्दौर दिनांक 28.05.2013
2. मौलाना आजाद राष्ट्रीय प्रौद्योगिकी संस्थान भोपाल का ज्ञाप क्र. CE/84 दिनांक 27.05.2013
3. आयुक्त पुनर्वास/फील्ड एजेंसीज का पत्र क्र. 2711/पुन/मेनिट/13/दिनांक 1.6.2013

कृपया संदर्भित पत्र दिनांक 27.05.2013 के प्रथम पेरा में यह लेख किया गया है कि जगान टेस्ट सर्टिफिकेट एक से अधिक पुनर्वास स्थलों की सूची में प्रस्तुत किया गया है। जिससे यह निष्कर्ष निकलता है कि इण्डेक्स में दर्शाये गये टेस्ट अनुसार एवं वास्तविक रूप से कराए गए संख्या में भिन्नता है। इस संबंध में वस्तुस्थिति इस प्रकार है कि एक निविदा के तहत एक से अधिक पुनर्वास स्थलों का घाड़ते विद्युतीकरण कार्य का अनुबंध किया गया एवं टेस्ट सर्टिफिकेट एक से अधिक पुनर्वास स्थल में कराये गये टेस्ट के रिजल्ट दिये गये है। एक से अधिक प्रतियों में एवं एक से अधिक पुनर्वास स्थलों की सूचियों में प्रस्तुत किये गये है। यहां यह भी अवगत कराना है कि मैनिट के द्वारा जब भी जो भी जानकारी मांगी गई हमारे द्वारा दी गई है एवं सावधी बरती उसमें पारदर्शिता है। मैनिट को न केवल मूल अभिलेख की छायाप्रति उपलब्ध कराई गई बल्कि उन छायाप्रतियों का मूल अभिलेख से बार-बार भोपाल जाकर मिलान करवाया गया एवं मूल अभिलेख में जो भी जानकारियां संधारित है उनका स्थल-वार से प्रपत्रों में जानकारी एकत्रित की गई और प्रस्तुत की गई। यहां तक की एक ही स्थल की जानकारी अनेक प्रपत्रों में दोहरीकरण के साथ भी पुन:-पुन: बनाकर प्रस्तुत की गई जिसके संबंध में इस कार्यालय के पत्र क्रमांक 795 दिनांक 03.06.2013 द्वारा अवगत कराना का कष्ट करें।

बिंदु क्रमांक 1 से यह भी उल्लेखित है कि सिस्टम इलेक्ट्रिसिटी रूल के अनुसार ही घाड़ते विद्युतिकरण से संबंधित पूरे सिस्टम जिसमें अर्थिंग, ट्रान्सफार्मर ओवर हेडलाइन, कंडक्टर आदि सभी कुछ सम्मिलित होता है का परीक्षण एवं परीक्षण उपरांत अनुमोदन एक तीसरे पक्ष यानि विद्युत सुरक्षा विभाग के इलेक्ट्रिकल इंस्पेक्टिंग अथॉरिटी द्वारा किया जाकर उनसे प्रमाण पत्र प्राप्त किया गया एवं इस प्रमाण पत्र के आधार पर ही लाइन, ट्रान्सफार्मर आदि चार्ज किये गये तथा विद्युत सुरक्षा विभाग द्वारा अनुबंध वार पुनर्वास स्थलों के बाहर विद्युतीकरण कार्यों की गुणवत्ता से संबंधित जारी किया गया प्रमाण पत्र मैनिट को पुनर्वास स्थलवार बनाई गई सूचि में दिया गया है।

बिंदु क्रमांक 2 में मांगित जो पत्र क्रमांक सी-04/ दिनांक 27.05.2013 में उल्लेखित टेस्ट विभाग द्वारा नहीं कराये गये एवं इस प्रकार की टेस्ट कराने की अनिवार्यता म.प्र.पू.क्षे.विद्युत वितरण कम्पनी/विद्युत सुरक्षा विभाग द्वारा कभी भी नहीं चाही गई सकती। ज्ञात है कि सभी तकनीकी मानदण्डों के अनुरूप पुर्नवास स्थलों में घाड़ते विद्युतीकरण का कार्य सम्पादित हुआ जिसकी गुणवत्ता के संबंध में म्यारंटी की तथा म्यारंटी अवधि आरंभ होने के बाद कहीं से कोई शिकायत प्राप्त नहीं हुई। नगरपालिका द्वारा गुणवत्तापूर्ण कार्य कराया गया है जिसकी पुष्टि विद्युत वितरण कम्पनी के लिए उपयुक्त एजेन्सीस तथा विद्युत सुरक्षा विभाग की प्रमाण पत्र से होती है।

3778
13/11/13

Annex 4-B

बिंदु क्रमांक 3 में उल्लेखित कार्य म.प्र.पश्चिम ... विद्युत वितरण कंपनी के सुपरविजन में किया गया है एवं लगाए गए पोल के संबंध में कोई शिकायत ... प्राप्त हुई।

बिंदु क्र. 4 में उल्लेखित पोल के मेनुफेक्चरर ... सर्टिफिकेट से संबंधित उपलब्ध प्रमाण पत्र की छायाप्रति रिकार्ड के अनुसार लगाई गई पोल की गुणवत्ता के ... में कोई शिकायत प्राप्त नहीं हुई।

बिंदु क्र. 5 में उल्लेखित कन्डक्टर ब्याईट्स ... स्टेशन संबंध में निवेदन है कि म.प्र. पश्चिम क्षेत्र विद्युत वितरण कंपनी के सुपरविजन में विभाग द्वारा कार्य संपादित किया गया एवं विद्युत सुरक्षा निरीक्षण के स्वीकार प्रमाण-पत्र की संतुष्टि उपरांत ही म.प्र.पश्चिम विद्युत वितरण कंपनी लिमिटेड को कार्य हस्तांतरित किया गया।

बिंदु क्र. 6 के संबंध में निवेदन है कि म.प्र. पश्चिम क्षेत्र विद्युत वितरण कंपनी के सुपरविजन में विभाग द्वारा कार्य संपादित किया गया एवं विद्युत सुरक्षा निरीक्षण के स्वीकार प्रमाण पत्र की संतुष्टि उपरांत ही म.प्र.पश्चिम विद्युत वितरण कंपनी लिमिटेड को कार्य हस्तांतरित किया गया।

बिंदु क्र.7 के संबंध में निवेदन है कि म.प्र. पश्चिम क्षेत्र विद्युत वितरण कंपनी के सुपरविजन में विभाग द्वारा कार्य संपादित किया गया एवं विद्युत सुरक्षा निरीक्षण के स्वीकार प्रमाण पत्र की संतुष्टि उपरांत ही म.प्र.पश्चिम विद्युत वितरण कंपनी लिमिटेड को कार्य हस्तांतरित किया गया।

बिंदु क्र. 8 के संबंध में निवेदन है कि म.प्र. पश्चिम क्षेत्र विद्युत वितरण कंपनी के सुपरविजन में विभाग द्वारा कार्य संपादित किया गया एवं विद्युत सुरक्षा निरीक्षण के स्वीकार प्रमाण पत्र की संतुष्टि उपरांत ही म.प्र.पश्चिम विद्युत वितरण कंपनी लिमिटेड को कार्य हस्तांतरित किया गया।

