Special conditions related to Environmental and Social Management Plan (EMP) for MMGSY

1) The rates to be quoted by the Contractor must be inclusive of **all taxes including Goods &Services Tax (GST).** No extra payment on this account will be made to the Contractor.**The quoted rates shall also be inclusive of implementation of Environmental & Social Management Plan (ESMP).**

2) Environmental and Social Management Plan (ESMP)

2.1) The Contractor shall strictly implement the Environmental and Social Management Plan (ESMP) as per annexure/s herewith; which are forming express part of the Contract.

Towards ensuring full compliance of ESMP on ground it is the duty of the Contractor to get access and study, understand in full the Environmental and Social Management Framework (ESMF) for MMGSY project by R&BD-GOG. Also Smart Operational Manual, Various Formats (Linked as Annexures to ESMP) uploaded along with tender shall be studied, understood before bidding and followed strictly during implementation.

Cost of implementation of Environmental & Social Management Plan (ESMP) is incidental to the works and shall not be paid separately to the Contractor.

The Engineer-in-charge shall maintain record of compliance or non-compliance of Environmental and Social Management Plan (ESMP). On observing any non–compliances, the Engineer-in-charge shall issue a notice to the Contractor, to rectify the same. In case of any failure to rectify the non-compliance within the specified / stipulated timeframe, the Contractor is liable for penalties as stipulated in the Environmental and Social Management Plan (ESMP).

2.2) For environmental Baseline monitoring contractor shall have to carry out following quality assurance test at preconstruction stage and at construction stage

Sr. No	Category	Frequency
1	**Environmental Baseline Monitoring**	
	Pre-Construction	
	Air Quality	2. Samples at the time of Construction
	Noise Monitoring	
	Water Quality	
	Construction	
	Air Quality	4. Sample per year (during Construction period)
	Noise Monitoring	
	Water Quality	

2.3) After receiving work order. Contractor shall submit the detail reports pertaining to the relevant matters on implementation of Environmental and social management plan(ESMP)/ mitigation measures to the engineer in charge within 15 days".

ANNEXURE -xxTO TERMS AND CONDITIONS OF CONTRACT

(Environmental and Social Management Plan (ESMP))

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

The Contractor shall implement the Environmental and Social Management Plan in line with ESMF for MMGSY project by R&BD-GOG as integral part of the scope of works.

ESMP forms express part of the Bid Document and eventually the Contract. The aspects given in ESMP are mandatory in nature and thus, the Contractor is contractually bound to abide by the samerelevant to the "Contractor" under the strict supervision, guidance and instructions of the Engineer-In Charge.

It is to reiterate that the costs associated with carrying out the requirements of the ESMP are very much part of the scope of works and explicitly as incidental to the works therefore, no excuses towards non-compliance during construction shall be entertained. The Engineer-In-Charge shall regularly monitor the compliance of ESMP by the Contractor. The Contractor shall regularly monitor the implementation of ESMP.

2.1 Nonconformity of ESMP

1. The Contractor shall implement all mitigation measures for which responsibility is assigned to him as stipulated in the ESMP. Any lapse in implementing the same will attract the damage clause as detailed below:

- All lapse in obtaining clearances / permissions under statutory regulations and violations of any regulations with regard to eco-sensitive areas shall be treated as a major lapse
- Any complaints of public, within the scope of the Contractor, formally registered with the R&BD, Panchayat, Govt. of Gujarat and communicated to the Contractor, which is not properly addressed within the time period intimated by R&BD, Panchayat shall be treated as a major lapse
- Non-conformity to any of the mitigation measures stipulated in the ESMP Report (other than stated above) shall be considered as a minor lapse
- On observing any lapses, Executive Engineer R&BD (Panchyat), Govt. of Gujarat or his representative shall issue a notice to the Contractor, to rectify the same
- Any minor lapse for which notice was issued and not rectified, first and second reminders shall be given after ten days from the original notice date and first reminder date respectively. Any minor lapse, which is not rectified, shall be treated as a major lapse from the date of issuing the second reminder.
- If a major lapse is not rectified upon receiving the notice Executive Engineer R&BD (Panchyat), Govt. of Gujarat or his representative shall invoke reduction, in the subsequent interim payment certificate.
- For major lapses, 10% of the interim payment certificate will be withheld, subject to a maximum of 0.5% of the contract value
- If the lapse is not rectified within one month after withholding the payment, the amount withheld shall be forfeited.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

1.1 ESMP Table

2. The Environmental and Social Management Plan (ESMP) is prepared to cover all the project related activities that are to be implemented during the project pre construction, construction and post construction stages.The summary of the environmental and social management plan (ESMP) is presented in **Error! Reference source not found.** below ".Environmental and Social Management Plan".

Table 1-1: Environmental and Social Management Plan

Project Stage/Activity	Potential Negative Impacts	Mitigation Measures	Location	Responsible Agency	
				Implementation	Monitoring
A. Location					
Location of construction camps and contractor facilities	• Inappropriate location such as close proximity to eco-sensitive zones, biodiversity hotspots and human settlements • Environmentally unsound use of community resources such as forestry products by workers	• Location of construction camps at least 500m away from community areas/religious structures, and away from drinking water sources (***refer Annexure – 1 OM – 1 Construction and Labour Camps***) • The construction camps shall be located at least 1000m (1km) away from eco-sensitive zones (the boundaries of the Community reserve, Biodiversity hotspots) and 500m away from the settlements. • The camps must be located such that the drainage from and through the camps shall not affect any domestic or public water supply.	Construction camp sites	Contractor	R&BD, Panchayat
Location of quarry sites	• Location in unstable areas or in sensitive areas legally and otherwise	• Only stable areas and existing or new government approved sites may be considered (***refer OM – 3 Quarry Management***) • Consent from GPCB (Consent to establish (CTE) and Consent to operate (CTO)) is required for stone crushers and quarry sites if setting up a new unit for this project, • In case sourced from third party then it shall be ensured that the construction materials are procured from approved/ licensed quarry sites and stone crushers	All parts of project area	Contractor	R&BD, Panchayat
Location of borrow pits	• Location in unstable areas or on agricultural land	• Location in area with stable soil and preferably away from agricultural land (***refer Annexure – 1 OM-2 Borrow Areas***) • The R&BD, Panchayat shall inspect every borrow area location prior to issuing approval for use of such sites.	All parts of project area	Contractor	R&BD, Panchayat
Crushers, Hot-mix Plants & Batching Plants	• Delays in processing clearances, causing delays in initiation of construction	• Processing of clearances/permits on a timely basis and keeping in mind the time requirements for these clearances (***refer Annexure – 1 OM-7 Construction Plants & Equipment Management***) • The contractor shall follow all stipulated conditions for pollution control as suggested by the GPCB in the consent/ NoC for establishing and operating the Hot-mix and Batching Plant.	All camps or plant location	Contractor	R&BD, Panchayat
B. Construction					
Alignment / road passing through coastal region	• Corrosion in reinforcement of road furniture, Sulphate attack on asphaltic surface and Blisters formation on road surface	• Careful surface brooming of the base should be carried out to remove the salts before the bituminous surfacing is applied. • During Construction the Aggregates should be stored in a place away from moisture and in a dry place	Roads near / in close vicinity of coastal region	Contractor	R&BD, Panchayat

Establishment and shifting of construction camps	• Deforestation and poaching by laborers • Improper waste disposal • Disturbance to aesthetic beauty • Disturbance to nearby settlements • Unfriendly use of community resources such as non-timber forestry products by construction workers • Leaving dirty and waste material after shifting from one camp site to another	• Provision of cooking fuel to contractors' staff • References to the illegality of cutting trees, hunting and fishing, and other prohibited activities in community areas to be included in contract documents • Provision of proper waste disposal facilities and health & safety facilities • Prior information to nearby communities of camp establishment • Ensure clean area left behind when shifting camp	All parts of project road	Contractor	R&BD, Panchayat
Stockpiling of construction materials	• Obstruction of drainage, disturbance/ safety hazard to road users, etc • Dust generation from stock pile area	• Due consideration shall be given for material storage and construction sites such that it doesn't cause Obstruction of drainage, disturbance/ safety hazard to road users, etc • Stockpiles shall be covered to protect from dust and erosion	All parts of project road	Contractor	R&BD, Panchayat
Removal of vegetation and uprooting of trees	• Negative changes in micro-level wildlife habitat/environment • Soil erosion • Scarring of landscape	• Design shall be prepared to minimize the loss of avenue trees. • If impacts on trees become unavoidable, compensatory tree plantation shall be carried out	All parts of project road	Contractor	R&BD, Panchayat
Cutting of hill slope and earth removal from borrow areas	• Soil erosion and landslides • Scarring of landscape because of improper disposal of debris • Dust pollution • Disruption of local drainage • Siltation in nearby water bodies and consequent negative effects on aquatic ecology • Noise and disturbance to nearby communities	• Confine cutting activities to dry season (***refer OM-5 Slope Stability and Erosion Control***) • Use standard method • Disposal of debris at proper sites or reuse material for construction • Proper restoration of borrow areas • Provision of appropriate drainage structures/facilities • Confine construction activities to daytime	Hilly terrain and borrow areas	Contractor	R&BD, Panchayat
Quarrying / Borrow pits Operations	• Landslides (rock slides/falls) • Scarring of landscape • Disturbance to wildlife and nearby communities from blasting	• Adequate safety precautions shall be ensured during transportation of quarry material from quarries to the construction site (***refer Annexure – 1 OM-2 Borrow area, OM-3 Quarry Management***). • Vehicles transporting the material shall be covered to prevent spillage. • Operations to be undertaken by the Contractor as per the direction and satisfaction of the R&BD, Panchayat/PMC • All borrow areas shall be restored to the original condition, immediately upon completion of the use of such a source	Quarry sites	Contractor	R&BD, Panchayat
Crushing of stone and transport of stone/materials	• Dust pollution affecting construction laborers and local vegetation • Air pollution from machinery and vehicle exhausts • Noise pollution and disturbance to nearby wildlife and communities	• Water sprinkling of stone crushing site • Proper covers for vehicles transporting stone and materials • Regular maintenance of machinery and vehicles • Confine stone crushing and transportation activities to daytime	Stone crushing sites and all parts of project road	Contractor	R&BD, Panchayat
Road surfacing activities	• Air pollution from smoke and gaseous emissions affecting health of workers	• Provide masks to workers exposed to dust and smoke • Manage movement of vehicles during road surfacing work	All parts of project road	Contractor	R&BD, Panchayat
Construction of line and cross drainage structures and bridges	• Disruption of local stream/river courses and aquatic hydrology • Increased sediments in rivers or streams	• Provision of appropriate drainage facilities and river/stream diversion structures (item to be included in BOQ)	All parts of project road	Contractor	R&BD, Panchayat

