Corrigendum for Tender for Research Infrastructure at Lab 101A, Department of Environmental Studies, University of Delhi

The following correction has been made to the above Tender uploaded on the University website on 30 December 2015:

On Page 11 under Laboratory Service Fixtures and Safety Equipment, Item B shall be read as "**Laboratory service fixtures shall be furnished, delivered to point of use and installed by the contractor/Tenderer**."

Department of Environmental Studies
University of Delhi

30 December 2015

NOTICE INVITING TENDERS

Sealed tenders are invited from eligible manufacturers/ authorized distributors/ dealers for the installation of Research Infrastructural facility comprising of Acid Safety Cabinet, Experiment island work bench, sitting height wall workstation and wall mounted storage cabinets at Lab No. 101A, Department of Environmental Studies, University of Delhi, Delhi 110007. The vendors intending to bid may follow the specifications listed and the other details and submit addressed to Dr. David Kothamasi, Department of Environmental Studies, University of Delhi, Delhi-110007 within 21 days of this call.

The vendor should preferably have service centres/ service engineers at Delhi / NCR for local and efficient after sales technical support.

Firm MUST provide a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature with clear reference of page number, paragraph or lines. This statement must be signed, with the company seal, by the Tendered for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification of the Tender.

Instructions to the suppliers:

Two kinds of quotations may be submitted, one technical quotation consisting of all technical details along with commercial terms and conditions, and one financial quotation containing item wise price for the items mentioned in the technical quotation. Both the quotations should be sealed by the supplier in separate covers duly SUPERSCRIBED and both these sealed covers are to be put in a bigger cover which should also be sealed and SUPERSCRIBED. Company should attach User's list and performance certificate. The supplier shall bear all costs associated with the preparation and submission of its quotation including samples, literatures, etc.

Conditions of the Contract:

The bidders will have to quote all the items together, partial quotes will not be considered. Quantity, make, model and technical specifications should be mentioned clearly. It may be stated if the rates are inclusive of taxes applicable and charges for onsite installation. Validity period of quotation should be 180 days from the due date. Any alteration/overwriting should be initialled. Kindly enclose a written authorization or certificate from the manufacturer. The supplier may mention the period of warranty in the quotation including the cost of comprehensive warranty for a period of two more year as an option. The period of warranty will start only after successful installation and satisfactory operation. University reserves the right to order equipment with better quality over lower price and to accept or reject any or all quotation without assigning reasons thereof. The bidders have to provide the following information with their technical quote.

- Manufacturer authorization form.
- Details of support and service centres.
- Warranty compliance statement.
- User list with name, address and telephone numbers.

DESCRIPTION OF WORK

1.00 SUMMARY AND SCOPE

A. Section Includes:

1. Furnish all cabinets and casework, including tops, ledges, supporting structures. Include delivery to the building, set in place, level, and scribe to walls and floors as required. Furnish and install all filler panels, knee space panels and scribes as shown on drawings.

2. Furnish and deliver all utility service outlet accessory fittings, electrical receptacles and switches identified on drawings as mounted on the laboratory furniture. All plumbing and electrical fittings, not preinstalled in equipment, will be packaged separately and properly marked for delivery to the appropriate contractor.

3. Furnish and deliver, for installation by the mechanical contractor, all laboratory sinks, cup sinks or drains, drain troughs, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment. All tailpieces shall be furnished less the couplings required to connect them to the drain piping system.

4. Furnish service strip supports where specified, and setting in place service tunnels, service turrets, supporting structures and reagent racks of the type shown on the drawings.

5. Removal of all debris, dirt and rubbish accumulated as a result of the installation of the laboratory furniture to an onsite container provided by others, leaving the premises broom clean and orderly.

1.01 BASIS OF WORK

Laboratory Furniture as the standard of construction for steel laboratory furniture. The construction standards of this product line shall provide the basis for quality and functional installation.

2.00 CABINET STYLE:

Steel:

Cabinet bodies, drawer bodies, shelves, drawer heads and door assemblies shall be fabricated from Cold Rolled Steel.

2.01 DRAWER AND DOOR STYLE:

The outer drawer and door head shall have a channel formation on all four sides to eliminate sharp raw edges of steel and the top front corners shall be welded and ground smooth. Drawer and door, when closed, shall be recessed to create an overall flush face, and with optional pull.

2.02 MATERIALS

A. General Requirements:

It is the intent of this specification to provide a high quality steel cabinet specifically designed for the laboratory environment.

B. Steel:

Cold Rolled Steel:

Cold rolled sheet steel shall be prime grade 12, 14, 16, 18 and 20 gauge U.S. Standard; roller levelled, and shall be treated at the mill to be free of scale, ragged edges, deep scratches or other injurious effects.

