

क्षेत्रीय कार्यालय, संयुक्त संचालक, नगरीय प्रशासन एवं विकास
(यांत्रिकी प्रकोष्ठ), बिलासपुर-संभाग, बिलासपुर (छ.ग.)

प्रो.स.स.ओ.फिस.के. बगल वाली गली, प्राथमिक स्वास्थ्य केन्द्र के पास, वार्ड क्र. 51 राजकिशोर नगर, बिलासपुर (छ.ग.)

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क्र.सं.स.ओ.फिस.के. / यो.प्र. / तक.स्वी. / मल्हार / 2026 (51) बिलासपुर, दिनांक: 07/04/2026

मुख्य नगर पालिका अधिकारी
नगर पंचायत - मल्हार
जिला - बिलासपुर (छ.ग.)

विषय :- निर्माण कार्यों की तकनीकी स्वीकृति बाबत।
संदर्भ :- आपका पत्र क्रमांक - 09 दिनांक 04.04.2026

विषयान्तर्गत नगर पंचायत - मल्हार से स्वच्छ भारत मिशन-शहरी 2.0 मद अंतर्गत निर्माण कार्यों के तकनीकी स्वीकृति हेतु प्राप्त प्राक्कलन का परीक्षण उपरान्त निम्नानुसार तकनीकी स्वीकृति प्रदान की जाती है :-

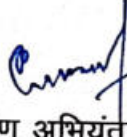
क्र.	कार्य का नाम	उन्नयन कार्य हेतु एम.आर.एफ. प्लॉट की संख्या (सूखा कचरा हेतु)	नवीन एम.आर. प्लॉट की संख्या (सूखा कचरा हेतु)	नवीन विन्ड्रो कम्पोस्ट प्लॉट की संख्या (गीला कचरा हेतु)	संयंत्र निर्माण लागत (लाख में)	मशीनों एवं उपकरणों की लागत (लाख में)	कुल निर्माण लागत (लाख में)	अतिरिक्त लागत (कंटेन्जेंसी, जी.एस.टी. इत्यादि) (लाख में)	परियोजना लागत (संचालन एवं संधारण को छोड़कर) (लाख में)
1	2	3	4	5	6	7	8 (6+7)	9	10(8+9)
1	प्रसंस्करण संयंत्र की स्थापना एवं उन्नयन कार्य।	1	-	1	22.35	5.06	27.41	1.52	28.93

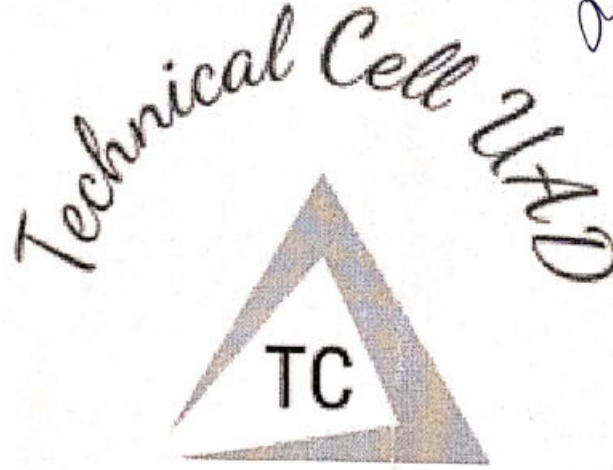
नोट :-

- निविदा आमंत्रण कार्य छत्तीसगढ़ नगर पालिका अधिनियम 1961 एवं उसके अंतर्गत लागू छत्तीसगढ़ (मेयर इन कौंसिल/प्रेसिडेंट इन कौंसिल कामकाज को संचालन तथा प्राधिकारियों की शक्तियां एवं कर्तव्य) नियम, 1988 एवं छ.ग. कार्य विभाग मैनुअल के प्रावधानों एवं विभाग द्वारा समय-समय पर जारी दिशा निर्देशों का पालन करते हुए निविदा संबंधी कार्यवाही की जावे तथा वित्तीय अधिकारिता के अनुसार सक्षम प्राधिकारी से निविदा प्रारूप (शर्तों) का अनुमोदन प्राप्त किया जावे।
- छत्तीसगढ़ शासन, नगरीय प्रशासन एवं विकास विभाग, मंत्रालय महानदी भवन, नवा रायपुर, अटल नगर के पत्र क्र. 5357/4137/2022/18 नवा रायपुर अटल नगर दिनांक 21.07.2022 के कंडिका क्र. 14 के अनुसरण में निकाय मद के निर्माण कार्य में यह तकनीकी स्वीकृति प्रभावशील नहीं होगा।
- उक्त तकनीकी स्वीकृति एस.ओ.आर. पर आधारित दर में जी.एस.टी. सम्मिलित कर जारी की गई है। किन्तु निविदा आमंत्रित करने के समय एस.ओ.आर. की राशि पर अर्थात् जी.एस.टी. छोड़कर शेष राशि पर निविदा जारी किया जाना अनिवार्य होगा। उक्त संबंधी जानकारी निविदा की विशेष शर्तों में अनिवार्य रूप से सम्मिलित किया जावे।
- भू-स्वामित्व/आधिपत्य के बिना निर्माण कार्य प्रारंभ नहीं कराया जावे। वन, रेलवे एवं शासकीय विभागों अथवा उपक्रमों की भूमि में सहमति/एन.ओ.सी. अनिवार्यतः लिया जावे।

F/SANCTION/MRF TECHNICAL SANCTION

5. उपरोक्त वर्णित कार्य यदि पूर्व से किसी अन्य योजना/विभाग द्वारा प्रस्तावित हो या पूर्व निर्मित हो अथवा पी.जी. के अधीन हो तो प्रदत्त तकनीकी स्वीकृति शून्य मानी जावे। इस कृत्य के लिए प्रस्तुतकर्ता अभियंता के विरुद्ध कार्यवाही सुनिश्चित किया जावे।
6. यदि निर्माण कार्य निजी भूमि (बिना सहमति के) एवं विवादित भूमि अथवा अवैध प्लानिंग/अवैध कालोनी में हो तो यह तकनीकी स्वीकृति प्रभावशील नहीं होगा।
7. अंक गणीतीय शुद्धता अनिवार्यतः परीक्षण कराया जावे।
8. जी.एस.टी. पृथक से देय नहीं होगा।
9. कार्य प्रारंभ करने के पूर्व प्रस्तावित स्थल का विभिन्न कोणों से लिया गया अभियंता द्वारा हस्ताक्षरित फोटोग्राफ अनिवार्यतः लगाया जावे, जिसमें लांगीट्यूड एवं लैटीट्यूड उल्लेखित हो। साथ ही अंतिम देयक के अनुशंसा हेतु भेजे जाने वाले प्रकरण के साथ उसी कोण से लांगीट्यूड एवं लैटीट्यूड सहित हस्ताक्षरित फोटोग्राफ प्रस्तुत किया जावे।
10. कार्य में कोई सारवान परिवर्तन नहीं किया जावे।
(कुल कार्य की संख्या :- 01)


 07/04/2026
 अधीक्षण अभियंता
 नगरीय प्रशासन एवं विकास
 बिलासपुर संभाग (छ.ग)



कार्यालय नगर पंचायत मल्हार, जिला-बिलासपुर (छ.ग.)

फोन नं. 07752-273990 - E-mail :- cmo_malhar@rediffmail..com

क्र./ 09/ न.पं./ 2026 -27
प्रति,

मल्हार दिनांक 02/04/ 2026

संयुक्त संचालक,
क्षेत्रीय कार्यालय बिलासपुर
छत्तीसगढ़।

- विषय :- स्वच्छ भारत मिशन-शहरी 2.0 अन्तर्गत नगर पंचायत मल्हार में प्रस्तावित सूखे एवं गीले कचरे के प्रबंधन हेतु संयंत्रों की स्थापना तथा स्थापित संयंत्रों के उन्नयन/विकास कार्य की तकनीकी स्वीकृति के संबंध में।
- संदर्भ : राज्य शहरी विकास अभिकरण, छत्तीसगढ़ का आदेश क्र PROJ-204/45/2025-SUDA (TMPF) Section/185441-99, नवा रायपुर अटल नगर, दिनांक 01.04.2026

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उपरोक्त विषयान्तर्गत संदर्भित पत्र के माध्यम से नगर पंचायत मल्हार में प्रस्तावित सूखे एवं गीले कचरे के प्रबंधन हेतु संयंत्रों की स्थापना तथा स्थापित संयंत्रों के उन्नयन/विकास कार्य हेतु प्राप्त प्रशासकीय स्वीकृति की कंडिका क्र. 02 के अनुक्रम में निम्नानुसार प्रस्ताव तकनीकी स्वीकृति हेतु एसएलटीसी द्वारा अनुमोदित डीपीआर/प्रस्ताव आपकी ओर संप्रेषित है :-

(राशि रु. लाख में)

क्र.	निकाय का नाम	उन्नयन कार्य हेतु एमआरएफ प्लॉट की संख्या (सूखा कचरा हेतु)	नवीन एमआरएफ प्लॉट की संख्या (सूखा कचरा हेतु)	नवीन विन्ड्रो कम्पोस्ट प्लॉट की संख्या (गीला कचरा हेतु)	संयंत्र निर्माण लागत	मशीनों एवं उपकरणों की लागत	कुल निर्माण लागत	अतिरिक्त लागत (कंटेनर्स, जीएसटी इत्यादि)	परियोजना लागत (संचालन एवं संधारण को छोड़कर)
1	2	3	4	5	6	7	8 = 6+7	9	10=9+8
1	मल्हार	1	—	1	22.39	5.06	27.45	1.52	28.97

कृपया उपरोक्त प्रस्ताव तकनीकी अनुमोदन हेतु आपकी ओर सादर प्रस्तुत है।

संलग्न :- उपरोक्तानुसार।

मुख्य नगर पालिका अधिकारी
नगर पंचायत, मल्हार, जिला- बिलासपुर (छ.ग.)

पृ. क्र./ 10/ न.पं./ 2026 -27
प्रतिलिपि :-

मल्हार दिनांक 02/04/ 2026

- मुख्य कार्यपालन अधिकारी, राज्य शहरी विकास अभिकरण, अटल नगर नवा रायपुर(छ.ग.)
- संयुक्त संचालक, क्षेत्रीय कार्यालय, नगरीय प्रशासन एवं विकास, रायपुर संभाग (छ.ग.)

मुख्य नगर पालिका अधिकारी
नगर पंचायत, मल्हार जिला- बिलासपुर (छ.ग.)



राज्य शहरी विकास अभिकरण, छत्तीसगढ़

डी-ब्लॉक, चतुर्थ तल, इन्द्रायती भवन, नवा रायपुर अटल नगर-492002
फोन नं. 0771-2222401; E-mail: osd.suda@yahoo.com

File No. : PROJ-204/45/2025-SUDA (T M P F) SECTION / 185441 - 99

—:: आदेश ::—

भारत सरकार, आवासन और शहरी कार्य मंत्रालय, नई दिल्ली द्वारा लागू स्वच्छ भारत मिशन-शहरी 2.0 अंतर्गत गठित राज्य स्तरीय तकनीकी समिति (SLTC) की ग्यारहवीं बैठक दिनांक 12.03.2026 के एजेण्डा क्र. 12 में लिये गए निर्णय तथा राज्य शासन के आदेश क्रमांक 4272/3201/2023/8 दिनांक 26.06.2023 के अनुक्रम में ठोस अपशिष्ट प्रबंधन (SWM) घटक अन्तर्गत निम्न तालिका के स्तम्भ क्र. 02 में उल्लेखित नगरीय निकायों को सूखे एवं गीले कचरे के प्रसंस्करण संयंत्र की स्थापना एवं स्थापित संयंत्रों के उन्नयन कार्य हेतु स्तम्भ क्र. 10 में वर्णित राशि की प्रशासकीय स्वीकृति प्रदान की जाती है :-

(राशि रु. लाख में)

क्र.	निकाय का नाम	उन्नयन कार्य हेतु एमआरएफ प्लांट की संख्या (सूखा कचरा हेतु)	नवीन एमआरएफ प्लांट की संख्या (सूखा कचरा हेतु)	नवीन विन्ड्रो कम्पोस्ट प्लांट की संख्या (गीला कचरा हेतु)	संयंत्र निर्माण लागत	मशीनों एवं उपकरणों की लागत	कुल निर्माण लागत	अतिरिक्त लागत (कंटेनर, जीएसटी इत्यादि)	परियोजना लागत (संचालन एवं संचारण को छोड़कर)
1	2	3	4	5	6	7	8 = 6+7	9	10 = 9+8
1	आमदी	1	-	1	26.49	5.06	31.55	1.61	33.16
2	अड़भार	1	-	1	26.33	5.06	31.39	1.61	33.00
3	अंबागढ़चौकी	1	-	1	31.11	5.06	36.17	2.42	38.59
4	अंतागढ़	1	-	1	21.08	5.23	26.31	1.53	27.84
5	अर्जुन्दा	1	-	1	25.35	7.48	32.83	2.19	35.02
6	बगीचा	1	-	1	29.45	5.23	34.68	2.37	37.05
7	बलौदा	1	-	1	22.23	16.08	38.31	3.97	42.28
8	बरमकेला	1	-	1	23.85	5.06	28.91	1.55	30.46
9	बारसूर	1	-	1	24.26	5.06	29.32	1.56	30.88
10	बसना	1	-	1	26.08	5.23	31.31	1.64	32.95
11	बस्तर	1	-	1	33.67	7.48	41.15	2.39	43.54
12	बेरला	1	-	1	20.92	5.06	25.98	1.49	27.47
13	भैरमगढ़	1	-	1	24.05	5.23	29.28	1.59	30.87
14	भखारा	1	-	1	25.51	5.06	30.57	1.59	32.16
15	भानुप्रतापपुर	1	-	1	30.02	7.48	37.50	2.35	39.85
16	भटगांव (सारंगढ़)	1	-	1	29.90	5.06	34.96	1.78	36.74
17	भटगांव (सूरजपुर)	1	-	1	22.25	16.08	38.33	3.79	42.12
18	भोपलपट्टनम	1	-	1	19.66	5.23	24.89	1.50	26.39
19	विलाईगढ़	1	-	1	27.96	5.06	33.02	1.85	34.87
20	बिल्हा	1	-	1	32.29	5.06	37.35	1.74	39.09
21	विश्रामपुर	1	-	1	24.21	15.43	39.64	3.69	43.33
22	बोड़ला	1	-	1	17.74	5.23	22.97	1.53	24.50
23	चंदखुरी	1	-	1	18.06	5.23	23.29	1.47	24.76

// 2 / /

क्र.	निकाय का नाम	उन्नयन कार्य हेतु एमआरएफ प्लॉट की संख्या (सूखा कचरा हेतु)	नवीन एमआरएफ प्लॉट की संख्या (सूखा कचरा हेतु)	नवीन विन्डो कम्पोस्ट प्लॉट की संख्या (गीला कचरा हेतु)	संयंत्र निर्माण लागत	मशीनों एवं उपकरणों की लागत	कुल निर्माण लागत	अतिरिक्त लागत (कंटेनर, जीएसटी इत्यादि)	परियोजना लागत (संचालन एवं संधारण को छोड़कर)
1	2	3	4	5	6	7	8 = 6+7	9	10 = 9+8
24	घनपुर	1	-	1	26.07	5.06	31.13	1.81	32.94
25	चारामा	1	-	1	27.23	5.23	32.46	1.82	34.28
26	छुईखदान	1	-	1	21.27	5.23	26.50	1.64	28.14
27	छुरा	1	-	1	24.62	7.48	32.10	2.07	34.17
28	छुरीकला	1	-	1	27.30	5.06	32.36	1.84	34.20
29	छुरिया	1	-	1	20.75	5.23	25.98	1.67	27.65
30	चिखलाकसा	1	-	1	22.40	5.23	27.63	1.71	29.34
31	डभरा	1	-	1	28.31	5.06	33.37	1.83	35.20
32	देवकर	1	-	1	17.88	5.23	23.11	1.46	24.57
33	धमधा	1	-	1	24.59	5.23	29.82	1.61	31.43
34	धरमजयगढ़	1	-	1	28.48	15.91	44.39	4.20	48.59
35	डोंगरगांव	1	-	1	27.57	16.08	43.65	4.03	47.68
36	दोरनापाल	1	-	1	21.92	5.23	27.15	1.55	28.70
37	डौण्डी	1	-	1	19.87	5.23	25.10	1.50	26.60
38	डौण्डीलौहारा	1	-	1	24.07	5.23	29.30	1.78	31.08
39	फरसागांव	1	-	1	20.50	5.23	25.73	1.52	27.25
40	फिंगेश्वर	1	-	1	24.12	5.23	29.35	1.60	30.95
41	गण्डई	1	-	1	35.61	16.08	51.69	4.80	56.49
42	गीदम	1	-	1	28.17	5.23	33.40	1.98	35.38
43	घरघोड़ा	1	-	1	27.91	5.06	32.97	1.77	34.74
44	गुण्डरदेही	1	-	1	25.93	5.23	31.16	1.74	32.90
45	गुल्लर	1	-	1	17.60	5.06	22.66	1.42	24.08
46	झगराखंड	1	-	1	22.98	5.23	28.21	1.57	29.78
47	जैजेपुर	1	-	1	27.57	5.06	32.63	1.89	34.52
48	जरही	1	-	1	22.12	5.23	27.35	1.55	28.90
49	कसडोल	1	-	1	27.39	16.08	43.47	3.90	47.37
50	केशकाल	1	-	1	31.27	5.23	36.50	2.12	38.62
51	थानखन्हरिया	1	-	1	27.08	5.23	32.31	1.66	33.97
52	खरौद	1	-	1	27.95	5.06	33.01	1.85	34.86
53	खरोरा	1	-	1	27.14	7.48	34.62	2.34	36.96
54	खोंगापानी	1	-	1	27.18	16.08	43.26	3.89	47.15
55	किरोड़ीमलनगर	1	-	1	32.17	15.91	48.08	4.31	52.39
56	कोण्टा	1	-	1	24.27	5.23	29.50	1.60	31.10
57	कोटा	1	-	1	34.86	15.91	50.77	4.25	55.02
58	कोतवा	1	-	1	20.44	5.23	25.67	1.52	27.19
59	कुनकुरी	1	-	1	29.03	16.08	45.11	3.93	49.04
60	कुरां	1	-	1	22.67	5.23	27.90	1.56	29.46
61	कुसमी	1	-	1	20.42	5.23	25.65	1.52	27.17
62	लैलूगा	1	-	1	28.29	5.06	33.35	1.80	35.15
63	लखनपुर	1	-	1	19.24	5.23	24.47	1.49	25.96
64	लवन	1	-	1	23.74	5.23	28.97	1.59	30.56
65	मगरलोड	1	-	1	26.55	5.06	31.61	1.61	33.22
66	मल्हार	1	-	1	22.39	5.06	27.45	1.52	28.97
67	मानाकम्प	1	-	1	29.29	16.08	45.37	3.94	49.31
68	मारो	1	-	1	25.60	5.06	30.66	1.69	32.35

// 3 //

क्र.	निकाय का नाम	उन्नयन कार्य हेतु एमआरएफ प्लॉट की संख्या (सूखा कचरा हेतु)	नवीन एमआरएफ प्लॉट की संख्या (सूखा कचरा हेतु)	नवीन बिन्दु कम्पोस्ट प्लॉट की संख्या (गीला कचरा हेतु)	संयंत्र निर्माण लागत	मशीनों एवं उपकरणों की लागत	कुल निर्माण लागत	अतिरिक्त लागत (कंटेनर्स, जीएसटी इत्यादि)	परियोजना लागत (संचालन एवं संचारण को छोड़कर)
1	2	3	4	5	6	7	8 = 6+7	9	10 = 9+8
69	नगरी	1	-	1	34.20	18.33	52.53	4.83	57.36
70	नईलेदरी	1	-	1	21.99	5.23	27.22	1.55	28.77
71	नरहरपुर	1	-	1	20.76	5.23	25.99	1.63	27.62
72	नवागढ़ (बेमेतरा)	1	-	1	27.24	5.06	32.30	1.73	34.03
73	नवागढ़ (जांजगीर)	1	-	1	23.74	5.06	28.80	1.63	30.43
74	नयाबाराद्वार	1	-	1	22.86	5.06	27.92	1.53	29.45
75	परखीर	1	-	1	31.88	7.48	39.36	2.55	41.91
76	पालारी (बलोदाबाजार)	1	-	1	26.17	5.23	31.40	1.64	33.04
77	पाली	1	-	1	24.69	5.06	29.75	1.93	31.68
78	पाण्डतराई	1	-	1	21.60	5.23	26.83	1.85	28.68
79	परपोड़ी	1	-	1	17.85	5.23	23.08	1.46	24.54
80	पाटन	1	-	1	25.45	9.73	35.18	2.55	37.73
81	पथरिया	1	-	1	23.33	5.06	28.39	1.54	29.93
82	पिपरिया	1	-	1	24.35	7.48	31.83	2.06	33.89
83	पिथौरा	1	-	1	24.93	5.23	30.16	1.61	31.77
84	प्रतापपुर	1	-	1	22.98	5.23	28.21	1.57	29.78
85	प्रेमनगर	1	-	1	19.34	5.23	24.57	1.49	26.06
86	पुत्तौर	1	-	1	24.59	5.06	29.65	1.74	31.39
87	राहौद	1	-	1	24.47	5.06	29.53	1.59	31.12
88	राजिम	1	-	1	30.48	18.08	48.56	4.39	52.95
89	राजपुर	1	-	1	20.79	5.23	26.02	1.52	27.54
90	सहसपुरलोहारा	1	-	1	25.84	5.23	31.07	1.81	32.88
91	साजा	1	-	1	18.91	5.23	24.14	1.65	25.79
92	समोदा	1	-	1	24.63	5.23	29.86	1.61	31.47
93	सारागांव	1	-	1	25.75	5.06	30.81	1.81	32.62
94	सरगांव	1	-	1	26.76	5.06	31.82	1.87	33.69
95	सरिया	1	-	1	27.02	5.06	32.08	1.83	33.91
96	शिवरीनारायण	1	-	1	26.29	5.06	31.35	1.78	33.13
97	सीतापुर	1	-	1	24.04	5.06	29.10	1.56	30.66
98	तुमगांव	1	-	1	21.02	5.23	26.25	1.53	27.78
99	टुण्डरा	1	-	1	20.54	5.23	25.77	1.52	27.29
100	उतई	1	-	1	26.05	7.48	33.53	3.05	36.58
101	वाङ्गनगर	1	-	1	21.06	5.23	26.29	1.53	27.82

शर्तें :-

1. सूखे एवं गीले कचरे के प्रबंधन हेतु संयंत्रों की स्थापना तथा स्थापित संयंत्रों के उन्नयन के समस्त कार्य हेतु संबंधित नगरीय निकाय क्रियान्वयन एजेंसी होगी।
2. उपरोक्त कार्य हेतु सक्षम प्राधिकारी से तकनीकी स्वीकृति प्राप्त की जावे एवं तकनीकी स्वीकृति के अनुक्रम में प्रशासकीय स्वीकृति की सीमा में निर्माण कार्य किया जावे।

// 4 //

3. परियोजना के कार्य की प्रगति का प्रतिवेदन प्रतिमाह एवं स्टेट नोडल एजेंसी द्वारा समय-समय पर उपलब्ध करायी जाने वाले धनराशि का उपयोगिता प्रमाण पत्र निर्धारित प्रारूप में निकाय द्वारा स्टेट नोडल एजेंसी को उपलब्ध कराया जावेगा। भारत सरकार से परियोजना की आगामी किश्तों की राशि प्राप्त किये जाने हेतु निकाय द्वारा यथा समय प्रस्ताव स्टेट नोडल एजेंसी को प्रेषित किया जावेगा।
4. सक्षम प्राधिकारी द्वारा अनुमोदित निविदा प्रारूप में ही निविदा आमंत्रित किया जावे, साथ ही विभाग द्वारा निविदा आमंत्रण के संबंध में समय-समय पर जारी निर्देशों का पालन करना अनिवार्य होगा।
5. भारत सरकार, आवासन और शहरी कार्य मंत्रालय द्वारा स्वच्छ भारत मिशन-शहरी 2.0 हेतु जारी प्रचालन दिशा-निर्देशों में निहित वित्तीय प्रावधानों का पालन करना अनिवार्य होगा।
6. परियोजना का कार्य निकाय द्वारा समय-सीमा में पूर्ण किया जाना सुनिश्चित किया जावेगा।
7. स्वच्छ भारत मिशन-शहरी 2.0 में निर्देशित रिफार्म का लक्ष्य वर्षवार निर्धारित कार्यक्रम के अनुसार प्राप्त करना अनिवार्य होगा।
8. निविदा आमंत्रण कार्य छत्तीसगढ़ नगरपालिका अधिनियम, 1961 एवं उसके अंतर्गत लागू छत्तीसगढ़ नगर पालिका (मेयर-इन-कौंसिल/प्रेसीडेंट-इन-कौंसिल के कामकाज का संचालन तथा प्राधिकारियों की शक्तियां एवं कर्तव्य) नियम, 1998 एवं छ.ग. कार्य विभाग मैनुअल के प्रावधानों एवं विभाग द्वारा समय-समय पर जारी दिशा निर्देशों का पालन किया जावे।
9. विभागीय आदेश क्र. 4272/3201/2023/18 दिनांक 26.06.2023 अनुसार उपरोक्त कार्य हेतु आमंत्रित निविदा में प्राप्त न्यूनतम दर का अनुमोदन एवं वित्तीय स्वीकृति प्राप्त की जावेगी।
10. निर्माण कार्य सक्षम अधिकारी द्वारा अनुमोदित डीपीआर नक्शे एवं ले-आउट अनुसार किया जावे।
11. सक्षम प्राधिकारी की स्वीकृति के बिना प्राक्कलन में सारवान परिवर्तन नहीं किया जावेगा।
12. परियोजना की प्रशासकीय स्वीकृति तथा परियोजना में निहित कार्यों का संक्षिप्त विवरण एमआईसी तथा सामान्य सभा की आगामी बैठक में सूचनार्थ प्रस्तुत किया जावे।
13. निर्माण कार्य हेतु प्रस्तावित भूमि का आधिपत्य/प्रावधिक आबंटन प्राप्त होने के पश्चात् ही निविदा आमंत्रित की जावे।
14. निर्माण कार्य निकाय के स्वामित्व/आधिपत्य की भूमि पर ही कराया जावे।