Operation of machinery and equipment and general activities of laborers	• Spillage/ leakage of chemicals and oil and contamination of soil and water resources • Injury to workers/others • Respiratory problems from dust and machinery emissions • Hearing problems due to high level of noise	• Proper storage and handling of chemicals and oil (***refer Annexure – 1 OM-7 Construction Plants & Equipment Management***) • Provision of workers with construction hats, face masks, earplugs, gloves, etc. • Provision of well-equipped first aid kits and health facilities at construction camp and work sites	All parts of project road	Contractor	R&BD, Panchayat
Water sourcing for domestic usage or construction work	• Misuse of community water resources	• Independent arrangements to be made for water requirements so that supplies to nearby communities remains unaffected (***refer Annexure – 1 OM-4 Water for Construction& refer Annexure 2 NoC format for water resource***)	Construction camps	Contractor	R&BD, Panchayat
Material Handling at Site	• Exposure of workers to dust and heat • Worker's safety in handling and storage of material	• All workers employed on mixing asphaltic material, cement, lime mortars, concrete etc., shall be provided with protective footwear and protective goggles (***refer Annexure – 1 OM-8 Labour and Worker's Health and Safety***). • Workers, who are engaged in welding works, shall be provided with welder's protective eye-shields. • Workers engaged in stone breaking activities shall be provided with protective goggles and clothing and shall be seated at sufficiently safe intervals.	All parts of project road	Contractor	R&BD, Panchayat
Disposal of Construction Waste / Debris / Cut Material	• Location impacts (including change in topography, landscaping etc.,)	• The waste generated shall be reused in the construction activities to the maximum extent possible. Cut and fill material shall be balanced so as not to have requirement for disposal. Remaining material if any shall be disposed off safely at the disposal sites (***refer Annexure – 1 OM-6 Waste Management and Debris Disposal***). • Safe disposal of the extraneous material shall be ensured in the pre-identified disposal locations. In no case, any construction waste shall be disposed around the sub-project locations indiscriminately. • Cut material generated because of cutting of slopes shall be utilized for construction of retaining walls, embankments and as filling material.	All parts of project road	Contractor	R&BD, Panchayat
Safety Measures During Construction	• Accident impacts	• Personal Protective Equipment (PPE's) for workers on the project and adequate safety measures for workers during handling of materials at site shall be taken up (***refer Annexure – 1 OM-8 Labour and Worker's Health and Safety***) • The contractor has to comply with all regulations regarding occupational health and safety	All parts of project road	Contractor	R&BD, Panchayat
Chance finds of archaeological Property / remains	• Damage to archaeological Property / remains in the performance of project activities	• The Contractor shall immediately upon discovery of a chance find of archaeological Property / remains stop the work and inform R&BD, Panchayat/PMC of such discovery and carry out the R&BD, Panchayat/PMC instructions for dealing with the same, awaiting which all work will be stopped • The R&BD, Panchayat/PMC shall seek direction from the Archaeologist at the Department of Archaeology before instructing the Contractor to recommence work on the site.	All parts of project road	Contractor	R&BD, Panchayat

Annexures to the ESMP

ANNEXURE -1: SMART Operational Manual

OM – 1: CONSTRUCTION AND LABOUR CAMPS

1. INTRODUCTION

1. The scope of this guideline pertains to the siting, development, management and restoration of construction and labour camps to avoid or mitigate impacts on the environment. The area requirement for the construction camp shall depend upon the size of contract, number of labourers employed and the extent of machinery deployed. The following sections describe the siting, construction, maintenance, provision of facilities in the camps and finally rehabilitation of the construction and labour camps. These are described in three stages, pre-construction, construction and post-construction stage. The issues related to construction camps are similar in the case of road construction and hence have been taken together.

2. PRE-CONSTRUCTION STAGE

2. Identification of site for construction and labour camps is the first task. The Contractor shall identify the site for construction camp in consultation with the individual owners in case of private lands and the concerned department in case of Government lands. The suitable sites shall be selected and finalized in consultation with R&BD (Panchayat)**Table 1-1** gives the lands that could be avoided for construction camps and conversely those that could be preferred.

Table 1-1: Selection Criterion for Construction Camps.

Avoid the following …	Prefer the following …
• Lands close to habitations. • Irrigated agricultural lands. • Lands belonging to small farmers. • Lands under village forests. Lands within 100m of community water bodies and water sources as rivers. • Lands within 100m of watercourses. • Low lying lands. • Lands supporting dense vegetation. • Grazing lands and lands with tenure rights. • Lands where there is no willingness of the landowner to permit its use.	• Waste lands. • Waste Lands belonging to owners who look upon the temporary use as a source of income. • Community lands or government land not used for beneficial purposes. • Private non-irrigated lands where the owner is willing. • Lands with an existing access road.

3. The contractor will work out arrangements for setting up his facilities during the duration of construction with the land owner/concerned department. These arrangements shall be in the form of written agreement between the contractor and the land owner (private/government) that would specify:

a) photograph of the proposed camp site in original condition;

b) activities to be carried out in the site;

c) environmental mitigation measures to be undertaken to prevent land, air, water and noise pollution;

d) detailed layout plan for development of the construction and labour camp that shall indicate the various structures to be constructed in the camp including temporary, drainage and other facilities (**Figure 1-1** gives a layout plan for a construction camp); and

e) Restoration plan of camp site to previous camp conditions.

Arrangements with Land owners…
The Contractor shall submit to R&BD (Panchayat)the following: • Written No Object Certification from respective land owner/Cultivator • Extent of land required and duration of the agreement • Photograph of site in original condition • Details of site after redevelopment after completion

4. The arrangements will be verified by the Engineer -incharge to enable redressal of grievances at a later stage of the project.

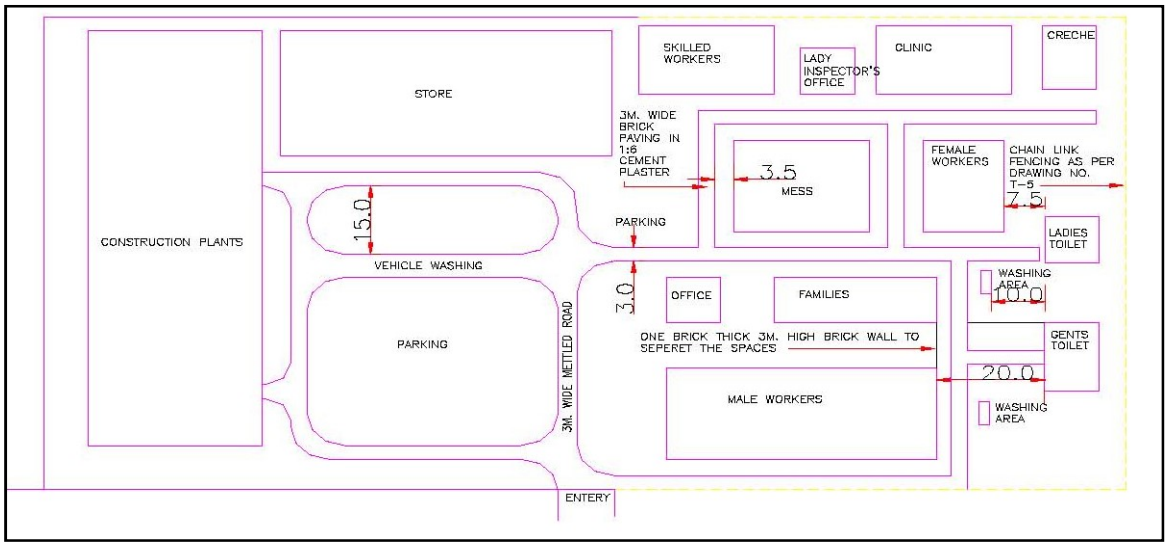

Figure 1-1: Layout Plan for Construction Camp

2.2 Setting up of labour camp

5. The contractor shall provide, free of cost in the camp site, temporary living accommodation to all the migrant workers employed by him for complete construction/maintenance works.. A minimum area of 6 sq.mts per person shall be provided. The rooms of labour shall be well lighted and ventilated. The facilities to be provided for the labour are discussed below:

a) Drinking Water

6. Towards the provision and storage of drinking water at the construction camp, the contractor shall ensure the following provisions

- The contractor shall provide for a continuous and sufficient supply of potable water in the camps, in earthen pots or any other suitable containers.
- The contractor shall identify suitable community water sources for drinking. Only in the event of non-availability of other sources of potable water, the Contractor shall obtain water from an unprotected source only after the testing for its potability. Where water has to be drawn from an existing open well, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with dust proof trap door.
- Every water supply or storage shall be at a distance of not less than 15m from any wastewater / sewage drain or other source of pollution. Water sources within 15m proximity of toilet, drain or any source of pollution will not be used as a source of drinking water in the project.
- A pump shall be fitted to covered well used as drinking water source; the trap door shall be kept locked and opened only for cleaning or inspection, which shall be done at least once a month.

b) Washing and Bathing Facilities

7. In every site, adequate and suitable facilities for washing clothes and utensils shall be provided and maintained for the use of contract labor employed therein. Separate and adequate bathing shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic conditions.

c) Toilets Facilities

8. Sanitary arrangements, latrines and urinals shall be provided in every work place separately for male and female workers. The arrangements shall include:

- A latrine for every 15 females or part thereof (where female workers are employed).
- A latrine for every 10 males.
- Every latrine shall be under cover and so partitioned as to secure privacy, and shall have a proper door

and fastenings.

- Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men Only" or "For Women Only" as the case may be.
- The latrines and urinals shall be adequately lighted and shall be maintained in a clean sanitary condition at all times and should have a proper drainage system;
- Water shall be provided in or near the latrines and urinals by storage in suitable containers.

d) Waste Disposal

- Disposal of sanitary wastes and excreta shall be into septic tanks.
- Kitchen waste water shall be disposed into soak pits/kitchen sump located preferably at least 15 meters from any water body. Sump capacity should be at least 1.3 times the maximum volume of wastewater discharged per day. The bottom of the pit should be filled with coarse gravel and the sides shored up with board, etc. to prevent erosion and collapse of the pit. New soak pits shall be made ready as soon as the earlier one is filled.
- Solid wastes generated in the kitchen shall be reused if recyclable or disposed off in land fill sites.

e) Medical and First Aid Facilities

9. Medical facilities shall be provided to the labour at the construction camp. Visits of doctor shall be arranged twice a month wherein routine check-ups would be conducted for women and children. A separate room for medical check-ups and keeping of first aid facilities should be built. The site medical room should display awareness posters on safety facilitation hygiene and HIV/AIDS awareness.