C. Glass:

Glass used for framed sliding and swinging doors shall be 1/8" float glass. Glass used for unframed sliding doors, shall be 1/4" float glass. Glass used in fume hoods or other hazardous locations shall be 7/32" laminated safety float glass, except the glass shielding fluorescent lights in fume hoods shall be tempered glass to provide greater resistance to heat and impact.

D. Drawer and Door Pulls:

Pull shall be of modern design, offering a comfortable handgrip, and be securely fastened to doors and drawers with screws. All pulls shall be satin finish aluminum, with a clear, lacquer finish. Two pulls shall be required on all drawers over 24" long. Use of plastic pulls (molded or extruded), or a design not compatible for usage by the handicapped will not be acceptable.

E. Hinges:

Hinges shall be made of Type 304 stainless steel .089 thick, 2-1/2” high, with brushed satin finish, and shall be the institutional type with a five-knuckle bullet-type barrel. Hinges shall be attached to both door and case with two screws through each leaf. Welding of hinges to door or case will not be accepted. Doors under 36" in eight shall be hung on one pair of hinges, and doors over 36" high shall be hung on 3 hinges.

F. Positive Catch:

A two-piece heavy-duty cam action positive catch shall be provided on all base cupboard doors and shall be positioned near the pivoting edge of door to provide a clean unobstructed opening. Main body of the catch shall be confined within an integral cabinet divider rail, while latching post shall be mounted on the hinge side of door. Nylon roller type catches are not acceptable.

G. Elbow Catches:

Elbow catches and strike plates shall be used on left hand doors of double door cases where locks are used, and are to be burnished cast aluminum, with bright brass finish.

H. Shelf Adjustment Clips:

Shelf adjustment clips shall be nickel-plated steel.

I. Base Molding:

Base Molding shall be provided on all table legs, unless otherwise specified, to conceal levelling device. Shoes shall be a pliable, black vinyl material. Corner clip should be provided to hold the base molding firmly. Use of a leg shoe, which does not conceal levelling device, will not be acceptable

J. Sink Supports:

Sink supports shall be the hanger type, suspended from top front and top rear horizontal rails of sink cabinet by four 1/4" dia. rods, threaded at bottom end and offset at top to hang from two full length reinforcements welded to the front and rear top rails. Two 3/4" x 1-2/2" x 12 gauge channels shall be hung on the threaded rods to provide an adjustable sink cradle for supporting sinks. When sink capacity exceeds 3,750 cu. in., the sink supports shall be suspended from full-length reinforcements welded to the two end rails. Two 1" x 2" x 10 gauge full-length channels shall be hung from the four 1/4" dia. rods to provide an alternate sink cradle.

2.03 CONSTRUCTION

K. Steel Base Cabinet Construction:

1. General:

a. The steel furniture shall be of modern design and shall be constructed in accordance with the best practices of the Scientific Laboratory Equipment Industry. First class quality casework shall be insured by the use of proper machinery, tools, dies, fixtures and skilled workmanship to meet the intended quality and quantity for the project.

b. All cabinet bodies shall be flush front construction with intersection of vertical and horizontal case members, such as end panels, top rails, bottoms and vertical posts in same plane without overlap. Exterior corners shall be spot welded with heavy back up reinforcement at exterior corners. All face joints shall be welded and ground smooth to provide a continuous flat plane.

c. Each cabinet shall be complete so that units can be relocated at any subsequent time without requiring field application of finished ends or other such parts.

d. Case openings shall be rabbeted on all four sides for both hinged and sliding doors to provide a dust resistant case.

e. All cabinets shall have a cleanable smooth interior. Bottom edges shall be formed down on sides and back to create easily cleanable corners with no burrs or sharp edges, and front edge shall be offset to create a seamless drawer and door recess rabbet for dust stop.

2. Steel Gauges:

Gauges of steel used in construction of cases shall be 18 gauge, except as follows:

a. Corner gussets for levelling bolts and apron corner braces, 12 gauge.

b. Case and drawer suspension channels, 14 gauge.

c. Top and intermediate front horizontal rails, table aprons, hinge reinforcements, and reinforcement gussets, 16 gauge.

d. Drawer assemblies, door assemblies, bottom, bottom back rail, toe space rail, and adjustable shelves, 20 gauge.