// 5 //

15. निक्षेप कार्य विहित प्रक्रिया का अनुसरण करते हुए संपादित किया जावे।
16. राज्य शासन तथा नोडल एजेंसी राज्य शहरी विकास अभिकरण, छत्तीसगढ़ द्वारा समय-समय पर जारी निर्देशों का पालन किया जाना अनिवार्य होगा।
17. कार्यों में व्यय होने वाली राशि का नियमानुसार लेखा संधारण निकाय द्वारा किया जावे।
18. कार्य प्रारंभ की सूचना एवं कार्य पूर्णता की सूचना इस कार्यालय को अनिवार्यतः प्रेषित किया जावे।
19. उपरोक्त प्रशासकीय स्वीकृति स्वच्छ भारत मिशन-शहरी 2.0 हेतु जारी प्रचालन दिशा-निर्देश की कंडिका 4.5.2 में उल्लेखित वित्तीय मापदण्ड (केन्द्रांश-50%, राज्यांश-33% एवं निकाय अंशदान-17%) के अधीन है।

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Shashank Pandey

Date: 01-04-2026

सह मिशन-कलेक्टर (SBM-U 2.0)
राज्य शहरी विकास अभिकरण,
नवा रायपुर अटल नगर

File No. : PROJ-204/45/2025-SUDA (T M P F) SECTION / 185441 - 100

प्रतिलिपि :-

1. विशेष कर्तव्यस्थ अधिकारी, मान. उप मुख्यमंत्रीजी सह भारसाधक मंत्री, छ.ग. शासन, नगरीय प्रशासन एवं विकास विभाग, मंत्रालय, नवा रायपुर अटल नगर।
2. संयुक्त सचिव एवं मिशन निदेशक (स्वच्छ भारत मिशन) भारत सरकार, आवासन और शहरी कार्य मंत्रालय, नई दिल्ली।
3. सचिव, छ.ग. शासन, नगरीय प्रशासन एवं विकास विभाग, मंत्रालय, नवा रायपुर अटल नगर।
4. संचालक, नगरीय प्रशासन एवं विकास, इन्द्रावती भवन, नवा रायपुर अटल नगर।
5. समस्त जिला कलेक्टर (छ.ग.)
6. मान. अध्यक्ष, संबंधित नगर पालिका परिषद/नगर पंचायत, (छ.ग.)
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8. संबंधित मुख्य नगर पालिका अधिकारी, नगर पालिका परिषद/नगर पंचायत, (छ.ग.)
9. प्रोग्रामर, डाटा सेंटर, संचालनालय, नगरीय प्रशासन एवं विकास, नवा रायपुर अटल नगर की ओर वेबसाइट में अपलोड करने हेतु।

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राज्य शहरी विकास अभिकरण,
नवा रायपुर अटल नगर



NAGAR PANCHAYAT MALHAR, CHHATTISGARH

75
आज़ादी का
अमृत महोत्सव

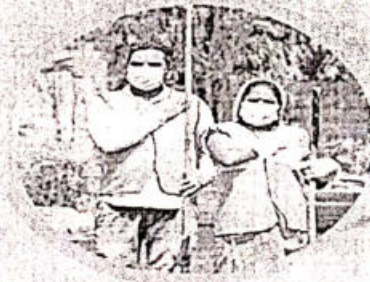


Ministry of Housing and Urban Affairs
Government of India



VOL - I

Swachh Bharat Mission-Urban 2.0



NAGAR PANCHAYAT REPORT UNDER SRM 2.0 FOR SWM, NAGAR PANCHAYAT MALHAR, CHHATTISGARH



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नगर पंचायत
मुख्य नगर प्रालिका अधिकारी
नगर पंचायत मल्हार

मुख्य नगर प्रालिका अधिकारी
नगर पंचायत मल्हार

Abbreviations

CC	Conventional Composting
C&D	Construction and Demolition
C/N	Carbon/Nitrogen Ratio
CPCB	Central Pollution Control Board
CPHEEO	Central Public Health & Environmental Engineering Organization
DPR	Detailed Project Report
EIA	Environmental Impact Assessment
EPA	Environment Protection Act (1986)
FCO	Fertilizer (Control) Order, 1985
GCV/CV	Gross Calorific Value
Ha	Hectare
ISWM	Integrated Municipal Solid Waste Management
Kcal	Kilo Calories
MCX	Municipal Corporation/Committee/Council XXXX
MOEF&CC	Ministry of Environment and Forests and Climate Change
MOUD	Ministry of Urban Development (Govt. of India)
MRV	Monitoring Reporting and Verification
MSW	Municipal Solid Waste
NGOs	Non-Governmental Organisations
PCC	Pollution Control Committee
PPE	Personal Protective Equipment
PPP	Public Private Partnership
PROM	Phosphate Rich Organic Manure
RC	Reinforced Concrete
RDF	Refuse Derived Fuel
RFP	Request for Proposal
SPCB	State Pollution Control Board
SLB	Service Level Benchmark
SLF	Sanitary Landfill
SOP	Standard Operating Procedure
SWM	Solid Waste Management
TPD/TPA	Tons per Day / Tons per Annum
ULBs	Urban Local Bodies

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उप-अभियंता
नगर पंचायत मल्हार

मुख्य नगर पालिका अधिकारी
नगर पंचायत मल्हार

Executive Summary

The state of Chhattisgarh currently generates about 2520 Tonnes per day (TPD) of Municipal Solid Waste and this quantity is likely to be more than 3000 TPD by 2026, assuming the rate of increase of per capita waste generation is in proportion to increase in urban population. State Urban Development Authority (SUDA), in its endeavour to provide people safe, clean and healthy environment, has proposed to set up Solid waste management facilities in the ULBs of Chhattisgarh on EPC mode. The government of India through Solid Waste Management Rules, 2016 has set the baseline for the modus operandi of SWM in the country.

Based on factors such as existing treatment facilities, additional machines and equipment required to attain saturation to ensure 100% scientific waste processing, availability of land parcel, optimal waste transport distance and project area the technical feasibility report has been prepared for Malhar. The Malhar ULB currently generates about 3.37 TPD of waste which is likely to increase to 3.43 TPD by 2026.

This report describes a possible design solid waste management system in Malhar ULB and identifies feasible technologies for processing and disposal of MSW. Based on the analysis and all the studies, it is proposed that processing of MSW into compost and RDF and recovery of recyclables through Compost and MRF plant is the most feasible technology based on quantity of waste generation, land availability, waste characteristics and volume reduction of waste.

The overall project has been designed considering the year 2026 which accounts for the time taken in bid process management, bid finalization, construction & commissioning of the plant and year on year expansion in population growth and subsequently in waste generation quantity which will be approximately 3.43 TPD for Malhar ULB (assuming 2% YOY increase in population and 300 g/capita waste generation). The total capital cost for up-gradation of SLRM centre to MRF plant and compost plant has been estimated to be INR 28.97 Lacs.

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1. Introduction

Waste generation encompasses activities in which materials are identified as no longer being of value (being in the present form) and are either thrown away or gathered for disposal. Solid Waste Management Rules, 2016 (MSW Rules 2016) define Municipal Solid Waste (MSW) as commercial and residential wastes generated in a municipal or notified area in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes.

Solid Waste Management (SWM) is a vital service provided by Urban Local Bodies (ULBs) to its citizens to ensure a healthier environment, standard of living, health and sanitation facilities. Although an obligatory function, SWM service has been an area of concern for urban centers of all sizes especially with changing patterns of lifestyle and behavior. With increasing population and urbanization, SWM in India has emerged as a priority not only because of the environmental and aesthetic concerns but also because of the quantities generated every day.

A typical SWM value chain comprises of the following steps:

- Waste generation and storage
- Segregation, reuse, and recycling at the household level
- Primary waste collection and transport to a transfer station or community bins
- Street sweeping and cleansing of public places
- Management of the transfer station or community bin.
- Secondary collection and transport to the waste disposal site/ processing facility
- Processing of waste using appropriate technologies
- Scientific and safe disposal of inert/ residual waste

Recognizing the importance of solid waste management, the Government of Chhattisgarh has initiated steps to improve SWM in the state of Chhattisgarh by planning setting up of new solid waste management facilities and upgradation/revamping of existing SLRM centers to achieve saturation and attain 100% scientific processing of MSW. This task is entrusted with the SUDA, Government of Chhattisgarh. There are 188 Urban Local Bodies (ULBs) in the state of Chhattisgarh with a population of about 59.89 lakhs as per Census 2011. These ULBs generate about 2514 TPD of MSW and this quantity is likely to be more than 3000 TPD by 2026. It has been proposed to setup new and upgrade/revamp existing SWM system in each of the ULBs. Such an infrastructure shall be designed in a manner that assures economical service delivery and establishes cost recovery mechanisms for long term sustainability. Further, it shall maximize resource recovery and minimize environmental impact.

1.1 Role of Urban Local Bodies (ULBs)

As per the Constitution of India, SWM is a state subject, and it is the primary responsibility of state governments to ensure that appropriate solid waste management practices are introduced in all the cities and towns in the state. Though SWM is a state subject, it is basically a municipal function and as such urban local bodies are directly responsible for performing this important activity. The 74th amendment of the constitution also envisages the urban local bodies to shoulder this responsibility.

The urban local bodies in the country are, therefore, responsible and required to plan, design, operate, and maintain the solid waste management system in their respective cities/towns. The ULBs may promote private sector participation to ensure solid waste management by deciding to set up treatment facilities and doorstep collection service with the private sector participation on suitable terms and

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conditions for which standard concession agreements/formats may be drawn up with legal assistance to ensure protection of ULB interest.

1.2 Regulatory Landscape

Solid Waste Management Rules, 2016

The Ministry of Environment and Forests (MoEF, later rechristened as Ministry of Environment, Forests and Climate Change (MoEFCC)), Government of India, enacted the "Municipal Solid Waste (Management and Handling) Rules 2000" (*MSW Rules 2000*) in conformance with Sections 3, 6 and 25 of the Environment Protection Act, 1986. These rules were aimed at standardization and enforcement of SWM practices in the ULBs. The rules mandated every municipal authority to, within the territorial area of the municipality, be responsible for the implementation of the provisions of these rules and infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes. In addition, the CPCB would coordinate with State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) in the matters of MSW disposal and its management and handling.

Central Public Health and Environmental Engineering Organization (CPHEEO), a department under the Ministry of Urban Development (MoUD) has developed a manual based on these rules to provide operational guidelines to ULBs for an efficient MSW management system.

Further, the MoEFCC has published the "The Solid Waste Management Rules, 2016" to supersede "The Municipal Solid Wastes (Management and Handling) Rules, 2000". The salient features of these rules include:

- The term "municipal solid waste" has been replaced by solid waste; solid waste encompasses domestic waste including sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, construction and demolition waste and treated bio-medical waste excluding industrial hazardous waste, bio-medical waste and e-waste.
- Inclusion of a separate chapter on construction & demolition waste management with roles and responsibilities of various stakeholders defined including Bureau of Indian Standards
- Separate standards for organic compost and phosphate rich organic manure; stringent standards for incineration
- Removal of term 'municipal authority'; new stakeholders have been identified. The functions of MoEFCC, MoUD, Ministry of Chemicals and Fertilizers, CPCB, SPCB, Pollution Control Committees for Union Territories, municipal administration, state governments and urban local bodies
- Provision for incentives to decentralized waste treatment facilities.

The rules have enlisted duties of various stakeholders:

- The waste generators are mandated to segregate and store waste generated by them in three separate streams namely bio-degradable, non-bio-degradable and domestic hazardous waste in suitable bins and handover these segregated wastes to authorized waste collectors. Further, construction and demolition waste shall be disposed of as per the Construction & Demolition Waste Management Rules, 2016.

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- Ministry of Environment, Forest and Climate Change shall be responsible for overall monitoring and implementation of these rules in the country. A Central Monitoring Committee shall be setup to monitor and review implementation of these rules.
- Ministry of Urban Development formulated the national policy and strategy on solid waste management including a policy on waste-to-energy in consultation with stakeholders, promote research and development in the sector and undertake training and capacity building of local bodies and other stakeholders.
- Department of Fertilizers, Ministry of Chemicals and Fertilizers shall provide market development assistance on city compost.
- Ministry of Agriculture, Government of India shall endeavor to provide flexibility in Fertilizer Control Order for manufacturing and sale of compost.
- Ministry of Power shall decide tariff for power generated from waste-to-energy plants and compulsorily purchase power generated from such waste-to-energy plants.
- Ministry of New and Renewable Energy shall facilitate infrastructure creation and provide subsidy or incentives for waste-to-energy plants.
- District Magistrate/ District Collector/ Deputy Commissioner shall facilitate identification and allocation of suitable land for setting up solid waste management facilities.

Service Level Benchmarks

In order to set minimum performance standards for public services, a Service Level Benchmarks (SLBs) programme has been undertaken by the Ministry of Urban Development (MoUD) since 2009 emphasising on an increased focus on delivery of service outcomes. The programme covers vital services offered by the ULBs that include water supply, wastewater and solid waste management. The minimum set performance parameters for SWM services include:

1. Household Level Coverage - 100%
2. Efficiency in Collection of Solid Waste - 100%
3. Extent of Segregation of MSW - 100%
4. Extent of MSW Recovered - 80%
5. Extent of Scientific Disposal of MSW - 100%
6. Extent of Cost Recovery - 100%
7. Efficiency in Collection of SWM Charges - 90%
8. Efficiency in addressing of Customer Complaints - 80%

Performance-related funds were earmarked under the 15th Finance Commission for improvements in SLBs including SWM. The focus is to achieve 100% source segregation, efficient door-to-door collection, minimize manual handling of waste and increase efficacy of covered transportation.

Regulatory landscape for SWM is summarized below.

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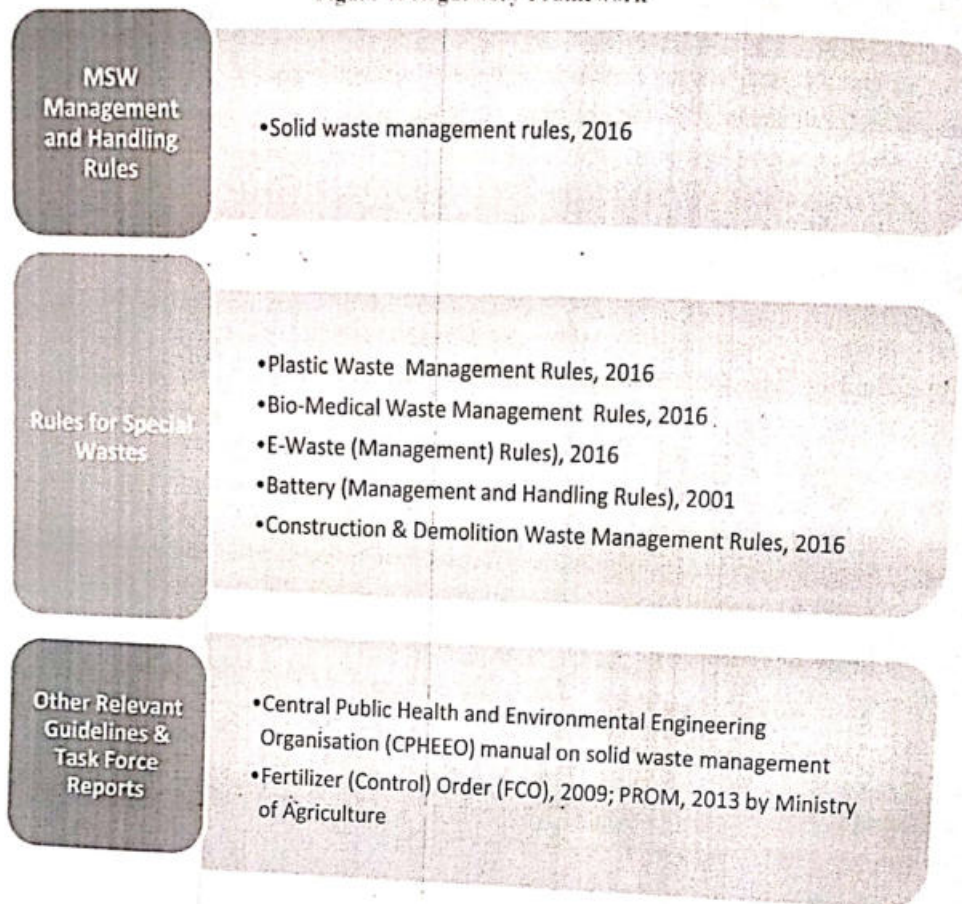
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Figure 1: Regulatory Framework



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2. Project Development

MSW can be managed through a centralized approach, a decentralized approach, or a combination of the two. Waste management services under each approach in turn can be delivered by the ULBs themselves or in association with the private sector or the local community. In India, both centralized and decentralized systems are in practice in different cities/towns. These two approaches have been briefly discussed below.

a. Centralized approach

The centralized approach to waste management, also termed as Integrated Solid Waste Management, is a technology-driven waste management system for handling bulk wastes at a central processing facility. With respect to the MSW value chain, in a centralized waste management system, the implementing agency (either the ULB or a private entity) collects wastes from household or community bins and transports it to a processing facility. Thereafter, composting techniques and/or waste to energy technologies like incineration, palletisation, Refuse Derived Fuel (RDF), plasma gasification, bio-methanation are used to derive value from the wastes. These waste-to-energy technologies are more common in developed countries and have been applied in a few waste management projects in India.

A Solid Waste Management System (SWM) envisages provisioning of all aspects of waste management i.e. collection, transportation, processing and disposal of waste by one or two large entities. Application of state-of-the-art technologies, reaping economies of scale and ensuring commercial viability of projects are the main reasons for bundling up of all segments of the waste value chain. Moreover, coordination between the ULB and the private entity is relatively better in the ISWM framework when compared to a scenario where multiple entities are engaged in different segments of the waste management process.

b. Decentralized approach

The decentralized method of managing a city's waste involves management of municipal waste by various small waste management centres within the locality. In technical parlance, such centres are called Integrated Resource Recovery Centres (IRRC) which can be either profit-making or not-for profit organizations engaged in collecting, transporting and processing around 2 to 20 metric tons of waste from the surrounding locality. The micro-entrepreneurs owning for-profit IRRCs generally engage informal workers for collection and transportation of wastes through hand-held carts or other small vehicles. Composting is undertaken to convert organic waste into manure whereas recyclables like metal, glass, plastics etc. are either sold to the recycling industry or recycled by the organization itself. The refuse is collected by the ULBs and transported to the sanitary landfill sites.

The system is based on door-to-door waste collection and provides training to households in segregation of wastes. The system provides daily door-to door collection services using cycle-carts operated by a team of two informal waste workers in uniforms and with safety equipment like hand gloves, boots and masks. The collected wastes are transported to the MRF where it is manually segregated, and organic waste is composted. Sieved compost is enriched with nitrogen, phosphorous and potassium to make organic

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The differences between the two approaches are highlighted below:

Table 1: Centralized & decentralized waste management

Parameter	Centralized approach	Decentralized approach
Processing	Collection & treatment of the combined waste at one location	Collection & treatment of the waste at ward/ zone level. – Dry & Wet
Land required	Less number of sites, NIMBY syndrome restricted to few locations	More number of sites, Public opposition possible
Transportation	High	Less
Scale of economies	Scale of economies work in processing	Helps recycling of waste in trade lines
Disposal	More waste going to SLF (as per the SWM Rules 2016 not more than 20% of the incoming Waste stream can be send to landfill)	Less waste going to SLF

The centralized waste management and the decentralized waste management systems have their own advantages and disadvantages and cannot be uniformly applied to ULBs of all sizes and locations. Both the waste management mechanisms – centralized and decentralized – when deployed in circumstances suited to the mechanism, can result in efficient solid waste management. Neither has been shown to be superior to the other on all parameters in all conditions, and hence, the question that needs to be answered is under which conditions should a centralized model of waste management be adopted, and when to adopt the decentralized model. The choice of a particular approach depends on several factors like financial and human resource capacity of the concerned ULB, socio-economic-cultural profile of city/town, status of service delivery, quantity and quality of waste generated, availability of land, among others.

2.1 Basis of Project Development

The quantity and composition of MSW generated in the ULB is essential for determining collection, processing and disposal options that could be adopted. They are dependent on the population, demographic details, principal activities in the city/ town, income levels and lifestyle of the community. In order to assess the sufficiency of the existing and potential MSW treatment capacity of the State of Chhattisgarh, the following stepwise process has been followed:

- Data on current MSW generation from non-industrial (domestic, commercial) and industrial sectors has been collected from ULBs.
- Population projections have been made taking population of 2011 as the base figures and considering 2% YoY increase in urban areas (CPHEEO manual, 2015)
- Future MSW generation from domestic, commercial and industrial sectors is estimated using sector specific growth factors.
- Treatment capacity of all functioning treatment plants and potential treatment capacity of identified land pockets have been estimated.

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2.2 Project Area

Malhar is a Nagar Panchayat city in district of Bilaspur, Chhattisgarh. The Malhar city is divided into 15 wards for which elections are held every 5 years. The Malhar Nagar Panchayat has population of 8,505 of which 4,410 are males while 4,095 are females as per report released by Census India 2011. In Malhar Municipality, Population of Children with age of 0-6 is 1203 which is 14.14 % of total population of Malhar (NP). In Malhar Nagar Panchayat, Female Sex Ratio is of 929 against state average of 991. Moreover Child Sex Ratio in Malhar is around 874 compared to Chhattisgarh state average of 969. Currently, Malhar Municipality has total administration over 1651 houses hold, 5 institutions, 160 commercial establishments and Hospital 01 to cater this MSW project.

Figure 2: Project Area



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Following are the ward details of the Malhar ULB.

Table 2: Malhar Ward Details

Ward No.	Ward Name	Population as per census 2011
	Column1	Column2
Ward No. 1	Vrindavan Ward	893
Ward No. 2	Siddhnagar Ward	526
Ward No. 3	Radhakrishna Ward	354
Ward No. 4	Baram Baba Ward	674
Ward No. 5	Pataleshwar Mahadev Ward	568
Ward No. 6	Mahatma Gandhi Ward	295
Ward No. 7	Budhadev Ward	510
Ward No. 8	Shantinagar Ward	477
Ward No. 9	Paraudev Ward	527
Ward No. 10	Nandmahal Ward	820
Ward No. 11	Guha Nishad Ward	684
Ward No. 12	Ma Didineshwari Ward	585
Ward No. 13	Madhyanagariy Ward	373
Ward No. 14	Parmeshwara Ward	541
Ward No. 15	Azad Ward	678
	TOTAL	8505

The details about the population and waste generation for ULB is as follows

Table 3: Population and Waste Generation Detail

ULB Code	ULB	Population projection for 2026	Waste generation in 2026 (Tons per day)	Wet Waste Generation (TPD) in 2026	Dry Waste Generation (TPD) in 2026
801978	Malhar	11439	3.43	1.89	1.20

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3. Existing Scenario of MSW Management

Currently, the ULB is responsible for collection, transportation, treatment, and disposal of all solid waste generated in the respective ULB, except untreated bio-medical waste and hazardous industrial waste. Brief summary of existing scenario for MSW management in the Malhar ULB is given below.