- First Aid Box will be provided at every construction campsite and under the charge of a responsible person who shall always be readily available during working hours. He shall be adequately trained in administering first aid-treatment. Formal arrangement shall be prescribed to carry injured person or person suddenly taken ill to the nearest hospital. The first aid box shall contain the following.
- 6 small sterilized dressings
- 3 medium size sterilized dressings
- 3 large size sterilized dressings
- 3 large sterilized burns dressings
- 1 (30 ml) bottle containing 2 % alcoholic solution of iodine
- 1 (30 ml) bottle containing salvolatile
- 1 snakebite lancet
- 1 (30 gms) bottle of potassium permanganate crystals
- 1 pair scissors
- Ointment for burns
- A bottle of suitable surgical antiseptic solution

In case, the number of labour exceeds 50, the items in the first aid box shall be doubled.

f) Provision of Shelter during Rest

10. The work place shall provide four suitable sheds, two for meals and two for rest (separately for men and women). The height of the shelter shall not be less than 3.0m from the floor level to the lowest part of the roof. These shall be kept clean.

g) Crèches

11. In case 30 or more women workers are employed, there shall be a room of reasonable size for use of children under the age of six years. The room should have adequate light and realisation. A caretaker is to be appointed to look after the children. The use of the room shall be restricted to children, their mothers and the caretaker.

2.1 Storage of Construction Material in Construction Camps

12. For storage of Petrol/Oil/Lubricants, brick on edge flooring or sand flooring will be provided at the storage places of Petrol/Oil/Lubricants to avoid soil and water contamination due to spillage. These should be kept away from labour residential areas. The storage of cement shall be at Damp-proof flooring, as per IS codes. All materials shall be stored in a barricaded area. In case of electrical equipment, danger signs shall be

posted. The batch mix plant is to be located away from the residential area and not in the wind direction. Separate parking areas for vehicles and also workshop areas need to be provided.

2.2 Firefighting arrangement

The following precautions need to be taken:

- Demarcation of area susceptible to fires with cautionary signage;
- Portable fire extinguishers and/or sand baskets shall be provided at easily accessible locations in the event of fire;
- Contractor shall educate the workers on usage of these equipment.

2.3 Interactions with host communities

13. To ensure that there is no conflict of the migrant labor with the host communities, the contractor shall issue identity cards to labourers and residents of construction camps.

3. CONSTRUCTION STAGE

14. Construction camps shall be maintained free from litter and in hygienic condition. It should be kept free from spillage of oil, grease or bitumen. Any spillage should be cleaned immediately to avoid pollution of soil, water stored or adjacent water bodies. The following precautions need to be taken in construction camps.

- Measures to ensure that no leaching of oil and grease into water bodies or underground water takes place.
- Wastewater should not be disposed into water bodies.
- Regular collection of solid wastes should be undertaken and should be disposed off safely.
- All consumables as the first aid equipment, cleaning equipment for maintaining hygiene and sanitation should be recouped immediately.
- The debris/scrap generated during construction should be kept in a designated and barricaded area.

15. The Engineer –in-charge will monitor the cleanliness of construction campsites and ensure that the sites are properly maintained throughout the period of the contract.

4. POST CONSTRUCTION STAGE

16. At the completion of construction, all construction camp facilities shall be dismantled and removed from the site. The site shall be restored to a condition in no way inferior to the condition prior to commencement of the works. Various activities to be carried out for site rehabilitation include:

- Oil and fuel contaminated soil shall be removed and transported and buried in waste disposal areas.
- Soak pits, septic tanks shall be covered and effectively sealed off.
- Debris (rejected material) should be disposed off suitably (Refer **OM-6** on "Waste Management and Debris Disposal").
- Ramps created should be levelled.
- Underground water tank in a barren/non-agricultural land can be covered. However, in an agricultural land, the tank shall be removed.
- If the construction camp site is on an agricultural land, top soil can be spread so as to aid faster rejuvenation.
- Proper documentation of rehabilitation site is necessary. This shall include the following: Photograph of rehabilitated site;
  - Land owner consent letter for satisfaction in measures taken for rehabilitation of site;
  - Undertaking from contractor; and
  - Certification from the Engineer-in-charge.

17. In cases, where the construction camps site is located on a private land holding, the contractor would still have to restore the campsite as per this guideline. Also, he would have to obtain a certificate for satisfaction from the landowner.

OM – 2: BORROW AREAS

1. INTRODUCTION

1. Embankment fill material is to be procured from borrow areas designated for the purpose. Borrow areas can cause significant adverse environmental impacts if appropriate mitigation measures are not taken. The scope of this guideline is to include measures that are required during project planning and design stage, pre-construction, construction stage and post construction stage. Borrow areas are related only to road construction activities.

2. PROJECT PLANNING AND DESIGN STAGE

2. Design measures must be implemented with a focus to reduce the quantity of material extracted and consequently decrease the borrow area requirement. Borrow area siting should be in compliance with IRC: 10-1961. The DPR shall contain (i) Guidelines for locating site of borrow areas and borrow material specifications.

3. PRE-CONSTRUCTION STAGE

3. The contractor shall identify the borrow area locations in consultation with the individual owners in case of private lands and the concerned department in case of government lands, after assessing suitability of material. The suitable sites shall be selected and finalized in consultation with theEngineer-in-charge. Borrowing are to be avoided in the following areas:

- Lands close to toe line.
- Irrigated agricultural lands (In case of necessity for borrowing from such lands, the topsoil shall be preserved in stockpiles. The subsequent Guidelines detail the conservation of topsoil.
- Grazing land.
- Lands within 0.8km of settlements.
- Environmental sensitive areas such as Reserve Forests, Protected Forests, Sanctuary, wetlands. Also, a distance of 1000 m should be maintained from such areas.
- Designated protected areas / forests.
- Unstable side-hills.
- Water-bodies.
- Streams and seepage areas.
- Areas supporting rare plant/ animal species;
- Ensure soft rock is not prominent within the proposed depth of excavation as it will render rehabilitation difficult.

3.1 Arrangements for Borrow Area

4. The Contractor will work out arrangements for borrowing with the land owner/concerned department of Commissioner of Geology and Mining, Govt. of Gujarat for necessary approval (Online application of Mining lease are available in the website: http://cgm.ncode.in/LeaseHolder/AppPages/Quarry_Lease.aspx**).**

5. The arrangements will include the redevelopment after completion of borrowing. The arrangements will be verified by the Engineer-in-charge to enable redressal of grievances at a later stage of the project. The Engineer –in-charge shall approve the borrow area after inspection of the site to verify the reclamation plan and its suitability with the contractor and landowner. The contractor shall commence borrowing soil only after the approval by the Engineer-in-charge. The contractor shall submit to the Engineer-in-charge the following before beginning work on the borrow areas.

- Written No-objection certificate of the owner/cultivator;
- Estimate extent of earth requires;
- Extent of land required and duration of the agreement;
- Photograph of the site in original condition; and
- Site redevelopment plan after completion.

6. The depth of excavation should be decided based on natural ground level of the land and its surroundings, as well as based on the rehabilitation plan. In case higher depth of excavation is agreed by backfilling using unsuitable excavated soil (from roadway), in those cases filling should be adequately compacted except for topsoil, which has to be spread on the top most layer (for at least 20m thick).

7. The guidelines for location, depth, size and shape of the borrow areas are available in the following:

- Clause 305.2.2.2 of MoRTH specification for roads and bridge works of IRC;
- Guidelines for environmental impact assessment of highway projects, Indian Roads Congress, 1989: (IRC: 104-1988);
- IRC: 10-1961-Recommended practice for borrow pits for road embankments constructed by manual operations, as revised in 1989;
- IRC SP: 58-2001 guideline for use of fly ash in road construction;
- EIA manual of MoEF& CC, 2010;
- MoEF& CC, GoI Notification on utilization of fly ash dated 27thAugust, 2005 and

subsequent amendments thereafter.

3.2 Documentation of Borrow Pit

8. The contractor must ensure that following database must be documented for each identified borrow areas that provide the basis of the redevelopment plan.

- Chainage along with offset distance;
- Area (Sq.m);
- Photograph of the pit from all sides;
- Type of access/width/kutcha/puccaetc from the carriageway;
- Soil type;
- Slope/drainage characteristics;
- Water table of the area or identify from the nearest well, etc;
- Existing landuse, for example barren/agricultural/grazing land;
- Location/name/population of the nearest settlement from borrow area;
- Present usage of borrow area; and
- Community facility in the vicinity of borrow pit.

3.3 Redevelopment Plans for Borrow Pits

9. The following checklist provides guidelines in order to ensure that redevelopment of borrow areas must comply with MoRTH, clause 305.2.2.2 and EMP requirement. Borrow areas can be developed as:

- Ponds (various types) (eg: Drinking Water only; Washing and for other Domestic Chores; Only for Cattle; Mixed Uses etc.) (a large pond can be divided into two parts - each having a defined use)
- Farmland submission
- Water Recharging Zones
- Pastureland
- Fish Ponds (pissiculture)
- Waste disposal Sites (depending upon the location, distance from settlements, pollution risks, safety, associated environmental risks and hazards, regulations/ permissions of appropriate authority and other such factors)
- Plantation Zones
- Recreational Zones (depending upon location, size, potential of the site, willingness of the local bodies to develop it)
- Wildlife Refuge and Drinking Area (applicable only in case of sensitive environs with appropriate planning and understanding including regulation of depth for safety of animals etc.)

10. The rehabilitation measures for the borrow areas shall be dependent on the following factors:

- Land use objectives and agreed post-borrowing activities;
- Physical aspects (landform stability, erosion, re-establishment of drainage);
- Biological aspects (species richness, plant density,) for areas of native re vegetation;

- Water quality and soil standards; and
- Public safety issues.

11. **Rehabilitation should be simple and maintenance free**. Depending on the choice of the individual land owner/community, the contractor shall prepare redevelopment plans for the borrow areas. The options can be: (i) Restoring the productive use of the land (ii) Development of detention ponds in barren areas.

Option I: Suitable in locations with high rainfall and productive areas

12. Topsoil must be placed, seeded, and mulched within 30 days of final grading if it is within a current growing season or within 30 days of the start of the next growing season. Vegetative material used in reclamation must consist of grasses, legumes, herbaceous, or woody plants or a combination thereof, useful to the community for the fuel and fodder needs.

13. Plants must be planted during the first growing season following the reclamation phase.

14. Selection and use of vegetative cover must take into account soil and site characteristics such as drainage, pH, nutrient availability, and climate to ensure permanent growth. The vegetative cover is acceptable if within one growing season of seeding, the planting of trees and shrubs results in a permanent stand, or regeneration and succession rate, sufficient to assure a 75% survival rate.

Option II: In barren land, the borrow areas can be redeveloped into detention ponds.

15. These will be doubled up as water bodies and also for removal of sediment from runoff flowing through the ponds. Design of the detention basin depends upon the particle size, settling characteristics, residence time and land area. A minimum of 0.02 mm size particle with a settling velocity of 0.02 cm/sec (assuming specific gravity of solids 2.65) can be settled in the detention basin.