बिंदु क्र. 9 में नगरनिगम द्वारा पुनर्वास स्थलों पर ग्राह्य विद्युतीकरण के कार्य 2001–02 से 2009 तक की अवधि में कराये गये इसके पूर्व कुल विकसित लगभग स्थलों पर स्वयं म.प्र. पश्चिम क्षेत्र विद्युत वितरण कंपनी ने ही डिपाजिट वर्क के रूप में ग्राह्य विद्युतीकरण का कार्य कराया गया है। इसलिए विभागीय नस्तों में उपलब्ध समस्त टेस्ट रिजल्ट की प्रतियां प्रस्तुत की जा चुकी है। यहां यह निवेदन है कि विभाग की वर्षों से संलग्न के तकनीकि दल द्वारा समस्त पुनर्वास स्थलों का निरीक्षण अनेक बार किया जा चुका है। एवं उनके द्वारा सौंपे गये दायित्व के संबंध में आवश्यक ... आदि भी जप्त किये है। अतः यदि किसी पुनर्वास स्थल में गुणवत्ता संबंधी कोई शिकायत, जिस पर विभाग ... प्रतिक्रिया/प्रमाणपत्र की आवश्यकता परिलक्षित होती हो से अवगत कराये जाने का निवेदन है।

सहपत्र – शून्य।

कार्यपालन यंत्री
म.वि.वि./यां. संग्राम बड़वानी

पत्र क्र. 772/म.प.वि./या./ग्रा.आयोग/बड़वानी/13 दिनांक 3/06/2013

प्रतिलिपि–

1. आयुक्त (पुनर्वास/फीडर) नगर पालिका भवन ... नगर इन्दौर की ओर सूचनार्थ प्रेषित।
2. मुख्य अभियंता (वि./या.) नगरनिगम ... की ओर सूचनार्थ प्रेषित।
3. अनुविभागीय अधिकारी ... विभाग बड़वानी की ओर सूचनार्थ।

कार्यपालन यंत्री
म.वि.वि./यां. संग्राम बड़वानी

Annex 4-B

मौलाना आजाद राष्ट्रीय प्रौद्योगिकी संस्थान
भोपाल–४६२०५१ (म.प्र.) भारत
Maulana Azad National Institute of Technology
Bhopal - 462051 (M.P.) INDIA

No. CE/84 dated 27.05.2013

The Secretary,
SSP-Fake Sale Deed & Rehabilitation Sites Enquiry Commission
18/4, Jajli House, South Tukoganj, Indore, MP

27.05.2013

Subject: Missing Information in the records provided by NVDA pertaining to Electrical Services at R & R Sites.

Sir,

In the records submitted to us last month, it has been often found that the same test certificates have been annexed in several copies in files of several R&R Sites implying that the actual tests conducted are not as many as listed in the index. Furthermore, a large number of test results/certificates are totally absent in the records, including the following that still need to be submitted:

1. Under the provision 61 (4) (c) of The Indian Electricity Rules 1956, "All earthing systems shall be tested to ensure efficient earthing, before the electric supply lines or apparatus are energised". Please provide a copy of the initial test records for earthing before the supply lines were first energised at R&R sites for all transformers.
2. Material and strength test certificates for all conductors of Overhead lines including certificates for breaking strength, tensile strength etc.
3. Site Tests conducted on poles for determining their strength etc.
4. Test certificates provided by pole manufacturers, if any.
5. Under provision 75 of The Indian Electricity Rules 1956, for ensuring that joints are mechanically and electrically secure under the conditions of operation, the Test certificates for the ultimate strength and electrical conductivities of Joints between conductors of overhead lines are required.
6. Copies of test results are needed under provision 76 of The Indian Electricity Rules 1956, wherein minimum factor of safety (against maximum stresses) for conductor is to be ensured for metal / concrete / wood supports etc as the case is, determining the strength of the supports in the direction of the line and transverse to the line.
7. Test results/certificates for stay-wires, guard-wires, bearer wires etc.
8. In pursuance to provision 65 of Indian Electricity Rules, 1956, please provide the following records:
   - manufacturer's test certificates for all the routine tests for panels/switchgears as required under the relevant Indian Standard before approval as was accorded by the Inspector under rule 63
   - Site Tests for HV or EHV cables or supply lines conducted as per relevant code of practice of the Bureau of Indian Standards performed prior to commissioning
9. Any other test results / test certificates as may be available with NVDA.

Since NVDA has already submitted the records as available with them, in case NVDA does not furnish us these still not provided test results/certificates within 15 days, we would assume that the below mentioned test certificates/results are not available with NVDA, and proceed with our reporting work.

Dr Mukul Kulshrestha
Department of Civil Engineering
Tel:+91-9425079032;e-mail: mukul_kuls@yahoo.com

Annex 4-D

प्रेषक:- कार्यालय कार्यपालन यंत्री (वि.तु.)
स्वम् संभागीय विद्युत निरीक्षक.
म.प्र.शासन उर्जा संभाग उज्जैन.
29, शैल मार्ग, फ्रीगंज, उज्जैन.

प्रति,
सब डिवीजनल आफीसर,
नर्मदा विकास प्राधिकरण.
सब डिवीजन (वि./पी) बड़वानी मध्य

क्रमांक : 504 दिनांक : 27-9-2003

विषय:- नये उच्चदाब या अतिरिक्त उच्चदाब अधिष्ठानों के प्रारंभ करने की अस्थायी अनुमति ।

सन्दर्भ:- आपका पत्र क्रमांक : निरंक दिनांक : 27-09-2003.

निम्नलिखित अधिष्ठानों को उच्चदाब / अतिरिक्त उच्चदाब के विद्युत प्रदाय से जोड़ने के लिए भारतीय विद्युत अधिनियम 1910 स्वम् नियम जो इसके अंतर्गत बनाए गए हैं, के पालन की शर्त पर अस्थायी स्वीकृति प्रदान की जाती है :-

(1) 3×100 के.व्ही.ए. 11/.4 के.व्ही. उपकेन्द्र
उपकेन्द्र सरल क्रं.[illegible]/24052, 24067, 24070.
स्थान-नितरपुर फेज-I.

(2) 2×100 के.व्ही.ए. उपकेन्द्र (11/.4 के.व्ही.)
उपकेन्द्र सरल क्रमांक क्रमशः डीटी/22735, 24073.
स्थान-नितरपुर फेज-I.

(3) 4×100 के.व्ही.ए. 11/.4 के.व्ही उपकेन्द्र.
उपकेन्द्र सरल क्रमांक क्रमशः 24054, 24051, 22742, 24053.
एवं 7.0 कि.मी. 11 के.व्ही.लाईन. स्थान निवरपुर फेज-I.

(4) 3×100 के.व्ही.ए. 11/.4 के.व्ही. उपकेन्द्र व 11 केवी लाईन.
उपकेन्द्र सरल क्रमांक क्रमशः डीटी/22753, 22726, 22752.
स्थान-ग्राम-गनपुर.

(5) 2×63 के.व्ही.ए. 11/.4 के.व्ही. उपकेन्द्र
उपकेन्द्र सरल क्रमांक क्रमशः 22639, 22640.
एवं 3.9 कि.मी.11 केवी लाईन. स्थान-ग्राम डेहर.

(6) 2×100 के.व्ही.ए. व 1×63 के.व्ही.ए. 11/.4 के.व्ही. उपकेन्द्र.
उपकेन्द्र सरल क्रमांक क्रमशः डीटी/22627, 22628, 22641.
एवं 1.9 कि.मी.11 केवी लाईन. स्थान- ग्राम-बड़मान.

(7) 3×100 के.व्ही.ए. 11/.4 के.व्ही. उपकेन्द्र.
उपकेन्द्र सरल क्रमांक क्रमशः डीटी/24072, 24055, 24066.
एवं 2.0 कि.मी. 11 केवी लाईन. स्थान ग्राम-भोंदरिया.

(8) 2×100 के.व्ही.ए. 11/.4 के.व्ही. उपकेन्द्र.
उपकेन्द्र सरल क्रमांक क्रमशः डीटी/24096, 24097.
एवं 1.6 कि.मी. 11 केवी लाईन. स्थान- ग्राम गोंगली.

(9) 5×100 के.व्ही.ए. 11/.4 के.व्ही. उपकेन्द्र. सरल क्रं. 22620. एवं
उपकेन्द्र सरल क्रं. क्रमशः डीटी/22644, 22629, 22649, 22650
एवं 2 कि.मी.11 केवी लाईन. स्थान ग्राम गहलगाँव.

