

At Division 01 under section 01 50 00, add new subsection “01 56 00 Temporary Barriers and Enclosures” with all new subheadings and text as follows:

01 50 00 TEMPORARY FACILITIES AND CONTROLS

01 56 16 Temporary Dust Barriers and Construction Indoor Air Quality Control Plan

.01 General

- A. Scope: These requirements apply to all renovation projects that entail sanding, cutting, grinding/mechanical abrasion, spraying, welding/related activities, or other activities that generate significant amounts of airborne particles, fumes, or aerosols, or activities that generate significant amounts of gaseous contaminants conducted in occupied facilities.
- B. Definitions:
1. Construction Areas – Construction areas include those areas of a facility/building under temporary or permanent construction or renovation. Construction areas may be present in occupied or unoccupied facilities.
 2. Continuous Duration Construction Work – Construction work activity necessarily conducted for greater than 1 week, and which may include multiple user spaces, or cross departmental areas in a given building, such as a building wing, floor, or multiple contiguous or non-contiguous groups of areas.
 3. Limited, Short-Duration Construction Work – Construction work activity necessarily conducted for approximately 1 week or less, and which is conducted within a well-defined space such as an office, common room, conference room, etc.
 4. Occupied Areas – Occupied facility areas include any areas of a facility which may be routinely or intermittently occupied by building occupants, guests of building occupants, or dedicated maintenance or custodial personnel.
 5. Occupied Facilities – Occupied facilities shall include facilities which may be accessed by faculty or staff during any period of a 24-hour day, including daytime and nighttime hours.
 6. Public Areas – Public areas associated with construction work may include: common building areas, which may be occupied by the general public, or nearby outdoor areas such as public walkways, parks or seating areas, that may be directly impacted by the building-related construction activity.
 7. Sensitive Work Areas – Certain work areas such as specialized biological, chemical or instrumental laboratories, other research areas, food packaging or production areas, or other controlled work environments, which may require specialized controls and procedures to comply with Codes or other requirements, and to protect occupants, processes, and equipment.
 8. Unoccupied Facilities – Unoccupied facilities shall include facilities which are permanently or temporarily closed to occupants due to non-use, or substantial

construction, in which environmental management systems are disengaged or significantly adjusted for temporary/construction requirements.

- C. Contract Documents: Shall include well-defined requirements to provide temporary dust barriers and all necessary means and methods during construction activities to prevent dust/debris, fumes, chemicals, odors and sources of airborne contamination associated with construction activities (site work, demolition, renovation, additions, new construction, etc.) from being distributed into and throughout the occupied areas.
1. These requirements shall protect and maintain:
 - a. Clean and safe working conditions and adequate indoor air quality (IAQ) for all occupants. Comply with requirements in **ASHRAE Standard 62.1 - Ventilation for Acceptable Indoor Air Quality** (2010 or current), **Construction & System Start-Up**.
 - b. Existing building construction and associated system components (louvers, dampers, ductwork, filters, coils, fans, control sensors, computers, equipment, etc.) from damage and deterioration due to construction activities.
- D. Construction Indoor Air Quality and HVAC-Control Plan (Construction IAQ Plan): Contract documents shall require contractor to submit coordination drawing(s) and narrative to the University that summarizes the Indoor Air Quality and HVAC-Control measures proposed for use, the proposed locations, and proposed time frame for their operation.
1. The Construction IAQ and HVAC-Control Plan shall include the following:
 - a. Construction features and locations of all dust-control partitions at each phase of work,
 - b. Location of proposed negative air and/or air-filtration system(s) and discharge(s),
 - c. HVAC system isolation procedures and schematic drawings (as needed),
 - d. Waste handling staging and procedures,
 - e. Other specific dust-control measures, pertinent to the scope of work.
 - f. Identify further options if proposed measures are later determined to be inadequate,
 - g. Periodic inspections with contract representative,
 - h. Project communications plan supporting timely notifications with the contract representative and occupants regarding project status, changes in work, or conditions affecting occupancy considerations or IAQ.
 - i. Means of monitoring negative air and/or air-filtration systems(s) , discharges and airborne dust levels for continuous duration work, where specified in consultation with OPP Safety, EHS and OPP Engineering Services.

