



CONSULTANCY SERVICE FOR PREPARATION OF DPR, BID DOCUMENTS, MONITORING, ENGINEERING FOR OPRC ROAD WORKS FOR GUJARAT STATE HIGHWAY PROJECT - II

ENVIRONMENTAL AND SOCIAL GUIDELINES FOR PRACTICE
OPRC-GSHP-II

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#ESGP	ESGP 01
Activity	Tree Felling Along the Project Road

Brief Description & Scopes

This code relates to tree felling or trimming within the project right of way (RoW) during the entire tenure of OPR Contract period. The scope includes practices to be followed in all phases of project implementation viz. planning, rehabilitation/ up-gradation related construction and routine operation & maintenance of the project roads.

Environmental & Social (E&S) Issues

Due to tree felling adverse impact on ecological environment is anticipated. The significance of the adverse impact depends on number of trees to be felled, ecological sensitivity (forest area, barren land, community forest etc), species diversity, support to ecosystem etc in project area. E&S issues that are anticipated during tree felling and trimming activity include the following:

- Legal issues triggered by the activity
- Cut wood disposal
- Indiscriminate felling of trees
- Health and safety of general public as well as construction workers
- Compensatory restoration measures
- Compensatory plantation, its survival monitoring and reporting

Issues such as compensatory plantation and fresh plantation in vacant land area within RoW will be within the purview and responsibility of State Forest Department.

Policy and Legal Requirements

The policy guidelines and legal requirements in the following acts and rules are applicable to the activity:

- The Forest (Conservation) Act, 1980
- Forest (Conservation) Rules, 2003

The Forest (Conservation) Act, 1980 of Government of India and its corresponding Rules, restricts de-reservation of forests or use of any forestland coming under the purview of Forest Act for non-forest purposes. Such activities will require forest clearance from Ministry of Environment and Forest (MoEF), Government of India. Since trees have been planted and are being maintained by State Forest Department along either side of PWD followed prior to cutting or trimming them under OPRC project.

Current Regulatory Framework¹

The R&B dept, GoG under the provisions of the Forest (Conservation) Act, 1980 will be the applicant requesting diversion of Forest lands for non-forest purpose in the prescribed format through the State Forest Department to the concerned Regional Office of the Ministry of Environment and Forests (MoEF), Government of India. The Regional Office of MoEF is the competent authority to issue clearance of such diversion proposals irrespective of the area involved. While issuing such approval, the Regional Office of MoEF may stipulate a condition that for every tree cut at least two trees have to be planted.

Forest Department of the Government of Gujarat after having identified the lands on the embankment and toes of the road will delineate the proposed area of compensatory afforestation on a suitable map. The Department of Forest will thereafter prepare an afforestation scheme providing therein the details of work schedule, the cost structure and proposed monitoring mechanism.

Funding Mechanism for Compensatory Plantation

The Ministry of Environment and Forests, Government of India have constituted an authority known as Compensatory Afforestation Fund Management and Planning Authority for the purpose of management of money received from user agencies for compensatory afforestation. The B&R, Dept. being the user agency in this project, will be required to deposit the money as estimated by the State Forest Department to the CAMPA.

CAMPA shall release funds to the State in predetermined instalments through the State Level Management Committee as per the Annual Plan of Operations drawn by the State Forest Department. State Forest Department using the funds received from CAMPA is responsible for undertaking compensatory plantation and its maintenance unless otherwise directed.

Recommended Environmental Practices/ Management Measures

Planning stage

Identification of Trees to be felled/trimmed: During project preparation stage *i.e.* planning or design stage, OPRC Contractor shall get each and every individual tree - that are to be felled/trimmed - identified, surveyed and mapped on the road alignment maps through his own design consultants or other appropriate agency. The regulatory guidelines and field procedures for tree survey, numbering of trees and mapping shall be consulted with local State Forest Department official.

Filing Application with State Forest Department: During project preparation stage, at least 180 days before actual construction work is planned in a road stretch, an application seeking permission to fell/trim trees shall be filed with State Forest Department routed through the Employer (B&R Dept.). Application shall be accompanied by description of tree to be felled/trimmed, identification number affixed on field and legible road alignment plan showing trees to be felled/trimmed. The standard procedure for filing applications and supplementary details required by the Forest Department for issuing clearance shall be learnt from the Department by consulting the appropriate authority in the local State Forest Department office.

Compensatory Tree Plantation

As stated above, in the State of Gujarat, it is the responsibility of State Forest Department to undertake compensatory tree plantation based on the monetary fee paid by the applicant who filed for tree felling or trimming. OPRC Contractor shall consult the local State Forest Department in this regard and their directions shall be complied with.

Fresh Avenue Plantation

Land on either side of road corridor has been handed over to Forest Department for plantation and maintenance of the same. Hence, undertaking new tree plantation in the vacant or barren stretches of land within the RoW lies within the purview and responsibility of Forest Department. OPRC Contractor shall consult the local State Forest Department in this regard and their directions shall be complied with.

Project Implementation Stage

Clearing and Grubbing: All trees permitted for felling and trimming shall alone be cleared. The trees that are to be retained as per Clearance conditions shall not be damaged or disturbed. Felling by local community or general public shall not be allowed near work areas taking advantage of the felling activity by the OPRC Contractor. OPRC Contractor shall bring to the notice of Implementing Consultant of the Employer and the local State Forest Department office, if he observes any such activity near or adjoining RoW/ work areas.

Cut wood disposal: Cut wood is the property of State Forest Department. OPRC Contractor shall abide by the directions of Forest Department in this regard and shall seek and consult local State Forest Department officials in this regard.

Safety Issues: During felling of trees, deployment and use of machinery, safety issues shall be considered, especially if the C&G is in progress near stretches where pedestrian/ commuter movement is significant. Temporary barricading to restrict public movement near work areas can be considered. Barricading can be removed after C&G is completed.

References and Recommended further reading

- Forest (Conservation) Act, 1980
- Forest (Conservation) Rules, 2003

#ESGP	ESGP 02
Activity	Setting up Labour Camps and Labour Deployment

Brief Description of Activity

This code relates to setting up of construction labour camps near or away the project site. The scope of this ESGP covers the procedures to be followed during site selection, setting-up, use & maintenance, dismantling and reinstatement of labour camp occupied land.

Environmental, Health and Safety (EHS) Issues

EHS issues that are to be addressed while setting up temporary construction labour camps include the following:

- Siting of construction camps
- Land use pattern in and around the selected camp site
- Ecological impact
- Sensitive receptors in the vicinity
- Impacts on soil environment
- Waste generation and disposal
- Liquid wastes
- Solid wastes
- Air emissions
- Sanitary conditions
- Health and hygiene
- Labour welfare
- Reinstatement of land

Certain issues such as the following have been dealt in detail in other ESGPs specified below:

ESGP 04 – Setting up Concrete Batching Plant and Casting Yard

ESGP 05 – Setting up Concrete Batching Plant and Casting Yard

These ESGPs shall also be referred and construed as reference part of the above ESGPs as well as any case where labour deployment is required.

Policy and Legal requirements, if any

The Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and Central Rules, 1998 made there under stipulates that all establishments employing more than ten (10) workers will have to meet the provisions of the act and rules made there under.

For engaging twenty or more labour on contract on any day the Contractor shall also abide by the provisions laid down in the Contract Labour (Regulation & Abolition) Act, 1970. Under this Act, the Contractor shall secure a license from the Labour Commissioner after certification from the Employer (R&B Dept, GoG in this case). The contractor shall maintain all wages, attendance, PF, leave registers as applicable under the Act and shall keep them available for any inspection by the Employer.

Similarly the provisions of Interstate Migrant Workmen Act 1979 shall become applicable in case 5 or more interstate migrant workmen are engaged by the Contractor.

Child labour prohibition Act shall be universally applicable to the Contractor which prohibits employing of any workmen/labour below the age of 14 years. In addition compliance to labour laws like payment of wages, payment of PF, equal remuneration, hours of work, overtime, weekly

holiday etc shall be observed by the contractor as per applicable laws.

Chapter 6 of The Building and other Construction Workers Act and **Chapter 28** of Central rules stipulate the basic welfare measures that are to be provided by the employer or establishment. Similarly **Chapter 5** of Contract Labour Act stipulates the basic welfare measures. These have been reproduced in **Annex A**. The stipulations shall be reviewed and followed.

Recommended Measures

Need for Labour Camps – Weigh the options: As per Clause 108.3 of MRTD specifications it is the responsibility of Contractor to make his own arrangement for the land required by him for setting up site offices, labour camps and stores. Under the OPRC model, Contractor may not require a dedicated labour camp to be set-up. Instead, Contractor can analyse all the best available options such as rental or leased housing stock available with the local community for providing housing to his labour staff. Contractor may also analyse the option of hiring local labourers in both skilled and unskilled category to avoid setting up dedicated labour camp under the project.

However, if the Contractor decides to set-up labour camp(s), the management measures recommended in this ESGP shall be fully complied as minimum requirements under OPR Contract.

Site Selection during Project planning stage: OPRC Contractor shall identify probable labour campsites both within project RoW and outside after having consultations with Implementing Consultant, R&B, Dept, GoG. The selected sites shall be evaluated against environmental impacts anticipated at each site. The site with least environmental problems which are mitigable shall be identified and reported to Implementing Consultant, B&R Dept, GoG for approval. Assistance of Local Relationship Committee (LRC) shall also be sought in order to identify a land which has no local issues and ownership conflicts since the contractor will have to pay rent for using the land.

Land Use: Ideal land use at probable construction campsites could be open, barren and non-agricultural land devoid of any vegetation or minimum vegetation. In urban areas, unused and isolated private/public lands shall be preferred over properties located in midst of residential or forested land use. Vacant, unused lands that are located at least 500-1000 m away from nearest habitation areas shall be preferred.

Tree Felling: At selected site, no trees above 100-mm girth size shall be felled. All efforts to reduce felling of trees shall be encouraged by working out alternate layout plans. Tree felling is a regulated activity at least within the RoW and practices proposed under ESGP 01 shall be followed if unavoidable. Bushes, dry grass growth, creepers etc shall be cleared.

Agreement with Landowner: Contractor shall obtain the approval of landowner even in the case of government owned land. The agreement or approval letter shall specifically state that land will be returned to the owner in pre-project stage status after the agreed duration. Payment of fair land rent value, clause for payment of compensation for any damages due to project work and time period within which the land shall be returned etc shall be explicitly mentioned in the agreement with the landowner. To record the pre-construction stage status, contractor shall take photographs of the site from every angle and document the same. During the agreement period Contractor will be responsible for discouraging encroachers and hawkers around the campsite. A copy of final agreement shall be kept ready for any inspection by the Employer.

Soil Environment: Before setting up construction camps, during clearing operation, topsoil of about 100-150 mm thick, shall be removed, if the site selected is having vegetation even in the form of ground grass cover. The removed topsoil shall be preferably used for landscaping efforts

at project site or within the camp site. Stacking at camp site should be exercised as the last option. If stored in stacks, care should be taken to avoid anaerobic condition developing in the stacks by limiting stack height to a maximum of 1.5 m and overturning the stacks after every 3-6 months.

Sensitive receptors: Sensitive receptors such as residential areas, educational institutes, hospitals, religious places, community playgrounds, water bodies used for public purposes, declared forested areas etc shall not share boundary with camp site. Preferably, the campsite should be located at the farthest location possible.

Sanitary facilities: Toilet facilities adequate in number for the capacity of the camp shall be provided. A shared toilet facility shall be located at least 200 feet away of residential dwelling units. If less distance is available, the orientation shall be kept in such a way that facility faces away from residential area. No shared toilet facility shall be closer than 100 feet to any sleeping room, dining room, lunch area, or kitchen.

Separate toilet rooms shall be provided for each sex. These rooms shall be distinctly marked "for men" and "for women" by signs printed in English and in the native language of the persons occupying the camp, or marked with easily understood pictures or symbols. If the facilities for each sex are in the same building, solid walls or partitions extending from the floor to the roof or ceiling shall separate them.

Number of privy toilet seats shall be in the ratio of one unit to each 15 persons, with a minimum of two units for any shared facility.

Urinals shall be provided on the basis of one unit or 2 linear feet of urinal trough for each 25 men. Urinals shall be provided with adequate water flush.

Bathing facilities: In the campsite, shared bathing rooms in the ratio of one room for every 10 persons shall be provided. If bathing facilities for each sex are in the same building, solid walls or partitions extending from the floor to the roof or ceiling shall separate them. Bathing room floors shall be made of smooth finish but not slippery materials; they shall be impervious to moisture. Floor drains shall be provided in all bathrooms.

Laundry and washing facilities: Hard floored washing area behind bathing facilities shall be provided in the ratio of 20 sq.ft per 30 persons or 15 families. Flooring material shall be of smooth finish but not slippery. Floor drains shall be provided to clear wastewater. Facilities for drying clothes shall be provided.

Upkeep and maintenance of sanitary facilities: Each toilet rooms, bathing rooms and washing area shall be lighted naturally or artificially by a safe type of lighting at all hours of the day and night. Each of toilet, bathrooms and wash area shall be kept in a sanitary condition. They shall be cleaned at least daily.

Lighting: Where electric service is available, each habitable room in a camp shall be provided with at least one ceiling-type light fixture. Laundry and toilet rooms and rooms where people congregate shall contain at least one ceiling- or wall-type fixture. Light levels in toilet and storage rooms shall be at least 20 foot-candles 30 inches from the floor. Other rooms, including kitchens and living quarters, shall be at least 30 foot-candles 30 inches from the floor.

Domestic garbage disposal bins: Common campsite garbage bins shall be provided at least 100feet away from nearest residential unit. Bins shall be made of metal barrels with lids and tarred inside or other equivalent container material. The containers shall be kept clean and emptied when full, but not less than twice a week. Disposal shall be at designated disposal sites as advised by the local Panchayat body or the municipal corporation.

Construction Camp facilities: One residential unit shall be provided for each family at the campsite. Any dimension of the residential unit shall not be less than 7 feet. Each adult person shall have minimum dwelling area of not less than 40 sq. feet. In case of dormitories, each person shall have a minimum of 50 sq. feet of dwelling area. In the units wherein workers cook, live and sleep in a single room, a minimum area of 100 Sq. feet per person shall be provided.

In addition, if the contractor is engaging women labour, the provisions regarding crèches shall also be observed as per law.

Material of Construction: The residential units shall be constructed of reuseable/recycleable materials, which are easy to construct and dismantle. Construction material shall be selected to provide protection against harsh natural elements such as heat, cold, monsoon etc. If corrugated GI sheets or asbestos sheets are used as roofing material, to provide cool liveable environment inside, double roofing of the same material or providing a thatched roof above campsite units shall be considered.

Provision for drinking water: Wholesome drinking water at the rate of 10 litres per person per day shall be provided in the camps which shall be used for drinking and cooking purpose only. For bathing, washing and ablution purposes, potable water at the rate of 30 litres per person per day shall be provided. The water quality provided at the campsite for all purposes including bathing and washing should meet the IS 10500-1993 specifications for desirable quality parameters (web link provided at the end). The contractor shall arrange for the testing of drinking water by way of personal equipment or through an analytical laboratory.

Provision for cooking fuel: All labourers staying in the camp shall be provided with/ encouraged to use kerosene stoves at the least for cooking purposes. Use of firewood for cooking shall be discouraged or prohibited. Within the residential unit good ventilation shall be provided if cooking is to be done inside. It will be better to cook outdoors than inside dark and enclosed living rooms of the unit.

Liquid waste generation and disposal – Regulatory Compliance: Liquid waste generation and disposal from labour camp site is a regulated activity under the Water (Prevention & Control of Pollution) Act, 1974. Any new discharge or disposal of liquid waste requires consent to establish (CTE) and operate (CTO) from the Gujarat State Pollution Control Board (GSPCB). The regulatory implications and applicability of the act on the construction labour camps needs to be ascertained from the local Regional Office of GSPCB. At any point during the contract period, Contractor is expected to comply with the regulations and directives of GSPCB. If CTE and CTO are not required under the Water Act for labour camp facilities, an exemption letter issued by GSPCB shall be maintained as part of Project Records. A copy of the CTO/CTE or the exemption letter shall be kept available for any inspection by the Employer.

Liquid waste generation and disposal: A common kitchen utensil washing area shall be provided. Washing outside dwelling units shall be prohibited. Liquid waste generated from bathing, laundry wash, kitchen utensils wash areas shall be collected at one point and disposed off to public sewer system if available. If more than 1000 litres of water is consumed at a campsite for various purposes, installing appropriate, onsite packaged treatment plant will be appropriate. Treated wastewater can be used for landscaping and gardening purposes or disposed off in public sewer system.

Wastewater generated from toilets: Wastewater emanating from toilets and urinals shall be treated onsite before disposal. Onsite options such as septic tanks and twin pit pour flush latrines shall be preferred.

Solid waste generation and disposal: Solid waste generated shall be collected in common

campsite garbage barrels as mentioned earlier. Collected garbage shall not be burnt in open as it is prohibited under Solid waste (Management and Handling) Rules, 2000. Salvageable dry waste (such as recyclable plastics, metal, glass, containers etc) shall be removed prior to disposal through the use of local scavengers. Wet solid waste shall be transported to nearest municipal/Panchayat disposal site. If area is available onsite treatment systems such as composting shall be encouraged for treating wet waste.

General Housekeeping and Sanitation: The entire campsite area shall be managed with better housekeeping practices. Sweeping the area daily at least once, prohibiting spitting, bathing, washing etc in open camp community space, avoiding cesspool formation of water/wastewater in low-lying areas, not throwing garbage and waste food indiscriminately in open areas, or feeding to local cattle, prohibiting open defecation etc. Effective measures shall be taken to prevent infestation by and harbourage of animals (pigs and stray dogs) or insect vectors or pests especially at waste disposal locations.

Reinstatement of Land: During reinstatement, all efforts to return the land in its pre- construction stage status shall be taken. Onsite treatment systems like septic tanks, leach pits, composting yards, if established, shall be closed safely. Topsoil collected prior to establishment shall be re-spread and vegetation reinstated. Any encroaches within or adjoining camp boundary shall be discouraged and Landowner/ Implementing Consultant, B&R Dept, GOG shall be kept informed about such developments. A satisfaction certificate will be secured from the landowner upon handing back the land. This certificate as well as photographs of restored land shall be kept as a document of proof and shall be provided to Employer during any inspection.

Health and Welfare Measures: If the project campsite is to be used and maintained for more than 6 months duration at a location, the Works contractor may organise and arrange medical camps exclusively for the benefit of construction workers and their families staying in the camp. The medical camp shall be organised under a registered medical practitioner.

References and Recommended further reading

- The Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
- The Building and other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1996
- Contract Labour (Regulation & Abolition) Act, 1970
- http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9791
- www.whoindia.org/.../Water_Quality_neeri_Annexure-I_DRINKING_WATER_-_SPECIFICATION.pdf

Annexure A

**Relevant Stipulations Reproduced from Construction Workers Act, 1996 and Central
Rules, 1998**

The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996

CHAPTER VI

HOURS OF WORK, WELFARE MEASURES AND OTHER CONDITIONS OF SERVICE OF BUILDING WORKERS

28. Fixing hours for normal working day, etc.-

1. The appropriate Government may, by rules, -
 - a) Fix the number of hours of work which shall constitute a normal working day for a building worker, inclusive of one or more specified intervals;
 - b) Provide for a day of rest in every period of seven days which shall be allowed to all building workers and for the payment of remuneration in respect of such days of rest;
 - c) Provide for payment of work on a day of rest at a rate not less than the overtime rate specified in section 29
2. The provisions of sub-section (1) shall, in relation to the following classes of building workers, apply only to such extent, and subject to such conditions, as may be prescribed, namely: -
 - a) Persons engaged on urgent work, or in any emergency which could not have been foreseen or prevented;
 - b) Persons engaged in a work in the nature of preparatory or complementary work which must necessarily be carried on outside the normal hours of work laid down in the rules;
 - c) Persons engaged in any work which for technical reasons has to be completed before the day is over;
 - d) Persons engaged in a work which could not be carried on except at times dependent on the irregular action of natural forces.

29. Wages for overtime work-

1. Where any building worker is required to work on any day in excess of the number of hours constituting a normal working day, he shall be entitled to wages at the rate of twice his ordinary rate or wages.
2. For the purpose of this section, "ordinary rates of wages" means the basic wages plus such allowance as the worker is for the time being entitled to but does not include any bonus.

30. Maintenance of registers and records-

1. Every employer shall maintain such registers and records giving such particulars of building workers
2. employed by him, the work performed by them, the number of hours of work which shall constitute a normal working day for them, a day of rest in period of seven days which shall be allowed to them, the wages paid to them, the receipts given by them and such other particulars in such form as may be prescribed.
3. Every employer shall keep exhibited, in such manner as may be prescribed, in the place where such workers may be employed, notices in the prescribed form containing the prescribed particulars.
4. The appropriate Government may, by rules, provide for the issue of wage books or wage slips to building workers employed in an establishment and prescribe the manner in which entries shall be made and authenticated in such wage books or wage slips by the employer or his agent.

- 31. Prohibition of employment of certain persons in certain building or other construction work-** No person about whom the employer knows or has reason to believe that he is a deaf or he has a defective vision or he has a tendency to giddiness shall be

required or allowed to work in any such operation of building or other construction work which is likely to involve a risk of any accident either to the building worker himself or to any other person.

32. Drinking water-

1. The employer shall make in every place where building or other construction work is in progress, effective arrangements to provide and maintain at suitable points conveniently situated for all persons employed therein, a sufficient supply of wholesome drinking water.
2. All such points shall be legibly marked "Drinking Water" in a language understood by a majority of the persons employed in such place and no such point shall be situated within six metres of any washing place, urinal or latrine.

33. Latrines and urinals- In every place where building or other construction work is carried on, the employer shall provide sufficient latrine and urinal accommodation of such types as may be prescribed and they shall be so conveniently situated as may be accessible to the building workers at all times while they are in such place. Provided that it shall not be necessary to provide separate urinals in any place where less than fifty persons are employed or where the latrines are connected to a water-borne sewage system.

34. Accommodation-

1. The employer shall provide, free of charges and within the work site or as near to it as may be possible, temporary living accommodation to all building workers employed by him for such period as the building or other construction work is in progress.
2. The temporary accommodation provided under sub-section (1) shall have separate cooking place, bathing, washing and lavatory facilities.
3. As soon as may be, after the building or other construction work is over, the employer shall, at his own cost, cause removal or demolition of the temporary structures erected by him for the purpose of providing living accommodation, cooking place or other facilities to the building workers as required under sub-section (1) and restore the ground in good level and clean condition.
4. In case an employer is given any land by a Municipal Board or any other local authority for the purposes of providing temporary accommodation for the building workers under this section, he shall, as soon as may be after the construction work is over, return the possession of such land in the same condition in which he received the same.

35. Creches-

1. In every place wherein, more than fifty female building workers are ordinarily employed, there shall be provided and maintained a suitable room or rooms for the use of children under the age of six years of such female workers.
2. Such rooms shall-
 - a) provide adequate accommodation;
 - b) be adequate lighted and ventilated;
 - c) be maintained in a clean and sanitary condition;
 - d) be under the charge of women trained in the care of children and infants.

36. First-aid- Every employer shall provide in all the places where building or other construction work is carried on such first-aid facilities as may be prescribed.

37. Canteens, etc. - The appropriate Government may, by rules, require the employer-

- a) to provide and maintain in every place wherein not less than two hundred and fifty building workers are ordinarily employed, a canteen for the use of the workers;
- b) to provide such other welfare measures for the benefit of building workers as may be prescribed.

The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998

CHAPTER XXVIII WELFARE OF BUILDING WORKERS

243. Latrine and urinal accommodation- Latrines or urinals, as the case may be required to be provided under section 33 of the Act shall be of the types as specified below, namely: -

- a) Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings;
 - (i) where both male and female building workers are employed, there shall be displayed outside each block of latrines or urinals a notice containing therein "For Men Only" or "For Women Only", as the case may be written in the language understood by the majority of such workers; (ii) such notice shall also bear the figure of a man or of a woman, as the case may be;
- b) every latrine or urinal shall be convenient situated and accessible to building workers at all times;
- c) every latrine or urinal shall be adequately lighted and shall be maintained in a clean and sanitary condition all times;
- d) every latrine or urinal other than those connected with a flush sewage system shall comply with the requirements of the public health authorities;
- e) water shall be provided by means of tap or otherwise so as to be conveniently accessible in or near every latrine or urinal;
- f) the walls, ceilings and partitions of every latrine or urinal shall be white washed or colour washed once in every period of four months.

244. Canteens-

1. In every place wherein not less than two hundred and fifty building workers are ordinarily employed, the employer of such building workers shall provide an adequate canteen in the manner as specified in this rule for the use of such building workers.
2. The canteen, referred to in sub-rule (1) shall consist of a dining hall with furniture sufficient to accommodate building workers using such canteen, a kitchen, store-room, pantry and washing places separately or building workers and for utensils.
 - a) The canteen referred to in sub-rule (1) shall be sufficiently lighted at all times when any person has access to it; (ii) the floor of such canteen shall be made of smooth and impervious material and inside walls of such canteen shall be lime-washed or colour-washed at least once in every six months. Provided that such inside walls of the kitchen of such canteen shall be lime-washed once in every three months.
 - b) The precincts of the canteen referred to in sub-rule (1) shall be maintained in a clean and sanitary condition; (ii) waste water from such canteen shall be carried away in suitable covered drains and shall not be allowed to accumulate in the surroundings of such canteen; (iii) suitable arrangement shall be made for the collection and disposal of garbage from such canteen.
 - c) Building of the canteen referred to in sub-rule (1) shall be situated at the distance not less than fifteen point two metres from any latrine or urinal or any source of dust, smoke or obnoxious fumes.

245. Foodstuff to be served in the Canteen- The foodstuffs and other items to be served in the canteen, referred to in sub-rule (1) of rule 244, shall be in conformity with the normal dietary habits of the building workers.

246. Serving of tea and snacks at the work places- At a building or other construction work where a work place is situated at a distance of more than zero point two kilometres from the canteen provided under sub-rule (1) of rule 244, arrangement shall be made by the employer employing building workers at such place for serving tea and light refreshment

to such building workers at such place.

247. Charges of foodstuff-

1. The charges for foodstuff, beverages and other items served in the canteen provided under sub-rule (1) of rule 244 shall be based on “no profit no loss” and the price list of such items shall be conspicuously displayed in such canteen.
2. In arriving at the prices of items referred to in sub-rule (1) the following shall not be taken into consideration as expenditure, namely: -
 - a) the rent for the land and building of such canteen;
 - b) the depreciation and maintenance charges for the building and equipment provided in such canteen;
 - c) the cost of purchase, repairs and replacement of equipments including furniture, crockery, cutlery, utensils and uniforms provided to the employees of such canteen; (d) the water charges and other charges incurred for lighting and ventilation of such canteen, and
 - d) the interest on the amounts spent for providing and maintaining furniture and other equipment for such canteen.

Contract Labour (Regulation and Abolition) Act, 1970

CHAPTER V

WELFARE AND HEALTH OF CONTRACT LABOUR

16. Canteens.-

- (1) The appropriate Government may make rules requiring that in every establishment-
 - a) to which this Act applies, wherein work requiring employment of contract labour is likely to continue for such period as may be prescribed, and
 - b) Wherein contract labour numbering one hundred or more is ordinarily employed by a contract, one or more canteens shall be provided and maintained by the contractor for the use of such contract labour.
- (2) Without prejudice to the generality of the foregoing power, such rules may provide for-
 - a) the date by which the canteens shall be provided ;
 - b) the number of canteens that shall be provided, and the standards in respect of construction, accommodation, furniture and other equipment of the canteens; and
 - c) the foodstuffs which may be served therein and the charges which may be made therefore.

NOTES

Provisions, held, are not unreasonable. *Gammon India Ltd. v. Union of India*, (1974)1SCC 596.

17. Rest-rooms.-

- (1) In every place wherein contract labour is required to halt at night in connection with the work of an establishment-
 - a) to which this Act applies, and
 - b) in which work requiring employment of contract labour is likely to continue for such period as may be prescribed, there shall be provided and maintained by the contractor for the use of the contract labour such number of rest-rooms or such other suitable alternative accommodation within such time as may be prescribed.
- (2) The rest-rooms or the alternative accommodation to be provided under sub-section (1) shall be sufficiently lighted and ventilated and shall be maintained in a clean and comfortable condition.

NOTES

Provisions, held are not unreasonable. *Gammon India Ltd. v. Union of India*, (1974) 1 SCC 596.

18 Other facilities.-It shall be the duty of every contractor employing contract labour in connection with the work of an establishment to which this Act applies, to provide and maintain-

- a) a sufficient supply of wholesome drinking water for the contract labour at convenient places;
- b) a sufficient number of latrines and urinals of the prescribed types so situated as to be convenient and accessible to the contract labour in the establishment; and
- c) washing facilities.

NOTES

Provision, held, reasonable. *Gammon India Ltd. v. Union of India*, (1974) 1 SCC 596.

19. **First-aid facilities.**-There shall be provided and maintained by the contractor so as to be readily accessible during all working hours a first aid box equipped with the prescribed contents at every place where contract labour is employed by him.
20. **Liability of principal employer in certain cases.**- (1) If any amenity required to be provided under Section 16, Section 17, Section 18 or Section 19 for the benefit of the contract labour employed in an establishment is not provided by the contractor within the time prescribed therefor, such amenity shall be provided by the principal employer within such time as may be prescribed. (2) All expenses incurred by the principal employer in providing the amenity may be recovered by the principal employer from the contractor either by deduction from any amount payable to the contractor under any contract or as a debt payable by the contractor.

NOTES

Ss. 20 & 21- Obligation to provide amenities conferred under the Act to the workers is on the principal employer. Government will be responsible for enforcement of those amenities where contractors engaged by it for executing its construction project fail to provide the amenities to its workers. Government's failure to perform its obligation amounts to violation of Art. 21 and workers can enforce their right by writ petition under Art. 32.

