Annexure 1.

Salient guidance specification points for the BSL-2 laboratory (aligned with national guidelines issued by DBT in September 2024) facilities in the NCDC State and Regional branches.

Biosafety Level (BSL)-2 is mainly applicable to clinical/diagnostic/teaching/operational research facilities working with handling of risk group 2 microorganisms (Isolation, cultivation, and storage) and environmental samples. The following standards and facility specifications should be followed for the BSL-2 facility, as stated below.

1. Location & Access

- The public health laboratory complex shall have adequate signage
  - biohazard warning symbol and sign in various areas handling patient samples
  - for restricted access
  - "Limit access/entry for only trained and authorized personnel/staff"
- The laboratory area may be kept under constant CCTV surveillance.

2. Design & Construction

- Laboratory **doors** must be **self-closing. The door should have pull handles** and elbow push plates in stainless steel with a locking mechanism.
  - **Doors in BSL-2 lab area-** should be a minimum 4 ft. (1.2 meters) in width and 7 ft. (2.1 meters) in height, and corridor width should be a minimum 1.8 meters wide to facilitate lab equipment in and out movement.
- Laboratory **windows** – Should be closed and sealed type. Window glass should be toughened glass.

- **Ceilings** -Ceiling should be jointless, monolithic and smooth in an easily cleanable surface finish like epoxy paint or powder coating. Coving should be provided at the ceiling and wall corners.

- **Flooring** and **Base Materials**: **(Welded PVC or Epoxy flooring, along with corner coving desired essentially for BSL-2 Labs and areas with BSC and PCR labs)**
  - Non-absorbent, skid-proof, resistant to Chemicals and detergents in normal use.
  - Monolithic or have a minimal number of joints.
  - Floor surfaces should be easily cleanable and impervious to water.
  - Joints in the flooring material should be kept to a minimum and sealed by hot welding; the flooring should be coved to walls and sealed at wall junctions.

18/11/2025 (Concurrence on email) (Concurrence on email) Dr. Aradhna Bhargava.
Mr. Rajeev
Mr. Imran
Mr. Khan
24/11/25

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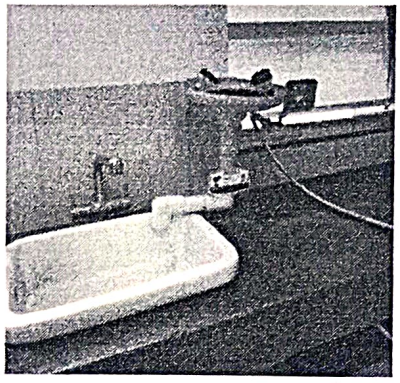
- **Wall surfaces** should be in a monolithic and easily cleanable surface finish like epoxy paint or powder coating. Coving should be provided at wall-to-wall corners should be free from cracks, unsealed penetrations, and imperfect junctions with the ceiling and floors. Materials/wall paint should be washable, such as polyurethane or epoxy.

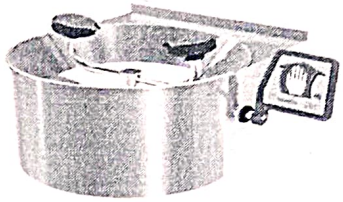
- **Workbenches**: to be made of non-porous, non-absorbent materials, skid-proof, and also resistant to chemicals. These should be monolithic or have a minimal number of joints between them. (**Bench-tops** to be **impervious to water and resistant to** chemicals).

- **Biological Safety Cabinet (Class II, A2)** (70% air re-circulated and 30% air exhausted) with HEPA filters in supply and return/exhaust air (min. efficiency of 99.97% at 0.3 micrometer particle size) incorporated.

- An **autoclave** for decontamination of potentially hazardous laboratory wastes should be available **in the biomedical waste management area situated in the same floor of the building as the laboratory.**



Eye wash stations in laboratories



Eye wash station made of stainless steel

- **Washing stations:**
  1. **General laboratory sinks** should be "all- in one' units to avoid the need for sealing around the sink. They should be of Stainless Steel and should drain directly to the Waste via a simple S-bend trap. ***Splash-proof sinks*** should be provided, especially at the washing areas of reusable items. A separate **sink** for hand-washing should be available, **preferably near the exit.**
  2. **Hand wash basin** should be provided along with Liquid Soap Dispenser/Hand Wash and Tissue paper towel (preferably wall-mounted) or Hand dryers. It is recommended that the **Taps** should be lever- knee or elbow or automatic sensor-operated.
  3. **Eyewash station** made of stainless steel with an eye wash signage and a minimum 30 lbs. water pressure, should be provided adjacent to hand-wash basins near the lab exit. A deluge shower should be provided near emergency exits for a quick wash/bath in case of accidental spill.