3. Base Cabinets:

a. End uprights shall be formed into not less than a channel formation at top, bottom, back and front. The front edge shall further offset to form a strike for doors and drawers, and shall be perforated for the support of drawer channels, intermediate rails and hinge screws. An upright filler shall be screwed in place in all cupboard units to close the back of the channel at front of the upright and to provide a smooth interior for the cupboard to facilitate cleaning. The upright filler shall be perforated with shelf adjustment holes at not more than 2" centres painted prior to assembly. The inside front of the upright shall be further reinforced with a full height 16 gauge hinge reinforcement angle.

b. Top horizontal rail on base cabinets shall interlock within the flange at top of end panels for strength, but shall be flush as face of unit. Top rail shall have a full width rabbet for swinging doors and drawers. Reinforcements shall be provided at all front corners for additional welded strength between vertical and horizontal case members.

c. Intermediate rails shall be provided between doors and drawers, but shall not be provided between drawers unless made necessary by locks in drawers. When required, intermediate rails shall be recessed behind doors and drawer fronts, and designed so that security panels may be added as required.

d. Intermediate vertical uprights shall be furnished to enclose cupboards when used in a unit in combination with a half width bank of drawers. However, to allow storage of large or bulky objects, no upright of any type shall be used at the centre of double door cupboard units.

e. Cabinet bottom, and bottom rail shall be formed of one piece of steel except in corner units and shall be formed down on sides and back to create a square edge transition welded to cabinet end panels, and front edge shall be offset to create a seamless drawer and door recess rabbet for dust stop.

f. Toe space rail shall extend up and forward to engage bottom rail to form a smooth surfaced fully enclosed toe space, 3" deep x 5" high. Whenever toe space base is omitted for units to set on building bases on separate steel bases, then the toe space rail shall extend back 4-1/2".

g. Back construction shall consist of a top and bottom rail, channel formed for maximum strength and welded to back and top flange of end uprights, open for access to plumbing lines. Cupboard units only shall be provided with removable back panels.

h. Die formed gussets, with multiple ends for strength, shall be furnished in each bottom corner of base units to insure rigidity, and a 3/8"-16 levelling bolt, 3" long, and shall engage a clinch nut in each gusset. Access to the levelling bolts shall be through plug buttons in the bottom pan. Each levelling bolt and gusset shall be capable of supporting 500 lbs. Access to levelling bolts through toe space or levelling bolts requiring special tools to adjust are not acceptable.

i. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear; formed down 3/4" at each end, shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf.

j. Drawer bodies shall be made in one-piece construction including the bottom, two sides, back and front. They shall be fully coved at interior bottom on all four sides for easy cleaning. The top front of the inner drawer body shall be offset to interlock with the channel formation in drawer head providing a 3/4" thick drawer head.

k. Drawer suspension assembly shall consist of 2 sections providing a quiet, smooth operation on ball bearing nylon rollers. All drawers shall be self-closing from a point 5" open. Cabinet channels shall maintain alignment of drawer and provide an integral drawer stop, but the drawer shall be removable without the use of tools. Drawers shall provide 13-5/8" front to back clearance when fully extended. Drawers shall rise when opened thus avoiding friction with lower drawers and/or doors. Drawer suspension system shall incorporate a double stop, lock open feature. Case suspension channels shall be Galvanized Steel, drawer suspension channels shall be Cold Rolled Steel. Drawer suspension channels on Stainless Steel Cabinets shall be zinc plated after they are formed.

l. Steel Door assembly (two-piece) for solid pan swinging doors shall consist of an inner and outer door pan. Outer door pan shall be formed at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel at these critical points. Inner door pan shall be flanged at all four sides with hinge reinforcements welded in place. The door assembly shall be 3/4" thick and contains sound deadening material.

m. Steel Drawer/door assemblies shall be painted prior to assembly. Both shall be punched for attaching drawer pulls. Likewise, inner pan formation of door and drawer body shall be indented for in-field installation of locks when required.

n. Doors shall be readily removable and hinges easily replaceable. Hinges shall be applied to the cabinet and door with screws. Welding of hinges to either cabinet or door will not be acceptable.

o. Knee space panels, where shown or specified, shall be 20 gauge, finished same as casework cabinets, and easily removable for access to mechanical service areas.

2.04 PERFORMANCE REQUIREMENTS

L. Steel Casework Construction Performance:

1. Base cabinets shall be constructed to support at least a uniformly distributed load 200 lbs. per square foot of cabinet top area, including working surface without objectionable distortion of interference with door and drawer operation.

2. Base cabinet corner gussets with levelling bolts shall support 500 lbs. per corner, at 1-1/2" projection of the levelling bolt below the gusset.

3. Each adjustable and fixed shelf 4 ft. or shorter in length shall support an evenly distributed load of 40 lbs. per square ft. up to a maximum of 200 lbs., with nominal temporary deflection, but without permanent set.

4. Drawer construction and performance shall allow 13-5/8" clear when in an extended position and suspension system shall prevent friction contact with any other drawer or

door during opening or closing. All drawers shall operate smoothly, a minimum of 10,000 cycles with an evenly distributed load of 150 lbs.

5. Swinging doors on floor-mounted casework shall support 200 lbs. suspended at a point 12" from hinged side, with door swung through an arc of 160 degrees. Weight load test shall allow only a temporary deflection, without permanent distortion or twist. Door shall operate freely after test and assume a flat plane in a closed position.