Peoples' Union for Democratic Rights v. Union of India, (1982) 3 SCC 235: 1982 SCC (L & S) 275.

21. **Responsibility for payment of wages.**-(1) A contractor shall be responsible for payment of wages to each worker employed by him as contract labour and such wages shall be paid before the expiry of such period as may be prescribed. (2) Every principal employer shall nominate a representative duly authorised by him to be present at the time of disbursement of wages by the contractor and it shall be the duty of such representative to certify the amounts paid as wages in such manner as may be prescribed. (3) It shall be the duty of the contractor to ensure the disbursement of wages in the presence of the authorised representative of the principal employer. (4) In case the contractor fails to make payment of wages within the prescribed period or makes short payment, then the principal employer shall be liable to make payment of wages in full or the unpaid balance due, as the case may be, to the contract labour employed by the contractor and recover the amount so paid from the contractor either by deduction from any amount payable to the contractor any contract as a debt payable by the contractor.

NOTES

S. 21 -Payment of wages including overtime wages etc. must be made directly to the workers in full except with authorised statutory deductions, if any. Payment through khatedars after deducting any advance repayable by the workers to the khatedars or any messing charges etc. was not proper. Due amounts could be recovered from the workers after paying full wages.

Labourers Working on Salal Hydro Project v.State of J. & K., (1983) 2 SCC 181: 1981 SCC (L & S) 289

THE INTER-STATE MIGRANT WORKMEN (Regulation of Employment) AND Conditions of Service) ACT, 1979

1. **OBJECT:** To regulate the employment of inter-state migrant workmen and to provide for their conditions of service and for matters connected therewith.
2. **APPLICABILITY:** It extends to the whole of India and applies to: (1) every establishments in which 5 or more inter-state migrant workmen (whether or not in addition to other workmen) are employed or who were employed on any day of the preceding twelve months. (2) To every contractor who employed 5 or more interstate migrant worker (whether or not in addition to other workmen) on any day of the Preceding twelve months.
3. **WHO IS AN INTER-STATE MIGRANT WORKMAN:**
Any person who is recruited by or through a contractor in one state under an agreement or other arrangement for employment in an establishment in another state whether with or without the knowledge of the Principle employer.
4. **REGISTRATION OF ESTABLISHMENTS:**
Every principle employer of an establishment to which this Act applies shall make an application for registration in triplicate in Form No.1 to the registering officer, along with the Prescribed fees. On receipt of an application, registering officer shall issue a registration certificate in Form-II based on the specifications stipulated in the concerned State Inter-State Migrant Workmen (regulation of employment and conditions of service) Rules
5. **FEE FOR REGISTRATION:**
If the number of Inter-State Workmen is 5 but does not
 - a. Exceed 20 Rs.50.00
 - b. Between 20 - 50 Rs.100.00
 - c. Between 50 - 100 Rs. 200.00
 - d. Between 100 - 200 Rs. 350.00
 - e. Between 200 - 400 Rs. 650.00
 - f. Above 400 Rs. 800.00
6. **PROHIBITION AGAINST EMPLOYMENT OF INTER-STATE MIGRANT WORKMEN WITHOUT REGISTRATION:**
No principle employer shall employ inter-state migrant workmen in the establishment unless a certificate of registration is obtained under this Act.
7. **LICENSING OF CONTRACTORS:**
No contractor shall (I) recruit any person in a state for the purpose of employing him in any establishment situated in another state except without obtaining a recruitment licence issued by the licensing officer of the area where the recruitment is done. (II) Employ any interstate workmen without obtaining an employment licence received from the licensing officer of the area where the establishment is situated.
8. **GRANT OF LICENCES:**
The contractor shall apply for a recruitment licence in triplicate in Form-IV to the licensing officer having jurisdiction in relation to the area wherein recruitment is made.

#ESGP	ESGP 03
Activity	Setting-up temporary, concrete batching plant and casting yard

Brief Description of Activity

This code relates to installation, operation and decommissioning of cement concrete mixing (*batching*) plant. Casting yard for manufacturing pre-cast, pre-stressed concrete structures, if has been set-up adjoining batching plant, shall also be installed, operated and dismantled as per the procedures recommended in this ESGP.

Environmental, Health and Safety & Social (EHS&S) Issues

EHS&S issues that are anticipated during installation, operation and decommissioning phases of a batching plant and casting yard include the following:

Installation Phase

- Land preparation
- Site location related sensitivities
- Loss of topsoil
- Loss of vegetation
- Change in land use
- Drainage
- Soil erosion from newly formed embankment or cut slopes

Operation Phase

- Abstraction of surface/ ground water
- Mining of stone aggregates and sand
- Erosion from stockpiles
- Local traffic management
- Impact on surface water bodies
- Impact on air quality due to fugitive dust emission from unpaved roads, other surfaces and material handling/processing
- Impact on ambient noise levels due to operation of vehicles and plant
- Solid waste generation such as rejected concrete mix and sludge from wash water etc.
- Occupational health and safety

Decommissioning phase

- Permanent change in land use of the area due to encroachment and induced development
- Reinstatement of the land to its pre-construction status

Certain issues such as the following have been dealt in detail in other ESGPs specified below:

ESGP 01 – Tree felling

ESGP 02 – Setting up labour camps and labour deployment

ESGP 07 – Sourcing construction materials

ESGP 14 – Traffic management

ESGP 15 – Deployment and use of construction equipments and vehicles

ESGP 16 – Project road and other network roads used by contractor

ESGP 20 – Debris storage, transport and disposal

These ESGPs shall also be referred and construed as forming part of this ESGP.

Policy and Legal requirements, if any: The activity is regulated under the following acts:

- Section 25/26 of The Water (Prevention and Control of Pollution) Act, 1974
- Section 21 of Air (Prevention and Control of Pollution) Act, 1981
- The Factories Act, 1948

DG sets, if installed in concrete batching plant, provisions of Environment Protection Rules (Sl. # 83 of Schedule I) and CPCB's Emission Regulations will be applicable.

Recommended Practice/ Management Measures

Project Preparation Phase

Need for Batching Plant – Weigh the options: Under the OPRC model, Contractor may not require a dedicated Concrete Batching Plant to be set-up under the project. Instead, Contractor can analyse all the best available options such as procuring ready-mix concrete (RMC) from existing Batching plants in the region or other in-situ options to prepare RMC.

However, if the Contractor decides to set-up batching plant, the management measures recommended in this ESGP shall be fully complied as minimum requirements under OPR Contract.

Site Selection during project preparation stage: It is desirable that the OPRC Contractor at the project preparation stage itself identifies the appropriate site for setting up batching plant and casting yard. The identification of plant site should include an environmental assessment process to integrate location related sensitivities. Contractor shall identify probable sites both within project RoW and outside after having consultations with Implementing Consultant of R&B Dept, GoG. The selected sites shall be evaluated against environmental impacts anticipated at each site. The site with least environmental problems, which are mitigable, shall be identified and reported to Implementing Consultant, R&B Dept, GoG for approval. Assistance of Local Relationship Committee (LRC) shall also be sought in order to identify a land which has no local issues and ownership conflicts since the contractor will have to pay rent for using the land.

Change in Land use: All possible efforts shall be undertaken to identify land area where no major alteration will be required compelling a drastic change in land use. Drastic change in land use could occur if productive agricultural lands, horticultural orchards, forest lands, dense vegetated land etc are identified for setting up the plant. Preferably rocky and barren area shall be identified and within an urban area, commercial or industrial land use shall be preferred over others.

Batching Plant and Casting yard - Installation Phase

Consent to Establish: Plant operator/ contractor shall apply to Gujarat State Pollution Control Board (GSPCB) seeking consent to establish (CTE) under Air and Water Act. Only after obtaining CTE from GSPCB, Contractor shall undertake installation activities in compliance of CTE conditions.

Tree Felling: At selected site, no trees above 100-mm girth size shall be felled. All efforts to reduce felling of trees shall be encouraged by working out alternate layout plans. Tree felling is a regulated activity and practices proposed under ESGP 01 should be followed, if unavoidable. Bushes, dry grass growth, creepers etc shall be cleared.

Agreement with Landowner: Contractor shall obtain the approval of landowner even in the case of government owned land to set up the plant. The agreement or approval letter shall specifically state that land will be returned to the owner in pre-construction stage status after the agreed duration. Payment of fair land rent value, clause for payment of compensation for any damages due to project work and time period within which the land shall be returned etc shall be explicitly mentioned in the agreement with the landowner. To record the pre- construction stage status, contractor shall take photographs of the site from every angle and document the same as part of Project Records. During the agreement period, Contractor will be responsible for discouraging encroachers and hawkers around the site. Contractor shall bring to notice of Landowner and Implementing Consultant, R&B Dept, GoG, any change in land use upon encroachment in the adjoining areas upto 100m from the site. A copy of final agreement shall be secured and kept as proof to be shown to the Employer at times when asked for.

Loss of topsoil: During preparation of land for erecting the plant, the land surface may have to be levelled by cutting or filling. A layer of topsoil of about 100mm thick shall be removed by scraping the top layer before commencing the cutting or filling activities. If the chosen site is barren (not even grass growth on surface) and rocky, there is no need to implement this measure. The scraped topsoil shall be preferably re-spread over the prepared land surface and on fill/cut slopes for landscaping and attempting vegetation within the plant premises.

Drainage: The plant area shall be sufficiently drained by well laid out network of open, unpaved, earthen drainage channels (300m wide and 150m deep). The entire length of drainage channels shall be sparsely vegetated using local grass variety (doob grass). In areas where vegetation is not possible, broken bricks, rejected stone aggregates, demolition waste etc of size not larger than 50mm can be used for pitching the channel bottom and sides.

The vegetated channels should not block the water flow and in such cases the vegetation can be trimmed manually. During monsoon, siltation is expected to occur within channel, which shall be cleaned periodically to avoid overflowing of channels.

Storage areas of chemical admixtures, fuels, lubricants etc shall be roofed and bunded all around to avoid runoff through the areas.

Soil erosion: Soil erosion is bound to occur from newly formed land surface, cut/ fill slopes and due to continuous heavy vehicle movement within the plant premises. To control soil erosion from unpaved surfaces (sheet erosion), the surface shall be dressed with at least 100mm thick rejected stone aggregates, broken bricks, demolition waste etc. The surface shall be dressed devoid of any sharp edges. If topsoil is available, landscaping and attempting ground cover vegetation shall be preferred over surface dressing with rocks and stones.

Cut/ Fill slopes on soil surface shall not be steeper than 1V: 2H. The cut and fill slopes shall be stabilised using seeding and mulching as explained in Clause 308 of MORTH specifications for road and bridge works.

Batching Plant and Casting yard - Operation Phase

Consent to Operate: After installation is complete and well before operation of the plant starts, contractor shall apply to Gujarat State Pollution Control Board (GSPCB) seeking consent to operate (CTO) under Air and Water Acts. Only after obtaining CTO from GSPCB, Contractor shall commence the operational activities.

Other permits and licences: The plant operator/ contractor shall apply to relevant authorities under Factories Act/ State Factory Rules seeking permits/ licence in compliance of the provisions of the aforesaid acts/rules . Only after obtaining such permits/licenses, Contractor shall commence operational activities.

Abstraction of surface/ ground water: Groundwater abstraction is regulated by the Central Ground Water Board (CGWB). Contractor will do well to consult the Gujarat Department of Soil and Water Conservation and CGWB before abstracting groundwater. The Central Groundwater Act (model bill) regulates the exploitation of ground water for the protection of ground water resources; prevents sinking of any well within five hundred meters of a public drinking water source; and regulates extraction of water from a well within one kilometre of the public drinking water source in a declared water scarcity area preventing sinking of well in a declared 'over exploited' watershed. The provisions of the Act/ Rules can be better consulted with local CGWB prior to abstracting water from any source located within or outside OPRC districts of Ahmedabad, Botad and Surendranagar.

Drawing water from surface irrigation canals is regulated by the Irrigation Department of Gujarat State Government. River Board / Authorities regulate the withdrawal of water from surface water

bodies such as rivers. Sourcing water from surface water bodies such as canals and rivers must have prior approval of the concerned administrative authorities.

Mining of stone aggregates and sand: Mining of sand and stone aggregates is a regulated activity. Procurement of stone aggregates and sand shall be from licensed/ government authorised sources only. Procedures presented in ESGP 07 on this issue shall be followed.

Erosion from stockpiles: Wind-borne erosion shall be prevented by sprinkling water on the surface of stockpiles. Sprinkling shall be undertaken if dust cloud is visible on the downwind side. The erosion can be better controlled by locating stockpiles within secluded area such as areas surrounded by trees, parking lots, plant itself etc may obstruct the flow of wind over stockpiles directly resulting in less wind-borne erosion. Such layout planning will get rid of water sprinkling to control erosion.

To control water-borne erosion and slumping of stockpiles during monsoon, the material shall be stored within a 300mm high wall enclosure made of RR masonry with an opening at the front to allow vehicles to load/unload material. The surface and other runoff from stockpile area shall be collected at one point and a silt trap shall be provided before letting the discharge onto drainage channels.

Impact on traffic: The internal road leading to entry and exit point of Batching Plant and Casting yard premises, shall be laid in such a way that vehicles do not have to accelerate or decelerate excessively near the junction. If necessary a gate-keeping personnel from Batching Plant and Casting yard shall guide traffic on the main road whenever a vehicle approaches from/to batching plant. The drivers of the vehicles shall be trained/instructed to drive cautiously within and outside the Batching Plant and Casting yard premises.

Sewage from Plant: Domestic sewage generated from plant premises shall be treated adequately to meet consent conditions of GSPCB before discharging out to nearest sewer line or water body. On-site treatment systems such as soak pits (where groundwater level is sufficiently low) or septic tank followed by soak pit shall be provided.

Wastewater from plant: Wastewater is generated from agitator/mixer wash water, truck washing area, yard wash water, contaminated storm water runoff etc. All such wastewater shall be collected at point and discharged into a impermeable settling pond where minimum retention time of 30minutes shall be achieved. The settling pond outlet water shall be reused in process or dust control applications suitably. The concept of zero discharge shall be achieved by recycling wastewater suitably within the plant.

Dust emission from Plant area: Dust emission is expected if internal roads and concrete delivery point is unpaved. The most effective way is to pave all the vehicle movement and loitering area using rejected concrete material or other suitable material.

Fugitive Dust from Plant: Wind-borne erosion can be controlled by measures described earlier. Erecting wind barriers in the form of trees (existing/planted), artificial landforms, compound wall etc can be erected on the windward side. On the leeward side, placing stockpiles, conveyor belts, conveyor loading and unloading points can be effective to control wind-borne fugitive dust emission. However, dust emanating from the plant operations should be controlled through in-plant dust control equipments such as bag filters or ESPs which come as part of standard equipment. The consent conditions of GSPCB in this regards shall be fully complied.

Fugitive Dust from material transfer points: Dust emission is expected when material is transferred from one point to other. Where possible, enclosures made of jute bag screens can be installed. The jute screens shall be wetted frequently using treated wastewater generated within

plant premises. The jute bag screens can be periodically washed on dust collection side and reused. Where enclosures are not possible, dampening of material with treated wastewater at start point i.e. when loaders take material from stockpiles can be carried out.

Cement Dust near Silos and mixer: Cement transfer to storage silos shall be preferably carried out using pneumatic pumps. Where bag handling is envisaged, temporary enclosures at bag handling site and PPEs for labourers shall be strictly provided. The entire mixing section shall be enclosed and dust generation from mixers shall be controlled through dust collecting equipment's to achieve consent conditions of GSPCB

Impact on Ambient Noise levels: All efforts to control noise generation from avoidable sources such as honking and idling of vehicles shall be undertaken. This shall be undertaken by training the staff.

Noise from machinery: Process equipment's, plants and machinery shall be maintained as per manufacturers guidelines to reduce tonal components, frequency modulations or impulses which will increase the annoying effect of any noise generated.

Noise barriers: The artificial barriers in the form of plantation, landforms, material stockpiles etc around the process machinery will dampen noise generation to greater extent.

Rejected concrete waste disposal: Waste minimization is the preferred approach to dealing with this problem. Where possible waste concrete should be used for construction purposes at the Batching Plant and Casting yard or project site (e.g. tree guard blocks, footpath blocks, median blocks etc or paving unsealed areas). Alternatively, waste concrete can be directed to a suitable washout pit where concrete is poured into a pool of water. Concrete gets segregated and becomes gravel, sand and fine cement sludge, which can subsequently be collected and reused². The washout pit water can be treated along with other wastewater from process area. At no point of time, the concrete waste shall be disposed off indiscriminately or disposed off along with other construction debris.

Occupational health and safety: The staff and workers involved in the operation of the plant shall be provided with adequate/ appropriate PPEs and clothing. Typical PPEs applicable are safety gloves, boots, face masks or respirators, helmets, eye protective cover or goggles, ear muffs, etc. The plant operator shall maintain as far as practicable a working environment in which employees are not exposed to hazards.

On-site staff facilities: The plant operator shall provide wholesome drinking water (meeting IS 10500-1993 standards) and sanitary facilities in adequate numbers as per provisions of Chapter III of Factories Act, 1948. Latrines provided at site shall have appropriate night-soil treatment systems such as septic tanks, twin-pit pour flush type latrines etc.

Maintain First Aid kits/ appliances at site: The plant operator shall maintain first aid kits and appliances in compliance to the provisions of State Factories Rules.

Residential facilities: Where residential accommodation is provided for some or all of the staff working within the Batching Plant and Casting yard, the procedures recommended in ESGP 02 shall be followed.

Monitoring of Environmental quality: Ambient air quality (AAQ) with respect to SPM and RPM, Ambient noise levels (ANL) in terms of Leq day and Leq night, wastewater/ sewage disposal point quality in terms of pH, oil and grease, BOD, COD and suspended solids shall be monitored at least once in 6 months or as specified under GSPCB CTO conditions whichever is stringent. The monitoring shall be undertaken at least at 2 locations viz. one on the upwind direction and another on the downwind direction.

Duration of monitoring: AAQ and ANL shall be monitored for 24 hr/day for 2 consecutive working days per week for 2 weeks in a half-yearly period. Wastewater samples shall be grab samples collected at the outlet point of treatment systems installed.

Decommissioning Phase

Reinstatement of land: The Batching Plant and Casting yard site shall be reinstated completely after decommissioning is over. Minimum level of reinstatement required is to achieve the pre-construction (installation) stage status. All civil structures including foundations, internal road pavements, paved drainage channels, wastewater treatment pits etc shall be completely removed from site. Waste treatment systems such as soak pits, night soil treatment systems etc shall be closed safely. All the building and other demolition debris shall be removed, suitably segregated and reused if possible and rest shall be disposed off in a municipal/ Panchayat approved landfill site. A satisfaction certificate will be secured from the landowner upon handing back the land. This certificate as well as photographs of restored land shall be kept as a document of proof and shall be provided to Employer during any inspection.

Permanent Change in land use: To prevent encroachment of land area vacated by batching plant and casting yard operator, the operator/ Contractor shall inform the land owner well in advance to take possession of the land immediately after batching plant and casting yard is decommissioned. If the landowner desires, the contractor shall plant the vacated area with trees. The maintenance and nurturing of trees shall be the responsibility of landowner thereafter.

References and Recommended further reading

- 1) http://www.environ.wa.gov.au/downloads/Codes_of_Practice/Concrete_Batching_Plant_s.pdf
- 2) http://www.environment.sa.gov.au/epa/pdfs/guide_concrete.pdf
- 3) Clause 308, Page 87, MRTTH Specifications for Road and Bridge Works, Fourth Revision, IRC, 2001

#ESGP	ESGP 04
Activity	Setting-up bituminous hotmix / asphalt plant

Brief Description of Activity

The code relates to siting, setting-up, use, maintain and dismantling of bituminous hot mix plants and asphalt plants during project implementation. The scope of this ESGP covers from siting to dismantling the plant and reinstatement of land area occupied by the plant.

Environmental & Social (E&S) Issues

E&S issues that are anticipated during siting, setting-up, use and dismantling of hotmix plant are as below:

Project Preparation phase

- Siting criteria
- Land use
- Location with respect to adjacent to sensitive receptors
- Accessibility and approach to main road
- Local government policies and regulations
- Landowner and community approval

Project Implementation Phase

- Land preparation
- Loss of topsoil
- Loss of vegetation
- Change in land use
- Drainage
- Soil erosion from newly formed embankment or cut slopes
- Impacts on soil environment
- Access roads and internal roads
- Material inward and outward transport
- Air pollution
- Fugitive dust emission and bitumen-like odours from storage tanks during filling, drum-mixer and trucks leaving the premises laden with hot asphalt.
- Noise generation
- Water pollution
- Debris generation and disposal
- Drainage during monsoon season
- Good housekeeping
- Safe working practices

Decommissioning phase

- Permanent change in land use of the area due to encroachment and induced development
- Reinstatement of the land to its pre-construction status

Some of the E&S issues listed above have been dealt in detail under the following ESGPs as well. These ESGPs shall also be referred and construed as forming part of this ESGP.

ESGP 10 – Clearing and grubbing

ESGP 01 – Tree felling

ESGP 02 – Setting up labour camps

ESGP 05 – Setting up site office

ESGP 14 – Traffic management during construction

ESGP 15 – Deployment and use of construction equipments and vehicles

ESGP 16 – Use of project road and other network roads used by construction traffic

ESGP 20 – Debris removal, storage, transport and disposal

Policy and Legal requirements, if any

The activity is regulated under the following acts:

- Section 25/26 of The Water (Prevention and Control of Pollution) Act, 1974
- Section 21 of Air (Prevention and Control of Pollution) Act, 1981
- The Factories Act, 1948

DG sets, if installed in hotmix plant, provisions of Environment Protection Rules (Sl.# 83 of Schedule I) and CPCBs Emission Regulations will be applicable.

Recommended Practice/ Management Measures

Project Preparation Phase

Need for Hotmix Plant – Weigh the options: Under the OPRC model, Contractor may not require a dedicated Hotmix Plant to be set-up under the project. Instead, Contractor can analyse all the best available options such as procuring bituminous hotmix from existing plants in the region or other in-situ technological options to prepare bituminous mix.

However, if the Contractor decides to set-up hotmix plant, the management measures recommended in this ESGP shall be fully complied as minimum requirements under OPR Contract.

Site Selection during project preparation stage: It is desirable that the OPRC Contractor at the project preparation stage itself identifies the appropriate site for setting up hotmix plant. The identification of plant site should include an environmental assessment process to integrate location related sensitivities. Contractor shall identify probable sites both within project RoW and outside after having consultations with Implementing Consultant of R&B DEPT, GOG. The selected sites shall be evaluated against environmental impacts anticipated at each site.

The site with least environmental problems, which are mitigable, shall be identified and reported to Implementing Consultant, R&B DEPT, GOG for approval. Assistance of Local Relationship Committee (LRC) shall also be sought in order to identify a land which has no local issues and ownership conflicts since the contractor will have to pay rent for using the land.

Change in Land use: All possible efforts shall be undertaken to identify land area where no major alteration will be required compelling a drastic change in land use. Drastic change in land use could occur if productive agricultural lands, horticultural orchards, forest lands, dense vegetated land, marsh or wet lands etc. Preferably rocky and barren area shall be identified and within an urban area, dense industrial land use (where industries work through 24 hours) shall be preferred over others.

Mitigation strategy: Contractor shall carry out Environmental Assessment (EA) of the hotmix plant for all its phases viz. installation, use, maintenance, dismantling and reinstatement. Based on EA, comprehensive, site-specific mitigation strategy shall be formulated and implemented. The EA process shall involve local community as one of the stakeholders. Standard EA practice shall be followed especially stakeholder consultation and public disclosure of EA/EMP documents.

Hotmix Plant - Installation Phase

Consent to Establish: Plant operator/ contractor shall apply to Gujarat State Pollution Control Board (GSPCB) seeking consent to establish (CTE) under Air and Water Act. Only after obtaining CTE from GSPCB, Contractor shall allow the installation activities to commence as per CTE conditions.

Tree felling: At selected site, no trees above 100-mm girth size shall be felled. All efforts to reduce felling of trees shall be encouraged by working out alternate layout plans. Tree felling is a regulated activity and practices proposed under ESGP 01 should be followed, if unavoidable. Bushes, dry grass growth, creepers etc shall be cleared.

Agreement with Landowner: Contractor shall obtain the approval of landowner even in the case of government owned land to set up the plant. Payment of fair land rent value, clause for payment of compensation for any damages due to project work and time period within which the land shall be returned etc shall be explicitly mentioned in the agreement with the landowner. The agreement or approval letter shall also specifically state that land will be returned to the owner in pre-construction stage status after the agreed duration. To record the pre-construction stage status, contractor shall take photographs of the site from every angle and document the same as part of Project Records. During the agreement period, Contractor will be responsible for discouraging encroachers and hawkers around the site. Contractor shall bring to notice of landowner and Implementing Consultant, R&B Dept, GoG, any change in land use in the adjoining areas upto 100m from the site due to encroachments. A copy of final agreement shall be secured and kept as a proof to be later show to the Employer at times when asked for.

Loss of topsoil: During preparation of land for erecting the plant, the land surface may have to be levelled by cutting or filling. A layer of topsoil of about 100mm thick shall be removed by scraping the top layer before commencing the cutting or filling activities. If the chosen site is barren (not even grass growth on surface) and rocky, there is no need to implement this measure.

The scraped topsoil shall be preferably re-spread over the prepared land surface and on fill/cut slopes for landscaping and attempting vegetation within the plant premises.

Drainage: The plant area shall be sufficiently drained by well laid out network of open, unpaved, earthen drainage channels (300m wide and 150m deep). The entire length of drainage channels shall be sparsely vegetated using local grass variety (doob grass). In areas where vegetation is not possible, broken bricks, rejected stone aggregates, demolition waste etc of size not larger than 50mm can be used for pitching the channel bottom and sides.

The vegetated channels should not block the water flow and in such cases the vegetation can be trimmed manually. During monsoon, siltation is expected to occur within channel, which shall be cleaned periodically to avoid overflowing of channels.

Storage areas of bitumen, chemicals, admixtures, fuels, lubricants etc shall be roofed and bunded all around to avoid runoff through the areas.

Storm water drainage from entire plant area and washings from access ways, road-ways and any plant area should be conveyed to an adequately sized settling pond. Settling pond shall retain the storm water for at least 2 – 4 hours before discharging or reusing within the plant. Settling pond would only remove settleable solids and some amount of organic content. Wastewater that might not meet the CTO conditions may require specialized treatment depending on the pollutant to be removed.

Fuel oil, cut-back and bitumen storage: All storage of fuel and bitumen must comply with standard industry practice. Sawdust or absorbent clay should be readily available to soak up any spillage from the tanker or equipment

Soil erosion: Soil erosion is bound to occur from newly formed land surface, cut/ fill slopes and due to continuous heavy vehicle movement within the plant premises. To control soil erosion from unpaved surfaces (sheet erosion), the surface shall be dressed with at least 100mm thick rejected

stone aggregates, broken bricks, demolition waste etc. The surface shall be dressed devoid of any sharp edges. If topsoil is available, landscaping and attempting ground cover vegetation shall be preferred over surface dressing with rocks and stones.

Cut/ Fill slopes on soil surface shall not be steeper than 1V: 2H. The cut and fill slopes shall be stabilised using seeding and mulching as explained in Clause 308 of MRTTH specifications for road and bridge works.

Erosion from stockpiles: Sprinkling water on the surface of stockpiles shall prevent wind-borne erosion. Stockpiles need to be damp but not necessarily wet. Sprinkling shall be undertaken if dust cloud is visible on the downwind side. The erosion can be better controlled by locating stockpiles within secluded area such as areas surrounded by trees, parking lots, plant itself etc may obstruct the flow of wind over stockpiles directly resulting in less wind-borne erosion.

Such layout planning will get rid of water sprinkling to control erosion.

To control water-borne erosion and slumping of stockpiles during monsoon, the material shall be stored within a 300mm high wall enclosure made of RR masonry with an opening at the front to allow vehicles to load/unload material. The surface and other runoff from stockpile area shall be collected at one point and a silt trap shall be provided before letting the discharge onto drainage channels.

Visual impacts: The high structures of hotmix plant may cause visual intrusion and aesthetically displeasing sight, if located within an urban area. To mitigate such visual impacts, an aesthetically pleasing choice of finishing paint greatly enhances the appearance of the plant. Landscaping features such as trees, shrubs, rock walls and grass banks can be incorporated to screen the lower level structures and provide an effective wind break to help in dust control as well.

Hotmix Plant - Operation Phase

Consent to Operate: After installation is complete and well before operation of the plant starts, the plant operator/ contractor shall apply to Gujarat State Pollution Control Board (GSPCB) seeking consent to operate (CTO) under Air and Water Acts. Only after obtaining CTO from GSPCB, Contractor shall allow the operation activities to commence as per CTO conditions.

Other permits and licences: The plant operator/ contractor shall apply to relevant authorities under Factories Act/ State Factory Rules seeking permits/ licence in compliance of the provisions of the aforesaid acts/rules. Only after obtaining such permits/licenses, Contractor shall allow the operation activities to commence as per license conditions, if any.

Impact on traffic: The internal road leading to entry and exit point of hotmix plant premises, shall be laid in such a way that vehicles do not have to accelerate or decelerate excessively near the junction. If necessary a gate-keeping personnel from plant shall guide traffic on the main road whenever a vehicle approaches from/to hotmix plant. The drivers of the vehicles shall be trained/instructed to drive cautiously within and outside the plant.

Dust emission from Plant area: Dust emission is expected if internal roads and material delivery point is unpaved. The most effective way is to pave all the vehicle movement and loitering area using rejected bitumen pavement material or other suitable material. All access ways, road ways and any area intended to carry a vehicle of any type should be paved or sealed and kept clean.

