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CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents must be reviewed for applicable provisions related to the provisions in this document.

1.02 CONSTRUCTION IAQ MANAGEMENT REQUIREMENT

A. The Work of this Project shall minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities. Minimize factors that contaminate indoor air, such as, but not limited to: Dust entering HVAC systems and ductwork, improper storage of materials on-site, and poor housekeeping.

B. Design Builder shall develop an Indoor Air Quality (IAQ) Management Plan that is based on the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction.

C. Permanent heating, ventilation, and air conditioning equipment shall not be used for to heat, cool, or ventilate zones, areas, and sites that are under construction. Design Builder shall include measures to provide temporary ventilation, heating, and cooling as necessary.

1.03 SUMMARY

A. This Section includes Design Builder requirements for the development and implementation of a Construction Indoor Air Quality Management Plan (IAQ Plan). Develop the IAQ Plan for review and approval by Owner. The IAQ Plan shall be implemented throughout the duration of the project construction, and shall be documented as outlined in the SUBMITTALS Article below.

B. The IAQ Management plan shall be submitted to Owner for review and approval must prior to the commencement of construction.

1.04 DEFINITIONS

A. Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives; composite wood binder, and foam insulations. Not all VOC's are harmful, but many of those contained within building products contribute to the formation of smog and irritate (at best) building occupants by their smell and/or health impact.

B. Materials that act as "sinks" for VOC contamination: Absorptive materials, typically dry and soft (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOC's emitted by "source" materials and release them over a prolonged period of time.

C. Materials that act as "sources" for VOC contamination: Products with high VOC contents that emit VOC's either rapidly during application and curing (typically "wet" products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically "dry" products such flooring coverings with plasticizers and engineered wood with formaldehyde).

D. MERV: Minimum Efficiency Reporting Value.

E. SMACNA: Sheet Metal and Air Conditioning National Contractors' Association.

1.05 REFERENCES, RESOURCES

A. "IAQ Guidelines for Occupied Buildings Under Construction", 2nd Edition, November 2007, The Sheet Metal and Air Conditioner Contractors' National Association (SMACNA), www.smacna.org.

B. ANSI/ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", www.ashrae.org.

1.06 CONSTRUCTION IAQ MANAGEMENT PLAN

A. Prepare, submit, and implement a Construction IAQ Management Plan to the Owner for review and approval for each floor during

the duration on construction. The Construction IAQ Management Plan shall meet the following criteria:

1. Construction activities shall be planned to meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) "IAQ Guidelines for Occupied Buildings under Construction", First Edition, 1995.

2. Identify and implement IAQ controls, sources of dust, odors, other contaminants.

3. Upon periodic inspections during construction, if the ducts become contaminated due to inadequate protection, the ducts will be cleaned professionally. This activity is the responsibility of the Design Builder.

4. Furnish and install plastic barriers for dust or fumes and dirt containment, and special covers for equipment, cover any furniture and electronic equipment, and isolate from distribution system for IDF and MDF rooms.

5. Identify and implement procedures and implement necessary measures to protect any smoke detector heads from dust or fumes and potential false alarms during the demolition work. Design Builder shall provide fire watch as required by the construction activities.

6. Identify and implement construction activities likely to produce DETECTABLE odors, vapor, and dust

7. Identify and implement measures to protect the ventilation system components and air pathways against contamination during construction.

8. Identify and implement measures to positively pressurize occupied floors and negatively pressurize construction zones and areas.

9. Plans shall include cleaning procedure to be used prior to floor being occupied in the event that the ventilation system components and air pathways are not adequately protected. All areas are to be cleaned prior to a certificate to occupy the space by Owner.

10. Indicate the location, type, amount, sequence, and timing of the various control measure, including emergency procedures, and the labor, materials and the time required to implement them.

11. Absorptive materials shall be protected from moisture damage when stored on-site and after installation.

12. Identify and implement measures to protect carpet and flooring from dust and debris with heavy-duty, water-resistant Flexboard. Flexboard shall be securely fastened with tape. Tack mats shall be included when leaving a construction zone and entering occupied area.

