

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI  
ORIGINAL APPLICATION NO. 662 of 2025

In the matter of:

**PUDA Enclave Welfare Society**

**Applicant**

**Versus**

**State of Punjab & Others**

**Respondents**

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Filed by: Adv. Suman Arora

On behalf of Central Pollution Control Board

Place: Delhi

Date: 16.03.2026

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

**Original Application No. 662 of 2025**

**In the matter of:**

**PUDA Enclave Welfare Society**

**Applicant**

**Versus**

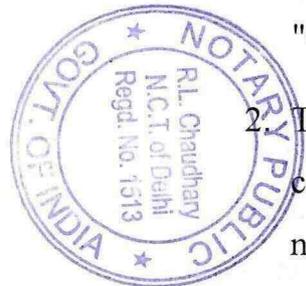
**State of Punjab & Others**

**Respondents**

**REPLY ON BEHALF OF CENTRAL POLLUTION CONTROL BOARD  
(CPCB), RESPONDENT No. 5**

1. That, the Hon'ble National Green Tribunal Principal Bench (hereinafter referred to as "Hon'ble NGT (PB)") vide order dated 23.12.2025 in Original Application (hereinafter referred to as "OA") No. 662 of 2025, has sought the response of Central Pollution Control Board (hereinafter referred to as "CPCB") in the instant matter.

2. That, the present OA filed by the Applicant raises objections against the construction being carried out at Commercial Site No. 1, PUDA Enclave-I, near Mini Secretariat, Patiala by Respondents No. 6 to 8. The Applicant has alleged that Consent to Establish (CTE) was originally granted for a multiplex and shopping arcade; however, Respondents No. 6 to 8 are allegedly constructing a full-fledged hotel at the said site without obtaining the requisite mandatory environmental consents. It is further alleged by the Applicant that the said CTE has expired and has not been renewed by Respondents No. 6 to



8, and that construction activities are being undertaken without installation of requisite pollution control infrastructure, in alleged violation of the statutory provisions governing water pollution, air pollution, noise emissions, solid waste management, applicable land-use norms and CPCB / Punjab PCB guidelines. Accordingly, the reply to this instant OA is submitted in the succeeding paragraphs.

3. That, at the outset, the answering respondent denies all claims, contentions, allegations and averments against answering respondent CPCB in the referred OA contrary to anything stated or submitted in this reply. Nothing in the OA may be deemed to have been accepted or admitted by the answering Respondent for want of a specific denial or on the ground of non-traverse, save any averment which has been expressly admitted hereinafter.
4. That, CPCB has been constituted under Section 3 of the Water (Prevention and Control of Pollution) Act, 1974. It performs the functions under the Water (Prevention and Control of Pollution) Act, 1974 (hereinafter referred to as "Water Act, 1974"), The Air (Prevention and Control of Pollution) Act, 1981 (hereinafter referred to as "Air Act, 1981") and The Environment (Protection) Act, 1986 (hereinafter referred to as "EP Act, 1986").
5. That, the State Pollution Control Boards (SPCBs)/Pollution Control Committees (PCCs) in every State/Union Territory have been constituted under Section 4 of the Water (Prevention and Control of Pollution) Act, 1974 and Section 5 of the Air (Prevention and Control of Pollution) Act, 1981 and are responsible for implementation of the provisions of both the Acts in their respective State/Union Territory.



**PRELIMINARY SUBMISSIONS:**

6. That, in context of consent required to be obtained by the projects and various units/components of the project, it is humbly submitted that, the SPCBs/PCCs are the concerned authorities to grant Consent (Consent to Establish/Consent to Operate) under the Water Act, 1974 and the Air Act, 1981 in their respective jurisdictions of State/Union Territory and to ensure the compliance of conditions of consent and prescribed environmental standards.
7. That, with respect to compliance with environmental norms by establishments such as Hotels, following is humbly submitted:
- a. In pursuance to the Hon'ble NGT's Order dated December 20, 2019 (Date of hearing: 17.12.2019, Date of uploading: 20.12.2019) in OA No. 400/2017 titled as *Westend Green Farms Society Vs Union of India & Ors.*, this Answering Respondent prepared document titled "***Mechanism/Guidelines for Control of Pollution and Enforcement of Environment Norms at Individual Establishments and the Area/ Cluster of Restaurants/ Hotels/ Motels/Banquets etc.***"
  - b. The said Mechanism/Guidelines outline the major environmental issues associated with Restaurants/Hotels/Motels/Banquets etc. and way to address/mitigate those issues e.g. water pollution, air pollution, solid waste management, noise pollution, infrastructure issues, parking issues, ground water extraction etc. in such establishments. A Copy of the above said guidelines is appended herewith as **Annexure-I**.
  - c. The said Mechanism/Guidelines was also circulated by CPCB vide letter dated 19.03.2020 (enclosed herewith as **Annexure-II**) to all States and Union Territories for taking necessary action for complying all the directions passed for States/UTs by Hon'ble NGT in its Order dated December 20, 2019. Copy



of said Letter was also issued to SPCBs/PCCs with direction for compliance of said Order of Hon'ble NGT and to adopt the Mechanism/Guidelines prepared by CPCB in consultation/coordination with concerned State Authorities, with necessary modifications but without diluting its essence. The copy of said CPCB guidelines is also available on the following web link of the CPCB website [https://cpcb.nic.in/NGT/Mechanism\\_07.09.2020.pdf](https://cpcb.nic.in/NGT/Mechanism_07.09.2020.pdf).

8. That, in respect of the management of pollution from construction activities during construction, it is humbly submitted that, the Construction and Demolition Waste Management Rules, 2016 (hereinafter referred to as "the C&D WM Rules, 2016") have been notified in March, 2016 by the Central Government.

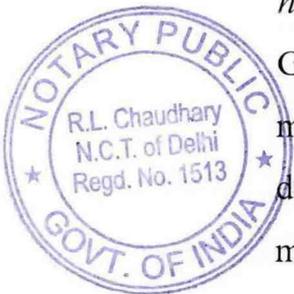
- i. That, in the said Rules, duties of the various stakeholders have been prescribed for effective implementation of the Rules.
- ii. That, in pursuance of the sub-rule 1(a) of Rule 10 of the C&D WM Rules, 2016, the guideline titled "Environmental Management of C & D Wastes" was prepared by CPCB in March, 2017 and a copy of said guidelines is enclosed as **Annexure-III**. The copy of the said guidelines is also uploaded on the Website of CPCB, which is available at <https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvNTUyXzE1MTEyNjQwMTVfbWVkaWFwaG90bzQ2OTAucGRm>. The said Guidelines cover environmental management of construction and demolition (C&D) activities, including proper handling, segregation, storage, transportation and disposal of C&D waste. They also prescribe dust suppression measures, noise control measures, debris management practices, and responsibilities of stakeholders to minimize adverse environmental impacts during construction activities.



9. That, further with respect to dust mitigation measures at construction and demolition sites, it is submitted that the Central Government has notified the Environment (Protection) Amendment Rules, 2018 vide G.S.R. 94(E), dated 25th January 2018, whereby Serial Nos. 106 and 107 have been inserted in Schedule-I of the Environment (Protection) Rules, 1986, prescribing “Mandatory Implementation of Dust Mitigation Measures for Construction and Demolition Activities for projects requiring Environmental Clearance” and “Mandatory Implementation of Dust Mitigation Measures for all Construction and Demolition Activities. Copy of the Environment (Protection) Amendment Rules, 2018 notified vide G.S.R. 94(E), dated 25<sup>th</sup> January 2018, is enclosed as **Annexure- IV**.

10. That, CPCB has also prepared ‘*Guidelines on dust mitigation measures in handling construction material and C&D Wastes (November, 2017)*’. The said Guidelines cover major dust generating activities, composition of construction material and C&D wastes, major dust borne material, dust mitigation measures during transportation of construction material and C&D wastes, dust mitigation measures at site, dust mitigation measures during storage of construction material and C&D wastes etc. A copy of said guidelines is enclosed as **Annexure-V**. A copy of the said guidelines is also available at: <https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvNTYxXzE1MTE5MzMzMzNzJfbWVkaWFwaG90bzEyNjcxLnBkZg==>.

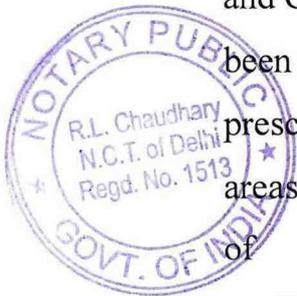
11. That, in respect of noise pollution due to construction activities, it is humbly submitted the guidelines on “**Environmental Management of C & D Wastes**” also highlights issues pertaining to abatement of adverse environmental impacts arising from C&D activities and SECTION VII of the



said Guidelines deals with Noise Management at C&D sites which states about-

- a. Noise Abatement-- Machinery deployed in construction/demolition activities
- b. Noise abatement - Genset noise,
- c. Noise abatement - due to vehicle movement,
- d. Noise abatement measures - Other areas

12..That, in addition to above, it is submitted that the Noise Pollution (Regulation and Control) Rules, 2000 (hereinafter referred to as 'Noise Rules, 2000') have been notified by the Central Government in February, 2000 and the said Rules prescribe ambient air quality standards in respect of noise for various areas/zones. Copy of the Noise Rules, 2000 is available on the following link of the CPCB website – <https://cpcb.nic.in/displaypdf.php?id=Tm9pc2UtU3RhbmRhcmRzL25vaXNlX3J1bGVzXzIwMDAucGRm>.



- i. That, as per Rule 2(c) of Noise Pollution (Regulation and Control) Rules, 2000, "authority" means and includes any authority or officer authorised by the Central Government, or as the case may be, the State Government in accordance with the laws in force and includes a District Magistrate, Police Commissioner, or any other officer not below the rank of the Deputy Superintendent of Police designated for the maintenance of the ambient air quality standards in respect of noise under any law for the time being in force.
- ii. That, as per Rule 3 (3) of Noise Rules, 2000, "The State Government shall take measures for abatement of noise including noise emanating from vehicular movements, blowing of horns, bursting of sound emitting fire crackers, use of loud speakers or public address system and sound producing instruments and

ensure that the existing noise levels do not exceed the ambient air quality standards specified under these rules.”

- iii. That, as per Rule 5A(3) of Noise Rules, 2000, “Sound emitting construction equipment shall not be used or operated during night time in residential areas and silence zones.”
- iv. That, as per Rule 7(1) of Noise Rules, 2000, A person may, if the noise level exceeds the ambient noise standards by 10 dB(A) or more given in the corresponding columns against any area/zone (or, if there is a violation of any provision of these rules regarding restrictions imposed during night time,) make a complaint to the authority.

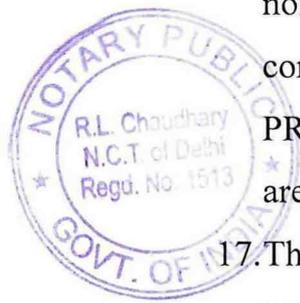
**PARAWISE REPLY:**

13. That, the averments made in Paragraph No. 1 are about introduction of the applicant. Hence, no comment is required from this Answering Respondent No. 5.

14. That, the averments made in Paragraph No. 2 and 3 of the Original Application relate to the allegation regarding unlawful establishment of a pollution-intensive hotel without obtaining mandatory Consent to Establish (hereinafter referred to as “CTE”) or Consent to Operate (hereinafter referred to as “CTO”) under the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981 and mentioning that ongoing construction in violation of the Environment (Protection) Act, 1986 and binding guidelines issued by the CPCB and PPCB and Hon’ble NGT judgments in OA No. 400/2017. It has also been mentioned that hotel activity has water, air, noise and solid-waste pollution potential. In this context, submissions made under PRELIMINARY SUBMISSIONS above of this instant reply, are reiterated and same are not repeated for the sake of brevity.



15. That, the averments made in Paragraph No. 4 and 5 of the Original Application are about the activities conducted by Respondent No. 6 beyond the scope and validity period of the CTE dated 23.11.2021. In this context, submissions made under PRELIMINARY SUBMISSIONS of this instant reply, are reiterated and same are not repeated for the sake of brevity.
16. That, the averments made in Paragraph No. 6 of the Original Application are about the issues of dust plumes, dumping of debris, DG-set exhaust emissions, noise pollution, and obstruction by heavy vehicles due to the ongoing construction work of the hotel. In this context, submissions made under PRELIMINARY SUBMISSIONS of this instant reply, are reiterated and same are not repeated for the sake of brevity.
17. That, the averments made in Paragraph No. 7.1 under the heading "FACTUAL MATRIX" are about alleged illegal construction at Project Site i.e. Commercial Site No. 1, PUDA Enclave-I, Near Mini Secretariat, Patiala by Respondent No. 6 to 9. In this context, submissions made under PRELIMINARY SUBMISSIONS above of this instant reply, are reiterated and same are not repeated for the sake of brevity.
18. That, the averments made in Paragraph No. 7.2 to 7.9 under the heading "FACTUAL MATRIX" are about launching of construction project by Punjab Urban Development Authority (hereinafter referred to as "PUDA") and Punjab Urban and Planning Development Authority (hereinafter referred to as "PUPDA") in 2015, zoning plan of the site and further occurrences of E-auction of the project which are not related to this answering respondent. Hence, need no comments from this Answering Respondent No. 5.
19. That, the averments made in Paragraph No. 7.10 under the heading "FACTUAL MATRIX" are about the construction of hotel by Respondent No. 6 by allegedly violating the conditions of the CTE dated 23.11.2021. In this



context, submissions made under PRELIMINARY SUBMISSIONS above of this instant reply, are reiterated and same are not repeated for the sake of brevity.

20. That, the averments made in Paragraph No. 7.11 under the heading "FACTUAL MATRIX" are about filing of a Civil Writ Petition (CWP No. 14462 of 2022) by Respondent No. 9 under Articles 226/227 of the Constitution of India seeking directions to the concerned authorities not to demand further installments or charge interest on the site, to refund interest already charged, and to obtain the requisite NOC from Punjab State Power Corporation Limited for development of the area, which is a matter of record and needs no comment from this answering respondent No. 5.

21. That, the averments made in Paragraph No. 7.12 under the heading "FACTUAL MATRIX" is about continuing the construction work by Respondent No. 6 beyond the expiry of Consent to Establish dated 23.11.2021 without its renewal. In this context, submissions made under PRELIMINARY SUBMISSIONS above of this instant reply, are reiterated and same are not repeated for the sake of brevity.

22. That, the averments made in Paragraph No. 7.13 under the heading "FACTUAL MATRIX" are about approval of revised plan of building for Multi Use Site-1, Animal Husbandry Scheme- Mini Secretariat Road, Patiala by the District Town Planner, Patiala. The reply of this paragraph relates to Patiala Development Authority, (hereinafter referred to as "PDA"). Hence, need no comment from this Answering Respondent No. 5.

23. That, the averments made in Paragraph No. 7.14 under the heading "FACTUAL MATRIX" are about the alleged impact on the health of the residents of the Applicant Society during 2024-25 due to pollution being caused by construction at the Project Site. In this context, submissions made

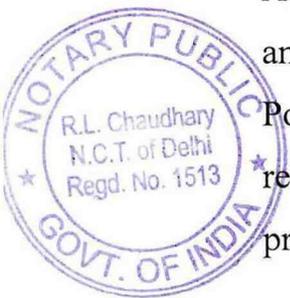


under PRELIMINARY SUBMISSIONS above of this instant reply, are reiterated and same are not repeated for the sake of brevity.

24. That, the averments made in Paragraph No. 7.15 to 7.17 under the heading "FACTUAL MATRIX" are about the complaints by the applicant before Real Estate Regulatory Authority, Punjab (hereinafter referred to as "RERA") alleging that the project in question being marketed and projected as a full-fledged commercial hub with tall and exaggerated claims of multiplexes, shopping complexes, dining and food courts, retail outlets, office spaces etc., without obtaining registration of the commercial component under the RERA Act, 2016 and seeking quashing of the Zoning Plan No 34 dated 03.10.2019 and Revised Zoning Plan No. 34R dated 28.11.2019 of the Commercial Pocket-1. In this context, it is humbly submitted that violation if any under the relevant Acts/Rules may be dealt by the concerned agency as per the provisions of those Acts/Rules.

25. That, the averments made in Paragraph No. 7.18 to 7.22 under the heading "FACTUAL MATRIX" are about conducting construction of hotel without requisite consents and pollution control measures, such as the installation of Sewage Treatment Plant, DG-set emission approval, air/noise pollution control, dust control measures at site and provision of solid waste management. In this context, submissions made under PRELIMINARY SUBMISSIONS above of this instant reply, are reiterated and same are not repeated for the sake of brevity.

26. That, the averments made in Paragraph No. 7.23 under the heading "FACTUAL MATRIX" are about submission of a Representation-cum-Complaint before Punjab Pollution Control Board by the Applicant Society



about misuse of the multiplex CTE, the unauthorised hotel construction, the absence of STP. In this context, submissions made under PRELIMINARY SUBMISSIONS above of this instant reply, are reiterated and same are not repeated for the sake of brevity.

27. That, the averments made in Paragraph No. 7.24 under the heading "FACTUAL MATRIX" relate to the alleged non-disclosure of facts and non-compliance with environmental norms by Respondent No. 6. In this context, submissions made in paragraphs under PRELIMINARY SUBMISSIONS above of this instant reply, are reiterated and same are not repeated for the sake of brevity.

28. That, the averments made in Paragraph No. 7.25 under the heading "FACTUAL MATRIX" relate to the reason for approaching this Hon'ble Tribunal by the Applicant which are matter of records and this Answering Respondent 5 has no comments to offer.

29. That, the averments made in Paragraphs No. 8.1 to 8.18 of the Original Application relate to the Grounds and under the Heading "Prayer" are related to the prayers sought by the applicant. In this regard, it is humbly submitted that the submissions made in preceding paragraphs may please be considered and are not repeated for the sake of brevity.

30. That, it is most respectfully submitted that the Answering Respondent No. 5 seeks liberty to file additional affidavit, if the same is required to be filed at later stage.



31. In light of the above submissions, it is most respectfully submitted that this Answering Respondent No. 5 i.e. CPCB, shall abide by any order(s) or direction(s) passed by this Hon'ble NGT in the instant OA



A handwritten signature in blue ink that reads "Sharandeep Singh". The signature is stylized with a long horizontal stroke at the beginning.

(Sharandeep Singh)

Scientist 'E'

Central Pollution Control Board

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL**

**PRINCIPAL BENCH, NEW DELHI**

**Original Application No. 662 of 2025**

**In the matter of:**

**PUDA Enclave Welfare Society**

**Applicant**

**Versus**

**State of Punjab & Others**

**Respondents**

**AFFIDAVIT**

I, Sharandeep Singh, aged about 46 years in the capacity of Scientist-E, having office at Delhi, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi, do hereby solemnly affirm and sincerely state on oath as follows: -



1. That I, the deponent herein is well conversant with the facts and circumstances of the present case on the basis of the information derived from the official records, and hence, I am competent to verify, sign and swear this affidavit on behalf of the Respondent CPCB.
2. That the accompanying reply may be read part and parcel of the present affidavit.
3. That the accompanying reply has been drafted and filed under my instructions, the contents thereof are true and correct on the basis of the records maintained during ordinary course of business of CPCB and available records and

documents and the contents of the same are read over and explained to me and are not repeated herein for the sake of brevity.



**VERIFICATION**

16 MAR 2026

Verified at New Delhi on this day of \_\_\_\_\_ 2026 that the contents above are correct and true on the basis of the record of the cases as mentioned in the day-to-day affairs of the CPCB. Nothing has been concealed therefrom or mis-stated.

*Sharandeep*

**DEPONENT**

शरणदीप सिंह / Sharandeep Singh  
वैज्ञानिक 'ई' / Scientist 'E'  
केंद्रीय प्रदूषण नियंत्रण बोर्ड  
Central Pollution Control Board  
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार)  
(Mo Environment, Forest & Climate Change, Govt. of India)  
परिवेश भवन, पूर्वी अर्जुन नगर, दिल्ली-110032  
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

*Sharandeep*

**DEPONENT**

शरणदीप सिंह / Sharandeep Singh  
वैज्ञानिक 'ई' / Scientist 'E'  
केंद्रीय प्रदूषण नियंत्रण बोर्ड  
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Parivesh Bhawan, East Arjun Nagar, Delhi-110032

ATTESTED  
*R.L. Chaudhary*  
NOTARY PUBLIC  
GOVT. OF INDIA  
16 MAR 2026

**Mechanism/Guidelines**

for

**Control of Pollution and Enforcement of Environment Norms**

at

**Individual Establishments and the Area/Cluster of Restaurants/Hotels/Motels/Banquets  
etc.****Prepared by****Central Pollution Control Board  
Pariviesh Bhawan, East Arjun Nagar, Delhi – 110032****(In compliance with the Hon'ble NGT Order dated 19.09.2019 in the matter of OA No.  
400/2017 titled as Westend Green Farms Society Vs Union of India &Ors.)**

**Mechanism/Guidelines for Control of Pollution and Enforcement of Environment Norms at Individual Establishments and the Area/ Cluster of Restaurants/ Hotels/ Motels/ Banquets etc.**

**1.0 Background**

Hon'ble NGT vide Order dated 19.09.2019 in the matter of OA No. 400/2017 titled as Westend Green Farms Society Vs Union of India & Ors. stated that –

*“12. There can be no dispute that violation of environment norms having adverse impact on environment and public health cannot be ignored. Apart from formalizing and enforcing the action plan reproduced above, the MoEF&CC may evolve appropriate siting guidelines as well as mechanism for undertaking impact assessment either of individual establishments or of the area/cluster to ensure that activities beyond carrying capacity of the area are duly regulated to enforce the ‘Precautionary’ principle as well as ‘sustainable development’. The MoEF&CC may also review the reports which may be furnished by the CPCB in respect of progress made by the SPCBs/PCCs. We direct the MoEF&CC to entrust the responsibility of evolving mechanism for mitigation to the CPCB which is a statutory body under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974 and/or any other expert/institution. It will be appreciated if the CPCB can lay down suitable guidelines for the regulation of such entities, within the framework of law. The guidelines must provide for coercive measures in case of violations and also a monitoring mechanism.”*

Further, Hon'ble NGT, vide Order dated 17.12.2019 on the matter highlighted various practical issues and requirements like parking provisions, rain water harvesting system, installation of CCTV cameras, GPS systems and the likes (paras 20 & 21) for consideration and incorporation in CPCB's mechanism/guidelines et also passed the following relevant direction-

*“22. (i). CPCB may finalize its draft guidelines dated 16.12.19 referred to in para 13 above in light of observations in paras 20 and 21 above and circulate the same to all the States/UTs within one month. The PCBs/PCCs may, in consultation/coordination with concerned State Authorities, adopt the same with necessary modifications but without diluting its essence and furnish status report about compliance to CPCB within three months but before 30.04.2020.”*

In compliance with the above Order, Central Pollution Control Board (CPCB) approached all the State Pollution Control Boards/Pollution Control Committees (vide letter dated 24.10.2019, **Annexure-I**) requesting them to provide relevant information about operation and pollution control initiatives/policy (if any) adopted in case of marriage halls, banquets, restaurants and similar other venues of mass gatherings. Only three PCBs/PCCs namely Tamil Nadu State Pollution Control Board, Meghalaya State Pollution Control Board and Madhya Pradesh Pollution Control Board replied submitting limited data and information about marriage halls/banquets operating under their jurisdictions. Two detailed inspection reports prepared by

CPCB in connection with NGT O.A. No. 1008/2018 and O.A. No. 412/2018 were also available for reference. Based on information submitted by the SPCBs/PCCs, technical inputs taken from CPCB inspection reports and relevant literature survey, guidelines/mechanisms for control of pollution and enforcement of environmental laws in marriage halls, banquets, etc. has been prepared and presented below.

## **2.0 Major Environmental Issues related to marriage halls, banquet halls, party venues**

With the paucity of space, marriage halls, banquet halls, party venues, etc., have now become a social necessity. Apart from marriages, these venues are also increasingly being used for celebrating birthdays, organizing religious functions, get-togethers and other events. Unlike the bigger star hotels doing business all throughout the year, marriage halls, banquets, party venues, etc. are essentially operated occasionally particularly during marriage seasons, religious festivals, etc. Party venues, including smaller and bigger ones, hold approximately 15 to 30 events per year. For hosting a single big event, these halls/venues generally remain operational for about 05 days (including 02 days before the event for preparations, the event-day and 02 days after the event for clearing and dismantling temporary fixtures/stages, etc.). All banquets and party halls may not have indigenous kitchens for cooking and serving foods. Banquets/party halls having no kitchens normally outsource cooking/food requirements to some outside caterers/agencies who cook/prepare foods at a different place and transport the same to the party halls/banquets for serving guests. Banquets/party halls having own kitchens/cooking arrangements may be more polluting than the ones having no kitchens of their own.

In general, marriage halls, party venues and the likes end up creating water pollution, air pollution, solid waste problems, noise pollution and also cause public inconveniences due to lack of adequate infrastructures like - vehicle parking space, proper waste collection and disposal systems, improper storage provisions etc. Following are the major environmental issues concerning marriage halls, banquets, party venues, etc. particularly identified after reviewing the available information/reports.