Fugitive Dust from Plant: Wind-borne erosion can be controlled by measures described earlier. Erecting wind barriers in the form of trees (existing/planted), artificial landforms, compound wall etc can be erected on the windward side. On the leeward side, placing stockpiles, conveyor belts, conveyor loading and unloading points can be effective to control wind-borne fugitive dust emission. However, dust and fumes emanating from the plant operations should be controlled

through in-plant dust and fume control equipments such as bag filters, ESPs and or scrubbers which come as part of standard equipment. The consent conditions of GSPCB in this regards shall be fully complied.

Fugitive Dust from material transfer points: Dust emission is expected when material is transferred from one point to other. Where possible, enclosures made of jute bag screens can be installed. The jute screens shall be wetted frequently using treated wastewater generated within plant premises. The jute bag screens can be periodically washed on dust collection side and reused. Where enclosures are not possible, dampening of material with treated wastewater at start point i.e. when loaders take material from stockpiles can be carried out.

Impact on ambient noise levels: All efforts to control noise generation from avoidable sources such as honking and idling of vehicles shall be undertaken. This shall be undertaken by training the staff.

Noise from machinery: Process equipment's, plants and machinery shall be maintained as per manufacturers guidelines to reduce tonal components, frequency modulations or impulses which will increase the annoying effect of any noise generated.

Noise barriers: The artificial barriers in the form of plantation, landforms, material stockpiles etc around the process machinery will dampen noise generation to greater extent. Installing the plant in such a layout those high structures within the plant itself screens noise levels and obstructs the path between plant and nearest sensitive receptor.

Hot aggregate storage bins: The hot aggregate storage bins should be equipped with standard dust collector system that would meet CTO conditions for dust emission. Such dust collector systems should be removed and physically cleaned at least once a month and any worn, frayed or leaking bag or cartridge element repaired before re-use.

Rejected bituminous material disposal: Rejected batch of bituminous pavement material or other similar wastes shall be suitably reused or recycled as per standard industry practice. Waste minimization is the preferred approach to dealing with this problem. Wherever possible, waste material should be used for paving unsealed areas or treatment of shoulder as per Clause 112.2 of MPTH specifications. At no point of time, the waste bituminous material shall be disposed off indiscriminately or disposed off along with other construction debris.

Good Housekeeping Practices: The plant manager shall be responsible for imbibing good housekeeping practices to workers and staff involved on the operation and maintenance of plant. Maintaining the entire plant premises clean at all times; removing and storing materials/ tools/ equipments at appropriate designated locations; avoiding material spillage in the premises; appropriate management measures in dust generating activities; restricting the speed of vehicles to less than 10 km/hr within plant or on unpaved surfaces etc are some of the practices that can be followed at the plant.

Occupational health and safety: The staff and workers involved in the operation of the plant shall be provided with adequate PPEs and clothing. Typical PPEs applicable are safety gloves, boots, face masks or respirators, helmets, eye protective cover or goggles, ear muffs, etc. The plant operator shall maintain as far as practicable a working environment in which employees are not exposed to hazards.

Residential and Other facilities provided to workers: If residential and other facilities are extended to workers and staff, the measures recommended in ESGP 02 and 05 shall be followed.

Monitoring of Environmental quality: Ambient air quality (AAQ) with respect to SPM and RPM,

Ambient noise levels (ANL) in terms of Leq day and Leq night, wastewater/ sewage disposal point quality in terms of pH, oil and grease, BOD, COD and suspended solids shall be monitored at least once in 6 months or as specified under GSPCB CTO conditions whichever is stringent. The monitoring shall be undertaken at least at 2 locations viz. one on the upwind direction and another on the downwind direction.

Duration of monitoring: AAQ and ANL shall be monitored for 24 hr/day for 2 consecutive working days per week for 2 weeks in a half-yearly period. Wastewater samples shall be grab samples collected at the outlet point of treatment systems installed.

Decommissioning Phase

Reinstatement of land: The hotmix plant site shall be reinstated completely after decommissioning is over. Minimum level of reinstatement required is to achieve the pre-construction (installation) stage status. All civil structures and construction carried out during installation including foundations, internal road pavements, paved drainage channels, wastewater treatment pits, ponds etc shall be completely removed from site. Waste treatment systems such as soak pits, night soil treatment systems, if provided etc shall be closed safely. All the building and other demolition debris shall be removed, suitably segregated and reused if possible and rest shall be disposed off as per practices recommended in ESGP 20. A satisfaction certificate will be secured from the landowner upon handing back the land. This certificate as well as photographs of restored land shall be kept as a document of proof and shall be provided to Employer during any inspection.

Permanent Change in land use: To prevent encroachment of land area vacated by hotmix plant, the operator/ contractor shall inform the land owner well in advance to take possession of the land immediately after the plant is decommissioned. If the landowner desires, the contractor shall plant the vacated area with trees. The maintenance and nurturing of trees shall be the responsibility of landowner thereafter.

References and Recommended further reading

www.environ.wa.gov.au/downloads/codes_of_practice/Asphalt_Plants.pdf

# ESGP	ESGP 05
Activity	Setting up Project/Site Office

Brief Description of Activity

This code relates to sitting, setting up, usage, maintenance and dismantling of temporary field/ site office for the purpose of project management and administration of construction activities. The scope of this ESGP includes all the activities related to sitting, setting up, usage, maintenance, dismantling and reinstatement of land after dismantling the site office structure.

Environmental & Social (E&S) Issues

E&S issues that are to be addressed during the activity include the following:

- Siting criteria
- Impacts on soil environment
- Impacts on ecological environment
- Construction material and methodology
- Housekeeping issues
- Waste generation and disposal
- Liquid waste
- Solid waste
- Traffic movement
- Conservation practices
- Water consumption
- Energy consumption
- Rainwater harvesting
- Minimising waste generation during dismantling
- Reinstatement of land/ property

Policy and Legal requirements, if any

There are no policy or legal requirements regarding this activity. Clause 120 of MRTH specifications, landowner stipulations and local government/ municipal authority guidelines, if any, will be the governing guidelines for this activity.

Recommended Practice/ Management Measures

Need for setting up new Site/ Project Office – Weigh the options: As per Clause 108.3 of MRTH specifications it is the responsibility of Contractor to make his own arrangement for the land required by him for setting up site offices, labour camps and stores. Contractor will be required to maintain a dedicated Site or Project Management Office from where the Contract Manager and his staff will essentially operate. Contractor can analyse all the best available options such as rental or leased housing stock/ Commercial units available in the District Headquarter towns or at other appropriate locations.

However, if the Contractor decides to set-up a new Project Management office on a green field or brown field land, the management measures recommended in this ESGP shall be fully complied as minimum requirements under OPR Contract.

Site Selection during Project planning stage: OPRC Contractor shall identify probable Office locations both within project RoW and outside after having consultations with Implementing Consultant, R&B Dept, GoG. The selected sites shall be evaluated against environmental impacts anticipated at each site. The site with least environmental problems which are mitigable shall be identified and reported to Implementing Consultant, R&B Dept, GoG for approval. . Assistance of Local Relationship Committee (LRC) shall also be sought in order to identify a land which has no local issues and ownership conflicts since the contractor will have to pay rent for using the land. Payment of fair land rent value, clause for payment of compensation for any damages due to project work and time period within which the land shall be returned etc shall be explicitly mentioned in the agreement with the landowner. A copy of final agreement shall be kept as a proof

to be shown to the Employer at times when asked for.

Housekeeping issues: Site office and associated areas such as parking lots, open areas etc shall be maintained clean during its use. Indiscriminate littering, spitting in open areas, using open areas for ablution purposes, leaking sanitary pipes, unpaved parking areas, dusty internal roads etc are some of the issues that needs to be prohibited or rectified. Wastes generated shall be appropriately disposed off.

Sanitary facilities: Adequate number of privy toilet seats shall be provided in the ratio of one unit to each 15 persons, with a minimum of two units for any shared facility. Ablution taps shall be provided in each of the toilets. Urinals shall be provided on the basis of one unit or 2 linear feet of urinal trough for each 25 men. Urinals shall be provided with adequate water flush. Wash basins at a rate of 1 per 25 staff shall be provided outside the privy toilet room. The toilets shall be provided with water, at a rate of 45 litres per person per day, if flush type toilets are provided.

Separate toilet rooms shall be provided for each sex. These rooms shall be distinctly marked "for men" and "for women" by signs printed in English and in the native language of the staff working, or marked with easily understood pictures or symbols. If the facilities for each sex are in the same building, solid walls or partitions extending from the floor to the roof or ceiling shall separate them.

Upkeep and maintenance of sanitary facilities: Each toilet rooms, and washing area shall be lighted naturally or artificially by a safe type of lighting at all hours of the day and night. Each of toilet, wash area shall be kept in good sanitary condition. They shall be cleaned at least daily.

Liquid waste generation and disposal: Wastewater generated from sanitary facilities, wash basins, floor washing and pantry shall be collected at one point and disposed off to public sewer system if available. If public sewer system is not available, the wastewater shall be treated onsite before disposal. Onsite treatment systems such as septic tank or soak pits shall be installed. In any case, untreated wastewater shall not be discharged in open areas. Disposal points shall be maintained to avoid animals' infestation.

Solid waste generation and disposal: Solid waste generated shall be collected, stored and disposed in municipal bins or along with other construction debris generated in the project. Collected office garbage shall not be burnt in open as it is prohibited under Solid waste (Management and Handling) Rules, 2000. Solid waste shall be transported to nearest municipal disposal site. Disposal shall be at designated disposal sites as advised by the local Panchayat body or the municipal corporation.

Traffic movement: Approach road to site office area shall be laid out to ensure safe movement of traffic on main road and avoid traffic congestion at entry/exit point.

Drinking water: Wholesome drinking water meeting the IS10500-1993 specifications shall be provided at the site office for staff at a rate of 5 litres per person per day. The contractor shall arrange for the testing of drinking water by way of personal equipment or through an analytical laboratory. Drinking water storage and use shall not be located within six metres of any washing place, urinal or privy toilet.

Conservation practices: Consumption of water, energy and other resources shall be controlled and monitored to avoid its wastage. Leaking taps and other pipe-fittings shall be replaced. Office maintenance staff shall be trained and instructed to switch off electrical appliances and utilities when not in use. Procuring and using energy saving electrical utilities and appliances shall also be practised. Contractor may use the site office for rainwater harvesting purposes. The harvested water, depending upon the quality, can be used in the office itself.

Minimising waste generation during dismantling: During dismantling of site office structure, all

re-usable and recyclable materials shall be recovered before starting the dismantling operations. All options to reduce waste generation shall be explored and implemented.

Reinstatement of Land: During reinstatement, all efforts to return the land in its pre- construction stage status shall be taken. Onsite treatment systems like septic tanks and leach pits if established, shall be closed safely. Topsoil collected prior to establishment shall be re- spread and vegetation reinstated to the extent possible. A satisfaction certificate will be secured from the landowner upon handing back the land. This certificate as well as photographs of restored land shall be kept as a document of proof and shall be provided to Employer during any inspection.

References and Recommended further reading

- <http://astre.scor.com/astrehelp/en/g11q03ww.htm>
- Clause 120 of MRTTH Specifications for Road and Bridge Works

ESGP #	ESGP 06
Activity	Setting up Construction Yards

Brief Description of Activity

This code relates to siting, setting-up, use and dismantling/removal of following yards in a project:

- Material stockpile and storage yard
- Formwork fabrication and scaffolds maintenance yard
- Reinforcement bar bending yard/area

These stockyards can be located within project RoW or outside RoW. All the yards can be located at one area or at different locations depending on the land availability and requirements of the project. The scope of this ESGP covers from siting of yards to dismantling and subsequent reinstatement of land area occupied by yards.

Environmental, Health and Safety & Social (EHS&S) Issues

EHS&S issues that are anticipated during siting, setting-up, use and dismantling of various yards are as below:

Project Preparation phase

- Siting criteria
- Land use pattern
- Sensitive receptors
- Accessibility and approach to main road

Project Implementation Phase

- Land preparation
- Loss of topsoil
- Loss of vegetation
- Change in land use
- Drainage
- Soil erosion from newly formed embankment or cut slopes
- Impacts on soil environment
- Access roads and internal roads
- Material inward and outward transport
- Fugitive dust emission
- Noise generation
- Water pollution
- Debris generation and disposal
- Drainage during monsoon season
- Good housekeeping
- Safe working practices
- Spillage of materials such as construction chemicals, admixtures, corrosion resistant paints, fuel oil, lubricants etc during their storage and use
- Risk due to storage of hazardous material/chemicals

Decommissioning phase

- Permanent change in land use of the area due to encroachment and induced development
- Reinstatement of the land to its pre-construction status
- Some of the EHS&S issues listed above have been dealt in detail under the following ESGPs as well. These ESGPs shall also be referred and construed as forming part of this ESGP.

ESGP 01 – Tree felling

ESGP 02 – Labour Camp and Deployment of Labour

ESGP 12 – Clearing and grubbing

ESGP 14 – Traffic management during construction

ESGP 15 – Deployment and use of construction equipments and vehicles

ESGP 16 – Use of project road and other network roads used by construction traffic

ESGP 20 – Debris removal, storage, transport and disposal

Policy and Legal requirements, if any

Policy and legal requirements that are applicable on this activity could be the following:

- Manufacture, Storage and Import of Hazardous Chemical (MSIHC) Rules, 1989.
- Explosives Act, 1884 and The Explosives Rules, 1983
- The Petroleum Act, 1934
- The Petroleum Rules, 2002

MSIHC rules regulate the transport, storage and handling of specified hazardous chemicals identified under the rules. Petroleum Act and Rules regulate the transport and storage of petroleum products such as Diesel, Petrol and Kerosene. License is required for transport and storage, if the stored quantity exceeds the limits specified under the regulations. Storage of explosives at stockyard will be required to comply with the provisions of Explosives Act and Rules. Contractor shall review the applicability of these acts and rules vis-à-vis different types chemicals and materials stored in the yard and ensure compliance.

The following Clauses of MRTTH Specifications on Road and Bridge Works would be applicable to the activities covered under this ESGP:

- Clause 1000 and its sub-clauses on Materials for Structures
- Clause 1500 and its sub-clauses on Formwork
- Clause 1600 and its sub-clauses on Steel reinforcement

Recommended Practice/ Management Measures

Planning Phase

Site selection during project preparation stage: It is recommended that the Contractor at the project preparation and planning stage itself identify the appropriate site for setting up multi-purpose yards. Operating and maintaining one centralised yard per OPRC Package at an appropriate location (ideally at the centre of the road networks to reduce logistical issues) will be beneficial from economical and environmental perspective. Creating small yards at individual road links shall be discouraged or else practice measures recommended in this ESGP shall be adopted in each of the yards. Assistance of Local Relationship Committee (LRC) shall also be sought in order to identify a land which has no local issues and ownership conflicts since the contractor will have to pay rent for using the land.

Location related sensitivities: Contractor shall identify probable sites both within project RoW and outside after having consultations with Implementing Consultant, R&B DEPT, GOG. The selected sites shall be evaluated against environmental impacts anticipated at each site. The site with least environmental problems, which are mitigable, shall be identified and adopted. Coordination with the LRC will also help in understanding the sensitivities.

Change in land use: All possible efforts shall be undertaken to identify land area where no major alteration will be required compelling a drastic change in land use. Drastic change in land use could occur if productive agricultural lands, horticultural orchards, forest lands, dense vegetated lands, marshy areas etc. Preferably rocky and barren area shall be identified and within an urban area, commercial or industrial land use shall be preferred over others.

Implementation Phase

Tree Felling: At selected site, no trees above 100-mm girth size shall be felled. All efforts to

reduce felling of trees shall be encouraged by working out alternate layout plans. Tree felling is a regulated activity and practices proposed under ESGP 01 should be followed, if unavoidable. Bushes, dry grass growth, creepers etc however shall be cleared.

Agreement with Landowner: If the Contractor settles for a rental or lease agreement with the landowner of identified land area instead of outright purchase of the land, he shall obtain the approval of landowner even in the case of government owned land. Payment of fair land rent value, clause for payment of compensation for any damages due to project work and time period within which the land shall be returned etc shall be explicitly mentioned in the agreement with the landowner. The agreement or approval letter shall also specifically state that land will be returned to the owner in pre-construction stage status after the agreed duration. To record the pre-construction stage status, contractor shall take photographs of the site from every angle and document the same as part of Project records. During the agreement period, Contractor will be responsible for discouraging encroachers and hawkers around the site. Contractor shall bring to notice of Implementing Consultant, R&B Dept, GoG and landowner, any change in land use in the adjoining areas upto 100m from the site. A copy of final agreement shall be secured from the landlord and kept as a proof to be later produced to the Employer at times when asked for.

Loss of topsoil: During preparation of land, the land surface may have to be levelled by cutting or filling. A layer of topsoil of about 100mm thick shall be removed by scraping the top layer before commencing the cutting or filling activities. If the chosen site is barren (not even grass growth on surface) and rocky, there is no need to implement this measure.

The scraped topsoil shall be preferably re-spread over the prepared land surface and on fill/cut slopes for landscaping and attempting vegetation within the plant premises.

Drainage: The plant area shall be sufficiently drained by well laid out network of open, unpaved, earthen drainage channels (300m wide and 150m deep). The entire length of drainage channels shall be sparsely vegetated using local grass variety (doob grass). In areas where vegetation is not possible, broken bricks, rejected stone aggregates, demolition waste etc of size not larger than 50mm can be used for pitching the channel bottom and sides.

The vegetated channels should not block the water flow and in such cases the vegetation can be trimmed manually. During monsoon, siltation is expected to occur within channel, which shall be cleaned periodically to avoid overflowing of channels. Storage areas of chemical admixtures, fuels, lubricants etc shall be roofed and bunded all around to avoid runoff through the areas.

Soil erosion: Soil erosion is bound to occur from newly formed land surface, cut/ fill slopes and due to continuous heavy vehicle movement within the plant premises. To control soil erosion from unpaved surfaces (sheet erosion), the surface shall be dressed with at least 100mm thick rejected stone aggregates, broken bricks, demolition waste etc. The surface shall be dressed devoid of any sharp edges. If topsoil is available, landscaping and attempting ground cover vegetation shall be preferred over surface dressing with rocks and stones.

Cut/ Fill slopes on soil surface shall not be steeper than 1V: 2H. The cut and fill slopes shall be stabilised using seeding and mulching as explained in Clause 308 of MRTTH specifications for road and bridge works.

Erosion from stockpiles: Wind-borne erosion shall be prevented by sprinkling water on the surface of stockpiles. Sprinkling shall be undertaken if dust cloud is visible on the downwind side. The erosion can be better controlled by locating stockpiles within secluded area such as areas surrounded by trees, parking lots, plant itself etc may obstruct the flow of wind over stockpiles directly resulting in less wind-borne erosion. Such layout planning will get rid of water sprinkling to control erosion.

To control water-borne erosion and slumping of stockpiles during monsoon, the material shall be

stored within a 300mm high wall enclosure made of RR masonry with an opening at the front to allow vehicles to load/unload material. The surface and other runoff from stockpile area shall be collected at one point and a silt trap shall be provided before letting the discharge onto drainage channels.

Impact on traffic: The internal road leading to entry and exit point of yard premises, shall be laid in such a way that vehicles do not have to accelerate or decelerate excessively near the junction. The junction shall have adequate turning radius for even longer chassis vehicles can negotiate the turn. If necessary a gate-keeping personnel from yard shall guide traffic on the main road whenever a vehicle approaches from/to yard. The drivers of the vehicles shall be trained/instructed to drive cautiously within and outside the yard premises. Inside the yard, especially on unpaved areas, speed shall be restricted less than 10 km/hr.

Dust emission from yard area: Dust emission is expected if internal roads are unpaved. The most effective way is to pave all the vehicle movement and loitering area using rejected concrete material or other suitable material.

Impact on Ambient Noise levels: All efforts to control noise generation from avoidable sources such as honking and idling of vehicles shall be undertaken. This shall be undertaken by training the staff.

Decommissioning Phase

Reinstatement of land: The yard site shall be reinstated completely after decommissioning is over. Minimum level of reinstatement required is to achieve the pre-construction (installation) stage status. All construction carried out in the yard, if any, shall be completely removed from site. All the building and other demolition debris shall be removed, suitably segregated and reused if possible and rest shall be disposed off as per ESGP 20. A satisfaction certificate will be secured from the landowner upon handing back the land. This certificate as well as photographs of restored land shall be kept as a document of proof and shall be provided to Employer during any inspection.

Permanent Change in land use: To prevent encroachment of land area vacated by yard operator, the land owner shall be informed well in advance to take possession of the land immediately after yard area is decommissioned. If the landowner desires, the contractor shall plant the vacated area with trees. The maintenance and nurturing of trees shall be the responsibility of landowner thereafter.

Recommended Practice/ Measures at Formwork and Scaffolding Yard

General House Keeping: Good house keeping practices shall be followed. Segregating and storing materials, tools, damaged form works and other items on a daily basis will be one of the good practice. Cleaning the working area and other open spaces for debris such as broken pieces of form work, cement mortar, carpentry pieces etc will ensure cleanliness at site. These practices shall be adopted as regularly as possible.

Waste generation and disposal: Waste generated might typically include damaged steel or wooden form work material, scaffolding materials, cement mortars sticking to form work, worn out nuts & bolts etc. The salvageable materials such as metals shall be recovered and sold to appropriate recyclers. Unusable materials such as cement mortar and other debris shall be disposed off along with construction debris at designated landfill locations.

Timber and other wooden debris can be reused as fuel wood either in industries or domestic household. However, if release agent has been applied on the surface of damaged timber form work material, it might emit obnoxious and toxic smokes upon burning. In such case, all such coated timber material shall be disposed off in a landfill along with construction debris.

Form work transport: The form work and scaffolding materials shall be transported through existing roads taking into consideration the safety of road users. Form work and scaffolding materials in different sizes and shapes, if projects out of transporting vehicles, appropriate warning indicators such as red flags, reflectors shall be installed before transporting.

Transporting any material from one location to other shall be preferred during off peak hours. If unavoidable, traffic guides man shall be deployed to guide the traffic from front, rear and sides of transporting vehicle.

Safety issues: At the formwork yard, electrical and mechanical machines/instruments, if used, then appropriate safety procedure shall be followed, safety engineer at site or yard supervisor shall regularly visit the site to see safe practices are being followed.

Coating release agents: The practices adopted for storing, using and disposing off empty containers etc shall be as per release agent manufacturer's specifications.

Spillage while storing or using shall be avoided. Else storage and application on formwork can be carried out in a designated area wherein spill control measures can be undertaken. The designated area can be covered with either of the following, which can be removed and disposed off in a landfill:

- Spreading 100 mm thick sand layer
- Spreading a tarpaulin sheet or such material

Formwork maintenance works: Formwork maintenance works may involve welding, hammering etc. Preferably these activities shall be carried out away from sensitive land use area such as residential, schools and hospitals. If such land use area is located within 500m distances from formwork yard the following control measures shall be adopted:

- Working in night time shall be avoided
- Stacking the formwork materials in such a way that they break the link of sight between sensitive land use and work area
- Use of construction debris as stack material to reduce noise impact if spare is available

References and Recommended further reading

- Hazardous and Other Wastes (Management and Trans Boundary Movement) Rules, 2016
- Explosives Act, 1884 and The Explosives Rules, 1983
- Manufacture, Storage and Import of Hazardous Chemical (MSIHC) Rules, 1989.
- The Petroleum Act, 1934 and Petroleum Rules, 2002
- Following clauses from MRTH Specifications on Road and Bridge Works, 2001
- Clause 1000 and its sub-clauses on Materials for Structures
- Clause 1500 and its sub-clauses on Formwork
- Clause 1600 and its sub-clauses on Steel reinforcement

ESGP #	ESGP 07
Activity	Sourcing Construction Materials

Brief Description & Scope

This code relates to identifying, entering into contract and continued procurement of crushed stone aggregates such as gravel, shingle, broken stone from integrated crushing plants and quarries. The activity also relates to procurement of other construction materials such as sand, bricks, water, ready mix concrete (RMC) and bituminous hotmix from construction plant and material suppliers.

Environmental & Social (E&S) Issues

As minerals are non-renewable, mining of minerals is a regulated activity under law. Similarly other materials such as sand, bricks, RMC are also regulated. Major E&S issues that should concern OPRC contractor is:

- The regulatory compliance status of the construction plant and material suppliers; and
- Safe transport of materials to site.

Policy and Legal requirements, if any

The following policy and legal issues cover this activity:

- Mining for sand and stone is regulated under Mines and Minerals (Regulations and Development) Act, 1957
- Abstraction of groundwater is regulated by Central Ground Water Authority which has been constituted under Section 3 (3) of the Environment (Protection) Act, 1986 to regulate and control development and management of ground water resources in the country.
- Installation, operation and maintenance of brick kilns, bituminous hotmix plants and Ready mix concrete preparation plants are regulated under Section 25/26 of The Water (Prevention and Control of Pollution) Act, 1974 and Section 21 of Air (Prevention and Control of Pollution) Act, 1981
- Chapter IV of the Ancient Monuments and Archaeological Sites and Remains Rules 1959, prohibits mining and excavation activities in unprotected areas (appended in Annex A).
- Contractor may have his own stone and sand mining leases. Else the policy and legal requirements are not directly applicable to OPRC contractor except in the case of groundwater abstraction. However, it is the responsibility of OPRC Contractor to see that any procurement under the OPRC project is from legally authorised sources which themselves are in compliance to various other government regulations and policies. This code prohibits sourcing of construction materials from illegal sources which are not duly authorised by competent government authorities for the sake of economical or logistical or any other reasons.

Recommended Practices/ Management Measures

Licensed stone quarries: Quarrying activity is a regulated activity under Gujarat Mines and Minerals Concession Rules 1964. Contractor shall source coarse aggregate materials such as gravel, shingle, broken stone etc from licensed quarry operators. Under Clause 1002 of MRTH specifications, Contractor shall always insist, collect and maintain a current valid copy of the license from State/Central Government for carrying on stone quarrying activities and valid consent to establish and operate (CTE/CTO) issued by Gujarat State Pollution Control Board (GSPCB) issued to the construction material supplier. Implementing Consultant, R&B Dept, GoG or Monitoring Consultant shall seek a copy during the OPRC Contract period and in case contractor fails to submit the same will be considered as non-compliance and unsatisfactory performance under the contract. The mining licence shall be kept as a proof to be shown to the Employer at times when asked for. This is also important since the Ancient Monuments and Archaeological Sites and Remains Rules may also apply to the operated sites and a valid license and approval of quarry area will help in avoiding conflict with the law.

Sand mining: Sand mining is also a regulated activity under the Gujarat Mines and Minerals Concession Rules, 1964. Similar to stone mining, Contractor shall always insist, collect and

maintain a current valid copy of the license from State/Central Government for carrying on sand mining activities issued to the construction material supplier. The mining licence shall be kept as a proof to be shown to the Employer at times when asked for.

Abstraction of surface/ ground water: Abstraction of groundwater is regulated by Central Ground Water Authority (CGWA) under the provisions of Environment (Protection) Act, 1986. The Act regulates the exploitation of ground water for the protection of ground water resources; prevents sinking of any well within five hundred meters of a public drinking water source; and regulates extraction of water from a well within one kilometre of the public drinking water source in a declared water scarcity area preventing sinking of well in a declared 'over exploited' watershed. The provisions of the Act/ Rules can be better consulted with local Central Ground Water Board/ or Authority officials prior to abstracting water from any source located within or outside Project Districts.

Significantly, the areas notified by CGWA for regulation of ground water development include OPRC districts as below:

- Ahmadabad, Botad and Surendranagar

Sourcing water from canals or rivers: Sourcing surface water resources such as irrigation canals and river water bodies are also administered and regulated by Irrigation Department and River Board respectively in the State of Gujarat. Contractor shall consult the concerned administrative authority before sourcing water from such surface water resources. The permits for sourcing water from any groundwater or surface water body shall be secured and kept as a proof of compliance to be shown to the Employer at times when asked for.

Brick Kilns, Hotmix and RMC Plants: Brick kilns, Hotmix and RMC manufacturing units are regulated under Air and Water Acts by GSPCB. There is a need to obtain consent to establish and operate from GSPCB prior to commercial operation of these plants.

Contractor shall always insist, collect and maintain a current valid copy of the consent to establish and operate (CTE/CTO) issued by Gujarat State Pollution Control Board (GSPCB) issued to the kiln/plant operator. Implementing Consultant, R&B Dept, GoG's Independent Auditor/ Monitoring Consultant shall seek a copy during the OPRC Contract period and in case contractor fails to submit the same will be considered as non-compliance and unsatisfactory performance under the contract.

Transport of materials to site: During transportation of materials to construction site, vehicles engaged by the contractor shall not create hazardous condition on the network roads enroute to site. Practices recommended in ESGP 16 shall be followed.

References and Recommended further reading

- Clause 1000 of MRTH Specifications on Road and Bridge Works, 2001
- http://cgwb.gov.in/GroundWater/gw_regulation.htm and http://cgwb.gov.in/GroundWater/authority_area.htm

Annexure A

**Ancient Monuments and Archaeological
Sites and Remains Rules 1959**

ANCIENT MONUMENTS AND ARCHAEOLOGICAL SITES AND REMAINS RULES 1959
CHAPTER IV
EXCAVATION IN UNPROTECTED AREAS

- 24. Intimation to the Central Government.**—Every State Government intending to undertake or authorize any person to undertake any archaeological excavation or other like operation in any area which is not a protected area shall intimate its intention to the Central Government at least three months prior to the proposed date of the commencement of the excavation or operation specifying the following details, namely,— (i) name, location and other details of the site; (ii) nature of antiquities previously found; (iii) details of previous explorations, if any; (iv) purpose of the excavation or operation; (v) proposed extent of the excavation or operation (a plan of the site in triplicate showing in red outline the extent of the proposed excavation or operations should be attached); (vi) proposed duration of the excavation or operation; (vii) amount of the proposed expenditure on the excavation or operation; and (viii) name and status of the director of the excavation or operation.
- 25. Approval by the Central Government.**—After considering the proposal, the Central Government may either approve it or advise the State Government to modify it or to abandon it altogether.
- 26. Deputation of an archaeological officer.**—The Central Government may depute an archaeological officer to inspect the excavation or operation while it is in progress and render such advise as he deems necessary.