(10) 1×100 के.व्ही.ए. एवं 1×63 के.व्ही.ए. 11/.4 के.व्ही उपकेन्द्र.
उपकेन्द्र सरल क्रमांक क्रमशः डीटी/22626, 22637.
एवं 2.25 कि.मी. लाईन. स्थान- ग्राम कवठी.

Sub-Divisional Officer
N.D.V.A. Sub-Division
Barwani (M.P.)

((2))

(1) 1x100 के.वी.ए. 11/0.4 के.वी. उपकेन्द्र.
उपकेन्द्र सहित क्रमांक डीटी/22625.
एवं 1.4 कि.मी. 11 केवी लाईन-स्थान- ग्राम रेवटी.

(2) 2x100 के.वी.ए. 11/0.4 के.वी. उपकेन्द्र.
उपकेन्द्र सहित क्रमांक क्रमशः डीटी/24057, 24058.
एवं 1.55 कि.मी. 11 केवी लाईन-स्थान-ग्राम अजोदा.

(3) 2x100 के.वी.ए. 11/0.4 के.वी. उपकेन्द्र.
उपकेन्द्र सहित क्रमांक क्रमशः डीटी/22745, 24056.
एवं 2.5 कि.मी. 11 केवी लाईन-स्थान-ग्राम झालपुरा.

नोटः- आरोपित समस्त उपकेन्द्रों पर ए.बी. स्विच की स्थापना कर छुस्ती रिपोर्ट शीघ्र भिजवा दी जावेगी ।

अपीलकर्ता के ने किसी भी परिस्थिति में अधोहस्ताक्षरी को निम्नलिखित नोटिस जारी करेगी कि :-

1. सिद्ध 63 (अंतर्गत स्थायी स्थगिती प्रदान की जावे* ।

अथवा

2. उक्त सिविल रिवीजन में जो कि सिम्न संक्षिप्त द्वारा निर्देशित की जावेगी, अपील का कारण यह है कि अपीलेन्ट विद्युत प्रदाय (संशोधन) अधिनियम 1956 के प्रावधानों का पालन पूर्णतः नहीं करता है ।

कार्यपालन यंत्री (वि.सु.) एवं
सेवाग्राही विद्युत शिकायत निवारण मंच
उज्जैन संभाग उज्जैन.

क्रमांक/ /अपील/विद्युत शिकायत निवारण मंच/ उज्जैन, दिनांक :

प्रतिलिपि :-

(1) कार्यपालन यंत्री (ओ पै.सु.) म.प्र.राज्य विद्युत प्रेषण राजगढ़/ मनावर/धार की ओर कृपया आवश्यक कार्यवाही हेतु सूचनार्थ. उपरोक्त समस्त उपकेन्द्र एवं लाईन चार्जिंग पश्चात म.प्र.राज्य विद्युत मण्डल द्वारा अभिमुक्ति किया जावेगा ।

(2) सहायक यंत्री (वि.सु.) एवं सहा. सिविलदी. म.प्र.शासन धारजी को सूचनार्थ.

कार्यपालन यन्त्री (वि.सु.) एवम्
सेवाग्राही विद्युत शिकायत निवारण मंच
उज्जैन संभाग उज्जैन.

Annex 4-E

M.P.P.K.V.V.C.L.

MADHYA PRADESH ~~Madhya Kshetra~~ (E.M) DIVISION ...Badwani

Handing over report of 11 KV Lines, 11/0.4 KV X-mer Sub Station and LT lines ... MPEB

31-28-2-2006

1.	Name of work	Extend Electrification work at village Khamla Tahasil - Sendhwa
2.	Sanctioned estimate No. & Date	08-000.04246-03-0058 Dt. 13.08.2023
3.	Whether work done departmentally or through contractor	M.P.P.K.V.V.C.L. Badwani
4.	Name of the agency executed the work	
5.	Name & Address of the contractor who has done the work	Durga Electricals (Kusum) 527 Shanti Niketan, Saundagra Bhopal
6.	a) Length of HT lines	2.00 km. (Route Length)
	b) Type of supports	
	i) for line	13.2x13.2 13MTR Long H-Beam
	ii) for DP	— do. —
	c) PTCC approval certificate No. & date	—
7.	a) Location of the sub station	At village Khajuda Dist Dhar
	b) Capacity of the sub station	8x100 KVA Pole mounted S/S
	c) S. No. and make of the Rec. X-mer	TTL/PP. 27067 27076 27080 27083 27087 27092
8.	a) Length of LT lines	TTL/PP 27060 & 27075 Voltamp Transformer Ltd Dhar
	b) Type of supports	7.8 KM. Route Length
	c) Size of conductor	8 MTR Long PCC Pole
	i) for phase	AAA conductor
	ii) for neutral or Street Light	05 AAA conductor
		03 AAA conductor
9.	Reference for permission of electrical inspector for charging	Ni-2/1744/BTC/05-06/1384/930. Dt. 28.2.06
10.	Date of completion of work	25-2-2006
11.	Date of charging	28-3-2006

(Note : To be prepared in four copies)

T/C

For Durga Electricals

Sub-Divisional Officer

Executive Engineer (E.M.)

Assistant Engineer

M.P.P.K.V.V.Co. Ltd.

Annex 4-F

HANDING OVER REPORT OF 11 KV LINES, 11/0.4 KV X-MERS/S AND L.T. LINE TO M.P.E.B.

Date : 13/01/2006.

1. Name of work : External electrification of Rehabilitated Site-Servicing, Mr. Mangaram Bijl. Dhaler Vir-no-631 dt. 03-03-2003 Bkl. 04.07.2003
2. Sanctioned Estimate No. & Date :
3. Approval Reference to execute the work through contractor :
4. Name of the agency executed the work : Executive Engineer, M.P.K.V.V.Co. Ltd. /Nr Rajvistem Right Hydel (M.P.)
5. Name & address of the contractor who has done the work : M.P.K. Electricals, F-8/21, Maratha Railway Housing Society Near 12 No. Bus Stop Bhopal (M.P.)
6. (a) Length of H.T. Lines : 2.5 = 2½ = 2.640 Kms.
   (b) Type of support
      (i) for line : M-Beam 13 Mt long - 1 No. 15 x 6 (Min)
      (ii) for DP : M-Beam-13 Mt long
      M-Beam-13 Mt long
   (c) Size of Conductor : 0.05 Aluminium Conductor
   (d) P.T.C. approval certificate No. & Date :
7. (a) Location of the Sub Station : Rehabilitated Site-Servicing 1 No. 3-Phase Pole 100 KVA X.F.C. 11/0.4 KV) 63 x 2 (11/0.4 KV)
   (b) Capacity of the Sub Station : 100 KVA S.No. 03/21015 (2) 03/21015 (3) 03
   (c) S.No. & make of the distribution Transformer : (11) 03/21015 2 (5) 03/21015 3 (6) 03/21015 63 KVA (10) 03/21025 (5) 03/21056
8. (a) Length of L.T. Line : 160 Kg./8 Mtr. long P.C.C.
   (b) Type of support
   (c) Size of conductor
      (i) For Phase : 0.05 Aluminium Conductor (5-1 x 4) 37.60 Kms.
      (ii) For Neutral St. light : 03 Aluminium Conductor (3-4 x 1) 5.4 Kms.
9. Date of completion of work : 03/01/2006
10. Date of charging : 13/01/2006.

(NOTE : TO BE PREPARED IN FOUR COPIES)

Junior Engineer
M. P. K. V. V. Co.
MANAWAR (M.P.)

