



I. GENERAL GUIDELINES:

A. Plan Nodes

A “Science Room” Project in the CIP system is typically one component, with one LLW number. It is important to determine the intent of the project, as it may be to upgrade an existing science room(s) or to convert other classrooms to science rooms. The nodes and descriptions in the CIP system will typically provide that detail. For schools with existing science rooms, the work will typically be to upgrade, while for schools without such science rooms, the work will be to convert existing space into a science room.

These are among the most complex and difficult CIP projects to do well, and to do correctly and completely. They require scope investigation of multiple systems and architectural, mechanical, electrical and plumbing study and design of not only the subject rooms, but those above and below as well. Designers are advised to plan on exhaustive preparation of scope and design documents in order to have a successful project in the construction phase. The complexity of this work should not be underestimated.

B. Budget

The LLW budget for each project included in the Five-Year Capital Plan is based on values that Capital Plan Management assigns to the various components. The LLW budget is not a calculated estimate for the scope of work, and hence should not be used as such. The goal is to provide a correct scope of work for the needed space while being cost efficient.

C. Room Planning Standards for Science Rooms

Science Room Upgrades and Conversions are not required to follow the Room Planning Standards “to the letter”, but rather the designer should use them as a general guide for the science room set-up, millwork, furniture and equipment. This document includes guidance on varying from the standards to accommodate available spaces and allow for cost-effective design.

II. GUIDELINES FOR SCIENCE CLASSROOM CONVERSIONS/UPGRADE PROJECTS:

A. General Procedures related to the School Community

1. Multiple School Organizations in the building: Prior to the meeting, the DM or DPM will verify with Capital Plan Management Department (if not clearly indicated in the node description) as to whether the science room(s) is for one specific organization within the building or is to be shared by the entire school. If Capital Plan Management has given the direction that the science room(s) is to be shared by all schools in the building, the DM or DPM is to advise the principal(s) accordingly.

2. DOE Space Planner and Science Coordinator Input:

a. Room Selection: The DOE Space Planner will recommend the appropriate number and selection of classrooms to be upgraded or converted to meet the needs of the science program. Their decision must carefully weigh the impacts of removing classrooms to be converted from their existing service. Verify with the Space Planner if the project is to provide a typical science room/lab or a specialty room/lab for advanced/accelerated program for gifted students.



- b. Space Limitations: When reviewing the Space Planner's recommendations, the A/E must consider the physical constraints of the building. Where full implementation of their recommended layout would result in excessive cost or difficult space issues, options with a reduced scope should be prepared.
 - c. DOE Science Coordinator: If education consultation with the DOE Science Coordinator is needed, the DM or DPM will contact Greg Borman, who can be reached via phone at (212) -323-7857 and email at gborman@schools.nyc.gov.
- 3. Meetings with School Staff:** A minimum of two on-site meetings will be needed during the scope and design phases. The following people should be invited:
- Principal(s) of the school organizations impacted/involved
 - School Building Custodian
 - DOE Director of Facilities and Space Planning (Space Planner)
 - SCA A&E Design Team
 - DOE Science Coordinator (or their designee)
 - SCA Construction Management PO, with the Project Support Manager.

Attendance by the relevant principal(s) in the building, and the appropriate Space Planner, is required for the first meeting and for any other discussions by which the scope of the project may be significantly changed (e.g. cost, changing location, scope growth).

Under no circumstances should the A&E consultants have the scope and design kick-off meetings with principals without A&E staff.

At the meetings, the A/E shall provide technical input on what may be required. They will take minutes of the meeting for distribution per Procedural Guideline PG 3.1.2.