CHAPTER V
REPORT ON EXCAVATED ANTIQUITIES BY AN ARCHAEOLOGICAL OFFICER

- 27. Form of report by an archaeological officer.**—Where, as a result of an excavation made by an archaeological officer in any area under section 21 or 22 any antiquities are discovered, the archaeological officer shall, as soon as practicable, submit a report in Form V to the Central Government through the Director-General on the antiquities recovered during the excavation.

CHAPTER VI
MOVING OF ANTIQUITIES FROM CERTAIN AREAS

- 28. Application for moving antiquities.**—Every application for permission to move any antiquities or any class of antiquities in respect of which a notification has been issued under sub-section (1) of section 25 shall be made in Form-VI to the Director General at least three months before the proposed date of the moving.
- 29. Grant of refusal of permission.**—On receipt of an application under rule 28, the Director-General may, after making such enquiry as he may deem necessary, grant permission for the moving of all or any of the antiquities or, for reasons to be recorded, refuse such permission.
- 30. Appeal.**— Any person aggrieved by an order of the Director General under rule 29 may prefer an appeal to the Central Government; and the decision of that Government on such appeal shall be final.

ESGP #	ESGP 08
Activity	Geotechnical investigations and other surveys

Brief Description & Scope

This code relates to carrying out geotechnical investigation works such as Standard Penetration Test (SPT), Groundwater sampling, Collection of undisturbed soil sample, Field vane shear test, Field CBR test, Plate load bearing test etc. The scope of this procedure covers the practices that need to be followed during field execution of such investigations and closing the investigation site safely. Other surveys such as road alignment surveys, tree surveys, social surveys, bridges/culvert inspections and pavement structure related surveys etc will also be covered under this code.

Environmental (E&S) Issues

E&S issues anticipated during geotechnical investigations and other surveys include the following:

- Traffic management and survey personnel safety
- Test bore mud storage and disposal
- Groundwater contamination
- Damage to underground utilities such as water and gas pipelines, electrical, telephone and OFC cables
- Closing bore holes and reinstatement of the area

Policy and Legal requirements, if any

There are no policy and legal requirements to be addressed before starting geotechnical investigation work or any kind of surveys in a project. However, if geotechnical investigations are to be carried out on an existing carriageway in an urban area wherein traffic police regulates traffic flow and which might need traffic to be diverted within a constricted portion of road or traffic to be diverted on other network roads, an approval from local traffic police department will be needed before starting the activity.

Recommended Environmental Practice/ Management Measures

Local traffic management: Traffic shall be managed as per the procedures presented in ESGP 12 and Clause 112 of MRTH Specifications. These measures shall be strictly followed if soil investigations are to be carried out within existing road RoW and close to traffic movement.

Bore mud storage: During soil investigation, earth material generated while drilling the test bore, if any, shall be stacked within the barricaded region. Waste earth material stack shall never slump towards traffic allowed carriageway. Better housekeeping practices shall be adopted at each test location.

Mud disposal: Earth material generated and stacked shall be periodically removed and disposed off in low lying areas within project RoW. If quantum of earth material generated exceeds one truck load, then they shall be disposed off at authorised landfill sites or suitably reused as filling material at project office, labour camp construction or stockyard preparation sites.

Groundwater contamination: At location where ground water level lies within the test boring depths, groundwater contamination might occur due to oil lubricants used in boring rods. Contamination can also occur if the bore is closed with contaminated soil material. Boring rods and their connectors shall be kept free of rust by oiling the threads when not in use. During use, no lubricant shall be applied and the connectors shall be wiped clear of any excess oil/lubricant. If water is added from top of the bore for easy augur movement as lubricant, potable water or in-situ groundwater shall be used for the purpose.

Closing test bore holes: All test bores, shallow and deeper ones shall be closed immediately

after the test is completed. No test bores shall remain open. Site Engineer responsible for the work shall inspect all the bore holes for checking its neat closure.

No contaminated soil or topsoil shall be used for closing the bore. The excavated material can be stacked over an impermeable sheet, such as tarpaulin to prevent its contamination. The stored subsoil can be reused for filling the bore. Preferably, the excavated material can be refilled in a reverse sequence into the bore to achieve the original stratigraphy. In case of doubt about contamination of stored soil, dry and clear sand shall be used for closing the boreholes. After closing the bores, the soil shall be compacted to achieve at least 60 –80% of original, in-situ compaction density.

Damage to underground utilities: Before starting geotechnical investigation at a site, it shall be ensured that no underground utilities such as water pipelines; electrical, telephone and OFC cables; gas pipelines etc. are located within boring depth and within 1m diameter zone of influence. Utility layout maps and inspection pits dug nearby shall be helpful in identifying utilities within boring location.

Workers safety: Workers involved in all survey works shall be instructed about basic do's and don'ts when working in the midst of traffic. Safe working procedures for different survey work shall be formulated and the staff should be trained as part of daily 'tool box' meetings. Sufficient barricading cover shall be provided for workers movement and safety. If space is a constraint, an extra supervisor shall keep a vigil on workers. If work is carried out in night, workers shall be provided with reflective aprons and reflectors shall be fitted on barricades as well.

Appropriate PPEs such as gum boots or safety boots, full body cover clothing or overhauls should be made compulsory for survey staff. Snake bites and other insect bites could be a potential safety risk and appropriate first aid kit should be readily available with the survey team. The team should be trained on health issues such as dehydration, sun stroke, appropriate food and rest etc.

References and Recommended further reading:

Clause 900 and 112 of MRTTH Specifications for Road and Bridge Works, 2001

ESGP #	ESGP 09
Activity	E&S Regulatory Compliance

Brief Description & Scope

This code relates to systems and procedures that need to be adopted by OPRC Contractor to ensure sustained policy and regulatory compliance through the OPRC Contract tenure.

Environmental & Social (E&S) Issues

The issues anticipated during OPRC Contract tenure include the following:

- Regulatory compliance in a sustained manner through contract period.
- Negative media coverage upon OPRC Contractor’s regulatory non-complaint activities.
- Legal ramifications, risks and liabilities to OPRC Contractor as well R&B DEPT, GOG as an employer.
- Non-governmental organisations, civil society movements and local community groups precipitate issues against OPRC Contractor for non-compliance against any policy and regulations.
- People complaining to the World Bank and other State/Central Government Departments against OPRC Contractor on regulatory issues.

Policy and Legal requirements, if any

The policy and legal framework applicable on the OPRC Project is highlighted below for reference and review. OPRC Contractor may do well undertake a thorough review of regulations applicable on the project as part of the Environmental Management Framework processes recommended in the Contract.

Policy framework relevant to the project

- National Environment Policy – 2006 (Ref: <http://moef.gov.in/mef/policy.htm>)
- National Conservation Strategy and Policy Statement on Environment and Development, June 1992
- Policy Statement for Abatement of Pollution, 1992
- National Forest Policy, 1988
- Wildlife Conservation Strategy 2002
- National Water Policy, 2002
- Gujarat State Water Policy
- R&R Policy of Gujarat Govt.

Regulatory Framework applicable on the Project: Environmental Regulations

- Environment (Protection) Act, 1986
- EIA Notification, 2006 and subsequent amendments.
- Air (Prevention & Control of Pollution) Act, 1981
- Water (Prevention & Control of Pollution) Act, 1974
- National Ambient Air Quality Standards and its amendments;
- The Plastics (Manufacture, Usage and Waste Management) Rules, 2009
- Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
- The Batteries (Management and Handling) Rules, 2001
- The Solid Waste Management Rules, 2016
- Construction and Demolition Waste Management Rule, 2016
- The Manufacture, Storage and import of Hazardous Chemical Rules, 1989 and subsequent amendments
- The Bio-Medical Waste Management Rules, 2016
- Fly Ash Notification, 1999 and subsequent amendments
- Eco-sensitive zones specified in any of the Project or project related footprint areas
- Noise Pollution (Regulation and Control) Rules, 2000 and its amendments till date
- Forest (Conservation) Act, 1980 and its amendments;
- Forest (Conservation) Rules, 2003 and its amendments;
- Guidelines for diversion of forest lands for non-forest purpose under the Forest

- (Conservation) Act, 1980
- Wildlife (Protection) Act, 1972;
- Wildlife (Protection) Amendment Act, 2002;
- The Ancient Monuments and Archaeological Sites and Remains Act, 1958;
- The Motor Vehicles Act, 1988 and Central Motor Vehicle Rules, 1989; and

Other guidelines

- Environmental Guidelines for Rail, Road & Highway Projects, 1989 (MoEF);
- EIA Manual published by Ministry of Environment & Forests, January 2010
- IRC: 104:1988, Guidelines for EIA of Highways Projects;
- IS Codes & CPCB Guidelines for monitoring & analysis of air, water, soil etc;
- The World Bank Operational Policies (<http://go.worldbank.org/4D2JSWFIW0>)

Health and Safety related regulations

- The Factories Act, 1948
- Explosives Act, 1884 and The Explosives Rules, 1983
- The Petroleum Act, 1934
- The Petroleum Rules, 2002
- The Gas Cylinder Rules, 2004.
- The Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and Central Rules, 1998

Social and labour regulations

- The Trade Unions Act, 1926
- The Industrial Employment (Standing Orders) Act, 1946 and Rules, 1946
- The Industrial Disputes Act, 1947
- The Payment of Wages Act, 1936 and Rules, 1937
- The Minimum Wages Act, 1948 and (Central) Rules, 1950
- The Payment of Bonus Act, 1965 and Rules, 1975
- The Factories Act, 1948
- The Plantation Labour Act, 1951
- The Mines Act, 1952
- The Motor Transport Workers Act, 1961
- The Contract Labour (Regulation & Abolition) Act, 1970
- The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979
- The Shops and Establishments Act
- The Building & Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996
- The Maternity Benefit Act, 1961
- The Equal Remuneration Act, 1976
- The Bonded Labour System (Abolition) Act, 1976
- The Child Labour (Prohibition & Regulation) Act, 1986
- The Workmen's Compensation Act, 1923
- The Employees' State Insurance Act, 1948
- The Employees' Provident Fund & Miscellaneous Provisions Act, 1952
- The Payment of Gratuity Act, 1972
- The Employment of Manual Scavengers and Construction of Dry latrines Prohibition Act, 1993
- The Fatal Accidents Act, 1855
- The Weekly Holiday Act, 1942
- The National and Festival Holidays Act
- The Personal Injuries (Emergency) Provisions Act, 1962
- The Personal Injuries (Compensation Insurance) Act, 1963
- The Labour Laws (Exemption from Furnishing Returns and Maintaining Register by Certain Establishments) Act, 1988

- The Public Liability Insurance Act, 1991

The Contractor shall be aware of the following clearances (list is not exhaustive and final) that are specific to the operation of the OPRC network including any subsequent amendments:

- Forest Clearance for felling and branches trimming of trees from RoW of existing roads from the Gujarat State Forest Department;
- Permission for withdrawal of groundwater for construction from Central Ground Water Board;
- Permission for withdrawal of surface water from rivers and canals from Irrigation Department, Government of Gujarat;
- Permission for locating and operating borrow area pits from Local Administration/ Panchayats;
- Installation and operation of Hot Mix plants, Concrete batching plants and Crushers require Consent from Gujarat State Pollution Control Board under Water and Air Acts;
- Authorization for Storage, handling, transport and disposal of hazardous materials from Gujarat State Pollution Control Board under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016;
- Consent for discharge of air / water pollutants from workers camp, DG set installations, equipment and storage yards from Gujarat State Pollution Control Board under Air, Water Acts and HWM Rules;
- License for Quarries (in case of opening of new quarries) from Department of Mining, Govt of Gujarat;
- Permission for sand mining from river bed from Department of Mining, Govt of Gujarat;
- Authorization for disposal of bituminous wastes, if any from Gujarat State Pollution Control Board under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016;
- All Construction vehicles and off-road equipments are to be registered with Regional Transport Office as required under Central Motor Vehicles Act and possess appropriate PUC certificate;
- Traffic Police clearance to divert traffic or change traffic scheme within an urban area; and
- Licenses and certificates as per labour legislations.

List of International conventions and treaties to which India is a signatory is appended in **Annexure** to this code for reference and review.

Recommended Practice/ Measures

Policy and Regulatory review: As can be inferred from the above list of applicable policies, regulations and guidelines, it is clear that a host of regulations are to be complied in a sustained manner during the OPRC contract tenure.

Contractor as part of the EMF processes recommended in the contract shall undertake a review of Policy and Regulatory framework that would be applicable on the project. This review shall be repeated at least once every 5 years to re-assess and re-establish the applicable framework to integrate and take on-board any changes in policy and legal environment in the future. In the interim between two reviews, a regulatory register as mentioned below shall be maintained to keep track of applicable regulations.

Regulatory register: Based on the regulatory review, formulating and maintaining a regulatory register applicable to project will prove useful to OPRC Contractor.

The regulatory register should shortlist policies, acts, rules and standards, those are applicable and relevant to the project activities. The register should enlist all required permits and consents that are required by the Contractor to do project activities and through the contract period and the competent authority details who issue such permits and consents. The register should highlight the periodicity of individual permits and consents and renewal of same.

The register can be made in a user friendly format with appropriate trigger points for timely renewal of permits and licenses. Various software applications are available in the market which can be reviewed and procured, if found useful as they can help in administering efficient regulatory compliance system in the project.

The register shall be reviewed and updated at least once in a year either through in-house staff or using external resources. This will help in updating the register to prevailing policy and legal environment and integrate regulatory changes as applicable to the project.

Timely renewal and update of regulatory documents: As stated above, it is imperative on the part of OPRC Contractor to set in systems that will enable him to renew and or update licenses, consents and permits upon expiry of the current ones. OPRC Contractor will be held responsible for all regulatory compliance issues and his performance in this regard will be measured as part of the Environmental Performance Indicator.

Co-ordination with regulatory authorities: Contractor shall establish firm relationship and credible contact points at each of the regulatory authority to have a smooth functioning of the project. This co-ordination will help in getting timely updates of any upcoming regulations; clear and unambiguous clarifications on the law provisions; smooth applicatory process including prior knowledge of appropriate supporting document requirements etc. OPRC Contractor as part of his routine training and capacity building program of his field staff especially the management staff, can organise and conduct regulatory training sessions to understand the regulations; clearance procedures; penal procedures for contravening the law etc. The key contact personnel in each of the regulatory authorities can be sourced as training faculty in a periodic manner.

References and Recommended further reading:

Most of the regulations and policies are uploaded on the following weblinks which can be referred and reviewed:

- <http://moef.nic.in/index.php>
- <http://cpcb.nic.in/#>
- http://www.moef.gov.in/mef/regional_offices.pdf
- <http://cgwb.gov.in/>
- http://cgwb.gov.in/GroundWater/gw_regulation.htm
- <http://www.ppcb.gov.in/>
- <http://go.worldbank.org/4D2JSWFIW0>

Annexure

International Agreements and Commitments to Conventions

- Ramsar Convention on Wetlands of International Importance - Provides the intergovernmental framework for international co-operation for the conservation and wise use of wetland habitat and species.
- Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 12 November 1972) - Protect cultural monuments and natural sites within their territory that are recognised to be of such outstanding universal value that safeguarding them concern humanity as a whole.
- Convention on International Trade in Endangered Species in Wild Fauna and Flora (Washington, 3 March 1973) - To ensure, through international co operation, that the international trade in specimens of species of wild fauna and flora does not threaten the conservation status of the species concerned.
- Bonn Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 23 June 1979) - To conserve migratory species by Parties restricting harvests, conserving habitat and controlling other adverse factors. Sustainable utilisation is an implicit goal.
- The International Tropical Timber Agreement (Geneva, 18 November 1983) - To promote the management of tropical forests on a sustainable basis and to provide a framework for co-operation between production and consuming member states in the tropical timber industry.
- International Undertaking on Plant Genetic Resources (Rome, 23 November 1983) as supplemented - To ensure that plant genetic resources are preserved, particularly cultivated varieties of plants, plants or varieties which have been in cultivation in the past, primitive versions of cultivated plants, wild relatives of such plants and certain special genetic stocks and restrict destructive impact of development activities to conserve plant varieties which are threatened with extinction as a result of deforestation (especially in tropical areas) or changes in agricultural practices
- Vienna Convention for the Protection of the Ozone Layer (Vienna, 22 March 1988) and Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, 16 September 1987) - To protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge, taking into account technical and economic considerations and bearing in mind the developmental needs of developing countries.
- The Convention concerning Protection against Hazards of Poisoning Arising from Benzene (ILO Convention 136, Geneva, 23 June 1971) (hereafter, Benzene Convention, 1971);
- It contains 13 substantive articles providing, inter-alia, that whenever harmless or less harmful substitute products are available, ratifying States should use such substitutes instead of benzene.
- The International Convention on Civil Liability for Oil Pollution Damage, Brussels 1969 (CLC) - To pportion the liability of oil pollution on the owner of oil tanker.
- The International Convention on the Establishment of an International Fund for Compensation of Oil Pollution Damage, Brussels 1971 (Fund Convention);
- Provide for a compensation system in order to ensure full compensation to victims; and (b) to distribute the economic burden between shipping and cargo interests. Source: <http://envfor.nic.in/divisions/iass/eia/Annex3.htm>

Environmental and Social Guidelines for Practice

ESGP #	ESGP 10
Activity	R&R Planning and RAP Framework

Brief Description of Activity

This code relates to identification and verification of project affected people, assets and CPRs and a framework for resettlement and rehabilitation of affected people. the entitlement matrix as per the Gujarat State Highway Project (GSHP) guidelines is also provided for better understanding of the type of losses and the corresponding compensation that needs to be paid to the PAFs.

Environmental (E&S) Issues

E&S issues that need to be addressed while undertaking R&R measures include the following:

- Inadequate/improper identification of entitled people
- Inadequate or non payment of entitlements
- Forceful evacuation of RoW

Policy and Legal requirements, if any

As per the proposed interventions for the finalised network roads, there is no need to land acquisition on any network or road package. Therefore, many provisions of the guiding policy adopted for this project, namely the R&R policy for Gujarat State Highway Project (GSHP) may not be applicable. Only the relevant clauses of the policy will be invoked.

The policy will get invoked for the first instance when the road is being cleared of any encumbrance before being offered for maintenance contract. This shall be the responsibility of the Employer who is required to provide roads free of all encumbrances to the contractor.

After being fully satisfied with the road condition w.r.t the available RoW width, the contractor may enter into agreement /maintenance contract with the Employer. Once this contract has been signed, and any new encroachment takes place or re-encroachment of cleared RoW takes place, the responsibility of initiating the process of removing the encroachment shall then rest with the contractor, including the payment of compensation as per the policy mentioned above. This compensation shall be entirely payable by the contractor at no additional costs to the Employer.

The Entitlement matrix

The following entitlement matrix is only for the non-titleholder category. For detailed matrix covering titleholders as well the link provided at the end may be visit [POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK](#)

The basic principles that guide this Social Management Framework (SMF) are: Avoidance socially sensitive areas while planning project activities; Minimisation of impacts when project activities occur in socially sensitive areas; Mitigation of any unavoidable negative impacts arising out of its projects; Optimization of land requirement; and Greater transparency through involvement of community and other stake holders.

The policy frame work and entitlements for the project are based on the national law The Right to Fair Compensation and Transference in Land Acquisition, Rehabilitation and Resettlement Act, 2013, (LARR 2013) its 2014 Ordinance.

A. Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCT in LARR), 2013.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCT in LARR Act - 2013) has been effective from January 1, 2014 after receiving the assent of the President of Republic of India. This Act extends to the whole of India except the state of Jammu and Kashmir. The Act replaced the Land Acquisition Act, 1894. 70. The aims and objectives of the Act include: (i) to ensure, in consultation with institutions of local self-government and Gram Sabhas established under the constitution of India, a humane, participative, informed and transparent process for land acquisition for industrialization, development of essential infrastructural facilities and urbanization with the least disturbance to the owners of the land and other affected families; (ii) provide just and fair compensation to the affected families whose land has been acquired or proposed to be acquired or are affected by such acquisition; (iii) make adequate provisions for such affected persons for their rehabilitation and resettlement; (iv) ensure that the cumulative outcome of compulsory acquisition should be that affected persons become partners in development leading to an improvement in their postacquisition social and economic status and for matters connected therewith or incidental thereto.

Section 27 of the Act defines the method by which market value of the land shall be computed under the proposed law. Schedule I outlines the proposed minimum compensation based on a multiple of market value. Schedule II through VI outline the resettlement and rehabilitation entitlements to land owners and livelihood losers, which shall be in addition to the minimum compensation per Schedule I.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Amendment) Second Ordinance, 2015: With an intention to overcome the procedural difficulties in land acquisition for important national projects, President of India has issued an amendment ordinance on 30th May 2015. Three main features of the ordinance among others are as following:

(i) The Chapter II and III of the RFCT in LARR Act - 2013 regarding determination of social impact assessment and public purpose and special provision to safeguard food security shall not apply to the project such as (a) vital to national security or defence of India and every part thereof, including preparation for defence or defence production; (b) rural infrastructure including electrification; (c) affordable housing and housing for the poor people; (d) industrial corridors ; and (e) 24 infrastructure and social infrastructure projects including projects under public private partnership where the ownership of land continues to vest with the Government.

(ii) The five year period set by the principal Act in Section 24 under sub-section (2), for lapse of 1894 Act shall exclude the cases where acquisition process is held up on account of any stay or injunction issued by any court or the period specified in the award of a Tribunal for taking possession.

(iii) The five year period set by the principal Act for any land acquired and unused is now will be a period specified for the setting up of any project or five years, whichever is later.

B. R&R Policy Framework for the Project

Based on the above analysis of government provisions and the policy following key resettlement principles, definitions and Entitlement Matrix have been adopted for the Project.

- i. Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including a gender

analysis, specifically related to resettlement impacts and risks. Measures to avoid and minimize involuntary resettlement impacts include the following: (i) explore alternative alignments or locations which are less impacting, (ii) ensure the appropriate technology is used to reduce land requirements, (iii) modify the designs, cross sections, and geometrics of components to minimize the ROW and ensure involuntary resettlement is avoided or minimized.

- ii. Carry out meaningful consultations with displaced persons, host communities, and concerned nongovernment organizations. Inform all displaced persons of their entitlements and resettlement options. Ensure their participation in planning, implementation, and monitoring and evaluation of resettlement programs. Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and indigenous peoples, and those without legal title to land, and ensure their participation in consultations. Establish a grievance redress mechanism to receive and facilitate resolution of the concerns of displaced persons. Support the social and cultural institutions of displaced persons and their host population. Where involuntary resettlement impacts and risks are highly complex and sensitive, compensation and resettlement decisions should be preceded by a social preparation phase.
- iii. Improve, or at least restore, the livelihoods of all displaced persons through; (i) land-based resettlement strategies when affected livelihoods are land based where possible or cash compensation at replacement cost for land when the loss of land does not undermine livelihoods, (ii) prompt replacement of assets with access to assets of equal or higher value, (iii) prompt compensation at full replacement cost for assets that cannot be restored, and (iv) additional revenues and services through benefit sharing schemes where possible.
- iv. Provide physically and economically displaced persons with needed assistance, including the following: (i) if there is relocation, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, integration of resettled persons economically and socially into their host communities, and extension of project benefits to host communities; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) civic infrastructure and community services, as required.
- v. Improve the standards of living of the displaced poor and other vulnerable groups, including women, to at least national minimum standards. In rural areas provide them with legal and affordable access to land and resources, and in urban areas provide them with appropriate income sources and legal and affordable access to adequate housing.
- vi. Develop procedures in a transparent, consistent, and equitable manner if land acquisition is through negotiated settlement⁴ to ensure that those people who enter into negotiated settlements will maintain the same or better income and livelihood status.
- vii. Ensure that displaced persons without titles to land or any recognizable legal rights to land are eligible for all compensation, relocation and rehabilitation measures, except land.
- viii. Prepare a resettlement plan elaborating on the entitlements of displaced persons, the income and livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound implementation

schedule. This resettlement plan will be approved by ADB prior to contract award.

- ix. Disclose a draft resettlement plan, including documentation of the consultation process in a timely manner, before project appraisal, in an accessible place and a form and language(s) understandable to displaced persons and other stakeholders. Disclose the final resettlement plan and its updates to displaced persons and other stakeholders.
- x. Conceive and execute involuntary resettlement as part of a development project or program. Include the full costs of resettlement in the presentation of project's costs and benefits. For a project with significant involuntary resettlement impacts, consider implementing the involuntary resettlement component of the project as a stand-alone operation.
- xi. Pay compensation and provide other resettlement entitlements before physical or economic displacement. Implement the resettlement plan under close supervision throughout project implementation.
- xii. Monitor and assess resettlement outcomes, their impacts on the standard of living of displaced persons, and whether the objectives of the resettlement plan have been achieved by taking into account the baseline conditions and the results of resettlement monitoring. Disclose monitoring reports.

ENTITLEMENTS, ASSISTANCE AND BENEFITS

A. Introduction

The project will have three types of displaced persons i.e., (i) persons with formal legal rights to land lost in its entirety or in part; (ii) persons who lost the land they occupy in its entirety or in part who have no formal legal rights to such land, but who have claims to such lands that are recognized or recognizable under national laws; and (iii) persons who lost the land they occupy in its entirety or in part who have neither formal legal rights nor recognized or recognizable claims to such land. The involuntary resettlement requirements apply to all three types of displaced persons and the RP describes provision for all type of DPs and accordingly formulated the entitlement matrix.

B. Cut-off-Date for Entitlement

In case of land acquisition, the date of publication of preliminary notification for acquisition under section 11 of the RFCT in LARR Act – 2013 will be treated as the cut-off date. For non-titleholders, the cut-off date will be the beginning of the census survey which is 24th November 2014. DPs who settle in the affected areas after the cut-off date will not be eligible for compensation. The cut-off date for non-titleholders will be officially declared by the EA along with the disclosure of RP and notified in the project area through newspaper and other methods to ensure people who are illiterate are made aware. They, however, will be given sufficient advance notice, requested to vacate premises and dismantle affected structures prior to project implementation. Their dismantled structures materials will not be confiscated and they will not pay any fine or suffer any sanction.

C. Project Entitlement

In accordance with the R&R measures outlined in the previous chapter, all displaced households and persons will be entitled to a combination of compensation packages and resettlement assistance depending on the nature of ownership rights on lost assets and scope of the impacts

including socio-economic vulnerability of the displaced persons and measures to support livelihood restoration if livelihood impacts are envisaged. The displaced persons will be entitled to the following five types of compensation and assistance packages:

- a) Compensation for the loss of land, crops/ trees at their replacement cost;
- b) Compensation for structures (residential/ commercial) and other immovable assets at their replacement cost;
- c) Assistance in lieu of the loss of business/ wage income and income restoration assistance;
- d) Assistance for shifting and provision for the relocation site (if required), and
- e) Rebuilding and/ or restoration of community resources/facilities.

Loss of land will be compensated at replacement cost plus refund of transaction cost (land registration cost, stamp duties etc) incurred for purchase of replacement land. As per the RFCT in LARR Act – 2013, all impacts irrespective of magnitude of impact, are equally treated and accordingly, compensation measures and provisions for assistance will be made. DPs with traditional title/occupancy rights will also be eligible for full compensation for land at replacement value. If the residual plot(s) is (are) not viable, i.e., the DP becomes a marginal farmer, three options are to be given to the DP, subject to his acceptance which are (i) The DP remains on the plot, and the compensation and assistance paid to the tune of required amount of land to be acquired, (ii) Compensation and assistance are to be provided for the entire plot including residual part, if the owner of such land wishes that his residual plot should also be acquired by the EA, the EA will acquire the residual plot and pay the compensation for it and (iii) If the DP is from vulnerable group, compensation for the entire land by means of land for land will be provided if AP wishes so, provided that land of equal productive value is available. The replacement of land option will be considered by the District Collector while acquiring land wherever feasible alternate land is available. All fees, stamp duties, taxes and other charges, as applicable under the relevant laws, incurred in the relocation and rehabilitation process, are to be borne by the EA. Each families losing land will be entitled for following assistances.

(i) One time resettlement allowance of Rs. 50,000.

(ii) One time assistance option from: (i) Where jobs are created through the project, employment for at least one member of the affected family with suitable training and skill development in the required field; or (ii) one-time payment of Rs. 500,000.

(iii) Scheduled Caste (SC) and Scheduled Tribe (ST) families will receive additional one-time Rs. 50,000 as subsistence allowance.

Loss of Structures will be compensated at replacement value with other assistance to both titleholders and non-titleholders. The details of entitlement will be as:

(i) Compensation for structure at the replacement cost to be calculated as per latest prevailing basic schedules of rates (BSR) without depreciation. In rural area, the displaced family will be provided with the option of constructed house as per Indira Awaas Yojana (IAY) specifications in lieu of cash compensation. In urban area, the displaced family will be provided with the option of constructed house of minimum 50 sq. m. plinth area in lieu of cash compensation. Fees, taxes, and other charges related to replacement structure.

- (ii) Right to salvage materials from structure and other assets with no deductions from replacement value.
- (iii) One-time Resettlement allowance of Rs. 50,000
- (iv) One time financial assistance of Rs. 25,000 to the families losing cattle sheds for reconstruction
- (v) One time shifting assistance of Rs. 50,000 towards transport costs etc.
- (vi) Scheduled Caste (SC) and Scheduled Tribe (ST) will receive additional one-time Rs. 50,000 as subsistence allowance.