Following parameters are to be observed while setting up a detention pond:

- Pond should be located at the lowest point in the catchment area. Care should be taken that the horizontal velocity should be less then settling velocity to prevent suspension or erosion of deposited materials.
- Minimum Effective Flow Path: 5 times the effective width
- Minimum Free Board: 0.15 m
- Minimum Free Settling Depth: 0.5 m
- Minimum Sediments Storage Depth: 0.5 m
- Maximum interior slope: 2H : 1V
- Maximum exterior slope: 3H : 1V

16. The inlet structure should be such that incoming flow should be distributed across the width of the pond. A pre-treatment sump with a screen should be provided to remove coarse sediments. Settled sediment should be removed after each storm event or when the sediment capacity has exceeded 33% of design sediment storage volume. Accumulated sediment must be disposed off in a manner, which will prevent its re-entry into the site drainage system, or into any watercourse.

4. CONSTRUCTION STAGE

17. No borrow area shall be operated without permission of the Engineer -in charge. The procurement of borrow material should be in conformity to the guidelines laid down in IRC: 10-1961. In addition, the contractor should adopt precautionary measures to minimise any adverse impacts on the environment. Checklists for monitoring borrow areas operation and management has been prepared (**Table 2-1**).

Table 2-1: Checklist for Monitoring Borrow Area Operation and Management

Attributes	Requirements
Access Road	Access road shall be used for hauling only after approved
Top soil preservation	To soil, if any, shall be stripped and stored at corners of the area before the start of excavation for material collection; Top soil should be reused / re-laid as per agreed plan; In case of riverside, borrow pit should be located not less than 15m from the toe of the bank, distance depending on the magnitude and duration of flood to be withstood. In no case shall borrow pit be within 1.5m from the Toe line of the proposed embankment.
Depth of excavation	For agricultural land, the total depth of excavation should be limited to 150cm including top 30 cm for top soil preservation; For river side borrow area, the depth of excavation shall be regulated so that the inner edge of any borrow pit, should not be less than 15m from the toe of the bank and bottom of the pit should not cut

Attributes	Requirements
	the imaginary line of 1:4 projected from the edge of the final section of the embankment. To avoid any embankment slippage, the borrow areas will not be dug continuously, and the size and shape of borrow pits will be decided by the Engineer -in charge.
Damage to surrounding land	Movement of man and machinery should be regulated to avoid damage to surrounding land. To prevent damages to adjacent properties, the Contractor shall ensure that an undisturbed buffer zone exists between the distributed borrow areas and adjacent land. Buffer zone shall be 3 m wide or equal to the depth of excavation whichever is greater.
Drainage control	The Contractor shall maintain erosion and drainage control in the vicinity of all borrow pits and make sure that surface drains do not affect the adjacent land or future reclamation. This needs to be rechecked by the Engineer-In-charge
Dust Suppression	Water should be sprayed on kutcha haul road twice a day or as may be required to avoid dust generation during transportation of material; Depending on moisture content, 0.5 to 1.5% water may be added to excavated soil before loading during dry weather to avoid fugitive dust emission.
Covering material for transport material	Material transport shall be provided with tarpaulin cover
Personal Protective Equipment	Workers should be provided with helmet, gumboots and air mask and their use should be strictly enforced.
Redevelopment	The area should be redeveloped within agreed timeframe on completion of material collection as per agreed rehabilitation plan.

5. POST CONSTRUCTION STAGE

18. All reclamation shall begin within one month of abandonment of borrow area, in accordance with the redevelopment plan. The site shall be inspected by the Engineer-in-chargeafter implementation of the reclamation plan. Certificate of Completion of Reclamation is to be obtained by the Contractor from the landowner that “the land is restored to his satisfaction”. The final payment shall be made after the verification by the Engineer-In-charge or his representative.

6. CHECKLIST FOR INSPECTION OF REHABILITATION AREA

19. Inspection needs to be carried out by the Engineer-In-charge or his representative for overseeing the redevelopment of borrows areas as per the plan. The checklist for the inspection by the Engineer-In-charge or his representative is given below.

- Compliance of post-borrowing activities and land use with the restoration plan;
- Drainage measures taken for inflow and outflow in case borrow pit is developed as a detention pond;
- Levelling of the bottom of the borrow areas;
- In case the borrow area is on private property, the contractor shall procure written letter from landowner for satisfaction on rehabilitation. In case of no rehabilitation is desired by the landowner, the letter should include statement “no responsibility of R&BD, Panchayat on contractor in the event of accident.
- Condition of the reclaimed area in comparison with the pre-borrowing conditions.

OM – 3: QUARRY MANAGEMENT

1. INTRODUCTION

1. This guideline pertains to the measures to be taken to address environmental concerns in quarry areas. The general practice adopted is to procure materials from existing quarries operating with the requisite permits. The measures to be taken for operation and management for quarries during all stages of construction have been discussed in this Guideline.

2. PROJECT PLANNING AND DESIGN STAGE

2. R&BD (Panchayat) shall provide in the DPR / bid document, a list of licensed quarries operating within the district and adjoining districts. In addition, the DPR shall contain the following: (i) Quantity of materials available in quarries (ii) Lead from the various existing quarries and (iii) Adequacy of materials for the project in these quarries. **Table 3-1** and **3-2** give the format for preparing a list of quarries.

Table 3-1 Details of Sand Quarry

Sample No.	Source of Sand	Name of quarry area	Site Identification/ Location			Approximate Quantity (cum)	Approximate basic cost of the material (Rs.)	Remarks
			Nearest Chainage (Km.)	Left/Right	Offset from nearest chainage (km)			

Table 3-2 Details of Quarry Area for Aggregates

Sample No.	Chainages (Km.)	Left/ Right	Name of Quarry Area	Name of Crusher	Lead from nearest chainage (Km.)	Basic cost of the material (Rs.)	Available land/terrain	Surrounding land Terrain	Remarks

3. In the event of non-availability of existing quarries, the Contractor shall open a new quarry in accordance with Mines and Minerals (Development & Regulation) Act, 1957 (Online application of Mining lease are available in the website: http://cgm.ncode.in/LeaseHolder/AppPages/Quarry_Lease.aspx**).**

4. The bid document shall include the exhaust quarry reclaim plan as per needs of the landowner / community.

3. PRE-CONSTRUCTION STAGE

5. The Contractor shall select an existing licensed quarry identified in DPR for procuring materials. The Contractor shall establish a new quarry with the prior consent of the Engineer-In-charge only in cases when: (i) Lead from existing quarries is uneconomical and (ii) Alternative material sources are not available. The Contractor shall prepare a Redevelopment Plan for the quarry site and get it approved by the Engineer.

6. The construction schedule and operations plans to be submitted to the Engineer-in-chargeprior to commencement of work shall contain a detailed work plan for procuring materials that includes procurement, transportation and storage of quarry materials.

4. CONSTRUCTION STAGE

4.1 Development of Quarry Area

7. To minimize the adverse impact during excavation of material following measures are need to be undertaken:

- Adequate drainage system shall be provided to prevent the flooding of the excavated area
- At the stockpiling locations, the Contractor shall construct sediment barriers to prevent the erosion of excavated material due to runoff.
- Construction of offices, laboratory, workshop and rest places shall be done in the up-wind of the plant to minimize the adverse impact due to dust and noise.
- The access road to the plant shall be constructed taking into consideration location of units and also slope of the ground to regulate the vehicle movement within the plant.
- In case of storage of blasting material, all precautions shall be taken as per The Explosive Rules, 1983.

4.2 Setting up of Crushers and other equipment

8. The following measures shall be undertaken for setting up of crushers is other equipment.

- The contractor shall obtain "No Objection Certificate (NoC)" from the Gujarat State Pollution Control Board.
- All vehicles must possess Pollution Under Control (PUC) Certificate and shall be renewed accordingly
- All machinery, equipment, and vehicles shall comply with existing CPCB noise and emission norms.
- The Engineer must ensure that contractor shall submit the copy of NoC and PUC Certificate before the start of work.

4.3 Quarry operations

9. The followings precautions shall be undertaken during quarry operations. vii) Overburden shall be removed and disposed as per **Guideline 8** "Waste Management and Debris Disposal".

- During excavation slopes shall be flatter than 20 degrees Guideline 8 on to prevent their sliding
- In case of blasting, the procedure and safety measures shall be taken as per The Explosive Rules, 1983
- The Contractor shall ensure that all workers related safety measures shall be done as per measures for, "Labour& Workers Health & Safety" (**OM-8**).
- The Contractor shall ensure maintenance of crushers regularly as per manufacturer's recommendation.
- Stockpiling of the excavated material shall be done
- During transportation of the material, measures shall be taken as per **OM-7** "Construction Plants and Equipment Management" to minimize the generation of dust and to prevent accidents
- The Engineer-in-charge and the concerned authority shall review the quarry site for the management measures during quarry operation, including the compliance to pollution norms.

5. POST CONSTRUCTION STAGE

10. A quarry redevelopment plan shall be prepared by the Contractor. All haul roads constructed for transporting the material from the quarries to construction site shall be restored to their original state.

11. The Engineer and the concerned authority shall be entrusted the responsibility of reviewing the quarry site for the progress of implementation of Redevelopment Plan.

12. The plan shall include:

- Photograph of the quarry site prior to commencement
- The quarry boundaries as well as location of the materials deposits, working equipment, stockpiling, access roads and final shape of the pit.
- Drainage and erosion control measures at site
- Safety measures during quarry operation
- Design for redevelopment of exhaust site.

Two options for redevelopment of quarry areas are given below:

Option A: Vegetating the quarry to merge with surrounding landscape. This is done by conserving and reapplying the topsoil for the vegetative growth.

Option B: Developing exhausted quarries as water bodies. The pit shall be reshaped and developed into pond, for harvesting rainwater. This option shall only be considered where the location of quarry is at the lowest point, i.e. surrounding areas/ natural drainage slopes towards it.

OM – 4: WATER FOR CONSTRUCTION

1. INTRODUCTION

1. The scope of this guideline includes the procurement of water required for construction of roads. Except bituminous works, water is required during all stages of road construction such as Embankment Sub-Grade; Granular sub-base (GSB) and Water Bound Macadam (WBM). Management of water in various stages of construction is given in the following sections.

2. PROJECT PLANNING & DESIGN STAGE

2. The DPR for the road constructions shall contain the following information:

- Estimate of water requirement during different seasons based on construction schedule of various stages of construction.
- Identification of potential sources of water for construction,
- Arrangements to be worked out by the contractor with individual owners, when water is obtained from private sources, and
- Whether scarcity of water would have any impact on schedule of construction.