2. The Construction IAQ Plan shall be reviewed and approved by the OPP Safety Office, and with support or guidance by the Environmental Health and Safety office and OPP Engineering Services representatives, prior to commencing work.

.02 Products

- A. Contract documents shall define the materials and equipment required for the project specific application to meet the intent of this section. This may include, but not be limited, to the following:
 1. Adhesive-Surface Walk-off Mats
 2. Polyethylene Sheet - reinforced, fire-resistive type
 3. Modular Dust Barrier systems, similar to Zipwall, <https://www.zipwall.com/>
 4. Modular Work Area Dust Containment Enclosures (aka "cubes"), mobile or stationary, similar to those manufactured by:
 - a. Abatement Technologies, Inc., Aire Guardian
 - b. Akon <http://www.curtain-and-divider.com/dust-containment-enclosures/>
 - c. Mintie Technologies
 5. Field-fabricated Temporary Partitions with the appropriate assembly of components constructed as required to meet the application
 6. Negative Pressure (Exhaust) Systems
 7. Air Filtration Systems
 8. HEPA-filtered vacuum cleaners
 9. Acoustic Insulation

.03 Execution

- A. General: Project specific dust barriers and other dust and fume control methods shall be selected according to the duration, type and extent of construction work activity employed, as above defined for limited or continuous construction work activity.
 1. Also consider the critical nature of airborne particulate, gas or vapor control, or containment of contaminants generated by construction activities with respect to adjacent occupants (e.g. general service areas, general office space, sensitive research labs or occupied healthcare facilities). These considerations impact determination of the necessary types, and extent of partitions and/or controls.

2. The OPP Safety Office, and/or EHS, and OPP Engineering Services shall be contacted for guidance and support in making necessary determinations of the appropriate measures as pertinent to the project scope.
 3. Maintain operation of temporary barriers and other dust and fume control methods on a 24-hour basis where required to achieve indicated results and to avoid possibility of adverse impact to occupants or property damage.
 4. Consideration shall also be given to controlling noise transmission to occupied areas, where applicable.
- B. Temporary Dust Barriers: Select and erect dust barriers/partitions according to the type and duration of work specific to each project.
1. Limited, Short-Duration Construction Work:
 - a. Isolate work area within, or contiguous to, occupied areas by means of portable, stable, modular dust barrier “Zipwall” systems of plastic sheathing or modular dust containment enclosure “cubes” for the duration of the work.
 - b. Appropriate selection of the modular barrier/enclosure will depend on the scope of the work and the relative sensitivity of the adjacent occupied areas.
 2. Continuous Duration Construction Work:
 - a. Isolate work within or contiguous to occupied areas by means of constructing and maintaining temporary walls, partitions and/or plastic sheathing for the duration of the work, which are constructed to seal out project dusts and/or vapors from occupied areas.
 - b. Project specifications shall define construction of such partitions to best fit the specific needs of the application. Considerations shall include:
 - 1) Construction materials and assemblies used shall be appropriate for maintaining dust barrier integrity, and security, as applicable for the scope and duration of the project.
 - 2) Any required fire-resistance rated temporary construction barriers.
 - 3) Acoustic insulation to control noise transmission to occupied areas.
 - 4) Sealing of all joints, and perimeter of partitions.
 - 5) Construct partitions with gasketed or sealable dust-proof doors and security locks where secure openings are required.