4. Meeting Agenda:

- a. The agenda for the first meeting will include general discussion of design and construction activities, as well as specific discussion of existing science rooms (if any) in the building and room selection possibilities. **It is very important that the design team relay to the principal and the school's science coordinator at the scope meeting that the standards for science rooms no longer include gas, vacuum, and air and this change has been vetted through the DOE Science Curriculum specialists and is part of the DOE's Green and Safe Science initiative. The labs will be equipped with a multi-functional science unit that has an electric Bunsen burner as one of its functions.**
- b. The designers will have to survey the rooms selected for upgrade or conversion, as well as the rooms above and below those spaces, and any building systems that will be affected (mechanical, electric and plumbing).
- c. A&E management and designers must defer to CM as far as providing any schedule information; they should also not discuss any cost or funding issues with the school team.



5. **Existing Science Rooms/Labs:** If the school has an existing science room/lab, determine its degree of functionality through discussions with the principal. Where existing, the rooms/labs are to be reused/ upgraded as the first choice for the project. Every effort shall be made to reuse existing equipment if they meet the functionality required for the program. If a new space is the ultimate choice for the room/lab, it must be noted in discussions that the current use of that space will not be re-created elsewhere as part of the project.
6. **Review of Proposed Layout/Location:** The designer shall provide a summary of the meeting in a field report along with sketches of the proposed work. These sketches will need to be reviewed by the QCCS unit to verify the appropriateness of the location prior to any distribution.
7. **Second Meeting at the School:** A second meeting is to be convened with the school team and space planner after the Draft Scope has been reviewed to review sketches showing the preliminary layout for the scope of work. The school team and Space Planner should be asked to sign-off on the proposed layout.

B. Project Milestone Phases:

1. **Scope:** A Scope Report with a cost estimate is to be submitted to Capital Plan Management at the end of the Scope Phase.
 - a. If scope is within the bounds of a typical upgrade or conversion, the project shall proceed to design.
 - b. If the scope is beyond the typical work of a science room/lab suite upgrade/conversion, the DM shall await review by Capital Plan Management before proceeding to design.
 - c. If directed by the SCA Design Manager, a scope with alternate design option is to be prepared.
2. **Scope Reports:** must include as part of basic information:
 - a. Room Numbers of the spaces to be converted or of the existing science rooms to be upgraded.
 - b. Intent of the educational program for the intended science room/lab.
 - c. Rationale and all supporting information for the specific room selections and systems as indicated below.
 - d. Layout signed by the school team and Space Planner
3. **Design:** The Contract Documents shall be developed, finalized and bid out. If any significant change (e.g. resulting in cost growth above authorized amount, changing room selections, scope growth, etc.) occurs during design, Capital Plan Management shall be notified immediately with details for their review and authorization.



4. **Construction:** Regarding the construction schedule, the goal is to have most of the work done over the summer. CM is responsible for determining the schedule and coordination with the school. If it is possible to do some preliminary work prior to summer, that should be evaluated for potential advantages. Also, it may be necessary to complete some finishing touches in September. All construction taking place in the building must be coordinated with the principals, custodians, and Space Planners.

A&E management and designers must defer to CM as far as providing any schedule information; they should also not discuss any cost or funding issues with the school team.

C. TECHNICAL SCOPING AND DESIGN GUIDELINES

1. **General**

- a. **BCC Filing:** Projects should be filed under the 1968 code as permitted by §28-101.4.3 except for those portions required to comply with the 2014 code.

Path of compliance must be clearly indicated on the first notes of the drawing, and if required a CCD-1 filed requesting filing to be done under the 1968 code. If the project is filed under the 2014 code, automatic sprinkler requirements would be triggered for the science labs, prep rooms & acid storage rooms.

- b. **Primary School Science Rooms** should use the SCA Room Planning Standards as a design guide for the room layout and equipment. If a separate “prep/storage” room cannot be provided, which is typical due to space limitations, an attempt should be made to accommodate the storage needed within the science room.

- c. **Intermediate School and High School Science Room Designs** may differ from SCA Room Planning Standards as follows:

- 1) High School Science Prep Room: In a conversion or upgrade, a High School prep room is required but will not require an acid storage room, only an acid storage cabinet under the fixed fume hood.