Representative of Contractor

Representative of Agency

सहायक अभियन्ता

प्रपत्र XXII-Elec.—40

प्रेषक :—

कार्यालय कार्यपालन यंत्री (विद्युत शुल्क)
एवं संभागीय विद्युत निरीक्षक
म. प्र. शासन २९, अहमदाबाद, कोलंब इन्दौर

सेवा में

अनुविभागीय अधिकारी
नर्मदा घाटी विकास प्राधि-
-करण(ई एण्ड एम)सब डिवी
नं. 1 बड़वानी

क्रमांक-2/वि. मे./पो. मा./धार/ /कार्यालय/उज्जैन दिनांक

विषय :—नए उपकेन्द्रों या अतिरिक्त उच्च-दाब प्रतिष्ठानों के प्रारम्भ करने की संस्तुति अनुमति।

संदर्भ :—आपका पत्र क्रमांक/रेंड/प्रा.पो. दिनांक 25-02-04 196

निम्नलिखित प्रतिष्ठानों को उच्च-दाब/अतिरिक्त उच्च-दाब विद्युत प्रदाय से जोड़ने के लिए, भारतीय विद्युत अधिनियम, 1910 एवं नियम जो इसके अन्तर्गत बनाये गये हैं, के पालन की शर्तों पर संस्तुति/स्वीकृति प्रदान की जाती है।

ग्राम रतवा, वि0ख0 बांकानेर जिला धार के ग्राम्य विद्युतीकरण हेतु निम्नलिखित पोल माउन्टेड उपकेन्द्र 3x63 के. वी. ए. 11/.4 के. वी. उपकेन्द्र ट्रांसफोर्मर-स्टार डेल्टा ट्रांस0, सरल कं. 24465, 24466, 24467 एवं 11 के.वी. लाईन - 5 किमी0

ग्राम सेमलदा विधेमनावर जि. धार के ग्राम्य विद्युतीकरण हेतु- 1x100केवीए 11/.4 केवी उपकेन्द्र ट्रांसफोर्मर - स्टार डेल्टा सरल कं0 24447 एवं 11 केवी लाईन। किमी0

उपरोक्त में से किसी भी प्रतिष्ठान का अभार स्वीकृति निम्न शर्तों अधीन होगा :—

1. नियम 63 के अन्तर्गत अभार स्वीकृत प्रदान की जावे।

शर्तें

2. उस निश्चित दिनांक से जो कि नियम द्वारा निर्दिष्ट की जावेगी, जबकि यह पाया जावे कि उपरोक्त प्रतिष्ठान भारतीय विद्युत अधिनियम, 1956 के प्रावधानों का पालन पूर्णतः नहीं करता है।

शर्त :- ए. बी. स्विच एक माह में लगवाकर जांच दुरुस्ती प्रेषित की जिये।

हस्ताक्षर
एस. एस. बालदे
कार्यपालन यंत्री (वि.शु.) एवं
संभागीय विद्युत निरीक्षक
म.प्र. शासन उज्जैन संभाग, उज्जैन

Sub-Divisional Officer
M.P.E.B. M.S. Division
Barwani (M.P.)

Annex 4-G

प्रेषक :-

कार्यालय,

अधीक्षण यंत्री, (विद्युत सुरक्षा) एवम्
उप-मुख्य विद्युत निरीक्षक, म. प्र. शासन
इन्दौर क्षेत्र, इन्दौर, रविन्द्रनाथ टैगोर मार्ग, इन्दौर

क्रमांक 5414

प्रति

1. कार्यपालन अभि.मं.वि.वि. एण्ड एम.
ए.बी.वी. डी. ए. बद्नावर
ग्रा.प्र.1

दिनांक 24-6-2004

विषय :- नए उच्च-दाब या अतिरिक्त उच्च-दाब अधिष्ठानों के आरम्भ करने की अस्थाई अनुमति।

संदर्भ :- आपका पत्र क्रमांक- TariFF II 3701 दिनांक 22.6.2004.

निम्नलिखित अधिष्ठानों को उच्च-दाब/अतिरिक्त उच्च-दाब के विद्युत प्रदाय से जोड़ने के लिए, भारतीय विद्युत अधिनियम, 2003 एवं भारतीय विद्युत नियम 1956 के पालन की शर्तों पर अस्थाई स्वीकृति प्रदान की जाती है।

1. 1X1600 के.वी.ए. 33/11 के.वी. उपकेन्द्र
तरफ ग्राम-भवरासला-ई.टी./104/01, मेक-स्टार डेल्टा ट्रांसफार्मर.
2. 1X100 के.वी.ए. 11/0.4 के.वी. उपकेन्द्र
तरफ ग्राम-ई.टी./2444B, मेक-स्टार डेल्टा ट्रांसफार्मर.

शर्तें :- 1. 33 के.वी. की ओर एच.टी. ब्रेकर तीन माह में लगाया जावेगा।
2. 100 के.वी.ए. ट्रांसफार्मर डी.बी.सर ए.बी. स्विच स्थापित किया जावेगा।
3. थाना-गाँव तेगल्दा, तह.बनावर, जिला-धार ग्रा.प्र.1

उपरोक्त में से किसी भी अधिष्ठान की अस्थाई स्वीकृति निरस्त मानी जावेगी यदि :-

1. नियम 63 अन्तर्गत स्थाई स्वीकृति प्रदान हो जावे।

अथवा

2. उस निश्चित दिनांक से जो कि निम्न हस्ताक्षरित द्वारा निर्देशित की जावेगी, कि यह पाया जावे कि उपरोक्त अधिष्ठान भारतीय विद्युत अधिनियम, 1956 के प्रावधानों का पालन पूर्णतः नहीं करता है।

हस्ताक्षर

पद 1 SMO Class-II

अधीक्षण यंत्री, (विद्युत सुरक्षा) एवम्
उप-मुख्य विद्युत निरीक्षक, म. प्र. शासन
इन्दौर-क्षेत्र, इन्दौर

दिनांक

पृष्ठ क्रमांक

प्रतिलिपि

(1) कार्यपालन यंत्री, मं.वि.वि. एण्ड एम. ए.बी.वी.वि.वि. बनावर की ओर आवश्यक कार्यवाही हेतु सूचनार्थ उक्त स्थापना पर्यवेक्षण प्रभारी ए.बी.वी.वि.वि. बनावर को प्रेषित किया जावेगा।

Annex 4-G

HANDING OVER REPORT OF 11 KV LINES, 11/0.4 KV X-MER S/S AND L.T. LINE TO M.P.E.B.

Date :- 12/01/2006

1	Name of work	External electrification of Rehabilitated Site-Sevalala, Tah-Manawar Dist-Dhar
2	Sanctioned Estimate No. & Date	317-00-631-16-03-0031 Dtd. 04.07.2003
3	Approval Reference to execute the work through contractor	
4	Name of the agency executed the work	Executive Engineer, N.D.I./M Division Nagarparishad (M.P.)
5	Name & address of the contractor who has done the work	M.R.K. Electricals, E-8/21, Maathya Railway Housing Society Near 12 No. Bus Stop, Bhopal (M.P.)
6	(a) Length of H.T. Lines	5.400 Kms.
	(b) Type of support	
	(i) for line	H-Beam 13 M long 175x150x6mm
	(ii) for DP	H-Beam-13 M long
		H Beam-13 M long
	(c) Size of Conductor	075 AAAC Conductor
	(d) P.T.C. approval certificate No. & Date	
7	(a) Location of the Sub Station	Rehabilitated Site-Sevalala Tah-Manawar
	(b) Capacity of the Sub Station	100 KVA (11/0.4KV), 63 KVA (11/0.4KV)
	(c) S.No. & make of the distribution Transformer	100 KVA S.No. 03/251419 (2) 01/251150 (3) 01 (4) 03/251453 (5) 03/251453 (6) 03/251453 63 KVA (1) 03/251335 (2) 03/251206
8	(a) Length of L.T. Line	140 Kg./5 mtrs. long Pcc
	(b) Type of support	
	(c) Size of conductor	
	(i) For Phase	05 AAAC Conductor (5.4x4) 33.60 Km
	(ii) For Neutral St. light	03 AAAC Conductor (5.4x1) 8.4 Km
9	Date of completion of work	03/01/2006
10	Date of charging	12/01/2006

(NOTE :- TO BE PREPARED IN FOUR COPIES)

Junior Engineer
M. P. P. K. V. V. Co.
MANAWAR (M.P.)