M. Steel Paint System Finish and Performance Specification:
Steel Paint System Finish:
After Cold Rolled Steel and Textured Steel component parts have been completely welded together and before finishing, they shall be given a pre-paint treatment to provide excellent adhesion of the finish system to the steel and to aid in the prevention of corrosion. Physical and chemical cleaning of the steel shall be accomplished by washing with an alkaline cleaner, followed by a spray treatment with a complex metallic phosphate solution to provide a uniform fine grained crystalline phosphate surface that shall provide both an excellent bond for the finish and enhance the protection provided by the finish against humidity and corrosive chemicals.
After the phosphate treatment, the steel shall be dried and all steel surfaces shall be coated with a chemical and corrosion-resistant, environmentally friendly, electro statically applied powder coat finish. All components shall be individually painted, insuring that no area be vulnerable to corrosion due to lack of paint coverage. The coating shall then be cured by baking at elevated temperatures to provide maximum properties of corrosion and wear resistance. The completed finish system in standard colours shall meet the performance test requirements specified under

PERFORMANCE TEST RESULTS

1. Performance Test Results (Chemical Spot Tests):
a. Testing Procedure:
Chemical spot tests for non-volatile chemicals shall be made by applying 5 drops of each reagent to the surface to be tested and covering with a 1-1/4" dia. watch glass, convex side down to confine the reagent. Spot tests of volatile chemicals shall be tested by placing a cotton ball saturated with reagent on the surface to be tested and covering with an inverted 2-ounce wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of 77° ±3° F. For both methods, leave the reagents on the panel for a period of one hour. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried.
Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.
b. Test Evaluation:
Evaluation shall be based on the following rating system.
Level 0 – No detectable change.
Level 1 – Slight change in colour or gloss.
Level 2 – Slight surface etching or severe staining.

Level 3 – Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.
After testing, panel shall show no more than three (3) Level 3 conditions.

c. Test Reagents

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	Cotton ball & bottle
2.	Acetate, Ethyl	Cotton ball & bottle
3.	Acetic Acid, 98%	Watch glass
4.	Acetone	Cotton ball & bottle
5.	Acid Dichromate, 5%	Watch glass
6.	Alcohol, Butyl	Cotton ball & bottle
7.	Alcohol, Ethyl	Cotton ball & bottle
8.	Alcohol, Methyl	Cotton ball & bottle
9.	Ammonium Hydroxide, 28%	Watch glass
10.	Benzene	Cotton ball & bottle
11.	Carbon Tetrachloride	Cotton ball & bottle
12.	Chloroform	Cotton ball & bottle
13.	Chromic Acid, 60%	Watch glass
14.	Cresol	Cotton ball & bottle
15.	Dichlor Acetic Acid	Cotton ball & bottle
16.	Dimethylformanide	Cotton ball & bottle
17.	Dioxane	Cotton ball & bottle
18.	Ethyl Ether	Cotton ball & bottle
19.	Formaldehyde, 37%	Cotton ball & bottle
20.	Formic Acid, 90%	Watch glass
21.	Furfural	Cotton ball & bottle
22.	Gasoline	Cotton ball & bottle
23.	Hydrochloric Acid, 37%	Watch glass
24.	Hydrofluoric Acid, 48%	Watch glass
25.	Hydrogen Peroxide, 3%	Watch glass
26.	Iodine, Tincture of	Watch glass
27.	Methyl Ethyl Ketone	Cotton ball & bottle
28.	Methylene Cloride	Cotton ball & bottle
29.	Mono Chlorobenzene	Cotton ball & bottle
30.	Naphthalene	Cotton ball & bottle
31.	Nitric Acid, 20%	Watch glass
32.	Nitric Acid, 30%	Watch glass
33.	Nitric Acid, 70%	Watch glass
34.	Phenol, 90%	Cotton ball & bottle
35.	Phosphoric Acid, 85%	Watch glass
36.	Silver Nitrate, Saturated	Watch glass
37.	Sodium Hydroxide, 10%	Watch glass
38.	Sodium Hydroxide, 20%	Watch glass
39.	Sodium Hydroxide, 40%	Watch glass
40.	Sodium Hydroxide, Flake	Watch glass
41.	Sodium Sulfide, Saturated	Watch glass
42.	Sulfuric Acid, 33%	Watch glass
43.	Sulfuric Acid, 77%	Watch glass
44.	Sulfuric Acid, 96%	Watch glass

45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	Watch glass
46.	Toluene	Cotton ball & bottle
47.	Trichloroethylene	Cotton ball & bottle
48.	Xylene	Cotton ball & bottle
49.	Zinc Chloride, Saturated	Watch glass

* Where concentrations are indicated, percentages are by weight.

2. Performance Test Results (Heat Resistance):
   Hot water (190° F - 205° F) shall be allowed to trickle (with a steady stream at a rate not less than 6 ounces per minute) on the finished surface, which shall be set at an angle of 45° from horizontal, for a period of five minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.