- 2) Intermediate School Science Rooms:

- a) The Intermediate School science program is typically an Earth/Life Science curriculum. If a separate “prep/storage” room cannot be provided, which is typical due to space limitations, a “prep area” within the IS demo room, with appropriate equipment is to be provided. No emergency shower need be provided. A handheld drench hose/eyewash system is to be provided at the demo room/area sink.
- b) If the school has an existing prep room, the prep room can be upgraded to match the Room Planning Standard, but without the shower and acid storage cabinet.
- c) The demo room will not require an acid storage cabinet, only a lockable cabinet for the storage of dilute chemicals.
- d) If no fume hood exists, a portable fume hood is to be provided in lieu of a ducted fixed fume hood.

- 3) All prep areas or prep rooms are to have a freezer.



2. Room Conversions - Selection Criteria

- a. Rooms designated for work should be within the "territory" of the school organization which will use the room.
- b. Select the floor closest to the roof, if possible, for simpler ventilation.
- c. Rooms selected for conversion should not have active leaks through the roof or masonry as the project will not be able to address those water infiltration issues.
- d. Room floor areas preferred:
 - 1) HS Science Suite: 2,300 sf (Lab 25x41; Demo 25x33; Prep 25x16)
 - 2) IS Science Lab/Demo: 1,100 sf (25x35 for Lab/Demo, 200 for prep area)
- e. Finding adequate space is difficult. IS schools may offer up only one classroom (which may be approximately 700 sf) for conversion, which is undersized for a science room. If that is the only space available, the designer should work with the Space Planner to provide a layout that shows the maximum number of seats that can reasonably be placed in the space provided. This may result in fewer seats than required by the school.
(Note that the 30"x60" work tables will accommodate 4 students only.) If a principal cannot work with the reduced capacity, then the Space Planner will need to get involved again to see how to make a larger space available.
- f. Issues of insufficient space are to be flagged at the beginning of scoping based on the square footage of the room being offered. Information regarding reduced capacity/insufficient space is to be forwarded to the Space Planner through the Design Manager for follow up with the central DOE staff. Do NOT promise the school that the science room/lab can be made to work in insufficient space.
- g. Prep, Demo, and Lab rooms for one organization should be contiguous if possible, or proximate at least.

3. Existing Science Rooms/Equipment Survey

- a. Existing Science Rooms: The Scope Report must list and describe any existing science rooms (lab, demo, prep). Provide room numbers, floor level and dimensioned sketch floor plans and indicate all existing equipment, utility and P&D components within, with description sizes and condition.
- b. If the room is to be upgraded, indicate if the furniture and/or equipment is to be discarded, relocated within the building or delivered to DSF. If furniture is to be re-located within the building, indicate room/floor number of the new location.

4. Systems

a. Acid Neutralization System

- 1) A full building-wide survey of the existing acid neutralization system and any acid neutralization canisters must be done at the start of scoping. If the existing central acid neutralization system is not operational or is undersized,



it may have to be upgraded. If the existing tank size was selected prior to 1993 (the year sizing guidelines were instituted by DEP), and it meets the manufacturer's recommendation for the total number of sinks it is serving, DEP will accept the installation and will require only that a sampling tank and monitoring system to be installed. If it does not meet those sizing guidelines or was installed after the DEP guidelines were instituted and is undersized, the system will have to be upgraded.