In water-scarce regions, provide the following additional information in Project Reports…

- Exploring possibilities for use of existing perennial sources, through interactions with water user groups as the villagers, relevant Government Departments, keeping in view that the water extraction does not infringe upon the usufruct rights of the existing water users.
- Identification of potable water source for domestic use of workers and for use in cement - based construction such as cement concrete roads, culverts and other cross drainage works.
- Identification of alternate water sources, water-harvesting techniques will be explored to avoid water extraction from the existing community sources.

3. In water scarce regions, if water-harvesting structures are to be constructed, suitable locations and mechanism for siting these structures will be identified. These are envisaged to be permanent water tanks for collection of stream water. Detailed drawings of water harvesting structures based on site conditions will need to be worked out and presented in the DPR. No extra payment shall be generally made for these works and the Contractor has to include the cost of these items in his offer while quoting his tendered rate.

4. Scheduling Construction in Water Scarce Areas: As part of the project preparation, the Engineer-in-charge shall conduct an assessment of water requirement and availability in water scarce regions. As far as possible, schedule for construction in these water scarce areas shall be prepared such that earthwork for embankment is carried out just before monsoon, so that water requirement for subsequent construction works such as granular sub-base and water bound macadam are met in monsoon and post monsoon season. Carrying out these activities even during the monsoon is possible as the rainfall may not be high enough to disrupt construction.

3. PRE-CONSTRUCTION STAGE

5. Prior to commencement of extraction of water for construction, the contractor shall work out arrangements as specified in the DPR.

In water-scarce regions, provide the following additional information in Project Reports…

- Exploring possibilities for use of existing perennial sources, through interactions with water user groups as the villagers, relevant Government Departments, keeping in view that the water extraction does not infringe upon the usufruct rights of the existing water users.
- Identification of potable water source for domestic use of workers and for use in cement - based construction such as cement concrete roads, culverts and other cross drainage works.
- Identification of alternate water sources, water-harvesting techniques will be explored to avoid water extraction from the existing community sources.
  from any septic tank/soak pit or other source of pollution.
- **In case of water harvesting structures** (if required), the Contractor shall in consultation with the residents, identify suitable locations for siting the structure and construct the same.
- **In case of perennial sources,** the Contractor shall adhere to all administrative procedures pertaining to procurement of water from such sources.

CONSTRUCTION STAGE

6. During construction, the Contractor shall be responsible to monitor the following:

- The arrangements worked out with the Panchayat/individual land owners for water extraction is adhered to;
- Extraction of water is restricted to construction requirement and domestic use of construction workers;
- Water requirement for curing of concrete shall be minimized by pooling of water over the concrete or by covering with wet gunny bags; and
- The potable water used for drinking purposes of construction workers shall be as per the Indian Standard for Drinking Water IS: 10500, 1991.

OM – 5: SLOPE STABILITY AND EROSION CONTROL

1. INTRODUCTION

1. Stability of slopes is a major concern in locations of high embankment. In cases of high embankment, water retention at the embankment base initially causes toe failure and subsequently failure of the whole embankment. Soil erosion is consequent to high runoff on hill slopes. Embankments made up of silty and sandy soils get eroded, in the absence of vegetative cover, when the slopes are steep say more than 20 Degree.

2. The scope of this guideline includes measures to minimize the adverse environmental impacts due to slope instability and soil erosion. The adverse environmental impact can be: (i) Damage to adjacent land, (ii) Silting of ponds and lakes disturbing the aquatic habitat (iii) Erosion of rich and top fertile top layer of soil (iv) Contamination of surface water bodies and (v) Reduction in road formation width due to erosion of shoulders/berms.

2. PROJECT PLANNING AND DESIGN STAGE

3. During the detailed project preparation phase, the following investigations shall be carried out prior to finalisation of alignment.

- Topographical;
- Hydrological;
- Geo-technical; and
- Geological Investigation (in case of roads in hill areas and areas of high seismic activity)

4. In addition to the slope stability analysis the alignment should be such that (i) steep as well as heavy cuts are avoided, (ii) Flora and fauna of the area are not disturbed and (iii) Natural drainage pattern is not obstructed.

5. For high embankments, geo-technical investigations (determination of C, φ, density etc.) of the available material need to be done to check its suitability as fill material.

6. Following guidelines shall be followed in desert areas while using cohesion-less soils for embankment construction.

- The alignment should follow the natural ground level to the extent possible and the embankment shall be restricted to minimum to achieve ruling grades.
- Slope of the embankment should be 3 (H): 1(V) or flatter.
- The corners of the embankment should be rounded for better aerodynamic performance.

3. PRE-CONSTRUCTION STAGE

7. Interceptor ditches are constructed along hilly slopes or areas with high rainfall to protect the road bench and hillside slope from erosion due to heavy rainfall and runoff. Interceptor ditches are very effective in the areas of high intensity rainfall and where the slopes are exposed. These are the structures designed to intercept and carry surface run-off away from erodible areas and slopes, thus reducing the potential surface erosion. The Engineer-in-charge must ensure that the layout and siting of ditches is as per specifications.

4. CONSTRUCTION STAGE

8. When alternative material such as fly ash is used for embankment formation, it needs to be ensured that sufficient filter bed is provided along with the top cap. All tests as per IS: 2720 (Parts: 4, 5, 8 & 40) and IRC: SP: 20-2002 are to be conducted on the embankment to keep a check on the compaction achieved. Slope stabilisation techniques and erosion control measures such as vettiver grass, stone pitching, use of geotextile and turfing.

Box-1: Detailed specifications for Vegetative cover

Description:

The vegetative cover should be planted in the region where the soil has the capacity to support the plantation and at locations where meteorological conditions favours vegetative growth.

Site Preparation:

- To prevent the seeds from being washed away subsequent to sowing, the area should be protected with surface roughening and diversions.
- Soil samples should be taken from the site and analysed for fertiliser and lime requirements.

Seed Application:

- The seed should be sown uniformly as soon as preparation of the seedbed has been completed.
- No seed should be sown during windy weather. The best time for needing would be during monsoon.

Maintenance:

During first six weeks, the planting should be inspected by the EIC o check if the growth is uniform and dense. Appropriate moisture levels shall be maintained. There may be requirement of watering the plantings regularly during the dry seasons.

5. POST CONSTRUCTION STAGE

9. All the exposed slopes shall preferably be covered with vegetation using grasses, brushes etc. Locally available species possessing the properties of (i) good growth (ii) dense ground cover and (iii) deep root shall be used for stabilization.

10. In case of steep and barren slopes, in order to retain the seedling to the ground asphalt mulch treatment shall be given. Seedling are covered with asphalt emulsion and spread into a thin layer. The asphalt film gradually disintegrates and a carpet of green vegetation and deep-rooted species of grass and clovers, takes its place. Anchoring shall be carried out as per IRC: SP: 48-1998.

11. Regular inspection of check dams and repositioning/replacement of dislodged or stolen stones need to be carried out.

12. Repair and maintenance of eroded side drain inverts is to be done in order to arrest retrogation of levels in side drains. Slopes of high embankment can give a fertile base for growth of vegetative cover / sodding.

13. In arid areas, in order to avoid the deposition of sand over or near the road surface, shrubs are to be planted at an appropriate distance from the formation. The shrubs should not be abutting the road and the distance for carrying out plantation shall be determined based on prevalent wind speeds as well as quantity of sand being carried amongst various other factors. There should be a clear gap between the roadway and shrubs to allow the wind to pick up its velocity and carry along with it any sand that is deposited.

OM – 6: WASTE MANAGEMENT AND DEBRIS DISPOSAL

1. INTRODUCTION

1. This guidance describes procedures for handling, reuse and disposal of waste materials during road construction. The Guideline describes waste management measures in all stages of construction. Also, the Guideline discusses the measures to be taken for debris disposal.

2. PROJECT PLANNING AND DESIGN STAGE

2. As part of DPR preparation, R&BD (Panchayat) shall carry out the following measures

- Finalize road design and alignment to minimize waste generation through balancing of cut and fill operations and minimizing excess cuts requiring disposal.
- Identify the type of wastes as well as sources of waste during construction and suggest options for possible reuse
- Provide guidelines to the contractor for locating waste disposal sites for non-toxic wastes
- Identify existing landfill sites if available for disposal of toxic materials.
- Incase no existing landfill sites are available, identification of landfill site as well as identification of the clearance requirements.
- Identify sites of disposal of debris.

3. PRE-CONSTRUCTION STAGE

3. The contractor shall identify the activities during construction, that have the potential to generate waste and work out measures for reducing, reusing and proper disposing of the generated waste in the construction schedule to be submitted to the Engineer-in-charge. A sequential listing of the activities during road construction and the nature of wastes together with the possible options for reuse are specified in **Table 6-1**. For the disposal of excess cut and unsuitable (non-toxic) materials, the contractor shall identify the location for disposal in consultation with the community / concerned department. Any toxic materials shall be disposed in existing landfill sites that comply with legislative requirements. Prior to disposal of wastes onto private/community land, it shall be the responsibility of the Contractor to obtain a No-objection Certificate (NOC) from the land owner/community. The NOC shall be submitted to the Engineer-in-charge prior to commencement of disposal.

4. The Contractor shall educate his workforce on issues related to disposal of waste, the location of disposal site as well as the specific requirement for the management of these sites.

Practices to avoid – waste disposal …
•Tipping of waste into stream channels, water bodies, forests and vegetated slopes
•Non-cleaning of wastes after day's work
•Leaching of wastes
•Littering in construction camps / sites
•Storing wastes on private land

4. CONSTRUCTION STAGE

5. The Contractor shall either reuse or dispose the waste generated during construction for roads depending upon the nature of waste, as specified in **Table 6-1**. The reuse of waste shall be carried out by the contractor only after carrying out the specific tests and ascertaining the quality of the waste materials used, and getting the same approved by the Engineer-in-charge. Wastes that were not reused shall be disposed off safely by the contractor. The contractor shall adopt the following precautions while disposing wastes:

- Bituminous wastes shall be disposed off in 60mm thick clay lined pits and covered with 30cm good earth at top, so as to facilitate growth of vegetation in long run.
- In case of filling of low-lying areas with wastes, it needs to be ensured that the level matches with the surrounding areas. In this case care should be taken that these low lying areas are not used for rainwater storage
- In case oil and grease are trapped for reuse in a lined pit, care shall be taken to ensure that the pit should be located at the lowest end of the site and away from the residential areas.

6. The waste management practices adopted by the Contractor, including the management of wastes at construction camps etc. shall be reviewed by the Engineer-in-charge and the Gujarat Pollution Control Board (GPCB) during the progress of construction.

5. POST CONSTRUCTION STAGE

7. On decommissioning of construction sites, the Contractor shall hand over the site free of all debris/wastes to the satisfaction of R&BD (Panchayat). In case of any temporary disposal of wastes on private land, certificate of Completion of Reclamation is to be obtained by the Contractor from the landowner that "the land is restored to his satisfaction". The same is to be submitted to the Engineer-in-charge before final payment is claimed.