3. Performance Test Results (Impact Resistance):
   A one-pound ball (approximately 2" diameter) shall be dropped from a distance of 12 inches onto the finished surface of steel panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close eye-ball examination.

4. Performance Test Results (Bending Test):
   An 18 gauge steel strip, finished as specified, when bent 180o over a 1/2" diameter mandrel, shall show no peeling or flaking off of the finish.

5. Performance Test Results (Adhesion):
   Ninety or more squares of the test sample shall remain coated after the scratch adhesion test. Two sets of eleven parallel lines 1/16" apart shall be cut with a razor blade to intersect at right angle thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush. Examine under 100 foot-candles of illumination.
   Note: This test is based on ASTM D2197-68, "Standard Method of Test for Adhesion of Organic Coatings".

6. Performance Test Results (Hardness):
   The test sample shall have a hardness of 4-H using the pencil hardness test. Pencils, regardless of their brand are valued in this way: 8-H is the hardest, and next in order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which is the softest). The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one-that is, the hardest pencil that will not rupture the film-is then used to express or designate the hardness.

Table Tops:

The table-tops shall be of 18/19mm Jet black Granite of an even surface and the level Tolerance less than 1 mm. The front edge of the granite shall be chamfered at an angle of 28

degrees and smoothened. The back splash for the wall bench shall be granite 18/19mm thick material for a height of 4” from the finished table top level.

Polypropylene Molded Sinks:

The sinks should be injection molded from Poly propylene co-polymer resin. Polypropylene to have very high resistance to attack from a wide range of chemicals and the ability to withstand temperatures up to 100 deg C. The impact resistance should be high which will minimize damage during and after installation. The sinks should be with self-draining base and should be suitable for mounting on top or underside of the work benches. The sinks should be compatible to a vast number of acids, alkalis and reagents. The size of the sink is 600Lx450Dx315Hmm and Bowl size is 550Lx400Dx315Hmm. This sinks shall have bottle trap with reducing coupler of size 51x31mm and with 38mm polypropylene pipe of one foot length. All gaskets and O-rings are made from Nitrile.

LABORATORY SERVICE FIXTURES AND SAFETY EQUIPMENTS

I. General

A. All laboratory service fixtures shall have the construction and shall meet the performance requirements set forth in this specification. Fixture types shall be as indicated in the fixture schedule or fixture details included in either the project drawings or these specifications.

B. Laboratory service fixtures shall be [furnished, delivered to point of use and installed by the laboratory casework contractor under this Division of the specifications, for connection and plumbing by the mechanical contractor under Division 15 of the specifications] [furnished and delivered to point of use by the laboratory casework contractor, for installation, connection and plumbing by the mechanical contractor under Division 15 of the specifications.]*

C. All laboratory service fixtures and safety equipment shall be the product of one service fixture manufacturer to assure uniform appearance and ease of maintenance of the laboratory facility. Remote control valves and fittings furnished with fume hoods shall be the product of the same fixture manufacturer.

D. All service fixtures shall be factory assembled (including the assembly of valves and shanks to turrets, flanges and other mounting accessories), and each fixture shall be individually factory tested. Fixtures shall be tested in the manner and at the pressures set forth below.

E. Except as otherwise indicated, faucet and valve handles shall be forged brass Nylon type and shall have a colour coded screw-on index disc. Colour code requirements for indexing service fixtures shall follow DIN Standard 12920:1995.

II. Finish

A. General

1. Laboratory service fixtures and safety equipment shall be furnished with a powder coated finish to enhance the appearance of the fitting and to protect against corrosion. Coating material shall be a blend of epoxy and polyurethane. The hybrid blend shall ensure a finish coating with and optimum combination of chemical resistance, mar and abrasion resistance and resistance to fading under ultraviolet (UV) light.

2. Mar and Abrasion Resistance

Finishes shall have a pencil hardness of 2H-4H with adhesion substantial enough to withstand both direct and reverse impacts of 160 inch pounds. Finish shall have excellent mar resistance and be capable of withstanding scuffing, marring and other ordinary wear.

3. Reparability

Finish shall be capable of surface repair in the event that a fixture is scratched or a surface rupture occurs. The service fixture manufacturer shall have available an air-drying aerosol coating, specially formulated to match the existing epoxy coating colour, which may be applied in the field to repair coated surfaces.

III. Water Faucets and Valves

A. All faucets and valves for water service shall have a renewable unit containing all working components subject to wear, including a stainless steel replaceable seat and an integral adjustable volume control (designated by the suffix "AC"). The renewable unit shall be interchangeable among all faucets and valves for water service. The renewable unit shall be broached for position locking in the valve body. The unit shall have a high durometer thermoplastic valve disc and a molded TFE stem packing. The unit shall be capable of being readily converted from compression to self-closing, and vice versa, without disturbing the faucet body.