Table 4: Summary of Existing Structure

ULB	Collection and Transportation	Processing and Disposal
Malhar Nagar Panchayat	<ul style="list-style-type: none"> Municipal Solid Waste of Malhar ULB collected by, 5 E-Rikshaw and 2 Auto Tippers. 	<ul style="list-style-type: none"> There is 1 SLRM Center in ULB to process dry waste and compost pits/plant to process wet waste.

The primary sources of solid waste generation in Malhar are from the households, markets, commercial establishments/ shops, hotels & restaurants, institutions, function/marriage halls, Offices, Hospitals etc.

Source Segregation

Waste should be segregated by waste generators into two fractions – wet fraction (green container) and dry fraction (blue container). The list of different waste bins is provided below:

Table 5: Waste bins for source segregation of waste

Wet Waste (Green Bin)	Dry Waste (Blue bin)			
	With further sub-segregation			
Food wastes of all kinds, cooked and uncooked, including eggshells and bones, flower and fruit wastes including juice peels and house plant wastes, soiled tissues, food wrappers, paper towels	Paper, cardboard, and cartons	Containers and packaging of all kinds, excluding those containing hazardous material, compound packaging of all kinds	Rags, rubber, wood, discarded clothing, furniture	Metals, glass (all kinds), Inert, house sweeping,

Collection of wet and dry waste separately enhances the potential of cost-effective treatment of such wastes cost effectively and ensure optimum advantage from the recyclable material fed into the system. Segregated waste must be stored on-site in separate containers for further collection and should be kept separate during all steps of waste collection, transportation, and processing.

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3.1 Storage and Collection

All residents are encouraged through information and education campaign to;

- Keep the food waste, kitchen waste and other bio-degradable waste as and when generated, in the domestic waste container as prescribed by ULB
- Keep recyclable and non-biodegradable waste in the waste container prescribed by ULB.

3.2 Collection & Transportation

Malhar is collecting municipal solid waste on daily basis with 2 Auto Tippers, 5 E-Rikshaw. There are 20 Swachhata Didi working on collection, transportation, and processing of municipal solid waste. ULB is getting around 60% of solid waste in segregated manner.

3.2.1 Primary Collection

Primary collection refers to the process of collecting waste from households, markets, institutions, and other commercial establishments and taking the waste to processing plants. ULB is collecting waste through the use of E-Rickshaw and Auto-Tippers. The waste is collected in the morning hours before 12 noon.

Vehicles and equipment

Light commercial vehicles with hydraulic tipping containers: These vehicles are suitable for door-to-door collection from lanes of width less than 5 meters with a total pay load capacity of nearly 600 – 900 kilograms per trip. For The Malhar ULB, as a conservative estimate a capacity of 600 kg per trip is considered. This is equivalent to a carrying capacity of about 1.2 cum of waste per trip. Each light commercial vehicle may collect waste from 700 households.

3.2.2 Litter Bins

The main objective of the litter bins system commercial and public area is to store the waste temporarily and transport it as early as possible. Waste is temporarily stored in the litter bins prior its transportation disposal site.

ULB aspires to follow the two bins system at each 100 m distance in commercial and public area. Organic waste bins are proposed to be in green colour and inorganic or non-biodegradable waste bins are proposed to be in blue colour.

Waste from the commercial areas is collected between 10.00 am and 4 pm. Vegetable market waste is collected in non-peak hours either early morning or late in the afternoon or at night.

3.2.3 PPE Kits

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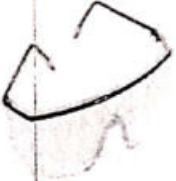
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The PPE are mandatory requirement for the safety and hygiene purpose for workers at the SLRM Centre/ MRF Plant. The PPE requirements for all the manpower handling MSW are gloves, shoes, uniforms covering the entire body etc. Following table provides the detailed specifications, along with applicable codes of practice.

Table 6: Specifications for PPE

Name of PPE	Image/Picture	Specification	Standards
Nose Mask (Surgical)		<ul style="list-style-type: none"> - Size (L x W) 5.5" x 3.5" - Blue Colour - Plain Cloth Fabric - Cotton (10% Poplin) cloth - Non-irritant, anti-allergenic and Skin friendly - Breathable without restriction and environment friendly - 50 to 150 GSM of Fabric - Soft stretch elastic earloops - Foldable 	IS: 9473-2002 IS:15323-2003
Safety goggles		<ul style="list-style-type: none"> - Polycarbonate lens with soft PVC frame & body. - Fully adjustable headband attached to fit most users. - Light, resilient, durable & over the glass protective eyewear for all day wears. - Anti-fog lens coating - 4-point venting system that circulates air yet prevents dust, splashes. - Scratch resistant lens - Lens provides medium velocity impact & splash protection around the eyes. - Universal fit soft nose bridge conforms to facial contours to ensure a comfortable fit. 	EU 86/686/EFC EN166/2002 and ANSI/SEA Z87.1-2010 or equivalent





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Name of PPE	Image/Picture	Specification	Standards
Chemical resistant gloves, multi-use		<ul style="list-style-type: none"> - CE Marked fully nitrile rubber hand gloves (In pair) shall have inside soft cotton flocked lining. - It shall be able to resist acid, alkali & solvent while providing solid protection against snags, abrasion, puncture & cuts. - Nitrile rubber hand glove should meet requirement of the overall length of the gloves shall not be less than 12 Inches (from middle finger to end of the sleeve). 	IS: 4770-1991 EN-388 & EN-374 (2016)
Safety (High visibility/ warning) Jacket		<ul style="list-style-type: none"> - 100% mesh polyester - Reflective Tape: High gloss - Tape Width: 2 inches 	IS: 15809 - 2017
Bouffant Caps		<ul style="list-style-type: none"> - Bouffant caps are lightweight. - Water repellent - Help protect the user against germs and bacteria. 	IS: 2925-1984 CE-EN-397 ANSI Z891-2003
Safety shoes		<ul style="list-style-type: none"> - Safety footwear must be as per ISO. - The standard outlines the minimum and optional requirements for safety footwear. - A protective toecap that can withstand a 200-joule impact. - Antistatic protection, midsole penetration protection, energy absorption, water resistance insulation against cold and heat. 	IS: 5852-2004 IS: 15298 (Part 2)-2011




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Name of PPE	Image/Picture	Specification	Standards
Ear Plugs		<ul style="list-style-type: none"> Ear plug for protection against noise (NRR to be minimum 29db) Made of soft sponge material or silicone Polyurethane, non-allergic, smooth, comfortable, tapered shape to fit into the ear canal closely, longer length to facilitate fitting. Removable point, attached with nylon thread packed in good 	IS: 6229-1980
			
Apron		<ul style="list-style-type: none"> Apron to be used in by personnel performing works procedures with high risk of contamination. Thickness: 150-300 microns. 	IS: 4501-1981

Note: If apron having reflective stripe are available in market that will be preferable, instead of separate Apron & Safety jacket

3.3 Processing Facilities

There is 1 SLRM centre available in Malhar in which dry waste is processing and selling to Kabadiwala by Swachhata Didi. There is 1 compost plant available in ward no. 02 which is operational.

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Table 7: Existing SLRM Centre & Compost Plant Details Malhar

SLRM No./COMPOST PLANT	SLRM I OLD	COMPOST PLANT 1
Ward No.	2	2
Location Name	SWAMI VIVEKANAD WARD NO. 2 NEAR PIPARAH TALAB	
SLRM Plant Capacity (TPD)	4.95 TPD	2.5 TPD
Total No. of Wards Covered	15	15
Wards covered	01 TO 15	
Total Household covered	2275	
Weighing Machine Available (Yes/ No)	NO	
Bailer Machine Available (Yes/ No)	YES	NA
Fatka Machine Available (Yes/ No)	YES	NA
Compost Machine (Yes/ No)	NA	NO
Compost Pits Operational (Yes/ No)	NA	YES
Toilet Available (Yes/ No)	YES	NO
Civil Infrastructure Retrofitting required (Yes/ No)	YES	NA
SLRM Shed need to change (Yes/ No)	NEED REPAIRING	NEED REPAIRING
Boundary Wall Available (Yes/ No)	YES (REQUIRE MAINTENANCE OF SLRM)	REQUIRED
Water Availability (Yes/ No)	YES	NO
Electricity Available (Yes/ No)	YES	
Approach Road Available (Yes/ No)	YES	YES
CCTV Required (Yes/ No)	YES	

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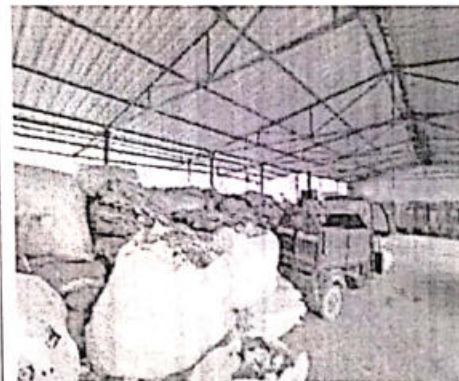
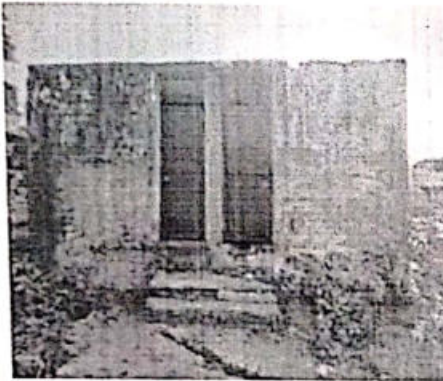
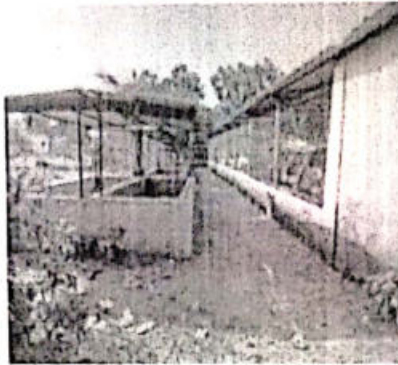
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Figure 3 : (photos of slm centre and compost pitsWard No. 02)



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3.4 Deficiency Analysis – Existing Solid Waste Management System

There is a considerable improvement in waste management in ULB, yet there are some issues in the existing system. There are issues that need to be addressed such as absence of segregation practice, absence of 100% door to door collection, systematic collection and absence of processing and treatment processes and scientific disposal facility. The issues identified with the current management system are highlighted in below table.

Solid Waste Management practices in Malhar town need improvements to make it more effective and efficient. The following aspects of the present system shall be addressed to establish a solid waste management system for the town.

Table8: Deficiency Analysis in present scenario of SWM in Malhar

Component	Remarks
Segregation at Source	<ul style="list-style-type: none"> lack of collection & segregation of waste at the source of generation.
Primary Collection	<ul style="list-style-type: none"> There is 90% door-to-door collection. Unhealthy and unhygienic waste disposal practices followed by the citizens.
Street Sweeping	<ul style="list-style-type: none"> Inefficient street sweeping operations. The current sweeping does not cover all the roads and streets.
Transportation	<ul style="list-style-type: none"> Lack of systematic disposal of waste and its transportation from entire town to processing plant and landfill site causing nuisance to the environment and sanitation system of the city.
Community Participation	<ul style="list-style-type: none"> Community participation is absent with some exceptions.
Public Awareness	<ul style="list-style-type: none"> Lack of significant educational programs, campaigns for public awareness on solid waste management, significance of recycling, reuse and segregation of MSW creating environmental and sanitation problems.
Processing and Disposal	<ul style="list-style-type: none"> Lack of waste processing practices.

Service level benchmarking has been assessed with respect to the performance indicators for the solid waste management of Malhar. The service levels of the existing performance indicators have been compared with benchmark values given by MoUD, GOI. Proposals have been framed with consideration of benchmark values given by MoUD under handbook of Service Level Benchmarking for solid waste management. Following table shows the existing scenario of Malhar town with reference to state level benchmark.

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Table 9: Deficiency in SWM with respect to state level benchmark

Sr. No.	Indicator	Unit	Value	Existing Scenario	Target for the year 2026
1	Household level coverage of SW services	As % of households and establishments that are covered by daily door-step collection system	100%	90%	100%
2	Efficiency of Collection of municipal solid Waste	As % of total waste collected by ULB and authorized service providers against waste generated within the project area (excluding the waste recycled through rag pickers)	100%	90%	100%
3	Extent of Segregation of municipal solid waste	As % of households and establishments that segregate their waste	100%	55%	100%
4	Extent of municipal solid waste recovered	Quantum of waste collected, which is either recycled or processed, expressed as %	80%	55%	80%
5	Extent of scientific disposal of solid waste	As % of waste disposed in a sanitary landfill site against total quantum of waste disposed in landfills and dumpsites	100%	0%	100%
6	Cost recovery in SWM services	Expressed as % recovery of all operating expenses related to SWM services that the ULB is able to meet from the operating revenues of sources related exclusively to SWM	100%	60%	100%
7	Efficiency in redressal of customer complaints	As a % of total number of SWM related complaints resolved against total number of SWM complaints received within 12-hour time period	80%	55%	80%
8	Efficiency in collection charges	Efficiency in collection is defined as current year revenues collected, expressed as a % of the total operating revenues, for the corresponding time period	90%	30%	90%

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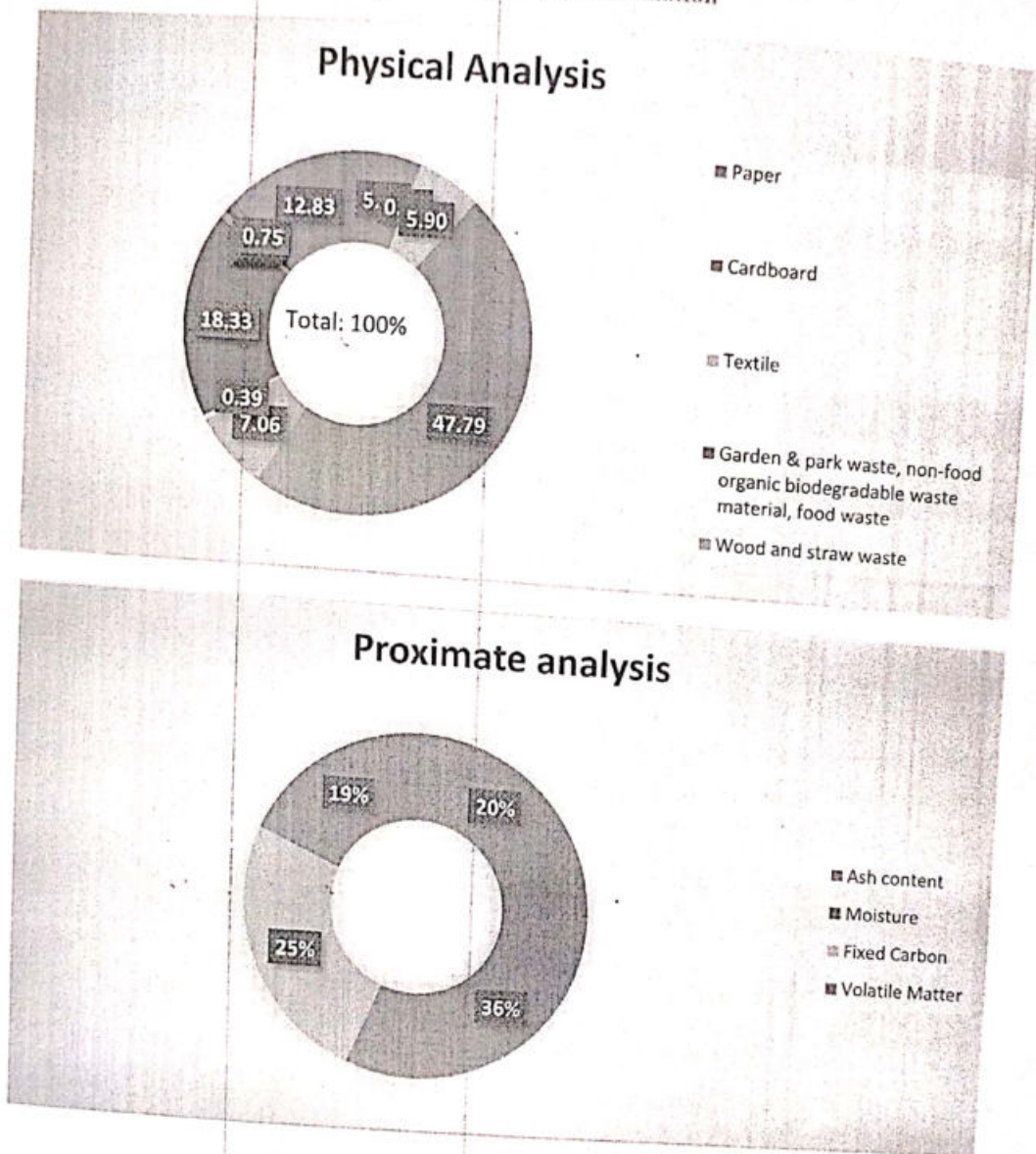


4. Proposed Studies

4.1 Waste Characterization

Solid waste is very heterogeneous in nature and its composition varies with place and time. Even samples obtained from the same place (sampling point) on the same day, but at different times may show totally different characteristics. Waste characterization has been done in all the ULBs to find out the physical and chemical components of MSW.

Figure 4: Waste characterization



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4.2 Geo-Technical Study

Geo-technical studies are conducted to analyse the strength and other characteristics of soil by making boreholes in the proposed site. Apart from a few on-site physical strength tests following parameters will be carried out in the laboratory:

Table 10: Tests for geo-technical studies

S. No.	Tests/Parameters
1.	Sieve analysis - soil texture type and classification, Particle size distribution etc.
2.	Hydrometer analysis
3.	Permeability
4.	Field moisture content
5.	Bulk & dry density
6.	Specific gravity
7.	Field moisture content and water retention capacity
8.	Liquid & plastic limit
9.	Strength parameters - safe bearing capacity, SPT etc.
10.	Chemical analysis – on subsoil water samples and on soil samples for pH, Chlorides, Sulphates, Carbonates

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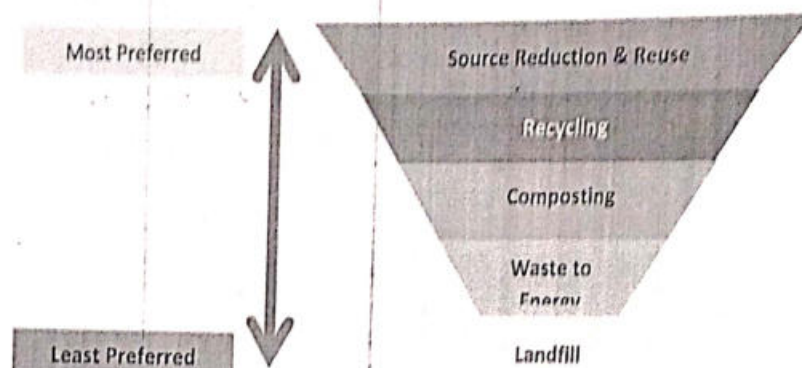
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5 Solid Waste Management Technologies

Solid Waste Management (SWM) proposes a waste management hierarchy with the aim to reduce the amount of waste being disposed, while maximizing resource conservation and resource efficiency. The SWM hierarchy ranks waste management operations according to their environmental, economic and energy impacts. Source reduction or waste prevention, which includes reuse, is considered the best approach (tier 1) followed by recycling (tier 2) and composting of organic matter of waste, resulting in recovery of material (tier 3). The components of waste that cannot be prevented or recycled can be processed for energy recovery (tier 4). Tier 5 is disposal of waste in sanitary landfill, which is the least preferred option. Moreover, solid waste management system shall be compliant with Solid Waste Management Rules, 2016 (and to amendments thereto).

Figure 5: Municipal solid waste management hierarchy



5.1 General Technologies & Trends

A judicious choice of technological options is mandatory to address treatment of municipal solid waste. A choice of more than one technology or combination of technologies (according to SWM) has many-a-times proved beneficial. The available technologies to treat MSW can be broadly categorized into 3 broad sections.

Table 11: MSW Treatment Technologies

Solid Waste Treatment Technologies		
Thermal Process Technologies <ul style="list-style-type: none"> ▶ Incineration ▶ Gasification ▶ Plasma Arc ▶ Pyrolysis 	Biological Processing Technologies <ul style="list-style-type: none"> ▶ Composting (Aerobic process) ▶ Vermicomposting ▶ Biogasification (Anaerobic Process) 	Physical Processing Technologies <ul style="list-style-type: none"> ▶ Landfill Technology

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Thermal processing technologies

The thermal processing technologies involve thermal decomposition of waste into gaseous, liquid and solid conversion products with release of heat energy. These technologies operate at temperatures greater than 200°C and have higher reaction rates. They typically operate in a temperature range of 375°C to 5,500°C. Thermal technologies include advanced thermal recycling (a state-of-the-art form of waste to-energy facilities) and thermal conversion (a process that converts the organic carbon-based portion of the MSW waste stream into a synthetic gas which is subsequently used to produce products such as electricity, chemicals, or green fuels).

The main thermal processing technologies adopted internationally for the treatment of municipal waste are:

► Incineration

Mass-burn systems are the predominant form of the MSW incineration. Mass-burn systems generally consist of either two or three incineration units ranging in capacity from 50 to 1,000 tons per day; thus, facility capacity ranges from about 100 to 3,000 tons per day. It involves combustion of unprocessed or minimally processed refuse. The major components of a mass burn facility include: (1) Refuse receiving, handling, and storage systems; (2) Combustion and steam generation system (a boiler); (3) Flue gas cleaning system; (4) Power generation equipment (steam turbine and generator); (5) Condenser cooling water system; and (6) Residue hauling and storage system.

► Pyrolysis

In pyrolysis, at high temperatures of 700°C to 1200°C, thermal degradation of organic carbon-based materials is achieved through the use of an indirect, external source of heat, in the absence or almost complete absence of free oxygen. This thermally decomposes and drives off the volatile portions of the organic materials, resulting in a syngas composed primarily of hydrogen (H_2), carbon monoxide (CO), carbon dioxide (CO_2), and methane (CH_4). Some of the volatile components form tar and oil, which can be removed and reused as a fuel. Most pyrolysis systems are closed systems and there are no waste gases or air emission sources (if the syngas is combusted to produce electricity, the power system will have air emissions through a stack and air emission control system). After cooling and cleaning in emission control systems, the syngas can be utilized in boilers, gas turbines, or internal combustion engines to generate electricity or used as raw stock in chemical industries. The balance of the organic materials that are non-volatile or liquid that is left as a char material, can be further processed or used for its adsorption properties (activated carbon). Inorganic materials form a bottom ash that requires disposal, although some pyrolysis ash can be used for manufacturing brick materials.

► Gasification

In the gasification process, thermal conversion of organic carbon based materials is achieved in the presence of internally produced heat, typically at temperatures of 660°C to 1800°C, and in a limited supply of air/oxygen (less than stoichiometric, or less than what is needed for complete combustion) to produce a syngas composed primarily of H_2 and CO. Inorganic materials are converted either to bottom ash (low-temperature gasification) or to a solid, vitreous slag (high temperature gasification that operates above the melting temperature of inorganic components). Some of the oxygen injected into the system is used in reactions that produce heat, so that Pyrolysis (endothermic) gasification reactions can initiate; after which,

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the exothermic reactions control and cause the gasification process to be self-sustaining. Most gasification systems, like Pyrolysis, are closed systems and do not generate waste gases or air emission sources during the gasification phase. After cooling and cleaning in emission control systems, the syngas can be utilized in boilers, gas turbines, or internal combustion engines to generate electricity, or to make chemicals.

Biological processing technologies

Biological treatment involves using microorganisms to decompose the biodegradable components of waste. Biological processing technologies operate at lower temperatures and lower reaction rates. Biological processing technologies are focused on the conversion of organics in the MSW. MSW consists of dry matter and moisture. The dry matter further consists of organics (i.e., whose molecules are carbon-based), and minerals, also referred to as the ash fraction. The organics can be further subdivided into biodegradables or refractory organics, such as food waste, and non-biodegradables, such as plastic. Biological technologies can only convert biodegradables component of the MSW. By-products can vary, which include electricity, compost, and chemicals.

Biological process can be aerobic and anaerobic. Biological technologies adopted for treatment of solid waste include:

Composting

Composting is a natural micro-biological process, where bacteria break down the organic fractions of the MSW stream under controlled conditions to produce a pathogen-free material called "Compost" that can be used for potting soil, soil amendments (for example, to lighten and improve the soil structure of clay soils), and mulch. The microbes, fungi, and macro-organisms that contribute to this biological decomposition are generally aerobic. A mixture of organic materials is placed into one or more piles (windrows), and the natural microbial action will cause the pile to heat up to 60 - 70°C, killing most pathogens and weed seeds. A properly designed compost heap will reach 70°C within 6 to 10 days, and slowly cool off back to ambient temperatures as the biological decomposition is completed. Systematic turning of the material, which mixes the different components and aerates the mixture, generally accelerates the process of breaking down the organic fraction, and a proper carbon/nitrogen balance (carbon to nitrogen or C/N ratio of 20:1) in the feedstock ensures complete and rapid composting. The composting process takes from 30 to 90 days.