13. Identify and implement modified work practices such as vacuum assisted saws or working weekends for extreme odor and dust generating activities.

14. Identify and implement measures for sealing and protecting all shafts, chases, and all penetrations openings that are pathways between floors in the building.

15. Plan and install temporary full-height walls from floor to floor to isolate lobbies, access pathways, and construction areas and or zones from dust and odor migration. Temporary walls or curtains shall be full-height walls from floor to floor containment for vapor and dust.

16. Identify and implement measures to protect all equipment and material stored in the construction area.

17. Design Builder shall photograph and document all IAQ controls that were installed with a brief description of the approach employed, such as protection of ducts, and on-site installed floor, wall, and absorptive materials.

18. For air handlers that are to be used for the occupied floors, filtration with a Minimum Efficiency Reporting Value (MERV) of 8 must be at each return air grill, as determined by ASHRAE 52.2-1999.

19. Filtration media shall be replaced immediately prior to occupancy. Filtration media shall have a Minimum

Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999. Confirm that all air filters, casing, coils, fans and ducts are clean, before testing and balancing (TAB) the system, and air quality testing.

20. A "Sequence of Finish Installation Plan" shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as "sinks".

B. Upon approval of the IAQ Plan by the Owner, it shall be implemented by the Design Builder through the duration of the construction process for both floors of this phased construction project, and documented in accordance with the SUBMITTALS Article below. The IAQ controls will be field verified by Owner prior to the commencement of work. Owner will issue a notice to commence construction when all IAQ requirements have been met.

C. Further description of the Construction IAQ Management Plan requirements is as follows:

1. SMACNA Guidelines: Chapter 3 of the referenced "IAQ Guidelines for Occupied Buildings Under Construction", outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format, and shall address measures to be implemented in each of the five categories (including subsections). All subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such.
   a. HVAC Protection:
      1) Return Side.
      2) Central Filtration.
      3) Supply Side.
      4) Duct Cleaning.

   b. Source Control:
      1) Product Substitution.
      2) Modifying Equipment Operation.
      3) Changing Work Practices.
      4) Local Exhaust.
      5) Air Cleaning.
      6) Cover or Seal

   c. Pathway Interruption:
      1) Depressurize Work Area.
      2) Pressurize Occupied Space.
      3) Erect full-height Barriers to Contain Construction Areas.
      4) Relocate Pollutant Sources.
      5) Temporarily Seal the Building.

6) Sealing air intakes and return systems

d. Housekeeping
   1) Cleaning to reduce migration of dust or odor
   2) Covering and protecting

e. Scheduling:
   1) Protect of Materials from Moisture Damage: As part of the "Housekeeping" section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from moisture damage shall be described. This section should also describe measures to be taken if moisture damage does occur to absorptive materials during the course of construction.

   2) Replacement of Filtration Media: Under the "HVAC Protection" section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.

   3) Sequence of Finish Installation for Materials: Where feasible, absorptive materials shall be installed after the installation of materials or finishes which have high short-term emissions of VOC's, formaldehyde, particulates, or other air-borne compounds. Absorptive materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the airstream); upholstered furnishings; and other woven, fibrous or porous materials. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.

   4) Develop a separate sequencing plan that identifies feasible opportunities to meet the above-stated goals for the project. The plan shall be submitted to Owner or Owner's Representative in accordance with the

SUBMITTALS Article below.

5) Implementation and Coordination: Implement the Construction IAQ Management Plan, and coordinate the Plan with all affected trades. Include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

6) Designate one individual as the Construction IAQ Representative, who will be responsible for communicating the progress and any issues implementing the IAQ Management Plan with the Owner or Owner's Representative.

1.07 SUBMITTALS

A. Submit the following records and documents:

1. A copy of the Construction IAQ Management Plan and the Sequence Installation Plan, as defined in CONSTRUCTION IAQ MANAGEMENT PLAN Article above.

2. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted.