### **2.1 Water Pollution**

Major sources of Water pollution include:

- Washing of utensils and food items
- Washing of kitchen floors
- Poor housekeeping
- Laundry ( as applicable)
- Improper maintenance of connecting drains
- Sewage

Further, such party halls are also found to extract groundwater indiscriminately without taking proper permission from the concerned local authority. Lackluster attitude towards implementation of water conservation measures and adoption of rainwater harvesting provisions also results in large quantity of water consumption

### **2.2 Air Pollution**

Major sources of Air pollution include:

- Kitchen: Inadequate exhaust treatment options like proper ducting, hooding, draft fans, etc. and use of conventional fuels
- DG Sets: Inadequate stack height and improper maintenance of DG sets,
- Bursting of fire crackers
- Coal fired tandoors
- Traffic congestion due to improper parking

### **2.3 Solid Waste Management**

Source of solid waste include:

- Kitchen waste
- Plastic waste from Packaging and use of disposable plastic items such as cups, plates , glasses etc
- Left over food items

Haphazard collection, storing and careless disposal of wastes are real concerns in case of such establishments.

### **2.4 Noise pollution**

Major source of Noise pollution include:

- Loudspeakers and DJ music,
- Bursting of crackers,
- Operation of DG sets without having proper acoustic enclosures
- Traffic congestion due to improper parking

### **2.5 Infrastructure issues related to parking etc.**

Most of the existing banquet halls are found to be adjacent to the main roads without having any indigenous parking facilities of their own. Therefore, during occasions, large numbers of cars/vehicles are parked on the main road thereby causing huge congestion and nuisance in the adjoining areas.

## **3.0 Mechanism/Guidelines/Mitigation measures**

The mechanisms and options for control of pollution and enforcement of environmental laws with particular focus on the common environmental issues symptomatic to such establishments are outlined below.

### **3.1 Water Pollution**

#### **(i) Effluent Treatment Plant**

- a. The units shall provide effluent/sewage treatment plant. Entire waste water generated from kitchen, laundry and domestic sewage should be treated in ETP.
- b. EP Rules specify effluent discharge norms for (A) Eateries/ restaurants along roadside having minimum seating capacity of 36 numbers & (B) Hotels. Details of same are as given below:

**(A) Eateries/ restaurants along roadside having minimum seating capacity of 36 numbers.**

A restaurant with minimum seating capacity of 36 shall install ETP and treated effluent water from ETP installed should meet existing Environmental Standard notified by the MoEF&CC vide GSR 794(E) dated 04.11.2009 and reproduced as under. The standard may be made stringent by concerned SPCB/PCCS.

Parameters	Effluent Standards (Limiting concentration in mg/l, except pH)	
	Inland surface water	On land for irrigation
pH	5.5-9.0	5.5-9.0
BOD <sub>3days, 27°C</sub>	100	100
Total Suspended Solids	100	100
Oil & Grease	10	10

**(B) Effluent discharge norms for hotels**

Hotel type	Parameters	Effluent Standards (Limiting concentration in mg/l, except pH)	
		Inland surface water	On land for irrigation
Hotel with at least 20 bedrooms	pH	5.5-9.0	5.5-9.0
	BOD <sub>3 days, 27°C</sub>	30	100
	Total Suspended Solids	50	100
	Oil & Grease	10	10
	Phosphate as P	1.0	-
Hotel with less than 20 bedrooms or a banquet hall with minimum floor area of 100 m <sup>2</sup> or a restaurant with minimum seating capacity of 36	pH	5.5-9.0	5.5-9.0
	BOD <sub>3 days, 27°C</sub>	100	100
	Total Suspended Solids	100	100
	Oil & Grease	10	10

Effluent from the unit shall comply with the above norms as applicable

- c) The units shall provide effluent treatment plant as proposed and maximize reuse of treated sewage in toilet flushing, floor washing, gardening and other non-potable purposes.
- d) The unit shall install water meters to record the daily consumption of water and separate electromagnetic flow meter at the inlet and outlet of effluent treatment plant to record actual flows on a daily basis.

- e) The unit shall install separate energy meters also to record the daily energy consumption of the effluent treatment plant on daily basis prior to completion of the project.
- f) The treated water has to be discharged as per conditions specified by the SPCBs/PCCs
- g) The quality of treated sewage and trade effluent should be analyzed regularly once in a month and report shall be furnished to SPCB/PCC. Moreover, SPCBs/PCCs are required to carry out surprise cross-checks.
- h) In case of bigger halls/star hotels with the capacity of hosting more than 500 people/guests, the halls shall install water meters to record daily consumption of water along with separate electromagnetic flow meters at the inlet and outlet of effluent treatment plants to record actual flows during events. The units having capacity of hosting less than 500 people/guests are required to install water meters only for recording consumption.
- i) Provisions/arrangements for utilizing treated wastewater for gardening and non-potable uses need to be done in case of all such units (smaller & bigger).
- j) The local authorities to ensure that necessary arrangement for collection and treatment of waste water generated from these units

***(ii) Ground water extraction***

- a) Necessary permissions should be obtained from concerned Authorities for extraction of groundwater.
- b) SPCB/ PCC to take action against units for unauthorized or illegal ground water extraction without proper permissions from concerned Authorities.
- c) Groundwater extraction pits/points should have required meters for recording flow/quantity of water extraction and the same shall be within the limit/quantity approved by the concerned Authority.

***(iii) Water Conservation Measures***

- a) Maximize reuse of treated water for non-potable purpose/gardening, etc.
- b) All the units shall furnish quarterly reports to the concerned SPCBs/PCCs showing quantity of water consumption (month-wise) and quality of treated water.
- c) Rain water harvesting systems must be installed by all units in consultation with the concerned Agency. Bigger hotels/halls need to make arrangements for both roof-top and ground-based harvesting of rain water. In case roof-top harvesting is not possible/viable, the smaller halls/venues having hosting capacity of less than 500 persons/guests should then go for ground-based/artificial storage systems, storage tanks and other similar arrangements.
- d) Along with bigger hotels, all marriage halls/venues need to use efficient fixtures such as low flow shower heads, bath, sink faucet aerators, low flow toilets etc.

### **3.2 Air Pollution**

#### **(i) Gensets and Fuel**

- a) Units to use approved fuel (e.g. LPG, PNG, Charcoal for tandoor, boiler, etc.). Preference should be given to cleaner fuels in such cases
- b) The units shall properly channelize the fugitive emissions including emissions from cooking & kitchen operations by providing proper ducting / hood arrangement and proper exhaust system and emissions
- c) Only Gensets having necessary Type Approval for emissions/ Noise level from the concerned agencies to be installed at the premises
- d) The unit shall provide stack for the emissions from the generator as well as acoustic enclosure for Gensets as per the specified norms

#### **(ii) Energy Conservation Measures**

- a) Application of solar energy in various areas such as illumination, water heating should be promoted
- b) Use of inverters instead of Diesel Generator Sets to be encouraged
- c) Use of LED bulbs should be adopted

#### **(iii) Consent to establish and Consent to operate**

- a) As per the Water Act 1974 and Air Act 1981 units obtain Consent to Establish (NOC) before commencement of the construction activities and Consent to Operate (CTO) before starting operation of the Units (individual establishments and the area/ cluster of restaurants/ hotels/ motels/ banquets etc.) from the concerned SPCB/PCC.
- b) Further, the SPCB/PCC to direct the defaulting units for paying environmental compensation for damaging the environment considering their operations despite being non-compliant.
- c) The SPCB/PCC may workout and assess the amount of environmental compensation in-line with the mechanism for charging environmental compensation as evolved by the CPCB.

### **3.3 Solid Waste Management**

- (a) The units shall properly handle, manage and dispose the solid waste generated and comply with the provisions of the Solid Waste Management Rules, 2016.
- (b) As per clause 3 (8) of the Solid Waste Management Rules, 2016, marriage halls generating waste of more than 100 kg/day fall under the category of 'Bulk Waste Generator' and should ensure compliance with the provisions of the Rules, and in specific the following::
  - **13(1)(d)** Store horticulture waste and garden waste generated from such premises separately in within the own premises and
  - 
  - **13 (2)** No waste generator shall throw, burn or burry the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.

- 
- **13 (8)** All hotels and restaurants shall, within one year from the date of notification of these rules and in partnership with the local body ensure segregation of waste at source as prescribed in these rules, facilitate collection of segregated waste in separate streams, handover recyclable material to either the authorised waste pickers or the authorised recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.
  - (c) The segregated food waste from the solid waste generated in the unit shall be treated in organic waste converter and the treated compost shall be used as manure.
  - (d) The unit shall ensure that the hazardous waste (used oil, used batteries) generated in the premises are collected properly and disposed only to authorized recyclers registered with MoEF&CC/CPCB and valid operating license of SPCB/PCC.
  - (e) The unit shall minimize use of disposable plastic on its premises and ensure its disposal through recyclers registered with SPCB/PCC for recycling plastic waste
  - (f) *The concerned local authorities shall make necessary arrangement for collection and processing of waste from these units in accordance with provisions of SWM Rules*

### **3.4 Noise pollution**

- (a) The unit shall obtain permission from designated authorities as per provisions of Noise Pollution (Regulation & Control) Rules, 2000.
- (b) The unit shall comply with provision of Noise Rules specifically Rule 5 and Rule 6 of the Noise Rules.
- (c) DJ Set, if used should be operated within the premises till 10 PM only. No loudspeakers and bands should be permitted beyond 10 PM.
- (d) D.G. sets shall comply with the provisions of Noise Pollution control limits.
- (e) Use of only green crackers to be permitted upto 10 PM as per Hon'ble Supreme Court Guidelines.

### **3.5 Infrastructure issues & Other Requirements**

- (a) Infrastructure requirement

The units come up in a cluster leading to severe stress on basic infrastructure including traffic management, parking as well as pose a fire hazard etc. Accordingly the following to be complied with:

- (i) Parking facilities
  - Adequate infrastructure arrangements may be made w.r.t parking in the area by Local Authorities. The parking capacity to be in line with the hosting capacity of such units.

- In areas where public parking is not commonly possible, banqueting area may be restricted and provision for parking to be made within the units' premises. Alternatively, the units may outsource parking to authorized parking lots subject to satisfaction of traffic authorities. Valet parking facilities may be provided in such areas

(ii)Traffic movement

- The local authorities to ensure adequate space for movement of vehicles
- Since it has been observed that due to the use of horse drawn carriages during Barat Processions the traffic crawls due to narrowing of the Right of Way(ROW), to ban the use of such carriages should be banned in areas not having adequate space for movement of vehicles
- The use of DG sets kept on trucks/trolleys during the Barat Processions also causes air and noise pollution, apart from creating traffic congestion; hence, the use of DG sets during such processions needs to be prohibited in not having adequate space for movement of vehicles.
- Prior permission for such processions to be taken from local authorities

(iii)Fire safety

The units to make adequate arrangements for fire safety and obtain fire safety certificate from the respective State Government agencies

The units to take permission from the local authorities for the hosting capacity of such units ; which is to be commensurate with the facilities provided within the unit as well as the common infrastructure facilities of the area. Local Authorities to ensure adequacy of infrastructure facilities. for existing units before granting necessary permissions. In case it is not possible to provide these facilities required for existing units, such units may be shifted out of the area. Fresh approval to new units to be considered based on the adequacy of these facilities

- (b) Building plans to be approved by concerned authorities. Local Authorities to ensure that these units are operating in compliance with approved building plans and without any parking & traffic issues.
- (c) Bigger units/star hotels shall develop green belt on its premises and shall furnish the green belt development plan while applying for consent to operate

## 5.0 Conclusion

- a) Individual units to provide necessary facilities for control of air, water & noise pollution, solid waste management, etc as enumerated in the previous sections.
- b) Individual units to take necessary approvals from the concerned authorities as listed below:
- Consent to Establish under Air/Water Act
  - Consent to operate under Air/Water Act
  - Permission for concerned Authorities in accordance with provisions of Noise Rules
  - Permission for Ground Water Extraction from concerned Authorities , if required

- Building Plan Approval from concerned Authorities
  - Fire Safety Certificate/NoC from concerned Authorities
- c) Local Authorities to ensure provision of adequate common facilities for water pollution, solid waste management, parking etc
- d) The State Board to have robust monitoring mechanism to evaluate compliance with norms of such units atleast twice a year. As per NGT Directions, SPCBs/PCCs are required to submit compliance report to CPCB as per the enclosed format (Annexure I )

-----X-----

No. B-31013/30/2020/UPC-I/  
To

SPEED POST  
Date: March 19, 2020

The Chief Secretary  
All States/UTs

**Subject: Mechanism/Guidelines for Control of Pollution and Enforcement of Environment Norms at Individual Establishments and the Area/Cluster of Restaurants/Hotels/Motels/Banquets etc.**

Ref.:

1. Hon'ble NGT Order dated December 20, 2019 in the matter of OA No. 400/2017 titled as Westend Green Farms Society Versus Union of India & Ors.
2. CPCB's letter dated 24.10.2010 in compliance with Hon'ble NGT Order dated 19.09.2019 issued to all SPCBs/PCCs.
3. Hon'ble NGT Order dated 19.09.2019 in the matter of OA No. 400/2017 titled as Westend Green Farms Society Versus Union of India & Ors.

Sir,

Hon'ble NGT vide Order dated December 20, 2019 passed following directions to CPCB in the above matter:

- i. CPCB may finalise its draft guidelines dated 16.12.2019 referred to in para 13 above in the light of observations in paras 20 and 21 above and circulate the same to all the States/UTs within one month. The PCBs/PCCs may, in consultation/coordination with concerned State Authorities, adopt the same with necessary modifications but without diluting its essence and furnish status report about compliance to CPCB within three months but before 30.04.2020.
- ii. PCBs/PCCs may in particular ensure compliance of directions in para 21 above.
- iii. CPCB may compile the data and furnish a comprehensive report before the next date."

In compliance with the above, "Mechanism/Guidelines for Control of Pollution and Enforcement of Environment Norms at Individual Establishments and the Area/Cluster of Restaurants/Hotels/ Motels/Banquets etc." has been prepared and finalized by CPCB. Said Mechanism/Guidelines is being issued to all the States/UTs for taking necessary action at their as per Hon'ble NGT's Order.

Encl.: As above

Yours sincerely



[Divya Sinha]

Divisional Head, UPC-I Division

Copy to:

The Member Secretary : The PCBs/PCCs are requested to comply with the Hon'ble NGT's Order  
All SPCBs/PCCs cited above, to adopt the Mechanism/Guidelines prepared by CPCB with necessary modifications but without diluting its essence and furnish the Modified Mechanism/Guidelines and status report about compliance as per enclosed format to CPCB before 30.04.2020.

d/c

# **GUIDELINES ON ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION & DEMOLITION (C & D) WASTES**

**(Prepared in compliance of Rule 10 sub-rule 1(a) of C & D Waste  
Management Rules, 2016)**



**MARCH 2017**



**CENTRAL POLLUTION CONTROL BOARD**

**( Ministry of Environment, Forests & Climate Change )**

# **GUIDELINES ON ENVIRONMENTAL MANAGEMENT OF C & D WASTES**

(Prepared in compliance of Rule 10 sub-rule 1(a) of C & D Waste  
Management Rules, 2016)

**MARCH 2017**



**CENTRAL POLLUTION CONTROL BOARD**

**( Ministry of Environment, Forests & Climate Change )**

एस.पी.एस. परिहार, भा.प्र.से.  
अध्यक्ष

S.P.S. PARIHAR, I.A.S.  
Chairman



केन्द्रीय प्रदूषण नियंत्रण बोर्ड  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
(भारत सरकार)

CENTRAL POLLUTION CONTROL BOARD  
Ministry of Environment, Forest & Climate Change  
(Government of India)

## Foreword

The Swachh Bharat Mission (MoUD) envisages processing of 100% solid waste generated in cities / towns by 2<sup>nd</sup> October 2019 as a key objective, which includes Construction and Demolition (C&D) wastes.

In course of preparation of these Guidelines it was noted that there are uncertainties in estimating the quantum of C&D waste generation, this can be attributed to several reasons like different methods adopted to estimate quantum of C&D waste generated, varying pace of developmental activities in cities, re-development of cities due to rapid urbanisation wherein demolition activities become necessary. Literature survey also indicated that the quantum and composition of C&D waste is project specific. It is also learnt that in the past Guidelines on C&D wastes have been brought out by CPWD under Guidelines for Sustainable Habitat - PART IV: Guidelines on reuse and recycling of Construction and Demolition (C&D) Waste (March 2014)' and also by Building Materials and Technology Promotion Council (BMTPC) titled "Guidelines for utilization of C&D waste in construction of dwelling units and related infrastructure in housing schemes of the Government (year 2016)".

CPCB has brought '**Guidelines on Environmental Management of C & D Wastes**' in compliance of Rule 10 sub-rule 1(a) of the C&D Waste Management Rules, 2016 and has attempted to address the issues pertaining to abatement of adverse environmental impacts arising from C&D waste management activities. These issues were not discussed in the Guidelines prepared by CPWD & BMTPC.

The guidance from expert members of 'Committee for implementation of C&D Waste Management Rules 2016' and feedback on the draft Guidelines on the website of CPCB are acknowledged. Unlike other rules addressing various key urban wastes such as MSW, plastic wastes, BMW, the Construction and Demolition (C&D) Waste Management Rules, 2016 are NEW rules that were notified on 29th March, 2016 by MoEF&CC. These Guidelines are expected to be helpful to all stakeholders and to academic institutions in carrying out further research on the subject.

(S. P. SINGH PARIHAR)

March 2017



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**ACKNOWLEDGEMENTS**

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Note: All photographs are taken from internet

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(SCHEDULE I)

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## SECTION I

### Objective and Scope

#### 1. Urban waste management

Safe and cost-effective management of solid wastes (SW) is a significant environmental challenge for modern society. Rapid urbanization is changing the nature of solid waste management from a low priority, localized issue to a pervasive social and environmental problem with risks to public health and environment. Inadequately managed waste disposal has the potential to affect the health and environment. Management wastes need to incorporate the principles of waste minimization and recycling and work towards an integrated processing & disposal facility such that it is both effective & sustainable. In most urban wastes ex. Municipal Solid Waste (MSW), Biomedical Waste (BMW) or Construction & Demolition (C & D) Wastes - management of solid waste is required at all stages from waste generation to the final disposal.

A general approach to an integrated solid waste management plan would comprise of the following:

- i. understanding the various waste management practices
- ii. identifying waste management needs
- iii. setting targets for actions required
- iv. identifying budget requirements
- v. identifying & coordinating with the stakeholders to achieve the targets
- vi. arriving at a rational basis for setting up a waste processing / disposal facility
- vii. Harnessing right tools for mass awareness

#### 2. Swachh Bharat Mission

The Swachh Bharat Mission (under MoUD) envisages processing of 100% solid waste generated in cities / towns by 2<sup>nd</sup> October, 2019 as a key objective, which includes C & D wastes. Ministry of Urban Development (MoUD) vide its circular dated 28<sup>th</sup> June, 2012 stated all states to set up C & D waste recycling facilities in all cities with population of over 1 million.

#### 3. C & D Waste Management Rules, 2016 - Notification

Unlike other rules addressing various key urban wastes such as MSW, plastic wastes, BMW, the Construction and Demolition (C & D) Waste Management

Rules, 2016 are NEW rules that were notified on 29<sup>th</sup> March, 2016 by the Ministry of Environment, Forest and Climate Change (MoEF&CC).

#### 4. C & D waste – definition, applicability and waste generating activities

As per Rule 3 (c) "construction and demolition waste" means *waste comprising of building materials, debris and rubble resulting from construction, re-modeling, repair and demolition of any civil structure.*

The rules shall apply to every waste resulting from construction, re-modeling, repair and demolition of any civil structure of individual or organization or authority who generates construction and demolition waste such as building materials, debris, rubble. Wastes also include surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.

Under Rule 3, the following definitions have been provided:

- a. Subrule (b) "**construction**" means the process of erecting of building or built facility or other structure, or building of infrastructure including alteration in these entities;
- b. Subrule (d) "**de-construction**" means a planned selective demolition in which salvage, re-use and recycling of the demolished structure is maximized;
- c. Subrule (e) "**demolition**" means breaking down or tearing down buildings and other structures either manually or using mechanical force (by various equipment) or by implosion using explosives.

Activities which generate C & D waste in cities / towns are mainly from:

- i. Demolition of existing, old dilapidated structures;
- ii. Renovation of existing buildings (residential or commercial);
- iii. Construction of new buildings (residential or commercial or hotel etc.);
- iv. Excavation/ reconstruction of asphalt/ concrete roads;
- v. Construction of new fly over bridges/ under bridges/ sub-ways etc.; and
- vi. Renovation/ Installation of new water/ telephone/ internet/ sewer pipe lines etc.
- vii. Present collection and disposal system.

## 5. Objectives and scope of the Guidelines

Rule 10 sub-rule 1(a) of C & D Waste Management Rules, 2016 gives the Duties of the Central Pollution Control Board (CPCB) which is as follows: to *'prepare operational GUIDELINES related to environmental management of construction and demolition (C & D) waste management'*.

In complying with the above Rule, the Guidelines have been prepared to:

- a. promote an integrated approach, whereby environmental management of construction and demolition waste is given due consideration throughout the duration of the project;
- b. approach towards reduction of environmental impacts.

The guidelines recommends pollution mitigation measures in operation of C & D dump sites / waste processing facilities. Though guidelines focus mainly on facilities generating more than 20 tons or more in one day or 300 tons per project in a month of installed capacity (bulk generators) in cities / towns however, the mitigation measures suggested can be scaled after consultation with the concerned department in the state government. The reference to 'operators' in these Guidelines imply operators of bulk C & D waste management / waste recycling / processing facilities.

**Figure 1.1: Indiscriminate dumping of C & D wastes along roadsides**



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## SECTION II

### Quantum & Composition of C & D Waste Generation

#### 1. Definition of C & D waste generator and bulk generators

As per Rule 3 (j) **“waste generator”** means *any person or association of persons or institution, residential and commercial establishments including Indian Railways, Airport, Port and Harbour and Defence establishments who undertakes construction of or demolition of any civil structure which generate construction and demolition waste.*

Under the Rules w.r.t. quantum of waste generation addresses those sources generating more than 20 tons or more in one day or 300 tons per project in a month of installed capacity.

#### 2. Uncertainty in quantum of generation of C & D wastes

During preparation of these Guidelines it was noted that there are uncertainties in estimating the quantum of C & D waste generation, this can be attributed to several reasons like different methods adopted to estimate quantum of C & D waste generated, varying pace of developmental activities in cities, re-development of cities due to rapid urbanization wherein demolition activities become necessary. Literature survey also indicated that the quantum and composition of C & D waste is project specific. It has been reported that the above quantum of C & D waste generation vary. However, it is estimated to account for approx. 25 - 30 percent of total solid waste generated. Some estimations of C & D wastes are provided below:

From MoUD:

- a. 10 MT -15 MT (MT – million tonnes) per year by MoUD (2000);
- b. Approximately 25-30 million tonnes of C & D wastes is generated annually in India of which 5% is processed
- c. The amount of C & D wastes in India has been estimated to be 10 - 12 million tonnes annually and the proportion of concrete estimated as 23 to 35% of total waste. Considering 30% percent of C & D wastes of 12 million tonnes as concrete, and 50% of the concrete as coarse aggregate, the total available recycled concrete aggregate (RCA) in India is of the order of 1.8 million tonnes annually.

The quantum of generation of C & D waste estimates available from other sources are summarized below:

- 12 MT - 15 MT by TIFAC (2001);
- 10 MT -12 MT by MoEF (2010) and
- 12 MT by CPCB
- 165-175 MT per annum between 2005-2013 (BMTC)

Forecast estimates: Presently, C & D waste generation in India accounts upto **23.75 million tons** annually and these figures are likely to double fold upto **2016**. (Source: International Society of Waste Management, India).

**Table 2.1: C & D waste generation in NINE cities**

City	Area (Metropolitan region km <sup>2</sup> )	POPULATION (CENSUS 2011)	No. of Wards / Zones	ULB	C & D WASTE GENERATION (TONNES PER DAY)
Chennai	1,189	6,500,000	200/ 15	Chennai Municipal Corporation (As per discussions with IIT-Madras)	2,500
Coimbatore	-	2,618,940	100/5	Coimbatore City Municipal Corporation (CCMC, 2015)	92
Bengaluru*	-	8,443,675	198/5	Greater Bengaluru Municipal Corporation (BBMP)(TIFAC, 2001)*	875
Mumbai	4,355	12,442,373	24/6	Municipal Corporation of Greater Mumbai (www.mcgm.gov.in)	2,500
Ahmedabad	-	6,063,047	64/6	Ahmedabad Municipal Corporation (As per discussions with AMC officials)	700
Patna*	99.45	2,514,590	72/4	Patna Municipal Corporation (TIFAC, 2001)*	250
Jaipur*	-	3,471,847	91/8	Jaipur Municipal Corporation (TIFAC, 2001)*	200
Bhopal*	-	1,917,051	70/ 14	Bhopal Municipal Corporation (TIFAC, 2001)*	50

Kolkata	-	4,496,694	144/-	Kolkata Municipal Corporation (As per discussions with KMC)	1,600
*Due to unavailability of data for these cities, 25% of MSW was taken as C & D waste based on TIFAC, 2001 study ; Ref. (a) A Baseline Study of the Automotive and Construction Sectors- : GIZ, IFEU, TERI, VDI, Development Alternatives (DA) (b) Market study on C & D waste utilization in Ahmadabad. : GIZ & DA					

### 3. Estimation of C & D waste generation for India

In literature, various methods have been employed to quantify the C & D waste generation at both regional and project levels. Technology Information, Forecasting and Assessment Council's (TIFAC) has developed some estimations on C & D waste generation which recognizes that the generation is project specific as follows:

- a. Range 40-60 kg per sq.m of new construction,
- b. Range 40-50 kg per sq.m of building repair,
- c. Range 300-500 kg per sq.m for demolition of buildings.