There are two fundamental types of composting techniques: a) open or windrow composting, which is done out of doors with simple equipment and is a slower process, and b) enclosed system composting, where the composting is performed in some enclosure (e.g., a tank, a box, a container or a vessel).

Anaerobic digestion

In anaerobic digestion, biodegradable material is converted by a series of decomposition processes by different bacterial groups into methane and CO₂. A first group breaks down large organic molecules into small units like sugar. This step is referred to as hydrolysis. Another group of bacteria converts the resulting smaller molecules into volatile fatty acids, mainly acetate, but also hydrogen (H₂) and CO₂. This process is called acidification. The last group of bacteria, the methane producers or methanogens, produce biogas (methane and CO₂) from the acetate and hydrogen and CO₂. This biogas can be used to fuel boilers or reciprocating engines with minimal pre-treatment. In addition to biogas, anaerobic digestion generates a residue consisting of inorganics, non-degradable organics, and

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bacterial biomass. If the feedstock entering the process is sufficiently free of objectionable materials like colourful plastic, this residue can have market value as compost. Anaerobic digestion process is also referred to as the Bio-methanation process.

► Bioreactor landfill

A bioreactor landfill is a wet landfill designed and operated with the objective of converting and stabilizing biodegradable organic components of the waste within a reasonable time frame, by enhancing the microbiological decomposition processes. The technology significantly increases the extent of waste decomposition, conversion rates and process effectiveness over what would otherwise occur in a conventional wet landfill. Stabilization in this context means that landfill gas and leachate emissions are managed within one generation (twenty to thirty years) and that any failure of the containment system after this time would not result in environmental pollution. There is better energy recovery including increased total gas available for energy use and increased greenhouse reduction from reduced emissions and increase in fossil fuel offsets. These factors lead to increased community acceptance of this waste technology. Management of a bioreactor landfill requires a different operating protocol to conventional landfills. Liquid addition and recirculation is the single most important operational variable to enhance the microbiological decomposition processes. Other strategies can also be used, to optimise the stabilization process, including waste shredding, pH adjustment, nutrient addition and temperature management.

Physical processing technologies

Physical technologies involve altering the physical characteristics of the MSW feedstock. The MSW is subjected to various physical processes that reduce the quantity of total feedstock, increase its heating value, and provide a feedstock. It may be densified or pelletized into homogeneous fuel pellets and transported and combusted as a supplementary fuel in utility boilers. These technologies are briefly described below.

► Refused Derived Fuel (RDF)

The RDF process typically includes thorough pre-separation of recyclables, shredding, drying, and densification to make a product that is easily handled. Glass and plastics are removed through manual picking and by commercially available separation devices. This is followed by shredding to reduce the size of the remaining feedstock to about eight inches or less, for further processing and handling. Magnetic separators are used to remove ferrous metals. Eddy-current separators are used for aluminium and other non-ferrous metals. The resulting material contains mostly food waste, non-separated paper, some plastics (recyclable and non-recyclable), green waste, wood, and other materials. Drying to less than 12% moisture is typically accomplished through the use of forced-draft air. Additional sieving and classification equipment may be utilized to increase the removal of contaminants. After drying, the material often undergoes densification processing such as pelletizing to produce a pellet that can be handled with typical conveying equipment and fed through bunkers and feeders. The RDF can be immediately combusted on-site or transported to another facility for burning, alone or with other fuels. The densification is even more important when RDF is transported off-site to another facility, in order to reduce volume being transported. RDF is often used in waste to energy plants as the primary or supplemental feedstock, or co-fired with coal or other fuels in power plants, in kilns of cement plants, and with other fuels for industrial steam production.

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► Mechanical separation

Mechanical separation is utilized for removing specific materials or contaminants from the inlet MSW stream as a part of the pre-treatment process. Contaminants may include construction and demolition (C&D) debris, tires, dirt, wet paper, coarse materials, and fine materials. Generally, MSW reaching the dumping sites is unsegregated and mixed, containing C&D debris and other contaminants. Therefore, it is essential to remove these contaminants from the incoming MSW by mechanical separation before processing the waste further by either biological, physical and thermal technologies (except Plasma Arc Technology).

► Size reduction

Size reduction is often required to allow for more efficient and easier handling of materials, particularly when the feed stream is to be used in further processes. Sizing processes include vibrating screens and trommels. To reduce the size of the entire stream, or portions of it, mechanical equipment, such as shredders, is utilized. This allows for other physical processes, such as dryers, magnetic and eddy current separators, and densification equipment to work more efficiently. Magnetic and eddy current separators may be installed both up and downstream of shredders to increase the recovery of metals.

The above technologies can be summarized as follows:

Table 12: Summary of MSW processing technologies

Thermal processing technologies		Pros	Cons
Incineration	Waste incineration is a treatment process that involves the combustion of organic fraction of MSW to convert the same into ash, flue gases and heat.	<ul style="list-style-type: none"> ✓ Reduction in volume of waste going to landfill ✓ Production of energy which could be used for various purposes ✓ Reduction in toxicity of waste and pathogens 	<ul style="list-style-type: none"> ✓ Release of harmful emissions in the air ✓ Treatment of the by-products is imperative ✓ Skilled operators are required ✓ NIMBY syndrome
Gasification	Gasification also involves the partial oxidation of carbon-based feedstock to generate syngas, which can be used as a fuel or for the production of chemicals.	<ul style="list-style-type: none"> ✓ Limited air requirement which leads to less volume of flue gas for treatment 	<ul style="list-style-type: none"> ✓ Larger land requirement ✓ Requirement of pre-treatment of waste
Pyrolysis	Pyrolysis is a thermal process that uses high temperatures to break down any waste containing carbon.	<ul style="list-style-type: none"> ✓ Less quantity of waste going to landfill 	<ul style="list-style-type: none"> ✓ Limited success stories
Biological processing technologies			
Composting	Controlled decomposition of organic matter by micro-organisms into stable humus. It can be done by either open/windrow composting or enclosed/in vessel composting.	<ul style="list-style-type: none"> ✓ Relatively cost effective 	<ul style="list-style-type: none"> ✓ Discharge of leachate and phenols leading to water contamination ✓ Possible odour ✓ NIMBY syndrome
Biomethanation	Biodegradable material is	<ul style="list-style-type: none"> ✓ Treatment at source 	<ul style="list-style-type: none"> ✓ Only applicable to

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on	broken down by bacteria into methane and CO ₂ in the absence of oxygen.	✓ Gas/ power generation	organic fraction of MSW
Physical processing technologies			
Refuse Derived Fuel Technology	MSW may be separated, shredded and/or dried in a processing facility. The resulting material is referred to as Refuse Derived Fuel (RDF).	✓ Higher calorific value from for power generation ✓ Suitable for low input capacity	✓ Stringent air pollution monitoring is required for burning

5.2 Assessment of Technologies/Technology Selection Criteria

The selection of best available technology (BAT) for any waste processing facility depends upon a number of factors such as:

- ▶ Indian experience
- ▶ Nature of waste
 - Quantity of waste
 - Quality of waste
- ▶ Cost considerations
 - Capital investments required
 - Recurring expenditure
 - Economy of operation
 - Cost of end products
- ▶ Manpower Requirement
- ▶ Level of skill required
- ▶ The capability of the ULBs to manage such facility departmentally or through private sector participation
- ▶ Scale of operation
- ▶ Environmental impact of such technology
- ▶ Process aesthetics
- ▶ Compatibility of cycle of nature

The following criteria are to be considered to assess the suitability of technology in Indian context as per MSW CPEEHO Manual:

- ▶ Technology reliability
- ▶ Waste suitability
- ▶ Waste supply chain approach

Technology Reliability: The table below presents MSW treatment technologies with respect to potential reliability of operations.

Table 13: MSW treatment technology reliability

S.No.	Technology Category	Comments
1.	Composting	A number of installations have been satisfactorily working in India. The technology is simple and easy to scale up. This is one of the best suited technology due to techno-economical feature and composite climate of Indian cities.

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S.No.	Technology Category	Comments
2.	RDF	With large scale operations in the US, the technology is well proven. A number of medium scale plants are in operation in India.
3.	Bio methanation	Large scale projects are operational in the Europe. Pilot projects are been taken up in India. Some projects include Melvishram Project taken up in Tamil Nadu. Accelerated R&D is taking place to use this method to treat segregated waste.
4.	Vermicomposting	The technology is suitable for small scale plants as it requires high control of temperature and humidity. In India small scale plants are being taken up. Some plants worth mentioning are 100TPD plants at Mangalore and Eluru.

Table 14: Selection criteria - one page reckoner as per MSW CPEEHO Manual¹

Element	Composting	MRF	Biomethanation	Incineration
Technically & economically feasible size of operation per day fresh waste	Pit composting (Honeycomb pit composting) for small scale and windrow for large scale	No constraint	1 TPD at small scale and above 50 TPD at larger scales of Pure organic waste	500 TPD and above due to high moisture in our waste. Suitable only for segregated waste. However sizes as small as 10 – 50 TPD of waste are available for commercial sale but not advisable due to high running costs.
Land required (for TPD)	6 Ha	3 Ha	4 Ha	4 Ha
Waste characteristics necessary for operation	Moisture Content > 50% Organic Matter > 40% C/N Ratio between 25-30	Moisture < 45% Volatile Matter > 40%	Moisture Content > 50%; Organic Matter > 40% C/N Ratio between 25-30	Moisture Content < 45% Net Calorific Value > 1200 KCal/kg
Volume reduction of waste	45-55 %	55-65 %	55-65 %	> 80 %
Environmental issues	Impurities in compost due to mixed waste, traces of heavy metals,	Problems in burning exhaust	Problems if mixed feedstock	Ash handling and Air pollution (emission of particulate matter, chlorinated compounds dioxins/ furans)

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Element	Composting	MRF	Biomethanation	Incineration
	leachate runoff			
Technology reliability	Running successfully in India	Running successfully in integrated facilities	Small scale organic Treatment plant Operational but mixed waste large scale plants failed in India	Only Plant in India failed due to mismatch in waste quality. MSW 2000 has recommended for incineration of waste only after doing a waste suitability analysis, and providing adequate flue gas management
Limitation	Large land requirement, Sale of Compost	Fluff/Pellets can be used as fuel in large industries, e.g. in cement kilns with necessary permissions from the PCBs and required pollution control measures	The technology requires pre-segregated homogenous biodegradable waste as mixed waste retards efficiency of the process. Hence applicability is limited to highly organic and homogenous waste streams like market wastes	Expensive Technology, waste criteria must have low moisture content and high calorific value, which is not found in Indian Waste. Costly flue gas remediation methods to attain achievable outputs.

Waste suitability: Another important factor for selecting the waste processing technology is waste suitability. As Indian waste is mixed in nature without a segregation system in place. Indian waste is generally characterized with high organic content, low calorific value and high moisture content. The desirable range of parameters for technical viability of waste processing options:

Table 15: Suitability of waste for processing methods

Waste processing method	Important waste parameters	Desirable range
Thermal processing technologies	Moisture content	<45%
	Volatile Matter	>40%
	Inert Material	<35%
	Fixed Carbon	<15%
	Net Calorific Value	>1200Kcal/ kg
Biological processing Technologies	Moisture Content	>50%
	Organic Matter	>40%
	C/N Ratio	25-30

Waste supply chain approach: The third approach that plays a key role in selection of a suitable MSW technology is waste supply chain approach. Indian waste is mixed in nature and in most cases needs to be suitably segregated before treatment. The identified technologies are classified according to the levels of segregation necessary:

Table 16: Different technologies based on level of pre-processing required

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S.No.	Technology category	Comments
1.	Composting	Requires pre-processing of waste. Can accept mixed waste but the final product will be poor. Post processing of the compost is necessary for better quality; however compost enrichment with neem cake etc. may further increase the quality of MSW compost.
2.	MRF cum RDF	Requires pre sorting and pre-processing of waste to segregate and separate the recyclables into different categories either manually or mechanical. The technology also involves physical processing of waste to make it combustible and involves segregation, drying, shredding and densification of waste. The poor processing of waste may lead to lower calorific value and higher emissions due to combustion; are the main limiting factor for this technology.
3.	Bio methanation	Requires high degree of preprocessing of waste which calls for highly efficient source segregation calling for high investments for waste collection.
4.	Incineration	Segregation of glass, metal and large size materials is required. Because of low calorific value of Indian waste sorting is important to bring the waste to a threshold calorific value. Shredding and densification will increase the combustion efficiency. The poor processing of waste may lead to lower calorific value and higher emissions due to combustion; are the main limiting factor for this technology.

5.3 Recommended Technologies

The limitations of the individual conventional technologies can be mitigated by bringing together a mix of technologies by integrating them together to provide a holistic solution for the treatment of urban waste. An integration of technology so carried out would have the following benefits:

- It treats various components of urban waste in an efficient manner so as to provide optimum utilization of waste to produce compost, biogas, power and building materials.
- It leads to optimization of cost by treating larger quantities at the same place, sharing infrastructure and variable costs.
- It is environmentally desirable, as the rejects of one process becomes inputs for the other process.

Considering the Indian scenario, an economically and environmentally sustainable solid waste management system will only be effective if it follows an integrated approach i.e. refining of mixed waste in a series of mechanical sorting, shredding and drying stages followed by density separation to separate the combustibles, organic and inerts out of mixed waste and giving treatment to each fraction that would be most suitable and efficient for it. The unprocessed combustible material thus separated out from the MSW is known as segregated combustible fraction (SCF).

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6 Proposed Solid Waste Management Project

The quantity and composition of MSW generated in the ULB is essential for determining collection, processing and disposal options that could be adopted. They are dependent on the population, demographic details, principal activities in the city/town, income levels and lifestyle of the community. Waste generation encompasses activities in which materials are identified as no longer being of value (being in the present form) and are either thrown away or gathered for disposal. Following Figure depicts various sources of solid waste.

Figure 6: Sources of MSW generation



The primary generators of solid waste are local households, commercial establishments, industries, markets, hotels, restaurants, and hospitals. Apart from MSW, a lot of e-waste as well as bio-medical waste (hospital sector) is generated.

6.1 Proposed MSW Processing Technology

The plant is designed to process approx. 3.43 TPD municipal solid waste (MSW) on per day basis and can process different kind of waste types. MSW processing unit would comprise of the following:

- A Composting facility
- B MRF

i. Elements of composting facility

The elements of composting facility which has been mentioned above, would be further explained

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a. Yard Management System

The <100 mm fraction of MSW will be manually segregated in the pre-processing section which is conveyed to the designated areas of compost pad for windrow preparation. In windrow type aerobic composting system, the fresh MSW is stacked in the form of trapezoidal heaps called 'windrows'. *Sufficient quantity of decomposing microbial cultures (inoculum & sanitizer*) will be inoculated at this point with sprayer to reduce odour and repel vectors. Moisture will also be supplemented at required levels before windrow preparation. The thoroughly mixed waste is then made to windrows of convenient dimensions and kept for the biologic decomposition.

The windrows are periodically turned (normally once a week) using hydraulic excavators to provide proper aeration and temperature control. The composting heap is stabilized in about 6 weeks, when it is shifted to the screening plant for removal of the inert and non-composted matter.

In some of the plants, particularly, in high rain-fall areas, a shed is provided called 'rain shed' or 'monsoon shed'. In this case the material is shifted to the rain-shed after about 4 weeks and kept there for a further period of 2 weeks.

- *1. After windrowing, water is added to windrow using water tanker to maintain requisite moisture level.
2. Just after windrowing, bacterial activity starts within 2-3 days. Inside temperature of the windrow may go up to 65°C.

b. Curing system

Material coming out of the coarse segregation section is stored in curing section for 15 days for further stabilization and moisture control. Some additives, such as, as rock phosphate may be added at this stage to improve quality of final product. Curing area can hold up to 20 days of material coming to the curing section on daily basis.

c. Refinement system

As per compost quality norms nationally (FCO) and internationally, the compost should be below 6 mm average particle size and it should not contain impurities such as glass, plastic, other inert material etc. which spoils the overall appearance and creates suspicion in the mind of the end user about quality of the final product.

High quality organic manure is then passed through the packing spout and final packing of the product takes place.

d. Packing and storage system

The mechanized packing section can do the bagging, weighment and stitching of 50 kg bags and finally stacked in the finished product store by using a stacking conveyor.

e. Leachate, litter and odour management system

During composting a dark brown/black coloured fluid may get generated. This fluid is known as 'leachate'. It is collected through lined drains or concrete drains at the leachate tank. Managing leachate from composting yards is crucial to protect soil and water resources while exploring its reuse

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potential. Considering the low quantities of leachate generated from the decentralized composting facilities in the state, it is safely being managed in situ. The following practices are adopted:

- **Collection Systems**
Leachate is collected in lined pits or concrete tanks using HDPE liners or concrete structures to prevent seepage into the ground. This is especially important in areas with shallow groundwater levels.
- **Leachate Recirculation**
Recirculating leachate into compost piles helps maintain moisture and enhances microbial activity, reducing the need for additional water and minimizing leachate volume.
- **Evaporation Ponds**
Leachate collection tanks can also double up as solar drying tank when designed for the same. Instead of making a deep tank, the ULBs are advised to develop tanks with large surface areas and depth not exceeding 1 m. These are effective for reducing leachate volume. These should be properly lined and monitored, especially during the monsoon season, to prevent overflow or contamination.
- **Treatment Units**
Urban composting facilities can adopt biological treatment systems such as constructed wetlands or anaerobic digesters. These reduce organic load and pathogens. Physio-chemical methods like filtration and coagulation can be used as secondary treatment before discharge or reuse.
- **Dilution for Use as Liquid Fertilizer**
Treated or partially treated leachate can be diluted with water and used as a liquid fertilizer, especially for:
 - Non-edible crops (e.g., ornamental plants, green belts).
 - Soil enrichment in barren or degraded lands.
 - Nurseries and forestry plantations.Before application, it is essential to:
 - Test for heavy metals, pathogens, and nutrient content.
 - Dilute appropriately (commonly 1:20 or more, depending on quality).
 - Comply with FCO (Fertilizer Control Order) standards.

The air-borne litter is controlled by providing a high wire mesh. A green belt is proposed around the plant wherever possible.

ii. Process monitoring & control systems

a. Yard management

Yard management process needs to be monitored in order to achieve proper digestion and obtaining right quality finished product. For aerobic composting, proper temperature, moisture and aeration is required in the windrows. Temperature in the core of the windrow should reach up to 65-75° C and a moisture level of 35 – 40 % should be maintained in the windrows. These will ensure proper growth of the bacteria and thus proper stabilization. An operator will take temperature readings of the

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windrows and also check the moisture level. C: N ratio of the waste must also be checked by sampling, so that corrective measures can be taken at the initial stage if the ratio is found not in-line with the requirement. If heavy metals are found in the waste with the values exceeding the stated ones, the waste material should be removed from the windrows and not used for food crops.

b. Removal of recyclables & processing rejects

Recyclables will be sold to authorized recyclers and combustibles fraction will be balled and sold to industries. Rejects from the compost plant must be regularly removed. These would be loaded in dumpers or tractor trolleys and directed to designated landfill site.

iii. Design considerations of Malhar ULB compost plant

The design, construction, and operation of Malhar ULB compost plant has been planned, keeping in view the present MSW compliance and quality requirements (as per the Solid waste management rules, 2016 and expectations of the market. The proposed plan for design, construction and operation of Malhar ULB Compost Plant has four stages -

- (1) Pre-processing
- (2) Windrow composting
- (3) Processing
- (4) Refinement of the stabilized material

The compost process and the material balance are worked out for -100mm fraction of incoming municipal solid waste every day. The basic design of the Malhar ULB compost plant is based on open windrow aerobic composting of organic (biodegradable) component of solid waste, utilising the usable facilities in the existing compost plant. The basic parameters considered for design of the Malhar ULB compost plant are:

- ▶ Best utilisation of the land available
- ▶ Smooth flow of material

▶ Ensure the output standards to meet the Solid Waste Management Rules, 2016 (MoEF, GoI)

iv. Compost process and material flow

The complete process has been designed with the following steps:

- (i) <100 mm to compost pad
- (ii) Preparation of windrows & addition of decomposing microbial cultures & required moisture
- (iii) Periodic Turning of Windrows
- (iv) Process Monitoring and Controlling activities
- (v) After four turnings, shifting of material to Monsoon Shed and air drying
- (vi) Screening of composted solid waste in coarse segregation section
- (vii) Screening of compost from 6 mm sieve
- (viii) The screened compost then stored in bulk
- (ix) Packing of the screened compost for further utilisation/sale

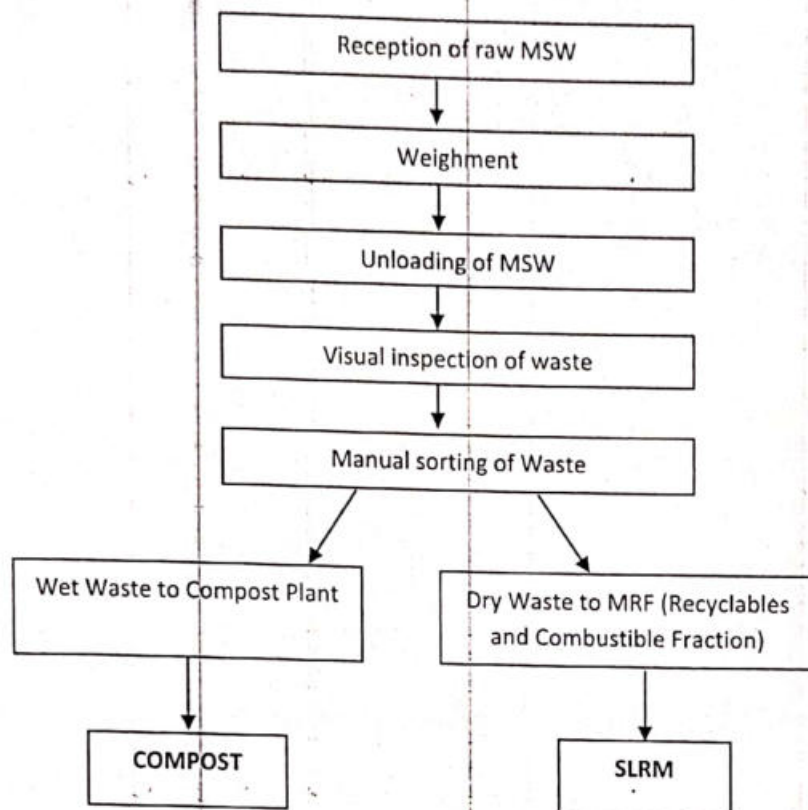
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Figure 7: Process flow at the processing facility



C. MRF/SLRM

The MRF processing unit would receive the segregated dry waste through following process:

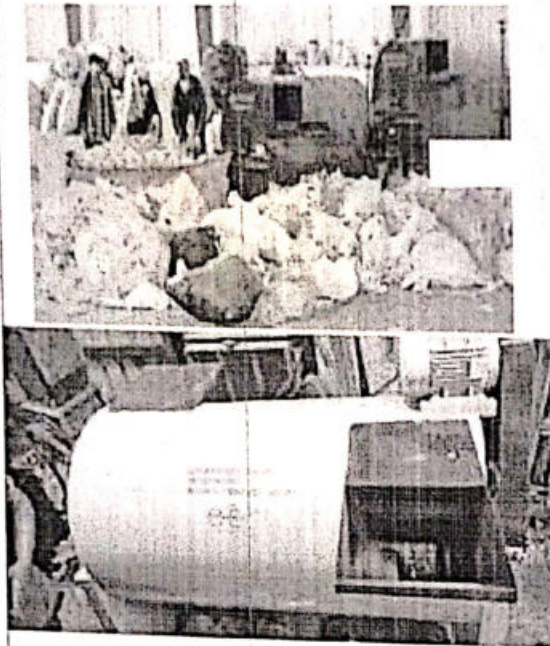
- i. Collected dry waste from the sources will be received through an auto tipper/other vehicle, which will be weighed on the weigh bridge.
- ii. Vehicles will be unloaded at the tipping area. The dumpster bags, gathari etc will be unbundled and oversized materials will be taken out physically for further handling and disposal.
- iii. The waste will be segregated into at least 8 categories i.e., Wood, Steel, Paper, Cardboard, Plastic (High Density and Low Density), Cloth, Glass, Rubber, etc. (Separate section for recyclables and RDF)
- iv. Fine fraction would generally contain inert, multi layered, plastics etc. Mid-size recyclable materials and oversize particle materials contain multi- layer package materials, paper and cardboards etc.
- v. Workers would physically sort this waste on conveyor belts. Non-recyclable components and inert will be sent to sanitary landfill.
- vi. Potential hazardous, such as batteries, aerosol cans, etc would also be removed physically. Other Domestic Hazardous Waste (DHW), such as empty paint cans, empty vials of injections, discarded/expired medicines, etc. are segregated.
- vii. DHW would be sent to common facilities for hazardous wastes and bio-medical wastes to Bio Medical Processing Plant.