Loss of livelihood due to loss of primary source of income will be compensated through rehabilitation assistances. There are various categories of entitled persons under this category which are (i) titleholders losing income through business, (ii) titleholders losing income through agriculture, (iii) non-titleholders losing primary source of income. Details of entitlements for the above categories are described below:

- (i) One time financial assistance of minimum Rs. 25,000.
- (ii) Skill up-gradation training to DPs opted for (one member of the affected family) income restoration.
- (iii) Preference in employment under the project during construction and implementation.
- (iv) Monthly Subsistence allowance of Rs. 3,000 for one year (total Rs. 36,000) from the date of award
- (v) Displaced families belong to Scheduled Caste (SC) and Scheduled Tribe (ST) will receive additional one-time Rs. 50,000 as subsistence allowance.

Loss trees and crops will be compensated by cash compensation. The entitlements to the DPs losing trees and crops will be:

- (i) Advance notice to harvest crops, fruits, and timbers.
- (ii) Compensation for standing crops in case of such loss, based on an annual crop cycle at market value
- (iii) Compensation for trees based on timber value at market price, and compensation for perennial crops and fruit trees at annual net product market value multiplied by remaining productive years; to be determined in consultation with the Forest Department for timber trees and the Horticulture Department for other trees/crops.

Additional assistance to vulnerable households (Vulnerable households includes BPL, SC, ST, WHH, disabled and elderly) will be paid with special assistance as detailed below.

- (i) One time lump sum assistance of Rs. 25,000 to vulnerable households. This will be paid above and over the other.
- (ii) Receive preference in income restoration training program under the project.

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- (iii) Preference in employment under the project during construction and implementation.
- (iv) Access to basic utilities and public services.

Loss of community infrastructure/common property resources will be compensated either by cash compensation at replacement cost to the community (registered trust, society or village committee as appropriate) or reconstruction of the community structure in consultation with the affected community.

Temporary Impacts on agricultural land due to plant site for contractor etc will be eligible for cash compensation for loss of income potential including:

- (i) Any land required by the Project on a temporary basis will be compensated in consultation with the landholders.
- (ii) Rent at market value for the period of occupation
- (iii) Compensation for assets at replacement cost
- (iv) Restoration of land to previous or better quality
- (v) Location of construction camps will be fixed by contractors in consultation with Government and local community.
- (vi) 60 days advance notice regarding construction activities, including duration and type of temporary loss of livelihood.
- (vii) Cash assistance based on the minimum wage/average earnings per month for the loss of income/livelihood for the period of disruption, and contractor’s actions to ensure there is no income/access loss consistent with the EMP.
- (viii) Assistance to mobile vendors/hawkers to temporarily shift for continued economic activity.

Any unanticipated impacts due to the project will be documented during the implementation phase and mitigated based on provision made in the Entitlement Matrix of this RAP.

Type of Loss	Definition of Entitled Person	Compensation Policy	Responsible Agency
Land			

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Type of Loss		Definition of Entitled Person	Compensation Policy	Responsible Agency
1.a	Loss of private land - agricultural land, ¹ - homestead/ commercial land - vacant plot	Legal titleholders/ traditional titleholders ²	<ul style="list-style-type: none"> • Land for land if available.³ Compensation at replacement cost or as calculated under section 26 of LARR Act 2013 • If according to the landowner, the residual land is economically unviable, option to be compensated for entire parcel. • One time 50,000 Resettlement Allowance as per LARR Act 2013 if family needs to physically relocate to different area • 90 days advance notice to relocate 	<p>IA/CSC will ensure sufficient provision of notice</p> <p>NGO/Consultant will validate and verify AP list jointly with IA.</p>
1.b	Loss of rented private land and government land	Tenants, leaseholders and Sharecroppers (with lease documents)	<ul style="list-style-type: none"> • Assistance for rental deposit or unexpired lease deducted from the land owner's compensation. • 60 days advance notice to harvest standing seasonal crops prior to damage, if notice cannot be given, compensation for share of crops will be provided (see entitlement No. 3.a). 	<p>NGO/Consultant will confirm tenants' eligibility</p> <p>IA/ CSC will ensure provision of notice.</p>
1.c	Loss of Government land	Non-titled holders (i.e. Squatters ⁴ , Encroachers ⁵)	<ul style="list-style-type: none"> • Compensation for assets lost at replacement cost (see EM 2.a). • 90 days advance notice to shift • 60 days advance notice to harvest standing 	<p>IA/ CSC will ensure provision of notice.</p> <p>NGO/Consultant will confirm affected</p>

¹ The RFCLARRA 2013 outlines that no irrigated multi-cropped land shall be acquired under this Act, except in exceptional circumstances, as demonstrable last resort. Wherever such land is acquired, an equivalent area of cultivable land shall be developed for agricultural purposes or an amount equivalent to the value of land acquired shall be deposited with the appropriate Government for investment in agriculture for enhancing food security. Such costs must be reflected in the resettlement budget.

² Traditional land rights refer to households with customary rights to land, and shall be treated equivalent to titleholders

³ During the preparation of the Resettlement Plan for the subproject road, the availability of land will be assessed and this option will be retained/dropped depending on this assessment

⁴ Squatters are those who have no recognizable legal rights on the land they are occupying

⁵ Encroachers are those who use land or build structures which are in whole or in part of an adjacent property to which they have no titles.

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Type of Loss		Definition of Entitled Person	Compensation Policy	Responsible Agency
			seasonal crops prior to damage, if notice cannot be given, compensation for share of crops will be provided (see entitlement No. 3.a).	household's eligibility
1.d	Temporary loss of land	Legal titleholders	<ul style="list-style-type: none"> • Rent at market value for the period of occupation. • Restoration of land to previous or better quality • Location of construction camps will be fixed by contractors in consultation with Government and local community. 	<p>Contractor negotiates amount with landowner – supervised by CSC.</p> <p>IA/CSC ensures compensation paid prior to take-over.</p> <p>Contractor responsible for site restoration.</p>
2	Structures			
2.a	Loss of residential, commercial structures and other assets	Legal titleholders Encroachers and squatters	<ul style="list-style-type: none"> • If partially affected⁶: Replacement cost of the affected part or assets with right to salvage materials. If remainder of the structure is unviable, the owner has the option to claim compensation for entire structure (see below). • If Residential/Commercial structure fully affected: <ul style="list-style-type: none"> • Replacement Cost of the structure • If relocating outside RoW, Resettlement Allowance of Rs. 50,000 per family as per LARR Act 2013.⁷ • Monthly Subsistence Allowance of Rs. 3,000 for one year (total Rs. 36,000) for families having to relocate their 	<p>NGO/Consultant will confirm titleholder's eligibility</p> <p>IA/ CSC will ensure provision of notice.</p>

⁶ External to the living/commercial areas (i.e. verandahs, stairs)

⁷ Not cumulative if Resettlement Allowance has been given for loss of land (Entitlement 1.a)

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Type of Loss		Definition of Entitled Person	Compensation Policy	Responsible Agency
			<p>homesteads as per LARR Act 2013.⁸</p> <ul style="list-style-type: none"> • Shifting allowance of 10% of replacement cost of structure up to a maximum of Rs 50,000, as per the LARR Act 2013 • Right to salvage materials from structure and other assets with no deductions from replacement cost. • 90 day notice to vacate structure. 	
2.b	Loss of residential/commercial structure and other assets	Tenants (without documentation) and leaseholders	<ul style="list-style-type: none"> • Replacement cost of part/whole of structure – if latter has been constructed by the tenant/leaseholder with right to salvage material • Compensation for rental deposit or unexpired lease (only for AP with legitimate lease documentation). This will be deducted from the compensation amount of the structure owner. • Lump-sum equivalent to two month lease to support search of alternative housing. 	<p>NGO/Consultant will confirm tenants' eligibility</p> <p>IA/ CSC will ensure provision of notice.</p>
2.c	Loss and temporary impacts on common property resources	Titled and non-titled owners/communities	<ul style="list-style-type: none"> • Replacement or restoration of the affected community facilities • Best efforts need to be made to avoid impacts on sensitive sites (i.e. religious, sacred). If these need to be relocated or rehabilitated additional level of consultation with community is required to ensure proper process 	<p>IA/ CSC will assess how to avoid sensitive sites</p> <p>NGO/Consultant will conduct additional consultations</p>

⁸ Households losing commercial structures are not eligible

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	Type of Loss	Definition of Entitled Person	Compensation Policy	Responsible Agency
3	Loss of crops and trees			
3.a	Loss of trees and crops	Legal titleholder/tenant/leaseholder/sharecropper/non-titled AP	<ul style="list-style-type: none"> • 60 days advance notice to harvest standing seasonal crops prior to damage, fruits and timber • Compensation for standing crops (or share of crop for sharecroppers) based on an annual crop cycle at market value. • Compensation for trees based on timber value at market price, and compensation for perennial crops and fruit trees at annual net product market value multiplied by remaining productive years; to be determined in consultation with the Forest Department for timber trees and the Horticulture Department for other trees/crops. 	<p>NGO/Consultant will confirm affected household eligibility</p> <p>IA/ CSC will ensure notice is provided.</p>
4	Loss of livelihood			
4.1	Loss of livelihood income	<p>Legal Titleholder/tenant/leaseholder/non-titled holder of fully affected commercial structure⁹</p> <p>Employee of affected commercial structure.</p> <p>Farmer/ agricultural worker of land acquired.</p>	<ul style="list-style-type: none"> • Loss of business income/wages: One time financial assistance based on three month income¹⁰ or Rs. 25,000 as per RFCLARRA 2013, whichever is higher • 	<p>NGO/Consultant will confirm affected household eligibility</p>
4.2	Temporary disruption of livelihood	Legal titleholders, non-titled Ahs	<ul style="list-style-type: none"> • 90 days advance notice regarding construction activities, including duration and type of disruption. • Economic Disruption Grant of Rs. 3,000/week when commercial 	<p>IA/ CSC will ensure notice is provided.</p>

⁹When core commercial space is affected – when external sections of the structures such as verandahs, stairs, balcony are affected the owner will not be eligible to this entitlement.

¹⁰ Based on income tax return

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Type of Loss		Definition of Entitled Person	Compensation Policy	Responsible Agency
			structure is partially affected and owner loses income to rebuild part of structure or because of construction activities. <ul style="list-style-type: none"> Assistance¹¹ to mobile vendors/hawkers to temporarily shift for continued economic activity during construction activities. 	
5	Special assistance to Vulnerable Households			
5.1	Impacts on Vulnerable Households (VAHs) and Severely Affected Households (SAHs) ¹²	Vulnerable Households Severely Affected Households	<ul style="list-style-type: none"> Rs. 50,000 for each physically displaced family¹³. Participation of one member of household in Livelihood Improvement and Skills Development Training Priority of employment under the project during construction and implementation for one family member to extent possible. 	NGO/Consultant to confirm VAH/SAH list NGO/Consultant to conduct assessment of skills development
6	Other losses			
6.1	Any other loss not identified		<ul style="list-style-type: none"> Unanticipated involuntary impacts will be documented and mitigated based on Safeguard Policy (SPS) 	NGO/Consultant to identify other potential losses

Terms

- Contract farming (Theka):** In contract farming, land is usually leased out for the purpose of cultivation by the owner to a contract farmer for a period of one year. The contract farmer bears the cost of all inputs and takes away the crop while the owner gets a fixed fee or rental (*Theka*), which is commonly payable in cash or else in kind.
- Notification:** Refers to the Government Notification that is required to be published in the Official Gazette to acquire private land for the purpose of the project.
- Gram Panchayat:** A constitutionally elected local self-government body at the village-level.

¹¹ Assistance will be provided in accommodating a temporary space for commercial activities during construction, dismantling and reassembling mobile structure and in physically relocating structure

¹² Severely Affected Households (SAHs): defined as losing 10% or more of their total productive assets and/or physical displacement

¹³ Severely Affected Households (SAHs) and Vulnerable Households (VAHs) losing their homestead and having to physically relocate from affected area

4. **Sarpanch:** Refers to the elected Head of a Gram Panchayat
5. **Project Authority:** Refers to the Competent Authority in which the overall control and superintendence of the execution of the project vests (R&B DEPT, GOG in the context of this project).
6. **Pucca structure:** Refers to buildings and structures whose walls and roofs are made of durable materials. The materials of walls can be from among burnt bricks, stones or concrete. Roofs can be made of Reinforced Cement Concrete or reinforced brick concrete.
7. **Kutcha structure:** Refers to those buildings and structures whose walls and roofs are made of materials that have to be replaced frequently. The walls may be made of materials such as grass, thatch, bamboo, plastic, polythene, mud, un-burnt bricks or wood. The roofs may be made of materials such as grass, thatch, bamboo, wood, mud, plastic or polythene.
8. **Right of Way (RoW):** Refers to land acquired by or belonging to the Government or to a local body or Statutory Authority for the purpose of maintaining public utilities along roads.
9. **Sharecropping (Batai):** Land is usually leased out for one year in sharecropping by the owner to another farmer on *Batai* for the purpose of joint cultivation. The sharecropper usually takes away half the crop produced during the contract period.

Definitions

1. **Affected zone:** Refers to the area of a village or locality under a project for which land will be acquired under the Land Acquisition Act 1894 (as amended in 1984) or any other Act in force through declaration by Notification in the Official Gazette by the appropriate Government or for which land belonging to the Government will be cleared from obstructions.
2. **Agricultural land:** Denotes land used or capable of being used for the purpose of agriculture or horticulture, including cultivation of medicinal herbs and plants; dairy farming, poultry farming, pisciculture, breeding of livestock; raising of crops, grass or garden produce and land used for the grazing of cattle.
3. **BPL Family:** Below Poverty Line Families shall be identified by using the definition of Planning Commission as adopted by Government of Gujarat and keeping the threshold income levels 20% higher than those specified therein. For clarity BPL income limit shall be Rs. 24,000 for this project (i.e. Rs. 20,000 as BPL for 2005-06 + 20% thereof).
4. **Corridor of Impact:** Refers to the minimum width of land required for the construction/improvement of roads, including road embankments, roadside facilities and features such as service roads, drains, footpaths, utility ducts and lines, fences, green belts, safety zones, working spaces etc. .
5. **Cut-off date:** Refers to the date prior to which the affected family/person was in possession of the immovable or movable property or a source of livelihood within the affected zone. For non-titleholders, the cut-off date is the date on which the census of affected zone begins or the date on which Notification is issued under section 4 of the Land Acquisition Act, 1894, which ever is earlier. The cut-off date for land acquisition purpose is the date on which Notification is issued under section 4 of the Land Acquisition Act, 1894 to the titleholder.
6. **Displaced family (DF):** Any tenure holder, tenant, Government lessee or or non-titleholder who on account of the project has been displaced from such land including plot in the abadi or other property.
7. **Entitled Person (EP):** A person, who is adversely impacted by the project and is thus entitled to some kind of assistance as per the project entitlement framework.
8. **Family:** A family consists of a person, his or her spouse, unmarried sons, unmarried daughters, minor brothers, unmarried sisters, father, mother and other members residing with him/her and dependent on him/her for their livelihood
9. **Landowner:** A person who is an allottee or a grantee of any land under any scheme of the Government under which such allotment or grant is to mature into ownership, or who has permanent rights and interest in land.
10. **Marginal farmer:** Refers to a cultivator with an unirrigated land holding not more than one hectare or irrigated land holding not more than half hectare.
11. **Non-titleholder:** Affected persons/families with no legal title to the land, structures and other

- assets adversely affected by the project. Non-titleholders include tenants, encroachers, squatters, kiosk operators etc.
12. **Project.** Refers to the Gujarat State Highway Project.
 13. **Project Affected Family/Person (PAF/PAP):** PAF/PAP means a family/person whose place of residence or other properties or sources of livelihood are substantially affected by the process of acquisition of land or by clearing the ROW from obstructions for purpose of the project and who has been residing or practising any trade, occupation or vocation in the affected zone preceding the cut-off date. PAP is either Title holder or Non - Title holder.
 14. **Residual Plot.** Refers to part(s) of land plots left with the Project Affected Family, which have not been acquired for the project and which measure less than 1000 sq.m for industrial plot, 1 acre for agriculture plot, 35 sqm for homestead and 15 sq.m for commercial plot.
 15. **Small farmer.** Refers to a cultivator with an unirrigated land holding up to two hectares but more than one hectare or with an irrigated land holding up to one hectare but more than half a hectare.
 16. **Tenant.** Indicates a Non - Titleholder who holds land of another person and is, or but for a special contract would be liable to pay rent for that land to that other person and includes the predecessor and successor-in-interest of such person but does not include a mortgagee of the rights of a landowner, or a person to whom holding has been transferred or an estate or holding has been let infarm (under the Punjab Land Revenue Act, 1967) for the recovery of an arrear of land revenue or of a sum recoverable as such an arrear or a person who takes from Government a lease of unoccupied land for the purpose of subletting it.
 17. **Titleholder.** A PAP who has legal title to land, structures and other assets in the affected zone.
 18. **Vulnerable Group:** Includes Affected Persons who are Scheduled Caste families, small and marginal farmers; families headed by women, disabled or handicapped persons, orphans, destitute and BPL families. Vulnerable groups would also include those farmers who (after acquisition of land) become small/marginal farmers. For such cases, total land holding of the landowner in the r State will be considered
 19. **Wage Earner.** Wage earner are those livelihood is affected due to the displacement of the employer.
 20. **Replacement Cost.** Replacement cost is the cost of purchasing comparable assets elsewhere by the affected person in lieu of the acquired land and other amenities, buildings etc. The compensation awarded for the acquired land and other amenities, buildings, etc. should be adequate to enable purchase of comparable assets elsewhere by the affected person.

Wherever compensation is not adequate enough to buy replacement lands/ buildings, the project authority shall provide other assistance to overcome the shortfall.

References and Recommended further reading

1. http://www.R&B Dept. GoG.gov.in/files/Acts/R&R%20Policy_eng.pdf

ESGP #	ESGP 11
Activity	Prior information and disclosure to the public

Brief Description of Activity

This code relates to informing the general public as well as PAPs in advance, about any activity related to road upgradation or maintenance to be undertaken by the contractor so as to minimise inconvenience that may be caused due to the activities to be undertaken.

Environmental, Health and Safety (EHS&S) Issues

EHS&S issues that are addressed by prior information and disclosure include:

- Public inconvenience and nuisance
- Reduced damages to public and private property
- Disclosure about R&R activities
- Participation in resettlement planning

Policy and Legal requirements, if any

There is no legal requirement for any prior information or disclosure to local community about any activity under the OPR contract, except for undertaking R&R activities or blasting operations, if required. However, as a good practice and in long term interest of the project, the contractor should undertake the following recommended measures.

Recommended Measures

Any intervention under the OPR contract, for upgradation or general maintenance works will lead to temporary detouring of the traffic and chances of damages to private property and CPRs. Therefore, it will cause certain level of inconvenience to general public and road users depending on the duration of activities.

The contractor and its team shall therefore, inform the local community about their entry and range of activities they would undertake. The contractor shall also inform the local community about the measure s/he will adopt in order to reduce the inconvenience including presence of his team to ease the traffic. This prior information will also allow the local community in helping the contractor avoid any damages to private property or CPRs. The local community will get time to relocate their assets as well.

In addition, the prior information and disclosure to public in cases of major road work involving more than 2 days of work on site and thus diversion of traffic etc, shall be by way of display of information at prominent places so that the intended audience gets the information. Also the information about grievance redressal system shall be made to general public and local community alongwith introducing the team of LO/CRM (refer ESGP 27 for Grievance Management)

In cases other than where emergency services are required, the contractor shall visit the site atleast three days in advance and inform the local community about the planned intervention/maintenance two days later.

ESGP #	
Activity	Clearing and grubbing

Brief Description & Scope

This code relates to execution of works such as cutting, removing and disposing of all materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, top organic soil not exceeding 150mm in thickness, rubbish etc. as specified in Clause 201.1 of MRTH specifications. The scope of this practice covers the procedures to be followed during execution of clearing and grubbing (C&G) activity.

Environmental & Social (E&S) Issues

EHS&S issues that are anticipated during clearing and grubbing activity include the following:

- Loss of top soil
- Soil erosion
- Fugitive dust emission
- Debris generation, storage, transport and disposal
- Loss of trees, bushes and other vegetation
- Air and noise pollution due to deployment of construction equipments and vehicles
- Local traffic management
- Health and safety of general public as well as construction workers

Issues such as traffic management and air/ noise pollution due to deployment of construction vehicles/ equipments have been dealt separately in detail under ESGPs 14 and 15. They shall be referred, reviewed and construed as part of this ESGP. For tree felling, ESGP 01 shall be referred.

Policy and Legal Requirements

The policy guidelines and legal requirements in the following acts and rules are applicable to the activity:

- The Forest Conservation Act, 1980 and Forest Conservation its rules
- Municipal Solid Wastes Management Rules, 2016

In 1958, Government of Gujarat has declared strips of government lands irrespective of tree growth on either side of all roads, canals and railways in the State of Gujarat as protected forests bringing those lands under the ambit of Forest Conservation Act. All PWD (Building and Roads) road side strips and also other PWD lands in Gujarat State have been transferred to the Forest Department for management. Hence, tree felling or trimming requires prior forest clearance from the State Forest Department.

As per Schedule II of Municipal Solid Wastes Management Rules, 2016, construction or demolition wastes or debris shall be separately collected and disposed off following proper norms. Waste (garbage and dry leaves) shall not be burnt.

Recommended Practices/ Management Measures

Loss of Topsoil: In areas where grass or any form of vegetation is found, efforts to conserve topsoil shall be undertaken. Topsoil of not more than 100-150 mm thick from surface shall be scraped and stored separately near site. In areas where no vegetation is found (such as road shoulders) there is no need to follow this measure. Topsoil collection will be helpful during vegetation reinstatement as part of soil erosion control and landscaping of ground surface after construction is complete. Topsoil is considered as the seed bank for effective ecological restoration of the area. As the seed bank contains species of local variety, introduction of alien, conflicting and dominating species is minimised.

Topsoil storage: Segregated topsoil shall be stored in stockpiles of 1 to 1.25-m height. The

stockpiles shall be located such that disturbance to construction work is minimal. Preferably, topsoil stocks shall be located along RoW or at common storage location for the project. Height of stacks affects the quality of stack material as anaerobic conditions develop in the stack defeating the purpose of collecting and storing topsoil. In dry weather conditions (between Feb - May), topsoil stacks shall be sprinkled with water on all sides to keep the moisture content of the stack. Water sprinkling shall not result in surface runoff. If topsoil stacks are undisturbed for more than six months at a location, to increase aeration in the stack, the stacks shall be disturbed and formed again. At any part of project site, if topsoil is required for reinstatement, the stored topsoil shall be used.

Dust carried over to carriageway: Cleared debris might find its way to traffic-allowed carriageway due to spillage from loaded trucks, dirt falling off wheels and crawlers etc. The truck shall not be loaded beyond its maximum capacity. Surface of loaded material on a truck shall be compacted lightly to prevent rolling off. Sprinkling of water may also prevent dirt falling off trucks while travelling. Wherever clearing and activity is in progress, carriageway at that stretch shall be kept free of debris by brooming. At least upto 10m length of road shall be swept clear from the point where loaded trucks enter road from C & G site. Debris on traffic-allowed pavement results in dust generation.

Fugitive dust emission: Dust could generate from C & G site due to loading and unloading of removed debris on trucks and speeding of trucks on cleared soil surface. To reduce dust emission at loading/ unloading point, free fall of debris from excavator bucket to body of trucks or from tilting dumpers shall be avoided. Vehicle speed on barren earth, unpaved surface or exposed soil surface shall not exceed 10 km/hr to reduce dust cloud generation.

Clearing of trees: Clearing trees including perennial woody plants that are in seeding of sapling stage and shrubs that branch from ground level requires permission from State Forest Department. The practices recommended in ESGP 01 should be referred and followed before initiating felling activity.

Cleared Debris Transport: Clearing and grubbing debris shall be collected, stored and transported without causing any disturbance to public activities around the site. Transport of debris shall not cause dust emission or result in debris falling off trucks on the way to disposal site. More measures recommended in ESGP 20 shall also be referred and followed.

Debris disposal: Combustible debris such as trees, bushes, shrubs, stumps, roots, grass, weeds, paper, clothes, dry leaves, barks and others shall not be burnt to reduce waste quantity or as a method of disposal. The combustible portion of C&G debris can be used as fuel at brick kilns or by local community. Non-combustible waste shall be disposed off as per practices recommended under ESGP 20.

C&G activity pending R&R: At locations where physical resettlement of project affected people (PAPs) is yet to take place, C&G activity shall not commence. Near residential, commercial, forest and other sensitive areas, Clause 201.2 of MRTTH specifications shall be followed.

Traffic Management: Local traffic management shall be carried out as per Clause 112 of MRTTH specification and measures recommended in ESGP 14 on traffic management shall also be referred and followed.

Ground Vibration: During C & G activity, vibration induced risk criteria specified in terms of safe distance of work for various activities such as bulldozing, heavy truck traffic, pavement breaking shall be considered. Risk criteria for various activities are listed in Table 1. If any structure is located within the distance (specified in feet) specified in Table 1, the related activity shall be

undertaken with utmost caution and as per directions of site engineer in-charge. Use of light duty equipments, vehicles or manual operations, if feasible shall be preferred in such cases.

Soil Erosion: Cleared area is highly susceptible to wind and water erosion. C&G activity shall be scheduled in such a way that other construction activities follow immediately after completion of C&G activity. All practices recommended under clause 306.3 of MRTH specifications shall be followed. Near surface water bodies, sewage nallahs/rivers, drainage channels, C&G shall not commence before and during monsoon season.

Loss of trees and other vegetation: Loss of trees, plants and other minor vegetation such as bushes, shrubs, grass forming ground cover etc outside construction lines and RoW shall be kept to minimum. More damage to ground cover outside the construction area increases soil erosion. Damage to ground cover could occur due to movement of vehicles, crawler mounted earthmovers, workers, locating stockpiles of debris/topsoil, parking of vehicles, fuel/oil or lubricants leakage from machinery or disposal during on-site repair and maintenance of vehicles/machinery etc. Though these activities are unavoidable, restricting within a boundary can control the areal extent of damage. The boundary at site can be defined by temporary barricading so that workers will not indulge in any activity outside the barricades.

Safety Issues: During felling of trees, deployment and use of machinery, safety issues shall be considered, especially if the C&G is in progress near stretches where pedestrian/ commuter movement is significant. Temporary barricading to restrict public movement near work areas can be considered. Barricading can be removed after C&G is completed.

Table 1: Vibration Induced Risk Criteria

Table 2.16-2: Vibration-Induced Risk Criteria for Buildings

Activity	Perceptible Distance (feet)	Historic	Residential	Structural
Blasting	1,000	400	300	60
Pile Driving	200	90	50	12
Pavement breaking	150	60	40	8
Bulldozing	60	30	20	3
Heavy Truck Traffic	50	20	15	3
Jackhammers	30	15	10	2

Sources:

Wiss, John F. Construction Vibrations: States-of-the-art. Journal of the Geotechnical Engineering Division, Proceedings of the American Society of Civil Engineers, Volume 107, No. GT0, February, 1981. Standard Recommended Practice for Evaluation of Transportation Related Earthborne Vibrations, ASHTO Designation: R8-81 (1986).

References and Recommended further reading

Clauses 201 and 306, Specifications for Road and Bridge Works, MRTH

- www.environmental-agency.gov.uk/netregs/sectors/3654906/365482/?version=1
- www.wpa.vic.gov.au
- <http://www11.myflorida.com/specificationsoffice/y2kBook/d110.pdf>

ESGP #	ESGP 13
Activity	Dismantling of existing road structure

Brief Description & Scope

This code relates to dismantling of existing road pavement and roadside structures such as MS pipes, guard rails, fencing, footpaths, median, kerbs, gutters, residential and commercial RCC/masonry structures and slums etc. Scope of this practice covers execution of demolition activity, storage, transport and ultimate disposal of dismantling debris and waste material.

Environmental, Health and Safety & Social Issues

EHS&S issues that are anticipated during execution of demolition activity includes the following:

- Fugitive dust emission
- Noise emission
- Demolition debris storage, transport and disposal
- Local traffic management
- Safety of workmen and general public
- Demolition site housekeeping
- Vibration related risk to nearby buildings
- Wastage of material resources that can be reused

Issues such as deployment of labour (ESGP 2), R&R implementation (ESGP 10), local traffic management (ESGP 14); air/ noise pollution due to deployment of construction vehicles/ equipments (ESGP 15); and debris removal, storage, transport and disposal (ESGP 20) have been dealt separately in detail under various ESGPs. They shall be referred and construed as part of this ESGP.

Policy and Legal requirements, if any

There are no specific policy and legal requirements to be complied during execution of the activity. However, the following acts and guidelines will have to be reviewed and practised during the execution of the activity:

- Debris generated during dismantling will have to be disposed off at Implementing Consultant, R&B Dept, GoG approved locations and with consent from appropriate local government authority.
- Safe working practices recommended in ILO guidelines and Construction Workers Rules, 1998 for use of various equipment's, instruments, tools and work situations
- MRTH guidelines. Clauses 202.1, 202.3, 202.4 and 202.5 specifically cover this activity.
- As per Schedule II of Municipal Solid Wastes (Management and Handling) Rules, 2000, construction or demolition wastes or debris shall be separately collected and disposed off following proper norms. Waste (garbage and dry leaves) shall not be burnt.

Mitigation Measures

Dismantling after R&R is complete: Dismantling and demolition of structures used by project affected people (PAPs), if any shall not commence until physical resettlement of PAPs is complete and a go ahead is approval is given in writing by the Employer.

Fugitive dust emission: Dust would be generated: at dismantling area; while loading onto trucks and when vehicles move faster on barren soil surface and cleared areas. At the location where dismantling operations is on, the activity shall be carried out intermittently in case dust cloud is thick and visibility becomes poor. Light sprinkling of water on structure being demolished and on debris immediately after dismantling will help in controlling dust if site situation warrants so.