B. Goosenecks shall have a separate outlet coupling with a 3/8" IPS female thread securely brazed to the gooseneck for attachment of serrated hose ends, aspirators and other outlet fittings. Rigid goosenecks shall have a 3/8" IPS male inlet thread and be threaded directly into the faucet body so as to be absolutely rigid. Swing goosenecks shall utilize a TFE packing with an externally adjustable packing nut.

C. Water faucets and valves shall be fully assembled and individually tested at 80 pounds per square inch (PSI) water pressure.

APPLICABLE CODES AND STANDARDS

a. SEFA 3 – Scientific Equipment and Furniture Association
b. SEFA 8 - Scientific Equipment and Furniture Association
c. NFPA 30 - National Fire Protection Association
d. NFPA-45 - National Fire Protection Association
e. UL - Underwriters Laboratories
f. ASTM D552 – Bending Test

BILL OF QUANTITIES OF RESEARCH INFRASTRUCTURE AND ACCESSORIES

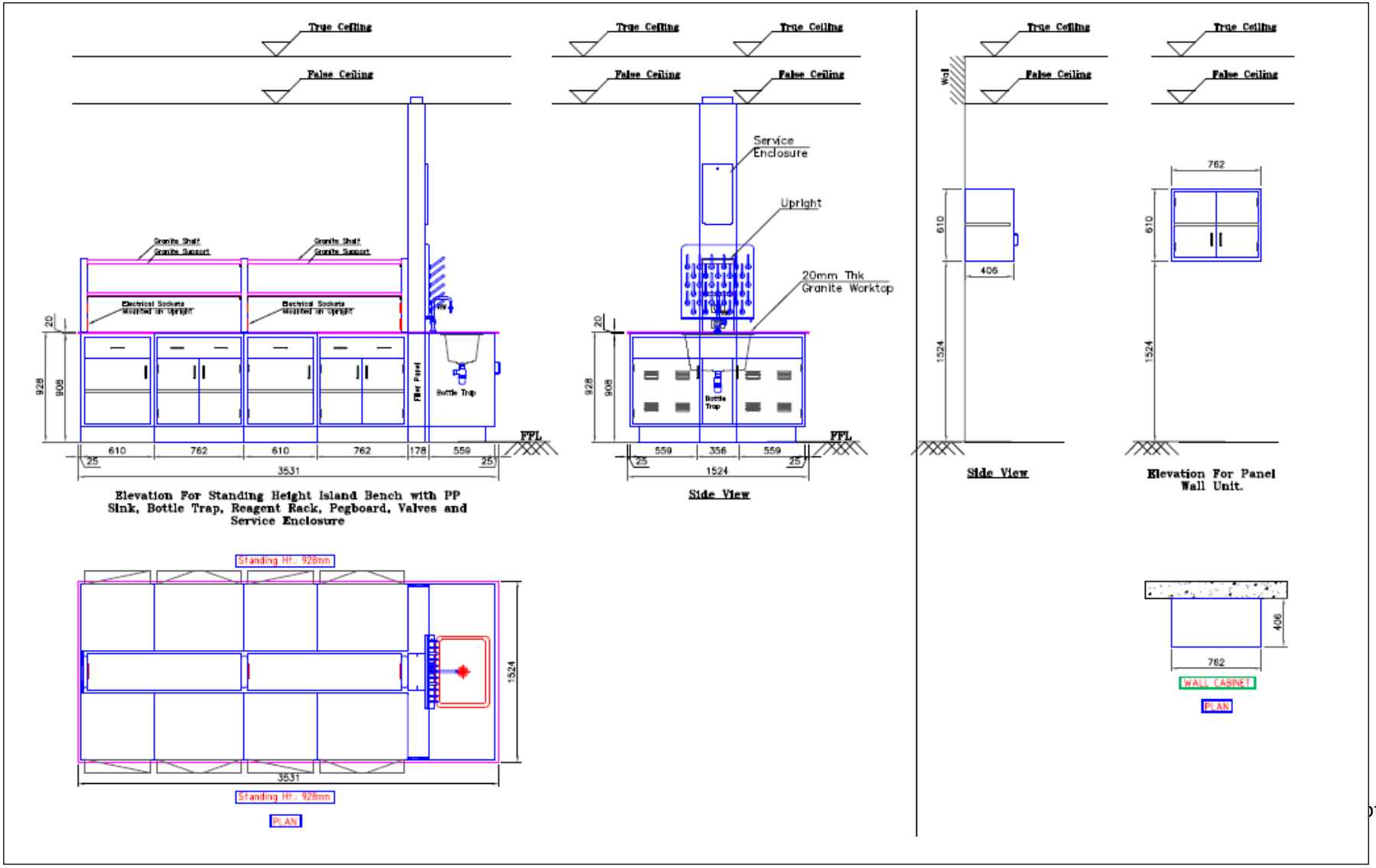
S.No.	Description	Unit	Quantity
ACID SAFETY CABINET			
1.	BASE MOLDING 4 FT	Nos	3
2.	CORNER CLIP	Nos.	2
3.	SAFETY CABINET FOR ACID STORAGE 60 GAL (FM) (SELF CLOSE) SIZE: 65"(H)x34"(D)x34"(L)	Nos.	1
EXPERIMENTATION ISLAND WORK BENCH			
1.	6/16A SOCKET WITH SWITCH	Nos.	6
2.	REAR SCRIBE - 36Hx00Dx14L	Nos.	1
3.	END SCRIBE - 36Hx00Dx07L	Nos.	2
4.	BENCH MOUNTED 1-WAY WATER FITTING WITH 8" RIGID/SWING GOOSENECK FOR RAW WATER	Nos.	1
5.	BASE UNIT 1 DOOR 1 DRAWER - 36Hx22Dx24L	Nos.	2
6.	BASE UNIT 1 DOOR 1 DRAWER - 36Hx22Dx24L	Nos.	2
7.	BASE UNIT 2 DOOR 1 DRAWER - 36Hx22Dx30L	Nos.	4
8.	BASE MOLDING 4 FT.	Nos.	10
9.	CORNER CLIP	Nos.	4
10.	BASE UNIT 2 DOOR - 36Hx22Dx58L	Nos.	1
11.	REAGENT GRANITE SUPPORT 08x51	Nos.	4
12.	ACRYLIC PEG BOARD WITH 33 PEGS WITH SS TRAY, 610L x 610mm(H)	Nos.	1
13.	PP SINK, SIZE: 600Lx450Dx315Hmm AND BOWL SIZE: 550Lx400Dx315Hmm	Nos.	1
14.	REDUCING COUPLER IN PP 51 X 31MM + PP PIPE LENGTHS - ONE FEET LENGTH - DIA. 38MM	Nos.	1
15.	ANTI SIPHON BOTTLE TRAP.	Nos.	1
16.	WASTE, 1 1/2" BSP X 76mm.	Nos.	1
17.	SERVICE ENCLOSURE FOR CENTRE BENCH 12x6x112	Nos.	1
18.	REAGENT RACK UPRIGHT, SIZE: 24(H)x10(W)x2(D)	Nos.	3
19.	GRANITE REAGENT SHELF 12x51	Nos.	4
20.	18/19mm THK. GRANITE WORKTOP IN SFT	Sft	60
SITTING HEIGHT WALL WORK STATION			
1.	6/16A (RAW POWER) SOCKET WITH SWITCH	Nos.	6
2.	APRON RAIL - 04Hx02Dx24L	Nos.	3
3.	KNEE SPACE PANEL - 24Hx00Dx24L	Nos.	3
4.	WORKTOP SUPPORT FRAME - 01Hx22Dx24L	Nos.	3
5.	ACRYLIC PARTITION, SIZE : 18"H x 01"D x 30L,10mm THICK	Nos.	2
6.	REAR SCRIBE - 30Hx00Dx07L	Nos.	2
7.	CABLE MANAGER DIA 2.5	Nos.	3
8.	SINGLE SIDE DATA SOCKET BOX 06x4x4	Nos.	3
9.	BASE UNIT 1 DOOR 1 DRAWER - 30Hx22Dx15L	Nos.	2
10.	BASE UNIT 1 DOOR 1 DRAWER - 30Hx22Dx15L	Nos.	2