Table 6-1: Type of wastes and scope for reuse- road construction

S. No	Activity	Type of waste	Scope for possible reuse	Disposal of waste
I	**CONSTRUCTION WASTES**			
1.	Site Clearance and grubbing	Vegetative cover and top soil	Vegetating embankment slopes	
		Unsuitable material in embankment foundation	Embankment Fill	Low lying areas Land fill sites
2.	**Earthworks**			
a)	Overburden of borrow areas	Vegetative cover and soil	Vegetating embankment slopes	
b)	Overburden of quarries	Vegetative cover and soil	Vegetating embankment slopes	
		Granular material	Embankment Fill, Pitching	
c)	Accidental spillages during handling	Dust		
d)	Embankment construction	Soil and Granular Material	Embankment Fill	
e)	Construction of earthen drains	Soil	Embankment Fill	
3.	**Concrete structures Dust**			
a)	Storage of material	Dust, Cement, Sand	Constructing temporary structure, embankment fill	
		Metal Scrap		Scrap Yard
b)	Handling of materials	Dust		
c)	Residual wastes	Organic matter	Manure, Revegetation	
		Cement, sand	Constructing temporary structure, embankment fill	
		Metal scrap	Diversion sign, Guard Rail	
4	**Reconstruction works**			
a)	Dismantling of existing pavement	Bitumen Mix, granular material	sub-base	
		Concrete	Road Sub-base, reuse in concrete, fill material and as rip rap on roads	
		Guard rail sign post, guard stone	Reuse for same	
b)	Dismantling of cross drainage structures	Granular material & bricks	Constructing temporary structure, embankment fill	
		Metal scrap	Diversion sign, Guard Rail Culvert	
		Pipes	Culvert	
5	**Decommissioning of sites**			
a)	Dismantling of temporary structures	Granular material and bricks	Constructing temporary structure, embankment fill	
6	Maintenance operation			
a)	Desilting of side drains	Organic matter and soil	Revegetation	
II	**OIL AND FLUIDS**			
1	Construction machinery – maintenance and refueling	Oil and Grease	Incineration, Cooking, Illumination	
2	**Bituminous works**			
a)	Storage	Bitumen	Low Grade Bitumen Mix	
b)	Mixing and handling	Bitumen	Low Grade Bitumen Mix	
		Bitumen Mix	Sub-base, Paving access & cross roads	
c)	Rejected bituminous mix	Bitumen Mix	Sub-base, Paving access & cross roads	
III	**DOMESTIC WASTES**			
1	Construction camps	Organic waste,	Manure	
		Plastic and metal scrap		Scrap Yard
		Domestic effluent	Irrigation	

6. Disposal of Debris

8. For the purpose of disposal of debris, dumping sites need to be selected. The criteria for selection of dumping sites include:

- No residential areas are located downwind side of these locations;
- Dumping sites are located at least 1000 m away from sensitive locations;
- Dumping sites do not contaminate any water sources, rivers etc; and
- Dumping sites have adequate capacity equal to the amount of debris generated;
- Public perception about the location of debris disposal site has to be obtained before finalizing the location;
- Permission from the Village Panchayat is to be obtained for the dumping site selected;
- Productive lands are avoided; and
- Available waste lands shall be given preference

OM – 7: CONSTRUCTION PLANTS & EQUIPMENT MANAGEMENT

1. GENERAL

1. During execution of the project, construction equipment's, machinery and plants are likely to cause adverse impact on the environment. The impact can be due to the emissions, dust, noise and oil spills that concern the safety and health of the workers, surrounding settlements and environment as a whole. This guideline describes the activities during the project stages where pollution control measures are required.

2. PROJECT PLANNING AND DESIGN STAGE

2. Selection criteria for setting up a plant area and parking lot for equipment's and vehicles shall be done as per siting criteria for construction camp specified in Guideline on "Construction and Labour Camps".

3. PRE-CONSTRUCTION STAGE

3. The Contractor must educate the workers to undertake safety precaution while working at the plant / site as well as around heavy equipment's. Before setting up the crusher, hot-mix plant and generator, the Contractor shall acquire "No Objection Certificate (NOC)" from the Gujarat State Pollution Control Board for the same. The Contractor shall ensure all vehicles must possess Pollution under Control (PUC) Certificate, which and shall be renewed regularly. The Contractor must ensure that all machinery, equipment's, and vehicles shall comply with the existing Central Pollution Control Board (CPCB) noise and emission norms. The Engineer-in-chargemust ensure that the Contractor shall submit a copy of the NOC and PUC Certificates before the start of work. The Contractor shall design the service road with protection measures as black topping at vulnerable points as in low lying areas.

4. CONSTRUCTION STAGE

4. The Contractor shall undertake measures as per **Table 7-1** to minimize -the dust generation, emissions, noise, oil spills, residual waste and accidents at the plant site as well as during transportation of material to construction site.

Table 7-1: Measures at Plant Site

Concern	Causes	Measures
Dust Generation	Vehicle Movement	•Water sprinkling •Fine Materials shall be Transported in Bags or Covered by Tarpaulin during Transportation •Tail board shall be properly closed and sealed to be spill proof
	Crushers	• Regular Water Sprinkling to keep the dust below visibility level
	Concrete-Mix Plant	• Educate the workers to follow/adopt good engineering practices while material handling
Emissions	Hot-Mix Plant	•Site Selection as per Clause 6.5.2, Section 6.5, IRC's Manual for Construction & Supervision of Bitumen Work •Regular maintenance of Dust Collector as per manufacture's recommendations
	Vehicles	• Regular maintenance as per manufacture's recommendation
	Generators	• Exhaust vent of long length and emission to confirm to PCB norms.
	Heavy Load Vehicles	• Exhaust silencer, Regular maintenance as per manufacture schedule
Noise	Crushers	• Siting as per guideline, "Construction and Labour Camps"
	Generators	• All generators should have mandatorily acoustic enclosures and confirms to PCB norms.
Oil Spills	Storage and Handling	• Good practice, guideline, "Waste Management and Debris Disposal"
Residual waste	Dust Collector and Pits	• Guideline , "Waste Management and Debris Disposal"
Concrete waste	Concrete-Mix plant	• Guideline, "Waste Management and Debris Disposal"
Bitumen and bitumen mix	Hot-mix Plant	• Guideline, "Waste Management and Debris Disposal"
Stone chips	Crushers	• Guideline, "Waste Management and Debris Disposal"
Safety	Trajectory of Equipment's	• No worker shall be present in the vicinity of the equipment's
	Movable Parts of Equipment's	• Caution Sign, awareness among workers
	Plant Area / Site	• Caution Sign, Safety Equipment's
	Accidents / Health	•First Aid Box, Periodic Medical Checkup Break down of
	Break down of vehicles	• Arrangement for towing and bringing it to the workshop

5. During site clearance, all cut and grubbed materials shall be kept at a secured location so that it does not raise any safety concerns. During excavation, water sprinkling shall be done to minimize dust generation. Frequent water sprinkling shall be done on the haul roads to minimize dust generation. In case of loose soils, compaction shall be done prior to water sprinkling. Cautionary and informatory sign shall be provided at all locations specifying the type of operation in progress. The contractor must ensure that there is minimum generation of dust and waste while unloading the materials from trucks. The construction waste generated shall be disposed as per Guideline on, "Waste Management and Debris Disposal". The equipment's, which are required to move forward and backward, shall be equipped with alarm for backward movement. It shall be ensure that the workers shall remain away from the working areas at such times. Also, equipment's at construction camp should be barricaded and kept away from residential quarters of workers.

6. The Engineer-in-chargeshall carry out periodic inspections to ensure that all the pollution control systems are appropriately installed and comply with existing emission and noise norms.

Safety Measures During Bitumen Construction Work…

- The Contractor shall ensure that bitumen storing, handling as well as mixing shall be done at hot-mix plant or designated areas[1] to prevent contamination of soil and ground water.
- Skilled labour shall be used while hand placing the pre-mixed bitumen material. The hand placing of pre-mixed bituminous material shall be done only in following circumstances:
  - For laying profile corrective courses of irregular shape and varying thickness
  - In confined spaces where it is impracticable for a paver to operate and
  - For filling potholes
- The Contractor shall provide safety equipments i.e. gumboots and gloves to the workers while handling bitumen.
- While applying Tack Coat, spraying of bitumen shall be done in the wind direction. The labour shall wear jacket while spraying the bitumen.
- All the bituminous work shall be done as per IRC's Manual for Construction and Supervision of Bituminous Works.

5. POST-CONSTRUCTION STAGE

7. The Engineer-in-chargeshall ensure that all the haul roads are restored to their original state. Incase any inner village road is damaged while transporting the procured material; the contractor shall restore the road to its original condition. The Engineer-in-chargemust ensure that the decommissioning of plant shall be done in environmentally sound fashion and the area to bring its original state.

8. Designated area refers to paved surfaces and barren parcels of land, with adequate drainage and disposal system. It must be ensure that these are away from agriculture land, water body and other sensitive areas.

OM – 8: LABOUR AND WORKER'S HEALTH AND SAFETY

1. INTRODUCTION

1. The safety and health concerns of the workers and the community are impacted due to the hazards created during the construction of road. **Box: 1** gives the safety concerns during construction. This Guideline describes the hazards and measures that need to be taken to mitigate the impacts.

2. PROJECT PLANNING AND DESIGN STAGE

2. To address health and safety concerns, the DPR shall contain selection criteria for setting up:

- Construction Camps (as per guideline);
- Borrow Areas (as per guideline); and
- In case of opening new quarry areas (as per guideline).

3. To address the safety concerns to road user during operational phase, the DPR shall contain the following:

- Selection and location of regulatory as well as informatory signs as per IRC: 67-2001, depending upon the geometry of the road.

PRE-CONSTRUCTION STAGE

4. In order to incorporate public health and safety concerns, the Engineer-in-charge and the Contractor shall disseminate the following information to the community:

- Location of construction camps, borrow areas and new quarry areas;
- Extent of work;
- Time of construction;
- Diversions, if any;
- Precaution measures in sensitive areas;
- Involvement of local labours in the road construction;
- Health issues - water stagnation, exposure to dust, communicable disease; and
- Mechanism for grievances.

Health Concerns are adversely impacted…….

Public due to:

- Unhygienic conditions due to water logging (improper drainage of waste water), either by improper decommissioning of Construction Camps and parking lots, or improper disposal of construction wastes, leading to the breeding of vectors that are likely to impact the health of the general public
- Interaction between workers and host community is likely to increase the risk of spread of communicable diseases.

Workers due to:

- Low quality drinking water as well as inappropriate storage of drinking water likely to cause water borne diseases among workers.
- Absence of proper sanitary facility likely to act as a breeding ground for vectors raising health concerns among workers.