Representative of Contractor

Representative of Agency

Assistant Engineer
सहायक अभियंता
म.प्र.पा.क्षे.वि.कं.लि.
मनावर (म.प्र.)

Executive Engineer
M.P.E.M.S.U. Division
Barwani (M.P.)

Annex 4-H

Mehgaon

133

XXXX/Elec./40

प्रेषक

प्रति

कार्यालय कार्यपालन यंत्री (वि.सु.) एवं
संभागीय विद्युत निरीक्षक, म.प्र. शासन
120, पंजाब कॉलोनी, अशोकनगर

कार्यपालन यंत्री (E/M)
ई.एच.टी. डिवीजन
अड़वानी भिंड-व इतानी

क्रमांक 1527 दिनांक 13-12-05 200

विषय :— 100 KVA या अतिरिक्त उच्च-दाब अधिष्ठानों के प्रारम्भ करने की अस्थाई अनुमति।

संदर्भ :— आपका पत्र क्रमांक अप्रति दिनांक 13.12.2005

निम्नलिखित अधिष्ठानों को उच्च-दाब/अतिरिक्त उच्च-दाब के विद्युत प्रदाय से जोड़ने के लिए, भारतीय विद्युत अधिनियम, 1910 एवं नियम जो इसके अन्तर्गत बनाये गये हैं, पालन की शर्त पर अस्थाई स्वीकृति प्रदान की जाती है।

निवासिका - श्री लाल सिंह फौजी- भोपाल

1. 3X100 के.वी.ए. का 11/0.4 के.वी. 3 फेज

2. आवेदन क्रमांक - (i) TTL/PP/27084 (ii) TTL/PP/27088 (iii) TTL/PP/21091

3. 1X63 के.वी.ए. का 11/0.4 के.वी.ए. 3 फेज
आवेदन क्रमांक - TTL/PP/27096
+ 2 कि.मी. 11 के.वी. लाईन

पुनर्वास स्थल - भोपाल
निवास-व्यवसाय

उपरोक्त में से किसी भी अधिष्ठान को अस्थाई स्वीकृति निरस्त मानी जावेगी यदि :—

X 1. नियम 63 के अन्तर्गत स्थाई स्वीकृति प्रदान हो जाये।

अथवा

2. उस निश्चित दिनांक से जो कि निम्न हस्ताक्षरित द्वारा निर्देशित की जावेगी, कि यह पाया जावे कि उपरोक्त अधिष्ठान भारतीय विद्युत अधिनियम, 1956 के प्रावधानों का पालन पूर्णतः नहीं करता है।

T/C

हस्ताक्षर कार्यपालन यंत्री (वि.सु.) एवं
संभागीय विद्युत निरीक्षक
पो.ई. म. शासन, अशोकनगर

[पीछे देखिये

Sub-Divisional Officer
N. D. E/M Sub-Division
Barwani (M.P.)

Annex 4-H

N.V.D.A.

M.P. [redacted] BOARD (E.M.) DIVISION Badwani

Handing over report of 11 KV Lines, 11/0.4 KV X-mer Sub Station and LT lines to MPEB

Date 15.12.2005

1. Name of work — External Electrification of Mehragaon 22kV Badwani
2. Sanctioned estimate No. & Date — 67-080-06443-03-0027 dt 16/07/05
3. Approval reference of executing the work through contractor — K.V. Soni
4. Name of the agency executed the work — M/s Suraja Electrical Works N.V.D.A. Badwani
5. Name & Address of the contractor who has done the work — [redacted]
6. a) Length of HT lines — 6 Km (2 Km Route length)
   b) Type of supports
      i) for line — 15.2 x 15.2 mtr 13 mtr long "H" Pole
      ii) for DP — do
   c) PTCC approval certificate No. & date —
7. a) Location of the sub station — Village – Mehragaon Dist Badwani
   b) Capacity of the sub station — 315 kVA + 63 kVA = 1
   c) S. No. and make of the Rect. X-mer — TTL/DP/2004/3091 & 96
8. a) Length of LT lines — 2.6 Km (6.5 Km Route length)
   b) Type of support — 8 mtr PCC Pole 120 kg
   c) Size of conductor
      i) for phase — AAAC 03 conductor
      ii) for neutral or Street Light — AAAC 03 conductor
9. Reference for permission of electrical inspector for charging — CEI 1528 Date 13.12.05
10. Date of completion of work — 31.05.2005
11. Date of charging — 15.12.2005

(Note : To be prepared in four copies)

Representative of Contractor
[redacted] Soni (LIC No. 370 A1)
For Data Electrical Contractor
[redacted]

Representative M.P. Housing Board N.V.D.A.
SDE N.V.D.A.
Sub-Divisional Officer.

Asstt. Engineer (O & M) Dy. & Inc.
M.P. Housing Board
M.P.P.K.V.V.Co. Ltd.
Sub. Divi. Barwani

Annex 4-H

XXXII-Elec.-40

प्रेषक :—

कार्यालय-कार्यपालन यंत्री (वि.सु.) एवं
संभागीय विद्युत निरीक्षक म.प्र. शासन
120, पंजाब कॉलोनी, जामाखेड़ी रोड
खण्डवा (म.प्र.)

प्रति

अनुविभागीय अधिकारी
एन. डी. एच. ई. एम. उपसंभाग क्र. -1
बड़वानी

क्रमांक ..... दिनांक 200

विषय :— नए उच्च दाब या अतिरिक्त उच्च दाब अधिष्ठापनों के प्रारम्भ करने की अनुज्ञा अनुरोध।

संदर्भ :— आपका पत्र क्रमांक प्राप्ति दिनांक 26 8. 2006

2003 निम्नलिखित अधिष्ठापनों को उच्च दाब अतिरिक्त उच्च दाब के विद्युत प्रदाय के प्रारंभ के लिए ..... एवं विवरण जो इसके अन्तर्गत प्रस्तुत किये गये हैं, पत्रक को ध्यान में रखकर स्वीकृति प्रदान की जाती है।

निर्माता – देसरदा इंजीनियर्स लिमिटेड ओंकारेश्वर

5 X 100 के.वी.ए. 11/0.4 के.वी. उपकेन्द्र

सरल क्रमांक - (i) TTL/PP/27096 (ii) TTL/PP/27097
(iii) TTL/PP/27098 (iv) TTL/PP/27099
(v) TTL/PP/27100

+ 1.75 कि.मी. 11 के.वी. लाईन पुर्नवास एवास - अमदा

उपरोक्त में से किसी भी अधिष्ठापन को प्रारंभ करने संबंधी विवरण नहीं भरा गया है।

Y1 विवरण दूर के कारण स्थल निरीक्षण संभव नहीं है।

अवगत

2. इस विभिन्न दिनांक से जो कि विद्युत अनुज्ञापत्रित द्वारा निर्देशित की जाकर है। यह पत्र ..... विद्युत अधिनियम, 2003 के प्रावधानों का पालन सुनिश्चित करेगी।

टीप :- स्थापनाएं चालू होने के पश्चात विद्युत वितरण कंपनी को सूचित करेंगी।

(प्रभात)
कार्यपालन यंत्री (वि.सु.) एवं
संभागीय विद्युत निरीक्षक
खण्डवा (म.प्र.)

Annex 4-H

88

MADHYA PRADESH ELECTRICITY BOARD: (O&M) [illegible] (PAL.