Plastic waste has a significant portion in total municipal solid waste. However, there is a proper collection system of waste in city. Municipal Corporation could be recycled plastic waste at Material Recovery Facility Centre with the help of below machines.

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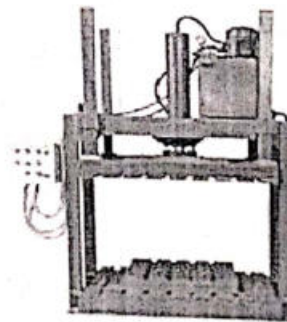
Fatka Machine – This machine will be used for cleaning the dust from waste plastic which having.

Figure 8: Fatka Machine



Baling Machine: This machine will be used to reduce the volume of plastic waste by compacting, so that storage and transportation becomes relatively easier. Baling is a suitable option for both plastic and bottles, providing a reduction in volume that aids storage, transportation and management of the waste plastics.

Figure 9: Baling Machine



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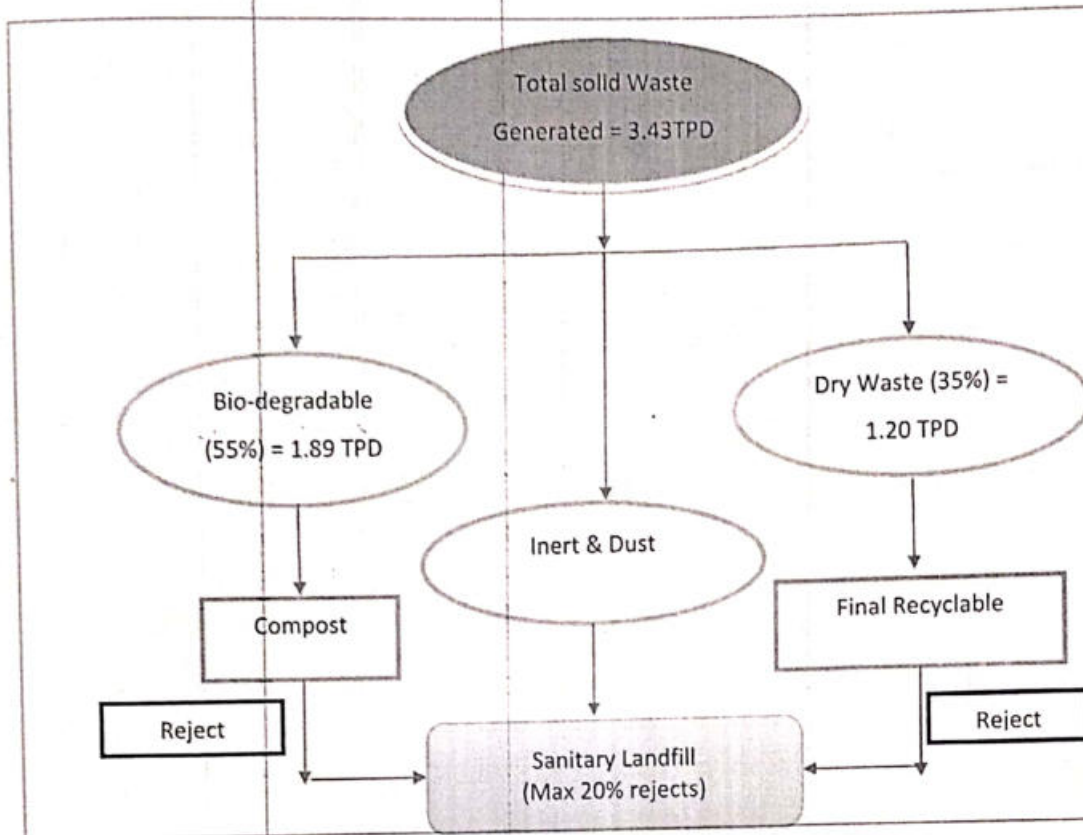
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6.2 Mass Balance

The MSW processing facility can be summarised in the following mass balance flow chart:

Figure 10: Flow Chart – Material Balance of 3.43 TPD Malhar ULB MSW Plant



The overall project has been designed considering the year 2026 which accounts for the time taken in bid process management, bid finalization, construction & commissioning of the plant and year on year expansion in population growth and subsequently in waste generation quantity which will be approximately 3.43 TPD for Malhar ULB (assuming 2% YOY increase in population and 300 g/capita waste generation). Accordingly, the cost estimation of collection, transportation as well as processing facility is considered for the year 2026.

6.3 Proposed Solid Waste Management Scheme

Following facility up gradation required in terms of retrofitting of civil infrastructure/ proposing new civil infrastructure/ machine to process 100% waste generated in 2026.

Table 17: SLRM /Compost Plant Proposal Details

Cost Estimate For Solid Waste Management At Nagar Panchayat Malhar, Bilaspur (C.G.)			
A	PT. SHYAMA PRASAD MUKHERJEE, WARD NO. - 08		
	PROPOSAL FOR SLRM CENTRE	Quantity	Dimention
	Part - I SOR ITEM		
	PROPOSED CIVIL WORK		
1	SLRM Revamping Work	1	-
2	Rain Water Harvesting	1	1.00 X 1.00 X 1.20 M
3	Plumbing & Sanitary Work	1	-
	Part - II NON-SOR ITEM		
4	Conveyor Belt	1	
5	HDPE Wheel Container (10 Nos.)	10	
6	Weigh Bridge	1	
7	Bale Trolley (03 Nos.)	3	
8	Surveillance Camera	1	
9	Turbine Vetilator	6	
B	PT. SHYAMA PRASAD MUKHERJEE, WARD NO. - 08		
	PROPOSAL FOR WINDROW COMPOST PLANT	Quantity	Dimention
	Part - I SOR ITEM		
	PROPOSED CIVIL WORK		
1	Windrow Compost Plant 2 TPD	1	6.8 X 21.50X M
2	Storage Room	1	11.50 X 5.0 M
3	Leachate Tank	1	5.00 X 2.00 X 1.50 M
4	C.C. Flooring	1	190.00 SQM
	Part - II NON-SOR ITEM		
6	Wheel Barrow	1	
7	Compost Sieve Machine	1	

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7 Information, Education and Communication (IEC)

An efficient waste management program, regardless of the strategy, requires significant cooperation from waste generators and active community participation. IEC is a multi-level tool for promoting and sustaining risk-reducing behaviour change in individuals and communities. The rationale for IEC is to undertake holistic interventions in addressing SWM issues and hence to enable workable communication among different stakeholders that participate at the different stages of the SWM hierarchy. The IEC plan can include both a short term plan and a long term plan. The short term plan will focus on issues of immediate importance whereas the long term plan will have a holistic and comprehensive outlook. Some strategies for implementation of IEC are as follows:

- ▶ Sensitization cum workshop for different stakeholders
These workshops shall be aimed at sensitization of different stakeholders and take their feedback on municipal solid waste management practices. This workshop shall also be utilized to identify volunteers dedicated to the cause of MSWM.
- ▶ Interpersonal Communication (IPC), contacting every household through identified leaders and volunteers. These volunteers shall tell the message to every household and take their feedback as well.
- ▶ Message dissemination by involving religious leaders, SHGs, youth clubs, mahilamandals, RWA and with pre-recorded religious & cultural program me
- ▶ Involvement of institutions academicians for the environment and atmosphere building by school/college student as school rallies, slogan writing, essay competition etc.

Information

Table 18: Template for information to stakeholders

Stakeholders	Content of Information	Methods to convey the information(Methodology)
Households	Collection & segregation and possible treatment	Interpersonal Communication (IPC) along with poster, leaflet, brochure, advertisements, social media
Community	Collection & segregation and possible treatment	workshops, advertisements
Mass level	All aspects of SWM practices	Print media, electronics media, poster, hoardings, workshops, trainings, advertisements on public transport
ULBs	All aspects of SWM practices	Technical manual, brochure
Institutions	All aspects of SWM practices	Rallies, quiz competition, debate, incorporation of concept of SWM in school curriculum, SWM oath at school

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Education

Education at individual level:

Education at individual level is aimed to make the people aware about all aspects of solid waste management and health hazards of solid waste due to improper handling and management. IPC at HHs level shall be designed to assess the sanitation facilities, solid waste management and handling practice and mobilize them for proper waste management and handling practices and to adopt the good sanitation and hygiene practices. IPC shall also introduce 3 R concepts and sensitize them.

Public education at group/community level:

The elements of group education may be taken as followings:

- ▶ Workshop
- ▶ Exhibition
- ▶ Lecture Series
- ▶ Panel discussion
- ▶ Group meeting/Community meeting

Mass education:

The elements of mass education may be taken as followings:

- ▶ Use of print media, electronic media, social media etc.
- ▶ Street plays, puppet shows
- ▶ Poster, pamphlet, hoardings, use of public transport system
- ▶ Incorporate the SWM into primary school curriculum
- ▶ Involvement of Nehru Yuva Kendra (NYK), National Cadet Corps (NCC), National Service Scheme (NSS), Scouts guide etc.
- ▶ Involvement of religious leader
- ▶ Improvement of medical practitioners to focus on health impacts of solid waste
- ▶ Involvement of Mahila Mandal (MM)/SHGs
- ▶ Involvement of Resident Welfare Association (RWA).

Communication:

Some means of communication for sustainable approach of SWM practices and handlings:

- ▶ Poster, pamphlet, banner, hoarding, leaflet and brochure
- ▶ Technical manual on SWM
- ▶ Slogan, standee display on steps of process of SWM
- ▶ Material on SWM for the school curriculum
- ▶ Display board at the site wherever underground waste bins are installed (How to use)
- ▶ Materials convergence with religious content on SWM
- ▶ Audio and video clipping for electronic media (e.g. AIR, FM, DD etc)

Capacity Building:

Capacity building is defined as the creation of an enabling environment with appropriate policy and legal frameworks, institutional development, including community participation, human resources

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development and strengthening of managerial systems. It is a long-term, continuing process, in which all stakeholders participate.

The approach to capacity building in SWM shall not be only about technology and economics but also about:

- Understanding the administration systems for waste management and related activities (multidisciplinary and cross-sectoral)
- Understanding the need for human resource development to achieve better results in SWM
- Focus on building sound institutions and good governance for attaining improved SWM
- Delineating strategies for sustenance of achievement

Broadly, the target audience can be categorized as waste generators, waste collectors and waste managers. The program shall be designed to spell out the problem clearly and make them know the manner in which the problem is proposed to be tackled to keep area clean and improve the quality of life. Various publicity tools will be used as under:

- Focus Group Discussions (FGDs)
- Interpersonal communications
- Creating watchdog committees comprising of local influential people, RWA members and important stakeholders, societies
- Printed materials and audio-visual aids
- Other locally popular media
- Other tools like newspapers, media/radio, and skit/street plays, billboards / print medium may be used for creating awareness

Training:

The basic approach of training of managing staff is to create effectiveness of the SWM system and its operational efficiency of sanitary staff. Training programs shall be designed to sensitize the key stakeholders with working knowledge of the benefits of waste reduction, segregation and management and to impart skills about the respective roles from generator to waste managers. A core group of trainers shall be organized for continuous in-house training of the manpower to be deployed and other sanitation staff.

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8. Cost Estimates

Assuming a 2% YOY increase in population and 300 per capita waste generation per day, the waste generation of the Malhar Nagar Panchayat at the end of the concession period, i.e. 2026, has been estimated to be 3.43 TPD. Therefore, considering the waste generation an up-gradation of compost plant and MRF/SLRM plant has been proposed with provision to enhance the capacity in future. The machines and equipment requirement, civil infrastructure required for the project along with cost estimations is as given below:
Following table shows capital cost required for processing the wet and dry waste under SBM 2.0 scheme.

Table 19: Capital Cost for Processing of solid waste management

Cost Estimate For Solid Waste Management At Nagar Panchayat Malhar, Bilaspur (C.G.)		
A	VRINDAVAN, WARD NO. - 01	
	COST OF SLRM CENTRE	
	Part - I SOR ITEM	
	PROPOSED CIVIL WORK	
		Amount
1	SLRM Revamping Work	511758.18
2	Rain Water Harvesting	32001.00
3	Plumbing & Sanitary Work	47635.00
	Total - I	591394.18
	Part - II NON-SOR ITEM	
4	Conveyor Belt	155000.00
5	HDPE Wheel Container (10 Nos.)	13750.00
6	Weigh Bridge	225000.00
7	Bale Trolley (03 Nos.)	20400.00
8	Surveillance Camera	17813.00
9	Turbine Ventilator	15000.00
	Total	446963.00
	18% GST	80453.34
	Total - II	527416.34
	Total - A (I+II)	1118810.52
B	VRINDAVAN, WARD NO. - 01	
	COST OF WINDROW COMPOST PLANT	
	Part - I SOR ITEM	
	PROPOSED CIVIL WORK	
1	Windrow Compost Plant 2 TPD	849661.39
	Storage Room	639658.87

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**Cost Estimate For Solid Waste Management At
Nagar Panchayat Malhar, Bilaspur (C.G.)**

3	Leachate Tank	75225.82
4	C.C. Flooring	83790.00
	Total - I	1648336.08
	Part - II NON-SOR ITEM	
5	Wheel Barrow	11000.00
6	Compost Sieve Machine	47500.00
	Total	58500.00
	18% GST	10530.00
	Total -II	69030.00
	Total - B (I+II)	1717366.08
	Total Of Part (A+B)	2836176.60
	Contingency Charges 1%	28361.77
	Consultancy Charges 1.16%	32899.65
	Grand Total	2897438.01

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9. Operation & Maintenance

The Operations and Maintenance (O&M) costs for the processing plant have been estimated based on the following key components:

- Water Consumption
- Electricity Charges
- Civil Infrastructure Maintenance
- Electrical and Mechanical Maintenance
- Fire fighting Equipment and Safety Provisions

In alignment with the operational model adopted by the Mission Clean City in Chhattisgarh, Self-Help Groups (Swachhata Didi's) are responsible for the collection and transportation of segregated waste. These same groups are also engaged in the operation and management of Material Recovery Facilities (MRFs) and composting plants. As a result, human resource costs are embedded within the collection and transportation budget and are not included in the O&M costs of the processing plant.

Additionally, the cost of water usage at composting and MRF/SLRM centres is significantly minimized due to the availability of groundwater through existing borewells at the processing sites.

Summary of O&M Costs (5-Year Projection)


A detailed summary of the projected O&M costs over a five-year period is provided in the table below (to be inserted from DPR data).

Table 20: O&M Details

S.No.	Description	O&M Cost (In Lakh)
1	Civil Maintenance	6.96
2	Electrical + Mechanical Maintenance Equipment	5.70
3	Firefighting Equipment	2.85
4	Electricity Consumption	3.60
	Total O&M Cost for Processing Plant (5 Years)	19.11


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10. Conclusion

For the horizon year 2026, the projected population of Malhar Urban Local Body (ULB) is estimated to be 11,439. Based on standard per capita waste generation rates, this translates to a solid waste generation of approximately 3.43 TPD.

To effectively manage this increasing waste load and ensure 100% processing of generated waste, it is imperative to upgrade and augment the existing waste processing infrastructure. After a comprehensive assessment of:

- Current waste generation trends,
- Waste characterization studies, and
- The existing solid waste management practices in the ULB,

It is proposed to undertake the following infrastructure enhancements:

- Up gradation of the existing compost plant to enhance its processing capacity and operational efficiency.
- Conversion of the existing SLRM (Solid and Liquid Resource Management) center into a full-fledged Material Recovery Facility (MRF) to improve segregation, recycling, and resource recovery.

These interventions are critical to achieving saturation of processing capacity, ensuring environmental compliance, and aligning with the objectives of Swachh Bharat Mission 2.0.

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References

- Municipal solid waste management manual (Draft): Central Public Health & Environmental Engineering Organization (CPHEEO)-May 2014
- Municipal solid waste management manual: Central Public Health & Environmental Engineering Organization (CPHEEO) - 2000
- Toolkit for Solid Waste Management Jawaharlal Nehru National Urban Renewal Mission
- CPCB Guidelines and Check-list for evaluation of MSW Landfills proposals with Information on existing landfills, 2008
- Municipal Solid Wastes (Management and Handling) Rules, 2000
- Environment (Protection) Act, 1986
- Handbook of Service Level Benchmark (MoUD)
- CPCB-Guidelines and Check-list for evaluation of MSW Landfills proposals with Information on existing landfills (2012)
- CPCB-Protocol for Performance Evaluation and Monitoring of the Common Hazardous Waste Treatment Storage and Disposal Facilities including Common Hazardous Waste Incinerators
- Report of the Task Force on Waste to Energy - Planning commission
- Toolkit for Solid Waste Management- Jawaharlal Nehru National Urban Renewal Mission


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NAGAR PANCHAYAT MALHAR, CHHATTISGARH

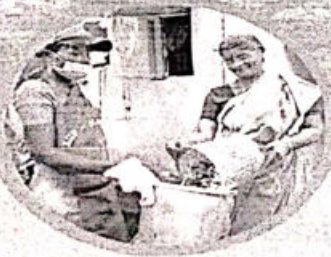


Ministry of Housing and Urban Affairs
Government of India



VOL - II

Swachh Bharat Mission-Urban 2.0



NAGAR PANCHAYAT REPORT UNDER SBM 2.0 FOR SWM, NAGAR PANCHAYAT MALHAR, CHHATTISGARH

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Cost Estimate For Solid Waste Management At Nagar Panchayat Malhar, Bilaspur (C.G.)			PWD Build. 2015 + ele. 2020 + PWD SOR 2020 + Revised 2023 + Amendment
A	VRINDAVAN, WARD NO. - 01		
	COST OF SLRM CENTRE		
	Part - I SOR ITEM		
	PROPOSED CIVIL WORK	Amount	
1	SLRM Revamping Work	511758.18	
2	Rain Water Harvesting	32001.00	
3	Plumbing & Sanitary Work	47635.00	46063.00
	Total - I	591394.18	589822.18
	Part - II NON-SOR ITEM		
4	Conveyor Belt	155000.00	
5	HIDPE Wheel Container (10 Nos.)	13750.00	
6	Weigh Bridge	225000.00	
7	Bale Trolley (03 Nos.)	20400.00	
8	Surveillance Camera	17813.00	
9	Turbine Ventilator	15000.00	
	Total	446963.00	
	18% GST	80453.34	
	Total - II	527416.34	
	Total - A (I+II)	1118810.52	1117238.52
B	VRINDAVAN, WARD NO. - 01		
	COST OF WINDROW COMPOST PLANT		
	Part - I SOR ITEM		
	PROPOSED CIVIL WORK		
1	Windrow Compost Plant 2 TPD	849661.39	846594.69
2	Storage Room	639658.87	
3	Leachate Tank	75225.82	
4	C.C. Flooring	83790.00	
	Total - I	1648336.08	1645269.38

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Cost Estimate For Solid Waste Management At Nagar Panchayat Malhar, Bilaspur (C.G.)		
Part - II NON-SOR ITEM		
5	Wheel Barrow	11000.00
6	Compost Sieve Machine	47500.00
	Total	58500.00
	18% GST	10530.00
	Total -II	69030.00
	Total - B (I+II)	1717366.08
	Total Of Part (A+B)	2836176.60
	Contingency Charges 1%	28361.77
	Counsultancy Chrges 1.16%	32899.65
	Grand Total	2897438.01

1714299-38
2831537-90
28315-37
32845-84

= 2892699-11
= 28.93 Lacs

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Total SOR ⇒ 22.35 9)
NON SOR ⇒ 5.06 6)
Total ⇒ 27.41

extra (contingency + consultancy
+ GST) ⇒ 1.52 c)

संलग्न पत्र क्र. 93 दि. 07/04/26
के शर्तों के अधीन जारी

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T.S. No. 57	Date 07/04/26
Technical Sanction of Nagar Nigam/Palika / Panichayat Malhar, here by Granted for the Construction of Establishment & Upgradation of Processing Plant in ward No. 01 for Rs. 28.93 Lacs (In words) Rs. Twenty Eight Lacs & ninety three thousand only	
Checked By.	Superintending Engineer U.A.&D., Bilaspur (C.G.)

SLRM CENTRE AT
VRINDAVAN, WARD NO - 01


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DETAILED ESTIMATE FOR PROPOSED WORK OF " SLRM CENTRE AT VRINDAVAN, WARD NO - 01 " NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)		
COST OF SLRM CENTRE		
Part - I SOR ITEM		
CIVIL WORK		
1	SLRM Revamping Work	511758.18
2	Rain Water Harvesting	32001.00
3	Plumbing & Sanitary Work	47635.00
Total I		591394.18
Part - III NON-SOR ITEM		
5	Conveyor Belt	155000.00
6	HDPE Wheel Container (10 Nos.)	13750.00
7	Weigh Bridge	225000.00
8	Bale Trolley (03 Nos.)	20400.00
9	Surveillance Camera	17813.00
10	Turbine Ventilator	15000.00
Total		446963.00
18% GST		80453.34
Total -II		527416.34
Total Of Part (I+II)		1118810.52

46063 = 00
589822 = 18

1117238 = 52

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**DETAILED ESTIMATE FOR PROPOSED WORK OF
" SLRM CENTRE AT VRINDAVAN, WARD NO - 01 "
NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)**

(Building SOR Item) W.F.F. - 01/01/2015

S.NO.	ITEM NO.	DESCRIPTION	NO.	L	B	H/D	QTY	UNIT	RATE	AMOUNT
SLRM ROOFING										
1	(BUILDING SOR ITEM NO - 10.12/91)	16.17 Dismantling G.I. sheet roofing including ridges hips, valleys and gutters etc. and stacking the material with 50 m lead								
	(BUILDING SOR ITEM NO - 3.3.1/23)		1	27.0	6.5	-	176			
							176	SQM	33.50	5879.25
2	(BUILDING SOR ITEM NO - 10.12/91)	10.12 Supply and fixing of polymer pre-coated galvalume profile sheets (PPGL) of approved size, shape and pitch of corrugation, total coated thickness (TCT) 0.60 mm +/- 5%, epoxy primer on both side of the sheet and colour polyester top coat 18-20 microns and 6-7 microns on bottom. Sheet should have protective guard film of 25 microns minimum to avoid scratches while transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x55mm) with EPDM seal or with polymer coated J or L hooks, bolts and nuts 8mm diameter with bitumen and G.I. limpet washers or with G.I. limpet washers filled with white lead complete upto any pitch in horizontal/ vertical or curved surfaces excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.								
		Top Roof Sheet	1	27.0	6.5	-	176			
							176	SQM	693.00	121621.50
3	(BUILDING SOR ITEM NO - 10.16/91)	10.16 Providing and fixing pre-coated galvanised steel sheet roofing accessories 0.50 mm +/- 5% total coated thickness (TCT), Zinc coating 120gsm as per IS 277 in 240mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self drilling/ self tapping screws or with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts, G.I. plain and bitumen washers complete.								
		10.16.6 Gutter (600 mm over all girth)	2	27.00			54.00	MTR	629.00	33966.00
		10.16.1 Ridges plain (500-600mm)	1	27			27	MTR	552.00	14904.00
SLRM FLOORING WORK										
1	(BUILDING SOR ITEM NO - 16.8/146)	Dismantling flag stone flooring laid in cement/slime mortar including stacking of serviceable material and disposal of unserviceable material within 50 metre lead.								
			1.00	23.40	9.60	-	224.64			
			2.00	3.00	3.00	-	18.00			
			1.00	3.20	3.00	-	9.60			
							252.24	SQM	57.00	14377.68
2	(BUILDING SOR ITEM NO - 12.49/118)	25 mm thick KOTA stone slab flooring over 20mm (Average) thick base of cement mortar 1:4 laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab including grinding rubbing and polishing etc. complete (Area of slab to be over 0.20 SQ.M and upto 0.50 SQ.M)								
			1.00	23.40	9.60	-	224.64			
			2.00	3.00	3.00	-	18.00			
		Add 10% Extra	1.00	3.20	3.00	-	9.60			
							22.46			
							274.70	SQM	897.00	246409.49
SLRM PAINTING WORK										
3	As per Amendment no 08, 05/05/2025 item no 16.62	Providing and applying Acrylic washable Distemper or lite economy Plastic emulsion paint having VOC content less than 50gms/lit Minimum two coats up to final finish applied @ 1.25 Kg/ 10Sq.m as per relevant L.S. Code 428 2000 (product such as Tractor Uno, Dulux Duval, Berger Bison, Opus Style/lite economy emulsion product such as Asian Tactor Spark Dulux Pomuse sheen, Neroloc Lint Master, Berger Bison Lite, Nippon Superio.) inclusive of providing abro tape on edges and article and cleaning of door, windows, floor and surface as required with all tools tackles and labour complete for the work.								
		Office & Store Area	3	9.6			3	86.40		
			6	3			3	54.00		
		Door Deduct	-3	0.9			-2.1	-5.67		
		Window Deduct	-3	1.2			-1.2	-4.32		
		SLRM Wall	2	23.6			1.2	56.64		
			1	9.6			1.2	11.52		
		Gate Deduct	-1	3			-1.2	-3.60		
							Total	194.97	Sqm	64.00
										12478.08