- C. Collection and Extraction Dust Control Methods within Work Area: Use combination of industry best practice methods to collect and/or exhaust dust or fumes as close to source as practical to prevent dust, fumes, and odors from entering occupied areas.
1. Install filtered vacuum collection attachments directly on significant dust and fume-producing equipment.
 - a. Potentially toxic, noxious, or fine/ultra-fine materials shall require HEPA-or pertinent absorption filtration. Toxic or noxious materials may include: organic vapors or solvents from product application, silica-containing dusts generated by mechanical abrasion or cutting, asbestos, carbon monoxide by equipment exhaust or heaters, metal fumes by welding, etc. Consult OPP Safety or EHS for assistance.
 2. General Particulate air filtration:
 - a. Control general dust within work area using air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - b. Air filtration shall consider the type and nature of contaminants present.
 - c. The presence of potentially toxic, noxious, or fine-ultra fine particulates shall require at least primary/secondary pre-filtration with HEPA-filtration.
 3. Arrange and initiate measures to exhaust/de-pressurize the construction work area, and/or pressurize contiguous occupied areas. Local exhaust ventilation equipment shall be configured to run continuously, or as determined necessary to safely contain and exhaust the particulates. Sensitive Work Areas may require specialized pressurization controls. Consult OPP Safety, EHS, and OPP Engineering Services for assistance in defining specialized controls.
 4. Vapor or gas extraction: Wherever toxic or noxious gases or vapors may be present, these shall be safely and effectively exhausted from the construction work area, and in a manner so as not to adversely impact occupied areas, or adjacent public areas, also including outdoor shipping docks, walk- or service ways or building entries. Provide single, pushbutton, high-visibility, Emergency Power Off (EPO) switch for emergency shutoff in conspicuous location.
 5. Dust-control adhesive-surface walk-off mats (36" x 60" minimum size) at each entrance through temporary partitions.
 6. Perform daily construction clean-up and final clean-up using approved collection methods.

7. Perform necessary inspections and project communications as further described at Sections E and F.
- D. HVAC Isolation/Protection: Prior to commencing work, isolate the HVAC system to fullest extent possible in construction areas where work is to be performed according to construction documents. Specific measures may necessarily include:
1. Ideally existing air handling systems affected by construction areas should be shut down to the fullest extent possible during the construction period.
 2. Disconnect and temporarily cap supply and return ductwork in work area from HVAC systems servicing occupied areas.
 3. If existing air systems cannot be disconnected and capped within work area for whatever reason, then provide adequate filter media on all remaining return inlets in the work area, carefully attached and sealed to prevent bypass around filter media.
 - a. Filter media shall be minimum MERV 8; similar to [TRI-DEK #8 media](#) as manufactured by Tri-Dim Filter Corp.
 - b. Replace clogged filter media periodically for duration of work.
 - c. At end of construction, interior of such ducts kept in service during construction activities shall be thoroughly inspected and cleaned as required to remove dirt and debris that resulted from construction activities.
 - d. Note: Check interior conditions of return ducts prior to construction. If existing ducts are found to be dirty prior to start of construction, advise the Project Manager. Overall duct cleaning of existing dirty duct systems is not intended to be work of this section.
 4. Other special hazardous and sensitive area applications: If existing air handling systems serving other Sensitive Work Areas and/or in hazardous work areas must be left operational, and return air systems pass through the construction work area, then in addition to the above, provide appropriate higher level filtration (up to MERV 16 depending on the type of dust/contaminant source) to adequately protect all surfaces in contact with the airstream of existing air handling systems from being contaminated by construction activities. Evaluate existing air systems and consult with OPP Safety, EHS, and OPP Engineering Services in these specialized filtration requirements.
- E. Inspections: During construction activities, periodic inspections shall be performed by the contractor(s) in coordination with the Penn State contract representative to ensure these provisions are routinely implemented.

1. Upon completion of construction activities, a final inspection shall be conducted to ensure proper demobilization of all barriers and temporary measures are complete, and that remnants of these features are removed.
 2. Inspection findings shall be communicated with designated building owner representatives, as needed for building owners to keep occupants informed of project progress.
- F. Project Communications: Project communications should be planned with respect to work planning throughout the project duration.
1. Communications shall occur regularly regarding inspections, project status, or project changes which may affect occupant perceptions of IAQ.
 2. These should routinely occur between the contract parties, the contract representative, and the facility coordinator or designee supporting timely communications with building occupants.

END of revision

Update Commentary:

Section was added primarily for the following reasons:

- 1) *To add new section to define requirements for specifying dust barriers and other construction IAQ control methods to effectively isolate construction work areas from the surrounding occupied areas.*
- 2) *To include definitions and roles of supporting parties.*