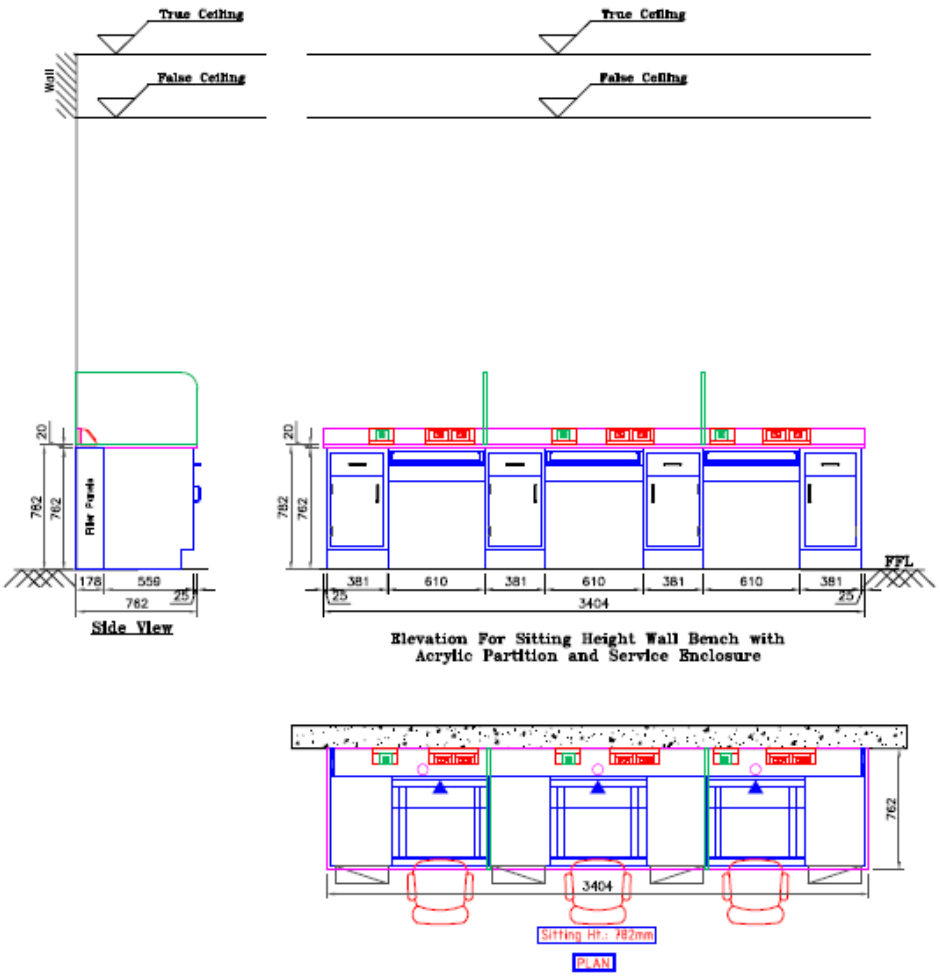
11.	SINGLE SIDE SOCKET BOX 12x4x4	Nos.	3
12.	BASE MOLDING 4 FT.	Nos.	8
13.	CORNER CLIP	Nos.	9
14.	KEY BOARD TRAY 24x12	Nos.	3
15.	DATA SOCKET	Nos.	3
16.	18/19mm THK. GRANITE WORKTOP IN SFT	Sft	29
17.	GRANITE SKIRTING. 4x1	Rft	14
WALL CABINET			
1.	WALL UNIT SWINGING PANEL – 24Hx16Dx30L, K=WITH LOCK	Nos.	6