Handing over report of 11 KV lines, 11/.4 [illegible] K-pur S/s and L.T. lines to M.P.E.B.-

Date : 25/01/2007

Enhancement electrification [illegible] Rlc. Manual Sub Station at Rehabilitation Zone-AWALDASH-Bagrawali

2. Sanctioned estimate No. of [illegible] : 4700-E/43-3-0/43 dt-12/3/04

3. Name of Agency executing the work. : M/s Electricals Bhopal

4. Name of the Supdy. Officer in charge of the work. : E.E. Elec. Div. M.P.P.K. Bagrawali

5. Name & address of the Contractor who has done the work. : M/s Electricals E-8/21 Maitya Rly. Housing Society (Shiva Kunj) Near D.N. Bhopal Bhopal

6. a) Length of HT lines → 1.750 Km.
b) Type of supports (i) for line : H-Beam 39 No.
(ii) for [illegible] : H-Beam 10 No.
c) P.T.C.C. approval certi. Circle No. & dt. : N/A

7. a) Location of the S/s : Shown in drawing.
b) Capacity of the S/s : 100 KVA 11/.433 KV - 5 No.
c) S.Nos & make of the Distr. Xmers : TTLM/1297-96, 98, 99, 100 "Tesla" Transformers Ltd. Bhopal
d) [illegible] : 5 Km.
e) Type of [illegible] : PCC Pole.
f) Size of conductor
i) For Phase : 03 ACSR Conductor
ii) For neutral & [illegible] : 03 ACSR Conductor
g) Dt. for Permission of Electrical Inspector for [illegible] : 30.6.06

For A.R.K. ELECTRICALS

Partner

Sub Divisional Officer
N. D. H. E. M. Sub Div. No. 1
BARWANI

Sub-Divisional Officer
N. D. H. E. M. Sub Division

Annex 4-I

(37)

XXII-Elec.-46

प्रेषक :—

प्रति

कार्यालय कार्यपालन यंत्री (वि.सु.) एवं
संभागीय विद्युत निरीक्षक, म.प्र. शासन
120, पंजाब कॉलोनी, जसवाड़ी रोड
खण्डवा संभाग खण्डवा

आधुनिकीकरण अधिकारी
नर्मदा विकास (विद्युत/सिविल)
उपसंभाग - खंडवा

क्रमांक

दिनांक 200

विषय :— मे. ... ई.व. के अतिरिक्त उच्च दाब प्रतिष्ठानों के प्रारंभ करने की अस्थाई अनुमति।

संदर्भ :— आपका पत्र क्रमांक प्राप्तिक दिनांक 25-3-2004

निम्नलिखित प्रतिष्ठानों को उच्च दाब प्रतिष्ठानों उच्च दाब के विद्युत प्रदाय से जोड़ने के लिए भारतीय विद्युत अधिनियम 1910 एवं नियम जो इसके अन्तर्गत बनाये गये हैं, तात्पर

उपरोक्त में से किसी भी अधिष्ठान को अस्थाई स्वीकृति निरस्त माने जायेगी यदि :—

1. नियम 63 के अन्तर्गत स्थाई स्वीकृति प्रदान हो जावे।

अथवा

2. उक्त निर्धारित दिनांक से जो कि किसी हालातों दशा निर्दिष्ट की जावेगी, कि यह पाया जावे कि उपरोक्त प्रतिष्ठान भारतीय विद्युत अधिनियम, 1910 के प्रावधानों का पालन पूर्णतः नहीं करता है।

Annex 4-I

(33)

(34)

For the Madhya Pradesh Electricity Board (MPEB) etc. etc.

... Km. length of 11 KV line, 11/4 ... line in ... Sub-Division

8x100 kVA 1 No. 11kV/kV Pole mounted Sub-Station at ... Ex. Colony at Rehabilitation Zone BRAHMANI

a) Length of 11 KV line : 1.2 / 1.2 / 0.3 ... Circuit

: Single Zero

: Single Zero

: Rehabilitation complete Zone at ... M.P. Nagar, Bhopal

a) Length of LT line : 80 Sq.mm Conductor

b) Type of supports
(i) For line : H Beam, PCC Pole
(ii) For ... : H Beam

c) P.T.C. approval certificate no. : nil

7. a) Location of the S/s : Shown in drawing.

b) Capacity of the S/s : 8x100 = kVA, 1x63 kVA 11/0.433 kV

c) S.No. & make of the Distribution Transformer : Shri Bella Tr. Wks Sr No. DT/24429, DT/24432, DT/24433, DT/24430, DT/24437, DT/24431
Testing Certificate No. TTC/III/27067 dated 63kVA Shri Bella Tr. DT/24...

: PCC Pole

: 50 Sq.mm Conductor

: 30 Sq.mm Conductor

... as per 25/3 ...

28.2.04

15/7/04

M/s. Sujeet Sen
A-IV Class Electrical Contractor
BHOPAL (M.P.)

Sub-Divisional Officer
N.D. E/M. Sub-Division
Barwani (M.P.)

Assistant Engineer
M. P. E. B. Barwani (M.P.)

Sub-Divisional Officer
N.D. E/M. Sub-Division
Barwani (M.P.)

Annex 4-I

Khujner

189

XXXII Elec.-40

प्रति,

सेवा में,

कार्यालय
कार्यपालन यंत्री (विद्युत सुरक्षा) एवं
संभागीय विद्युत निरीक्षक, म.प्र. शासन
38-सी महेन्द्र भवन [illegible] धारपुरी
खरगोन (म.प्र.), उज्जैन

क्रमांक :- वि.नि.-2/परीक्षा/खरगो/05-06/1384/कार्यालय उज्जैन दिनांक 28 FEB 2006

विषय :- ग्राम सुरसा तह. धारपुरी के पुर्नवास स्थल में ग्राह्य विद्युतीकरण हेतु।

संदर्भ :- आपका पत्र क्रमांक निरंक दिनांक 28-2-2006

निम्नलिखित अभिष्ठापनों को उक्त ग्राम/अतिरिक्त ग्राम का विद्युत प्रदाय से जोड़ने के लिए, भारतीय विद्युत अधिनियम, 1910 एवं नियम जो इसके अन्तर्गत बनाये गये हैं, शासन की ओर से सशर्त स्वीकृति प्रदान की जाती है।

1. ग्राम सुरसा तह. धारपुरी के पुर्नवास स्थल में ग्राह्य विद्युतीकरण हेतु
2. प्रस्तावित उपकेन्द्र :- 5x100केवीए, 11/.4 केवी परिवर्तक उपकेन्द्र
3. समस्त ट्रान्सफार्मर मेक :- जिला ट्रान्सफार्मर लिमिटेड या मेक
4. क्रमांक : डी.टी.एल/पी.पी.-2706?, डी.टी.एल/पी.पी/27086, डी.टी.एल/पी.पी/27090
5. डी.टी.एल/पी.पी/27083, डी.टी.एल.पी.पी.27087/डी.टी.एल.पी.पी. 27092,
6. डी.टी.एल/पी.पी/27091, डी.टी.एल.पी.पी. 27075/27077 1 केवी इण्डिकेटर लाईट

उपरोक्त में से किसी भी अभिष्ठापन की अस्थाई स्वीकृति निम्न शर्तों अधीन की जाती है :-

1. नियम 63 के अन्तर्गत स्थाई स्वीकृति प्रदान हो जाने।

अथवा

1. उस निश्चित दिनांक से जो कि निम्न हस्ताक्षरित द्वारा निर्दिष्ट की जावेगी कि वह पाया जाये कि उपरोक्त अभिष्ठापन भारतीय विद्युत अधिनियम, 1956 के प्रावधानों का पालन पूर्णतः नहीं करता है।

T/C

Clear

To
N. D. Jain ... Director
Barwani (M. P.)

हस्ताक्षर ... (106)
एम. सी. जैन
कार्यपालन यंत्री (विद्युत) एवं
पद संभागीय विद्युत निरीक्षक
म.प्र. शासन [illegible] संभाग खरगोन

Annex 4-I

(5)

(36)

M.P.P.K.V.V.C.L.