From the above, it may be noted that the highest waste generation comes from demolition of buildings. C & D waste generation figures for any region fluctuate as it depends largely on the type & nature of construction / demolition activities of the project concerned. Various approaches for estimation of C & D waste generation in literature include the following:

- i. The following FIVE categories of existing C & D waste quantification methodologies are reported :
  - a. Site visit method
  - b. Waste generation rate method
  - c. Lifetime analysis method
  - d. Classification system accumulation method
  - e. Variables modelling method

(Ref. Quantifying Construction and Demolition Waste: An Analytical Review, Volume 34, Issue 9, September 2014, Pages 1683–1692, Elsevier Ltd. All rights reserved).

Approach to estimate C & D waste is through materials flow analysis is embedded in above methods.

- ii. Estimation of C & D waste generation based on per capita multipliers or waste generation rate model. (International J. Global Environmental Issues, Vol. 12, Nos. 2/3/4, 2012, Waste quantification models for estimation of construction and demolition waste generation: a review).

**Table 2.2: C & D (%) waste - by activity in the United States**  
(Ref: BMTPC, 2016)

<b>C &amp; D waste type</b>	<b>Residential</b>	<b>Non residential</b>	<b>Total</b>
<i>New Construction</i>	11%	6%	8%
<i>Renovation</i>	55%	36%	44%
<i>Demolition</i>	34%	58%	48%
<i>Total (%)</i>	100%	100%	100%

#### 4. Composition of C & D waste is project specific

- a. The composition of C & D waste can vary depending on age of building being demolished / renovated or the type of buildings being constructed. As mentioned earlier, C & D waste generation figures for any region varies as it depends largely on the type and nature of construction / demolition project activities which may be regional / site / project specific.

Under Rule 4 sub-rule (3) the segregation by bulk C & D waste generators shall be done into four streams such as:

- i. Concrete
  - ii. Soil
  - iii. Steel, wood and plastics
  - iv. Bricks & mortar
- b. Demolition waste characteristics: In India, when old buildings are demolished the major demolition waste is soil, sand and gravel accounting for bricks (26%) & masonry (32%), Concretes (28%), metal (6%), wood (3%) others (5%). Bricks, tiles, woods and iron metal are sold for reuse / recycling (BMTPC).
- c. Excavations, concrete, masonry and wood together constitute over 90% of all C & D waste.
- d. The typical composition of Indian C & D waste:  
The major constituents are concrete, soil, bricks, wood, asphalt and metal. Brick & masonry, soil, sand & gravel account for over 60% of total waste. (Source- Municipal Corporation of Delhi, Burari facility).

**Table 2.3: Typical composition of Indian C & D waste**  
(TIFAC, 2001)

<b>Material</b>	<b>Composition</b>
Soil, Sand & Gravel	36%
Brick & Masonary	31%
Concrete	23%
Metals	5%
Bitumen	2%
Wood	2%
Others	1%

**Figure 2.1: Indiscriminate dumping of C & D wastes along roadsides**



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### SECTION III

#### Initiatives in Promoting C & D Waste Products by GoI

##### 1. The Rules promote C & D waste utilization

The Construction and Demolition (C & D) Waste Management Rules, 2016 promotes C & D waste utilization.

Under Rule (6) under Duties of Local Authority, the following sub-rules states:

- i. sub-rule (9) 'shall device appropriate measures in consultation with expert institutions for management of construction and demolition waste generated including processing facility and for using the recycled products in the best possible manner';
- ii. sub-rule (10) 'shall create a sustained system of information, education and communication (IEC) for construction and demolition waste through collaboration with expert institutions and civil societies and also disseminate through their own website';
- iii. sub-rule (11) 'shall make provision for giving incentives for use of material made out of construction and demolition waste in the construction activity including in non-structural concrete, paving blocks, lower layers of road pavements, colony and rural roads'.

Under Rule (7) mentions the 'Criteria for storage, processing or recycling facilities for construction and demolition (C & D) waste and application of construction and demolition waste and its products'.

Under **Schedule I** (Rule (7) (1)): 'Construction and demolition waste shall be utilized in sanitary landfill for municipal solid waste of the city or region as mentioned under Schedule I'.

- a. The Rule (7) sub-rule (3) gives Application of materials made from construction and demolition waste in operation of sanitary landfill shall be as per the criteria given in **Schedule II**.
- b. The Rule (9) sub-rule (4) mentions that the 'Procurement of materials made from construction and demolition waste shall be made mandatory to a certain percentage (say 10-20%) in municipal and Government contracts subject to strict quality control'.
- c. Rule (11) under Duties of Bureau of Indian Standards (**BIS**) and Indian Roads Congress (**IRC**) 'The Bureau of Indian Standards and Indian Roads Congress shall be responsible for preparation of code of practices and standards for use of recycled materials and products of

construction and demolition waste in respect of construction activities and the role of Indian Road Congress shall be specific to the standards and practices pertaining to construction of roads’.

## 2. Type of C & D wastes products proposed under Rules

The C & D wastes products suggested under the Construction and Demolition (C & D) Waste Management Rules, 2016 are as follows:

- i. Under Rule (6) under Duties of Local Authority : sub-rule (11) ‘shall make provision for giving incentives for use of material made out of construction and demolition waste in the construction activity including in non-structural concrete, paving blocks, lower layers of road pavements, colony and rural roads’.
- ii. Under **Schedule I** (Rule (7) (1)): ‘Construction and demolition waste shall be utilized in sanitary landfill for municipal solid waste of the city or region as mentioned under Schedule I’. The Rule (7) sub-rule (3) gives Application of materials made from construction and demolition waste in operation of sanitary landfill shall be as per the criteria given in **Schedule II**.
- iii. The Rule (9) sub-rule (4) mentions that the ‘Procurement of materials made from construction and demolition waste shall be made mandatory to a certain percentage (say 10-20%) in municipal and Government contracts subject to strict quality control’.

## 3. Thrust areas in C & D waste management – National Building Code (NBC)

Some key thrust areas regarding C & D waste reuse / recycling:

- a. Establish utilization of C & D wastes in concrete and concrete based products by preparing standards.
- b. Quality control and certification.
- c. Need for popularizing products from C & D waste.
- d. R&D activities on continuous basis in tandem with manufacturing industry and users.
- e. Achieving environment protection through C & D waste utilization.
- f. Optimizing utilization pattern of traditional materials by interfacing the same with supplementary materials.

#### 4. Initiatives to promote recycling of C & D waste in India

India has provisions for the protection and improvement of the environment in its constitution. *“The demand for aggregates in 2007 has seen an increase by five percent, to over 21 billion tonnes, the largest being in developing countries for example India”*. (Study by Asian Institute of Technology (AIT), Thailand for some Asian countries included India, report released in May 2008). Construction accounts for nearly 65 per cent of the total investment in infrastructure and the trend is increasing, hence it is more important to know how to effectively manage C & D waste w.r.t. reuse & recycle. Some key initiatives on C & D waste management in India is given below :

- a. **Ministry of Urban Development (MoUD)** : Ministry of Urban Development vide circular dated June 28, 2012, directed States to set-up such facilities in all cities with a population of over 10 lakhs ( one million plus cities ) to establish environment friendly C & D recycling facilities ( reference base being the first C & D waste processing facility commissioned in Delhi in Burari model ). The MoUD report ‘Technical Aspects of Processing and Treatment of Municipal Solid Waste’, Swachh Bharat Mission (MoUD, 2016) also recognises the need for C & D waste management (Page 227).
- b. **Ministry of Environment, Forest & Climate Change (MoEF&CC)**: Environmental considerations have been integrated into all levels and in National Environment Policy of 2006, incorporation of the concept of 3Rs, is reflected in all the notified waste management rules (MSW, plastic, BMW, HW, e-wastes). A Report of the Committee to ‘Evolve Road Map on Management of Wastes in India (2010)’ highlights C & D problems, it recognised the utility of the waste and also acknowledged lack of data on the waste generation. The C & D Waste Management Rules, 2016 were notified by MoEF&CC vide notification no. G.S.R. 317(E) dated 29th March, 2016.
- c. **Bureau of Indian Standards (BIS)** : Under the Construction and Demolition (C & D) Waste Management Rules, 2016 Rule (11) under Duties of Bureau of Indian Standards (**BIS**) and Indian Roads Congress (**IRC**), ‘The Bureau of Indian Standards and Indian Roads Congress shall be responsible for preparation of code of

practices and standards for use of recycled materials and products of construction and demolition waste in respect of construction activities.

Role of Standards (BIS) in Utilization of C & D Wastes:

- i. It is the basis for acceptance
- ii. Wider use by increasing confidence in users consumers
- iii. Transfer of technology
- iv. Scope for review / amendment / revision / withdrawal
- v. Techno-legal - Part of regulatory documents
- vi. Techno-financial - Part of financing projects
- vii. Basis for training / capacity building and R&D

**IS 383 : 2016** Indian Standard COARSE AND FINE AGGREGATE FOR CONCRETE – SPECIFICATION (Third Revision) - Scope: This standard covers the requirements for aggregates, crushed or uncrushed, derived from natural sources, such as river terraces and riverbeds, glacial deposits, rocks, boulders and gravels, and manufactured aggregates produced from other than natural sources, for use in the production of concrete for normal structural purposes including mass concrete works.

These manufactured aggregates are of two types namely:

- i. Recycled Aggregate (RA) — It is made from C & D waste which may comprise concrete, brick, tiles, stone, etc.
- ii. Recycled Concrete Aggregate (RCA) – It is derived from concrete after requisite processing.

BIS IS: 383 is the principal driver, the standard for coarse and fine aggregates for use in concrete was revised in January, 2016, permitting use of recycled aggregates up to 25% in plain concrete, 20% in reinforced concrete of M-25 or lower grade and up to 100% in lean concretes of grade less than M-15.

**Table 3.1: IS 383 : 2016 Indian Standard COARSE AND FINE AGGREGATE FOR CONCRETE – SPECIFICATION (Third Revision)**

<b>C &amp; D waste BIS IS: 383</b>	<b>Plain Concrete</b>	<b>Reinforced Concrete</b>	<b>Lean Concrete (&lt; M15 grade)</b>	<b>Extent of Utilization</b>
Recycled Concrete Aggregate (RCA)	25%	20% (only upto M25 grade)	100%	as Coarse Aggregate
Recycled Aggregate (RA)	nil	nil	100%	as Coarse Aggregate
Recycled Concrete Aggregate (RCA)	25%	20% (only upto M25 grade)	100%	as Fine Aggregate

National Building Code (NBC- CED 46) of India 2005 : Part 11 of NBC 2005 on 'Approach to Sustainability'(Chapter 11), states that :

- i. Recycled Coarse Aggregate may be used in concrete for bulk fills, bank protection, base/fill of drainage structures, pavements, sidewalks, kerbs and gutters etc.
- ii. Up to 30 percent of natural crushed coarse aggregate can be replaced by the recycled concrete aggregate
- iii. This percentage can be increased up to 50 percent for pavements and other areas which are under pure compression specific to the standards and practices pertaining to construction of roads.'

d. Building Material & Technology Promoting Council (**BMTPC**):

The demand of building materials for 2021-22 has been reckoned by Building Materials and Technology Promotion Council (BMTPC) as cement 380 million tonnes, steel 50 million tonnes, bricks 600 billion numbers, aggregate 400 million cubic meters and timber 40 million cubic meters. Data show that there is a considerable amount of shortage of conventional and traditional building materials in India. BMTPC in 2016 released "Guidelines for utilization of C & D waste in construction of dwelling units and related infrastructure in housing schemes of the Government".

- e. Central Public Works Division (**CPWD**): The "Guidelines for Sustainable Habitat (March 2014 )" are based on reports of National Mission on 'Sustainable Habitat' by the Ministry of Urban Development (MoUD) and draft code on "Approach to Sustainability" as part of National Building Code (NBC 2005). The PART IV of the Guidelines for 'Sustainable Habitat' discusses 'Guidelines on reuse and recycling of Construction and Demolition (C & D) waste'. The guidelines on Construction and Demolition (C & D) waste addressed the building industry activity.

f. **CPWD & NBCC**

Approximately 25-30 million tonnes of C & D wastes is generated annually in India of which 5% is processed. To address utilization of C & D wastes, the Central Public Works Department (CPWD) and National Building Construction Company (NBCC) have recommended use of recycled portions of C & D wastes in their construction activities or if the

same is available within 100 km from construction site. Reference was made to the BIS 383 : 2016 standards.

g. Indian Road Congress (**IRC**) :

Under the Construction and Demolition (C & D) Waste Management Rules, 2016, Rule 11 indicates the role of Indian Roads Congress (**IRC**) w.r.t. preparation of code of practices / standards for use of recycled materials and products of construction and demolition waste in respect of road works.

## 5. Roadmap for C & D waste management - TIMELINES & TARGETS

In MOEF Performance Audit was conducted during July 2007 to December 2007 through document analysis, collection of responses to questionnaires, physical collection and testing of samples. Records and documents relating to the issue in the Performance Audit were examined and a key observation was:

*‘MoEF, in consultation with the states, should prepare an action plan for the reduction, reuse and recycling of waste with clearly defined numerical targets as well as timelines for the achievement of targets’.*

The following targets / timelines to be considered in C & D waste management, however in some cases the concerned dealing departments may revise them in consultation with experts and project proponents was C & D waste management is project specific.

A. C & D waste management - identification of bulk generators

Waste generators generating more than 20 tons or more in one day or 300 tons per project in a month are referred to as bulk C & D waste generators under C & D Waste Management Rules, 2016.

B. Roadmap for C & D waste management - Population of cities

The targets for commissioning processing facilities utilization of C & D waste for various cities are based on population under C & D Waste Management Rules 2016 as given below:

- i. Cities with population of 01 million and above
- ii. Cities with population of 0.5-01 million
- iii. Cities with population of less than 0.5 million

C. Roadmap for C & D waste management - TIMELINES

The TIMELINES for achievement of targets: The roadmap for implementation of Construction and Demolition (C & D) Waste

Management Rules, 2016: Under Schedule III Timeframe for Planning and Implementation of the C & D Waste Rules [See Rule 13] (see below)

**Schedule III [See Rule 13]**

**Table 3.2: Timeframe for Planning and Implementation**

<b>Compliance Criteria</b>	<b>Cities with population of &gt;=one million</b>	<b>Cities with population of 0.5-01 million</b>	<b>Cities with population of &lt; 0.5 million</b>
1. Formulation of policy by State Government	12 months	12 months	12 months
2. Identification of sites for collection & processing facility	18 months	18 months	18 months
3. Commissioning and implementation of the facility	18 months	24 months	36 months
4. Monitoring by SPCBs	3 times a year / in 4 months	2 times a year / once in 6 months	2 times a year / Once in 6 months

**D. Mandate for Utilization of C & D waste products - Numerical targets**

- i. Under C & D Waste Management Rules, 2016, the Rule (9) sub-rule (4) mentions that the 'Procurement of materials made from construction and demolition waste shall be made mandatory to a certain percentage (say 10-20%) in municipal and Government contracts subject to strict quality control.'
- ii. Incentivisation recommended under BMTPC Guidelines: (i) All Government constructions may be mandated to use at least 20 per cent of recycled C & D waste products. (ii) The tipping fee for delivery of C & D waste to the recycling plant, terms & conditions of civic body with the concessionaire may be designed to keep the price of C & D waste recycled products about 20 per cent lower than the corresponding conventional products.

**E. Incentivize On-site utilization of C & D wastes – numerical targets for C & D Plans**

- i. To address utilization of C & D wastes the Central Public Works Department (CPWD) and National Building Construction Company (NBCC) have recommended use of recycled portions of C & D wastes in their construction activities or if the same is available within 100 km from construction site. Reference was made to the

- BIS 383 : 2016 standards similar (or more stringent targets) to be proposed in other projects of both government and private sectors.
- ii. BMTPC guidelines : All renovation projects involving demolition, even in private sector, may be mandated to use at least 20 per cent of recycled C & D waste products.
  - iii. Under the C & D Waste Management Rules 2016 ‘*Exemption from the compliance of norms (Schedule I (14)), the following are exempted from the norms of pollution from **dust and noise** as mentioned above:*
    - *For construction work, where at least 80 percent construction and demolition waste is recycled or*
    - *Reused in-situ and sufficient buffer area is available to protect the surrounding habitation from any adverse impact.*

iv. Mandate use of C & D waste products

BMTPC Guidelines: As and when C & D waste recycling plant is commissioned at a city, it may be made mandatory for all construction activities to use a specified percentage of building construction materials manufactured from recycled debris.

However, as C & D waste generation is project specific, the State departments may propose practical and achievable reuse / recycle targets in consultation with project proponents.

F. Criteria for setting up C & D waste processing facilities – BMTPC Guidelines

Building Materials and Technology Promotion Council (BMTPC) in year 2016 released “**Guidelines for utilization of C & D waste in construction of dwelling units and related infrastructure in housing schemes of the Government**”. Regarding criteria for setting up



C & D waste processing facilities it was recommended that the Civic bodies wherein current waste generation > than 2000 tpd, to set up more than one plant for recycling of C & D waste.

**Figure 3.1: Indiscriminate dumping of C & D wastes along roadsides**

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## SECTION IV

### C & D Waste Processing

#### 1. Hierarchy in waste management

According to United Nations Environment Programme (UNEP), waste management includes both the components of prevention and disposal of waste. The waste management hierarchy can be traced back to the 1970s, when the environment movement started to criticize the practice of disposal-based waste management. It argued 'waste' that is made up of different materials should be treated differently as suggested:

- a. Reduce its production
- b. Explore its reuse and recycle potential
- c. Final disposal

The same is echoed in India's waste management handling Rules either directly or indirectly and it includes C & D wastes.

**Table 4.1: Waste management as per Hazardous Waste and Solid Waste Rules**

HW Rules, 2016 (Rule 4)	Solid Wastes Rules, 2016 (Rule 3)
<p>Hierarchy in waste management w.r.t. Responsibilities of the occupier for <u>management of hazardous and other wastes</u>- For the management of hazardous and other wastes, an occupier shall follow the following SIX steps, namely:-</p> <ol style="list-style-type: none"> <li>i. Prevention;</li> <li>ii. Minimization;</li> <li>iii. Reuse,</li> <li>iv. Recycling;</li> <li>v. Recovery, utilization including co-processing;</li> <li>vi. Safe disposal.</li> </ol>	<p>Definition <b>#57 "waste hierarchy"</b> means the priority order in which the solid waste should be managed by giving emphasis to prevention, reduction, reuse, recycling, recovery and disposal, with prevention being the most preferred option and the <u>disposal at the landfill being the least;</u></p>

According to this hierarchy, the priority of any country should be to extract the maximum practical benefits from products and to prevent and minimize the waste that is generated. Prevention is the most desirable waste management

option as it eliminates the need for handling, transporting, recycling or disposal of waste. It provides the highest level of environmental protection by optimizing the use of resources and by removing a potential source of pollution. Reducing waste includes any process or activity that avoids, reduces or eliminates waste at its source or results in reuse or recycling. The conventional method of waste disposal desirably to engineered sanitary landfill. Regarding C & D waste, prevention at source (encourage on – site management) is the preferable approach, since this reduces waste volumes to be subsequently handled & transported.

## 2. Importance of recycling C & D Wastes

- a. Re-use and recycling 'wastes' has been promoted in all the waste rules.
- b. It has been estimated that *'by 2013, 20 million square meters of office space will be completed in India. Half of the demand will come from the **metro-cities**. With the increasing demand for built spaces and scarcity of land, a trend of re-development projects is expected. With increased urbanization and increased housing demands, there will be a shortage of aggregates to the extent of 55,000 million cu.m in housing sector, where as the road sector requires an additional 750 million cu.m. of aggregates. This emphasizes the need of C & D waste management in India. The cost of construction materials is increasing enormously. In India, the cost of cement during 1995 was Rs. 125/kg and in 2012 the price increased to Rs. 330/bag. In case of bricks, the price was Rs. 0.66 per brick in 1995 and the present rate is Rs. 6 per brick in 2012. With the environmental hazards caused by excessive and illegal extraction of river sand, the mining of river sand was banned since April 1, 2012'* (Ref. Report (May 2008) report on practices in C & D waste management in some Asian (includes India) by AIT Thailand ).
- c. Recycling of C & D waste is important as it helps to reduce the dependence on natural resources and eliminates adverse environmental impacts ex. mining which is energy intensive activity. Recycling of C & D wastes has the additional advantage of controlling the quantum of C & D waste destined for disposal at landfills besides reducing transportation costs.
- d. When opportunities for reuse or salvage are exhausted, recycling is the next level. C & D waste materials that can be recycled include acoustical ceiling tiles, asphalt, asphalt shingles, carpets, concrete, drywall, fluorescent lights,

- land clearing debris (vegetation, stumpage, dirt), metals and metal alloys, structural steel, plastic film (sheeting, packaging), glass, wood etc.
- e. The list of reuse and salvage materials include appliances, bathroom fixtures, bricks, blocks, masonry stone, structural steel, cabinets, carpeting, ceiling tiles, timber and timber based boards, door and window frames and shutters, flooring tiles, stone tiles/platforms, insulation, landscaping materials, lighting fixtures, metal framing including for partitions and ceiling, panelling, pipes, antique moldings, accessories and hardware of furniture, PVC water tanks, roofing sheets used for garages, outdoor areas, fabric of tensile structures etc.
  - f. From recyclability, building materials can be specified which will encourage recycling of building materials. The list of recycled content building materials include carpet, floor mats, flooring, cellulose insulation, ceiling tile, ceramic/porcelain tile, concrete masonry units, countertop, ductwork, fences/posts, fibre board, fibreglass, insulation, pilings, roofing, structural steel, wallboard, asphalt, concrete, drainage or backfill aggregate.
  - g. C & D and other inert waste may be utilized for making bricks, pavement blocks, construction materials such as aggregates etc. There are several plants of various capacities in India to make bricks, paver blocks, aggregates, etc. out of such waste material.
  - h. The Hon'ble Court's intervention on the controversy over sand mining in some states has focused the need to explore options for recycle, reuse and substitute naturally sourced building material (example sand) hence the spotlight on C & D waste management.

See **ANNEXURE II**: Potential uses of C & D wastes

### 3. 'Sustainable Model' on C & D waste management

The key components of a 'Sustainable Model' on Construction and Demolition (C & D) Waste Management Rules, 2016 can include the following:

- i. Practical estimation of C & D waste generation
- ii. Identified sites and timely acquisition of land for development of integrated C & D processing facilities with necessary approval from local administration / civic bodies
- iii. Specifications / standards for recycled C & D waste products for quality acceptance
- iv. List out and mandate use of recycled products from C & D wastes

- v. Penalty - Landfill levy
- vi. Map water bodies in a city / region – encroachment of water bodies in cities for generating ‘land’ is a common practice observed several cities
- vii. Research on economically viable C & D recycling options
- viii. Awareness campaign – tools for sensitization of general public

Refer **ANNEXURE III**: Global practices of utilization of C & D wastes.

**Figure 4.1: Photographs of Construction & Demolition waste processing facility**



**Crushing units at Burari C&D waste recycling plant**  
Picture credits: IL&FS Pvt Ltd



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## SECTION V

### Existing Guidelines on C & D Waste Management

#### 1. GUIDELINES w.r.t. Building Sector - Building Materials and Technology Promotion Council (BMTPC)

The demand of building materials for 2021-22 has been reckoned by Building Materials and Technology Promotion Council (BMTPC) which are as follows: cement 380 million tonnes, steel 50 million tonnes, bricks 600 billion numbers, aggregate 400 million cubic meters and timber 40 million cubic meters. Data show that there is a considerable shortage of availability of conventional and traditional building materials in India. BMTPC in year 2016 released **“Guidelines for utilization of C & D waste in construction of dwelling units and related infrastructure in housing schemes of the Government”**.

The Guidelines pertain to building industry, salient features are given below:

- i. The BMTPC Guidelines acknowledges the importance of Schedule III on time - frame for planning and Implementation [See Rule 13] in the *C & D Waste Management Rules 2016 notified by MoEF&CC vide G.S.R. no. 317(E) dated 29th March, 2016*
- ii. Cities with population > one million : MoUD vide its circular dated 28th June, 2012 states all states to set up C & D waste recycling facilities in all cities with population of over 1 million.
- iii. Direction to Bulk generators : The agencies that generate C & D waste in bulk quantity to deliver the C & D debris at the recycling plant
- iv. Concession to bulk generators : The terms and conditions with the concessionaire and the fee levied on bulk producer of C & D waste are made available at a price at least 20% lower than corresponding materials from natural resources.
- v. Criteria for setting up C & D waste processing facilities : The Civic bodies wherein current waste generation > than 2000 TPD, to set up more than one plant for recycling of C & D waste.
- vi. Cities of population < one million : Sensitization and facilitation for re-use and recycling of C & D waste may also be taken up in cities of population less than 1 million to encourage such initiative. This is because mega cities and cities with million plus population account for only 23 per cent of urban population (Census 2011).