Dhara Shah 12/11/2025 (Concurrence on email) Mr. Rajeev Mr. Imran Mr. Khan As 12.11.25

Concurrence on email (Dr. Aradhna Bhargava)

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4. **Washing area/ Service rooms:** A suitable washing area should be provided for the following activities:
    a. Area/space to accommodate autoclaves.
    b. Sinks for cleaning glassware.

Pass box provision in BSL-2 Lab may be optional depending on specific operational needs and a risk-assessment)

- **Pass boxes** needed in BSL-2 and PCR Lab areas
    - Made of rust-free SS 304 grade and built-in UV light. UV light should be with a timer operation and an hour meter.
    - With a hinge door having a wide glass window for seeing the material inside
    - Doors with an electrically magnetic interlock closure, and any one door can be opened at a time

- **Extracts Systems (Lab Safety Airflow Systems), Ventilation / HVAC System:**
    - **Room Exhaust air:** There should be an independent air supply and exhaust system with unidirectional airflow suitable for 30% fresh air and 70% recirculation for the BSL-2 and PCR lab facility areas. (A separate air exit/exhaust desired, especially for the area with a biosafety cabinet (BSC) in BSL-2, if possible through HEPA filtration.)
    - A **minimum of 6-12 air changes per hour (ACPH)** to be ensured with 70% recirculation and 30% fresh-air, along with negative pressure in lab area(s) having BSC, in addition to the exhaust system of BSC.
    - **Exhaust fan** provision in media preparation room.
    - Installation of an audible and clearly visible **alarm system to notify of HVAC system failure** should be installed.
    - **Control Systems:** All supply and extract systems should have local control systems in addition to the central main control. Laboratory spaces should be comfort-cooled and air-conditioned. Large laboratory spaces should be zoned, with each zone equipped with a thermostat for individual control.

- **Temperature and humidity recording panel provisions** to be made in labs.

- **Drainage system provision** in the lab complex, so that washing of laboratory floors can be done in case of spillage, etc

- **Fire Safety:**
  It should be as per the National Building Code (NBC). Display of fire-exit route (with location of nearest exit) and installation of A, B, and C types of fire extinguishers, along with Calibration and expiry dates to be available on all fire extinguishers.

(Concurrence on email) Mr. Rajeev Mr. Imran Mr. Ishan 12/11/25

(Concurrence on email) Dr. Aradhna Bhargava.

- **Storage areas inside the lab room/sections**:
  - Adequate storage space with **metallic storage cabinets** inside lab areas(beneath the counters above the work bench)
  - Storage **shelves:** wall-mounted or floor-mounted, with appropriate storage area.

- **Telephone and internet connection points provision** in all rooms, including in the laboratory rooms/sections.

- **Electrical points** (preferably 16-amp sockets); **3-phase electrical points** for autoclaves, deep freezers, etc., **in the lab** areas. Electrical conduits inside labs should be concealed, and surface conduits should be avoided.

- Laboratory **furniture** should be sturdy and ergonomically effective. **Chairs** used in laboratory work must be **covered with a nonporous material** that can be easily cleaned and decontaminated with appropriate disinfectants.

12/11/2025

(Concurrence on email)
Mr. Rajeev
Mr. Imran
Mr. Khan

A 12/11/25

(Concurrence on email)
Dr. Aradhana Bhargava

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Minutes of the first meeting of the Consultative group held to review the consolidated design specification of BSL-2 lab facilities for the new NCDC Branches, on 29.09.2025, 12 pm at CSR, NCDC (HQ), Delhi.

A meeting with a VC link was scheduled and conducted at CSR, NCDC (HQ) Delhi, on 29th September 2025, from 12:00 to 2:30 pm, under the chairmanship of Dr. Lata Kapoor, Additional Director, NCDC (Delhi), to review the queries received from state CPWDs regarding the approved prototype layout/design(s) of BSL-2 lab facilities along with prototype layout detailing for the new NCDC Branches.

In this regard, a discussion on the approved prototype drawings and the comprehensive draft of the essential specifications for the BSL-2 facility was carried out among the members of the Consultative group, involving a consultation with CDB, BSL-3 Consultant(external), and concerned NCDC officers through a physical meeting (with a VC link provision) at CSR, NCDC, Delhi.