MADHYA PRADESH ~~Paschimi Kshetra~~ (U.M) DIVISION ...Badnawar

Handing over report of 11 KV Lines, 11/0.4 KV X-mer Sub Station and LT lines to MPEB

31 - 28.2 - 2006

1. Name of work: Extend Electrification work at village Khirnia Tehsil: Dharampuri
2. Sanctioned estimate No. & Date: 03-000.0424 - 03 - 0058 Of 13.08.2003
3. Whether work done departmentally or through contractor: through contractor
4. Name of the agency executed the work: M.P.P.K.V.V.C.L. Badnawar
5. Name & Address of the contractor who has done the work: Surya Electricals (K.V.Soni) 52/1 Shanti Niketan, Govindpura Bhopal
6. a) Length of HT lines: 2.00 km (Route Length)
   b) Type of supports
      i) for line: 13.2 x 13.2 12 mtr. Long H-Beam
      ii) for DP: — do. —
   c) PTCC approval certificate No. & date: —
7. a) Location of the sub station: At village Khirnia Tehsil Dhar
   b) Capacity of the sub station: 8 x 100 kVA Pole mounted d/r
   c) S. No. and make of the 8 no. X-mer: TTL/PP 27067 27076 27080 27083 27087 27090
8. a) Length of LT lines: TTL/PP 27060 & 27075 70 KVA Transformer Ltd Bhopal
   b) Type of support: 7.8 km. Route Length
   c) Size of conductor: 8 Mtr. long PCC pole
      i) for phase: AAA conductor
      ii) for neutral or Street Light: 03 AAA conductor
9. Reference for permission of electrical inspector for charging: Nil - 21/MPR/BDR/03-04/1384/गति. 28.2.06
10. Date of completion of work: 25 - 2 - 2006
11. Date of charging: 27 - 3 - 2006

(Note : To be prepared in four copies)

T/C

For Surya Electricals
Agent

Sub-Divisional Officer
Badnawar (M.P.)

Executive Engineer
M.P.P.K.V.V.C.L.

संलग्नक -3

Executive Engineer
Narmada Development E/M. Division
BARWANI Dist. BARWANI

XVII-E 35-B (Large)
P.W.D

P.W.D. Form No. 3

.....Division

.....Sub-Division

MEASUREMENT BOOK

No.

...me of Office.....

Date of first entry.....

Date of last entry.....

Sub-Divisional Officer
N.D. E/M. Sub-Division
Barwani (M.P.)

Particulars	Measurements up-to-date: No.	L.	B.	D.	Contents of area	Remark
1	2	3	4	5	6	7
		Fly flared				
Name of work	:- CC lined Flood diversion canal					
	@ 19 Nights - 1 32/11 KV P/Station					
Agency	:- M/s Ashok Kumar Jain, Bhiwadi					
Agmt. No	:- 1 of 2021-07. ✓					
Date of start/ completion	:-					
Abstract made	:- 1st Part/ Final					
Final Bill prepared by	:- 1st Part/ Final					
Abstract note checked by	:- Shri K.C. Narwar, SDO & N.D. Film Side Div. Bhiwadi					
Final Bill verified by	:- Shri K.C. Narwar, SDO & N.D. Film Side Div. Bhiwadi					

Particulars	Measurements up-to-date: No.	L.	B.	D.	Contents of area	Remark
1	2	3	4	5	6	7

Executive Engineer
Bhiwadi (Raj.)

Annex 4-J

Particulars	Measurements up-to-date					Remark
	No.	L	B	D	Contents at area	
1	2	3	4	5	6	7
		Compliment Certificate				
4-8-11	To pursue clause 43-A of the approved MOU/2003-04 form B dated 21.12.04 between the Construction Mr. Ashok Kumar, Jain, Bhathal and the Executive Engineer, Electrical, It is hereby Certified that the contractor has duly completed the execution of the Internal Electrification work of Rajiv Indira Housing Scheme under this div. vide agt. No. 7/EE/2005-06 dtd. 31st Jan 2005					
EE						

Certified that the measurement have been checked by me/Team in this Contract for the Adjustments either to Contractor or Department.

Check
DY. Engineer

Asstt. Engineer
N.D.E./Nd. Sub-Div.

E. P/D
Page No. = W.01
Dt. 14.09.10
M.B. No. 2870
Compartment
Deptt. Enquiry

According to the provision of 10% Check Measurement before the final Settlement of the contract Price by the Executive Engr. The site of different Sites under this Agreement has been verified by me Vide 23rd NAD/TA/2 dt. NAD as follows:

Name of Site

Gazipur

Verification

MP Hardware 6/f to 100 KVA Transformer
153 x 51 x 10 mm. Channel & Plate 100 x 50
CT Ratio 50-5 A Class 1.45 mm
Control No 4-96 MS-D-Nala

Particulars	Measurements up-to-date					Remark
	No.	L	B	D	Contents at area	
1	2	3	4	5	6	7
		Linealing excavation to M.D.S.C.R level				
		final Reduced of soil by the S.D.O of different Sites is as follows:				
S.No.	Name of Right	Heading M.D.S.C.R			Final soil checked by S.D.O	
1.	Kukna	14/06/02			4/2/05	
2	Mushapur	28/06/03			7/2/05	
3	Rekhi	19/06/03			9/2/05	
4.	Bhidsen	15/01/05			28/2/05	
5.	Kanpuri	19/06/03			14/2/05	
6.	Achheja	28/06/03			16/2/05	
7.	Kewadhi	28/06/03			21/2/05	
8.	Gambhir	19/06/03			23/2/05	
9.	Gayal	28/11/03			13/2/05	
10	Sonakut	13/06/03			7/3/05	
11	Bamlali	12/06/03			10/3/05	
12	Sirsawi	13/06/03			12/3/05	
13	Bhamta	12/06/06			14/3/05	
14	Ekalwara	25/01/05			15/3/05	
15	Jamda	13/06/05			17/3/05	
16	Kalyanpura	12/06/05			18/3/05	
17	Behrar	19/06/03			20/3/05	
18	Khedi	16/06/03			28/3/05	
19	Anderi Jt.	28/06/03			30/3/05	
20	Talwara 9/s 33/11 KV 3-1 MVA	2/09/03				

Sub-Divl. Forest Officer
N.D. Forest Division
Barsani (H.P.)

Page 167 of 174

Particulars	Measurements up-to-date				Remarks
	No.	L	B	D	Contents of area
1	2	3	4	5	6
	LT Bus	Manual make	Isolator		
PSS & Elevators —	300 kVA Transformer at H.P. 13/14				
	50mm conduit 13/12				46-70 Nos
Activity →	DB No 13/14 – 50mm DP To				Transformer DP
	74	9 nos			N
SNO	LT 50mm	112/114 Pole			37.5 mtrs
	2 No Transformers metering change				
Kavvalli →	FL pole 40mm	50	51 →	46-8 nos	
Tulsa Gokul → (PSS & Engineering DP Status)	Power Transformer 1 No Make ALSTOM 5 MVA				
	Sr No. 3981	Found working OK			
	1 CB also Alstom make found working				
R Gokul Bantai Rd	DP No (2) HP 11/12				307 kVA
	Transformer H.P. 50 Sqm				150 X 6 | 150 X 6-1
	50mm conduit Pole (11)	To DP –			57.5 mtrs
	LT 50mm HDD	11 To 2			35-50 Mtrs
	Tulsi NO 1	H Beam			Erected – 12 Nos
Khadi (I)	7.P Pole No 6/7				
	50mm DP 16	P-5	=	44-20 mtrs	
	LT 50mm Pipe	P17	=	65-20 mtrs	
Kalyanpur	DP HB 3/4 → Grip				154-8 X 103 X 178
	50mm HDD Q3 To DP				48.5 Mtrs Completed
	LT Pole 13 to 21	–			51 mtrs
Jamka	One Transformer				200 kVA
	HA No 6/7 Grip				150 X 159 X 9-5 mm
	DP To P-5 – 50mm	–			38-8 mtrs
	LT 51/22	50mm	35	20 Mtrs	
Kachura (I)	HA Pole 12/13	50mm	To Pole 11	–	Single
	LT 50mm	Pole 10/11		=	7 Joints
	HT 50mm	Total	13 Nos.		
	Through cable will check Before Final the Supply not the OK Position Also Inspection 50mm				

The Quality Control observers have been given on all Govt works. The work was Changed 2/3 years earlier. No Significant found. Observations Closed. Heavy rains & 100% for Metal Sets may be reduced to Pole Pair as penalty. & also Pole Insert for Stay found loose. / This Qs 200 m (one Khanabi) in all to be provided.