- vii. Non-bulk generators : Collection points be provided so that small quantity generator of C & D waste is not required to transport the debris to a distance more than 2.5 to 3.0 km.
- viii. C & D Collection centers : to be notified wherein small quantity generators of C & D waste can deliver the C & D debris. The system and arrangements for collection and supply of C & D waste to recycling plants may be worked out and defined in an unambiguous manner.
- ix. Mandate use of C & D waste products :
  - a. Mandate use of C & D waste products: As and when C & D waste recycling plant is commissioned at a city, it may be made mandatory for all construction activities to use a specified percentage of building construction materials manufactured from recycled debris.
  - b. Incentivize utilization of recycled C & D waste products: (i) All Government constructions may be mandated to use at least 20 per cent of recycled C & D waste products. (ii) All renovation projects involving demolition, even in private sector, may be mandated to use at least 20 per cent of recycled C & D waste products. (iii) The tipping fee for delivery of C & D waste to the recycling plant, terms & conditions of civic body with the concessionaire may be designed to keep the price of C & D waste recycled products about 20 per cent lower than the corresponding conventional products.
- x. Guidelines also proposes MANAGEMENT PLAN and MARKETING PLAN.
- xi. Annexure-I of BMTPC Guidelines provides: Construction and Demolition Waste Management Rules, 2016, Gazette of India, Part-II, Section-3, Sub-section (ii)], Ministry of Environment, Forest and Climate Change.

## **2. GUIDELINES *w.r.t.* Building Sector - Central Public Works Department (CPWD)**

CPWD's Guidelines for Sustainable Habitat (March, 2014): The Guidelines are based on reports of National Mission on Sustainable Habitat by Ministry of Urban Development (MoUD) and draft code on "*Approach to Sustainability*" as part of National Building Code (NBC 2005).

The above CPWD Guidelines has FOUR parts:

- a. Guidelines on Architectural Design and Layout.
- b. CPWD Sustainability index and Guidelines for materials.

- c. Guidelines for selection of equipment for Electrical and Mechanical Services for sustainable buildings.

**d. PART IV : Guidelines on reuse and recycling of Construction and Demolition (C & D) Waste**

*The amount of C & D wastes in India has been estimated to be 10 - 12 million tonnes annually and the proportion of concrete estimated as 23 to 35% of total waste. Considering 30 % percent of C & D wastes of 12 million tonnes as concrete, and 50 % of the concrete as coarse aggregate, the total available recycled concrete aggregate (RCA) in India is of the order of 1.8 million tonnes annually.*

(Ref. [http://cpwd.gov.in/Publication/Guideleines\\_Sustainable\\_Habitat.pdf](http://cpwd.gov.in/Publication/Guideleines_Sustainable_Habitat.pdf))

### **3. GUIDELINES *w.r.t.* ROAD Sector**

Under the Construction and Demolition (C & D) Waste Management Rules, 2016 Rule (11) under Duties of Indian Roads Congress (**IRC**) ‘The role of Indian Road Congress shall be specific to the standards and practices pertaining to construction of roads.’

As per literature surveys the urban waste that has been used significantly in road construction are ‘plastic wastes’. There is scant documentation regarding ‘authorised’ utilization of construction and demolition (C & D) waste in ROAD works, though it is being used in filling low lying areas.

Case studies :

- i. Construction of Rural Roads using C & D Waste Materials in Thanjavur, TN : Project includes addition of C & D waste in the sub-base layer of the road structure, the conventional laterite layer can be further strengthened – the quantity of utilization of laterite is reduced and thus leads to cost reduction in road laying (rural roads).
- ii. Delhi government advisory C & D waste utilization: The Delhi government has issued an advisory on the use of products made out of recycled C & D waste by the Public Works Department (PWD). All Delhi government agencies will be required to incorporate a clause in their tenders that mandates use of a minimum of 2 per cent recycled products from construction waste in all future contracts for building works and **10 per cent recycled products for road works**. (Ref. CSE **August 26, 2015**).

#### 4. Need for inclusion of abatement of adverse environmental impacts in C & D waste management GUIDELINES

An overview of the available Guidelines on construction and demolition (C & D) waste:

- i. The Building Materials and Technology Promotion Council (BMTPC) in 2016 released “**Guidelines for utilization of C & D waste in construction of dwelling units and related infrastructure in housing schemes of the Government**”. The construction and demolition (C & D) waste guidelines pertain to building industry.
- ii. The Central Public Works Department (CPWD), the PART IV: **Guidelines on reuse and recycling of construction and demolition (C & D) waste** is available in CPWD’s Guidelines for Sustainable Habitat (March 2014) – also address the building sector.
- iii. Road sector: There is not much documentation regarding ‘authorised utilisation’ of construction and demolition (C & D) waste in ROAD works, though it is being used in road works.
- iv. The 1<sup>st</sup> initiative by an ULB to address C & D wastes was done in September 2005, the Municipal Corporation of Greater Mumbai issued the Demolition and De-silting Waste (Management and Disposal) Guidelines.
- v. GUIDELINES on **Environmental Management** of C & D wastes :  
*‘The waste generation from construction should not only be minimized, but should also minimize the hazardous effect from the generated wastes’.*  
 (Source : CPWD Guidelines on C & D wastes )

CPCB ‘**Guidelines on Environmental Management of C & D Wastes**’ in compliance of Rule 10 sub-rule 1(a) of the C & D Waste Management Rules, 2016 and has attempted to address the issues pertaining to abatement of adverse environmental impacts arising from C & D waste management activities. These issues were not discussed in the Guidelines prepared by CPWD & BMTPC.

**Figure 5.1: Loss of C & D wastes - can be processed for reuse / recycle**



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## SECTION VI

### Introduction to Guidelines on Environmental Management of C & D Wastes

#### 1. Environmental degradation due to indiscriminate disposal of C & D wastes in cities

As per C & D Waste Rules (Rule 4 sub-rule (4)) there *should be no littering or deposition of construction and demolition waste so as to prevent obstruction to the traffic or the public or drains*. Instances of environmental degradation caused in cities due to indiscriminate disposal of C & D waste are listed below:

- i. Indiscriminate dumping of C & D wastes is a visually annoying and conveys poor enforcement of C & D waste in a city.
- ii. Due to lack of options for dumping in designated sites, low lying areas or abandoned quarries, vacant plots or sometimes even the outskirts of the city often become targets for dumping debris from the construction and demolition (C & D) of a city.
- iii. Often C & D is dumped on roadsides quietly by C & D waste generators.
- iv. Private contractors remove waste to privately owned, low-lying land for a price, or more commonly, dump it in an un-authorized manner along roads or other public land.
- v. C & D debris is being indiscriminately disposed along river banks or dumped in drains (nallahs) which hamper flow thereby encourage mosquitoes breeding due stagnant sewage / water or cause floods.
- vi. Cases often reported are C & D wastes are used to illegally fill up water bodies and wetlands around urban centres for 'creating land' for real estate development.
- vii. As C & D waste forms a part of solid waste it gets disposed in landfills, as this is the cheapest option of disposal of C & D waste.
- viii. C & D waste from individual households finds its way into nearby municipal bins and waste storage depots making the municipal waste heavy, thereby affecting efficiencies of waste management treatment options ex. composting or energy recovery.

#### 2. Environmental pollutants highlighted under C & D Waste Management Rules

In the Construction and Demolition Waste Management Rules, 2016 under **Schedule I** *Criteria for Site Selection for Storage and Processing or Recycling*

Facilities for construction and demolition waste [See Rule 7(1)] in the Table 6.1 the following environmental conditions have been listed:

**Table 6.1: Environmental conditions for C & D waste processing facility**

Sl. as per Schedule I	Recommendation on environmental issues
(7)	Processing or recycling site shall be fenced or hedged and provided with proper gate to monitor incoming vehicles or other modes of transportation.
(8)	The approach and or internal roads shall be concreted or paved so as to avoid generation of dust particles due to vehicular movement and shall be so designed to ensure free movement of vehicles and other machinery.
(9)	Provisions of weigh bridge to measure quantity of waste brought at landfill site, fire protection equipment and other facilities as may be required shall be provided.
(10)	Utilities such as drinking water and sanitary facilities (preferably washing/bathing facilities for workers) and lighting arrangements for easy landfill operations during night hours shall be provided and Safety provisions including health inspections of workers at landfill sites shall be carried out made.
(11)	In order to prevent pollution from processing or recycling operations, the following provisions shall be made, namely: <ul style="list-style-type: none"> <li>(a) Provision of storm water drains to prevent stagnation of surface water;</li> <li>(b) Provision of paved or concreted surface in selected areas in the processing or recycling facility for <u>minimizing <b>DUST</b></u> and damage to the site.</li> <li>(c) <u>Prevention of <b>NOISE</b> pollution</u> from processing and recycling plant:</li> <li>(d) provision for treatment of effluent if any, to meet the discharge norms as per Environment (Protection) Rules, 1986.</li> </ul>
(12)	Work Zone air quality at the Processing or Recycling site and ambient air quality at the vicinity shall be monitored.
(13)	The measurement of ambient noise shall be done at the interface of the facility with the surrounding area, i.e., at plant boundary.

As per C & D Waste Rules (Rule 4 sub-rule (4)) there should be no littering or deposition of construction and demolition waste so as to prevent obstruction to the traffic or the public or drains.

Under the C & D waste Rules 2016 '*Exemption from the compliance of norms (Schedule I (14))*', there are exemptions from the norms of pollution from **dust and noise**:

From the above it can be noted that C & D waste management / activities are dusty. The key pollutants that impact environment are **DUST & NOISE** besides other issues.

### **3. Effective C & D Waste Management – Opportunities for resource conservation & employment generation**

Some key benefits of efficient recycling and reusing of C & D waste are listed below:

- i. Reduces the pressure for utilization of new construction materials / need for further mining operations. Mining activity if not properly monitored degrades the environment
- ii. Reduction of demand for energy and water in manufacture of building materials from mined / natural resources (thereby reducing environmental impacts arising from mining, manufacturing and transportation)
- iii. Reduces quantum of transportation and disposal of C & D wastes to be handled when on-site utilization is encouraged.
- iv. Proper segregation of C & D waste avoids mixing with bio-degradable waste destined for MSW treatment facilities / landfills.
- v. Promotes options for reuse / recycle of products from C & D waste.
- vi. Roadsides and vacant plots could be freed from debris dumps thereby giving cities a better facelift.
- vii. Creates employment generation and market :  
C & D waste management activities (segregation, reuse & recycling being labour intensive activities, generate employment opportunities. The manufacturing & sale of recycled products creates a market this further opens further job opportunities.

### **4. Major operations in C & D processing plant**

Major operations in a recycling plant are sorting, crushing, classification/sieving and washing. Sorting can either be done manually or using advanced devices. Before feeding the material into the crusher, a grizzly can be used to ensure the maximum feeding size of debris for the respective crusher. Generally, jaw crushers or horizontal impact crushers are used to crush the debris. Size classification is performed using appropriate screens of required sizes. Washing is done to separate fine particles (silt and clay particles)

and this operation can be done combined with size classification. Sorted aggregates of specific sizes are stored separately. Noise is generated from equipment, though operations generate both noise & dust (Ref. Study by IIT Madras on C & D waste Management for Chennai).

## 5. Overview of Construction & Demolition activities

**Table 6.2: An overview of Construction & Demolition activities**

Features	Construction activity	Demolition activity	Remarks
Activity awarded by	Mainly by : Development Authority / Housing Board / Slum Clearance Board / Private company		All factors depend on the size of the project / encroachments to be removed
Activity executed by	Mainly outsourced to private contractors		
Key activity	Preparation of : concrete mixture (RMC) and concrete slabs is mechanized	Activity mostly mechanized to save time & reduce manual intervention however removable of recyclable components done mostly manually	Mechanization of activities is being employed for expediency & reduce manual intervention / uncertainty  Main Pollutants : NOISE & DUST generation
Nature of activity	Manual & mechanized	Manual & mechanized	
Quantum of waste generation per sqm	Low	Very high	
Fees / Rates for lifting wastes	<u>Demolition</u> : Rates for lifting demolition waste are fixed per cub.m or cubic feet by the concerned department after assessing the salvageable wastes ; Most local bodies have empanelled contractors for executing demolition activities		
Common equipment deployed at site	Movement of construction material – RMC, bricks, slabs , metal frames by pulley system or cranes	concrete breaker machines , JCBs, earth movers, pneumatic breakers	

Wastes that can be salvaged ( Re-usable / Recyclable wastes	<p><u>Construction</u> : Wastes also include surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.</p> <p><u>Demolition</u> : Refer Annexure II</p>	
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## 6. GUIDELINES on Environmental Management of C & D Waste Management in India

The four common environmental impacts from an activity that may affect its surroundings are:

- (a) Dust
- (b) Noise
- (c) Smoke
- (d) Odour (fugitive emission)

In case of C & D waste management, the key parameters which impact environment are **DUST & NOISE**.

The draft “*Guidelines on Environmental Management of C & D Waste Management in India (2017)*” has been prepared by CPCB in compliance of under *Duties of the Central Pollution Control Board under Rule 10 sub-rule 1(a)* of Construction and Demolition (C & D) Waste Management Rules, 2016 states ‘prepare operational GUIDELINES related to environmental management of construction and demolition waste management’. Part II is in compliance of the above-mentioned rule.



CPCB constituted an expert Committee to advise it on matters pertaining to Implementation of C & D Waste Management Rules, 2016 that includes development of the above Guidelines.

**Figure 6.1: Indiscriminate dumping of C & D waste results in choking drains**

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## SECTION VII

### Guidelines on Environmental Management of C & D Wastes – Noise Management

#### 1. Public complaints on NOISE generation

- a. Construction & demolition activities often generate noise / vibration which lead to complaints from the public despite the limited time frame over which it takes place. Complaints typically arise when the community has no clear understanding of the extent or duration of the activities. The above underscores the need for identification and assessment of noise generating activities. A timely assessment can aid operators / contractors to change the schedule of activities to reduce noise before the construction / demolition activities and during the process.
- b. Unacceptable noise is a nuisance and activities associated in C & D waste processing activity are associated with perceptible noise increases.
- c. Noise from a C & D waste management facility is considered an environmental nuisance if the construction / demolition activity is conducted outside the stipulated hours of operation or on holidays.
- d. Some health problems caused due to excessive exposure to undesirable noise levels include :
  - i. Sleep problems, insomnia & fatigue.
  - ii. Fall in speech communication, disturbance and diminished concentration thus adversely affecting job performance efficiency.
  - iii. Psychological disturbance including impaired hearing.

#### 2. Restrictions on noise from construction equipment - Noise Pollution (Regulation and Control) Rules, 2000

- i. The above Rules highlights various sources of noise that impact ambient noise levels in public places ex. industrial activity, construction activity, fire crackers, sound producing instruments, generator sets, loud speakers, public address systems, music systems, vehicular horns and other mechanical devices.
- ii. *An area comprising not less than 100 metres around hospitals, educational institutions and courts may be declared as silence area / zone for the purpose of these rules (Rule 3(5)).*

- iii. Rule 5A (3), Rule 7(1) and Rule 8 (1) (a) (ii) provides restrictions on noise from construction equipment.

### 3. Guidelines for NOISE mitigation in C & D operations

Key noise generating sources in C & D waste management activities are:

- a. Machinery deployed in construction / demolition activities
- b. Operation of Gensets ( Noisy )
- c. Vehicle movement

#### a. Noise abatement - Machinery deployed in construction / demolition activities

The guidelines to reduce noise levels:

- i. Define Construction / demolition periods / time / duration:  
Construction / demolition activities are restricted as per Noise (Regulation & Control) Rules 2000: Daytime: 6 am to 10 pm; Days of the week propose - Monday to Saturday.
- ii. Days operations are permissible : Permissible days of operation to be determined as per feasibility by concerned department of the State Govt.
- iii. Night ban: No C & D activity shall be undertaken within the premise.  
**Rule 5A** under Noise (Regulation & Control) Rules 2000 : Restrictions on the use of horns, sound emitting construction equipments and bursting of fire crackers:- sub rule (3) Sound emitting construction equipments shall not be used or operated during night time in residential areas and silence zones.
- iv. Define permissible noise levels under Noise (Regulation & Control) Rules 2000 at the boundary of the facility / operations: The ambient air quality standards in respect of noise for different areas / zones are specified in the Schedule to the rules. The State Government shall categorize the areas into industrial, commercial, residential or silence areas / zones for the purpose of implementation of noise standards for different areas. All development authorities, local bodies and other concerned authorities while planning developmental activity or carrying out functions relating to town and country planning shall take into consideration all aspects of noise pollution as a parameter of quality of life to avoid noise menace and to achieve the objective of maintaining

the ambient air quality standards in respect of noise. The noise levels in any area / zone shall not exceed the ambient air quality standards in respect of noise as specified in the Schedule.

The ambient noise levels as per CPCB's noise monitoring in many cities have exceeded the area zone norms due to 'mixed' land-use (non-compatible landuse), rapid urbanisation, increased vehicular movement due to which there is significant background noise. As C & D waste management requires deployment of heavy machinery there will be significant noise generation. As C & D waste management (includes recycling) demonstrates nature of 'industrial' activity, the concerned authority may stipulate noise limits in the range applicable to industry area zone under the Noise (Regulation & Control) Rules, 2000.

#### **SCHEDULE**

(See rule 3(1) and 4(1))

**Table 7.1: Ambient Air Quality Standards in respect of Noise  
Noise (Regulation & Control) Rules 2000**

Area Code and Category of Area / Zone	Day Time Limits in dB(A) Leq*
<b>(A) Industrial area</b>	<b>75</b>
(B) Commercial area	65
(C) Residential area	55
The above measurements are measured as LAeq which is the equivalent continuous (energy average) level (A-weighted).	

#### **b. Noise abatement - Genset noise**

Refer CPCB weblink on Genset standards: <https://cpcb.nic.in/genset-notifications/>

#### **c. Noise abatement - due to vehicle movement**

Due to vehicular traffic and material transportation within applied area. Abatement due to transport activities arising due to vehicles movement (operation of vehicles within, entering or leaving the site):

- i. Regular checking and maintenance of vehicles should be ensured (valid PUC)
- ii. For long distance transportation overhaul routes to be judiciously selected
- iii. No parking outside the plant premise
- iv. Earmarked areas for parking vehicles within premise
- v. Smooth movement of incoming & out going vehicles / trucks
- vi. Roads within premise tarred
- vii. Minimum use of horns
- viii. Operational Weigh bridge

**d. Noise abatement measures - Other areas**

There will be noise due to heavy earth moving machinery / crushing etc – depends on extent of mechanization & machinery Deployed. Machinery deployed in construction / demolition activities: The dominant source of noise from most construction equipment is the engine, usually a diesel, without sufficient muffling (acoustic provision).

- i. Noise control: To control the noise regular preventative maintenance of equipment to be carried out. regular and proper maintenance of noise generating machineries to avoid noise increase.
- ii. Periodical monitoring of noise will be done to adopt corrective actions wherever needed.
- iii. Ear plugs to be made available to workers during the operational hours.
- iv. Besides the operators prepare Noise Mitigation Plan (NMP) which addresses: management and mitigation strategies to prevent an environmental nuisance caused by construction / demolition / recycling activities impacting ambient noise levels.
- v. Besides operators prepare Noise Mitigation Plan (NMP) which addresses: management and mitigation strategies to prevent an environmental nuisance caused by construction / demolition / recycling activities impacting ambient noise levels.
- vi. Other initiatives include
  - Maintain records of equipment / machinery maintenance
  - Maintain records of monitored noise levels
  - maintain records of complaints on noise

- Comply with Consent conditions issued by State Pollution Control Boards / PCCs and concerned authority
- vii. Plantation activities: Plantation reduces propagation of dust and noise.

**Figure 7.1: Dumping of C & D wastes near drains in cities**



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## SECTION VIII

### Guidelines on Environmental Management of C & D Wastes – Dust Management

#### 1. DUST – environmental pollutant in C & D waste operations

The importance of controlling dust / fine particles from construction and demolition activities are:

- a. Dust emissions arising from C & D activities are an environmental nuisance both within the site and beyond the plant site / boundary.
- b. Dusts from various C & D activities release wide range of particle sizes and material types and can cause both serious health problems ranging from eye irritation, nose, mouth and respiratory system.

The larger heavier particles settle out of the air quickly and are hazard to the operators of plant and equipment and those in the immediate vicinity. The smaller particles (usually invisible) can be transported further in the air and can cause health hazards beyond plant premise ( several km away ).

#### 2. Guidelines for DUST mitigation in C & D operations

C & D debris management activities are dusty. Major dust generating sources in C & D management sites are:

- i. Loading & unloading activities: waste & C & D products
- ii. Incoming / outgoing vehicles
- iii. due to machinery used in C & D operations

##### a. Dust Noise abatement - Dust from loading / unloading operations

- i. Areas to be earmarked for delivery / deposition of C & D wastes
- ii. A sheet cover over the debris : over designated transport vehicles at waste processing sites
- iii. Sign boards to be displayed indicating do's & don'ts
- iv. Dust (fugitive emissions suppression systems in place) : Water sprinklers to be sprayed at all unloading points.
- v. For containing fugitive emissions (dust) also refer CPCB's report : Inventorization of Railway Sidings and Guidelines for their Environment Management (regarding loading / unloading activities )

[weblink :](https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvTmV3SXRIbV8yMTZfUmVwb3J0X0ludmVudF9SYWlsc2F5U2lkaW5ncy5wZGY=)

[https://cpcb.nic.in/openpdffile.php?](https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvTmV3SXRIbV8yMTZfUmVwb3J0X0ludmVudF9SYWlsc2F5U2lkaW5ncy5wZGY=)

[id=UmVwb3J0RmlsZXMvTmV3SXRIbV8yMTZfUmVwb3J0X0ludmVudF9SYWlsc2F5U2lkaW5ncy5wZGY=](https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvTmV3SXRIbV8yMTZfUmVwb3J0X0ludmVudF9SYWlsc2F5U2lkaW5ncy5wZGY=)

**b. Dust abatement - due to vehicle movement**

Transport movement: Dust abatement due to transport activities arising due to vehicles movement (operation of vehicles within, entering or leaving the site) can also include the following:

- i. Monitor movement of vehicles ( incoming / outgoing ) carrying C & D wastes or processed C & D waste products only
- ii. Transportation of C & D wastes should be done in covered vehicles to prevent fugitive dust emission.
- iii. Regular checking and maintenance of vehicles should be ensured (valid PUC)
- iv. For long distance, transportation routes of C & D wastes to be selected after discussion with local authorities
- v. Earmark areas for parking vehicles
- vi. Smooth movement of incoming & out going vehicles / trucks
- vii. Roads within premise tarred
- viii. Weigh bridge (to be operational)
- ix. Dust suppression systems in place (fugitive emissions): Dust from roads , regular water sprinkling on haul road will suppress the dust.

**c. Dust abatement – due to machinery used in C & D operations**

The C & D operations include: crushing / hammering etc from machineries deployed at site causing dust emissions from machineries / equipment. Water sprinklers is a good practice to suppress dust emission, similar practice is adopted in stone crushing operations. Under Environmental Protection Rules 1986, Schedule I Standards for emissions & discharge of environmental pollutants refer Sl#31 Stone crushers.

**d. Compliance of National Ambient Air Quality Standards (NAAQS)**

Vide Notification dated 18<sup>th</sup> November, 2009 the National Ambient Air Quality Standards (NAAQS) were revised, the standards w.r.t. particulate matter need to be complied with at the outer boundary of the facility.

### 3. Other dust abatement measures and safety issues

#### i. Water requirement

- a. Water will be required for dust suppression, for plantation and for drinking & domestic purpose.
- b. No fresh water requirement shall be made for dust suppression

#### ii. Use of 'treated waste water' (preferably) in sprinklers for dust suppression

- a. As ambient air quality standards need to be complied, any manmade intervention (like dust generating activities in C & D waste management ) need adopt necessary dust suppression measures ex. Water sprinklers using treated waste water (controlling the dust particles in the air is as important as minimizing water usage) . Site operators need to demonstrate both (a) control of 'visible' dust in particular besides (b) fine dust from activities within their premises.
- b. Treated waste water (sprinklers) to be used for washings / unloading areas / roads to suppress dust
- c. Import wherever feasible treated waste water from other STPs for dust suppression / sprinklers

#### iii. Waste water management

- a. Adopt ZERO effluent discharge system
- b. All wash down of vehicles and equipment to be done in designated areas and wash water be treated for reuse within plant for suppression of dust.