3. Provide the Owner or Owner's Representative with a minimum of 18 photographs comprising of at least six photographs taken on three different occasions during construction. The photographs shall document the implementation of the Construction IAQ Management Plan throughout the course of the project construction. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs shall include integral date stamping, and shall be submitted with brief descriptions of the Construction IAQ Management Plan measure documented, or be referenced to project meeting minutes or similar project documents which reference to the Construction IAQ Management Plan measure documented.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

A. Procedures during construction shall use all elements of the IAQ management plan.

B. Meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, as applicable to new buildings. As a minimum, but not limited to, this means:

1. Protect the ventilation system components from contamination:
    a. Store HVAC equipment in a clean, dry location.
    b. Seal all HVAC inlets and outlets.
    c. Seal HVAC components during installation.
    d. Use a temporary ventilation system during construction.
    e. Use temporary filtration media.
        1) Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 8 as determined by ASHRAE 52.2-1999) on any return air systems operational during construction. For air intakes into rooms that are very sensitive to dust contamination, such as computer rooms, filtration media should be the best that the HVAC systems fans can handle, up to an MERV rating of 17.
        2) Replace all filtration media immediately prior to occupancy.
    f. Clean air plenums before closing them in.
    g. Inspect filters regularly.

2. Provide pollution source control:
    a. Protect on-site stored and installed absorptive materials (such as insulation, drywall, and wood) from moisture damage and from contamination by construction dust, debris, and fumes during all phases of construction, both before and after installation.
    b. Do not install moisture-damaged materials.
    c. Ensure that construction detailing will not result in moisture intrusion.
    d. Use low-emitting products (specified in appropriate sections). e. Provide strategies to avoid tracking pollutants into the work areas.
    e. Allow high-VOC materials to off-gas prior to installation. For example, all dry furnishing and materials (such as carpet, floor tile, acoustical tile, textiles, office furniture, wood shelving, etc.) shall be allowed to “air-out” in clean environments prior to installation in a building.
    f. Use the least amount of "wet" materials (such as adhesives, sealants, glazes, caulks, paints, etc.) during construction and product applications while still maintaining installation protocol required to meeting for manufacturer’s warrantee requirements.
3. Provide interruption of pollutant pathways:
    a. Provide temporary barriers to seal and isolate areas of the work to prevent contamination of clean or occupied spaces.

b. Depressurize the work area to prevent contamination of adjacent areas.
c. During installation of VOC emitting materials, maximize ventilation of work areas with outside air. Exhaust directly to the exterior. Do not cross contaminate.

4. Practice Healthy Housekeeping.
   a. Minimize accumulation of dust and other contaminants.
   b. Confine dust-generating activities.
   c. Suppress dust. Dry sanding allowed subject to owner approval.
   d. Clean up dust.
   e. Clean up spills.
   f. Keep work area dry.
   g. Seal containers of volatile liquids.
5. Schedule construction activities to reduce exposure to VOCs.
   a. Install porous materials only after closing in the building.
   b. Account for curing time and off-gassing when scheduling construction activities.
   c. Allow wet-spray cellulose to dry before covering.
   d. Install carpeting, acoustical panels, and furnishings after interior finishes have been allowed time to cure/dry in accordance with other good building practice.
   e. Provide adequate ventilation during curing period.
      1) Provide supplemental (spot) ventilation for at least 72 hours after work is completed. Preferred HVAC system operation uses supply air fans and ducts only; exhaust provided through windows. Use exhaust fans to pull exhaust air from deep interior locations. Stair towers and other paths to exterior can be useful during this process.

C. Use safety meetings and signage, to communicate the goals of the construction indoor air quality management construction plan.

D. Conduct regular inspection and maintenance of indoor air quality measures including ventilation system protection, and ventilation rate.

E. Require VOC-safe masks for interior and exterior workers installing VOC-emitting products (products that contain 150 g/L or more VOCs).

F. Use low-toxic cleaning supplies for surfaces, equipment, and worker's personal use. Options include several soybean-based solvents and cleaning options and citrus-based cleaners. (SoySolv provides several soy-based solvents and cleaning options. Phone 1-800-231-4274 or www.soysolv.com.)

G. Smoking is prohibited on site and within 50 feet of the building during and after construction

END OF SECTION