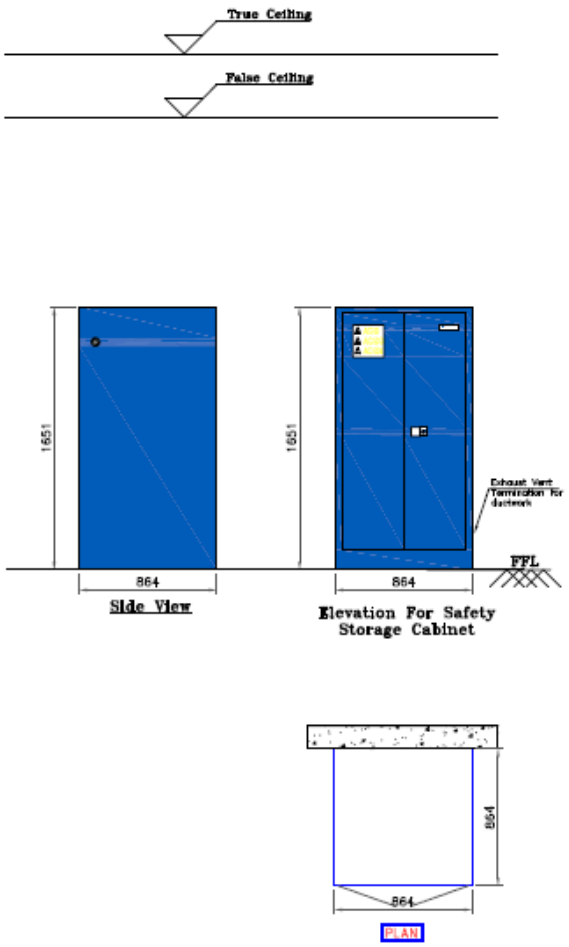
Note:
1 The thickness of Granite worktop is 18/19mm.
2 The cabling & tie in to Electrical sockets will be provided by the University
3 The tie in of water and drain for sinks will be provided by the University

Drawing of works to be installed.

All dimensions are in mm. Wall to wall dimensions may be verified at site. All floor mounted case work should have 100 mm height toe space




True Ceiling
False Ceiling
Wall
True Ceiling
False Ceiling
20
782
762
Raw Panels
178
559
25
762
Side View
20
782
762
FFL
381
610
381
610
381
610
381
25
25
3404
Elevation For Sitting Height Wall Bench with Acrylic Partition and Service Enclosure
762
3404
Sitting Ht.: 782mm
PLAN


True Ceiling
False Ceiling
1651
864
Side View
1651
Exhaust Vent Termination for ductwork
FFL
864
Elevation For Safety Storage Cabinet
864
864
PLAN