#### iv. Residual waste disposal

Solid waste generation / management in C & D waste operations - residues (C & D waste processing facility ) to be sent to nearest landfill in consultation with concerned authorities

#### v. Diesel use

Diesel use in equipment / gensets / vehicle movement generate emissions : Necessary pollution control measures to be adopted to reduce emissions

#### vi. Plantation / greenery (use of local species / low water uptake )

- a. Grow trees at the periphery - The plantation minimizes propagation of noise and also arrests dust
- b. To add to aesthetics : maintain water fountains , water bodies , landscaped areas wherever possible

- c. plantation helps to reduce fugitive of emission and noise control  
Under **Schedule I** Criteria for Site Selection for Storage and Processing or Recycling Facilities for construction and demolition Waste [See Rule 7(1)] : Sl#15 : A vegetative boundary shall be made around processing or recycling plant or site to strengthen the buffer zone.
- vii. Emergency facilities** : Equipment & Facilities: • Mobiles • Fire fighting equipment's • Emergency medical assistance
- viii. Protective gear** i.e. for dust and noise , goggles, helmet, face shield, hand gloves. First aid facilities to be in place
- ix. Training / Awareness program** : Training at all levels to staff on the following:
- Knowledge of machineries being used • Procedure for reporting emergencies • location and use of fire fighting equipment • knowledge of alarm system • Training in first aid
  - Environmental head to be aware of need for proper maintenance and operation of equipment / machineries etc and conduct environmental awareness / safety program to the workers, supervisory staff and contract workers periodically

**Figure 8.1: Continuous dumping of C & D wastes chokes city ponds / lakes**



**Table 8.1: National Ambient Air Quality Standards (NAAQS) –**  
[NAAQS Notification dated 18<sup>th</sup> November, 2009]

S. No	Pollutants	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (notified by Central Government)	
1	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	Annual*	50	20	1. Improved West and Gaeke 2. Ultraviolet Fluorescence
		24 Hours**	80	80	
2	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	Annual*	40	30	1. Modified Jacob & Hochheiser (Na-Arsenite) 2. Chemiluminescence
		24 Hours**	80	80	
3	Particulate Matter (Size <10µm) or PM <sub>10</sub> µg/m <sup>3</sup>	Annual*	60	60	1. Gravimetric 2. TOEM 3. Beta attenuation
		24 Hours**	100	100	
4	Particulate Matter (Size <2.5 µm) or PM <sub>2.5</sub> µg/m <sup>3</sup>	Annual*	40	40	1. Gravimetric 2. TOEM 3. Beta attenuation
		24 Hours**	60	60	
5	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	8 hours**	100	100	1. UV photometric 2. Chemi-luminescence 3. Chemical Method
		1 hours**	180	180	
6	Lead (Pb), µg/m <sup>3</sup>	Annual*	0.50	0.50	1. AAS/ICP Method after sampling using EPM 2000 or equivalent filter paper 2. ED-XRF using Teflon filter
		24 Hour**	1.0	1.0	
7	Carbon Monoxide (CO), mg/m <sup>3</sup>	8 Hours**	02	02	Non dispersive Infra Red (NDIR) Spectroscopy
		1 Hour**	04	04	
8	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	Annual*	100	100	1. Chemi-luminescence 2. Indophenol blue method
		24 Hour**	400	400	
9	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	Annual*	05	05	1. Gas chromatography based continuous analyzer 2. Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP)-particulate phase only, ng/m <sup>3</sup>	Annual*	01	01	Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m <sup>3</sup>	Annual*	06	06	AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m <sup>3</sup>	Annual*	20	20	AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

\* Annual Arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform interval.

\*\* 24 hourly 08 hourly or 01 hourly monitored values, as applicable shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

NOTE: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

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## SECTION IX

### Guidelines on Environmental Management of C & D Wastes – Other Issues

#### 1. Importance of processing C & D Wastes - Centralized Vs De-centralized

- a. SOLID WASTE (SW) RULES, 2016
  - i. Under SOLID WASTE (SW) RULES 2016, Rule 3 subrule 35. (Rule 3) "**processing**" of waste means *any scientific process by which segregated solid waste is handled for the purpose of reuse, recycling or transformation into new products;*
  - ii. Recognizing the major constraint in identifying land in cities for 'centralized' waste processing the **SW Rules 2016** has defined 'de-centralized' processing of solid wastes, under Rule 3 subrule 15. "**Decentralized processing**" means *establishment of dispersed facilities for maximizing the processing of biodegradable waste and recovery of recyclables closest to the **source** of generation so as to minimize transportation of waste for processing or disposal.*
- b. Application of Centralized Vs De-centralized processing of C & D wastes  
The above application is also being adopted in C & D waste recycling as given below:
  - i. Non-bulk generators : *Collection points be provided so that small quantity generator of C & D waste is not required to transport the debris to a distance more than 2.5 to 3.0 km ( Source : BMTPC Guidelines)*
- c. To address utilization of C & D wastes the Central Public Works Department (CPWD) and National Building Construction Company (NBCC) to use recycled portions of C & D wastes in their construction activities or if the same is available within 100 km from construction site. (Ref. Vide MoUD Circular dated 23.03.2016 directing State Works Dept to issue directions on use of C & D wastes as it is mandatory for use in CPWD & NBCC works)
- d. Decentralized of C & D waste may be inferred as 'on-site' Management of C & D wastes while centralized refers to the existing 'stand alone' C & D waste processing facility ex. facility of IL&FS in Burari, North Delhi.

## 2. Options in C & D waste management - Centralized Vs De-centralized processing / recycling facilities

As major components of Construction and Demolition (C & D) Wastes have the potential to be reused or recycled most of the city ULBs are gearing to set up integrated facilities of Construction and Demolition (C & D) waste collection and recycling facilities. Profitable use of recycled C & D waste minimizes the cost of managing such waste and requirement for valuable landfill space, besides giving employment opportunities to unemployed youth. It will also save on mining of natural resources and reduce transportation costs.

Three general ways to reuse C & D waste material in a building:

- a) reuse the structure (corresponding to renovation and design for adaptability)
- b) reuse the elements (corresponding to re-development) and
- c) recycle the material (corresponding to re-processing or re-cycling)

The three possible options that can be explored in C & D waste recycling (AIT study - 2008 )

- a) Mobile C & D waste recycling
- b) Semi-Mobile C & D waste recycling
- c) Stationary plant C & D waste recycling

A brief of the three options are given below:

- a. In the **Mobile** C & D waste recycling plant, the material is crushed and screened and ferrous impurities are separated through magnetic separation. The plant is transported to the demolition site itself and is suited to process only non-contaminated concrete or masonry waste.
- b. In the **semi-mobile** C & D waste recycling plant, removal of contaminants is carried out manually and the end product is also screened. Magnetic separation for removal of ferrous material is carried out. End product quality is better than that of a Mobile unit. These plants are not capable to process a of mixed demolition waste containing matter like metal, wood, plastic, etc.
- c. **Stationary C & D waste recycling plant plants** are equipped for carrying out crushing, screening as well as purification to separate the contaminants. (ex. the 1<sup>st</sup> C & D waste processing facility commissioned in Delhi in Burari and operated by IL&FS )

Options a & b options are often found to be practical for on-site operations as LAND availability and transportation in cities are MAJOR constraints besides public resistance to set up C & D facilities (Stationary plant C & D waste recycling).

### 3. Guidelines on Setback distances ( or buffer zone distance)

In view of the above discussion on the application of Centralized Vs De-centralized processing of C & D wastes there needs to be a practical approach in applying setback distances. The purpose of a buffer zone is to minimize the potential environmental impacts from the operation of a construction and demolition debris management & disposal activities. The Table 9.1 summarizes conditions under TWO waste rules - regarding 'buffer zone distance' and the importance of assessment on a case to case basis as the sites are regional specific

- a. Construction & Demolition (C & D) Waste Management Rules, 2016
- b. Solid Waste (MSW matter) Management Rules, 2016

**Table 9.1: Buffer area provisions under TWO Waste Management Rules**

Under C & D Waste Management Rules, 2016	Under Solid Waste (MSW matter) Management Rules, 2016
<p>(a) Under <b>Schedule I</b> Criteria for Site Selection for Storage and Processing or Recycling Facilities for construction and demolition Waste [See Rule 7(1)]</p> <ul style="list-style-type: none"> <li>• SI(6) A buffer zone of no development shall be maintained around solid waste processing and disposal facility, exceeding <b>20 tons or more in one day or 300 tons per project in a month of installed capacity</b>. This will be maintained within the total area of the C &amp; D waste processing. <i>The buffer zone shall be prescribed on case to case basis by the local authority in consultation with concerned State Pollution Control Board.</i></li> </ul>	<p>(a) <b>Rule 3</b> <u>Definitions</u> , Sub-rule 7 : <b>“buffer zone”</b> means zone of no development to be maintained around solid waste processing and disposal facility, exceeding <b>5 TPD of installed capacity</b>. This will be maintained within total and area allotted for the solid waste processing and disposal facility.</p> <p>(b) <b>Rule 11. Duties of the Secretary-in-charge, Urban Development in the States and Union territories.-</b></p> <ul style="list-style-type: none"> <li>• <b>Sub rule (j)</b> facilitate establishment of <u>common</u> regional sanitary land fill for a group of cities and towns falling within a distance of <u>50 km (or more)</u> from the regional facility on a cost sharing basis and ensure professional management of such sanitary landfills;</li> <li>a. <b>Sub rule (l)</b> <u>notify buffer zone</u> for the solid waste processing and disposal facilities of <u>more than five tons per day</u> in consultation with the State Pollution Control Board; and</li> </ul> <p>(c) <b>Rule 14. Duties of Central Pollution Control Board.-</b>The</p>

<ul style="list-style-type: none"> <li>Sl (14) The following projects shall be <u>exempted</u> from the norms of pollution from dust and noise as mentioned above: (a) For construction work, where <u>at least 80 percent</u> construction and demolition waste is recycled or reused in-situ and (b) sufficient buffer area is available to protect the surrounding habitation from any adverse impact.</li> <li>(15) A vegetative boundary shall be made around Processing or Recycling plant or site to strengthen the buffer zone.</li> </ul>	<p>Central Pollution Control Board shall <b>sub-rule (h)</b> publish guidelines for maintaining buffer zone restricting any residential, commercial or any other construction activity from the outer boundary of the waste processing and disposal facilities for different sizes of facilities handling <u>more than five tons per day</u> of solid waste;</p> <p>(d) Under <b>SCHEDULE I</b> [see rule 15 (w),(zi), 16 (1) (b) (e), 16 (4)] Specifications for Sanitary Landfills (A) Criteria for site selection.-</p> <p>Sl (ix) A buffer zone of no development shall be maintained around solid waste processing and disposal facility, exceeding <u>five Tonnes per day</u> of installed capacity. This will be maintained within the total area of the solid waste processing and disposal facility. The buffer zone shall be prescribed on case to case basis by the local body in consultation with concerned State Pollution Control Board.</p>
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Buffer zone area around C & D waste processing facility :

- The Environmental Protection Authority (EPA) has guidance which recommends separation distances between industrial activities and sensitive land uses. These buffers aim to protect sensitive land uses from unacceptable impacts on health and amenity that may result from industrial activities, emissions and infrastructure. The document, titled **Guidance for the Assessment of Environmental Factors, Separation Distances between Industrial and Sensitive Land Uses**, No. 3, EPA, June 2005 (web link [http://www.epa.wa.gov.au/docs/1840\\_GS3.pdf](http://www.epa.wa.gov.au/docs/1840_GS3.pdf)). This guidance document recommends a separation distance of **1000m** between premises that crush or screen C & D waste. It is important to note that the separation distance is not intended to represent an absolute separation distance and does not replace the need to demonstrate best practice in the prevention and minimization of emissions at prescribed premises. It is however, a useful tool to factor into impact assessments.
- It is widely recognized due to rapid urbanization maintaining 1000m separation distance due to mixed land-uses (non-compatible landuse) is a major challenge for transporting C & D waste for processing and subsequently transporting recycled C & D products. Siting needs to meet the

demand of the recycled products to make the processing wastes sustainable and economically sustainable.

- c. Separation distances are necessary in order to minimize potential environmental conflicts between non-compatible land uses particularly due to rapid urbanization witnessed across the cities wherein the number of cities entering the million plus population bracket is on a steady rise. Besides adopting noise and dust control abatement measures, the following restrictions be considered regarding setback distances from the outer boundary of the such C & D facilities shall not be located within the following receptor setback distances:
- i. 200 metres from any Industrial/Commercial land use property /
  - ii. 100 m from bank or high water mark of any watercourse or wetland / pond / lake
  - iii. 150 metres of the right-of-way boundary of a public highway;
  - iv. 50 metres from any other adjacent property;
  - v. The Coastal Regulation Zone (CRZ) notified under the Gazette of India, Extraordinary, Part-II, Section 3, Sub-section (ii) of dated the 6th January, 2011) COASTAL REGULATION ZONE Notification Ministry of Environment & Forests (Department of Environment, Forests and Wildlife). Prohibited activities under the CRZ Notification are include – *‘Dumping of city or town wastes including construction debris, industrial solid wastes, fly ash for the purpose of land filling and the like and the concerned authority shall implement schemes for phasing out any existing practice, if any, shall be phased out within a period of one year from date of commencement of this notification.’*
  - vi. Location of sites within the flood plains - Due rapid urbanisation across the country in the last two decades, the relevant data of past 50 years may be used to justify establishing a C & D waste processing site
  - vii. Any **other Notifications** under Central/ State Governments;
    - Notified Areas- Reserved Forests, Nature Protection, Sanctuary, Wild life Sanctuary, Eco-sensitive zones, Historical Monuments, places of tourist interest, etc.
    - State Policy / Plan
    - Master Plan of Development Authorities

Under the C & D waste management rules the threshold processing facility has been defined as ‘exceeding 20 tons or more in one day or 300 tons per project in a Month of installed capacity’ – (bulk C & D waste generator). As impacts are location specific , the above setback distances may be revised by the concerned local authority in consultation with SPCBs / PCCs.

Under **Schedule I** of the Rules Criteria for Site Selection for Storage and Processing or Recycling Facilities for construction and demolition Waste [See Rule 7(1)] at Sl#6 : The buffer zone shall be prescribed on case to case basis by the local authority in consultation with concerned State Pollution Control Board.

- d. Other environmental factors that be considered are :
- i. Site within compatible land uses
  - ii. provide all weather access roads
  - iii. providing access to a year round suitable cover to the C & D waste material
  - iv. no water collection within premises during rains / washings
  - v. providing controlled access to the site
  - vi. providing a appropriate fencing and sign board outside at site (do's / don'ts)

#### 4. Inspection of C & D waste load

C & D waste processing facility shall inspect each waste load before unloading debris and shall accept only C & D Debris - no industrial waste shall be accepted at the C & D facility unless otherwise approval received from concerned authority. No untreated industrial effluent / wastes are to be accepted at the facility.

#### 5. C & D waste processing facility – ‘ORANGE’ category activity

Consent to establish under section 21 of Air (Prevention & Control of Pollution) Act 1981 and under section 25/26 of Water (Prevention & Control of Pollution) 1974 has been treated as an **ORANGE** category project by Delhi Pollution Control Committee (DPCC) under the Product / activity : Processing / recycling of construction & demolition waste debris (malba) to IL&FS, the operator that

established the 1<sup>st</sup> C & D waste processing facility in Delhi. The categorization as ORANGE be considered by all SPCBs/PCCs to ensure harmonization when dealing with C & D processing activity. In Office Memorandum (OM) vide letter dated June 10, 2014 MoEF&CC on - Applicability of EIA 2006 Notification as amended from time to time for *standalone Construction & Demolition Waste processing facility* – the notification &CC mentions that this activity does not attract the provisions of the EIA 2006 Notification however the said activity will be governed by the consent mechanism under Air (Prevention & Control of Pollution) Act 1981 and under Water (Prevention & Control of Pollution ) 1974.

## **6. GOOD PRACTICES proposed: Constraints Vs opportunities in establishing C & D waste management facilities**

Though city residents & NGOs have come forward to support waste management (ex. MSW) initiatives by ULBs however when it comes to identification of land / acquisition of land for WASTE MANAGEMENT, project proponents face severe public protests. A number of civic bodies in various cities have initiated the process of establishing C & D waste processing facilities in cities. Key requirements include appropriate site location, availability of necessary land , road infrastructure besides provision of weigh-bridge , storage area etc. In most of the cities C & D wastes are being dumped haphazardly in low lying or sometimes reaching landfills.

Some constraints Vs opportunities in establishing C & D waste management facilities w.r.t. adopting and listed below:

### a) C & D waste management facilities w.r.t. population :

Under C & D Waste management Rules 2016 , Schedule III [See Rule 13] provides the Timeframe for Planning and Implementation of the rules based on population as follows :

- Cities with population of  $\geq$  one million
- Cities with population of 0.5 - 01 million
- Cities with population of  $<$  0.5 million

Ministry of Urban Development vide circular dated June 28, 2012, directed States to set-up such facilities in all cities with a population of over 10 lakh. (One million plus cities) to establish environment friendly C

& D recycling facilities. Refer **ANNEXURE I** Initiatives C & D waste management in 69 cities.

b) Quantification of C & D waste generation / processing is Region - specific:

Local bodies need to ascertain the quantum of C & D waste generation and its potential utilization taking into account the existing development / infrastructure projects and proposed regional plans w.r.t. compatible landuses in consultation with SPCBs/PCCs also. Referral documents for assessment of quantum of C & D waste generated / processed and the necessary land requirement in a region can be studied in the following documents under the C & D Waste Management Rules, 2016:

- i. under [Rule (7)(2)] : The operator of the facility as specified shall apply in **Form I** for authorization from State Pollution Control Board or Pollution Control Committee.
  - ii. under [Rule (8)(2)]: State Pollution Control Board or Pollution Control Committee shall grant 'authorization' to construction and demolition waste processing facility in **Form-III** as specified under these rules after examining the application received in **Form I**;
  - iii. under [Rule (7)(3)] : The operator of the facility shall submit the annual report to the State Pollution Control Board in **Form II**.
  - iv. under [Rule (8)(3)] : Annual Report to be submitted by the State Pollution Control Board / Committees in **Form - IV** to CPCB.
- c) Land acquisition :

Generally LAND disposal is 1<sup>st</sup> resort in waste management - Land disposal of solid wastes has been the oldest practice. Disposal of wastes by landfilling or uncontrolled dumping of commingled (mixed) wastes has been observed in many cities. Under SOLID WASTE RULES, 2016 Rule #3 subrule definition #57 - "**waste hierarchy**" it mentions that *prevention of waste should be the most preferred option and the disposal at the landfill being the least.* However in general 'land disposal' is 1<sup>st</sup> resort in waste management in several cities. The 'landfill' as a facility / destination for urban wastes is being gradually revised as availability of suitable land in cities is a major challenge besides the awareness of recyclability 'waste' has been growing over the years. The ULBs are

recognizing the importance of 'integrated' waste management i.e. processing cum disposal of wastes.

d) Using closed / capped landfills in cities – Land availability option

In cities where landfills have been capped and have complied with necessary closure conditions, the land can be used for installation C & D waste processing facility.

e) Bulk generators

Under the C & D Waste Rules w.r.t. quantum of waste generation addresses those sources generating more than **20 tonnes** or more in one day or **300 tonnes** per project in a month of installed capacity.

Criteria for setting up C & D waste processing facilities (BMTPC Guidelines) : The Civic bodies wherein current waste generation **> 2000 TPD**, to set up more than one plant for recycling of C & D waste.

f) Non-bulk C & D waste generators

The BMTPC Guidelines has suggested the following:

- i. Non-bulk generators: *Collection points be provided so that small quantity generator of C & D waste is not required to transport the debris to a distance more than 2.5 to 3.0 km*
- ii. C & D Collection Centers: *to be notified wherein small quantity generators of C & D waste can deliver the C & D debris. The system and arrangements for collection and supply of C & D waste to recycling plants may be worked out and defined in an unambiguous manner.*

As 'waste' generation is location / region specific the local bodies to identify sites for receiving / processing intermittent non-bulk C & D wastes.

g) Practice waste minimization 1<sup>st</sup> & waste disposal to be last option

- i. Management of C & D waste should reflect the waste management hierarchy - waste prevention and minimization being the first priority succeeded by reuse and recycling. Waste prevention should be noted at all stages of project duration, waste disposal to be last option.
- ii. Sorting and restoring the C & D waste at the source is a GOOD PRACTICE. The C & D waste may be segregated into following categories:

- for structures for buildings
  - for use in road works
  - building parts that could be salvaged
- iii. Another level of segregation can be done among materials such as plastic, cables, glass, wood and plaster board.
- iv. Some recommendations for use of recycled C & D wastes include
- (a) To source the recycled concrete aggregates from sites being re-developed for use in the same site.
  - (b) For a given structure, only one type of manufactured coarse aggregate and one type of manufactured fine aggregate to be used.
- v. Road projects : Utilization of bitumen and asphalt can be recycled in roads projects in consultation with concerned agencies.
- vi. Besides cost savings, use of on-site crushers to produce such aggregates can reduce the transportation impacts of a project associated with the removal of C & D waste from site and the transportation of quarried aggregates.
- vii. During site clearance / re-modelling / renovation / re-development works, there are opportunities for beneficial re-use and re-cycling of the demolition materials. The subsequent use of recycled materials in reconstruction works also reduces the quantities of waste which would need to be disposed in landfill sites.
- viii. Excavated spoil/topsoil can be carefully set aside and also be used creatively in the landscaping or for construction of embankments and screening / noise abatement berms in civil engineering projects.
- h) Encourage on-site C & D waste processing/ reuse
- India's first plant (stationary) for recycling of C & D waste was commissioned during 2009 at 10 acre site at Burari, Jahangirpuri in North Delhi by Infrastructure Leasing & Financial Services (IL&FS) under an agreement with North Delhi Municipal Corporation. A 'fixed' recycling plant requires higher volumes of demolition waste to justify high investment in complex, screening and separation systems, which are necessary to process mixed demolition waste. It has to be located in a place, where large volume of waste is easily transported and there is a market for recycled products.

Full advantage to be taken of all opportunities for the reuse of construction materials. Explore utilization of material generated for reuse on site or salvaged for subsequent reuse to the greatest extent possible, disposal should be considered as a last resort. Need to maximise the efficient use/reuse of materials. Encourage setting up C & D waste recycling facilities on-site ex. Operate mobile or semi mobile C & D waste processing plants , this will reduce volume of waste to be transported.

i) Hazardous wastes / toxic wastes streams

Hazardous wastes / toxic wastes streams should be kept separately from other wastes to avoid further contamination, their disposal to be done in consultation with SPCBs/PCCs under HW Management Rules 2016. Examples of C & D waste that are classified as hazardous include lead, tars, adhesives, sealants , asbestos . The concerned authorities shall examine the DEMOLITION PLAN submitted by the applicant to assess if there are any HW streams.

j) Market for utilization of C & D waste products

The capital investments involved in equipment and facilities required for recycling the materials is significant, unless the market for use recycled aggregate is developed, economic viability of C & D waste processing facilities would be a challenge.

k) Mandate utilization of C & D waste products in Govt & private projects

The building construction products manufactured from C & D wastes have been reported to satisfactorily meet necessary requirements of compressive strength and water absorption. The end products such as kerb stones, paving blocks of different shape, size and colour, hollow and solid blocks, manufactured sand etc. have been tested in laboratories and found to be satisfactory. Use of fine aggregates and coarse aggregates manufactured by recycling of C & D waste has also been validated scientifically for part replacement of natural aggregates

The Rule (9) sub-rule (4) mentions that the *‘Procurement of materials made from construction and demolition waste shall be made mandatory to a certain percentage (say 10-20%) in municipal and Government contracts*

*subject to strict quality control.* Private developers to be also encouraged to mandate a percentage for procurement of materials made from construction and demolition waste subject to strict quality control.

- i. Efficient building ratings like GRIHA, LEED etc. can explore factoring the utilization of C & D wastes in their computations
- ii. Since CPWD, BIS and NBCC promote :
  - Maximum of 20% replacement of aggregates in RCC with RCA (recycled concrete aggregates)
  - 100% replacement of aggregates with RCA in light or non-load bearing lean concrete
 Need to incentivize use of C & D waste products in both - structural and non-structural applications.
- iii. Cost savings up to 15% can be observed for finished products such as paving blocks made from recycled aggregates ( Ref. Market study on C & D waste utilization in Ahmadabad. : GIZ & Development Alternatives (DA ).

#### l) Architectural initiatives

Though there may be several such instances however two examples are highlighted wherein creativity has been used to reuse C & D waste in buildings ex.

- a. A school building in Rajkot, designed by Ahmedabad-based architect Surya Kakani, has been built from the debris of the Bhuj earthquake.
- b. The Institute of Rural Research and Development (IRRAD) building in Gurgaon has innovatively recycled and utilised its own construction waste in the building.

#### m) Drainage

As per C & D Waste Rules (Rule 4 sub-rule (4) ) there should be no littering or deposition of construction and demolition waste so as to prevent obstruction to the traffic or the public or drains. A proper drainage plan ensures planned disposal of water during rains / floods. Rivers to be protected from littering or deposition of construction and demolition waste to prevent obstruction to river flow.

Case study : Flood in Mega city - Mumbai ((Ref. Mumbai Marooned: An Enquiry into Mumbai Floods 2005) July 26, 2005 has gone down as a day no Mumbaikar will forget. A record 994 mm (37.2 inches) of rain

within 24 hours (75% of the downpour – 709 mm — fell in a five-hour period between 2.30 pm and 7.30 pm), widespread flooding and the loss of lives and property, the virtual shutdown of the city for two days (more in some areas)..... At least one-third of the surface area of the city is believed to have been flooded.

On issues pertaining to waste management the following were the observations:

- i. *According to official BMC figures, Mumbai generates about 7,800 tonnes of solid waste daily. However, this figure is probably significantly inflated by the contractor lobby. NGOs working in the field of solid waste management state that no one seems to have an accurate figure of the amount of solid wastes generated in Mumbai. (page 30).*
- ii. *Construction debris, silt etc forms a substantial part (2,000 tonnes per day according to the BMC) of waste. This debris is also used to illegally fill low-lying land and mangroves. Construction debris such as concrete, cement and brick rubble can be used as road base and crushed and re-used to cast concrete blocks etc. These practices are legally mandated and in place in many developed countries. The recycling of construction debris should be legally mandated in Mumbai, and if necessary the required infrastructure (crushers etc) can be set up by tapping funds from the construction lobby (page 70).*
- iii. *'Dumping of waste (solid or effluent) in rivers and nallahs must be punishable by a fine and/ or imprisonment. Within a year, the BMC should provide adequate waste disposal facilities to these areas or relocate those it cannot provide services to (page 75).*
- iv. *Un-authorized construction on open Nallas and alongside Nallas and drains has narrowed the width of the drains thus reducing their clearing capacity; Drain choking incidents were reported at 14 places.*

(Ref. Mumbai Marooned: An Enquiry into Mumbai Floods 2005).

n) Equipment deployment:

Different types of sorting devices and screens are used for separating contaminants from end-product and grading the recycled product in

various grain sizes. Vibrating screens, star screens or disc-separators are used for removal of impurities. Other existing equipment include jaw crushers and impact crushers etc are used to suit the requirements of recycling and processing of C & D waste.

o) Green belt plantation

Green belt has been recognized as an effective shield to abate pollution mainly activities generating DUST. The report 'Guidelines for Developing Greenbelts' (CPCB March 2000) is a referral document to identify native species w.r.t. climatic zones. The criteria for selection for development of Green Belt include:

- i. The plant species should be fast growing & native to the region
- ii. They should have thick canopy cover preferably perennial.

p) Enforcement

Though stringent laws are being formulated by the civic bodies their enforcement however needs to be further strengthened Roads sides, vacant plots and river banks could be freed from debris dumps and drains freed from clogging if C & D waste is properly disposed /managed.

q) Training programs - Awareness of recycling C & D wastes

The BMTPC Guidelines highlights that for cities of population < one million : *Sensitization and facilitation for re-use and recycling of C & D waste may also be taken up in cities of population less than 1 million to encourage such initiative. This is because mega cities and cities with million plus population account for only 23 per cent of urban population (Census 2011).*

SPCBs / PCCs and ULBs to conduct sensitization training programs highlighting good practices and economic viability of establishing C & D waste recycling operations that are being implemented in various cities across the country.