3. CONSTRUCTION STAGE

5. During the progress of work, following are the safety requirements that need to be undertaken by the contractor at the construction site:

- Personal Protective Equipment's (PPE) for the workers. **Table 8-1** gives the safety gear to be used by the workers during each of the construction activities.
- All measures as per bidding document shall be strictly followed.
- Additional provisions need to be undertaken for safety at site:
  - Adequate lighting arrangement;
  - Adequate drainage system to avoid any stagnation of water;
  - Lined surface with slope 1:40 (V:H) and provision of lined pit at the bottom, at the storage and handling area of bitumen and oil, as well as at the location of generator (grease trap); and
  - Facilities for administering first aid.

Table 8-1: Worker Safety Measures

Sl. no.	Activity	Safety Requirement
1.	Setting out and levelling	• Luminous jackets; • Helmets; • Boots for protection against insect bite; and Dust Mask
2.	Tree cutting	• Helmet Boots • Luminous safety jackets
3	Reinforced yard/ carpentry/ reinforcement cutting/ bending work.	• Hand gloves
4.	Shuttering work	• Goggles Hand gloves
5.	Plant and Machinery	• Hand gloves • Boots • Helmets • Dust Mask
6.	Material handling	• Hand gloves • Dust mask
7.	Batching plant	• Goggles • Hand gloves • Dust mask
8.	Weeding	• Goggles
9.	Binding reinforcement	• Safety belt • Boots
10.	Manual concrete laying	• Gum boots • Hand gloves • Helmet
11.	Piling	• Helmet • Hand gloves, gumboots.

6. The following measures need to be adopted by the contractor to address public safety concerns:

- The Contractor shall schedule the construction activities taking into consideration factors such as:
  - Sowing of crops;
  - Harvesting;
  - Local hindrances such as festivals etc.; and
  - Availability of labour during particular periods.
- All the cautionary signs as per IRC: 67-2001 and traffic control devices (such as barricades, etc) shall be placed as soon as construction activity get started and shall remain in place till the activities get completed.
- Following case specific measures need to be followed during the progress of the activity:
  - Incase of blasting, the Contractor must follow The Explosives Rules, 1983.
  - Incase of construction activity adjoining the water bodies, measures shall be taken as per measures suggested in Guideline on “Water Body”.
  - If construction of road is within the settlement, the contractor must ensure that there shall not be any unauthorized parking as well as storage of material, adjacent to road.
  - Approved chemicals should be sprayed to prevent breeding of mosquitoes and other disease-causing organisms, at all the water logging areas

7. The Engineer-in-chargeshall carry out periodic inspections in order to ensure that all the measures are being undertaken as per the guideline.

4. POST-CONSTRUCTION STAGE

8. During this stage a major concern is on road user safety. Following are the measures that need to be undertaken by the Engineer-in-charge to ensure safer roads:

- Inspection and maintenance of installed regulatory and informatory signs.
- Ensure that the location of signage does not obstruct the visibility
- Incase of hill roads, maintenance of parapet wall as well as of overtaking zones.

9. The Engineer-in-chargemust ensure that during the maintenance operation of road, road materials are stored at a location such that they shall not create any risk to road users.

10. The construction site shall be cleaned of all debris, scrap materials and machinery on completion of construction for the safety of public and road users, as per the measures given in Guideline on “Construction and labour Camp” and “Waste Management and Debris Disposal.”

OM – 9: FORESTS AND OTHER NATURAL HABITATS

1. INTRODUCTION

1. This guideline envisages measures to be undertaken during blacktopping / widening of road sections passing through natural habitats. These measures shall be undertaken in addition to the measures laid down in the other Guidelines.

2. Conservation of natural habitats is essential for long-term sustainable development. A precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development has been adopted for the project.

Natural Habitats means…
• National Park
• Reserve Forest
• Sanctuaries
• Notified Wetlands
• Fisheries and Aquatic Habitats

2. PROJECT PLANNING AND DESIGN

3. To minimize the adverse impact on the ecology of the natural habitats, selection of alignment should be as per guideline. An officer of at least the rank of a forest ranger shall be deputed for detailed inventory of ecological features along the road. The nature and type of impact on natural habitats due to road construction shall be identified. Magnitude of the impact to the extent feasible on the ecological features shall also be assessed.

Ecological Features…	Adverse Impacts…
• Area of natural habitat; • Type and number of endangered species of flora and fauna; • Stream and water bodies; • Breeding ground and seasons; • Migration season of bird species; and • Animal crossing.	• Diversion of forest land; • Cutting of trees; • Trampling of vegetation; • Contamination of water due to the usage of water from the source within the natural habitat; • Loss of breeding grounds; and • Interruption to animal crossings during the construction.

4. Impacts identified on the natural habitats shall be minimized to the extent required. Minimization shall be through precautionary measures or through appropriate mitigation measures. Following are the measures should be undertaken along the road passing through natural habitats:

- Constricting the road width to 6.0 m and embankment height to 0.5 m to minimize the extent of diversion of forest land and cutting of trees
- Drainage Structures shall be designed strictly in accordance with guideline on “Drainage”.
- Rumble strips shall be provided at every kilometer along the length of the natural habitat and invariably at the start and end of the natural habitat
- Signage (viz. speed limit, animal crossing, switch of headlight etc) shall be provided as per IRC: 67-2001 Code of Practice for road sign (first revision)

5. In addition to the above measures, specific impacts identified on site shall be mitigated as per the recommendation of the forest department / officer in charge of the identified natural habitat.

6. In case proposed alignment falls within the catchments of a water body or a stream, a flush causeway shall be constructed without impacting the drainage system. The length of the causeway shall be as per the existing water spread. The causeway shall be strictly in compliance with IRC:SP-20:2002. In no circumstances a water body within the natural habitat shall be cut across or filled for the purpose of laying the road.

3. PRE-CONSTRUCTION STAGE

7. No Construction Camps, Stockyards, Concrete Batching or Hot Mix Plants shall be located within the natural habitat or within 500m from its boundary.

8. Contractor in consultation with forest ranger or any other concerned authority shall prepare a schedule of construction within the natural habitat. Due consideration shall be given to the time of migration, time of crossing, breeding habits and any other special phenomena taking place in the area for the concerned flora or fauna.

4. CONSTRUCTION STAGE

9. Procurement of any kind of construction material (as quarry or borrow material) from within the natural habitat shall be strictly prohibited. No water resources within the natural habitat shall be tapped for road construction. Use of mechanized equipment shall be kept minimum within the natural habitat. Contractor must ensure that there will be no parking of vehicles machine and equipment within the natural habitat. Disposal of construction waste within the natural habitat shall be strictly prohibited and as far as possible reuse shall be undertaken as per **Table 6-1** type of waste of guideline, “Waste Management and Debris Disposal”.

5. POST CONSTRUCTION STAGE

10. The road passing through the natural habitat shall be declared as a silence zone. Compensatory tree plantation within the available Right of Way shall be done in accordance with guideline, on “Tree Cutting and Afforestation”.

ANNEXURE - 2: No Objection Certificate Water Resource

(WATER RESOURCE)

No Objection Certificate

This is to certify that the Gram Sabha has no objection to the use of the available water resources like boring, wells, ponds etc. falling in the village of ……..… …….. of the development block / revenue circle ……..…….. of the district……....., for the construction of the proposed road ……. under the MMGSY.

Signature (Gram Pradhan)

…… Gram Panchayat

ANNEXURE - 3: Environmental Monitoring Formats

Format EM1: Selection of disposal site locations

From _____ To _____

(Give chainage and nearest settlements from both ends)

Criteria on which information for each site is to be collected	Site 1	Site 2	Site 3	Site 4
Area covered (m^2)				
Total Material that can be dumped within the site (m^3)				
Depth to which disposal is feasible (m)				
Distance of nearest watercourse (m)				
Nearest Settlement (m)				
Date/s of Community Consultation/s				
Whether the community is agreeable to siting of dumping site (Y/N)				
Date of Permission from Village Council President(VCP)				
Proposed future use of the Site				

Selected Site (tick any one column only)

Certified that the above information is correct to the best of my knowledge and belief.

Contractor

Signed: Date:

Name & Designation:

Recommendation on the suitability of the site

Decision Taken (tick one): Approved/Not Approved

PMC

Signed: Date:

Name and Designation of Deciding Authority

Enclosures
(Tick as appropriate)

1 Maps of each location
2 Photographs
a Each disposal location
b Each community consultation
3 Photocopies of permissions from VCPs

Format EM2: Construction Camp and Storage Area

Construction Stage: Report - Date____ Month_____ Year_____

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)
Format to be submitted before target date (decided by R&BD, Panchayat) of establishing camps

Location of Camp (km_____)

Sl. No	Item	Unit	Details	Remarks
1	**Detail of item camp**			
A	Size of Camp	Mxm		
B	Area of Camp	sq.m		
C	Distance from Nearest Settlement			
D	Distance from Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
E	Date of camp being operational dd/mm/yy			
F	Present land use			
G	No other trees with girth > 0.3m.			
H	Details of Storage area(Availability of impervious surface)	m xm		
I	Availability of separate waste disposal from storage area	Cum		
2	**Details of top soil stacking**			
A	Quantity of top soil removed	Cum		
B	Detail of storage of topsoil	Describe stacking arrangement		
3	**Details of workforce**			
A	Total No of Labourers	nos		
B	Total no of Male Workers	nos		
C	No of Male Workers below 18 years of age	nos		
D	Total No of Female Workers	nos		
E	No of Female workers below 18 years of age	nos		
F	No of children	nos		
4	**Details of dwelling units**			
A	No of dwellings/huts	nos		
B	Minimum Size of Dwelling	m xm		
C	No of openings per dwelling	nos		
D	Minimum size of opening	m xm		
E	Walls	specifications		
F	Roofing	specifications		
G	Flooring	specifications		
H	Drinking Water Tank	specifications		
I	Capacity of Drinking water Tank	cum		
J	Size of Drinking Water Tank	m xmxm		
K	Total no of WC	nos		
L	No of Wcs for female workers	nos		
M	Minimum Size of WC	mxm		
N	Total No of Bathrooms for female workers	nos		
O	Size of septic tank for WC/Baths	mxmxm		
P	Capacity of Water Tank for WCs/ Bathrooms and general purpose			
Q	Fencing around camp	Y/N		
5	**Details of facilities**			
A	Availability of security guard 24 hrs a day	Yes/No		
B	Details of First Aid Facility	Yes/No		
C	Availability of Day Care Centre	Yes/No		
D	Availability of dust bins (capacity 60 ltr)	nos		

Certified that the furnished information is correct the quality of work is as per god practice and all relevant information as required is attached