Free fall of demolition debris from height shall be avoided. This can occur when forming debris stockpiles onsite and during loading onto trucks using excavator buckets. Loaded excavator buckets shall be brought closer to trucks or stockpile before releasing the debris. This will avoid

fanning of fine dust particles into ambient air environment. Vehicles and equipments riding over barren earth surface, exposed soil surface and over fine demolition debris shall be restricted to travel at a speed not more than 10 Km/hr to reduce fugitive dust generation.

Noise emission: Equipments that generate low noise shall be preferred over others, if available. For example concrete breakers that bend and twist concrete bars shall be preferred over percussion type breakers (pneumatic hammers). Adequate noise mufflers coming with standard equipment shall be used at all circumstances and they shall be maintained in good condition. Other noise abatement measures such as intermittent working, locating stockpiles and parking of equipments/vehicles to act as noise barrier, orientation of operations etc can be innovatively adopted as per site conditions.

If high noise during dismantling is unavoidable than dismantling in residential areas can be undertaken during mid noon and in institutional and commercial areas the dismantling operation can be carried out before or after office hours or on a holiday.

Demolition Debris – Segregation: Before starting any dismantling operation, all salvageable materials such as doors, windows, frames, holdfast, MS pipes, guard rails, fencing structures, cement tiles on footpath and median etc shall be carefully removed before deploying heavy equipments. Even after demolition, segregation of debris by stacking separately bricks, broken cement pavement mortar, bituminous pavement and earth material etc will help in reducing the quantum of waste debris. Segregating them at source increases the feasibility of analysing its reuse options. All reusable materials can be stacked and treated separately. All possible efforts to reuse, recycle and reduce waste quantity shall be undertaken.

Debris collection and storage: Dismantling debris shall be immediately cleared off the site and stacked if needed at site without causing any disturbance or hindrance to public activities nearby. Debris stacks shall not slump onto traffic carriageway or into open drains and agricultural lands etc. Debris collection and stacking shall be done on a daily basis. Better housekeeping practices shall be followed immediately after dismantling/demolition is over.

Debris transport and disposal: Debris that are combustible such as paper, wood, clothes etc shall not be burnt on site or off site to reduce volume of debris as it is prohibited under MSW Rules, 2000. All possible efforts to reuse (within or outside project), recycle and reduce waste instead of disposal shall be undertaken. If it has to be disposed, disposal sites shall be approved/authorised by local municipal/Panchayat authorities. It is illegal and unethical to dump debris anywhere in a municipal/rural area without authorisation from local authority. Debris can be used for landscaping purposes and increase aesthetic quality of the project by forming engineered debris mounds as explained in ESGP 20, provided space is available within project RoW.

Debris transport: Debris transporting vehicles shall not be overloaded; speeding beyond limits, causing debris to fall off from trucks. All Practices recommended in ESGP 16 and ESGP 20 shall be followed.

Local traffic management: Practices recommended in ESGP 14 shall be followed. Debris removal shall be carried out without causing any obstruction to free flow of traffic or pedestrian movement or any other public activity nearby. Debris falling off tyres of vehicles and crawlers of earthmovers shall be periodically broomed. This debris falls off within a 10m stretch of road from where truck/earthmover enters the carriageway. Brooming this 10m stretch periodically or as and when lumps of debris is noticed on carriageway will be enhance traffic safety and reduce fugitive dust generation.

Supervision by an Engineer or Experienced Supervisor: The dismantling activity shall commence and proceed in the presence of at least one experienced engineer or supervisor. The

workers shall be guided and managed by the engineer or supervisor at work location.

Safety of workman: Workman involved in demolition and dismantling shall be provided with personal protective equipments (PPE) such as safety head gears, shoes, earplugs, gloves etc. Deployment of labour and their movement shall be controlled especially on partially demolished structures, unstable over head structures etc.

Vibration: Vibration induced risk to structures very close to project boundary is high if heavy equipments and blasting is used for demolition. The risk is high if structures are located within the distance mentioned in **Table 1**. If any structure is located within the distance (specified in feet) specified in Table 1, the related activity shall be undertaken with utmost caution and as per directions of Engineer/ Site-in charge and the work undertaken under a qualified supervisor.

Recovery of materials: As per Clause 202 of MRTH guidelines, all salvageable materials such as steel bars, guard-rails, cement pipes, footpath and median tiles, kerb stones, flower vases/ pots, timber etc shall be recovered without damaging the material by adopting appropriate method and tools and devoted inspection by engineer or site supervisor.

Reuse of materials: Contractor shall identify appropriate reuse option for each of the material dismantled and accordingly direct its management. Besides the salvageable materials that are listed in the preceding measure, materials resulting out of dismantling of PCC, RCC, brick and stone masonry structures can be appropriately reused either within the project or auctioned off to private construction material suppliers in the market.

Contractor will do well to identify appropriate reuse options within the project itself and accordingly direct its usage.

Table 1: Vibration Induced Risk Criteria

Vibration-Induced Risk Criteria for Buildings

Activity	Perceptible Distance (feet)	Historic	Residential	Structural
Blasting	1,000	400	300	60
Pile Driving	200	90	50	12
Pavement breaking	150	60	40	8
Bulldozing	60	30	20	3
Heavy Truck Traffic	50	20	15	3
Jackhammers	30	15	10	2

Sources:

Wiss, John F. Construction Vibrations: States-of-the-art. Journal of the Geotechnical Engineering Division, Proceedings of the American Society of Civil Engineers, Volume 107, No. GT0, February, 1981. Standard Recommended Practice for Evaluation of Transportation Related Earthborne Vibrations, ASHTO Designation: R8-81 (1986).

References and Recommended further reading

- Clauses 202.1, 202.3, 202.4, 202.5 of MRTH Specifications for Road and Bridge Works, 2001
- Safety and Health in Construction, An ILO Code of Practice, Geneva, 1992
- Part III of The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998.

ESGP #	ESGP 14
Activity	Local traffic management during construction

Brief Description & Scope of Activity

This code relates to making arrangements for maintaining traffic movement along part of the existing carriageway under rehabilitation, up-gradation and or routine maintenance works or making arrangements for traffic movement along a temporary diversion.

Environmental & Social (E&S) Issues

EHS&S issues that are anticipated during the activity include the following:

- Fugitive dust emission
- Traffic congestion and incessant traffic snarls
- Traffic induced high noise levels
- Pedestrians and public transport commuters exposed to hazardous conditions/safety risks
- Hazardous conditions for night time traffic movement

If traffic is diverted along newly constructed diversion roads, following additional issues will have to be addressed while selecting the alignment at design/ preparation phase:

- Surrounding land use such as residential area, industrial or commercial areas
- Presence of sensitive receptors such as schools, hospitals, educational institutes, religious sites, prayer halls etc.
- Duration of diversion road in operation and reinstatement of land after dismantling
- Safe pedestrian and commuter movement

ESGP 11– Prior information and disclosure to the public shall also be referred and construed along with this ESGP

Policy and Legal requirements, if any

There are no policies to be complied during execution of the activity. In an urban area, any change to traffic scheme has to be effected after consultation and approval from city traffic police department. In rural areas, the concerned PWD/R&B Dept, GoG office shall be consulted for undertaking such diversions or change to normal traffic scheme. Besides, Clause 112 of MRTTH specifications governs this activity.

Recommended Environmental Practice/ Management Measures

Traffic Management Plan: OPRC Contractor shall be responsible for analysing viable options for local traffic management and a final traffic management plan after having discussions with Traffic Police Department/ local PWD officials or other appropriate stakeholders such as Mandi Board and local community.

The plan shall be assessed from environmental perspective. The plan shall include methods and procedures to be adopted to control: fugitive dust emission, traffic congestion, traffic induced high noise levels, pedestrian & commuter movement, and night-time driving safety. The items that will be required to implement the plan shall be included in the bill of quantities of the intended work and budgeted.

Traffic Police/ R&B Dept, GoG Approval: The Contractor as part of his work programme submission to Implementing Consultant, R&B Dept, GoG, shall include final traffic management plan. Contractor shall develop the plan based on stakeholder consultations and intended work schedule. The environmental and safety issues referred earlier shall be included in the final plan and methodology for their management shall be presented in detail. Contractor’s traffic management plan shall comply with minimum provisions of MRTTH clause 112. The detailed traffic management plan after review by Implementing Consultant, R&B Dept, GoG shall be submitted to concerned Traffic Police department/ local PWD office, for review and approval. Only after

receiving such approval, the work shall start.

Traffic along temporary diversion: In case the traffic needs to be diverted along a temporary diversion, the OPRC contractor will be responsible for: identifying such diversion route alignments; conducting stakeholder consultation; addressing environment, health and safety issues along diversion alignment; propose traffic management plan including recommendation for managing construction stage environmental issues; prepare and include the items to be implemented in intended work related BOQ etc. The Plan shall be reviewed and approved by Implementing Consultant, R&B Dept, GoG. The plan shall meet the minimum provisions of MRTH Clause 112.3.

Traffic Management Plan Implementation: During implementation, the road users shall be informed of traffic plan suitably by placing information/sign boards at appropriate locations as identified in the plan. In case of temporary diversion of traffic off the project area, the plan shall be communicated prior through advertisements in local newspapers and placing sign boards. The sign boards and other devices shall be maintained throughout construction stage or till such required time as per Clause 112.5 of MRTH.

Traffic safety and control: The provisions of Clause 112 of MRTH shall be included in the intended work BoQ by OPRC contractor. The contractor shall adhere to the provision of Clause 112 to ensure traffic safety and control in addition to the practices recommended by traffic police/ local PWD office in their approval letter.

Construction Equipments Movement: Whenever construction machinery, equipments and vehicles movement is expected to occur, the following practices shall be adopted to the extent possible:

- Planning the movement during non-peak hours or during clear traffic flow through the road.
- Slow moving equipments and machinery shall be escorted by at least three men at front, rear and side respectively to guide the traffic and driver & the Construction machinery.
- The escorting men shall wave red flags in day time or red lanterns in night to warn the traffic on the road about the movement.

Construction vehicles and lorries: The vehicles such as lorries, vans and other fast moving construction vehicles shall be maintained in good operational condition. Headlamps, turning indicators, parking rights, and other such accessories shall be maintained in operational condition. The drivers of the vehicle shall be trained for traffic safety rules, sober driving and need to maintain cool head at all times.

Vehicle movement if significant in numbers from or to construction site such as debris removal, construction material supply, Hotmix/RMC delivery etc. shall be preferred during non-peak hours. During peak hours and night time, the vehicle movement shall be guided by red flag/red lantern holding helpers on the road to avoid traffic congestion, if needed.

The entire stretch where traffic is allowed on part of existing carriageway or through temporary diversion, a 7m wide strip (for a 2-lane traffic) shall be maintained free of hawkers, 3- wheeler/taxi or private vehicles parking and any other obstruction to free flow of traffic. In this regard the traffic police/local police help shall be sought.

Special provisions and arrangements shall be provided for public transport commuters in consultation with Public Transport Authorities and local Traffic Police/ Police. In a constricted carriageway, the commuter shall be provided with temporary bus bays and a safe walking strip of at least 0.5 m width off the road edge to avoid accidents. Shifting existing bus stations (stops) to nearest convenient points or providing speed breakers (humps) on either side of bus stops to aid commuters cross the road etc can be some of the measures that can be implemented.

Near residential, commercial and industrial areas where pedestrian movement could be in large numbers, provision for safe movement along constricted carriageway and access to

areas/properties shall be planned and provided.

References and Recommended further reading

- Clause 112 of MRTH specifications for road and bridge works, 2001

ESGP #	ESGP 15
Activity	Deployment and use of construction equipments/vehicles

Brief Description & Scope

This activity relates to deployment and use of any fossil fuel (such as diesel and petrol) powered construction machinery, equipment and vehicles during pre-construction and construction phases of a project. Typical construction machinery includes the following:

- Earth moving equipment's such as hydraulic excavators and backhoes
- Road rollers and compactors
- Road pavers (concrete/Bituminous)
- Motor graders
- Wheel dozers and loaders
- Pile drilling and boring equipment's
- DG sets.
- Dumper/ Tipper lorries
- Band drain installation vehicle
- Ready mix concrete delivery trucks
- Pneumatic rock drilling machines

Environmental & Social (E&S) Issues

Environmental issues to be considered while deploying and using diesel/gasoline powered, construction machinery, equipment and vehicles include the following:

- Air pollutant emissions such as particulate matter, hydrocarbons (HC), oxides of sulphur, CO, CO₂ etc.
- Noise generation
- Air borne and ground borne vibration
- Oil, lubricant and fuel leaks at equipment in-situ installations, parking areas, beneath fuel tanks, storage areas etc.

Policy and Legal requirements, if any

Air Pollutant Emissions

Air pollutant emissions are regulated under Rule 115 of Central Motor Vehicles Rules, 2000. However, the emission regulation is applicable only to those vehicles, which are covered under the purview of Central Motor Vehicles Rules. According to Rule 115, sub rule 7, every registered motor vehicle shall carry a valid Pollution Under Control (PUC) certificate issued by an agency authorised for this purpose by the State government.

Noise Emissions

Under Environment (Protection) Rules, 1986 (*Schedule VI, Part E*) the noise generation standards applicable for construction equipments, machinery and vehicles are presented below:

Noise Limits for Automobiles (Free Field distance at 7.5 metre in dB (A) at the Manufacturing Stage)

- | | |
|---|----|
| • Passenger or commercial vehicles upto 4 tonne | 85 |
| • Passenger or commercial vehicles between 4 – 12 tonne | 89 |
| • Passenger or commercial vehicles above 12 tonne | 91 |
| • Compactors (rollers) front loaders, concrete mixers, | |
| • Cranes (movable) vibrators and saws | 75 |

Rule 120 of Central Motor Vehicle Rules, 2000 requires that registered motor vehicles are maintained so as to conform to noise standards mentioned above.

Noise emissions from stationary DG sets are regulated under Schedule I (SI.No.83) of Environment Protection Rules, 1986.

The vehicles and equipment's that are registered under Central Motor Vehicles Rules, 2000 shall meet the provisions of the rules especially the following:

- Licensing of drivers
- Registration of motor vehicles
- Renewal of certificate of registration
- Certificate of fitness
- Maintenance of vehicles
- Safety devices
- Control of traffic
- Transportation of goods of dangerous or hazardous nature to human life
- Insurance of motor vehicles

Recommended Practice/ Measures

The following recommended practice and measures shall be construed as in addition to the practice and procedures recommended in Clause 106 of Specifications for Road and Bridge Works, MRTH, 2001.

Air pollutant Emission: All vehicles registered under Central Motor Vehicle Rules, 2000 shall have valid PUC certificate issued by authorised agency throughout their deployment period at construction site. A separate or master register of vehicles shall be maintained at construction site office containing details of vehicles under deployment and a copy of PUC certificates.

Ensure all vehicles including equipments and machinery that are not covered under Central Motor Vehicle Rules, 2000:

- are fitted with emission control equipment provided by manufacturer as part of standard equipment;
- maintained frequently and serviced as per manufactures' specifications;
- Use of specified quality of fuel for better emission performance;
- Smoke from internal combustion engines are not visible for more than ten seconds; and
- Engines are switched off when not in active use to prevent exhaust emissions.

Noise Emission: All in-built noise silencing devices such as silencers and mufflers shall be maintained and any defective device shall be promptly replaced. Equipment's shall be maintained as per manufacturer's guidelines to reduce tonal components, frequency modulations or impulses which will increase the annoying effect of any noise generated.

Noise generation due to vibration of loose parts during operation, unstable foundation at temporary installations etc shall be immediately attended and rectified.

The noise emission from each of the construction equipments, machinery and vehicles that are perceived to be generating more noise than recommended limits shall be monitored when they are in operation. Such equipments, machinery and vehicles shall be stopped from deployment or further operation.

Stationary DG sets if provided at the construction site shall adhere to noise emission guidelines and regulations in Schedule I of EP Rules 1986. The web link providing the relevant guideline is provided in the reference below.

Some of the other practices that can be adopted depending upon site exigencies include the following:

- Vehicles, machines and equipment's in intermittent use should be shut down in the intervening periods between works or throttled down to a minimum.
- High noise emission due to activities like piling, rock breaking etc shall be controlled by the techniques explained under relevant ESGPs
- As far as possible demolition work should be carried out using equipment that breaks concrete by bending in preference to percussive methods

Release of vibration energy: Ground borne vibration from carrying out operations such as piling, boring, blasting, pavement breaking etc is perceptible within a distance of 300m. A significant impact core zone of radius 100m needs to be assessed and monitored if necessary. The practices explained under relevant ESGPs for each of the construction activity shall be referred and followed.

Carrying out operations such as bulldozing, heavy truck movement etc shall have vibration- related risks on nearby structures located within a distance of 20m. If historical, religious and residential unit is to be safeguarded that are located within 20m distance during such operations, use of light duty machinery, equipments and vehicles shall be encouraged⁷.

Oil, Lubricant and Fuel leaks and Spills: Leaks and spills on ground especially below fuel tanks, lubricating/ oiling points, equipment installations, fuel/oil/lubricant storage areas etc shall be avoided by following better practices and maintenance.

If leaks and spills are unavoidable from stationary equipments, spreading a layer of clay and sawdust or other organic absorbent material before installation shall insulate natural ground surface.

Refuelling, oiling and lubricating equipments, vehicles and machinery shall be carried out with appropriate tools and kits to avoid spillage. As a better practice, worn out jute bags or cleaning rags/cloth shall be spread right below on the ground to avoid spillage on soil surface. Importantly, the operating staff shall be trained regarding the issue and better practices that can be adopted. Leaking or empty oil/fuel/lubricant drums must be removed from the site immediately.

Contaminated sawdust, jute bags, cleaning clothes/rags and other absorbent material shall be collected and temporarily stored in a impermeable bag at site. Oil soaked organic absorbents can be used as fuel along with firewood. These contaminated absorbent materials should never be disposed off along with construction debris.

References and Recommended further reading

Noise emissions

1. http://www.epd.gov.hk/epd/english/environmentinhk/noise/help_corner/help_corner.html
2. <http://www.safetyline.wa.gov.au/pagebin/noisgenl0019.pdf>
3. IS 3028 - Automotive Vehicles - Noise Emitted by Moving Vehicles - Method of Measurement
4. <http://cpcb.nic.in/divisionsofheadoffice/pci2/Noise-vehicle.pdf>
5. <http://cpcb.nic.in/divisionsofheadoffice/pci2/generator1000diesel.pdf>

Air Emissions

6. <http://www.epa.gov/otaq/equip-hd.htm>
7. <http://www.epa.gov/otaq/largesi.htm>
8. http://www.akpf.org/pub/2003_wyser.pdf
9. http://cpcb.nic.in/Vehicular_Exhaust.php

Vibration

10. Standard recommended practice for evaluation of transportation related earthborne vibrations, ASHTO Designation R8-81, 1986

Brief Description of Activity

This code relates to use of project network roads and other roads in the region for transportation purposes by construction vehicles, equipments and heavy machinery engaged by contractor during the contract period.

Environmental & Social (E&S) Issues

E&S issues that are anticipated include the following:

- Damage to road pavement
- Compliance to road safety rules
- Creating hazardous conditions for traffic movement
- Movement through non-viable narrow and congested carriageway

Policy and Legal requirements, if any

There is no policy requirement to be complied during execution of the activity. Urban area traffic police regulations will have to be complied for which the local traffic police department will have to be consulted and co-ordinated through the contract period. The vehicles and equipment's that are registered under Central Motor Vehicles Rules, 2000 shall meet the provisions of the rules especially the following:

- Licensing of drivers
- Registration of motor vehicles drivers' part shall be viewed seriously. Local Traffic Police regulations shall be reviewed, consulted and complied with all through the contract period.

Hazardous condition for traffic movement: Dirt and earth material falling off tyres of debris disposal trucks, steel wheels of rollers and crawlers of earthmoving machinery's will affect the braking action on a paved surface. A thin layer of such material will result in vehicles skidding and slipping off the pavement. Materials carried on to pavement surfaces through vehicle tyres, crawlers will be significant in amount if the truck or equipment comes out of wet, marshy and slushy construction sites. In such cases, the vehicle tyres shall be cleaned before allowing on taking the roads. Cleaning of tyres and crawlers can be done manually or using water jets for cleaning. In case water cleaning is employed, wash water can be collected, degrittied, settled and reused for same purpose. Appropriate facilities, which can be mobilised anywhere in a project stretch, shall be preferred. Contractor's Site In-charge will be responsible for ensuring compliance to the measure by conducting random checks and bringing it to the notice of Contract Manager.

Transporting fine materials: When transporting fine materials such as cement, sand and debris, it shall be ensured that no wind borne erosion of materials occur when travelling. Visible dust clouds are formed in case wind erosion is prevalent. Fine materials blown off the wind from vehicles will create hazardous condition for vehicles travelling behind or alongside. These may prove to be fatal especially for 2 wheelers and cyclists. Measures such as covering fine materials using clean tarpaulin sheets; sprinkling water on the surface of the material stock and compacting the surface while loading using excavator buckets etc. Clause 501.8.6 of MRTTH specifications shall also be followed.

The vehicle transporting materials and debris shall not be over loaded beyond its capacity causing spillage on the way. Debris such as dry leaves, paper etc which can be easily blown away when the vehicle is moving shall be covered using clean tarpaulin sheets or placed under thick soil cover while loading.

Large volume of Construction traffic: Mass movement of vehicle in and out of construction site such as Hotmix/RMC delivery trucks, debris removal from site etc. shall be preferably planned during non-peak hours. Movement of vehicles through congested roads, narrow lanes that have insufficient turning radius shall be avoided and instead alternate road networks available shall be

preferred. Measures recommended in ESGP 14 shall be followed and assistance from Traffic Police shall be sought in case large volume of construction traffic is expected on a congested road.

Parking construction vehicles: Parking of vehicles and machinery shall be as per prevailing traffic rules in the area/location. Parking shall be in such a way that traffic flow along the road is not hampered. Heavy machinery, equipment or parts there of which are suspended or held aloft by the use of slings, hoists or jacks shall be blocked or cribbed to prevent falling or shifting. Bulldozers, scraper blades, end-loader buckets, dump bodies and similar equipments of construction machinery, when parked outside the project site or in areas of considerable public movement and near children playing area, shall be fully lowered or blocked. All controls shall be in neutral position and motors/engines stopped and parking brakes set. Parking on inclined surface shall warrant chocking the wheels along with parking brakes.

References and Recommended further reading

- Clause 501.8.6 of MRTD specifications for Road and Bridge works, 2001
- Central Motor Vehicle Rules, 2000

ESGP #	ESGP 17
Activit	Earthwork in excavation for roadway in all strata including rock

Brief Description & Scope

This code relates to earthwork consisting of excavation, removal and disposal of all earth materials, necessary for the construction of road formation, side drains and CD structures. The scope of this practice covers the procedures to be followed during earthwork in foundation in all strata including rock during construction of roadway, side drains and CD structures.

Environmental & Social (E&S) Issues

E&S issues that are anticipated during earthwork in roadway in all strata including rock include the following:

- Loss of topsoil
- Loss of vegetation
- Local traffic management and safety
- Pedestrian and commuter safety
- Cut off access to residential, institutional, commercial or similar such areas
- Damage to underground utilities
- Risk to workers and equipments from underground utilities such as electrical cables
- Damage to traffic-allowed pavement during deep excavation very close to pavement
- Earthwork material onsite storage
- Earthwork material transport and disposal
- Earthwork material reuse
- Safe practices at wedging and blasting sites
- Workers and public safety at blasting and rock pre-splitting sites
- Safe transport, storage, handling and use of explosives
- High noise generation at blasting, rock breaking and rock pre-splitting sites
- Safe working practices adopted at deep excavation sites
- Siltation, scouring and material transport during dewatering
- Health hazard to workers coming into contact with sewage and wastewater
- Increased soil erosion
- Fugitive dust emission
- Excavated material carried on to traffic allowed carriageway through dumper vehicle tyres and crawlers of earthmoving machinery
- Slump from debris stocks stored along side of road
- Allowing traffic to ride over stockpiles
- Material spill from loaded trucks and dumpers
- Marsh land excavation
- Reinstatement to baseline conditions

ESGP 11 – Prior information and disclosure to the public shall also be referred to in all cases where earthwork is required.

Policy and Legal requirements, if any

Legal requirements pertain to acquisition, transport, storage, handling and use of explosives at blasting and rock pre-splitting sites. The provisions of Explosives Act, 1884 and The Explosives Rules, 1983 have to be complied. Besides, the following acts and guidelines will have to be reviewed and practised during the execution of the activity:

- Debris generated during earthwork will have to be disposed off at local governments such as municipal/Panchayat authorities approved or Implementing Consultant, R&B Dept, GoG permitted locations only.
- Safe working practices recommended in ILO guidelines.

- Part III - Safety and Health, Construction Workers Rules, 1998 for use of various equipment's, instruments, tools and work situations especially at blasting and rock splitting sites.
- Chapter IV of the Ancient Monuments and Archaeological Sites and Remains Rules 1959, prohibits mining and excavation activities in unprotected areas.
- MoRTH guidelines. Clauses 301, 302, 303 and 305 cover this activity.

Recommended Practice/ Measures

Activities within RoW: All earthwork related activities such as onsite material storage, vehicle/ equipment manoeuvring, workers movement, dewatering pump installation and its outlet, DG set installation and onsite tents etc shall be located and or restricted within RoW. If unavoidable, the reinstatement efforts after completion of the activity should be extended to all disturbed areas outside RoW.

Earthwork in non-monsoon period: Scheduling of earthwork at all sites in a road project, shall be planned in such a way that they are carried out and completed during non- monsoon periods between two successive monsoon seasons.

Topsoil preservation: As per MRTTH Clause 301.3.2, topsoil shall be stripped and stored for re-use during soil erosion control and landscaping works. Practices recommended in ESGP 12 shall be followed.

Tree felling: Tree felling is a restricted activity and practices recommended in ESGP 01 shall be followed.

Local traffic management: Before initiating earthwork activities along roadway, traffic safety and control measures as outlined in clause 112 of MRTTH specifications shall be followed. Measures recommended in ESGP 13 should also be reviewed and adopted.

Cutting off access: During excavation and earthwork along developed areas, access to private properties will be cut off. Alternate arrangements for ensuring access shall be provided or a narrow pathway shall be left across excavation width with adequate openings in the barricades. Pathways provided across deep drainage channels by placing wooden planks or other such material shall be strong and stable enough to withstand the load. 2-wheelers and other such personal mode of vehicles shall not be allowed through excavation sites, unless until approved by Site in-charge. Local community shall be informed and their co-operation shall be sought before initiating any earthwork.

Damage to underground utilities: Underground and low-lying overhead utilities shall be shifted prior to initiating excavation and earthwork in a roadway. If not too sure about the utility infrastructure below ground, inspection pits can be dug across the excavation width to verify and assure of the utilities beneath the ground. Accordingly safety precautions and work directions shall be issued. Procedures recommended under ESGP 19 shall be followed.

Risk to workers and equipments: Risk to workers and equipments shall be avoided by following the previous measure. If in doubt, the concerned utility agencies can be called to be present at site to give directions and take necessary action, in case any untoward accidents occur. It is always advisable to start deep excavation work only after completing utility shifting work. Procedures recommended under ESGP 19 shall be followed.

Damage to traffic-allowed pavement: If during earthwork, deep excavation very close to

pavement has to be undertaken, the stability of traffic-allowed carriageway shall be considered before allowing such work. Especially during monsoon, there is a possibility of pavement layer sliding or slumping towards excavated area. Necessary safe zones shall be left without excavating or safe vertical slope shall be maintained throughout the length of excavation along traffic allowed carriageway.

Excavated material onsite storage: Earthwork at roadway construction sites may not be as sensitive as at other sites if carried out during non-monsoon seasons. Depending on the land use nearby, onsite storage of excavated material shall be located close to excavation area itself. The following issues shall be considered at such sites:

- Quantity at onsite storage shall be kept to the minimum possible depending upon the space availability. Periodical removal of excess material shall be practised preferably on a daily basis or directly excavators dumping into haulage trucks.
- Dump integrity shall be periodically verified so that they do not interfere with traffic movement. Any slump on traffic side of the road will lead to dust emission. Similarly stacking along any private structure or compound wall may also cause damage. Such issues shall be rectified immediately.
- Onsite storage shall not be located near surface drainage channels or underground drain openings and agricultural lands. If any slump or erosion occurs towards such drainage channels or farm lands, contractor may clean the drains and farm lands off excavation debris.

Wastewater ponding: Sewage or other wastewater drains or lines if breached would lead to wastewater stagnation at work sites. Stagnant wastewater will lead to mosquito breeding, bad odour, sludge deposition and health hazards to workers and staff. Temporary bunding or pumping or diversion of flow away from work area shall be undertaken. If necessary, downstream portion of surface drainage channels can be cleaned to some extent to aid free flow of wastewater.

Workers exposed to sewage and wastewater: Workers exposed to sewage and wastewater shall be trained to follow basic cleanliness practices such as the following:

- Washing hands, legs and face with clean water and soap before taking food, water or a drink
- Washing clothes, shoes and other things that have become wet while working with clean water and detergent
- Bathing in the evening after a day's work is completed
- Manual methods shall be limited to the extent possible in such a situation. During project level training to workers, this issue can be taken up for training.

Debris transport: Movement of debris transport trucks and earthmoving machinery in and out of work site shall be guided and controlled without creating traffic snarls or accidents. Along the road, at least 10m length of road shall be periodically cleaned from the point where loaded trucks/ earthmoving machinery enter the road by brooming to keep the pavement free of earth material falling off tyres, crawlers etc.

Large lumps of earth material sticking to tyres and crawlers shall be manually removed before vehicle/ machinery uses the road. The trucks shall not be overloaded beyond their body height and capacity. Further, measures recommended in ESGP 16 and 20 shall be followed.