## 7. C & D waste management - case study DELHI

All C & D plants coming up under the Public Private Partnership (PPP) model. Key features are given below:

- i. Delhi generates approximately 3000 MT of C & D waste per day as per IL&FS
- ii. Country's 1<sup>st</sup> C & D processing facility – Civic body: North Delhi Municipal Corporation (NMC); City – DELHI; Brief highlights: Site is at Burari, Jahangirpuri in North Delhi in collaboration with MCD developed by private operator IL&FS Environmental Infrastructure & Services Ltd (IEISL) to demonstrate the potential of a scientifically managed process in collection and recycling of C & D waste in Delhi of capacity 500 TPD. Plant commissioned during 2009 on a 10 acre site at Burari, Jahangirpuri in North Delhi.
- iii. **Delhi East Kidwai Nagar, New Delhi** : 2<sup>nd</sup> C & D facility set up by private operator M/s Enzyme India Pvt. Ltd. in year 2014 on PPP model with 100% by back by NBCC with a capacity of 150 TPD
- iv. **Delhi -Shashtri Park, New Delhi** : C & D plant in Delhi at Shastri Park in East Delhi at 2.5 acre site by private operator IL&FS, The facility will get mixed C & D waste from 15 designated sites of East Delhi.
- v. Civic body South Delhi Municipal Corporation (SDMC): The proposed plant at Ghumanhera in West Delhi will have a capacity to process some 500 tonnes of C & D waste per day.
- vi. Public Works Department (PWD): proposes to set up THREE C & D debris recycling plants in Delhi, each of installed capacity of 150 TPD. Two plots of two acres each identified at Tikri Kalan, Libaspur and near Nizamuddin Bridge, another plant being proposed at Kapashera.
- vii. C & D charges :
  - a. EDMC: There is a challan of up to Rs. 5,000/- for dumping waste illegally.
  - b. SDMC: imposition processing fee of Rs 205 per MT at time of sanctioning building plan and Rs 225 per MT for lifting waste. The transportation charges would be increased by 10% every two year.
- viii. Delhi government advisory C & D waste utilization  
The Delhi government has issued an advisory on the use of products made out of recycled C & D waste by the Public Works Department (PWD). All Delhi government agencies will be required to incorporate a

clause in their tenders that mandates use of a minimum of 2 per cent recycled products from construction waste in all future contracts for building works and 10 per cent recycled products for road works. (CSE **August 26, 2015**)

## 8. Initiatives in C & D waste management in 69 cities

Based on literature survey the data on C & D waste management initiatives taken by some urban local bodies in some major cities have been compiled in **ANNEXURE I**: Initiatives in C & D waste management in 69 cities, the data demonstrates that cities are recognizing the importance of processing C & D wastes hence many cities have stipulated collection charges and introduced penalties for illegal disposal.

Salient features of Enforcement as derived from Annexure I is summarized:

- a. C & D waste processing facilities are being established on PPP mode (private operators).
- b. Land acquisition for C & D waste processing  
Most of the cities are either in the final stages of acquiring site for establishing C & D waste processing site or have identified alternate sites which need to be evaluated for economic sustainability.
- c. Intermediate collection points – Some ULBs have declared designated sites for dumping C & D debris.
- d. Public services :
  - i. Many ULBs have announced Helpline toll free number for citizens for reporting illegal dumping of C & D waste provided
  - ii. Complaints by email: ex Chandigarh - Citizen can also be emailed at *bi\_mcc@chdut.nic.in*. MCC has vouched that *malba* will be collected within 48 hours of the complaint.
  - iii. Timing for C & D (*malba*) collection - Collection of *malba/ C & D waste* between 9 am and 5 pm. (Chandigarh)
  - iv. Call centre number 040-21111111 and 'My GHMC App' (Greater Hyderabad)
- e. C & D waste lifting charges :  
Different criteria have been used to setting fees for lifting C & D wastes ex.

- i. 0.5 to 0.75 tonnes - Rs. 500/- ; between 0.75 tonnes to 1.50 tonnes - Rs. 1,000/- ; between 1.50 tonnes to 3 tonnes – Rs 2,000 ; between 3 to 6 tonnes - Rs. 4,000/-
  - ii. For a structure > 80 sq m area Rs. 50/- per month ; Rs. 100/- charged for 120 sq. metre. Beyond 120 sq. metre, Rs. 200/- ; Stacking of construction/ demolition debris Rs. 1500/- per tractor trip Rs. 3000/- per truck trip
  - iii. To collect a quantity of *malba* between less than 25 cubic feet (cu ft) - Rs. 50 ;for > 25 cu ft Rs. 2 per cu ft extra is charged.
  - iv. GHMC user fee Rs 360 per tonne (Greater Hyderabad).
- f. Penalty range:
- i. Dumping of *malba* in front of houses, parks or at any other public space has been banned and any violation has a penalty of Rs. 500. (Chandigarh)
  - ii. A fine of Rs. 1,000 will be levied on those mixing construction debris with wet waste
  - iii. The civic body (PMC) has put a ban on dumping waste in open spaces, riverbeds, canals and quarries. Imposition fine of Rs 25,000 on such illegal dumping (Pune MC).
  - iv. The Corporation imposes a fine of Rs. 2000/-. (Chennai)
  - v. Penalty for not removing C & D waste , fine of Rs. 5000/- per tonne (Thiruvanthapuram).
  - vi. Penalty: For not delivering Construction and Demolition waste in a segregated manner as specified there is a fine of Rs. 1000/- & For dumping of construction and demolition waste in non-designated areas there is a fine of Rs 5000/-. (Shillong)
  - vii. Penalty: Violating norms while transporting construction debris , penalty Rs 5,000 (Ghaziabad)
  - viii. Penalty: Construction debris dumping on road, public places and open places = Rs. 1000/-. (Amravati)
  - ix. Penalty: Failure in lifting C & D Waste (at least one truck load) from designated location OR Failure in transportation of C & D Waste to the processing facility per instance processing facility per instance OR Failure to lift claimed C & D Waste from the generator within 48 hrs. per instance – fine Rs 2000 ; Failure to lift C & D Waste dumped on roadside within 24 hrs. per instance –

fine . Rs. 1000/- ; Non-performance of any other obligation under the Agreement for a continuous period of 7 (seven) days fine Rs. 10000/-. (Vijayawada)

- x. Penalty: for of C & D wastes ; fine ranging from Rs. 100/- to Rs. 500/- (Surat)

**Figure 9.1: Loss of C & D wastes “loss of opportunities to reuse / recycle**



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**ANNEXURE I : Initiatives in C & D waste management in 69 cities**

Sl.	City	C & D waste generation TPD/Mt	Status of C & D waste processing / disposal facility
1.	<b>Panaji, Goa</b>	25 TPD	The Integrated Solid Waste Management (ISWM) system has been proposed for the year 2040, for a total capacity of 100 Tonnes per day. Out of 100 TPD, around 33 TPD of construction debris could be processed. C & D waste will be collected separately, zone-wise, for transportation to Integrated Solid Waste Management (ISWM) Facility for processing and land filling.
2.	<b>Coimbatore, TN</b>	850 TPD	<u>Civic body</u> - Coimbatore City Municipal Corporation (CCMC) estimates that of the 850 TPD wastes generated about 150 TPD is construction debris. CCMC has proposed a processing plant of capacity 100 TPD
3.	<b>Madurai</b>	295.26 TPD	<p><u>Civic body</u> - Madurai city corporation has earmarked places four locations for disposal C &amp; D wastes :</p> <ul style="list-style-type: none"> <li>• at Vilankudi old dumping yard at ward 1 for zone 1</li> <li>• at Masthanpatti (Palathottam) at ward 29 for zone 2</li> <li>• at Gatelock Road at ward 71 for zone 3 and</li> <li>• at Vellaikal dumping yard at ward 94 for zone 4.</li> </ul> <p>Earlier C &amp; D waste was being dumped along the river at Thirumalairayar Padithurai on south bank and Mathichiyam on the north bank.</p> <p><u>C &amp; D lifting charges</u> : Corporation fixed clearing charges for 0.5 to 0.75 tonnes - Rs. 500/- ; between 0.75 tonnes to 1.50 tonnes - Rs. 1,000/- ; between 1.50 tonnes to 3 tonnes - Rs 2,000 ; between 3 to 6 tonnes - Rs. 4,000/-</p> <p><u>Helpline</u> toll free number for citizens for reporting illegal dumping of C &amp; D waste provided</p>
4.	<b>Nagpur</b>	1.120 TPD	<u>Civic body</u> : Nagpur Municipal Corporation (NMC) lifts, transports and dumps construction and demolition material at Bhandewadi dump yard engaging services of private operator m/s Kanak Resources Management Ltd.
5.	<b>Nashik</b>	-	<p><u>Civic body</u> : NMC has identified sites for dumping C &amp; D debris.</p> <p>The responsibility for disposing the construction debris is with the waste generators and not with the Corporation.</p> <p>Inert processing unit of capacity 50 TPD comprises of mechanical sieve and air density separator, main purpose plant is to recover the construction material from the waste and or</p>

			utilizing for construction activities to minimize landfill burden.
6.	<b>Ahmedabad</b>	295.26 TPD	<u>Civic body</u> : Ahmadabad Municipal Corporation (AMC) : <b>m/s</b> DNP Infrastructure Pvt. Ltd. has been awarded operations of a 300 TPD C & D waste processing plant 5 acres of land on PPP mode for 30 years. It is operational from October, 2013 , involved in collection & transportation of such waste from 24 designated locations.
7.	<b>Indore</b>	100 TPD	<u>Civic body</u> : Indore Municipal Corporation (IMC) :Proposes to award 75 TPD C & D waste processing facility on four acres of land in Devguradia region for period of 15 years.
8.	<b>Ujjain</b>	30 TPD	C & D wastes dumped at MR-V Agar Road trenching ground located about 4 km from the city.
9.	<b>Agartala</b>	123 TPD	<u>Civic body</u> : Agartala Municipal Council , though no separate facility for C & D waste however existing 250 TPD involved in Solid waste processing plant (composting and scientific landfill) w.e.f. March 2014
10.	<b>Kanpur</b>	189 TPD	C & D wastes processed for making bricks , HBTI Kanpur is associated with project.
11.	<b>Varanasi</b>	24.6 TPD	<u>Civic body</u> :Varanasi Nagar Nigam transporting C & D waste to Karsda / Ramana land fill ,where the waste is used as covering material for municipal solid waste (MSW) at the site. Proposes to address C & D waste separately.
12.	<b>Bhubaneswar</b>	196.8 TPD	<u>Civic body</u> : <u>Bhubaneswar Municipal Corporation</u> (BMC) proposes to set up a C & D <u>waste processing plant</u> on public-private-partnership mode. The civic body has identified two sites for dumping of waste - Patia and Kargil Basti. <u>C &amp; D charges</u> : For a structure > 80 sq m area Rs. 50/- per month ; Rs. 100/- charged for 120 sq. metre. Beyond 120 sq. metre, Rs. 200/- ; Stacking of construction/ demolition debris Rs. 1500/- per tractor trip Rs. 3000/- per truck trip <u>Disposal</u> : Regional Landfill of non bio-degradable and inert material site at Brajrajnagar/ Jharsuguda.
13.	<b>Salem</b>	85 TPD	<ul style="list-style-type: none"> <li>Large quantity non-hazardous waste (e.g. C &amp; D waste / flyash) disposed is being off in monofills (i.e. receiving one type of waste). The City Municipal Corporation has appointed a Bangalore-based private consultant to prepare a project report for the integrated solid waste management scheme.</li> </ul>
14.	<b>Thanjavur</b>	Total MSW + C & D waste =	Construction of Rural Roads using C & D Waste Materials: By addition of C & D waste materials in the sub-base layer of the road structure, the conventional laterite layer of rural

		~ 60 TPD	road formation can be further strengthened; quantity of utilization of laterite is reduced and thus leads to cost reduction in road laying. • Dumpsite near STP site - Thepperaumanallur.
15.	<b>Vellore</b>	1.37 TPD	- Total (MSW + C & D)
16.	<b>Kochi</b>	25.2 TPD	- Total (MSW + C & D)
17.	<b>Sholapur</b>	44.3 TPD	- Total (MSW + C & D)
18.	<b>Aurangabad</b>	85.6 TPD	-
19.	<b>Mumbai – (Kalyan-Dombiwali)</b>	~650-700 TPD	As of 2014, Mumbai generates over 10,000 metric tonnes of waste per day - 8,000 metric tonnes of MSW and 2,000 metric tonnes of debris.
20.	<b>Thane</b>	600 TPD	-
21.	<b>Chandigarh</b>	3.5 TPD	<p><u>Civic body</u> : Municipal Corporation Chandigarh (MCC), MCC has also identified 18 low-lying areas for dumping of debris. Facility – MSW facility in Dadu Majra , after compressing waste it is then covered with a layer of C &amp; D about 2 feet thick.</p> <p><u>C &amp; D charge</u> - Collection of <i>malba/ C &amp; D waste</i> between 9 am and 5 pm. MCC has fixed amounts for <i>malba</i> collection.</p> <p>To collect a quantity of <i>malba</i> between less than 25 cubic feet (cu ft) - Rs. 50 ;for &gt; 25 cu ft Rs. 2 per cu ft extra is charged.</p> <p>The rate at which MCC is charging to the residents, is hardly one third of the total cost incurred by the municipality. But the municipality does not mind spending this amount, as its aim is to make citizens conscious of cleanliness and contribute towards keeping their city clean.</p> <p><u>Penalty</u>: Dumping of <i>malba</i> in front of houses, parks or at any other public space has been banned and any violation has a penalty of Rs. 500.</p> <p><u>Mobile helpline number</u> MCC provide number 3274154 to book complaint for <i>malba</i> removal. Complaints can also be emailed at <i>bi_mcc@chdut.nic.in</i>. MCC has vouched that <i>malba</i> will be collected within 48 hours of the complaint.</p>
22.	<b>Jaipur</b>	150 TPD	The state government proposes set up C & D Waste Processing Plants in 29 cities including

			state capital, Jaipur. In Jaipur a private company proposes to set up recycling facility capacity 300 TPD on 6 acres of land near the existing dumping stations.
23.	<b>Lucknow</b>	693.8 TPD	Disposal of C & D waste and inert material used as covering material in Telibagh Bhatha Maidan area.
24.	<b>Bengaluru</b>	1,000-3,000 TPD	<u>Civic body</u> : Bruhat Bengaluru Mahanagara Palike (BBMP) - The BBMP proposes to put up the C & D waste processing facilities in PPP mode in three abandoned quarry areas in Kannur, Mallasandra and Anjanapura , each with capacity to process 750 TPD he facility to BBMP.  <u>Penalty</u> : A fine of Rs. 1,000 will be levied on those mixing construction debris with wet waste
25.	<b>Pune</b>	250-300 TPD	<u>Civic body</u> : PMC : The C & D waste in Pune constitutes 40% of MSW in Pune. District administration has allocated 2 acres of land at Wagholi for C & D waste processing. <u>Penalty</u> : The civic body (PMC) has put a ban on dumping waste in open spaces, riverbeds, canals and quarries. Imposition fine of Rs 25,000 on such illegal dumping.
26.	<b>Bhopal</b>	30-40 TPD	-
27.	<b>Hyderabad</b>	5000 TPD	<u>Civic body</u> : The transport wing deploys for Greater Hyderabad Municipal Corporation (GHMC) vehicles for collection and transportation of C & D waste from bulk generators. Proposed disposal sites - setting up of a decentralised C & D waste plants at four identified locations, Fathullaguda, Jeedimetla, Kothwalguda and Mallapur. <u>C &amp; D charge</u> - GHMC user fee Rs 360 per ton. Public service : call centre number 040-21111111 and 'My GHMC App'.
28.	<b>Chennai, Tamil Nadu</b>	1143 TPD	<u>Disposal</u> : <ul style="list-style-type: none"> <li>• According to Chennai Corporation- East, there is one dumping yard present in each of the 15 zones of the city.</li> <li>• There are two dumping sites in Chennai Perungudi and Kodungaiyur where, a large amount of C &amp; D waste is being dumped.</li> <li>• Cooum, Adyar, Buckingham Canal and Pallikaranai marshland are popular sites where construction debris is dumped illegally.</li> <li>• <u>C &amp; D waste disposal designated areas</u> : Sathangadu (Tiruvottiyur), CPCL junction (Manali), GNT Road Sembiam Sengundram Road (Madhavaram), Kodungaiyur (Tondiarpet), Moolakothalam crematorium (Royapuram), Otteri disposal yard (Thiru Vi Ka Nagar), Devi Karumariamman Nagar crematorium (Ambattur), 1st Avenue of Gajalakshmi</li> </ul>

			Colony (Anna Nagar), Karaneeswarar Pagoda Street Recycling Plant (Teynampet), Anna Avenue (Kodambakkam), Ramavaram Bharathi Road (Valasaravakkam), MGR Nagar recycling plant (Alandur), Near Kotturpuram Railway Station (Adyar), Perungudi dumpyard (Perungudi) and Gangai Amman Koil Street Extension in Karapakkam (Sholinganallur). . <ul style="list-style-type: none"> <li>• <u>Penalty:</u> The Corporation imposes a fine of Rs. 2000/-.</li> </ul>
29.	<b>Thiruvananthapuram</b>	15.84 TPD	<u>Penalty:</u> For not removing C & D waste , fine of Rs. 5000/- per tonne.
30.	<b>Patna</b>	1000-1200 Total (MSW + C & D)	<u>Civic body:</u> Patna Municipal Corporation (PMC) - Site at Bairia , area of 80 acres approx. under PMC has been used for open dumping for last 2-4 years. Waste collected from across the 72 wards, as well as part of the waste collected from the three ULBs of Danapur, Phulwari and Khagaul is presently reaching the designated dump site at village Bairia on the Gaya road
31.	<b>Kolkata</b>	4837 TPD Total (MSW + C & D)	C & D wastes recycled in road construction in Kolkata: The recycling process is best suited to roads with light traffic.
32.	<b>Guwahati</b>	0.864 TPD	-
33.	<b>Shillong</b>	2.76 TPD	<u>Disposal:</u> proposed use at landfill site at Mawiong to cover as a layer (earth) for covering compacted garbage. <u>Penalty:</u> For not delivering Construction and Demolition waste in a segregated manner as specified there is a fine of Rs. 1000/- & For dumping of construction and demolition waste in non-designated areas there is a fine of Rs 5000/-.
34.	<b>Mumbai</b>	2500 tonnes/ day	In September 2005, the Municipal Corporation of Greater Mumbai issued the Demolition and Desilting Waste (Management and Disposal) Guidelines but due to lack of enforcement, demolition debris still ended up in dumping grounds. The Youth for Unity and Voluntary Action (YUVA) and City Industrial Development Corporation (CIDCO then came up with a <u>decentralized</u> solution for recycling debris into construction material such as bricks and interlocking pavers. <u>Penalty:</u> For not delivering Construction and Demolition waste in a segregated manner as specified there is a fine of Rs. 1000/-
35.	<b>Srinagar, J&amp;K</b>	530 TPD	Srinagar Municipal Corporation has one dumping site at Syedpora Achan spread over 540

		(MSW + C & D waste )	kanals of land
36.	Ludhiana	17.57 TPD (MSW + C & D waste )	-
37.	Amritsar	600 tonnes/ day MSW	Propose to use C & D waste in making roads.
38.	Faridabad (M.Corp.)	26.52 TPD	Propose to set up C & D waste recycling facility near Kachra Chowk on the Gurgaon-Faridabad Road
39.	Shimla	99 TPD	C^D waste recycling plant proposed in Darni ka Bagicha area.
40.	Jodhpur	386 TPD	The existing trenching site is located at Dabi Road Nanta nearly 10-15 km from the city having area of 52.28 ha, there is a dumping site at Keru (15 km away from the city Jodhpur). <u>Penalty:</u> Selling of segregated/ un segregated waste and Usable/recyclable items from the MSW - Upto Rs 25,000/- per incident ; Waste found on road side/ on road Rs .500/- per incident
41.	Dehradun	13.5 kg/day	<u>Civic body</u> - Dehradun Nagar Nigam (DNN) The existing SW disposal site is located at Dateda Lakhond on Sahashradhara Road , distance of 7 km from the town.
42.	Ghaziabad		Density of construction waste in MSW samples = 1663.47 Kg/cu m <u>Penalty:</u> Violating norms while transporting construction debris , penalty Rs 5,000
43.	Agra	49.1 TPD	-
44.	Meerut	27.3 TPD	<u>Recycle of C &amp; D waste</u> - Left over cement and mortars, cement concrete blocks, aggregate, sand and other inorganic material is recycled and reused as Granular Sub Base (GSB) layer of pavement. Earth rendered surplus from the excavation is utilized in the embankment works.
45.	Allahabad	31.01 TPD	<u>Recycle C &amp; D wastes</u> - bricks of C & D in road works & river banks works
46.	Amravati	81.6 TPD	<u>Penalty:</u> Construction debris dumping on road, public places and open places = Rs. 1000/-.
47.	Greater Visakhapatnum Municipal Corporation	80 TPD	<u>Civic body GVMC</u> - C & D waste processing unit at Visakhapatnam under PPP model. The state government has accorded permission to the Swachha Andhra Corporation to float Request for Proposal for 80 TPD capacity recycling plant near Kapuluppada.

	(GVMC)		
48.	Vijaywada	70 TPD	<p>Unauthorised disposal of C &amp; D debris on Bandar Canal bund near Krishna Lanka , Kanaka Durga Varadhi and Eluru canal near Sitaramaraju bridge C &amp; D waste processing unit at Vijaywada under PPP model.</p> <p><u>Penalty:</u> Failure in lifting C &amp; D Waste (at least one truck load) from designated location OR Failure in transportation of C &amp; D Waste to the processing facility per instance processing facility per instance OR Failure to lift claimed C &amp; D Waste from the generator within 48 hrs. per instance – fine Rs 2000 ; Failure to lift C &amp; D Waste dumped on roadside within 24 hrs. per instance – fine . Rs. 1000/- ; Non-performance of any other obligation under the Agreement for a continuous period of 7 (seven) days fine Rs. 10000/-.</p>
49.	Kozhikode	50 Kg/ day	Civic body - Municipal Corporation Kozhikode , propose to set up facility under PPP mode
50.	Thrissur	1.55 TPD	-
51.	Malappuram	14 TPD	-
52.	Kannur	15 TPD (MSW + C & D waste )	-
53.	Kollam	1.55 Metric tonnes/ day	Kollam MC has a disposal site (4 ha) at Kureepuzha 6 Km from the city centre functioning since 2002. Civic body- Kollam
54.	Tiruchirappalli	14.5 TPD	Civic body - Trichy Corporation passed a resolution to control the indiscriminate dumping of C & D wastes on roads, riverbanks, canals and ponds. The corporation plans to utilize the C & D wastes in brick-making, with the technical support from IIT –Chennai
55.	Asansol	45 TPD	Civic body – AMC , two waste disposal sites under the AMC at Kalipahari (27 acres ) and other at Samdihi, Burnpur (area 03 acres) – mainly MSW , operator M/s. GEPIL
56.	Jamshedpur	30.93 TPD	Jamshedpur proposes to recycle a major part of its solid waste. Delhi-based consultant m/s Tetra Tech India Private Ltd to install a integrated solid waste management = compost plant + a sanitary landfill (disposal facility for inert wastes) + C & D waste processing facility to produce eco-friendly bricks. Site – at Khairbani on the city's outskirts.
57.	Dhanbad	26.93 TPD	<u>Penalty:</u> Dhanbad Municipal Corporation has decided to impose a fine of Rs 1,000 per day with immediate effect on citizens found guilty of dumping C & D wastes on public roads or dustbins.