The list of officer/official(s) invited and/or attended this meeting is as follows

1. Dr. Lata Kapoor, Additional Director (Chairperson)
2. Dr. Anubhav Srivastava, Joint Director & OIC, NPMU, NCDC Delhi
3. Dr. Aradhana Bhargava, Joint Director, APHO Nagpur
4. Dr. Preeti Madan, Joint Director (Microbiology), NCDC Delhi
5. Dr. Aarti Tewari, Joint Director(Microbiology), NCDC Delhi
6. Dr. Dhara Shah, Deputy Director(Microbiology), NCDC Delhi
7. Mr. Rajeev Kanauijia, Sr. Architect, CDB
8. Mr. Imran Khan, Dy. Architect, CDB
9. Mr. Anwar Khan, BSL-3 Consultant (External expert)
10. Mr. Soumya Bikas Bangal, SI(NPMU), NCDC, Delhi

The **main objectives** of this meeting were as follows:

1. To finalize the additional guidance related to already approved consolidated design specifications for laboratory sections/areas covering Public Health Microbiology (including BSL-2, PCR/Molecular Facilities, and serology), Clinical Chemistry, and Hematology and laboratory services support rooms.

2. To detail the respective rooms/laboratory sections in the prototype layouts/maps for Regional Centers and State NCDC branches (Category I, II & III).

Deliberations

- The Chairperson emphasized that discussions must remain focused on the ToRs of the committee, that is, the laboratory sections/areas and highlighted:

    - Compliance with good laboratory practices.
    - Appropriate workflow (sample movement, staff movement, waste movement, etc.) must be mentioned in the layout plan of the laboratory complex with the help of arrows.
    - Infrastructure support for adherence to good laboratory practices, including standard precautions and appropriate PPE usage, etc., is essential across all the upcoming NCDC branches.

- Regarding guidance to CPWD with respect to ETP installations, since all lab waste is to be pretreated before disposal, CPWD will adhere to prevailing standards for ETPs.

- Prototype Layouts:
  The Sr. Architect (CDB) presented the latest approved prototype layouts (Annexure 2) and apprised the members about the allocated spaces:
    - Regional Centre (RC): 4,738 sqm. (Laboratory on 3rd Floor – 962 sqm.)
    - Category I: 1,947.4 sqm. (Laboratory on 2nd Floor – 637.8 sqm.)
    - Category II: 1,793.96 sqm. (Laboratory on 2nd Floor – 586.63 sqm.)
    - Category III: 1,639.8 sqm. (Laboratory on 2nd Floor – 535.3 sqm.)

- **Facility Design related variations/modifications discussed are as follows:**

1. **Ground Floor:**

   Rename the specific area named 'Central sample collection' to "Central sample receiving and collection" with a reception area, at least two cubicles for sample collection, and a patient waiting area. Since the cubicles may be used for sample collection, such as throat swabs etc, label them for phlebotomy may be removed; instead, they can be labelled as sample collection room or sample collection/phlebotomy room.

2. **Bio-Medical Waste (BMW) Area (2nd floor in Cat. I–III; 3rd floor in Regional Centre):**
   Divide into two halves with one half for an autoclave for BMW management (with a provision for exhaust of steam from autoclave to the outside of the building) and the other half as washing area for glassware washing. Dedicated space is to be created for the storage of treated BMW outside the specific floor/building (in premises of the branch). Specifications of storage space must be as per the Bio-medical waste management rules/guidelines issued by the pollution control board.

3. **Common Store (on 1st Floor, Cat. I–III):**

   To designate storage space for laboratory supplies in the common store.

4. **Change Rooms:**

   Two change rooms already earmarked in the design may be labelled as Male and Female Change rooms to be used for BSL-2 as well as PCR labs. These two rooms may be converted to donning and doffing rooms as and when the testing procedure in the BSL 2 lab requires a higher level of biosafety.

5. **PCR lab area:** Wherever possible a provision for buffer room/zone may be made in molecular/PCR testing area so that the 3 lab rooms can be accessed from this buffer area instead of directly opening in the main corridor. Also, the PCR room can be labeled as "PCR and post-PCR room".

6. **Labeling:** The culture and sensitivity area is to be relabeled as "BSL-2 Lab for Culture and Sensitivity".

7. **Air Shower/Curtains** are not required in BSL-2 laboratory areas and may accordingly be excluded or removed.

Draft on additional guidance related to the details for the BSL-2 and PCR Lab facility areas prepared (based on Central team site visit reports and national BSL-2 guidelines) was reviewed and suggestions/comments made during the meeting were incorporated. Accordingly, the modified draft on 'additional guidance related to the details for the BSL-2 and PCR Lab facility' is placed at **Annexure 1.**

Concluding Remarks by the Chairperson

The Chairperson directed that detailing of all the rooms in the laboratory complex housing the public health laboratory complex, including the BSL-2 and PCR/Molecular laboratory facilities in the approved prototype layouts for Regional Centers and State branches, be drafted and prepared by the Deputy Director with support from the NPMU team, which will be reviewed in the next meeting of this Consultative Group (CG).