HT

Annex 4-K

Certified that this M.B. No. 117 contained Page No. 1 To 20 & Issued To S.D.O N.D. E/M Barwani on dated 9/10/05

Executive Engineer
Irrigation Development E.M. Division
BARWANI Distt. BARWANI

XVII-E 35-B (Large)
P.W.D.

P.W.D. Form No. 3

.....Division

.....Sub-Division

MEASUREMENT BOOK

No.

Name of Office.....

Date of first entry.....

Date of last entry.....

Certified that the M.B. No. 117 contains pages from 1 to 20 of a Bound Book which was in use during 2005-06

Sub-Divisional Officer
N.D. E/M. Sub-Division, Barwani (M.P.)

M.B. No 117 is issued to Shri S.C. Sudra Sub Engineer dtd 30/3/05

Sub-Divisional Officer
N. D. E/M. Sub-Division

Particulars	Measurements up-to-date					Remark
	No.	L.	B.	D.	Contents of area	
1	2	3	4	5	6	7

Name of work :- Record & Final Bill for extension/electrification work of R/Sites (11 Villages + 2 Sub stations) of Distt Dhar and Barwani.

Situation :- Barwani

Date of record :-

Agency :- M/s A.R.K. Electricals (J.V.) Bhopal

Agreement No. 02/2002-03

Work order No. 797/SAC/Barwani/3-8-2002

Date of starting work :-

Date of completion :- 180 days, upto 2-2-2003 (As per agreement)
Time extension given by the Chief Engineer E/M N.V.D.A. Bhopal upto 31-7-2006

Final Bill recorded by :- ~~C.B. Gaur~~ S.C. Savita E/M Sub Engg.

Final Bill verified by :- Shri K.C. Narware SDO E/M.

Final measurement recorded in M.B. No.

Final Bill recorded for :- →

Particulars	Measurements up-to-date No.	L.	B.	D.	Contents of area	Remark

Note: 1. The rates for substation Nizampur including 33KV line and Dealai 11KV including 33KV line is quoted as a turn-key rate with the said Nizampur details of different items to be erected has been omitted in the agreement without rates.

While measuring the details of each item it is found that the conductor in the 33KV line is less than the G. Schedule items while stay set & strain hardware found except than the G Schedule items. The rates of these items already available in the tidal agreement and the total quantity of the items are also in saving. Therefore the quantity found in short/excess has been adjusted accordingly whose reference is given in abstract of A.M. 34 on page 27 & 39.

2. There is a single item of capacitor bank of which is included in G Schedule at 120 KVAR capacity in agreement, but it was 1200 KVAR in the estimate the rate difference of such item received in the market and these are not installed by the contractor due to this reason.

Therefore proposed rate 1/3 of the estimated rate is proposed for deduction in total bill i.e. Rs 47000=

Sub-Divisional Officer
Barkhan Division

Particulars	No.	L.	B.	D.	Contents of area	Remark
1				5	6	7

Dated 12.10.05 Running Account Bill up-to-date

Payment of Provisional Bill of 21st Final Bill on account of External electrification work on K.S.T.P. 11 Village +2 Sub Station Situated in Distt. Zhob & Balochistan M/S A.F.K Electricals (P.V.T.) Electrical Contractor Agreement No. 20/2002-03 dated 3-8-02 amount mode Rs 7937800/- dated 3-8-02

Agreement Amount Rs 7937800/-

1) Total value of work done Rs 7142353=00

2) Deduct Previous bill Amount (-) Rs 7464297=00

Payment now be made Rs= 321833=00

Recovery of this above Credit — Rs 1140=00

Rs 321833=00

Recovery of these Head wise Rs 333=59=00

— Rs

— Rs 333=59=00

Passed for Rs. Rs 333=59=00

Vide T.E No. 1/1-3-09

Debit To		Credit To	
(1) W.H.S.O	Rs 266894/-	Rs 8013 S.P	Rs 533.75/-
(2) Misc. P.W Advance	Rs 66011/-		
Agreed rate after 1/3 K.P. in C.V. Bhoja			
Total Rs	333=59/-		Rs 333=59/-

Executive Engineer
Barkhan Division

Annex 4-L

Certified that this M.B. No (143) Contains
Page No 01 to 200 & Issued to The J.D.O N.D Electrical Sub Div
No. 50 Dhamnod on date 3-1-05

4[M.B.No-3] 19

Issued to Sh V.K. Pandhare
on dtd 4.1.05

Executive Engineer
Narmada Development Civil Division
KARYANI Dist. DHAR(M.P.)

[1] Name of work External Electrification at Village Dhamnod town

[2] Station of work Dhamnod

[3] Agency by which executed M/s. Power flow consultant Indore.

[4] Name of contractor M/s Power flow consultant, Indore

[5] Date of measurement Dt:- 14/06/2005

[6] Agreement Number 2 of 2005-06

[7] By whom the measurements taken V.K. Pandhare E/M Sub E

संपादन अधिकारी
कार्यालय कार्यपालन अभियंता नर्मदा विकास सिविल संभाग
कारम्यानी (म. प्र.)

20

XVII-E-35-B (Large)
P.W.D.

Particulars	Measurement up-to-date					Remarks
	No.	L.	B.	D.	Contents of area	
(1)	(2)	(3)	(4)	(5)	(6)	(7)

fly sheet

Name of work :- External Electrification works at K/S

Dharampuri Group. No. (4)

2 Situation :- Dharampuri

Agency :- M/s Power flow consultants, Jullundur.

Agreement No. 2 of 2005-06

Work order No :- 963/EIC dated 8/06/05

Bill prepared by V.K. Parle 25/9/06

Bill verified by :- Shri B.D. Sharma S.D.O N.D. 25/9 Sub Dn No. 5 Dharampuri

Bill entered in this MB Page No 113 dt 18/11/06

MB taken in MBNo 142 Page No 37 to ~~46~~ 43 dt ~~14/11/06~~ dt 19/3/06

Completion dt as per Agmt 30/9/05, 5/10/05

Actual completion dt 19/3/06

Excess qty sanctioned by ~~C.E. (M) 2555/C.E./E/M-2006-07~~ N.U.D.A. No 09013/1/ Elect./N.U.D.A./(M)05/1074 dt 9/12/06

Particulars	Measurement up-to-date No.	L.	B.	D.	Contents of area	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
34: Providing and fixing of guarding angle of size 65x65x6mm and hook clamps along with stay clamps at required places respectively	No. 20	—	—	2"	Contd.	
35: I Supplying and fixing of MS switch (1) For new line	No. 14	8	1	9	Contd.	
36: Providing and fixing of angle iron fitting size 65x65x6mm for steel stay R.S. joist and U-Bolts bolt with drilling of holes of required size.	No. 52	39	4	43	Contd.	

Note:- Newly proposed 2no. different size poles other than that of 6" schedule RS. joist-21 No. poles and 10 nos. pot struck in the 46273.00 may be distributed at the cost of contractor.