- 2) Adding science room sinks (which includes the sink under the fume hood) to the existing acid neutralization system, and the work to bring the system into compliance, will have to be filed with DEP. If the existing central system is DEP-compliant and no additional sinks will be put on the system, no DEP filing will be needed in this regard.
- 3) If there is NO existing acid neutralization system, the designer shall evaluate the installation of acid neutralization canisters below each new science room sink. The maximum number of neutralizing canisters in the building (regardless of the sizes of the canisters) may not exceed 20. If the count exceeds 20, a central acid neutralization system will need to be used - either upgraded or created new. A DEP filing will be required. Cannister capacity varies with the number of contributing faucets - tri-facial sinks, must be counted as three separate fixtures and require a 15-gallon canister; quad sinks (with 2 faucets, count as 2 fixtures) require a 10 gallon neutralizing canister; a typical single sink requires a 5-gallon neutralizing canister. Design of the center portion of the tri-facial must be modified to allow room for the height of the large cannister – the floor of this section of millwork may need to be deleted.
- 4) The Scope Report must include, but not be limited to the following:
 - a) Is there an existing central acid neutralization system in the building?
 - b) If so, indicate size of tank and location.
 - c) Is it in operation?
 - d) How many fixtures (faucets) currently feed into it? Is the sink of the fixed fume hood connected?
 - e) If the existing tank is undersized and must be upgraded as per 1993 DEP sizing requirements, is there enough space in the room to put a larger tank or a second tank to run in parallel with the existing?
 - f) If there is not enough space for a larger or second tank, is there an adjacent room that could be combined for such use? The designer must confirm that existing door widths are adequate to bring the tank into the building and into the tank room.
 - g) What is the current number of under-the-counter acid neutralization canisters?
 - h) When any new individual canisters are installed, will the total number in the building exceed 20?
- 5) The Drawings, as applicable, must clearly indicate the number of sinks tied into the existing central system, the size of the existing tank, and a statement that the system is functional and meets DEP requirements. Also, a letter of notification to the DEP will be required to state the existing central system is operational and it shall inform them of the number of individual canister units to be added.

- b. Ventilation System:** Ventilation requirements shall be calculated to include existing supply and exhaust. Try to avoid adding mechanical make-up air units.



If needed, clearly indicate in the report why they are needed. The investigation of the systems must include, but not be limited to:

- 1) Exhaust: What is the current method of exhausting the air; gravity or natural draft? Determine grille locations. Typically, classroom exhaust was through the students' wardrobe. Natural draft is acceptable if it met the code at time of design. Labs cannot have the air re-circulated.
- 2) If the mechanical ventilation system is not operational, provide a report to the design manager and, if directed by the DM, include mechanical system related work in the scope.
- 3) Mechanical Upgrade: If it is determined that the mechanical system requires a complete upgrade or if the system must be thoroughly investigated and tested to determine why it is not working, explore various options:
 - a) If there is an existing exhaust system but it is not functional and there is not sufficient window area for natural make-up (1% of floor area), the SCA Design Manager shall notify DSF for their investigation. Provide for any additional required ductwork hooked up to the existing exhaust system. The scope report must include this information and that the issue is being addressed.
 - b) Provide exhaust through the upper sash of one window if there is sufficient window area for natural make-up (1% of floor area). However, careful acoustical evaluation is required to prevent excess noise. Provide a noise reduction enclosure including outside air damper for the equipment, and an access door for maintenance.
 - c) For rooms with a ducted fume hood, the fume hood may be used to provide the exhaust air if there is sufficient window area for natural make-up air. However, it must be verified if the existing heating is sufficient to offset the increased infiltration of cold air due to the increased ventilation from the ducted fume hood.
 - d) As a last resort, provide separate exhaust and make-up if window area is not sufficient. Careful acoustical evaluation is required to prevent excess noise.

c. Air Conditioning: No new AC is to be provided in these rooms.

d. Existing Unit Ventilators: Existing Unit Ventilators are to remain in place. If operational, the unit ventilators can be used as a source of outside air (OA) make-up, providing that the OA arrangement can be verified or restored. Radiators shall also remain in place if possible. Thermostats and control valves are to remain unless they are not functioning. Notify the DPM if thermostats and control valves require replacement.

e. Ducted Fume Hoods:

- 1) Make-up air is not required for ducted fume hoods that are not required to be in continuous operation. (i.e. where the fume hood is not part of the ventilation system providing the code mandated room exhaust). Makeup air system must be sized in order to guarantee that the room is always maintained under negative pressure. The exhaust CFM must be sized in accordance with the hood type/size in order to guarantee minimum velocity across the face of the hood.