58.	<b>Ranchi</b>	25.92 TPD	<b>Recycle C &amp; D waste:</b> Brick making is used in processing C & D wastes
59.	<b>Raipur</b>	16.97 TPD	C & D waste segregated & sold balance used for filling low lying areas.
60.	<b>Dispur</b>	0.864 TPD	Most of the C & D debris used for the filling of low areas. Government has allotted a landfill site of 40 acres at Baragaon, 20 km away from Guwahati for composting MSW 100 TDP and dumping of C & D waste
61.	<b>Aizwal</b>	0.3 TPD	<u>Civic body</u> - Aizwal Municipal Corporation (AMC) has identified four low lying locations to dump the C & D wastes to develop flat land.
62.	<b>Kohima</b>	2.7 TPD	<u>Civic body</u> - KMC ; disposal site about 8 Kms away from the city on NH- 39 for MSW
63.	<b>Vasai Vihar City</b>	219 TPD	<u>Civic body</u> -Vasai Virar Municipal Corporation (VVMC)
64.	<b>Gandinagar</b>	36.50 TPD	Civic body –GMC ; C & D waste is transported by private contractors waste to privately owned low-lying land at a price
65.	<b>Surat</b>	1400 TPD (MSW & CDW)	For C & D the civic body has allotted 12,000 sq.m. land at Kosad for dumping. Helpline – toll -free number '1800-212-2829' for collection of C & D wastes. Penalty: for of C & D wastes ; fine ranging from Rs. 100/- to Rs. 500/-
66.	<b>Vadodara</b>	27.80 TPD	-
67.	<b>Rajkot</b>	100 TPD	<u>Civic body</u> -RMC taken initiative to collect and dispose C & D waste separately and setup a C & D processing facility of 100 TPD
68.	<b>Jabalpur</b>	26.60 TPD	Civic body - Municipal Corporation Jabalpur on PPP mode
69.	<b>Gwalior</b>	210 TPD (MSW + CDW)	Disposal site - Kedarpur.

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**ANNEXURE II: POTENTIAL USES OF C & D WASTES**

<b>C &amp; D waste</b>	<b>Potential use of C &amp; D wastes</b>
<b>Concrete</b>	<p>The utilization of recycled aggregate is particularly very promising as 75 per cent of concrete is made of aggregates.</p> <p><u>Opportunity:</u> The enormous quantities of demolished concrete can easily be recycled as aggregate and used in concrete. Research &amp; Development activities have been taken up all over the world for proving its feasibility, economic viability and cost effectiveness.</p> <p>Work on recycled concrete has been carried out at few places in India by CBRI and CRRI, but waste and quality of raw material produced being site specific, tremendous inputs are necessary if recycled material has to be used in construction for producing high grade concrete.</p>
<b>Bricks</b>	<p>If deconstructed properly, bricks can be reused after removal of mortar. Broken bricks can be used for refilling or for manufacturing debris paver blocks or debris blocks.</p>
<b>Stone</b>	<p>Stone can be reused for plinth formation, masonry construction, landscape purpose, ledges, platforms, window sills, coping etc. depending upon the form of available stones.</p>
<b>Timber</b>	<p>Timber elements from deconstructed building may have aesthetic and antique value.</p> <p><u>Opportunity :</u> Whole timber arising from construction and demolition works can be utilized easily and directly for reused in other construction projects after cleaning, de-nailing and sizing.</p>
<b>Plywood and other timber based boards</b>	<p>Plywood and other timber based boards can be either reused for interior works in new construction or it can be recycled for manufacturing of timber based boards.</p>
<b>Gypsum</b>	<p>In India, over 10 about of waste gypsum such as phosphor-gypsum, fluoro-gypsum etc., are being generated annually.</p> <p><u>Opportunity :</u> Plaster developed from this waste gypsum has showed improved engineering properties without any harmful effect. Phosphor-gypsum and lime sludge can be recycled for manufacture of Portland cement, masonry cement, sand lime bricks, partition walls, flooring tiles, blocks, gypsum plaster, fibrous gypsum boards, and super-sulphate cement.</p>
<b>Metals &amp; metal alloys-</b>	<p>Ferrous Metals are the most profitable and recyclable material. Scrap steel is almost totally recycled and allowed repeated recycling. Structural steel can be reused as well as 100% steel can be recycled to avoid wastage at construction site.</p>

	<p><u>Advantage</u> : Generally sold to a scrap metal dealer at a specified price. Metals like scrap iron can be mixed with the virgin metal in the foundry. In India more than 80% scrap arising is recycled.</p>
<b>Non ferrous metal</b>	<p>The main non ferrous metal collected from construction and demolition sites are aluminium, copper, lead and zinc .</p> <p><u>Opportunity</u> : In India aluminium and copper are recycled and are valuable resources</p>
<b>Debris</b>	<p>Construction debris can be recycled to manufacture paver blocks which can be used in light traffic areas and masonry blocks. Other uses of processed debris include use in lean concrete for leveling purpose, as mortar for masonry, as bedding mortar for pavement tiles and used for land filling materials is comparable with new materials.</p> <p><u>Opportunity</u>: Market potential on an average in Pune city estimates about 40 crores of bricks in a year.</p>
<b>Composite materials</b>	<p>The plastic wastes are best for recycling if these materials are collected separately and cleaned. Recycling is difficult if plastic wastes are mixed with other plastics or contaminants. Plastic may be recycled and used in products specifically designed for the utilization of recycled plastic, such as street furniture, roof and floor, PVC window noise barrier, cable ducting, panel.</p> <p><u>Constraint</u>: The third largest consumer of composite materials is <u>construction sector</u>, automobile and aeronautics being first two largest consumers. Composite materials like thermoplastics are not only using non-renewable resources, they are non-biodegradable products. Thermoplastics (Polycarbonate, polyethylene, polypropylene, PVC etc.) can be recycled, but recycling involves high costs, whereas thermosets (Epoxy adhesives) are difficult to recycle. The lack of adequate markets, high recycling cost, and lower quality of the recyclates are the major commercialization barriers in recycling of composite materials. PVC-U sourced mostly from window and door fabricators is being recycled into wiring accessories and cable management systems including skirting and trunking. Composite materials can be down-cycled.</p>
<p>Ref :  <a href="https://www.researchgate.net/publication/256677141_construction_and_demolition_waste_management_with_reference_to_case_study_of_Pune">https://www.researchgate.net/publication/256677141_construction_and_demolition_waste_management_with_reference_to_case_study_of_Pune</a></p>	

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**ANNEXURE III: GLOBAL PRACTICES OF UTILIZATION OF C & D WASTES** (Ref. BMTPC Guidelines)

<b>City / country</b>	<b>C &amp; D Waste utilization</b>
Ontario, Canada	A target fixed to divert 50% of the C & D waste from landfills by 2000 using 1987 waste production levels as baseline.
Alberta, western province of Canada.	Re-use/recycling of C & D began in late 2008.
Nova Scotia, Canadian Province	Halifax Regional Municipality is (2011) diverting more than 80% of C & D waste from storage in landfill to reuse and recycling.
Netherlands, Sweden, Denmark, Austria, France and Switzerland	recycle 80 to 90% of their C & D waste.
Tokyo	Enforced the construction waste recycling law in 2002. The current rate of recycling of waste concrete is more than 99% (Source: Tokyo Metro Waste Management web site).
In Australia - cities of Sydney and Melbourne.	The reuse and recycling is more than 80%
UK	The Olympic Stadium in London used 30% recycled concrete in its construction. United Kingdom regulations explicitly permit use of recycled and manufactured aggregates in non structural framework without any discrimination in relation to aggregate from natural resources. 28% of aggregates used in UK are recycled C & D waste aggregate.
USA, cities like New York.	<ul style="list-style-type: none"> <li>• Have no place for landfill for disposal of C &amp; D waste, as was practiced a decade ago.</li> <li>• does not have any C &amp; D waste disposal facility, it exports C &amp; D waste to neighbouring states by paying a tax Construction sites use C &amp; D waste in renovations or new construction</li> </ul>
California , USA	Reusing / recycling about 60% of C & D waste.
Portland, Oregon USA	More than 2/3 <sup>rd</sup> of C & D waste is getting recycled / reprocessed.
Minnesota, USA	About 70% of demolition debris and 60% construction waste are being salvaged, recycled and reprocessed.
Singapore	Reusing / recycling 980% C & D waste (land constrained area ).
Indonesia and Malaysia	Reusing / recycling about 50 to 60% of C & D waste.
Portugal	reuse/recycling of C & D waste is less than 40%
Hong Kong	C & D waste utilization is 60%.
Korea	Effective cycling rate is 36 per cent, with a target of increasing this to 45 per cent by 2016.

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**ANNEXURE IV****Criteria for site selection of C & D waste processing facility (SCHEDULE I)**

(Note: numerals in brackets as per Notification of C & D waste Rules 2016)

- i. (4) The processing or recycling shall be large enough to last for 20-25 years (project based on-site recycling facilities).
- ii. (5) The processing or recycling site shall be away from habitation clusters, forest areas, water bodies, monuments, National Parks, Wetlands and places of important cultural, historical or religious interest.
- iii. (6) A buffer zone of no development shall be maintained around solid waste processing and disposal facility, 20 tons or more in one day or 300 tons per project in a month of installed capacity. This will be maintained within the total area of the solid waste processing and disposal facility. The buffer zone shall be prescribed on case to case basis by the local authority in consultation with concerned State Pollution Control Board.
- iv. (7) Processing or recycling site shall be fenced or hedged and provided with proper gate to monitor incoming vehicles or other modes of transportation.
- v. (8) The approach and or internal roads shall be concreted or paved so as to avoid generation of dust particles due to vehicular movement and shall be so designed to ensure free movement of vehicles and other machinery.
- vi. (9) Provisions of weigh bridge to measure quantity of waste brought at landfill site, fire protection equipment and other facilities as may be required shall be provided.
- vii. (10) Utilities such as drinking water and sanitary facilities (preferably washing/bathing facilities for workers) and lighting arrangements for easy landfill operations during night hours shall be provided and Safety provisions including health inspections of workers at landfill sites shall be carried out made.
- viii. (11) In order to prevent pollution from processing or recycling operations, the following provisions shall be made, namely:
  - a. Provision of storm water drains to prevent stagnation of surface water;
  - b. Provision of paved or concreted surface in selected areas in the processing or recycling facility for minimizing dust and damage to the site.
  - c. Prevention of noise pollution from processing and recycling plant.
  - d. Provision for treatment of effluent if any, to meet the discharge norms as per Environment (Protection) Rules, 1986.
- ix. (15) A vegetative boundary shall be made around Processing or Recycling plant or site.

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## **Central Pollution Control Board**

**Parivesh Bhawan, C.B.D Cum Office Complex, East Arjun Nagar,**

**Delhi – 110032**

**Website : <http://cpcb.nic.in/>**



# भारत का राजपत्र

## The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (i)

PART II—Section 3—Sub-section (i)

प्राधिकार से प्रकाशित

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पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 25 जनवरी, 2018

सा.का.नि. 94(अ).—केन्द्रीय सरकार, पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 6 और धारा 25 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, पर्यावरण (संरक्षण) नियम, 1986 का और संशोधन करने के लिए, एतद्द्वारा निम्नलिखित नियम बनाती है, अर्थात् :—

1. (1) इन नियमों का नाम पर्यावरण (संरक्षण) संशोधन नियम, 2018 है।  
(2) ये राजपत्र में इनके प्रकाशन की तारीख को प्रवृत्त होंगे।
2. पर्यावरण (संरक्षण) नियम, 1986 में, अनुसूची-1 में, क्रम संख्या 105 और उससे सम्बन्धित प्रविष्टियों के पश्चात्, निम्नलिखित क्रम संख्याएं और प्रविष्टियां अन्तःस्थापित की जाएंगी, अर्थात् :—
- “106. पर्यावरणीय स्वीकृति की अपेक्षा वाली परियोजनाओं से संबंधित निर्माण एवं विध्वंस क्रियाकलापों के लिए धूल उपशमन उपायों का आज्ञापक कार्यान्वयन :
  - (i) पर्यावरणीय स्वीकृति की अपेक्षा वाली कोई भी भवन अथवा अवसंरचना परियोजना धूल उपशमन उपायों सहित अनुमोदित पर्यावरणीय प्रबंधन योजना के बिना कार्यान्वित नहीं की जाएगी।
  - (ii) निर्माण स्थलों पर या वहां तक जाने वाली सड़कें खड्गजा और ब्लैकटॉप (अर्थात् मेटेलिक सड़कें) होनी चाहिए।
  - (iii) पर्याप्त धूल उपशमन उपायों के बिना मिट्टी की खुदाई नहीं की जाएगी।
  - (iv) कोई भी मिट्टी या रेत या निर्माण और विध्वंस अपशिष्ट या धूल वाली कोई अन्य निर्माण सामग्री बिना ढके नहीं छोड़ी जाएगी।
  - (v) समुचित ऊंचाई अर्थात् भवन की ऊंचाई की 1/3 और अधिकतम 10 मीटर तक के विंड-ब्रेकर की व्यवस्था की जाएगी।
  - (vi) जल छिड़काव प्रणाली की व्यवस्था की जाएगी।
  - (vii) निर्माण स्थल पर जनता को आसानी से दिखाई देने के लिए धूल उपशमन उपायों का स्पष्ट तौर पर प्रदर्शन किया जाएगा।

**107. सभी निर्माण एवं विध्वंस क्रियाकलापों के लिए धूल उपशमन उपायों का अनिवार्य कार्यान्वयन :**

- (i) खुले क्षेत्र में भवन सामग्रियों की घिसाई तथा कटाई को प्रतिबंधित किया जाएगा।
- (ii) निर्माण सामग्री तथा अपशिष्ट का भंडारण केवल निर्धारित क्षेत्र के अंदर किया जाएगा और निर्माण सामग्री तथा अपशिष्ट को सड़क के किनारे भंडारण को प्रतिबंधित किया जाएगा।
- (iii) निर्माण सामग्री तथा अपशिष्ट ढोने वाले बिना ढके हुए किसी भी वाहन की अनुमति नहीं दी जाएगी।
- (iv) निर्माण तथा विध्वंस अपशिष्ट प्रसंस्करण और निपटान स्थल का अभिनिर्धारण किया जाएगा और स्थल पर अपेक्षित धूल उपशमन उपाय अधिसूचित किए जाएंगे।

**नोट :** उपरोक्त क्रम संख्यांक 106 और 107 उन नगरों और शहरों के लिए लागू होंगे जहां धूलकण 10/ धूलकण 2.5 राष्ट्रीय परिवेशी वायु गुणवत्ता मानकों में निर्धारित सीमाओं से अधिक हो।”

[फा. सं. क्यू-16017/172/2017-सीपीए]

रितेश कुमार सिंह, संयुक्त सचिव

**नोट :** मूल नियम भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (i) में का.आ. सं. 844(अ), तारीख 19 नवम्बर, 1986 द्वारा प्रकाशित किए गए थे और तत्पश्चात् उनमें निम्नलिखित अधिसूचनाओं द्वारा संशोधन किए गए थे, अर्थात् :-

का.आ. 433(अ), तारीख 18 अप्रैल, 1987; सा.का.नि. 176(अ), तारीख 2 अप्रैल, 1996; सा.का.नि. 97(अ), तारीख 18 फरवरी, 2009; सा.का.नि. 149(अ), तारीख 4 मार्च, 2009; सा.का.नि. 543(अ), तारीख 22 जुलाई, 2009; सा.का.नि. 739(अ), तारीख 9 सितम्बर, 2010; सा.का.नि. 809(अ), तारीख 4 अक्तूबर, 2010; सा.का.नि. 215(अ), तारीख 15 मार्च, 2011; सा.का.नि. 221(अ), तारीख 18 मार्च, 2011; सा.का.नि. 354(अ), तारीख 2 मई, 2011; सा.का.नि. 424(अ), तारीख 1 जून, 2011; सा.का.नि. 446(अ), तारीख 13 जून, 2011; सा.का.नि. 152(अ), तारीख 16 मार्च, 2012; सा.का.नि. 266(अ), तारीख 30 मार्च, 2012; सा.का.नि. 277(अ), तारीख 31 मार्च, 2012; सा.का.नि. 820(अ), तारीख 9 नवम्बर, 2012; सा.का.नि. 176(अ), तारीख 18 मार्च, 2013; सा.का.नि. 535(अ), तारीख 7 अगस्त, 2013; सा.का.नि. 771(अ), तारीख 11 दिसम्बर, 2013; सा.का.नि. 2(अ), तारीख 2 जनवरी, 2014; सा.का.नि. 229(अ), तारीख 28 मार्च, 2014; सा.का.नि. 232(अ), तारीख 31 मार्च, 2014; सा.का.नि. 325(अ), तारीख 7 मई, 2014; सा.का.नि. 612(अ), तारीख 25 अगस्त, 2014; सा.का.नि. 789(अ), तारीख 11 नवम्बर, 2014; का.आ. 3305(अ), तारीख 7 दिसम्बर, 2015; का.आ. 4(अ), तारीख 1 जनवरी, 2016; सा.का.नि. 35(अ), तारीख 14 जनवरी, 2016; सा.का.नि. 281(अ), तारीख 7 मार्च, 2016; सा.का.नि. 496(अ), तारीख 9 मई, 2016; सा.का.नि. 497(अ), तारीख 10 मई, 2016; सा.का.नि. 978(अ), तारीख 10 अक्तूबर, 2016; सा.का.नि. 1016(अ), तारीख 28 अक्तूबर, 2016 और अंतिम बार अधिसूचना संख्यांक सा.का.नि. 1265(अ), तारीख 13 अक्तूबर, 2017 द्वारा संशोधित किए गए थे।

**MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE****NOTIFICATION**

New Delhi, the 25th January, 2018

**G.S.R. 94(E).**—In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely: -

1. (1) These rules may be called the Environment (Protection) Amendment Rules, 2018.  
(2) They shall come into force on the date of their publication in the Official Gazette.
2. In the Environment (Protection) Rules, 1986, in Schedule-I, after serial number 105 and the entries relating thereto, the following serial numbers and entries shall be inserted, namely: -

**“106. Mandatory Implementation of Dust Mitigation Measures for Construction and Demolition Activities for projects requiring Environmental Clearance:**

- (i) No building or infrastructure project requiring Environmental Clearance shall be implemented without approved Environmental Management Plan inclusive of dust mitigation measures.

- (ii) Roads leading to or at construction sites must be paved and blacktopped (i.e. metallic roads).
- (iii) No excavation of soil shall be carried out without adequate dust mitigation measures in place.
- (iv) No loose soil or sand or Construction & Demolition Waste or any other construction material that causes dust shall be left uncovered.
- (v) Wind-breaker of appropriate height i.e. 1/3<sup>rd</sup> of the building height and maximum up to 10 meters shall be provided.
- (vi) Water sprinkling system shall be put in place.
- (vii) Dust mitigation measures shall be displayed prominently at the construction site for easy public viewing.

**107. Mandatory Implementation of Dust Mitigation Measures for all Construction and Demolition Activities:**

- (i) Grinding and cutting of building materials in open area shall be prohibited.
- (ii) Construction material and waste should be stored only within earmarked area and road side storage of construction material and waste shall be prohibited.
- (iii) No uncovered vehicles carrying construction material and waste shall be permitted.
- (iv) Construction and Demolition Waste processing and disposal site shall be identified and required dust mitigation measures be notified at the site.

**Note :** The serial numbers 106 and 107 above shall apply to cities and towns where value of particulate matter 10/ particulate matter 2.5 exceeds the prescribed limits in National Ambient Air Quality Standards.”

[F. No. Q-16017/172/2017-CPA]

RITESH KUMAR SINGH, Jt. Secy.

**Note :** The principal rules were published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), *vide* number S.O. 844(E), dated the 19<sup>th</sup> November, 1986 and subsequently amended *vide* the following notifications, namely:—

S.O. 433(E), dated the 18<sup>th</sup> April, 1987; G.S.R. 176(E), dated the 2<sup>nd</sup> April, 1996; G.S.R. 97 (E), dated the 18<sup>th</sup> February, 2009; G.S.R. 149(E), dated the 4<sup>th</sup> March, 2009; G.S.R. 543(E), dated the 22<sup>nd</sup> July, 2009; G.S.R. 739(E), dated the 9<sup>th</sup> September, 2010; G.S.R. 809(E), dated the 4<sup>th</sup> October, 2010; G.S.R. 215(E), dated the 15<sup>th</sup> March, 2011; G.S.R. 221(E), dated the 18<sup>th</sup> March, 2011; G.S.R. 354(E), dated the 2<sup>nd</sup> May, 2011; G.S.R. 424(E), dated the 1<sup>st</sup> June, 2011; G.S.R. 446(E), dated the 13<sup>th</sup> June, 2011; G.S.R. 152(E), dated the 16<sup>th</sup> March, 2012; G.S.R. 266(E), dated the 30<sup>th</sup> March, 2012; G.S.R. 277 (E), dated the 31<sup>st</sup> March, 2012; G.S.R. 820 (E), dated the 9<sup>th</sup> November, 2012; G.S.R. 176(E), dated the 18<sup>th</sup> March, 2013; G.S.R. 535(E), dated the 7<sup>th</sup> August, 2013; G.S.R. 771(E), dated the 11<sup>th</sup> December, 2013; G.S.R. 2 (E), dated the 2<sup>nd</sup> January, 2014; G.S.R. 229 (E), dated the 28<sup>th</sup> March, 2014; G.S.R. 232 (E), dated the 31<sup>st</sup> March, 2014; G.S.R. 325 (E), dated the 7<sup>th</sup> May, 2014; G.S.R. 612(E), dated the 25<sup>th</sup> August, 2014; G.S.R. 789 (E), dated the 11<sup>th</sup> November, 2014; S.O. 3305 (E), dated the 7<sup>th</sup> December, 2015; S.O. 4(E), dated the 1<sup>st</sup> January, 2016; G.S.R. 35(E), dated the 14<sup>th</sup> January, 2016; G.S.R. 281(E), dated the 7<sup>th</sup> March, 2016; G.S.R. 496(E), dated the 9<sup>th</sup> May, 2016; G.S.R. 497(E), dated the 10<sup>th</sup> May, 2016; G.S.R. 978(E), dated the 10<sup>th</sup> October, 2016; G.S.R. 1016(E), dated the 28<sup>th</sup> October, 2016 and lastly amended *vide* notification GSR 1265(E) dated the 13<sup>th</sup> October, 2017.

## Guidelines on DUST mitigation measures in handling Construction material and C&D wastes



**November 2017**



### **CENTRAL POLLUTION CONTROL BOARD**

**(Ministry of Environment, Forest & Climate Change, Govt. of India)**

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## Guidelines on DUST mitigation measures in handling Construction material and C&D wastes

### DUST – environmental pollutant generated during handling of Construction material and C&D wastes.

The concerns of controlling dust / fine particles generated during handling of Construction material and C&D wastes on site include:

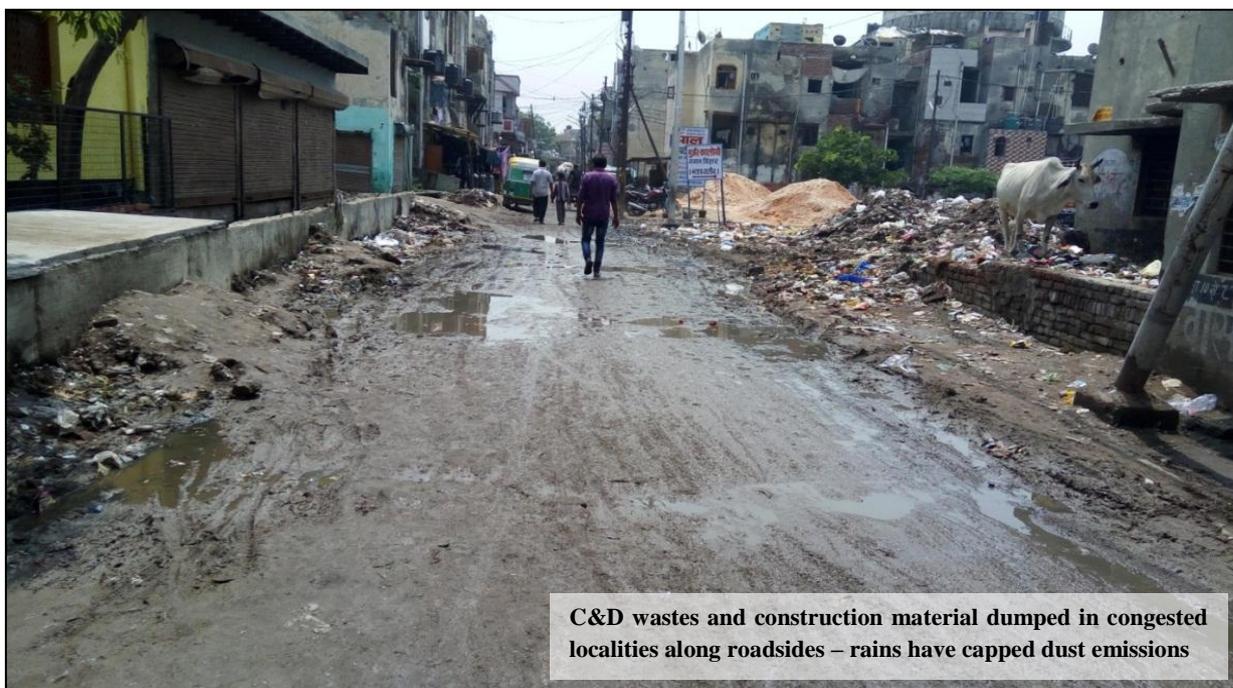
- a. Dust emissions are an environmental nuisance both on-site and off-site.
- b. Dust during handling ( loading / unloading) release a wide range of particle sizes and material types that can cause serious health problems ranging from eye irritation, nose, mouth to affecting the respiratory system.
- c. The larger heavier particles settle out of the air quickly and are hazard to the operators of plant and equipment (on-site) and to those in the immediate vicinity (off-site). The finer particles (usually invisible) are transported further can cause health hazards (off-site).