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S NO.	ITEM NO.	DESCRIPTION	NO.	L	B	H/D	QTY	UNIT	RATE	AMOUNT
4	As per Amendment no 08, 05/05/2025 item no 14.67	Providing and applying on exterior surface with ECONOMY Exterior Emulsion paint of required shades to give protective and water proof finish minimum three coats applied @ 1.43 lit / 10SqM up to final finish as per relevant I.S. Code 15489 2013 Type -2 Class D.C (Glossy /Semi Glossy finish) (Product such as Asian Ace,Dulux Promise Exterior Berger Wall Massa ,Nerolac Suraksha Plus , Nippon Shogun Opus, One Style Power Bright) inclusive of providing abro tape on edges and article and cleaning of door, windows, floor and surface as required with all tools tackles and labour etc. complete for the work (With 2 Year Warranty)								
		Office & Store Area	1	10	-	3.1	31.00			
			2	3.4	-	3.1	21.08			
		SLRM Wall	2	23.6	-	1.3	61.36			
			1	10	-	1.3	13.00			
		Gate Deduct	-1	3	-	1.3	-1.90			
						Total	122.54	Sqm	70.00	8577.80
5	As per Amendment no 08, 05/05/2025 item no.14.74	Providing and applying priming coat on steel work with red Oxide/ zinc phosphate primer applied @ 0.50 lit /SqM as per relevant code 3536 1999 (product such as Asian Zinc phosphate , Dulux Steel primer, Burger Red oxide primer) with all tools tackles and labour etc. complete for the work								
		Premium synthetic enamel paint								
		On Steel	2.00	27	5.50		297.00			
		SLRM side jali	2.00	23.6	1.20		56.64			
			1.00	9.6	1.20		11.33			
							364.97	Sqm	35.00	12773.88
6	As per Amendment no 08, 05/05/2025 item no.14.76	Providing and applying Aluminium paint minimum 2 coats in all metal surface applying @ 0.75 li/ 10 Sqm up to required finish as per relevant I.S. code 2932: 2013 of (Product such as Asian Apcolite aluminium paint, Dulux Aluminium paint, Burger Superior Aluminium Paint) with all tools tackle and labour etc. complete for the work					364.97	sqm	43.00	15693.62
DEMOLISH WORK										
7	(BUILDING SOR ITEM NO- 16.3.3/146)	Demolishing brick masonry including arches, stacking of serviceable material disposal of unserviceable material within 50 metres lead. In cement mortar.								
		Wash and Store Area Wall	2.00	12.00	0.20	1.20	5.76			
							5.76	SQ.M	263.00	1514.88
SLRM FENCING & GATE										
10	(BUILDING SOR ITEM NO 9.6.2/80)	Steel work welded in built up sections/ framed work including cutting, hoisting, fixing in position and applying a priming coat of red oxide zinc chromate primer. In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works.								
		* SLRM Main Entrance Gate	1	3.00	2.10		6.30			
		SLRM Entry Gate	1	2.50	2.10		5.25			
						30 KG/SQ.M	346.50	KG	68.00	23562.00
TOTAL										511758.18

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**DETAILED ESTIMATE FOR PROPOSED WORK OF
"SLRM CENTRE AT VRINDAVAN, WARD NO - 01"
NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)**

"RAIN WATER HARVESTING (1.00X1.00X1.20 M)"										
S.No.	PARTICULAR	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)	
1	Excavation for all types and sizes of foundations, trenches and drains or for any other purpose including disposal of excavated stuff upto 1.5 m lift and lead upto 50m (at least 5m away from the excavated area), including dressing and leveling of pits. In all types of soil (BUILDING SOR ITEM NO.-1.1.1/9)									
2	Providing and laying nominal mix reinforced cement concrete with crushed stone aggregate using concrete mixer in all works upto plinth level excluding cost of form work. 1:1½:3 (1 cement : 1½ coarse sand : 3 graded stone aggregate 20mm nominal size)	1	1.40	1.40	1.20	2.35	CUM	185.00	434.75	
	bottom Beam-	2	1.40	0.20	0.20	0.11				
	Top Slab-	2	1.00	0.20	0.20	0.08				
3	(BUILDING SOR ITEM NO.-3.9/24) Providing and placing in position reinforcement for R.C.C. work including straightening, cutting, bending, binding etc. complete as per drawings including cost of binding wire all complete: 3.12.1 Thermo-Mechanically treated bars FE 415	1	1.40	1.40	0.10	0.20	CUM	4163.00	1623.57	
	(SOR ITEM NO.-3.12.1/24) Qty. as per item No -3.2.1 50 kg/cum					0.39				
4	Brick work with modular fly-ash lime bricks (FaLG Bricks) conforming to IS 12894-2002 of class designation 4.0 in foundation and plinth in: 7.5.4 Cement Mortar 1:6 (1 cement : 6 coarse sand)					19.5	KG	54.50	1062.75	
5	(BUILDING SOR ITEM NO.-7.5.4/45) Supplying, filling, spreading & leveling stone boulders/ Gravels/ Coarse sand, in recharge pit, in the required layers and thickness, for all leads & lifts, all complete as per direction of Engineer-in-charge. (excavation of pit will be paid separately) Stone boulders of size range 5 cm to 20 cm, in recharge pit Gravels of size range 5 mm to 10 mm, over the existing layer of boulders Coarse sand of size range 1.5 mm to 2 mm over existing layer of gravel	1	4.80	0.20	1.40	1.34	CUM	3263.00	4385.47	
		1	1.00	1.00	0.40	0.40	CUM	863.00	345.20	
		1	1.00	1.00	0.30	0.30	CUM	806.00	241.80	
	(BUILDING SOR ITEM NO.-21.14/201) PIPELINE-	1	1.00	1.00	0.20	0.20	CUM	471.00	94.20	
6	Excavation for all types and sizes of foundations, trenches and drains or for any other purpose including disposal of excavated stuff upto 1.5 m lift and lead upto 50m (at least 5m away from the excavated area), including dressing and leveling of pits. In all types of soil (BUILDING SOR ITEM NO.-1.1/9)	1	50.0	0.30	0.30	4.50	CUM	185.00	832.50	
7	Filling from available excavated stuff (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20cm. In depth consolidation each deposited layer by ramming and watering with a lead upto 50M. And lift upto 1.5M. 50% of Item No 1 (BUILDING SOR ITEM NO.-1.17/11)					2.25	CUM	65.00	146.25	
8	Providing and filling in open area with sand /crusher dust and hard moorum under floor in layers not exceeding 20 cm in depth and consolidating each deposited layer by ramming and watering, including dressing etc. complete 50% of Item No 1 - Pipe Dia (BUILDING SOR ITEM NO.-1.18/11)					2.25	CUM	371.00	834.75	
9	Providing and fixing on wall face or under floor UV stabilized Unplasticised Rigid PVC pipes (single socketed) having 3.2mm wall thickness conforming to IS : 13592 (4kg/sqcm) including required couplers, jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion etc complete 150 mm dia (BUILDING SOR ITEM NO.-18.76.3/170)	1	50.00			50.00	RM	440.00	22000.00	
Total Rs.									32001.00	

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**DETAILED ESTIMATE FOR PROPOSED WORK OF
" SLRM CENTRE AT VRINDAVAN, WARD NO - 01 "
NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)**

" PLUMBING & SANITARY WORK "

S.No.	PARTICULAR	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
1	Providing and fixing vitreous china water closet (European type W.C. pan) with white ISI marked plastic seat and lid, 10 litre low level white P.V.C. flushing cistern (same colour), conforming to IS : 7231, with all fittings and fixtures complete including cutting and making good the walls and floors wherever required								
	18.4.2 Coloured pedestal type (BUILDING SOR ITEM NO.-18.4/161)	1	-	-	-	1.00	EACH	3592.00	3,592.00
2	18.1 Providing and fixing water closet squatting pan (Indian type W.C. pan), 100mm sand cast Iron P or S trap, 10 litre low level P.V.C. flushing cistern (same colour) conforming to IS : 7231, with flush bend and other fittings and fixtures complete including cutting and making good the walls and floors wherever required :							2882.00	2882.00
	Coloured Orissa pattern W.C. pan of size 580x440 mm (BUILDING SOR ITEM NO.-18.1/160)	1	-	-	-	1.00	EACH	3545.00	3,545.00
3	Providing and fixing 10 litre capacity P.V.C. low level flushing cistern conforming to IS : 7231, with all fittings and fixtures complete							2899.00	2899.00
	18.7.2 Coloured (BUILDING SOR ITEM NO.-18.7/161)	2	-	-	-	2.00	EACH	837.00	1,674.00
4	Providing and fixing vitreous china wash basin with C.I. brackets, 32 mm C.P. brass waste of standard pattern, including painting of brackets, cutting and making good the walls wherever required :							729.00	1458.00
	Coloured Size 550x450 mm (BUILDING SOR ITEM NO.-18.17/162)	1	-	-	-	1.00	EACH	1894.00	1,894.00
5	Providing and fixing on wall face or under floor UV stabilized Unplasticised Rigid PVC pipes (single socketed) having 3.2mm wall thickness conforming to IS : 13592 (4kg/sqcm) including required couplers, jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion etc complete.								
	18.76.1 75 mm dia pipe	1	5.00	-	-	5.00	MTR	182.00	910.00
	18.76.2 110 mm dia pipe (BUILDING SOR ITEM NO.-18.76/170)	1	5.00	-	-	5.00	MTR	267.00	1,335.00
6	Providing and fixing on wall face UV stabilized Unplasticised - PVC moulded fittings/ accessories having 3.2mm wall thickness for Rigid PVC pipes conforming to IS : 13592 (heavy) jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion. Tee/ Tee with door/ Bend 45°/ Bend 90°								
	18.77.1.1 75 mm	5	-	-	-	5.00	EACH	113.00	565.00
	18.77.1.2 110 mm Vent cover	5	-	-	-	5.00	EACH	154.00	770.00
	18.77.3.1 75 mm	4	-	-	-	4.00	EACH	34.00	136.00
	18.77.3.2 110 mm	4	-	-	-	4.00	EACH	44.00	176.00
	Access door cap								
	18.77.4.1 75 mm	10	-	-	-	10.00	EACH	49.50	495.00
	18.77.4.2 110 mm	10	-	-	-	10.00	EACH	59.00	590.00
	18.77.6 Nahani Trap 110 (BUILDING SOR ITEM NO.-18.77/170)	10	-	-	-	10.00	EACH	90.50	905.00
7	Providing and fixing UV stabilized Unplasticised PVC pipe clips of approved design to Rigid PVC pipes by means of 50 x 50 x 50 mm hard wood plugs, screwed with M.S. screws of required length including cutting brick work and fixing in cement mortar 1:4 (1cement : 4 coarse sand) and making good the wall etc complete								
	18.78.1 75 mm	10	-	-	-	10.00	EACH	57.00	570.00
	18.78.2 110 mm (BUILDING SOR ITEM NO.-18.78/171)	10	-	-	-	10.00	EACH	61.00	610.00

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S.No.	PARTICULAR	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
8	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings i/e fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge CONCEALED WORK including cutting chases and making good the walls etc.								
	19.5 1 15 mm nominal outer dia. Pipes	1	5.00	-	-	5.00	MTR	133.00	665.00
	19.5 2 20 mm nominal outer dia. Pipes	1	5.00	-	-	5.00	MTR	167.00	835.00
	(BUILDING SOR ITEM NO.-19.5/176)								
9	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings i/e fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge INTERNAL WORK - EXPOSED ON WALL.								
	19.4 3 25 mm nominal outer dia. Pipes	1	5.00	-	-	5.00	MTR	199.00	995.00
	19.4 4 32 mm nominal outer dia. Pipes	1	5.00	-	-	5.00	MTR	271.00	1,355.00
	19.4 5 40 mm nominal outer dia. Pipes	1	5.00	-	-	5.00	MTR	362.00	1,810.00
	(BUILDING SOR ITEM NO.-19.5/176)								
10	Providing and fixing on wall surface G.I. pipes medium class complete with G.I. fittings and clamps, including cutting, making good the walls etc. and testing of joints complete								
	19.7 6 50 mm dia. nominal bore	1	5.00	-	-	5.00	MTR	471.00	2,355.00
	(BUILDING SOR ITEM NO.-19.7/177)								
11	Providing and fixing 15 mm nominal bore C.P. brass fittings of approved make and conforming to IS 8931 including C.P. brass extension if required								
	19.14.1 Bib cock (400 grams)	2	-	-	-	2.00	EACH	382.00	764.00
	19.14.6 Stop cock (concealed) (600 grams)	2	-	-	-	2.00	EACH	494.00	988.00
	19.14.4 Piler Cock (400 grams)	2	-	-	-	2.00	EACH	398.00	796.00
	19.14.14 Soap dish plate	2	-	-	-	2.00	EACH	163.00	326.00
	(BUILDING SOR ITEM NO.-19.14/179)								
12	Providing and fixing flexible P.V.C. waste pipe for sink or wash basin including P.V.C. waste fittings complete.								
	18.25 2 40 mm dia	4	-	-	-	4.00	EACH	88.50	354.00
	(BUILDING SOR ITEM NO.-18.25.2/164)								
13	Providing and fixing 600x450 mm beveled edge 4mm mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete	2	-	-	-	2.00	EACH	599.00	1,198.00
	(BUILDING SOR ITEM NO.-18.29/164)								
14	Providing and fixing mirror of superior glass (of approved quality) and of required shape and size with plastic moulded frame of approved make and shade with 6 mm thick hard board backing								
	18.30 1 5mm thick mirror	2	0.60	0.60	-	0.72	SQ.M	2016.00	1,452.00
	(BUILDING SOR ITEM NO.-18.30/164)								
15	Making connection of G.I. distribution branch in G.I. main of following sizes by providing and fixing tee, including cutting and threading the pipe etc. complete: (dia. of main line to be measured)	5	-	-	-	5.00	EACH	347.00	1,735.00
	19.10.4 50 mm nominal bore								
	(BUILDING SOR ITEM NO.-19.10/178)								
16	Providing and fixing brass/ gun metal gate valve with C.I. wheel of approved quality (screwed end):	2	-	-	-	2.00	EACH	762.00	1,524.00
	19.16.4 50 mm nominal bore								
	(BUILDING SOR ITEM NO.-19.16/179)								
17	Providing, laying and jointing glazed stoneware pipes grade 'A' with stuff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete :	1	10.00	-	-	10.00	MTR	162.00	1,620.00
	20.1.1 100 mm diameter								
	(BUILDING SOR ITEM NO.-20.1/189)								

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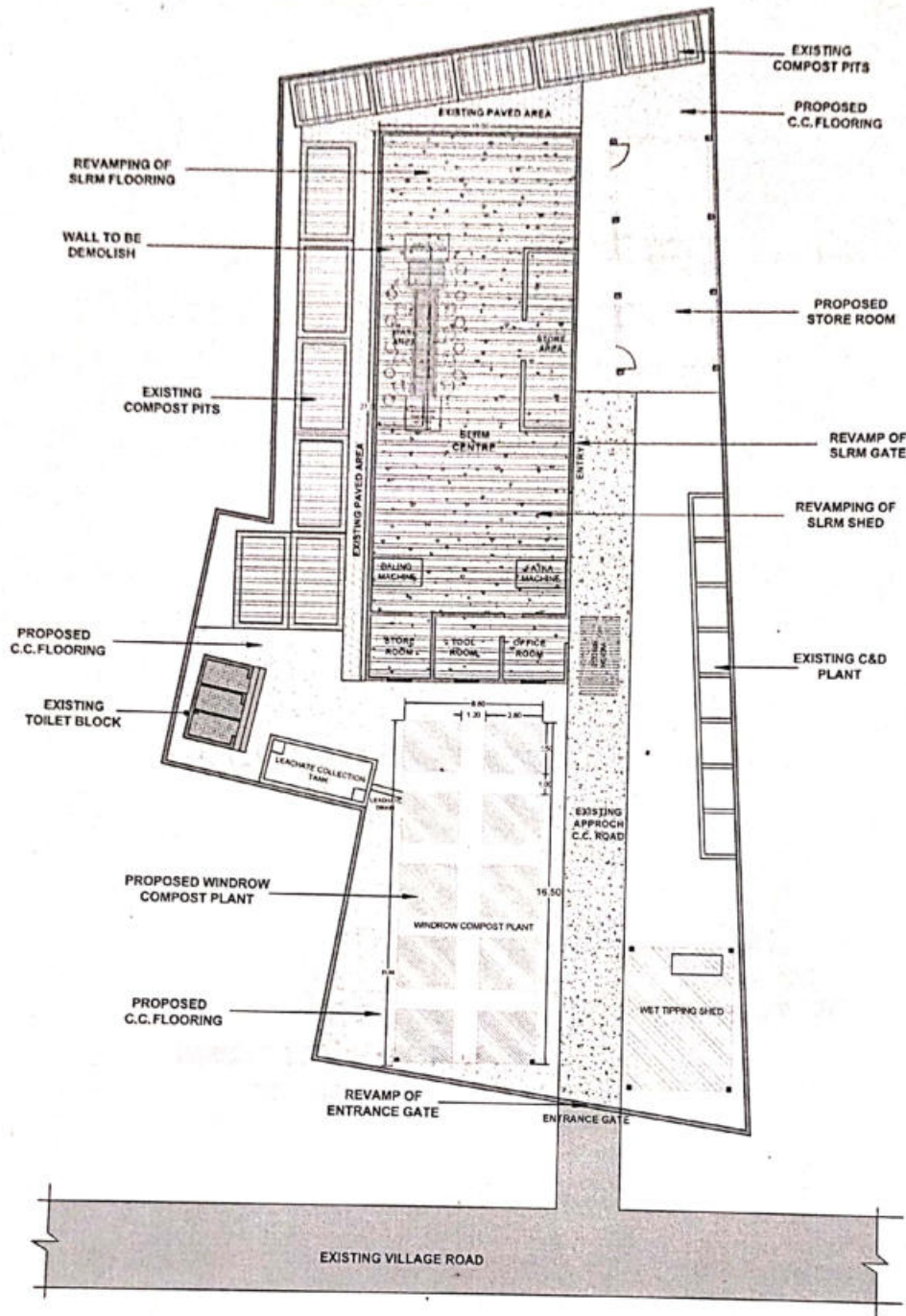
S.No.	PARTICULAR	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
18	Providing and constructing brick masonry chamber for underground pipe and and bends with well burnt modular clay bricks crushing strength not less than 35kg/cm ² in cement mortar 1:4 (1 cement : 4 coarse sand) C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover with frame to be not less than 18 kg (weight of cover 23 kg and weight of frame 15 kg) R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete as per standard design :								
	20.28.1 Inside dimensions 455x610 mm and 45 cm deep for single pipe line	1	-	-	-	1.00	EACH	3796.00	3,796.00
	(BUILDING SOR ITEM NO.-20.28/194)								
19	Providing and placing on terrace (at all floor levels) polyethylene water storage tank ISI : 12701 marked with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.								
	(BUILDING SOR ITEM NO.-19.42/184)	1.00	-	-	-	1000.00	LTR	7.30	7,300.00
Total Rs.									47,635.00

46,063 = 00

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RAIPUR (C.G.) PIN 497111 2245743 491874.



SITE PLAN

**"SITE PLAN OF PROPOSED WINDROW COMPOST PLANT
& EXISTING SLRM CENTRE"**

PILLIWAR NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)

PILLIWAR & ASSOCIATES
ENGINEERS, ARCHITECTS, PLANNERS
HIS CONSULTANT
& GOVT. APPROVED VALUER
25, SOUTH AVENUE, CHOUBEY COLONY
RAIPUR (C.G.) Ph: 97711 2745743 491674

PILLIWAR & ASSOCIATES			
ENGINEERS, ARCHITECTS, PLANNERS, GIS-CONSULTANTS & REGD. VALUERS, 25-SOUTH AVENUE, CHOUBEY COLONY, RAIPUR (C.G.) PHONE No. - 97711-2255744, 4038748 CELL No. 9-96252-98783 E-MAIL - manishpiliwar@gmail.com			
NOTE ALL DIM. ARE IN M.	DWG PATH	NAGAR PANCHAYAT, MALHAR (C.G.)	
CLIENT			
REVISION	PROJECT	MUNICIPAL SOLID WASTE MANAGEMENT, UNDER 2.0	
DESIGNED BY	DRAWN BY	CHECKED BY	DATE
MANISH PILLIWAR	NITISH DEWANGAN	MANISH PILLIWAR	13/02/2024

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WINDROW COMPOST PLANT AT
VRINDAVAN, WARD NO - 01


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RAIPUR (C.G.) ☎ 107711 2755743 481674

DETAILED ESTIMATE FOR PROPOSED WORK OF " WINDROW COMPOST PLANT AT VRINDAVAN WARD NO - 01 " NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)		
COST OF WINDROW COMPOST PLANT		
Part - I SOR ITEM		
CIVIL INFRASTRUCTURE		
1	Windrow Compost Plant 2 TPD	849661.39
2	Storage Room	639658.87
3	Leachate Tank	75225.82
4	C.C. Flooring	83790.00
Total - I		1648336.08
Part - II NON-SOR ITEM		
5	Wheel Barrow	11000.00
6	Compost Sieve Machine	47500.00
Total		58500.00
18% GST		10530.00
Total - II		69030.00
Total Of Part (I+II)		1717366.08

846594-69

1645269-38

⇒ 1714299-38

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25, SOUTH AVENUE, CHOBHEY COLONY,
RAIPUR (C.G.) PIN 492001 2245743 481874.