Contractor

Engineer-In-Charge

Format EM3: Reporting for Borrow Areas

Construction Stage Report: Date ____ Month_____ Year_____ Site Layout of Borrow Area and Proposed Borrow Area Redevelopment Plan to be attached with format. Format to be submitted before target date as (decided by R&BD, Panchayat) for establishing Borrow Areas Borrow Area No. BA_____
Location of Borrow Area (Km_____)

Sl. No	Item	Unit	Details	Remarks, if any
1	**Details of Borrow Area**			
A	Date of Borrow Area becoming operational dd/mm/yy			
B	Current Land use			
C	Distance from Nearest Settlement	Km		
D	No of settlements within 200m of Haul Road	No.		
E	No of settlements within 500m of Borrow Area	No.		
F	Total Capacity	cum		
G	No of Trees with girth more than 0.3 m	No.		
H	Length of Haul Road	km		
I	Width of Haul road	m		
J	Type of Haul Road	metal/dirt		
K	Size of Borrow Area	Sq. km.		
L	Area of Borrow Area	km x km		
M	Quantity Available	cum		
N	Distance of Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
O	Quantity of top soil removed	cum		
P	Detail of storage of topsoil			
Q	Daily/occasional use of the Borrow Area by the community, if any	-		
R	Probable reuse of Borrow pit-ask community	-		
S	Drainage channels/slope/characteristics of the area	-		
2	**Enhancement Elements**			
A	Quantity of top soil removed	sq.m		
B	Detail of storage of topsoil	sq.m		
C	Adjoining land use/Natural elements			
D	Near by catchment for storing water			
E	Erosion Control Programme			
F	Preventive measures for			
I	Leaching			
Ii	Mosquito Breeding			
Iii	Water run-off/contamination			
Iv	Any other environmental degradation			
3	**Details of workforce**			
A	Total No of Labourers	No.		
B	Total no of Male Workers	No.		
C	No of Male Workers below 18 years of age	No.		
D	Total No of Female Workers	No.		
E	No of Female workers below 18 years of age	No.		
4	**Details of redevelopment, Plan to be enclosed**			

Certified that the furnished information is correct the quality of work is as per good practice and all relevant information as required is attached

Contractor

Engineer-In-Charge

Format EM4: Tree Felling

Sr. No.	Links	Physical Target				Completion Target		Reason for Delay if any
		Total	Target	Target Achieved	% of task completed	Target Date	Date of Completion if task completed	
		Unit						
1		nos						
2		nos						
3		nos						
4		nos						

Contractor

Engineer-In-Charge

Format EM 5 Topsoil Conservation Monitoring

Contract _____

Report No. _____ Date_____

Location (Chainage)	Original Use of Topsoil removed	Measures for preventing spillage of topsoil on Haul Roads(Earthen/ Metalled)	Present Method of Storage	Anticipated period of Storage (Months)	Distance of nearest Water course (m)	Present Slope of Pile (V: H)	Whether silt fencing provided ?	Is any other covering/ measure provided ? If yes, what is it?	Improvements required	Extent of Compliance as on date of report

Certified that the above is true.

Signed_____

Contractor

Verified

Signed_____

Engineer-In-Charge

Format EM 6 Redevelopment of Borrow Areas

Operation Stage: Report: Date ____ Month_____ Year_____

To be monitored by R&BD, Panchayat during operation period

Details of remarks to be appended wherever necessary.

Sl. No	Activity	Particulars	Drawbacks Identified			Improvements Required		
			Construction	Financial	Others (Ask Community)	Technical	Financial	Remarks/ Suggestions
1	Details of Borrow area and Surrounding Landuse							
2	End use of the borrow area							
3	Whether rehabilitation has been carried out in line with owners request							
4	Erosion Control Measures							
5	Number of trees planted							
6	Reuse of topsoil							
7	Preventive measures taken for -Mosquito Breeding -Water runoff/ contamination -Other Environmental Degradation							
8	Any problems faced by owner							
9	Any problems faced by the local community							
10	If it has been developed as a fish pond,							
a	Details of available catchment for storing water							
b	Economic Benefits/Utility							
11	If it has been developed as an orchard							
a	Details of suitability of soil and water.							
B	Type of Plantation							
c	Economic Benefits/Utility							
12	Any Other End use							
a	Particulars							
b	Economic Benefits/Utility							

Contractor

Engineer-In-Charge

Format EM 7 Checklist for Construction Safety

Sl. No.	Safety Issues	Yes	No	Non compliance	Corrective Action	Penalty	Remarks
Safety during Construction Stage							
1	Appointment of qualified Construction safety officers (there should be provision in the conditions of the contract regarding appointment of qualified construction safety engineer to look after environmental aspects)						
2	Approval for Construction Safety Management Plan by the Engineer-in charge.						
3	Approval for Traffic Management/control Plan in accordance with IRC: SP: 55-2001						
4	Maintenance of the existing road stretches handed over to the Contractor.						
5	Provision of Temporary Traffic Barriers/Barricades/caution tapes in construction zones						
6	Provision of traffic sign boards						
7	Provision for flags and warning lights						
8	Provision of metal drum/empty bitumen drum delineator, painted in circumferential strips of alternate black and white 100mm wide 2 coats fitted with reflectors 3 Nos of 7.5cm diameter						
9	Providing plastic crash barrier						
10	Provision of adequate staging, form work and access (ladders with handrail) for works at a height of more than 3.0 m						
11	Provision of adequate shoring / bracing / barricading / lighting for all deep excavations of more than 3.0 m depth.						
12	Demarcations (fencing, guarding and watching) at construction sites						
13	Provision for sufficient lighting especially for night time work						
14	Arrangements for controlled access and entry to Construction zones						
15	Safety arrangements for Road users / Pedestrians						
16	Arrangements for detouring traffic to alternate facilities						
17	Regular Inspection of Work Zone Traffic Control Devices by authorized contractor personnel						
18	Construction Workers safety - Provision of personnel protective equipment						
19	A. Helmets						
	B. Safety Shoe						
	C. Dust masks						
	D. Hand Gloves						
	E. Safety Belts						
	F. Reflective Jackets						
	G. Earplugs for labour						

Sl. No.	Safety Issues	Yes	No	Non compliance	Corrective Action	Penalty	Remarks
20	Workers employed on bituminous works, stone crushers, concrete batching plants etc. provided with protective goggles, gloves, gumboots etc.						
21	Workers engaged in welding work shall be provided with welder protective shields						
22	All vehicles are provided with reverse horns.						
23	All scaffolds, ladders and other safety devices shall be maintained in as safe and sound condition						
24	Regular healthcheck-up for labour/ Contractor's personnel						
25	Ensuring the sanitary conditions and all waste disposal procedures & methods in the camps.						
26	The Contractor shall provide adequate circuit for traffic flow around construction areas, control speed of construction vehicles through road safety and training of drivers, provide adequate signage, barriers and flag persons for traffic control						
27	Provision for insurance coverage to the contractor's personnel						

Contractor

Engineer-In-Charge

Format EC1: Target Sheet for Pollution Monitoring

Construction Stage: Report - Date_____ Month_____ Year_____

(Locations at which monitoring to be conducted as per EMP)

Sl. No	Chainage	Details of Location	Duration of Monitoring	Instruments Used	Completion Target		Reason for Delay if any
					Target Date	Date of Completion if task completed	
Air Monitoring							
1							
2							
3							
4							
5							
Water Monitoring							
1							
2							
3							
4							
5							
Noise Monitoring							
1							
2							
3							
4							
5							

Certified that the Pollution Monitoring has been conducted at all the locations specified in the EMP

Contractor

Engineer-In-Charge

Reporting System

The contractor will operate the reporting system for environmental condition and environmental management indicators. The Contractor will report to the Executive Engineer (Panchyat Division) Roads and Building Department, Govt. of Gujarat on the progress of the implementation of environmental conditions and management measures as per the EMP. The reporting formats; environmental monitoring formats are enclosed in the **Annexure 3** and the summary of reporting is given in the **Table 4.**

Table 4: Summary details of Reporting

Format No.	Item	Stage	Contractor	EE (Panchyat), R & BD., GoG
			Implementation & Reporting to EE, (P), R & Bd., GoG	Oversee / Field Compliance Monitoring
EM 1	Identification of Disposal Locations	Pre-Construction; Construction	One Time	One Time
EM 2	Setting up of Construction Camp	Pre-Construction	One Time	One Time
EM 3	Borrow Area Identification	Pre-Construction	One Time	One Time
EM 4	Top Soil Monitoring	Construction	Quarterly	Quarterly
EM 5	Status Regarding Rehabilitation of Borrow Areas	Construction	-	Half Yearly
EM6	Construction Safety	Construction	Quarterly	Quarterly
EC 1	Pollution Monitoring	Pre-Construction; Construction	As Per Monitoring Plan	Quarterly
		Post Construction (DLP)		
		End of Maintenance		

Clearance Requirements of Government of Gujarat

Sr. No.	Clearances	Acts	Approving Agency	Applicability to the Project	Time Required	Responsibility	
						Execution	Monitoring (Supervision)
PROJECT IMPLEMENTATION STAGE							
1	Permission for Withdrawal of Surface Water from Rivers, Nala, Water harvesting structure/ Reservoirs/ Ponds/ Irrigation canals	Gujarat Water Supply and Sewerage Board Act, 1978	Gujarat Water Supply and Sewerage Board	Applicable (If the contractor is extracting surface water)	3 months	Contractor	Engineer-in-charge
2	Permission for Sand Mining from river bed	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 month	Contractor	Engineer-in-charge
3	Permission for Opening of New Quarry	Mines and Minerals (Development and Regulation) Act, 1957	Commissioner of geology and mining, GoG	Applicable	2 month	Contractor	Engineer-in-charge
4	Hot mix plant, Crushers, Cement Batching Plant	Air (Prevention and Control of Pollution) Act. 1981	Gujarat Pollution Control Board	Applicable	3 months	Contractor	Engineer-in-charge
5	Storage of Hazardous Chemicals	Hazardous Waste (Management and Handling) Rules 1989 and Manufacturing Storage and Import of Hazardous Chemicals Rules 1989	Gujarat Pollution Control Board	Applicable	3 months	Contractor	Engineer-in-charge
6	Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 1989	Gujarat Pollution Control Board	Applicable	2 months	Contractor	Engineer-in-charge
7	Disposal of Construction Waste and liquid effluent from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Gujarat Pollution Control Board	Applicable	2 months	Contractor	Engineer-in-charge
8	Pollution Under Control Certificate	Central Motor Vehicles Act 1988	Transport Department (GoG)	Applicable	1 Month	Contractor	Engineer-in-charge
9	Employing Labour	Executing Agency of Building and other construction act, 1996	Labour& Employment Department, GoG	Applicable	1 Week	Contractor	Engineer-in-charge
10	Registration of Workers	Labour welfare Acts.	Labour& Employment Department, GoG	Applicable	1 Month	Contractor	Engineer-in-charge