Dewatering: Dewatering if needed to be carried out in roadway earthworks, its outlet shall not be directed into drains especially underground lines. Dewatering activity will result in release of highly turbid water on the receiving body and additionally result in scouring at the outlet point. Material

transport and siltation downstream due to release of high turbid water can be controlled by constructing temporary silt arrestor basins or use of geo-textile filters. Pump outlet water can be allowed to stagnate in a shallow pit of dimension 5 -10 m (L) x 1.5m (B) x 0.5m (D) dug outside work area or near drainage channels. Stagnation or retention time in the pit shall be between 30 - 90 minutes. Appropriate arrangement will be required to control soil erosion and siltation.

Dewatering outlets: Dewatering pump outlets shall be provided with splash pads to avoid scouring at outlet point. The splash pads can be prepared of inter demolition debris such as stones and bricks or using straw bales. All these arrangements are temporary and hence after completion of work they shall be removed from the site while reinstatement and restoration.

Wedging and blasting operations: Clause 302 of MRTH specifications shall be strictly followed. Also provisions of Chapter XXII on explosives handling, Part III, Construction Workers Rules, 1998, shall be reviewed and followed.

Housekeeping practices: Good housekeeping practices shall be adopted while carrying out earthwork. Housekeeping practices such as the following shall be adopted to the extent possible:

- Clearing the working area of excavated material periodically, if not daily
- Segregating and storing, excavated earth material at appropriate locations onsite before they are transported out of site
- Periodic removal of earth material from onsite storage area
- Limiting work and circulation area within the RoW
- Strictly monitoring excavation material disposal outside RoW
- Manoeuvring heavy equipment's and vehicles in wet and marshy areas shall be avoided.

Reuse of excavation earth: Contractor shall identify appropriate reuse options for earth material excavated and accordingly direct its management. The excavated earth material depending upon its quality can be appropriately reused either within the project or in other projects of PWD. Contractor will do well to identify appropriate reuse options within the project itself and accordingly direct its usage. Clause 301.3.11 of MRTH specifications shall be followed.

Reuse of excavated earth in other projects: Excavated earth of any quality may be reusable in other projects of PWD/R&B Dept, GoG or other government agencies. In such case, Contract Manager of OPRC Contractor shall approach Implementing Consultant, R&B Dept, GoG to co-ordinate with appropriate government agencies and advise them to reuse earth material generated from this project. This practice will greatly reduce material wastage, which will otherwise increase quantity of disposable debris.

Increased soil erosion: Excavated and exposed soil surface layer will be prone to increased soil erosion during monsoon. Scheduling earthwork in such a way that other subsequent works of road construction shall be taken up immediately without any delay. Excavated areas shall be closed by taking up subsequent construction activities on a priority basis before onset of monsoon season. Contractor shall review the earthwork activities during the months of December – February from this perspective and accordingly direct the field staff to accelerate the work prior to approaching monsoon season.

Fugitive dust emission: During earthwork, significant impact on ambient air environment would arise due to fugitive dust emission. Fugitive dust is generated mainly because of the following reasons:

- Excavated material carried on to traffic allowed carriageway through dumper vehicle tyres and crawlers of earthmoving machinery
- Slump from debris stocks stored along side of road and material finding its way to

carriageway

- Allowing traffic to ride over stockpiles
- Material spill from loaded trucks and dumpers
- Damage to traffic-allowed carriageway and traffic allowed to ply on earthen shoulders

The measures recommended in Clause 112.2 of MRTH specifications shall be strictly implemented and measures recommended in ESGPs 16 and 20 shall be reviewed and followed. Avoiding earth material finding its way to traffic allowed carriageway through some means would mitigate dust problem to large extent.

Marsh land excavation: In addition to Clause 301.3.6 of MRTH specifications, the excavated muck shall be stored at site within RoW to ensure that debris is well drained and dry to the extent possible. Wet and flowing debris shall not be transported through traffic- allowed carriageway or other network roads unless and until the carrier vehicle is completely sealed from all sides. Slushy debris will be significant traffic hazard and may cause fatal accidents on road if spilled or leaked through containers. Wet debris shall be transported to dry excavation areas for better draining and drying. Use of geotextile or sand layer at the bottom for better drainage can be adopted.

Tyres and crawler plates of vehicles/ equipments working or coming out of marsh land area shall be cleaned off all debris before allowing them to ply on road. Minimum number of vehicles and equipments shall be deployed and the same set of vehicles/equipments shall be preferred over others. Repeated manoeuvring, turning etc resulting in churning of the area shall be avoided.

Reinstatement: After earthwork and excavation activity is complete, backfilling shall be carried out as per Clause 301.3.12 and 301.7 of MRTH guidelines. Besides the following measures shall also be considered for working area used within RoW and outside construction limits:

- Working area used within RoW and outside construction limits shall be reinstated to its original condition to the extent possible. Disturbance rendered to topsoil layer due to deployment of men and machines will increase the soil erosion rate especially across watercourses.
- Reinstatement shall be carried out to achieve baseline compaction, density and surface profile.
- Vegetation such as shrubs, grasses, wild plants etc if observed during baseline condition, the same shall be brought back by re-vegetating the disturbed area with same kind of variety and species.
- If vegetation needs to be reinstated at the site, topsoil removal, storage, preservation and reinstatement shall be adopted to achieve better results.
- All debris in the work zone shall be completely removed and watercourses desilted, if directed.
- Soil erosion control shall be carried out as per Clause 306 through 308 of MRTH guidelines and ESGP 21 shall also be referred
- The RoW on either side of roadway, shall be inspected before handing over the site for any signs of indiscriminate disposal of waste and debris. If required cleaning any indiscriminate disposal of waste and debris on either side of roadway work shall be carried out as a good intention practice. Any dewatering outlets constructed shall be removed and reinstated to original condition.

References and Recommended further reading

- Clauses 301, 302, 303 and 305 of MRTH Specifications for Road and Bridge Works, IRC, 2001
- ILO guidelines on Safe working practices
- Part III, Health and Safety, The Building and other Construction Workers (Regulation of employment and conditions of service) Central rules, 1998
- Explosives Act, 1884 and The Explosives Rules, 1983.

ESGP #	ESGP 18
Activity	Earthwork in embankment using borrow material

Brief Description & Scope

The activity relates to obtaining earth/soil materials from designated borrow areas located nearby RoW.

Environmental & Social (E&S) Issues

E&S issues could arise during execution of following activities:

- Local body or land owner approval
- Siting borrow pit location:
- Location related sensitivities
- Soil erosion
- Ponding of water and associated problems
- Disposal of debris by local community
- Ground water quality
- Waste water discharge
- Loss of topsoil and vegetation
- House keeping practices
- Segregation at site and indiscriminate disposal of unacceptable material from the pit.
- Numerous trips of vehicles and dumper lorries to site
- Fugitive dust emission
- Noise generation
- Transport of borrow earth to construction site
- Storage and use of borrow earth at site
- Location of stockpiles
- Stockpile related problems such as
- Slumping towards carriageway
- Soil erosion form stockpiles
- Reinstatement of borrow pits and sites

ESGP 11 – Prior information and disclosure to the public shall also be referred to in all cases where earthwork using burrow material is required.

Policy and Legal requirements, if any

There are no specific policy and legal requirements to be compiled during the activity. Clause 305.2.2.2 of MRTH specifications and IRC:10-1961 guideline on Recommended Practice for Borrow pits for Road Embankments Constructed by Manual Operation governs this activity.

Indirectly, the policy and regulatory initiatives undertaken by Ministry of Environment and Forests, Government of India for use of fly ash also govern use of borrow pit earth in road construction when Thermal Power plants are located in the region. MoEF, Gol has notified the following notifications which can be reviewed and integrated in the planning and design phase before scouting for borrow area sites under OPRC contract:

- the amended Fly Ash Notification 25 January 2015 can be reviewed at <http://envfor.nic.in/orders>
- Prevailing Fly ash notification, September 1999 can be reviewed at <http://envfor.nic.in/orders>
- The amended Notification SO 979(E) dated August 2003 can be reviewed at <http://envfor.nic.in/orders>

In response to MoEF initiatives on fly ash, IRC has come out with special publication IRC specification No. SP: 58 of 2001 regarding the use of fly ash in road construction which can also be reviewed and incorporated into design and planning phase of the project.

Recommended Practice/ Measures

Analysis of alternatives: During preparation stage, OPRC Contractor shall explore all options to avoid borrowing earth from anywhere either inside RoW or sites outside project RoW. Measures such as the following shall be explored:

- Balancing cut and fills within project road network or adjoining OPRC network contractors.
- Use of fly ash in road construction as per IRC guidelines and MoEF directives.
- Exploring with other departments such as Irrigation through Implementing Consultant, R&B Dept, GoG or directly to see if any desilting of ponds, canals, lakes and rivers within OPRC network region is scheduled and desilted material is available.

EA Process: In case there is no other alternative but to borrow earth material, environmental consequences of the activity shall be completely assessed. Once a site has been selected for borrowing earth, the concerned local government and landowner shall be treated as one of the stakeholder and their approval obtained. The mitigation strategies recommended for borrow pit siting, use and reinstatement phase shall be effectively disclosed to the stakeholders. Their opinion shall be obtained and mitigation strategy shall reflect the same. Borrow pits shall not be opened unless and until local body approval/regulations are obtained along with landowners' agreement. A copy of written approval/agreement from the concerned Panchayat body, or the land owner(s) shall be secured by the contractor and shown to the Employer at times when asked for. Farm lands and other productive land parcels shall be avoided while siting borrow pits. Preferably, desilting of ponds, lakes, dredging of rivers and canals etc will be ideal source for borrowing earth depending on the quality requirements of the project. It could be possible to blend different earth materials with fly ash to meet quality requirements of project.

Borrow Area Management (Development and rehabilitation) Plan: The mitigation strategy in the form of Borrow Area Management (Development and rehabilitation) Plan shall be prepared by Contractor and such plan shall form part of the following project documents.

- Public disclosure
- Engineering/Work specifications
- EA/EMP Report, if any.

While locating borrow pits, the following points shall be considered.

Basic principles: Standard practices recommended in locating, laying out, use and closing of borrow pits have been presented in **Annexure A**. This procedures and practices are based on guidelines prepared for another World Bank funded; Rural Road Improvement Project (RTIP) at Bangladesh, Punjab (India) which can reviewed for reference.

Reinstatement of borrow pits/area: The borrow pit/area shall be reinstated as per the following:

- Landowner agreement conditions
- Borrow Area Management Plan
- Implementing Consultant, R&B Dept, GoG directions and up to his satisfaction.

Reinstatement: The borrow pits shall be reinstated by re-spreading about 100mm of topsoil. The topsoil shall be re-vegetated by fertilizing, mulching, reseeding or other appropriate measures. Reinstating vegetation would protect from soil erosion, except where a lake or sub-water table conditions are designed, or where the area is zoned for commercial, industrial, or residential use, or where the borrow is in. When the borrow pit is acquired by agreement with landowner, the restoration method shall be determined by landowner requirements. However, borrow pits shall not be left open near residential or other areas where domestic waste dumping is predominant. Fly ash notification directives to fill in fly ash at these pits should also be reviewed and incorporated.

References and Recommended further reading

- Clause 305.2.2.2 of MORTH Specifications for Road and Bridge Works, IRC, 2001
- ESGP 07, Borrow Area Development and Operation, Rural Road Improvement Project (RTIP), LGED, Bangladesh <http://140.194.76.129/publications/eng-manuals/em1110-2-1913/c-4.pdf>
- Amended Fly Ash Notification 25 January 2016 can be reviewed at <http://envfor.nic.in/orders>
- Prevailing Fly ash notification, September 1999 can be reviewed at [http://www.envfor.nic.in/legis/hsm/so763\(e\).htm](http://www.envfor.nic.in/legis/hsm/so763(e).htm)

Excerpts from the Fly Ash Notification, 1999, 2003, 2016 for further reading:

- As per the amendment of the Notification dated 25th January 2016 “No agency, person or organization shall, within a radius of 300 kilometers of a thermal power plant undertake construction or approve design for construction of roads or flyover embankments with top soils; the guidelines or specifications issued by the Indian Road Congress (IRC) as contained in IRC specification No. SP: 58 of 2001 as amended from time to time regarding use of fly ash shall be followed and any deviation from this direction can only be agreed to on technical reasons if the same is approved by Chief Engineer (Design) or Engineer-in-Chief of the concerned agency or organization or on production of a certificate of “fly ash not available” from the Thermal Power Plant(s). This certificate shall be provided by the TPP within two working days from the date of making a request for ash.
- Soil required for top or side covers of embankments of roads or flyovers shall be excavated from the embankment site and if it is not possible to do so, only the minimum quantity of soil required for the purpose shall be excavated from soil borrow area. In either case, the topsoil should be kept or stored separately. Voids created due to soil borrow area shall be filled up with ash with proper compaction and covered with topsoil kept separately as above. This would be done as an integral part of embankment project within the time schedule of the project.
- No agency, person or organization shall within a radius of 100 kilometres of a coal or lignite based thermal power plant allow reclamation and compaction of low-lying areas with soil. Only pond ash shall be used for compaction. They shall also ensure that such reclamation and compaction is done in accordance with the bye-laws, regulations and specifications laid down by the authorities mentioned in sub- paragraph (3) of paragraph 3.

Annexure A

**Basic Guidelines in Locating
And Using Borrow Pits**

The following principles for location, depth and drainage of borrow pits shall be followed:

- Earth for the embankment should be obtained:
 - Cut material available from other road construction projects nearby, may be within OPRC network or adjoining networks, NHAI/PWD projects etc;
 - from dredging operations of ponds, lakes, rivers and canals;
 - from barren land or land without tree cover outside the road reserve;
 - by excavating land and creating new water tanks/ponds;
 - from land acquired temporarily outside the road reserve;
 - from excavation of proposed culverts.
- Borrow pits shall be rectangular in shape with one side parallel to the centre line of the road and generally maintain the form of the land.
- No borrow pits shall be dug within 5 m of the toe of the final section of the road embankment;
- Borrow pits shall be dug continuously. Ridges of not less than 8m width shall be left at intervals not exceeding 300m and small drains should be cut through the ridges to facilitate drainage;
- To ensure efficient drainage, the bed level of the borrow pits shall, as far as possible, slope down progressively towards the nearest cross drain, if any, and shall not be lower than the bed of the cross-drain;
- When it becomes necessary to borrow earth from temporarily acquired cultivable lands, the depth of borrow pits shall not exceed 45 cm. The topsoil to a depth of 15 cm shall be stripped and stockpiled for later rehabilitation of the pit. Thereafter, soil may be dug out to a further depth not exceeding 30 cm and used in forming the embankment. Once the borrow pit is no longer required, the stockpiled top soil shall then be spread back on the land;
- Borrow pits shall not be located within 500m of any identified archaeological, religious, cultural sites; residential areas and other sensitive receptors such as schools, hospitals, educational institutions etc.
- Haulage of material to embankments, or other areas of fill, shall proceed only after sufficient spreading and compaction plant is operating at the place of deposition.
- Recommended mitigation measures for rehabilitation and restoration of borrow areas are:
 - if used for agriculture, stockpiled topsoil should be returned to the borrow pit;
 - if used as a fish pond, the banks should be stabilised by compaction and any additional excavated material disposed of in accordance with good operating practice;
 - for all other uses, stockpiled topsoil should be returned to the borrow pit and all worked areas stabilised through revegetation using local plants.
- Sediment shall be controlled at each site by ensuring that base of the borrow pit drains into a sediment trap prior to discharging from the site.
- After obtaining approval from the Implementing Consultant, R&B Dept, GoG, the Contractor shall locate and peg out the full extent of proposed extraction areas prior to the use of a borrow area. For location, depth and drainage of borrow pit, the principle criteria mentioned above shall be followed by the Contractor. Once borrow pit sites have been determined they shall be inspected by Implementing Consultant, R&B Dept, GoG.
- The borrow areas shall be rehabilitated as per the provisions of the approved rehabilitation plan.

Source: SECP 07, Borrow Area Development and Operation, Rural Road Improvement Project (RTIP), LGED, Bangladesh

Annexure B

**Safe Operating Procedures
At Borrow Pit sites**

SAFE OPERATING PROCEDURES

Borrow Pit, Waste Pit and Stockpiling Operations and Inspection

- Review Safe Operating Procedures for applicable equipment and perform pre- operational checks.
- Review Mine Safety Act requirements.
- Evaluate site and follow excavation, trenching and shoring standards that apply.
- Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
- Wear appropriate personal protective equipment consistent with hazards.
- Employees on foot must use extreme caution to stay clear of operating equipment.
- Avoid areas behind operating equipment.
- Observe and stay clear of overhead utility lines.
- Be aware of loose material, excavation drop-offs, uneven ground and other obstructions.
- Before backing, make sure area is clear and use an observer when available.
- Be aware of stockpile stability when removing material. Do not leave vertical slopes in stockpiles that could collapse on a person on foot.
- Drivers should stay in cab while truck is being loaded.

ESGP #	ESGP 19
Activity	Utility relocation

Brief Description of Activity

This code relates to shifting of public utilities that are either underground or above ground. Public facilities and utilities such as: water pipelines, sewer lines, roadside drains, telephone cables and poles, optical fibre cables, electrical cables, overhead HT/LT electrical lines and their poles, transformers, oil & gas pipelines, street lights and its cables, public bus stands and public toilets etc are covered within the scope of this code of practice.

Environmental & Social (E&S) Issues

EHS&S issues that are anticipated during utility shifting include the following:

- Delay in utility shifting that has commenced and associated adverse impacts on environment
- Lack of co-ordination between various stakeholders and associated impact on end-user community
- Fugitive dust emission
- Noise pollution
- Air emissions
- Local traffic management
- Debris generation and disposal
- Reinstatement of land
- Health and safety issues associated with utility shifting works

Issues such as earthwork, prior information and disclosure to public dismantling of old materials, deployment of equipments, setting up labour camps, local traffic management, engaging construction labourers etc have been dealt separately in detail under various ESGPs. They shall be referred and construed as part of this ESGP as well.

Policy and Legal requirements, if any

There are no policy and legal requirements that are to be complied during execution of the activity. Clause 110 of MRTH specifications governs this activity.

Recommended Practice/ Measures

Utility Inventorization and Mapping: Utility services that need to be relocated or shifted from project road shall be inventorised and mapped during project preparation stage itself. OPRC Contractor shall be responsible for such Inventorization and mapping. If needed, inspection pits or trenches shall be dug to verify the underground utilities, their depth below ground level; etc. In urban areas, MRTH clause 110.2 specifications may not be applicable as any delay in utility shifting during construction stage aggravates construction stage adverse impacts such as fugitive dust emission, local traffic management, soil erosion and control during monsoon, delayed construction schedule and its subsequent adverse impacts etc.

Co-ordination with service agencies: OPRC Contractor shall do the initial spadework of utility relocation approval process along with Implementing Consultant, R&B Dept, GoG and concerned utility service agencies. Initial spadework shall start at least 3 - 6 months prior to scheduled OPRC intervention.

Utility relocation – Planning & Scheduling: Utility relocation planning and scheduling shall be tentatively prepared by OPRC Contractor after having discussions with Implementing Consultant, R&B Dept, GoG. The contractor shall prepare final planning and scheduling of utility shifting after detailed consultation with concerned service agencies. This plan and schedule shall be final and be implemented in time bound manner. Any delay in utility shifting process will increase construction stage impacts on environment.

End-user concerns: Utility service users/ beneficiaries concern shall be borne in mind while planning and scheduling the shifting process. Disruption in services, non-availability of service for a prolonged period, substantive drop in service quality levels etc. might aggravate user/ beneficiary community concerns. Proper communication of such eventuality due to utility shifting to the beneficiary community will ensure co-operation of the community. During public consultation i.e. stakeholder consultation and public disclosure, OPRC Contractor shall effectively communicate the utility shifting plan prepared in consultation with agencies. During implementation stage, sticking to planned and promised utility shifting schedule will reassure the community. Alternate arrangements during service *cut-off* period will also improve community co-operation to the project.

During shifting, drop in service quality shall be monitored by the concerned service agencies. Eventualities such as water pipeline contamination, sewage wastewater flooding/ponding, electrical cable leaks and associated accidents shall be averted by monitoring the utility shifting work. Utility shifting work contract shall be under the direct supervision and control of concerned service agency. OPRC Contractor, however, shall ensure that agreed time schedule is followed and any eventualities if occurs shall be brought to the notice of Implementing Consultant, R&B Dept, GoG and concerned utility agency.

Utility shifting work: During utility shifting work, earthwork, dismantling of old materials, deployment of equipments, setting up labour camps, local traffic management, engaging construction labourers etc. shall be as per various code of practices appended with this code. Issues such as fugitive dust emission, noise generation, air pollution and debris management shall be mitigated and managed per practices recommended in the ESGPs mentioned above.

Health and Safety of workers: During shifting work, especially within RoW where traffic is allowed on part or full carriageway, safety of workers shall be considered. Temporary barricading of the work area as per MRTTH Clause 112.4 and deploying a supervisor to oversee the workers would ensure workers safety. Timely execution of shifting work without avoiding any delay will improve traffic as well as workers safety.

References and Recommended further reading

- Clause 110 of MRTTH Specifications for Road and Bridge Works, 2001
- Clause 112 of MRTTH Specifications for Road and Bridge Works, 2001
- ILO Guidelines on Construction safety
- The Building and other Construction Workers (Regulation of employment and Conditions of Service) Act, 1996 and Rules 1998
- Inter-state Migrant workmen Act, 1979

ESGP #	ESGP 20
Activity	Construction waste management

Brief Description of Activity

This code relates to debris management at construction sites. The debris generated from various operations and activities such as earthwork, clearing & grubbing, dismantling of existing structures, construction plant (hotmix/batching plant) operations, site office, staff canteens, vehicle maintenance yard and material stockyard maintenance etc. shall be managed as per the practices recommended in this ESGP.

Environmental & Social (E&S) Issues

EHS issues are anticipated during following stages:

- Debris generation
- Storage at site
- Transport
- Disposal

Policy and Legal requirements, if any

Debris generation storage transport and disposal is regulated by the local government such as Local Municipal Corporation/Municipality or Panchayats. Concerned local government office shall be consulted regarding Contractors obligations. The debris generated has to be disposed off at Local government authorised locations or Implementing Consultant, R&B Dept, GoG permitted locations only.

The following regulations on different types of wastes govern this activity:

- Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
- Batteries (Management and Handling) Rules, 2001
- Solid Waste Management Rules, 2016
- Construction and Demolition Waste Management Rules, 2016
- Plastic waste Management Rules 2016
- Bio-Medical Waste Management Rules, 2016

Under Hazardous waste rules, any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger to health or environment is regulated for its management, handling, transport and disposal. Road sector projects generally do not generate much hazardous wastes as specified in the schedules of the rules. However, local Gujarat State Pollution Control Board shall be consulted to understand the regulatory provisions applicable on road project components. Used oil, oily sludge, oil containing wastes, construction chemicals and resins, paints, empty containers of these materials etc could be treated as hazardous wastes.

Battery rules regulate the use and disposal of lead acid batteries which is a source of electrical energy and contains lead metal. These rules apply to even consumer and bulk consumer involved in use of batteries.

MSW Rules regulate the commercial and residential wastes generated in a municipal or notified areas. MSW Rule states that constructions wastes shall be separately collected and disposed off following proper norms. Waste such as garbage and dry leaves shall not be burnt.

Recycled Plastics Rules notifies the rules for use of recycled plastics carry bags and containers. This rule prohibits the use of plastic bags that are of thickness less than 20 micron size.

Bio-Medical Waste Management Rules, 2016 apply to all persons who generate bio medical waste in any form.

OPRC Contractor shall review the detailed regulations as recommended in ESGP 09 depending

upon the types of waste getting generated in the project and comply with the same.

Recommended Practice/ Measures

Debris management plan: During project preparation stage OPRC Contractor shall estimate debris generation quantity from the project and its quality. Based on detail engineering information, OPRC Contractor shall prepare detailed debris management plan containing the following information:

- Cut and fill balancing method to self-manage the debris within the project
- Waste generation quantity and quality
- Sorting and segregation at the point of generation or later
- Reuse and recycle options available
- Disposal locations
- Approval from local government for debris disposal or land owner approval in case of private locations
- Disposal methods and procedures, if disposed off at private locations

Contractor through his environmental expert shall review such debris management plan from environmental impact assessment angle and improve upon the plan in consultation with Contract Manager. Any environmental mitigation measures that need to be built-in shall be added to the plan or in specifications.

Debris generation: Before initiating any activity, if the debris generated is to be reused or recycled, the implementation plan, sequence, equipment and methods for the activity proposed shall be reviewed to consider that execution of the activity does not result in harming the reuse/recycle option of debris. If segregation at generation point is to be carried out, adequate logistics shall be arranged so that waste segregation does not hinder construction schedule or activity.

Debris generated or segregated shall be stored at Contract Manager approved locations within or outside RoW without causing any hindrance to traffic movement or any public activity in the area. Integrity of debris stocks shall be periodically checked to prevent slump towards traffic- allowed carriageway or slumping against any structure causing its failure. If debris stacks or dumps are stored along roadside, it shall be ensured that either due to slump or due to riding of vehicles on the stack, fugitive dust is not generated. Appropriate measures such as: barricading the stacks along the roadside, cleaning the pavement and reforming the stack shall be taken. Environmental officer or field engineer shall regularly (at least once in a week) visit the stack sites to see if they are contributing to fugitive dust or other integrity related problems.

Balance by cut and fill method: Debris generated can be better managed by balancing the cut and fill sections within the project. Cut section debris, if suitable can be reused at fill sections. However, such specification has to meet the technical requirements of the project.

Bituminous waste generated from road pavement dismantling: Scarified bitumen waste will be generated if damaged road pavements are to be removed and rehabilitated. The bitumen waste can be recycled for use below sub grade under pavement or below GSB under shoulder. Any other appropriate re-use shall be explored and its disposal in the landfill shall be avoided at all costs.

Debris Transport: Debris shall be transported on project road and other urban network roads without causing any hazardous conditions that would endanger health and safety of the community. The following issues shall be managed appropriately:

- Debris spill from loaded trucks
- Fine material persistently blown-off from the truck enroute to disposal site
- Debris lumps falling off crawlers of earthmoving equipments and tyres of dumper lorries

- Debris from wet or marshy construction sites finding its way to traffic allowed carriageway through crawlers and tyres of dumper lorries. Practices like the following can be adopted to mitigate some of the issues highlighted above:
- Do not overload the trucks beyond its maximum capacity. MRTH specifications in clause 501.8.6 shall followed.
- Loaded material on the trucks can be compacted slightly using excavator buckets or sprinkled with water. Covering the loaded material using clean tarpaulin sheets may also be adopted
- Debris transported or falling off tyres and crawlers can be prevented by manually cleaning the tyre and crawlers with water before allowing the vehicles to take the road. The wash water can be reused as many times by storing it in an underground tank.
- Debris transported through tyres and crawlers normally fall off within a short distance from where the trucks/vehicle entered the road. Cleaning the pavement within that short distance can also be adopted to prevent dust generation and skidding of vehicles on soiled road pavement. Contractor can broom and clean at least 10m length of road from where vehicles enter the road from work sites.

Debris disposal: Construction debris is generally inert and simple landfill methods can be used for its disposal. Construction debris is preferred in MSW landfills to use as daily cover material. During disposal, the following issues shall be reviewed to explore the options available to use and reduce the quantum of debris:

- Reuse and recycle options available
- Possibility for regarding the debris as a resource and reusing it as Construction material.
- Feasibility for its use within OPRC network roads or adjoining OPRC networks or some other projects (e.g. rural road construction projects under NHAI/PWD projects, as cover material in domestic solid waste sanitary landfill sites)

Disposal Location: Debris disposal shall be carried out at local government (Corporation/Municipality/Panchayat) authorised or Implementing Consultant, R&B Dept, GoG authorised locations only. In case disposal is carried out on sites other than landfill sites, landowner approval shall be obtained before starting the activity. Approval shall be obtained even if the land is owned by government.

Debris as Noise Barriers: Debris can be used as effective noise attenuation barrier along roadside, opposite sensitive receptors and median, if space is available. Well compacted debris along roadside and median can attenuate noise, light and dust emissions to certain extent. An effective noise barrier characteristics can be achieved if the line of sight is obstructed between road traffic and sensitive receptor and barrier has a density of 20kg/sqm. Landscaping on such debris mounds laid longitudinal along the road alignment improves the aesthetics of the project while controlling soil erosion. For more details, this web link can be reviewed: <http://www.fhwa.dot.gov/environment/keepdown.htm>

Construction debris can be used for landscaping and other beautification purposes. Appropriate lands located along project corridor can be used as landfill site and after completion of work, the debris landfill can be closed and covered with a 150-300 mm thick topsoil layer brought from borrow sites. The closed landfill site can be planted with appropriate type of plants, trees, shrubs and grass cover to conceal the site. This will add to the aesthetic value in the area.

Landfill site selection: If debris is to be disposed off at sites other than existing landfill sites, then siting criteria shall be carefully reviewed to avoid adverse impacts at the chosen site. It would be better, if such site selection is carried out as part of project preparation stage studies and as part of Environmental Management Processes recommended in the OPRC contract. The following sites

shall not be selected for debris disposal:

- Land located in the midst of agricultural lands, river beds or catchment areas or any other surface water body.
- Wet lands or marsh lands even if it is of recent origin or artificially made
- Forest lands – declared as well as densely vegetated land parcels
- Low lying lands forming part of larger catchment basin especially on the downstream side

The selected site shall be assessed from environment perspective before undertaking dumping activity. Contractor shall be responsible to conduct such environment assessment and formulate activity and site-specific EMP.