**DETAILED ESTIMATE FOR PROPOSED WORK OF
" WINDROW COMPOST PLANT AT VRINDAVAN WARD NO - 01 "
NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)**

Based on C. G. P. W. D. BUILDING S. O. R. IN FORCE FROM 1 JAN 2015

WINDROW COMPOST PLANT - 2 TPD

SN	DESCRIPTION OF ITEM	NO	MEASUREMENT			QTY	RATE	UNIT	AMOUNT
			L	B	H/D				
I	II	III	IV	V	VI	VII	VIII	IX	X
1	1.1 Excavation for all types and sizes of foundations, trenches and drains or for any other purpose including disposal of excavated stuff upto 1.5 m lift and lead upto 50m (at least 5m away from the excavated area), including dressing and level								
	1.1.1 In all types of soils								
	F1(1500X1500)	12	1.50	1.50	1.70	45.90			
	For Beam	1	51.80	0.40	0.20	4.14			
	total					50.04	185.00	cum	9258.14
2	1.18 Providing and filling in plinth with sand/ Crusher dust and hard moorum under floor in layers not exceeding 20cm in depth consolidating each deposited layer by ramming and watering, including dressing etc complete								
	Footing								
	F1(1500X1500)	12	1.50	1.50	0.10	2.70			
	For Beam	1	51.80	0.40	0.10	2.07			
	total					4.77	371.00	cum	1770.41
3	3.1 Providing and laying nominal mix plain cement concrete with crushed stone aggregate using concrete mixer in all works upto plinth level excluding cost of form work								
	3.1.3 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40mm nominal size)								
	Footing								
	F1(1500X1500)	12	1.50	1.50	0.10	2.70			
	For Beam	1	51.80	0.40	0.10	2.07			
	total					4.77	2970.00	cum	14172.84
4	3.2 Providing and laying nominal mix reinforced cement concrete with crushed stone aggregate using concrete mixer in all works up to plinth level excluding cost of form work								
	3.2.1 1:1½:3 (1 cement : 1½ coarse sand : 3 graded stone aggregate 20mm nominal size)								
	F1(1500X1500)	12	1.30	1.30	0.30	6.08			
	Subtotal a					6.08			
	Column upto G.L.								
	C1(300X300)	12	0.30	0.30	1.20	1.30			
	Subtotal b					1.30			
	Column above G.L.								
	C1(300X300)	12	0.30	0.30	0.75	0.81			
	Subtotal c					0.81			
	Plinth Beam								
		1	51.80	0.30	0.40	6.22			
	Subtotal d					6.22			
	total					14.41	4163.00	cum	59972.18
5	2.1 Providing and fixing form work including centring, shuttering, strutting, staging, propping bracing etc. complete and including its removal								
	2.1.1 Foundations, footings, bases of columns plinth beam, curtain wall in any shape and size and all type of wall below plinth level.								
	Footings								
	F1(1500X1500)	1	12	5.20	0.30	18.72			
	Column upto G.L.								
	C1(300X300)	1	12	1.20	1.20	17.28			
	Column above G.L.								
	C1(300X300)	1	12	1.20	0.75	10.80			
	Plinth Beam								
		1	2	51.80	0.40	41.44			
	total					88.24	139.00	sqm	12265.36
6	3.12 Providing and placing in position reinforcement for R.C.C work including straightening, cutting, bending, binding etc. complete as per drawings including cost of binding wire in foundation and plinth all complete								
	3.12.1 Thermo-Mechanically treated bars FE 415								
	Footing		6.08		80.00	486.72			
	Column		2.11		80.00	168.48			
			6.22		80.00	497.28			
	total					1152.48	54.50	Kg	62810.16

PHILIPPA ASSOCIATES
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25, SOUTH AVENUE, CHOBAY COLONY,
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SN	DESCRIPTION OF ITEM	NO	MEASUREMENT			QTY	RATE	UNIT	AMOUNT
			L	B	H/D				
I	II	III	IV	V	VI	VII	VIII	IX	X
7	1.17 Filling from available excavated stuff (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20cm in depth consolidating each deposited layer by ramming and watering with a lead upto 50 M								
	area of excavated Qty					30.03	65.00		1951.95
	total					30.03	38.15	cum	1145.50
8	1.18 Providing and filling in plinth with sand/ Crusher dust and hard macadam under floor in layers not exceeding 20cm in depth consolidating each deposited layer by ramming and watering including design etc complete								
	Washdown Shed and Wet Tipping Platform	1	20.90	6.20	0.30	38.87			
	total					38.87	371.00	cum	14422.25
9	12.4 32 mm thick cement concrete flooring with under layer of 40mm thick cement concrete 1:2:4 (1 cement 2 coarse sand 4 graded stone aggregate 20mm nominal size) and top layer of 12 mm thick cement metallic hardener concrete mix 1:2 (1 cement hardener mix 2 stone aggregate of 6 mm size by volume) with metallic hardening compound of approved quality mixed with cement in ratio of 4:1 (4 cement 1 metallic floor hardening compound by weight) including finishing etc								
	Washdown Shed and Wet Tipping Platform	1	20.90	6.20		129.58			
	total					129.58	441.00	cum	57144.78
10	7.5 Brick work with modular fly-ash lime bricks (FaLG Bricks) conforming to IS 12894-2002 of class designation 4.0 in foundation and plinth in								
	7.5:3 Cement Mortar 1:4 (1 cement 4 coarse sand)								
	Wall								
	Deductions	1	51.80	0.20	0.35	3.63			
	Opening					3.63			
	total	2	6.20	0.20	0.35	0.87			
	Subtotal					0.87			
	total					2.76	3452.00	cum	9520.62
11	11.2 Providing and making 12mm thick cement plaster of mix 1:1:2 4 In Cement Mortar 1:6 (1 cement 6 fine sand)								
	Internal wall								
	C1(300X300)	1	51.80		0.35	18.13			
	Openings	1	12	0.30	0.35	1.26			
	Opening					19.39			
	total	2	6.20		0.35	4.34			
	Subtotal					4.34			
	total					15.05	91.50	sqm	1377.08
12	11.3 Providing and making 15mm thick cement plaster on the rough side of single or half brick wall								
	11.3:3 In Cement Mortar 1:5 (1 cement 5 fine sand)								
	External Wall								
	C1(300X300)	1	51.80		0.35	18.13			
	total	1	12	0.30	0.35	1.26			
	Subtotal					19.39	113.00	sqm	2191.07
13	Providing and applying Acrylic washable Distemper or lite economy Plastic emulsion paint having VOC content less than 50gms/ltr Minimum two coats up to final finish applied @ 1.25 Kg/ 10Sqm as per relevant I. S. Code 428:2000 (product such as Tractor Uno, Dulux Duval, Berger Bison, Opus Style/lite economy emulsion product such as Asian Tactor Spark Dulux Promise sheen, Nerolac Lital Master, Berger Bison Lite, Nippon Superno) inclusive of providing abro tape on edges and article and cleaning of door, windows, floor and surface as required with all tools tackles and labour complete for the work								
	As per Amendment no 08, 05/05/2025 item no 16.62								
	Area of Internal Plaster								
	total		15.05			15.05			
	Subtotal					15.05	64.00	sqm	963.20
14	Providing and applying on exterior surface with ECONOMY Exterior Emulsion paint of required shades to give protective and water proof finish minimum three coats applied @ 1.43 ltr / 10Sqm up to final finish as per relevant I. S. Code 15489:2013 Type -2 Class D.C (Glossy /Semi Glossy finish) (Product such as Asian Ace, Dulux Promise Exterior Berger Wall Masta ,Nerolac Suraksha Plus , Nippon Shogun Opus, One Style Power Bright) inclusive of providing abro tape on edges and article and cleaning of door, windows, floor and surface as required with all tools tackles and labour complete for the work (With 2 Year Warranty)								
	As per Amendment no 08, 05/05/2025 item no 14.67								
	Area of External Plaster								
	total								

PILLAI & ASSOCIATES
ENGINEERS & ARCHITECTS
14/5, L. CHANDRAN

25, SOUTH AVENUE, CHOBAY COLONY,
RAIPUR (C.G.) PIN 487111 2245743 4871744

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SN	DESCRIPTION OF ITEM	NO	MEASUREMENT			QTY	RATE	UNIT	AMOUNT
			L	B	H/D				
I	II	III	IV	V	VI	VII	VIII	IX	X
	Area of External Wall								
	total			19.39			19.39		
							19.39	70.00	sqm 1357.30
15	9.3 Steel work in tubular (round, square or rectangular hollow tubes etc) structure in built-up sections, trusses and frame work including cutting, hoisting, fixing in position upto a height of 5m above plinth level, consisting of columns trusses, roof and bottom purlins, base plate, holding down bolts, wind ties bracing (if required), bolts, nuts and washers for fastening etc. complete with applying a priming coat of red oxide zinc chromate primer.								
	9.3.1 Electric resistance or induction butt welded tubes Grade-250								
	PWD S.O.R.-P-80/I-9.3.1								
	Pole @38 90kg/meter	1	12	4.00	38.90	-	1867.20		
	Truss On Processing Shed								
	Tie Beam 50mm dia @6 19Kg/meter	6	1	7.60	6.19	-	282.26		
	Rafter 50mm dia @6 19Kg/meter	6	2	3.80	6.19	-	282.26		
	Intermediate members 50mm dia @6 19Kg/meter	6	2	7.10	6.19	-	527.39		
	Purlins 40mm dia @ 4 37Kg/meter (On Top)	3	2	22.30	4.37	-	584.71		
							3543.82		
	Gusset Plate, Fixing Bolt and Base Plate Etc	10%					354.38		
	total						3898.20	88.50	Kg 344990.88
16	10.12 Supply and fixing of polymer pre-coated galvalume profile sheets (PPGL) of approved size, shape and pitch of corrugation, total coated thickness (TCT) 0.60 mm +/- 5%, epoxy primer on both side of the sheet and colour polyester top coat 18-20 microns and 6-7 microns on bottom. Sheet should have protective guard film of 25 microns minimum to avoid scratches while transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x 55mm) with EPDM seal or with polymer coated J or L hooks, bolts and nuts 8mm diameter with bitumen and G.I. limpet washers or with G.I. limpet washers filled with white lead complete upto any pitch in horizontal/ vertical or curved surfaces excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.								
	PWD S.O.R.-P-91/I-10.11								
	Roofing	2	22.30	3.80			169.48		
	total						169.48	693.00	sqm 117449.64
17	10.16 Providing and fixing pre-coated galvanised steel sheet roofing accessories 0.50 mm +/- 5% total coated thickness (TCT), Zinc coating 120gsm as per IS 277 in 240mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self drilling/ self tapping screws or with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts,								
	10.16.1 Ridges plain (500-600mm)								
	Ridge	1	22.30				22.30		
	total						22.30	552.00	mtr 12309.60
18	10.16.6 Gutter (600 mm over all girth)								
	Gutter	2	22.30				44.60		
	total						44.60	629.00	mtr 28053.40
19	Providing and applying Aluminium paint minimum 2 coats in all metal surface applying @ 0.75 lit/ 10 Sqm up to required finish as per relevant I.S. code 2932: 2013 of (Product such as Asian Apcolite aluminium paint, Dulux Aluminium paint, Burger Superior Aluminium Paint) with all tools tackle and labour etc. complete for the work								
	As per Amendment no 08, 05/05/2025 item no 14.76								
	On Steel Structure								
	pole	1.5	2	48.00			144.00		
	Truss	1.5	2	177.90			533.70		
	total						677.70	43.00	sqm 29141.10
20	18.76 Providing and fixing on wall face or under floor UV stabilized Unplasticised Rigid PVC pipes (single socketed) having 3.2mm wall thickness conforming to IS : 13592 (4kg/sqcm) including required couplers, jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion etc complete								
	18.76.2 110 mm dia pipe								
	Rain water Pipe	6	4.00				24.00		
	total						24.00	267.00	mtr 6408.00

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Add % Electrical and Plumbing Work
Grand Total for 1 Windrow Shed

187529=95
59064=75
846594=69

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**DETAILED ESTIMATE FOR PROPOSED WORK OF
" WINDROW COMPOST PLANT AT VRINDAVAN WARD NO - 01 "
NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)**

" STORAGE ROOM "										
S. No	SOR	PARTICULARS	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
1	1.2	Surface dressing of the ground including removing vegetation and making up undulations and in-equalities not exceeding 15 cms in depth/ height including disposal of rubbish upto 1.5 m lift and lead upto 50m (at least 5m away from the dressed area).								
		Plot Area	1	13.50	7.00	-	94.50			
							Total	94.50	Sqm	7.20
										680.00
2	1.1	Excavation for all types and sizes of foundations, trenches and drains or for any other purpose including disposal of excavated stuff upto 1.5 m lift and lead upto 50m (at least 5m away from the excavated area), including dressing and leveling of pits.								
	1.1.1	In all types of soil								
		Footing								
		F1	8	1.50	1.50	1.80	32.40			
		Below Plinth								
		Long Wall	2	10.70	0.40	0.20	1.71			
		Short Wall	2	4.40	0.40	0.20	0.70			
		step	1	1.20	1.00	0.20	0.24			
3	2	Extra for every additional lift of 1.5 m or part thereof.					Total	35.05	Cum	185.00
	1.6.1	All types of soil								
		F1	8	1.50	1.50	0.30	5.40			
							Total	5.40	Cum	26.50
										143.00
4	1.17	Filling from available excavated stuff (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20cm in depth consolidating each deposited layer by ramming and watering with a lead upto 50 M. and lift upto 1.5 M.								
		Filling At Side 60%								
							Total	21.03	Cum	65.00
										1367.00
5	1.18	Providing and filling in plinth with sand/ Crusher dust and hard moorum under floor in layers not exceeding 20cm in depth consolidating each deposited layer by ramming and watering, including dressing etc complete.								
		F1	8	1.50	1.50	0.10	1.80			
		Floor	1	11.10	4.60	0.50	25.53			
		step	1	1.20	1.00	0.20	0.24			
		Long Wall	2	10.70	0.40	0.10	0.86			
		Short Wall	2	4.40	0.40	0.10	0.35			
							Total	28.78	Cum	371.00
										10677.00
6	3.1	Providing and laying nominal mix plain cement concrete with crushed stone aggregate using concrete mixer in all works upto plinth level excluding cost of form work.								
	3.1.3	1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40mm nominal size).								
		Below Footing								
		F1	8	1.50	1.50	0.10	1.80			
		Floor Area	1	10.70	4.40	0.10	4.71			
		Below Plinth Beam								
		Long Wall	2	10.70	0.30	0.10	0.64			
		Short Wall	2	4.40	0.30	0.10	0.26			
		step	1	1.20	1.00	0.10	0.12			
							Total	7.53	Cum	2970.00
										22364.00
		Providing and laying damp proof course (upto 50mm thick) with plain concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) including form work.								

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S. No	SOB	PARTICULARS	NO.	L	B	H/D	QTY.	UNIT	RATE (In Rs.)	AMOUNT (In Rs.)
		Long Wall	2	10.70	0.20	0.03	0.21			
		Short Wall	2	4.40	0.20	0.03	0.09			
						Total	0.30	Cum	4237.00	1271.00
8	3.15	Applying a coat of hot bitumen VG-10 using @ 1.7kg/sqm on damp proof course after cleaning the surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil.								
		Long Wall	2	10.70	0.20	-	4.28			
		Short Wall	2	4.40	0.20	-	1.76			
						Total	6.04	Sqm	93.50	565.00
9	3.2	Providing and laying nominal mix reinforced cement concrete with crushed stone aggregate using concrete mixer in all works upto plinth level excluding cost of form work.								
	3.2.1	1:1½:3 (1 cement : 1½ coarse sand : 3 graded stone aggregate 20mm nominal size).								
		Footings								
		F1	8	1.20	1.20	0.30	3.46			
		Column (Upto Ground Level)								
		C1	8	0.20	0.30	1.30	0.62	2.15		
		Column (Ground Lvl to Plinth Lvl)								
		C1	8	0.20	0.30	0.60	0.29			
		Column (Abv. Plinth Top to GF Slab Top)								
		C1	8	0.20	0.30	3.10	1.49			
		Plinth Beams								
		Outer at Ground Lvl								
		Long Wall	2	10.70	0.20	0.45	1.93			
		Short Wall	2	4.40	0.20	0.45	0.79			
		Lintel Beam								
		Long Wall	1	10.70	0.20	0.15	0.32			
		Chajja								
		Long Wall	1	11.50	0.60	0.075	0.52			
		Slab Beam								
		Long Wall	2	10.70	0.20	0.45	1.93			
		Short Wall	4	4.40	0.20	0.45	1.58			
		Slab								
		All Area	1	10.90	4.80	0.125	6.54			
						Total	19.47	Cum	4163.00	81054.00
10	3.12	Providing and placing in position reinforcement for R.C.C. work including straightening, cutting, bending, binding etc. complete as per drawings including cost of binding wire in foundation and plinth all complete.								
	3.12.1	Thermo-Mechanically treated bars FE 415								
		As per Item No-	1	19.47	-	-	19.47			
						Total	19.47	Cum		
		@ 100kg /Cum of Concrete	1	19.47	x	100.00	1947.00			
						Total	1947.00	Kg	54.50	106112.00
11	2.1	Providing and fixing form work including centring, shuttering, strutting, staging, propping bracing etc. complete and including its removal at all levels, for:								
	2.1.1	Foundations, footings, bases of columns plinth beam, curtain wall in any shape and size and all type of wall below plinth level.								
		Footings								
		F1	8	4.80	-	0.30	11.52			
		Column (Upto Ground Level)								
		C1	8	1.00	-	1.30	10.40			
		Column (Ground Lvl to Plinth Lvl)								
		C1	8	1.00	-	0.60	4.80			
		Plinth Beams								
		Outer at Ground Lvl								
		Long Wall	2	10.70	-	0.90	19.26			
		Short Wall	2	4.40	-	0.90	7.92			
						Total	33.90	Sqm	139.00	7492.00
	2.1.5	Columns, Pillars, Piers and likes- rectangular or square in shape								
		Column (Abv. Plinth Top to GF Slab Top)								
		C1	8	1.00	-	3.10	24.80			
						Total	24.80	Sqm	297.00	7366.00
		Long Wall	1	11.50	0.60	-	6.90			
		Side	1	12.70	-	0.10	1.27			

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S. No	SOR	PARTICULARS	NO.	L	B	H/D	QTY.	UNIT	RATE (In Rs.)	AMOUNT (In Rs.)
						Total	8.17	Sqm	294.00	2402.00
2.1.8		Beams, lintels, cantilevers & walls								
		Lintel Beam								
		Long Wall	2	10.70	-	0.15	3.21			
		Slab Beam								
		Long Wall	4	10.70	-	0.45	19.26			
		Short Wall	8	4.40	-	0.45	15.84	35.10		
						Total	38.31	Sqm	202.00	7739.00
2.1.7		Suspended floors, roofs, access platform, balconies (plain surfaces) and shelves (cast in situ)								
		Slab								
		All Area	1	11.30	4.80	-	54.24			
						Total	54.24	Sqm	233.00	12746.00
2.1.4		Edge of slab, breaks in floor and walls upto 200mm								
		Slab Edges at Slab Lvl	1	32.20	-	-	32.20			
						Total	32.20	Rm	34.00	1095.00
12	7.5	Brick work with modular fly-ash lime bricks (FALG Bricks) conforming to IS:12894-2002 of class designation 4.0 in foundation and plinth in:								
	7.5.4	Cement Mortar 1:6 (1 cement : 6 coarse sand)								
		step	1	1.20	0.90	0.15	0.16			
		step	1	1.20	0.60	0.15	0.11			
		step	1	1.20	0.30	0.15	0.05			
						Total	0.32	Cum	3263.00	1057.00
13	7.5	Brick work with modular fly-ash lime bricks (FALG Bricks) conforming to IS:12894-2002 of class designation 4.0 in foundation and plinth in:								
	7.5.4	Cement Mortar 1:6 (1 cement : 6 coarse sand)								
	7.6	Extra for brick work in superstructure above plinth level for every floor or part thereof in addition to rate for foundation and plinth:								
		Above Plinth								
		Long Wall	2	10.70	0.20	2.95	12.63			
		Short Wall	2	4.40	0.20	2.95	5.19			
		Parapet	2	11.50	0.20	0.60	2.76			
		Deduction	2	4.60	0.20	0.60	1.10			
		D	2	1.20	0.20	2.10	-1.01			
		W	2	1.50	0.20	1.20	-0.72			
						Total	19.95	Cum	3384.00	67511.00
14	9.47	Providing and fixing aluminium work for doors, windows, ventilators and partitions made out of extruded aluminium standard sections (main section with minimum 1.5mm thickness) conforming to IS: 733, IS: 1285 mitred and jointed mechanically including aluminium cleats, neoprene weather stripping gasket beveled edge beading, screws duly fixed in wall/ floor with fixing clips or hold fasteners or bolts and nuts as required aluminium sections shall be anodized transparent or dyed to approved shade according to IS: 1868, minimum anodic coating shall be of grade AC-15. (Glazing to be paid for separately):								
	9.47.2	For shutter of doors, windows & ventilators including providing and making provision for fixing of fitting wherever required including the cost of PVC/ neoprene gasket required (Fittings shall be paid for separately).								
		W	2	1.50	-	1.20	3.60			
		For Weight	1	3.60	x		15.00	Sqm		
						Total	54.00	Kg		
						Total	54.00	Kg	338.00	18252.00

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S No	SOR	PARTICULARS	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
15	12.79.1 AS PER AMMENDMEN T	Providing and laying vitrified floor tiles with double charge/ multi charge printing with water absorption less than 0.5% and conforming to IS : 15622 of approved make in all colours and shades and size mentioned below (+/- 10mm), laid on 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand) including grouting the joints with white cement and matching pigments etc. complete.								
		12.79.1 Size 600x600mm								
		area	1	11.10	4.60		51.06			
						Total	51.06	Sqm	1082.00	55247.00
11	12.50	KOTA stone slab 25mm thick in risers and treads of steps, skirting dado and pillar laid in 12mm (Average) thick cement mortar 1:3 (1 cement : 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slab including rubbing and polishing complete. (single stone is to be used for riser and treads of steps and the width of stone for skirting and dado shall be equal to the height of skirting/ dado up to length of 1.0 M.)								
		Steps	4.00	1.20	0.75		3.60			
							3.60	sqm	990.00	3564.00
16	11.1	Providing and making 6mm thick cement plaster of mix:								
	11.1.2	In Cement mortar 1:4 (1 cement : 4 fine sand)								
							24.80			
							8.17			
							35.10			
							54.24			
			1	32.20		0.125	4.03			
						Total	126.34	Sqm	87.00	10991.00
17	11.2	Providing and making 12mm thick cement plaster of mix:								
	11.2.4	In Cement Mortar 1:6 (1 cement : 6 fine sand)								
			2	11.10		3.00	66.60			
			2	4.60		3.00	27.60			
		Deduction								
		D	2	1.20		2.10	-5.04			
		W	2	1.50		1.20	-3.60			
						Total	85.56	Sqm	91.50	7829.00
18	11.3	Providing and making 15mm thick cement plaster on the rough side of single or half brick wall of mix:								
	11.3.4	In Cement Mortar 1:6 (1 cement : 6 fine sand)								
		Outer Plaster								
		Long Wall	2	11.50	-	5.10	117.30			
		Short Wall	2	5.00	-	5.10	51.00			
		Deduction								
		D	2	1.20		2.10	-5.04			
		W	2	1.50		1.20	-3.60			
						Total	159.66	Sqm	107.00	17084.00
19	As per Amendment no 08, 05/05/2025 Item no.14.57	Providing and applying 2mm thick white cement based Acrylic grade putty with minimum 3 coats applied @ 4.0 kg/ 105sqm as per relevant IS code 17545:2021 (Product such as Asian trucore, Berger Happy walls Putty Birla Opus One pro smooth) to make the surface smooth and even with all tools tackles and labour etc. complete for the work. (This item to be use in heigher grade painting works Item No. 14.65)								
		As per Item No-	16	-	-	-	126.34			
		As per Item No-	17	-	-	-	85.56			
		As per Item No-	18	-	-	-	159.66			
						Total	371.56	Sqm	95.00	35298.00

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20	As per Amendment no 08, 05/05/2025 Item no.16.60	Providing and applying of Acrylic primer on all surface applied @ 0.80 litrs/10 sqm as per relevant I.S. code 15489:1974 (Product such as Aslan Spark/suprimo, J.K. Primer, Dulux Acrylic Primer) with all tools tackles and labour etc. complete for the work.								
				-	-	-	371.56			
						Total	371.56	Sqm	37.00	13748.00
21	As per Amendment no 08, 05/05/2025 Item no.16.62	Providing and applying Acrylic washable Distemper or lite economy Plastic emulsion paint having VOC content less than 50gms/ lit Minimum two coats up to final finish applied @ 1.25 Kg/ 10Sqm as per relevant I.S. Code 428:2000 (product such as Tractor Uno, Dulux Duval, Berger Bison, Opus Style/lite economy emulsion product such as Aslan Tactor Spark Dulux Promise sheen, Neroloc Lini Master, Berger Bison Lite, Nippon Superio.) inclusive of providing abro tape on edges and article and cleaning of door, windows, floor and surface as required with all tools tackles and labour complete for the work								
	14.9.1	On new work (Two or more coats)								
				-	-	-	85.56			
				-	-	-	126.34			
						Total	211.90	Sqm	64.00	13561.00
22	As per Amendment no 08, 05/05/2025 Item no.14.67	Providing and applying on exterior surface with ECONOMY Exterior Emulsion paint of required shades to give protective and water proof finish minimum three coats applied @ 1.43 lit / 10Sqm up to final finish as per relevant I.S. Code 15489:2013 Type -2 Class D,C (Glossy /Semi Glossy finish) (Product such as Asian Ace,Dulux Promise Exterior Berger Wall Masta ,Neroloc Suraksha Plus ,Nippon Shogun Opus, One Style Power Bright) inclusive of providing abro tape on edges and article and cleaning of door, windows, floor and surface as required with all tools tackles and labour etc. complete for the work (With 2 Year Warranty)								
				-	-	-	159.66			
						Total	159.66	Sqm	70.00	11176.00
23	4.21	Providing post water proofing treatment against dampness & Seepage in roof, terraces, sunken floor of toilets with reinforced acrylic breathable (polymer content 35%, elongation at break at > 100%) coating consisting of following operations: i) Removing loose material and cleaning the surface. ii) Priming in one coat with water based acrylic emulsion. iii) Three coats with reinforced acrylic breathable polymer								
			1	11.50	5.00		57.50			
						Total	57.50	Sqm	611.00	35133.0
24	8.3	Providing 40x5mm iron hold fast 40cm long including fixing to frame with 10mm bolts nuts and wooden plug and embedding in Cement Concrete 1:2:4 in blocks of size 30x10x15cm.								
	DOOR		12	-	-	-	12.00			
						Total	12.00	Each	72.50	870.0

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S. No	SOR	PARTICULARS	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
25	8.12	Providing and fixing flush door shutters, conforming to IS : 2202 (Part-I), decorative type core of block board construction with frame of first class hard wood and well matched teak ply veneering with vertical grains or cross bands and face veneers on both faces of shutters excluding hinges								
	8.12.2	35 mm. thick (single leaf)								
	8.15	Extra for double leaf shutter instead of single leaf.								
		Providing post water proofing treatment against dampness & Seepage in roof, terraces, sunken floor of toilets with reinforced acrylic breathable (polymer content 35%, elongation at break at > 100%) coating consisting of following operations: i) Removing loose material and cleaning the surface. ii) Priming in one coat with water based acrylic emulsion. iii) Three coats with reinforced acrylic breathable polymer	2	1.20	-	2.10	5.04			
						Total	5.04	Sqm	2057.00	10367.0
26	8.58	Providing and fixing bright finished brass butt hinges with brass polished MS screws complete:								
	8.58.2	100x85x5.50 mm (Heavy Type)								
		Providing post water proofing treatment against dampness	12	-	-	-	12.00			
						Total	12.00	Each	195.00	2340.0
27	8.60	Providing and fixing bright finished brass sliding door bolt with nuts and brass polished MS screws complete:								
	8.60.2	250x16mm								
		Providing post water proofing treatment against dampness	2	-	-	-	2.00			
						Total	2.00	Each	344.00	688.0
28	8.61	Providing and fixing brass door latch with brass polished MS screws complete:								
	8.61.2	250x16x5 mm								
		Providing post water proofing treatment against dampness	2	-	-	-	2.00			
						Total	2.00	Each	268.00	536.00
29	8.62	Providing and fixing bright finished brass tower bolts (barrel type) with brass polished MS screws complete:								
	8.62.2	200x10mm								
		Providing post water proofing treatment against dampness	2	-	-	-	2.00			
						Total	2.00	Each	231.00	462.0
30	8.65	Providing and fixing bright finished brass door handles with brass polished MS screws complete:								
	8.65.1	125 mm								
			4	-	-	-	4.00			
						Total	4.00	Each	55.50	222.0
31	9.15	Providing and fixing M.S. grill of approved pattern made of M.S. flats or square or round bars welded to steel frame of windows etc. including applying a priming coat welded to frame with all necessary fitting complete including applying a priming of red oxide zinc chromate primer.								
			2	1.50	-	1.20	3.60			
							3.60	Sqm		
		For Qty of steel = Area x 30.0 kg/Sqm	1	3.60	x	30.00	108.00			
						Total	108.00	kg	67.50	7290.0
32	9.51	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with PVC/ neoprene gasket etc. complete. (Cost of aluminium snap beading shall be paid in basic item):								
	9.51.2	With float glass panes of 5 mm thickness								
		As Per Item No.	31	-	-	-	3.60			
						Total	3.60	Sqm	708.00	2349.0

PILLIWAR & ASSOCIATES
ENGINEER, ARCHITECT PLANNER
GIS CONSULTANT
& GOVT. APPROVED VALUER
25, SOUTH AVENUE, CHOBAY COLONY,
RAIPUR (C.G.) PIN 497111 2245743 487874.