## Introduction to Guidelines

Unlike other rules that have been revised namely those addressing key urban wastes such as MSW, plastic wastes, BMW, however the Construction and Demolition (C&D) Waste Management Rules, 2016 are NEW rules that were notified on 29<sup>th</sup> March, 2016 by the Ministry of Environment, Forest and Climate Change (MoEF&CC). In compliance of Rule 10 sub-rule 1(a) of C & D Waste Management Rules, 2016 the ‘*GUIDELINES ON ENVIRONMENTAL MANAGEMENT OF C&D WASTES (March 2017)*’ were prepared under the guidance of the Committee for implementation of C&D Waste Management Rules 2016. In compliance of Rule 10 sub-rule 1(a) of C & D Waste Management Rules, 2016, the focus was on Schedule III w.r.t. environmental concerns in C&D waste management facilities.

The present report i.e. *Guidelines on DUST mitigation measures in handling Construction and Demolition material / wastes* addresses DUST abatement measures arising measures during handling of Construction material and C&D wastes on-site and off-site.



C&D wastes and construction material dumped in congested localities along roadsides – rains have capped dust emissions

This report has also been prepared under the guidance of the Committee (**Annexure A**) for implementation of C & D Waste Management Rules 2016. The areas covered include the following:

1. Major DUST generating activities
2. Composition of Construction and Demolition wastes / material
3. Major dust borne material
4. Dust management in C&D Waste Management Facilities
5. Dust management during transportation
6. Dust control measures during storage

7. Dust control measures at site
8. Other dust mitigation measures
9. NGT Order w.r.t. Compensation on Construction related works for DELHI

### **DUST management in C&D Waste Processing Facilities**

The Swachh Bharat Mission (under MoUD) envisages processing of 100% solid waste generated in cities / towns by 2<sup>nd</sup> October, 2019 as a key objective, the wastes include Construction & Demolition (C&D) wastes. Ministry of Urban Development (MoUD) vide its circular dated 28<sup>th</sup> June, 2012 directs all states to set up Construction & Demolition Waste recycling / processing facilities in cities with population of over ONE million (10 lakhs).

The Construction and Demolition (C&D) Waste Management Rules, 2016 apply to every waste resulting from construction, re-modeling, repair and demolition of any civil structure of individual or organization or authority generating construction and demolition waste such as building materials, debris, rubble.

In March 2017, 'GUIDELINES ON ENVIRONMENTAL MANAGEMENT OF C&D WASTES' were prepared under the guidance of the Committee for implementation of C&D Waste Management Rules 2016. The focus was on the environmental concerns in C&D waste processing facilities with attention on Schedule III. Timelines for implementation of C&D Waste Management Rules 2016 focus on establishment of C&D waste management facilities as provided under Schedule III as given hereunder.

### **Timelines for implementation of C&D Waste Management Rules 2016**

#### **Schedule III [See Rule 13]**

<b>Compliance Criteria</b>	<b>Cities with population of &gt;=one million</b>	<b>Cities with population of 0.5-01 million</b>	<b>Cities with population of &lt; 0.5 million</b>
Formulation of policy by State Government	12 months	12 months	12 months
Identification of sites for collection & processing facility	18 months	18 months	18 months
Commissioning and implementation of the facility	18 months	24 months	36 months
Monitoring by SPCBs	3 times a year / in 4 months	2 times a year / once in 6 months	2 times a year / Once in 6 months

The two main environmental concerns highlighted under the Guidelines were DUST and NOISE. In SECTION VIII of the Guidelines, DUST management was discussed covering the following areas:

- i. DUST – environmental pollutant in C & D waste operations

- ii. Guidelines for DUST mitigation in C & D operations
  - a. Dust Noise abatement - Dust from loading / unloading operations
  - b. Dust abatement - due to vehicle movement
  - c. Dust abatement – due to machinery used in C & D operations
  - d. Compliance of National Ambient Air Quality Standards (NAAQS)
- iii. Other dust abatement measures and safety issues
  - a. Water requirement
  - b. Use of treated waste water (preferably) in sprinklers for dust suppression
  - c. Waste water management
  - d. Residual waste disposal
  - e. Diesel use
  - f. Plantation / greenery
  - g. Emergency facilities
  - h. Protective gear
  - i. Training / Awareness program

The Guidelines are presently on display in CPCB's website at:

[http://cpcb.nic.in/upload/NewItems/NewItem\\_228\\_Final\\_C&D\\_March\\_2017.pdf](http://cpcb.nic.in/upload/NewItems/NewItem_228_Final_C&D_March_2017.pdf)



**Air Quality Index (AQI) w.r.t DUST (PM<sub>10</sub> & PM<sub>2.5</sub>)**

Air Quality Index (AQI) is a tool for effective communication of air quality status to people in terms, which are easy to understand. It transforms complex air quality data of various pollutants into a single number (index value), nomenclature and colour (see - [http://cpcb.nic.in/FINAL-REPORT\\_AQI\\_.pdf](http://cpcb.nic.in/FINAL-REPORT_AQI_.pdf))

There are SIX AQI categories, namely GOOD, SATISFACTORY, MODERATELY POLLUTED, POOR, VERY POOR, and SEVERE. Each of these categories is decided based on ambient concentration values of air pollutants and their likely health impacts (known as health break-points). The index has SIX colours schemes indicating the six categories. AQ sub-index and health breakpoints are evolved for eight pollutants which include **PM<sub>10</sub>**, **PM<sub>2.5</sub>** besides, NO<sub>2</sub>, SO<sub>2</sub>, CO, O<sub>3</sub>, NH<sub>3</sub>, and Pb for which short-term (upto 24-hours) National Ambient Air Quality Standards are prescribed. The worst sub-index determines the overall AQI. AQI categories and health breakpoints for **PM<sub>10</sub>** and **PM<sub>2.5</sub>** are given below.

**Table: IND-AQI w.r.t. PM<sub>10</sub> and PM<sub>2.5</sub>**  
(See - [http://cpcb.nic.in/About\\_AQI.pdf](http://cpcb.nic.in/About_AQI.pdf))

AQI category	AQI Category Colour scheme	AQI Range µg/m <sup>3</sup>		Break point 24 - hourly	
		PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
I.	<b>Good</b>	0 – 50	0-30	50	<b>30</b>
II.	<b>Satisfactory</b>	51 – 100	31-60	100	60
III.	<b>Moderate</b>	101 – 250	61-90	250	90
IV.	<b>Poor</b>	251- 350	91-120	350	120
V.	<b>Very Poor</b>	351 – 430	121-250	430	250
VI.	<b>Severe</b>	430 <sup>+</sup>	250 <sup>+</sup>	430 <sup>+</sup>	250 <sup>+</sup>

**Graded Response Action Plan (GRAP) for Delhi & NCR addresses DUST control (particulate matter) measures**

In pursuant to the Hon'ble Supreme Court's order dated December 02, 2016 in the matter of M. C. Mehta vs. Union of India regarding air quality in National Capital Region of Delhi, the Ministry of Environment, Forests & Climate Change (MoEF&CC) notified for implementation of GRAP through Environment Pollution (Prevention & Control) Authority vide S.O. 118 (E) dated January 12, 2017. The Graded Response Action Plan is displayed at- [http://cpcb.nic.in/final\\_graded\\_table.pdf](http://cpcb.nic.in/final_graded_table.pdf)).

As per National Air Quality Index, FOUR different Air Quality Index (AQI) categories were identified i.e. MODERATE & POOR, VERY POOR, SEVERE and SEVERE<sup>+</sup> (this new category of 'Emergency' has been added). The PM levels (PM<sub>10</sub> and PM<sub>2.5</sub>) are summarized in Table below:

**Table: GRAP addresses ambient air quality w.r.t. particulate matter (dust)**

Air Quality Index (AQI) categories	Ambient PM <sub>2.5</sub> / PM <sub>10</sub> concentration values (µg/m <sup>3</sup> )	Concentration values (µg/m <sup>3</sup> )	
		PM <sub>2.5</sub>	PM <sub>10</sub>
<b>Severe<sup>+</sup> or Emergency</b>	ambient PM <sub>2.5</sub> or PM <sub>10</sub> concentration values of 300µg/m <sup>3</sup> or 500 µg/m <sup>3</sup> respectively persist for 48 hours or more	300µg/m <sup>3</sup> respectively & persisting for 48 hours or more	of 500 µg/m <sup>3</sup> respectively & persisting for 48 hours or more
<b>Severe</b>	ambient PM <sub>2.5</sub> or PM <sub>10</sub> concentration value is more than 250 µg/m <sup>3</sup> or 430µg/m <sup>3</sup> respectively)	more than 250 µg/m <sup>3</sup>	more than 430µg/m <sup>3</sup>
<b>Very Poor</b>	ambient PM <sub>2.5</sub> or PM <sub>10</sub> concentration value is between 121-250µg/m <sup>3</sup> or 351-430 µg/m <sup>3</sup> respectively)	concentration value is between 121-250µg/m <sup>3</sup>	concentration value is between 351-430 µg/m <sup>3</sup>
<b>Moderate to poor</b>	ambient PM <sub>2.5</sub> or PM <sub>10</sub> concentration value is between 61-120 µg/m <sup>3</sup> or 101-350 µg/m <sup>3</sup> respectively	concentration value is between 61-120 µg/m <sup>3</sup>	concentration value is between 101-350 µg/m <sup>3</sup>

#### **National Ambient Air Quality Standards - includes PM<sub>10</sub> and PM<sub>2.5</sub>**

The basis of development of standards is to provide a rational for protecting public health from adverse effects of air pollutants, to eliminate or reduce exposure to hazardous air pollutants, and to guide national/local authorities for pollution control decisions. CPCB revised and notified in year 2009 the National Ambient Air Quality Standards (NAAQS) (<http://www.cpcb.nic.in>) for TWELVE parameters viz. carbon monoxide (CO) nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), particulate matter (PM) of less than 2.5 microns size (PM<sub>2.5</sub>), PM of less than 10 microns size (PM<sub>10</sub>), Ozone (O<sub>3</sub>), Lead (Pb), Ammonia (NH<sub>3</sub>), Benzo(a)Pyrene (BaP), Benzene (C<sub>6</sub>H<sub>6</sub>), Arsenic (As), and Nickel

(Ni)]. The first eight parameters include PM (**PM<sub>10</sub>** and **PM<sub>2.5</sub>**), have short-term (1/8/24 hours) and annual standards (except for CO and O<sub>3</sub>) and rest four parameters have only annual standards. The standards are laid down in Schedule VII of the Environment (Protection) Rules, 1986 and are given in Table below.

**Table: National Ambient Air Quality Standards (NAAQS, 2009)  
w.r.t. PM<sub>10</sub> and PM<sub>2.5</sub>**

Pollutant	PM by size	Time weighte d Average	Concentration ( $\mu\text{g}/\text{m}^3$ ) in Ambient Air		
			Industrial, Residential, Rural & Other Area	Ecologically Sensitive Area (notified by Central Govt.)	Methods of measurement
Particulate Matter - PM <sub>10</sub>	< 10 $\mu\text{m}$	Annual*	60	60	- Gravimetric - TOEM - Beta attenuation
		24-hrs**	100	100	
Particulate Matter - PM <sub>2.5</sub>	< 2.5 $\mu\text{m}$	Annual*	40	40	- Gravimetric - TOEM - Beta attenuation
		24-hrs**	60	60	

\* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

\*\* 24 hourly or 08 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year, 2% of the time; they may exceed the limits but not on two consecutive days of monitoring.

Note - Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigations.

### Major DUST generating activities during in handling Construction material and C&D wastes

Major activities generating DUST during handling (loading / unloading) C & D wastes / material are summarized below:

Dust generating sources	Major activity
a) Demolition of existing / old dilapidated structures	Generation
b) Renovation of existing buildings / concrete structures	(on-site)
c) Construction of new infrastructure (buildings, bridges etc )	
d) Storage of construction material	Storage
e) Storage of C&D wastes	(on-site or off-site)
f) Transportation of C&D wastes and construction material	Transportation (on-site or off-site)

### Composition of Construction material and C&D wastes

#### 1. Construction and Demolition wastes

As per Rule 3 (c) "construction and demolition waste" means waste comprising of building materials, debris and rubble resulting from construction, re-modeling, repair and demolition of any civil structure.

Composition of demolition wastes is project specific and varies depending on age of building being demolished / renovated or the type of buildings being constructed. Under Rule 4 sub-rule (3) of the C & D Waste Management Rules, 2016 the segregation by bulk C & D waste shall be done into four streams such as:

- i. Concrete
- ii. Soil
- iii. Steel, wood and plastics
- iv. Bricks & mortar

Wastes like surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities come under C&D wastes.

Key characteristics of C&D wastes include:

a) Demolition waste characteristics: In India, when old buildings are demolished the major demolition waste is soil, sand and gravel accounting for bricks (26%) & masonry (32%), Concretes (28%), metal (6%), wood (3%) others (5%).

b) The major constituents are concrete, soil, bricks, wood, asphalt and metal. Brick & masonry, soil, sand & gravel account for over 60% of total waste. (Source - Municipal Corporation of Delhi, Burari facility).

## 2. Construction material

Common construction material includes bricks, cement, sand / gravel, soil (earth) and stone aggregates of various sizes.



Construction material heaped at ZEBRA CROSSING!

### Major dust borne material in handling Construction material and C&D wastes

The major dust borne material generated during construction / demolition and renovation activities are soil, sand, gravel and cement.



### **Dust abatement measures during transportation of Construction material and C&D wastes**

The C&D wastes and construction material are stored / transported generally without proper coverage and necessary precautionary measures thereby contributing to dust to the ambient air.

Common dust management measures reported regarding transportation of C&D wastes / construction material include the following:

1. Transport routes for carrying construction material / C&D wastes to be identified – preferably to avoid residential, schools / institutional and hospital areas.
2. Transport material that are easily wind borne need to be covered by a sheet made of either jute , tarpaulin, plastic or any other effective material.
3. Trucks / lorries should not be overloaded to avoid overflow of material (C&D wastes / construction material) during transportation.

4. As the transport vehicles move generally during night time, the transport permit should also indicate the material / waste being transported, quantity being transported and place of loading and unloading destinations.

5. As most cities propose to have one C&D waste facility, the locations of all temporary / intermediate C&D wastes



storage dumpsites to be placed in public domain for stakeholders by the concerned department.

6. The unloading activities at temporary / intermediate C&D waste dumpsites to ensure that dust borne particles are damped either by water spray or aligning the waste disposal in such a way that minimizes dust dispersal (wind breakers).
7. The unloading activities of construction material at site / off site to ensure that dispersal of dust borne particles are minimized by either location of dumpsite or using water sprinklers or covered by a sheet made of either jute, tarpaulin, plastic or any other effective material.
8. Roads surfaces to be well maintained so that transport vehicles are not subjected to jerks resulting in ejection of C&D wastes / construction material on roads.
9. In many cases the transportation route may cover several kms, wet damping would be a major challenge, regular sweeping (or vacuum sweeping) would assist in reducing re-suspension of dust due to movement of vehicles, particularly in cities.

### **Dust control measures - Storage of Construction material and C&D wastes**

As mentioned in the previous section, management (transportation & storage) of C&D wastes and construction material generally lack dust abatement measures thereby contributing to dust to the ambient air. The dust control measures w.r.t. storage of construction material include:

All areas for storing C&D wastes / construction material to be demarcated and preferably barricaded particularly those materials that have potential to be dust borne.

## i. Off-site :

Contractors / builders / sellers / related stakeholders prohibited from storing / dumping C&D wastes / construction material on metalled (pucca) roads as it obstructs traffic flow - a case of encroachment inviting penalties.

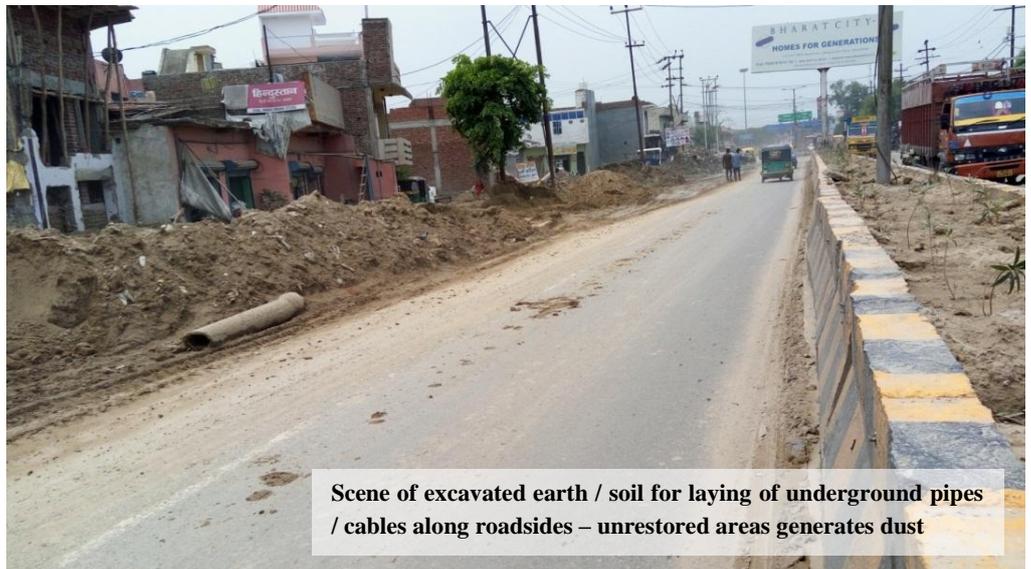


**Pedestrians, vehicles and construction material compete for road space**

## ii. On-site :

a. Locations of storage / dumping wastes within site are to be such that dust dispersal during handling (loading / unloading) is minimum.

b. The Contractors / builders associated in construction works to ensure quantity of construction material available at site synchronizes with its utilization so that the storage period is minimal



**Scene of excavated earth / soil for laying of underground pipes / cables along roadsides – unrestored areas generates dust**

thereby reducing dust dispersal.

c. Sites of demolition activities to be cordoned off and adequate measures to reduce dispersal of dust beyond site limits.

## iii. Dust borne particles into the air can be reduced by addressing :

a. Sand/ gravel: Sand and other fine aggregates be stored in demarcated areas and given a covering.

- b. Cement: Cement bags to be stored an enclosed areas; loose cement to be stored in silos.
- c. Other fine material: preferably to be kept in sealed bags.

#### **Dust control measures at site - construction / demolition / renovation activity**

Dust control measures at site - construction / demolition activity to include:

- i. Raise barricade along the perimeter depending on the nature of adjoining regions.
- ii. Mount dust barrier sheet ex tarpaulin / plastic on scaffolding around the construction / demolition building – particularly side facing residential areas.
- iii. Selective mechanization (deployment of construction / demolition) of handling material / wastes helps in better management and reduction of dust generation at site.

#### **NGT directions w.r.t. Compensation on Construction related works for DELHI**

National Green Tribunal in OA 21 of 2014 titled “Vardhaman Kaushik Vs Union of India & Ors.” regarding Air Pollution **in DELHI** vide its order dated 10.04.2015 has imposed compensation on construction related works as under: ....(XVII) (b) *“If any person, owner and or builder is found to be violating any of the conditions stated in this order and or for their non-compliance such person, owner, builder shall be liable to pay compensation of Rs. 50,000/- per default in relation to construction activity at its site and Rs. 5,000/- for each violation during carriage and transportation of construction material, debris through trucks or other vehicles, in terms of section 15 of the NGT Act on the principle of polluter pay....”* Measures taken by Delhi Govt. available at web-link:

<http://www.delhi.gov.in/wps/wcm/connect/538125004cb89776bec6bf2446aafa27/PPT+on+AIR+%26+DUST+POLLUTION+.pdf?MOD=AJPERES&lmod=-1632379739&CACHEID=538125004cb89776bec6bf2446aafa27>

Other State governments can address dust control measures on similar lines taking into account the regional influences to bring out guidelines as initiated by the Delhi Government.



### Overview of dust abatement measures in handling construction of C&D material / wastes

The environmental concerns during handling (loading / unloading) of Construction material and C&D wastes include:

- a. Generation of dust emissions impact environmental quality both on- site and off-site.
- b. Dust generated during handling (loading / unloading) release a wide range of particle sizes and material types that can *affect health and* cause problems ranging from eye, nose and throat irritation besides affect the respiratory system.
- c. The larger heavier particles settle out of the air quickly and are hazardous to the workers and construction equipment (on-site) and to those in the immediate vicinity. The finer particles (usually invisible) are transported further can cause health hazards (off-site).

GRAP & AQI focus on dust reduction (includes  $PM_{10}$  and  $PM_{2.5}$ ), overview of dust abatement measures in handling of C&D material / wastes include:

1. Sprinkling of water / fine spray from nozzles to suppress dust re-suspension at site.
2. C&D wastes or construction material whether stored or transported (Lorries / tractors) to be preferably covered depending on the dust that is generated.

3. Areas where loading / unloading (fugitive dust) activities to be demarcated and located such that dust dispersal is minimized.



Indiscriminate dumping of C&D waste along roadsides (illegal activity) generates dust into the atmosphere (Photos - above & below)



4. Operations of equipment / machineries include transporting (conveyor belt) crushing / hammering etc deployed at site generate dust - these areas need to be bounded (enclosed) and use of water sprinklers suppress dust emissions.
5. Gensets (DG sets) be well maintained to ensure low emissions.
6. The transport vehicles engaged be well maintained (PUC compliance).

7. Routes of transport vehicles within construction site be damped by water (preferably treated waste water) sprinklers.
8. Dry sweeping of work areas to be prohibited.
9. For construction activities simultaneous development of green buffer would assist in arresting dispersal of dust (preferably shrubs & trees that have low uptake of water).
10. Workers to be provided necessary safety equipment - Workers at construction / demolition, Loading / unloading activities are provided with face mask to prevent inhalation of fine dust.
11. All builders / contractors engaged in construction & demolition activities to submit an undertaking to the concerned government department on measures adopted to control dust.
12. Use of covering sheets ( plastic, tarpaulin etc) on:
  - a. Construction material heaps that are easily air borne
  - b. C&D debris that are dumped at temporary storage sites
  - c. Adequate covering on construction works, particularly side facing residential areas
13. Use of water sprinklers is commonly recommended as a dust mitigation measure, however there water is a precious commodity and its use needs to be rationalized. It is thereby important to adopt alternate measures that are effective ex location of loading / unloading sites, build higher barricades to arrest dust generated at ground levels and adopt covering (jute, plastic, tarpaulin etc) of construction material / wastes.
14. Sale of construction material from road-sides to be prohibited.
15. Dumping (unloading) and storage of construction material for use in on-going projects on public road-sides is prohibited.
16. Dumping (unloading) and disposal of C&D wastes on non-designated sites (ex road-sides, vacant plots, water bodies, drains etc) be prohibited.
17. Demand for construction material at site to synchronizes with its utilization, so that the storage period of un-used construction is minimal thereby reducing dust dispersal.
18. Construction projects to be encouraged to utilize products manufactured from C&D waste processing – this step improves organized collection of C&D wastes, stops indiscriminate dumping of C&D wastes thereby reducing dust load escaping into the atmosphere during dry weather.



19. Inclusion of condition(s) by concerned agencies for adoption of dust mitigation measures in approvals / permits / consent provisions / environmental clearances for construction projects.
20. There is a need to highlight the environmental concerns & disseminate information on the matter.

All contractors associated in construction works and C&D waste handling need to display a board at the site indicating dust control measures being adopted, a sample display is given below for guidance:

- a. *Dust affects health* cause problems ranging from eye, nose and throat irritation besides the respiratory system
- b. *This project site adopts dust reduction measures*
- c. *All light (potential to be wind blown) construction material is covered or put in sealed bags*
- d. *Loading / unloading areas are barricaded*
- e. *Water sprinkling for dust reduction is being practiced*
- f. *Adequate covering material shall be used to reduce dust generation*
- g. *Workers health & safety is our concern*
- h. *Staff at site have been apprised of CPCB's Guidelines on DUST reduction w.r.t. handling of C&D wastes & construction material.*

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**REFERENCES:**

1. Graded Response Action Plan (see - [http://cpcb.nic.in/final\\_graded\\_table.pdf](http://cpcb.nic.in/final_graded_table.pdf))
2. National Ambient Air Quality Standards (2009) (see -<http://www.cpcb.nic.in>)
3. Air Quality Index (AQI) (See - [http://cpcb.nic.in/FINAL-REPORT\\_AQI\\_.pdf](http://cpcb.nic.in/FINAL-REPORT_AQI_.pdf) and [http://cpcb.nic.in/About\\_AQI.pdf](http://cpcb.nic.in/About_AQI.pdf))
4. CPCB's Guidelines on Environmental Management of C&D Wastes (March 2017) (See - [http://cpcb.nic.in/upload/NewItems/NewItem\\_228\\_Final\\_C&D\\_March\\_2017.pdf](http://cpcb.nic.in/upload/NewItems/NewItem_228_Final_C&D_March_2017.pdf))
5. Measures taken by Delhi Govt w.r.t. on Construction related works for DELHI at web-link: <http://www.delhi.gov.in/wps/wcm/connect/538125004cb89776bec6bf2446aafa27/PPT+on+AIR+%26+DUST+POLLUTION+.pdf?MOD=AJPERES&lmod=-1632379739&CACHEID=538125004cb89776bec6bf2446aafa27>

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## ANNEXURE A

**Committee for implementation of “C & D Waste Management Rules 2016”**


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Member Secretary, Central Pollution Control Board (CPCB)	A. Sudhakar
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Central Road Research Institute (CSIR-CRRI)	Dr. Sudhir Mathur
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Building Materials & Technology Promotion Council (BMTPC)	S. K. Agarwal J. K. Prasad
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