References and Recommended further reading

<http://www.tjcog.dst.nc.us/cdwaste.htm>

ESGP #	ESGP 22
Activity	Providing and laying bituminous pavement construction

Brief Description of Activity

This activity relates to laying and constructing sub-base, base (both bituminous and non-bituminous) and surface bituminous course layers in road construction. Various types of sub-bases, bases and surface courses discussed under clauses 400 and 500 of MRTH is covered in this ESGP.

Environmental & Social (E&S) Issues

Various EHS&S Issues could arise during execution of the following activities:

- Sourcing of materials such coarse and fine aggregates from legitimate sources.
- Local traffic management.
- Mobilisation and use of various types of construction machinery, equipment and vehicles.
- Hauling construction material such as coarse/fine aggregates, water, borrow earth, finished material from hotmix/Asphalt plants etc.
- Fugitive dust emission during various activities.
- Installation, operation and dismantling of temporary, in-situ hotmix/Asphalt plants.
- Occupational health and safety of workers.
- Debris generated and rejected materials/layers, if any.
- Many of the EHS&S issues that could arise during execution of above activities have been dealt in detail in the following ESGPs:
- Setting up hot mix plants
- Setting up stockyard
- Sourcing construction materials
- Traffic management
- Deployment and use of construction equipments and Vehicles.
- Project road and other networks roads used by construction traffic.
- Debris removal, storage, transport and disposal.

These ESGPs shall be referred and constructed as forming part of this ESGP.

Policy and Legal requirements, if any

There are no specific policy and legal requirements to be compiled during execution of the activity. Clause 400 and 500 of MRTH specifications govern this activity.

Recommended Mitigation Measures

Preparation of sub-grade: Manual mixing, if allowed, as per MRTH specifications 401.4.2 or mix-in-place method is used, the mixing of materials shall be carried out within construction area. If mixing is carried outside new carriageway that is being laid, the site shall be cleaned off all debris and reinstated to original conditions prior to moving next segment of road.

Soil material carried off to road: When preparing the sub-grade, soil material might be carried off to traffic allowed carriageway through vehicle tyres and crawlers. Measures recommended in other ESGPs shall be followed.

Lime and cement stabilised courses: In case lime or cement is used as per clause 402 and 403 of MRTH specifications, fugitive dust from storage areas and during application shall be prevented by following appropriate measures such as clause 402.3.6 specifications.

Dust generated during cleaning the surface: As per clause 405.3.2 of MRTH specifications, if mechanical broom or compressed air is used for blowing off surface dust, dirt and other foreign matter, the area of such operation shall be well enclosed or covered using GI sheets or jute bag screens. This measure needs to be employed only if there are human-use buildings or public

movement is very close to work area. Dust removal by section type instruments, if available, shall be preferred as they generate less dust.

Use of Bitumen heaters, self-propelled sprayers, tar boilers etc: Various bitumen, onsite, processing equipments and vehicles might be used during various stages of bituminous road constructions. Fuel used for heating will be one major source of air emissions. The following measures shall be followed to the extent possible:

- Contractor will do well to procure and use latest equipments that emit less air pollutants specifically the black smoke and hydrocarbons. Fossil fuel fired or gas fired heaters could be considerably less polluting than fuel wood fired ones. In dense residential areas, high smoke emitting equipments shall be prohibited.
- Locating bitumen heaters, tar boilers or similar such equipments in open areas where dispersion of gaseous pollutants is better.
- Barricading the work site and especially such high temperature operations and equipments to prevent general public especially children coming very close to the equipment.
- Prohibiting crude way of heating bitumen or tar using fuel wood in dense residential/commercial areas
- Spillage and leakage of fuel oils, fluid bitumen etc shall be avoided by using appropriate tools and by following safe operating procedures.

Workers health and safety: Appropriate PPE's shall be provided to workers and a supervisor deployed to oversee use of PPE's and entire operation during construction. Standard safe operating procedures shall be followed and one reference document is appended in the **Annexure**.

References and Recommended further reading

Clause 400 and 500 of MRTTH specifications for Road and Bridge Works, 2001

Annexure
SAFE OPERATING PROCEDURES

Impactor-Asphalt Cutter Class Code 2215

- Operators shall perform a pre-operational check of equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not operate any equipment that is unsafe. Shut engine off when not in use.
- Never leave machine unattended with the engine running.
- Do not leave attachment in the raised position when it is not in use
- Locate utilities prior to beginning operation.
- Never allow anyone to work under raised attachment without proper safeguards in place and secured.
- Never attempt to start or operate the machine except from the operator's station.
- Check bolts, fittings and housing for cracks three (3) times a day.
- Be sure of position of impactor to surface.
- Wear appropriate personal protective equipment consistent with the hazard.
- Operators should be aware of employees and others in work zone.

Asphalt Overlays/Widening

- Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
- Determine the traffic control needs from the Work Zone Safety Handbook.
- Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
- Wear appropriate personal protective equipment consistent with the hazard. Safety vests are required.
- Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
- Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
- Keep fire extinguishers available at all times when using a fired kettle.
- Use caution when handling hot/flammable materials. Review MSDSs for each material used.
- Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
- Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
- Allow ample space for each employee to work safely.
- Before backing, make sure area is clear and use an observer when available.
- Observe and stay clear of overhead utility lines.
- Watch for flying sand and rock from sweeping operation and adjacent traffic.

Asphalt Distributor/Kettle

- All drivers shall be properly licensed.
- Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
- Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
- Always know location of fire extinguishers and ensure that they are properly charged.
- Remove fire extinguisher and have nearby prior to firing distributor.
- Use gloves or insulated material when handling heated spray bar sections or hoses.
- To avoid having hot material overflow from the tank, allow sufficient space in the tank for expansion of the material when heated. Do not overfill. Keep tank and burner areas clean.
- To prevent an explosion or possible fire, do not operate burners unattended, while vehicle is in motion or in a confined area.

- To prevent a possible explosion, do not heat material beyond manufacturer's recommended temperature. Do not light burner(s) unless the flue is covered by a minimum of 6 inches of asphalt.
- Plan ahead to minimize or eliminate backing. Always check to the rear before backing and use an observer if available. Make sure back-up alarms are working properly.
- No personnel shall be allowed to ride on the rear, i.e., when the vehicle is equipped with interior cab-mounted controls. If a greater hazard is created by using cab-mounted controls, such as when maneuvering on narrow, twisting roadways, personnel may be allowed on the rear of the vehicle, if adequate fall protection is provided.
- Make sure appropriate decals and placards are displayed on distributor.
- Operators and passengers shall wear seat belts and shoulder harnesses as provided.
- Wear appropriate personal protective equipment consistent with the hazard.
- Operators should be aware of employees and others on foot in work zone.
- Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
- If vehicle is equipped with A.C. engine heater and/or tank heater, first switch current off and then unplug heater before operating either piece of equipment.
- Operator shall stop at all unsignalized railroad grade crossings.
- Eye protection is required when loading or unloading material.

Asphalt Patcher Truck Class Code 1012

- Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
- Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
- All drivers shall be properly licensed.
- Never wear loose clothing that can get entangled in the working parts of the tools.
- Maintain proper footing and balance at all times.
- Operator should be aware of employees and others on foot in work zones.
- Disconnect all equipment before inspecting or servicing.
- Always connect hoses to the tool hose couplers before energizing the hydraulic power source.
- Do not operate the tool at oil temperatures above 140 degrees F.
- Do not weld, cut with an acetylene torch or hardface the breaker tool.
- Be sure that all hoses and attachments are put back in truck and properly secured before moving.
- Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
- Use caution when handling hot/flammable materials. Review MSDS for each material used.
- Use proper lifting and handling techniques while shoveling asphalt.
- Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
- Wear appropriate personal protective equipment consistent with the hazard.
- Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
- Keep windshield, windshield wipers, side windows and mirrors clean.
- When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
- Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
- If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Impactor-Asphalt Cutter Class Code 2215

- Operators shall perform a pre-operational check of equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not operate any equipment that is unsafe. Shut engine off when not in use.
- Never leave machine unattended with the engine running.
- Do not leave attachment in the raised position when it is not in use.
- Locate utilities prior to beginning operation.
- Never allow anyone to work under raised attachment without proper safeguards in place and secured.
- Never attempt to start or operate the machine except from the operator's station.
- Check bolts, fittings and housing for cracks three (3) times a day.
- Be sure of position of impactor to surface.
- Wear appropriate personal protective equipment consistent with the hazard.
- Operators should be aware of employees and others in work zone.

ESGP #	ESGP 24
Activity	Road Materials Testing Laboratory

Brief Description & Scope

This activity relates to setting up of road materials testing laboratory at project site. This practice covers the issues to be addressed during siting, setting up, operation, dismantling and reinstatement of land occupied by road materials testing laboratory.

Environmental & Social (E&S) Issues

Specific EHS&S issues that needs to be considered while setting up temporary, road materials testing laboratory include the following:

- Siting the laboratory
- Waste generation and disposal
- Housekeeping practices
- Noise generation
- Dismantling of laboratory
- Reinstatement of land

The following ESGPs covering some of the EHS&S issues shall also be reviewed and construed to form part of this ESGP:

- Setting up site office
- Debris removal, storage, transport and ultimate disposal

Policy and Legal requirements, if any

There are no specific legal requirements covering this activity. Clause 121 of MRTH guideline covers this activity.

Recommended Practice/ Measures

Siting Criteria: As per clause 121.2 & MRTH Specifications, field laboratory has to be located near site office. The siting criterion recommended for locating site office shall be followed. The selected site for field laboratory shall have adequate working space as per various requirements illustrated in clause 121.2 of MRTH Specifications.

Waste generation & disposal: Liquid waste generated in the field laboratory may typically include:

- Wash water generation due to washing of testing equipments, equipment parts, moulds, vessels etc.
- Floor washing water

Wastewater generated from field laboratory might have high grit, suspended solids, oil and grease among other pollutants. Wastewater shall not be disposed off into sewer lines or open drainage channels without degritting. If onsite disposal is to be adopted, degritting followed by the onsite disposal methods such as leach pits/soak pits shall be preferred. To remove oil and grease, O&G traps or a layer of O&G adsorbents like saw dust can be provided in the Leach pits.

Solid Waste generation & disposal: Solid waste ranging from innocuous earth and stone samples to hazardous wastes such as broken glass and discarded laboratory equipments built with hazardous materials (e.g. asbestos) will be generated from a field laboratory. Used and excess samples of earth, stone, sand, bitumen, cement, concrete, concrete cubes/beams etc shall be stored at an isolated place within or outside (within enclosures) the laboratory. Waste material shall be periodically removed from the storage site.

Method of disposal could include: returning the samples to sampling points in case of earth, stone,

sand, bitumen and cement; recycling and reusing options for tested or excess concrete cubes which can be used as fill material; breaking the cubes/beams and using the broken pieces along with coarse aggregate material in embankment/sub-grade forming works etc.

Materials such as broken glasses, discarded lab equipments having hazardous wastes such as glass wool and asbestos fibres, sharpnells etc shall be stored in separate containers and disposed off in a secured landfill site along with construction debris that goes to landfill. Care shall be taken while transporting such materials. Any salvageable materials such as metal parts shall be retrieved, stored and auctioned off along with other such materials after project is completed.

Housekeeping practices: The field lab shall be maintained with better house keeping practices. Some of the practices could include:

- Layout of the laboratory shall be planned in such a manner that will enable easy cleaning and washing of the floors periodically.
- The equipments, sample storage area, office furniture's, working tables etc. shall be placed in manner that gives more working and movement space for lab staff.
- Lab shall be well lit and ventilated
- Tested or excess samples shall not be indiscriminately thrown or strewn around the field lab room. They shall be stored in an isolated or enclosed cabin within or outside the room.
- Washing area shall be kept dry and clear of grit and earth material. Water shall not spill over and entire room shall be broomed at least once in a day.

Noise generation: Though noise emission from some of the testing equipments will be for short and brief period, the field lab room shall have doors and windows that can be closed air-tight. Noise nuisance will not be a problem unless the lab is located adjacent to residential or other such sensitive areas

Dismantling & Reinstatement: The field lab shall be dismantled and cleared of all construction/dismantled materials, samples, broken glassware etc. The onsite disposal systems such as leach pits shall be hygienically closed. Top 500mm layer of leach pits shall be dug out and replaced with dry, clean sand or local soil material. The soil or sand layer shall be compacted to residual density.

The land shall be reinstated in terms of soil and ecological environment. Practices recommended in ESGP related to site office shall be followed.

Water & Energy consumption: Water and electrical energy consumption shall be managed and maintained at minimum possible level. The staff shall be instructed or trained in reducing water and electricity consumption. Simple do's and don'ts of established road testing labs shall be presented to them for review, understanding and adapting the practices.

References and Recommended further reading

Clause 121 of MRTTH Specifications for Road and Bridge Works, IRC, 2001

Brief Description of Activity

This code of practice relates to general workmanship that is to be followed during execution of road and bridge works. This practice specifically covers the following works:

- Providing and laying interlocking concrete blocks in footpath and medians
- Providing and fixing chequered tiles in traffic island
- Road markings - Providing and laying hot applied thermoplastic road marking compound for centre/edge line, pedestrians, chevrons, directional arrows etc marking
- Traffic signs and road furniture
- Providing and applying one coat of zinc-rich epoxy primer and coal tar epoxy on cement surfaces

- Providing and applying epoxy Phenolic primer and epoxy Phenolic coating
- Providing and compacting sand in footpath and median
- Landscaping and other vegetation works
- Onsite bitumen hotmix/concrete mixing plant operations.

Environmental & Social (E&S) Issues

EHS&S issues could arise during execution of various activities listed above. Some of the issues which needs to be considered include the following:

- Good workmanship
- Location of stockpiles of sand and other material
- Removal of excess material
- Health and safety of workers
- Clearing and cleaning work site after work is completed

Policy and Legal requirements, if any

There are no policy or legal requirements to be complied during execution of this practice. The general workmanship expected of and recommended in various clauses of MRTH specifications shall however be applicable and specifically the following:

Good workmanship: Good quality of work as expected/specified in contract documents, concerned MRTH specifications etc. shall be achieved in each of the works carried out by the contractor. Good workmanship greatly enhances aesthetic value of the project. Contract Manager or his site incharge shall be responsible to approve completion of activities after field staff achieves minimum required workmanship as specified in project specifications and concerned MRTH clauses.

Location of material stockpiles: Location of material stockpiles, temporary tents, labour resting areas shall be in such a way that health and safety of workers as well as traffic is not compromised. Stockpiles shall be periodically checked for integrity and any slump towards carriageway shall be corrected immediately. Sand and other fine material stocks shall not be located near drainage channels or drain openings. Stockpiles shall not cause any obstruction to traffic flow or pedestrian/commuter movement. All the activities shall be executed within the time allowed and if delayed for some reasons by more than three months, the stockpiles shall be removed from the site. Contract Manager or his site incharge shall be responsible for periodically supervising such minor activities at least once in three days and instruct the field staff.

Excess material: Any excess material or any material that has been brought to site and has not been used shall be removed and disposed off immediately. Materials should be removed, howsoever, small or meagre quantity is left at site. Contract Manager or his site incharge shall thoroughly inspect the project site and get cleared all the excess material found within RoW and outside RoW. The areas where stockpiles were located or any spill on carriageway shall be cleaned by brooming or other appropriate methods. Similarly, while erecting traffic signs, light poles or any other information boards etc, excavated earth from pits shall be stored, collected, transported and disposed as per ESGP 20. If poles are grouted using cement mortar or concrete, practices recommended under ESGP 26 shall be followed. Contract Manager or his site incharge shall check each location where poles have been erected for compliance to this measure before approving the work. A layer of sand or other fine earth material on carriageway is a traffic hazard.

The project site shall be taken over by Contract Manager or his site incharge after getting every inch of space cleared and cleaned by field staff. Especially the following works, after completion shall be cleared off all debris and excess material:

- Providing and laying interlocking concrete blocks
- Providing and laying interlocking concrete blocks in footpath and medians
- Providing and fixing chequered tiles in traffic island
- Road markings - Providing and laying hot applied thermoplastic road marking compound for centre/edge line, pedestrians, chevrons, directional arrows etc marking
- Traffic signs and Road furniture
- Providing and applying one coat of zinc-rich epoxy primer and coal tar epoxy on cement surfaces
- Providing and applying epoxy Phenolic primer and epoxy Phenolic coating
- Providing and compacting sand in footpath and median
- Landscaping and vegetation works
- Routine maintenance works involving patchwork or potholes filling on pavement; road embankment strengthening; storm drain cleaning; and shoulder repair and strengthening etc.

Health and Safety of workers: All the activities listed in this ESGP shall be carried out with due care and attention to health and safety of workers. Many of the activities listed under this ESGP may be scheduled for execution after opening new carriageway or infrastructure to traffic. Small segments of road area shall be taken up at a time for execution of various activities. The work area shall be adequately barricaded as per MRTH Clause 112.4. One experienced worker or supervisor shall be deployed to oversee workers straying outside barricaded region and onto traffic carriageway.

References and Recommended further reading

Specifications for Road and Bridge Works, 4th Revision, MRTH, 2001

ESGP #	ESGP 26
Activity	Onsite concrete preparation

Brief Description of Activity

This activity relates to concrete preparation at site either manually or using mechanical mixers which are diesel engine driven and tyre mounted. Scope of this practice covers the procedures to be followed during execution of the activity.

Environmental & Social (E&S) Issues

E&S issues that are anticipated during execution of the activity include the following:

- Noise pollution form mechanical mixers
- Air emission form diesel engine
- Wash water discharge
- Location of material stockpiles
- Spillage of concrete while transport
- Oil, fuel and lubricant leakage
- Impact on soil environment
- Debris and other waste concrete
- Reinstatement of land area used for onsite concrete preparation

Policy and Legal requirements, if any

Air Pollutant Emissions

Air pollutant emissions from non-road construction equipments, engines and vehicles are yet to be regulated and as of now there are no legal or statutory regulation.

Noise Emissions

Under Environment (Protection) Rules, 1986 (*Schedule VI, Part E*) the noise generation standards applicable for construction equipments, machinery and vehicles at the manufacturing stage is presented below:

Noise Limits for Automobiles (Free Field distance at 7.5 metre in dB(A) at the Manufacturing Stage)

- Passenger or commercial vehicles upto 4 tonne
- Passenger or commercial vehicles between 4 – 12 tonne
- Passenger or commercial vehicles above 12 tonne
- Compactors (rollers) front loaders, concrete mixers, Cranes (movable) vibrators and saws

Recommended Mitigation Measures

Noise Emission: Noise generation is expected form diesel engine driven mechanical mixers. The following measures shall be practised to the extent possible

- Orientation of mixer in such a way to reduce noise nuisance to nearest sensitive receptor.
- Locating Stockpiles to act as noise barrier
- Operating and maintaining the mixer in good condition to reduce noise generation
- Checking vibration induce noise and rectifying the same
- Operating the engine with factory recommended silencers

Air Emission: Air pollutant emitted from engine driven mechanical mixer is not a significant problem. However in an urban area, it is better to follow good O & M practices. Any dark, thick smoke emitted from engine which is persistent lasting more than 10 seconds in air shall be checked. Fugitive emissions from fuel tank shall be controlled by maintaining leak proof tank and cover.

Wash water discharge: Mechanical mixer will have to be washed with large amount of water after

every production cycle is complete. Wash water will have cement and grit in large quantities and hence indiscriminate throwing of the same in nearby areas shall be prohibited. The wash water can be stored in a tank or a pit dug on ground. After about 30-90 minutes of setting, the clear water can be reused for cement preparation, washing, dust control sprinkling or even in curing newly cast concrete members. Throwing wash water on nearby land will form an impermeable layer due to cement content. Repeatedly throwing wash water at one location may result in formation of hard, crusty, cement concrete layer, the crusty hard layer shall be removed after the work is complete and disposed off along with other debris.

Location of stockpiles: Stockpiles shall be located without obstructing any public activity in the area. Slumping towards carriageway or drainage channels/nallahs shall be prevented or rectified. Location of stockpiles shall be near to concrete preparation site to prevent material spillage on the way. Other stockpile related problems such as wind-borne and water-borne erosion shall be prevented by following appropriate preventive measures. Cement bags storage and its handling shall not be result in dust generation.

Spillage of Concrete: Concrete shall be prepared close to work site where concrete is to be placed to avoid spillage on the way. After the concrete work is completed, any spillage on the way shall be cleaned and cleared.

Oil, Fuel or Lubricant Spill/Leak: In a mechanical mixer, any spill or leak of oil, fuel or lubricant shall be avoided by following good O & M practices. Refuelling diesel engines, applying oil or lubricants to various mechanical parts of the mixer shall be carried out using appropriate tools and equipments. If unavoidable spreading a jute bag or other such cover on the ground below when refuelling or lubricating can prevent spillage onto ground.

Soil Environment: Soil environment especially the topsoil *environment will be adversely impacted during onsite concrete preparation. The impact can be significant* if manual mixing of concrete or cement mortar is made on ground. Besides stockpile area, wash water disposal on ground, waste concrete or excess concrete/mortar disposal on ground, spillage of concrete, oil, fuel spill etc may also have adverse impacts on top soil environment. These impacts can be mitigated to some extent by following the measures recommended in this ESGP and proper reinstatement of the area after completing all concreting activities at the site.

Debris Disposal: Debris generated from stockpile area, waste/reject concrete/mortar, excess quantity of concrete/mortar, hard crusty soil surface formed due to manual mixing on ground etc. shall be disposed off as debris as per ESGP 18.

Reinstatement: The entire area used for concrete/mortar preparation shall be reinstated to pre-use or pre-construction status. All of the following areas shall be cleared:

- Stockpile area
- Concrete mixer area
- Manual mixing area
- Wash water disposal point, if any

In case of private land being used, a satisfaction certificate will be secured from the landowner upon handing back the land. This certificate as well as photographs of restored land shall be kept as a document of proof and shall be provided to Employer during any inspection.

References and Recommended further reading

- www.epa.nsw.gov.au/small_business/ci_concreteguide.pdf
- Schedule VI, Part E, Environment (Protection) Rules, 1986
- <http://onsite.rmit.edu.au/case/case001SA.htm>

ESGP #	ESGP 27
Activity	Grievance Management

Brief Description of Activity

This code relates to management of grievances due to any project activity, routine or emergency during the entire project period.

Environmental (E&S) Issues

E&S issues that are encountered by grievance management include:

- Public inconvenience and nuisance due to maintenance activities
- Public grievances due to damages to private property or CPRs
- Grievances due to labour camps and labour interaction with local community
- Grievances due to improper use of contractor’s vehicles and construction machinery
- Excessive fugitive dust and noise emission
- Repeated grievances/ residual impacts after mitigation measures taken
- Contamination of local land resources, water bodies etc due to operation of project machinery

Policy and Legal requirements, if any

There is no legal requirement for grievance management under the OPR contract. However, a World Bank funded project is required to maintain minimum standards of good practice in social, labour and environmental issues and achieving operational excellence. Grievance management not only helps in managing issues of potential risks to the project but also helps in maintaining a good relationship with the local community and thus helps in garnering overall support in favour of the project.

The following measures are recommended for establishing and managing a good grievance handling mechanism. The contractor shall undertake the following measures and also include institution of a grievance system into his/her Bill of Quantities (BoQ).

Recommended Measures

Establish a team

Establishing a capable team for handling of grievances shall be done by the contractor at the outset of the contract. Having a team with experienced social and community experts will also be a qualifying criterion for the OPR contracts for each package.

A typical team shall have one Community Relations Manager (CRM) who shall be supported by a team of two Liaison Officers (LO). Each LO shall be responsible for handling of grievances for 50% of the road length under the contract subject to a maximum of 100 km.

The CRM shall possess atleast 10 years experience of working in similar capacity in other road project of NHAI or internationally funded road project. S/he shall also have experience of undertaking social impact assessments for major road project. Knowledge of local language shall be one of the qualifying criteria for the candidate. Similarly the LO shall have similar experience of atleast 4 years, knowledge of social impact assessment for road projects and good knowledge of local language.

Function of team

The CRM shall be stationed at one of the site offices, so located that s/he can reach any spot of concern on the road length within two (2) hours of first information. The LO shall be stationed such that they can reach the spot of concern within one (1) hour.

The broad function of CRM and LO are described here. Exact job description shall be designed by

the contractor incorporating these essential elements.

- LO shall undertake a reconnaissance survey of the entire road length, for which s/he is responsible, every 15 days while the CRM shall undertake a similar survey every 30 days.
- During any onsite work by the contractor, the LO will be present at all days for at least 4 hours every day till the demobilization has happened and the contractor as well as labour has left the site. The CRM shall be present at the time of mobilization and demobilization of the contractor/labour team.
- It shall be the joint responsibility of the concerned LO and the CRM to identify, discuss with impacted landowner/community/Panchayat body and bring to the notice of contractor all cases of residual impacts post demobilization.
- LO shall also identify road stretches/nodes requiring more focus in terms of potential concerns, repetition of grievances etc
- Both the LO and CRM shall meet the LRC at least once every month.

Grievance recording mechanism

Each LO shall maintain a register of complaints where, all complaints pertaining to any aspect of OPR contract shall be recorded. The register shall record the name of grievant/date of grievance/location/ and description of grievance. In addition, the LO shall personally visit the location within 24 hours and make a first hand assessment of the concern. Depending on the gravity of issue, the LO shall also take a photograph of the damage/ accident etc as per his judgement.

A similar register shall be placed with the LRC, where any grievant can log a complaint. The register will have similar entries of name, location, date, and description of grievance. In addition as and when the grievance gets resolved, an entry will be made to demonstrate that the grievance has been closed and closure notified to the grievant.

It shall be the duty of the CRM to ensure that the two registers are updated regularly. The register shall be one of the monitoring indicators for the performance under OPR contract. It is to be noted that, non logging of grievance when there is one, in order to keep the register clear in anticipation of good rating in OPRC shall be discouraged and penalised. Instead, logging all complaints and resolving most of them amicably shall lead to a higher rating. It shall, therefore, be the joint responsibility of the LO/CRM and the contractor to ensure that the grievances are updated in the registers on every periodic reconnaissance survey of the LO/CRM as mentioned above.

The contact numbers of LO and CRM, preferably always available mobile cell numbers, shall be made available to the LRC and shall be displayed on the contractor's display boards and other boards or media used to divert/control the traffic and in conspicuous form at all sites of works, minor or major, routine or maintenance. Non availability of numbers at these locations/spots, or numbers printed in illegible print, or numbers not working or numbers not responded to shall lead to non compliance under this ESGP.

Other modes of logging grievances shall also be made available to the general public/road users and local community. These shall include, drop boxes at prominent locations on the roadsides or at locations like petrol pumps etc. It shall then be the responsibility of the LO/CRM to collate the grievances sent through drop boxes and update their grievance databases periodically.

Resolving mechanism

It shall be the endeavour of the contractor/CRM and LO, in that order, to get the grievances resolved and closed within a month of its first logging. Every grievance, big or small shall be dealt with at the first level by the CRM and LO together with the aggrieved party in presence of the

human source of grievance. Every instance of LRC intervention shall be in presence of the contractor. The process of resolving the grievance shall be recorded promptly and upon completion of process the same shall be signed off by the CRM (in all cases), at least two members of LRC (in all cases where LRC is involved) and the aggrieved party (in all cases). All the proceedings shall be recoded in local dialect/language and one copy each shall be given to the aggrieved party, the LRC while one is retained by the CRM/concerned LO.

In cases where material and monetary compensation is required due to damages to private property or CPR or due to accidental claims, the case shall be dealt with only after getting advice from the Employer.

Residual impacts

Even after resolving of a grievance, there could still be some residual impacts, e.g. the reconstruction of a damaged agricultural pipe/channel may have residual impact of construction material/debris being not removed, or dismantling of labour camp without restoring the land properly.

All such residual impacts shall be a monitoring indicator for the Employer. Therefore, the contractor/CRM shall do a followup exercise once the grievance is resolved or once a mitigation plan has been implemented at any site.

System efficiency and feedback

Residual impacts, repeated grievances of same type, repeated grievances on same node/spot, gravity of grievance, comments of LRC, compensation cost etc shall be internal indicators for the CRM/contractor to reflect upon. The CRM/contractor should make every effort that their system/process of grievance management is informed by an analysis of above results atleast every six months. This will help the contractor to improve his/her performance over time and achieve operational excellence and cutting on future compensation costs to a certain extent by taking proactive measure.

While the above is for internal consumption of the contractor and shall not be monitored by the Employer, a feedback of this being done systematically and the resultant upgrades introduced into the system will be appreciated by the Employer.

Grievance management plan

Translating the above into a good grievance management plan shall be the first responsibility of the contractor. The above mentioned staff and capacities are absolutely mandatory for any grievance management plan to succeed and hence there shall be no compromise on that standard. The above mentioned are essential elements of the plan and the contractor shall put individual names, contact details, survey periodicity (with actual dates), names of LRC members etc in shape of a document that shall be submitted to the Employer along with the bid document. This shall also be one of the qualifying criteria for evaluation of bidders and hence a bill of quantity for the Table Structure of District Level GRC

Sl. No	Member	Post
1	The District Collector of the concerned District	Chairman
2	A Judge of the District not below the rank of sub-judge	Member
3	The Joint Collector of the District	Member
4	The Land Acquisition Officer concerned	Convener

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5	The Executive Engineer, R&B	Member
6	Executive Engineer, APSHP/NHAI	Member
7	One retired Judge	Member

All efforts will be made to first resolve the issue faced by PAPs at the VLC level. Disputes not resolved by VLC could be resolved with the intervention of LAO and Package Manager. Unresolved disputes could be placed at the District R&R Committee. NGO will have an important role in the entire process of grievance redressal to ensure that PAPs are satisfied with the implementation of RAP. NGOs in their monthly progress reports will include the type of issues raised on grievances, their status and how these were resolved would also be construed to be included in the bid.

Later during the maintenance contract period, an annual plan shall be provided to the Employer at the start of every contract year reflecting all changes, if any, in the team, contact details, change in process due to feedback and upgradation etc.