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S. No	SOR	PARTICULARS	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
33	As per Amendment no 08, 05/05/2025 Item no.14.76	Providing and applying Aluminim paint minimum 2 coats in all metal surface applying @ 0.75 ll/ 10 Sqm up to required finish as per relevent I.S. code 2932: 2013 of (Product such as Asian Apcolite aluminium paint, Dulux Aluminim paint, Burger Superior Aluminium Paint) with all tools tackle and labour etc. complete for the work								
	14.22.2	Premium synthetic enamel paint								
		On Steel work								
		As per Item No-	0	-	-	-	3.60			
		On Wood work								
			2	1.20	x	2.10	5.04			
						Total	8.64	Sqm		
		For Area for Painting	1	8.64	x	2.50	21.60			
						Total	21.60	Sqm	43.00	929.0
34	9.37	Providing and fixing M.S. fan clamp/ hook for ceiling fan made out of 16 mm dia M.S. bar bent to shape with hooked ends in R.C.C. slabs, beams during laying including painting the exposed portion of loop.								
			6	-	-	-	6.00			
						Total	6.00	Each	97.00	582.0
Total Rs.										586843.00
Add 9% Extra For Electrical and Plumbing Work Rs										52815.87
Grand Total Rs.										639658.87

PILLIWAR & ASSOCIATES
ENGINEER, ARCHITECT PLANNER
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& GOVT. APPROVED VALUER
25, SOUTH AVENUE, CHOBAY COLONY,
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**DETAILED ESTIMATE FOR PROPOSED WORK OF
" WINDROW COMPOST PLANT AT VRINDAVAN WARD NO - 01 "
NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)**

" PROPOSED LEACHATE TANK 5.00X2.00X1.50 M "

S.No.	PARTICULAR	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
1	Excavation for all types and sizes of foundations trenches and drains or for any other purpose including disposal of excavated stuff upto 1.5 m lift and lead upto 50m (at least 5m away from the excavated area), including dressing and leveling of pits. 1.1.1) In all types of soil								
	(BUILDING SOR ITEM NO.-1.1/9)	1	5.70	2.70	2.10	32.32	CUM	185.00	5979.02
2	Filling from available excavated stuff (Excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20cm. In depth consolidation each deposited layer by ramming and watering with a lead upto 50M. And lift upto 1.5M.								
	Excavated Area-	1	5.70	2.70	2.10	32.32			
	Deduction Tank Area-	-1	5.40	2.40	1.50	-19.44			
	P.C.C.-	-1	5.70	2.70	0.15	-2.31			
	(BUILDING SOR ITEM NO.-1.17/11)					10.57	CUM	65.00	687.08
3	Providing and filling in plinth with sand/ Crusher dust and hard moorum under floor in layers not exceeding 20cm in depth consolidating each deposited layer by ramming and watering, including dressing etc. complete.								
	(BUILDING SOR ITEM NO.- 1.18/11)	1	5.70	2.70	0.15	2.31	CUM	371.00	856.45
4	Providing and laying nominal mix cement concrete with crushed stone aggregate using concrete mixer in foundation, plinth and at ground level excluding cost of form work. 3.1.3) 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40mm nominal size).								
	(BUILDING SOR ITEM NO.- 3.1.3/23)	1	5.70	2.70	0.15	2.31	CUM	2970.00	6856.25
5	Providing and laying nominal mix reinforcement cement concrete with crushed stone aggregate using concrete mixer in all works upto floor five level excluding cost of reinforcement and form work. 3.2.1) 1:1½:3 (1 cement : 1½ coarse sand : 3 graded stone aggregate 20mm nominal size).								
	Bottom Slab-	1	5.40	2.40	0.15	1.94			
	Top Slab-	1	5.40	2.40	0.15	1.94			
	Deduction-	-2	0.60	0.60	0.15	-0.11			
	(BUILDING SOR ITEM NO.- 3.2.1/23)					3.78	CUM	4163.00	15736.14
6	Providing and fixing formwork including centering, shuttering, strutting, staging, propping bracing etc. complete and including its removal at all levels, for: Foundations, footings, bases of columns plinth beam, curtain wall in any shape and size and all type of wall below plinth level.								
	Bottom Slab-	1	14.40	-	0.15	2.16			
	(BUILDING SOR ITEM NO.- 2.1.1/16)					2.16	SQ.M	139.00	300.00
7	2.1.7) Suspended floors, roofs, access platform, balconies (plain surfaces) and shelves (cast in situ)								
	Top Slab-	1	5.40	2.40	-	12.96			
	side	1	14.40	-	0.15	2.16			
	Deduction-	-2	0.60	0.60	-	-0.72			
	(BUILDING SOR ITEM NO.-2.1.7/16)					14.40	SQM	235.00	3384.00
8	Providing and placing in position reinforcement for R.C.C. work including straightening, cutting bending binding etc. complete as per drawings including cost of binding wire all complete: Thermo-Mechanically treated bars FE 415								
	Qty.as per item no. 5					3.78			
	(BUILDING SOR ITEM NO.-3.12.1/24)					302.40	KG	54.50	16480.80
9	Brick work with modular fly-ash line bricks (FALG Bricks) conforming to IS:12894-2002 of class designation 40 in foundation and plinth in:								
	(SOR. ITEM NO.-7.5.4/45)								
	Cement Mortar 1:6 (1 cement : 6 coarse sand)								
	Extra for brick work in superstructure:								
	(SOR. ITEM NO.-7.6/45)								
	Leachate Tank Wall	1	14.40	0.20	1.50	4.32			
						4.32	CUM	3384.00	14618.88
	1:4 cement plaster of mix								
	(SOR. ITEM NO.-1.1.1/03)								
	& GOVT. 2:8:16 (1 cement : 4 fine sand)								

PILLIWAR & ASSOCIATES
ENGINEERS & ARCHITECTS
(SOR. ITEM NO.-1.1.1/03)
& GOVT. 2:8:16 (1 cement : 4 fine sand)
25, SOUTH AVENUE, CHOEY COLONY,
RAIPUR (C.G.) PIN - 492001

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S.No.	PARTICULAR	NO.	L	B	H/D	QTY.	UNIT	RATE (In Rs.)	AMOUNT (In Rs.)
	Inside Plaster	1	14.40		1.50	21.60			
						21.60	SQM	87.00	1879.20
11	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) as per standard design. 20.11.1 With 20x20 mm square bar								
	(BUILDING SOR ITEM NO.-20.11/191)	2	-	-	-	2.00	NOS.	168.00	336.00
12	Providing and fixing in position precast R.C.C. manhole cover and frame L.D. 2.5 of required shape and approved quality Rectangular shape 600x450mm Internal dimensions								
	(BUILDING SOR ITEM NO.-20.13.1/192)	2	-	-	-	2.00	EACH	1031.00	2062.00
13	25mm thick cement concrete flooring with 1:2:4 cement concrete (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5 mm nominal size) finished with floating cost of neat cement.								
	(BUILDING SOR ITEM NO.-12.2/111)	1	5.00	2.00	-	10.00	SQM	165.00	1650.00
14	Providing and fixing on wall face or under floor UV stabilized Unplasticised Rigid PVC pipes (single socketed) having 3.2mm wall thickness conforming to IS : 13592 (4kg/sqm) including required couplers, jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion etc complete. 150 mm dia pipe.								
	Leachate Drain Pipeline	1	10.00	-	-	10.00	MTR	440.00	4400.00
	(BUILDING SOR ITEM NO.-18.76/170)								
Cost of 1 Leachate Tank Rs.									75225.82

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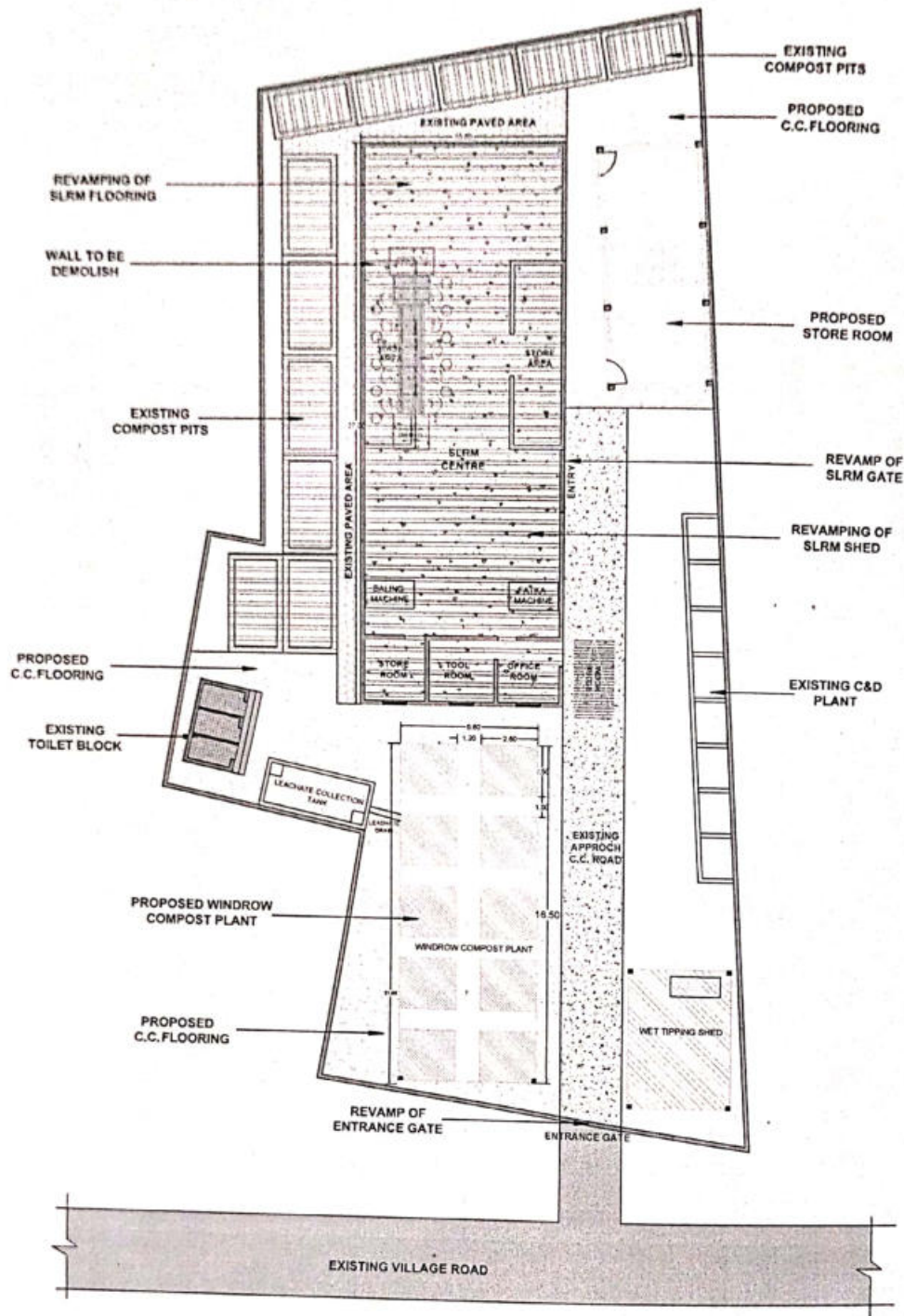
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GIS CONSULTANT
& GOVT APPROVED VALUER
25, SOUTH AVENUE, CHOBHEY COLONY
RAIPUR (C.G.) PIN (07731) 2255743 481876.

DETAILED ESTIMATE FOR PROPOSED WORK OF " WINDROW COMPOST PLANT AT VRINDAVAN WARD NO - 01 " NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)									
" EXTERNAL C.C. FLOORING "									
S.No.	PARTICULAR	NO.	L	B	H/D	QTY.	UNIT	RATE (in Rs.)	AMOUNT (in Rs.)
1	52 mm thick cement concrete flooring with under layer of 40mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) and top layer of 12 mm thick cement metallic hardener concrete mix 1:2 (1 cement hardener mix : 2 stone aggregate of 6 mm size by volume) with metallic hardening compound of approved quality mixed with cement in ratio of 4:1 (4 cement : 1 metallic floor hardening compound by weight) including finishing etc complete								
		1.00	190.00			190.00			
	(BUILDING SOR ITEM NO.12.4/111)				Total	190.00	SQ.M	441.00	83790.00
Total Rs.									83790.00


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 GIS-CONSULTANT
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 25, SOUTH AVENUE, CHOBAY COLONY,
 RAIPUR (C.G.) ☎ (07711) 275743 (07711) 275744



SITE PLAN

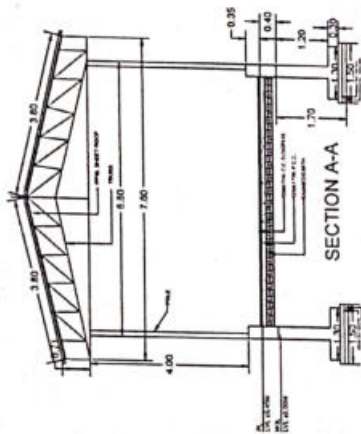
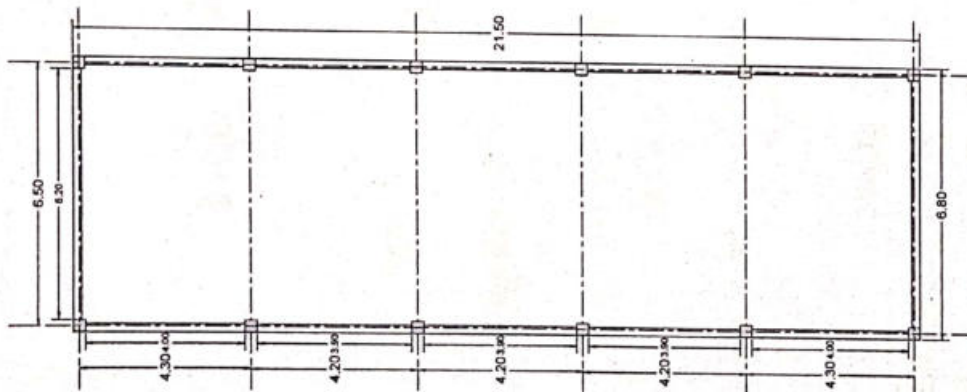
**"SITE PLAN OF PROPOSED WINDROW COMPOST PLANT
& EXISTING SLRM CENTRE "
AT NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)**

PILLIWAR & ASSOCIATES
ENGINEERS, ARCHITECTS, PLANNERS,
GIS-CONSULTANTS & REGD. VALUERS
25, SOUTH AVENUE, CHOUBEY COLONY, RAIPUR (C.G.)
RAIPUR (C.G.) PIN- 491004
PHONE NO. 0311-2255748, 4236748 CELL NO. 942202-08760
E-MAIL: manishpiliwar@yahoo.com

PILLIWAR & ASSOCIATES			
SITE PLAN	ENGINEERS, ARCHITECTS, PLANNERS, GIS-CONSULTANTS & REGD. VALUERS 25-SOUTH AVENUE, CHOUBEY COLONY, RAIPUR (C.O.) PHONE No. - 9711-2255748, 4236748 CELL No. 942202-08760 E-MAIL: manishpiliwar@yahoo.com		
NOTE ALL DIM. ARE IN M.	DWG PATH	CLIENT NAGAR PANCHAYAT, MALHAR (C.G.)	
	CLIENT		
REVISION	PROJECT	MUNICIPAL SOLID WASTE MANAGEMENT, UNDER 2.0	
DESIGNED BY	DRAWN BY	CHECKED BY	DATE
MANISH PILLIWAR	NITISH DEWANJAN	MANISH PILLIWAR	13/02/2024

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FOOTING DETAILS		REINFORCEMENT DETAILS	
FOOTING NO.	FOOTING TYPE	FOOTING DIM.	FOOTING REIN.
F1	1500	1500	1500 1500CC

COLUMN DETAILS		COLUMN SECTION	
COL. TYPE	UP TO PLINTH	UP TO PLINTH	ABOVE PLINTH
C1	300X300	300X300	300X300

GROUND BEAM DETAILS		GROUND BEAM SECTION	
GROUND BEAM NO.	GROUND BEAM TYPE	GROUND BEAM DIM.	GROUND BEAM REIN.
G1	1500X400	1500X400	1500X400

2 TPD WINDROW COMPOST

"SITE PLAN OF PROPOSED WINDROW COMPOST PLANT & EXISTING SLRM CENTRE" AT NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)

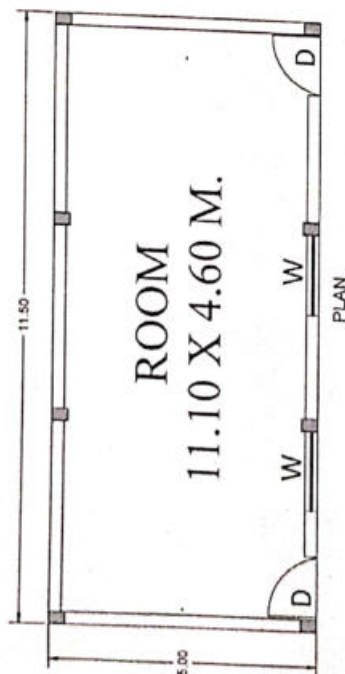
PILLIWAR & ASSOCIATES
ENGINEERS - ARCHITECTS - PLANNERS
& GOVT. APPROVED VALUER
25, SOUTH AVENUE, CHOURAY COLONY, RAIPUR (C.G.)
E-MAIL: manishpilliwari@gmail.com

WINDROW COMPOST	PILLIWAR & ASSOCIATES ENGINEERS - ARCHITECTS - PLANNERS GIS-CONSULTANTS & REGD. VALUERS 25, SOUTH AVENUE, CHOURAY COLONY, RAIPUR (C.G.) E-MAIL: manishpilliwari@gmail.com			
NOTE	DWG PATH	CLIENT	NAGAR PANCHAYAT, MALHAR (C.G.)	
ALL DIM. ARE IN M.		PROJECT	MUNICIPAL SOLID WASTE MANAGEMENT UNDER 2.0	
DESIGNED BY	DRAWN BY	CHECKED BY	DATE	
MANISH PILLIWAR	MITISH DEWANGAN	MANISH PILLIWAR	13/02/2020	

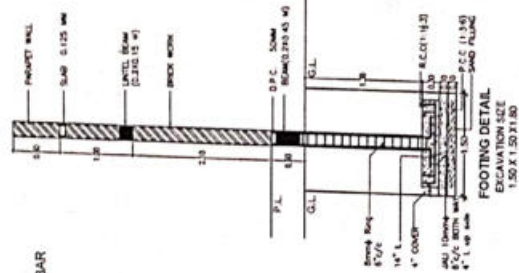
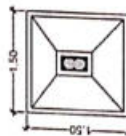
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ELEVATION







ROOM
11.10 X 4.60 M.




STORAGE ROOM

FOOTING SCHEDULE			
Sl. No.	FOOTING	EDUCATION SLIDE	FOOTING SET
1.	1	with 1000 sq. ft. area	1000 sq. ft. area

COLUMN IDENTIFIABLE	COLUM	COLUMN SIZE	RECOMMENDED "ST" TUBE ID
COAST CHRYSLER CO. WILLYS PONTIAC		100 100-100T C-1	100-100L @ 100L & C with 1/2 inch angled section

PINTH BEAM SCHEDULE						
BEAM SECTION	COLUMN SIZE	REINFORCEMENT DETAILS				TYPICAL SECTION
		TOP	SO	BOTTOM	UPPER	
	400-250-400	4-12	4-12	4-12	4-12	4-12
	400-250-400	4-12	4-12	4-12	4-12	4-12
	400-250-400	4-12	4-12	4-12	4-12	4-12

INTEL BEAM SCHEDULE					
SECTION	COLLUM SIZE	REINFORCEMENT (ET AL.)			STIRRUPS
		TOP	MD	BOTTOM	
	18" x 24" x 150 mm	2 # 6 mm	-	2 # 25mm	6 mm @ 100mm

LAB BEAM SCHEDULE		REINFORCEMENT DETAILS				STIRRUPS
BEAM CROSS SECTION	COLUMN SIZE	TOP	MID	BOTTOM	CHAIR	
	20" x 20" (40 x 40 cm)	3 # 12 top bars	2 # 12 mid bars	3 # 12 bottom bars	2 # 10 chair bars	1 # 10 @ 16" max c/c

SLAB SCHEDULE					
NAME OF SLAB	DEPTH OF SLAB IN mm	REINFORCEMENT ALONG SHORT DIRECTION AT TOP FACE	REINFORCEMENT ALONG LONG DIRECTION AT TOP FACE	REINFORCEMENT ALONG LONG DIRECTION AT BOTTOM FACE	GENERAL TIME REQUIRED IN HRS
S1	125mm	NEAR TOP FACE	NEAR TOP FACE	NEAR BOTTOM FACE	9.000 @ 120mm SLAB

STORAGE ROOM	PILLIWAR & ASSOCIATES ENGINEERS, ARCHITECTS, PLANNERS, CONSULTANTS & REGD. VALUERS 24 SOUTH STREET, MALHAR (C.G.) PHONE NO. - 0175-3255748, 0308798 CELL NO. 3-84752 (974) E-MAIL: manishpiliwar@gmail.com			
	NOTE	DWG PATH	CLIENT	NAGAR PANCHAYAT, MALHAR (C.G.)
	ALL DIM ARE IN M		PROJECT	MUNICIPAL SOLID WASTE MANAGEMENT, UNDER 2.0
	REVISION			
	DESIGNED BY	DRAWN BY	CHECKED BY	DATE
MANISH PILLIWAR	NITISH DEWANGAN	MANISH PILLIWAR	15/03/20	

PILLAIAR & ASSOCIATES
ENGINEERS IN-CHARGE PLANNED
US CONSULTANT
& GOVT APPROVED VALUER
31, SOUTH AVE. SEC. CHOYE COLOR.
CHENNAI 600 033 TEL: 47511 37-5510 INTL.

**"SITE PLAN OF PROPOSED WINDROW COMPOST PLANT
& EXISTING SLRM CENTRE"
AT NAGAR PANCHAYAT MALHAR, BILASPUR (C.G.)**

& EXISTING SLRM CENTRE)
AT NAGAR PANCHAYAT MALHAR, BILASHIPUR (C.G.)

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[illegible]

**"SITE PLAN OF PROPOSED WINDROW COMPOST PLANT
& EXISTING SLRM CENTRE "
AT NAGAR PANCHAYAT, MALHAR, BILASPUR (C.G.)**

PILLIWAR & ASSOCIATES
ENGINEER, ARCHITECT, PLANNER
— U.S. GOVERNMENT —
& GOVT. APPROVED VALUER
25, SOUTH AVENUE, CHASEY COLONY,
BALNOR H.C.3. TEL: (0711) 274543. DENVER.

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