- 2) Make-up air is required for ducted fume hood if they are required to be in continuous operation for the ventilation of room. (see sub-paragraph 3)c) above under Ventilation)
 - 3) Ducted fume hoods are required in HS Labs and Prep Rooms, and can be installed between the two rooms, with a single duct and two-sided access to the hood, if space is limited.
- f. Ductless Fume Hoods:** As needed, these will be utilized in the HS Demo Room and the IS Demo/prep room. These are fume hoods with filters rather than being ducted to the roof.
- g. Exhaust Ducts:** Dedicated ducts for fume hood exhaust or acid storage cabinet must rise to the code-required height above the roof (10 feet). In SHPO eligible buildings, this duct must be set back or otherwise “hidden” from major views of the building.
- h. Acid Storage Rooms:**
- 1) If any Acid Storage Rooms exist, these are to continue to be used. Provide a sprinkler head off of the domestic water supply. The sprinkler pipe must have a chained isolation valve located in the Acid Storage Room. A Flow Switch is not needed.
 - 2) The room must be ventilated 24/7 via a dedicated exhaust duct; make-up air shall be via a transfer grille. As the acid storage rooms are fire-rated, the dampers are to be fire dampers.
 - 3) If the acid storage room has no floor drain, a type-F floor Drain will have to be installed.
 - 4) For those schools without an acid storage room, none is to be provided.
- i. Acid Storage Cabinets:** Where no Acid Storage Room exists, provide an acid storage cabinet in the HS prep room only. The acid storage cabinet is typically installed below the ducted fume hood, but it is to have a dedicated exhaust to the roof. The exhaust is to be either by natural draft (preferred) or mechanical means.
- j. Gas Service:** As per the DOE/SCA standards change of October 2016, gas is not to be provided in the Science suite.
- k. Plumbing**
- 1) The designer will need to establish whether or not the building water service has an RPZ. If it does, no local RPZ is required. If it does not, the water supply piping to the Science Room will require two local RPZ’s (one for hot and one for cold). If the science room hot water lines are more than 20’ from the riser, a return line will be required or a local electric hot water heater must be utilized to feed the new sinks.
 - 2) An emergency shower with drain is to be installed in the High School prep room. Provide thin set tile around the drain (depending on the existing floor finish).



- 3) Primary School Science Resource room sinks do not require acid neutralization canisters below each sink since these rooms do not use acid. They are to be provided with a sediment trap.
 - 4) Existing shower/eye wash must be upgraded as tempered water is required.
- I. Vacuum and Air: As per the DOE/SCA standards change of October 2016, these items are not to be provided.**
- m. Electric**
- 1) **As per the DOE/SCA standards change of October 2016, hardwired power packs are not to be provided. Lab-master units will be provided thru the SCA F&E unit as per the Room Planning Standard.**
 - 2) Each room is to include a Master Electric On/Off switch that shuts of the electric to the outlets of the science tables, including the perimeter benches of that room only (as described on the Standard Room Layouts). It should not shut off the convenience outlets.
 - 3) A new dedicated panel shall be provided to serve each lab/prep/demo room suite. The feeders shall come from the local floor power panel, or if not available there, from the Electric Switchboard. Along the exterior wall, one outlet is to have a dedicated circuit. (For those rooms with existing window AC units, the dedicated outlet is to be near the window AC unit.)
 - 4) Load Letter: The A/E shall obtain the electric service demand from DCAS Office of Energy Conservation for performing the calculations needed for the additional design load and utility load Letter. The contact person for DCAS is Mr. Vadim Fridgin. Mr. Fridgin can be reached at (212) 669-4707 or vfridgin@dcas.nyc.gov.
- n. Lighting:** Generally new direct/indirect lighting fixtures are to be installed in the new science rooms (unless the existing ceiling height is prohibitively low), However, if the fixtures in these rooms were recently replaced, they should remain). Note that lighting in the room below may also need to be replaced if the existing lighting is impacted by the running of utilities. Lighting including controls must meet the NYCECC.
- o. Low-Voltage Systems:** As the room is reconfigured/converted, existing low voltage system devices may need to be added or relocated, such as the PA/Clock system, Intrusion Alarm, Telephone, Data. Ensure existing system is working during the scoping and if items are to be replaced or added that they are compatible with the remainder of the school's systems.
- p. Carbon Monoxide Detection:** Carbon monoxide detection is NOT required in Science Preparation Rooms, Science Labs or Science Demonstration Rooms.
- q. Floors:** In HS Demo Rooms and IS Lab/Demo rooms (including prep area), existing non-ACM tile floors can remain if in reasonable condition and patching of the floor tile will not be required. All ACM floors must be replaced as indicated in q.2) below. If the existing floor is wood and it is in good condition, it is to be sanded and re-finished. In HS Prep Rooms and HS Labs, an acid-resistant floor must be installed as follows:



- 1) If existing Lab or Prep Room floor is wood – Remove the wood flooring, sleepers, and fill; fill space with lightweight concrete and install a mud-set quarry tile floor
- 2) If existing floor is VAT or VCT, work required depends on the age of the building and the substrate. Designer is to review the existing drawings to verify construction.
 - a) If building is constructed of stone concrete and existing flooring is placed directly on floor slab (typically late 1940's and later buildings), remove the floor tile, including abatement if necessary, flash patch, prepare surface, and install acid-resistant floor as per Section 09705.
 - b) If the building is constructed of cinder concrete or clay tile Arch, which typically involves a screed material over cinder fill below the floor tiles (typically early 1940's and earlier), or the construction can't be ascertained from the drawings, the screed and cinder fill may need to be removed and replaced with concrete. An engineering analysis must be done to determine the floor restoration.
- r. **Roof Penetrations:** All penetrations through the roof will require that the designer check and report back on the status of the Roof Warranty. Roof cuts are required for establishing the presence of ACM, requiring that roof penetrations be done under abatement conditions. Ensure the roof cut locations are where the new penetrations will be. Details for watertight flashing at all new roof penetrations (ducts, vent pipes, etc) are required.
- s. **Walls and Ceilings:** Paint the walls and ceiling of the new science rooms. As needed, patch and paint ceiling of room(s) below in addition to any soffits that may have been created.
- t. **Science Millwork/Cabinets** – In the design, selection and location of cabinetry, the designer must be cognizant of the potentially negative impact the cabinets may have as they may block access to windows, mechanical systems, outlets, access panels, reasonable “reach” to windows and other room elements required for instructional operation. To this end, the designer is responsible for fully documenting all existing conditions on the floor Plan, Sections and the Reflected Ceiling Plan. The designer is to coordinate them similarly with all proposed new construction and installations.
- u. **Interactive White Boards** are to be installed as per the Standard Room Layouts.

C. Design Documents

1. **Coordination:** The designer is responsible for fully documenting all existing conditions in Plan, Section and the Reflected Ceiling Plan, and coordinating them similarly with all proposed new construction and installations.
2. **Survey of existing conditions:** Field notes/measurements must include every element in the existing rooms to be converted, and must include relevant information about other parts of the building that will be affected by services going to and from the new science rooms.



3. **Code:** Compliance with Chapter 11 of the 2014 New York City Building Code (accessibility requirements) and NYCECC must be considered thoroughly in planning

4. **Reflected ceiling plans (RCP)** of rooms below the rooms selected for conversion will be required. This is important in considering how piping coming down from the science room will be routed in an aesthetically acceptable manner and be coordinated with the existing room elements (structure, piping, lights, etc). The RCP must indicate heights AFF for all elements. A section to show this coordination is required. If height allows, a new hung ceiling in the “rooms below”, with new lighting, may be considered if it does not create additional work to the finishes, low voltage systems, mechanical ventilation, sprinklers, etc. Alternatively, a soffit arrangement may be appropriate.

It is the designer’s responsibility to solve the potentially negative aesthetic impact of pipe, conduit, vent pipe and duct runs from the new Science Rooms as they leave those rooms and are routed as needed through the building.

End of Science Room Conversion/ Upgrade Scoping Guidelines