Construction Waste Management Plan

SNL CA New Data Center Building 902

7011 East Avenue Livermore, CA 94550

For compliance with LEED MR Construction and Demolition Waste Management Planning

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OBJECTIVES

This Construction Waste Management (CWM) Plan specifies the procedure for the management, control and disposition of items designated as waste material for the project. Since no two construction projects are exactly alike, this manual emphasizes general concepts and approaches from which the contractor may select solutions best suited to the given project.

This project is attempting to recycle 75% of the construction, demolition and land clearing debris. In order to meet LEED project requirements, implementing a comprehensive recycling program is mandatory.

IMPLEMENTATION

The aim of this plan is to minimize the amount of waste generated on this project to the extent practical. The Contractor is responsible for the implementation and oversight of this plan. All subcontractors of the Contractor are required to identify, maintain proper control, and provide documentation for the disposition of materials described in this plan. Each subcontractor is required to follow this plan for the disposition of the waste generated by the subcontractor's activity.

A copy of this plan will be available in the jobsite trailer and shall be distributed to entities when they first begin work on-site. The Contractor shall review plan procedures and locations established for salvage, recycling and disposal. Each construction employee on the jobsite will be trained on the *Construction Waste Management Plan* for this project. The status of the CWM Plan shall be discussed at regular project meetings and recorded in the meeting minutes. Recycling progress must be discussed during weekly jobsite meetings with the subcontractors to assess progress and address problems. Any problems associated with the CWM Plan must be reported to the Contractor immediately.

Implementation of this plan shall comply with all applicable requirements of the State of California Department of Public Health concerning management of construction, land clearing, inert and yard trash debris.

The person accountable for managing the day to day operation of the construction waste recycling plan on the job site is John Mycek . Duties include ensuring material separation, arranging for material removal, and enforcing plan objectives.

RECYCLABLE MATERIALS

In order to achieve the goal listed above, the following materials will be recycled:

- Concrete
- Asphalt
- Gypsum Board
- Metal Scrap
- Glass
- Packaging (Paper, Cardboard, Boxes, Plastic Sheeting, Wood Crates, Plastic Pails)

To the greatest extent feasible, the following additional materials may be recycled:

- Masonry
- Lumber
- Wood Sheet Materials
- Roofing
- Insulation
- Carpet and Pad
- Plumbing Piping

HANDLING PROCEDURES

The Contractor shall provide on-site instruction of appropriate separation, handling and recycling, salvage, reuse and return methods to be used by all parties at the appropriate stages of the Work.

Recyclable waste materials shall be transported from the Work Area to the recycle containers and carefully deposited in the containers without excess noise and interference with other activities, in a manner to minimize noise and dust. Reclose container covers immediately after materials are deposited. Do not place recyclable waste materials on the ground adjacent to a container.

Deposit all indicated recyclable materials in containers in a clean (no mud, adhesives, solvents, petroleum contamination), debris-free condition. Do not deposit contaminated materials into the containers until such time as such materials have been cleaned.

If the contamination chemically combines with the material so that it cannot be cleaned, do not deposit into the recycle containers. In such case, request resolution by the Contractor's designated recycling coordinator as to disposal of the contaminated material.

Directions from the Contractor's designated recycling coordinator do not relieve the Contractor from compliance with all legal and regulatory requirements for disposal, not shall such directions cause a request for modification of the Contract.

Concrete & Masonry

Remove steel reinforcing materials and sort as specified below for metals unless Contractor has a source which will take these materials with their reinforcing and the Contractor desires to use this source.

Demolish into smaller pieces to allow for better consolidation/handling within containers. Where Contractor has a source for sale of recycled concrete materials, these material may be ground up at the project site and made suitable for aggregate sale.

Asphalt

Rotomill existing asphalt pavement to be removed to the greatest extent possible and arrange for delivery to or pick-up from an aggregate supplier or government agency for use as base course or finish coarse aggregate.

Break up balance of asphalt pavement and arrange for off-site recycling of such products. Where Contractor has a source for sale of recycled asphalt materials, these material may be ground up at the project site and made suitable for aggregate sale.

Gypsum Board

Stack large clean pieces on wood pallets and store in a dry location.

Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

Metals

Cut all items to lengths and sizes to fit within the container provided, when necessary.

Where there is sufficient quantity of a specific recyclable waste item (for example; salvaged aluminum fenestration framing), make special arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up.

Glass

Remove waste glass products (sheet, bottles, etc.) daily from the work area and deposit in designated containers.

Where glass containers are marked for separation by color or type, segregate glass accordingly.

Glass containing embedded wire (typical in some fire rated doors having glazed lights) is usually not reprocessed; verify with the Contractor's designated recycling coordinator that wire glass is not recyclable.

Packaging Materials

Cardboard and Paperboard Cartons and Boxes: Knock-down, fold flat and deposit in the appropriate recycle container.

Paper packing materials (separators, stiffeners, etc.) shall be placed in the same container.

Newsprint, used as packing (shredded or whole), shall be deposited in the recyclable container for newsprint.

Plastic (polystyrene peanuts and other shapes) shall be deposited in the recyclable container for plastics.

Metal and plastic banding materials shall be deposited in the appropriate container.

Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

Crates: Break down crates into component wood pieces and comply with requirements for wood recycling.

Plastics

Collect recyclable plastics (polystyrene and others specifically marked for recycling) daily from work areas and deposit in designated containers.

Acoustical Ceiling Panels and Tile

Stack large clean pieces on wood pallets and store in a dry location.

Separate suspension system, trim and other metals from panels and tile and sort with other metals.

Piping

Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers and other components by type and size.

Other Items

Where recyclability classification of any given waste material is unclear, verify with the Contractor's designated recycling coordinator.

CONTAINMENT METHOD AND SITE LOCATION

The Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse and return. Recycling and waste bin areas are to be kept neat and clean, and clearly marked in order to avoid contamination of materials.

Recyclables may be sorted by creating dedicated fenced in zones, or material specific roll-off containers. Recycled material containers will be hauled off on an as needed basis, as determined by the Contractor. Each container must be clearly labeled in both English and Spanish. Material must be stored and handled so it is acceptable to the recycler and meets all applicable codes and regulations. Care should be taken to protect the environment, both on and off site during construction operations. Hazardous wastes shall be separated, stored, and disposed of according to local regulations.

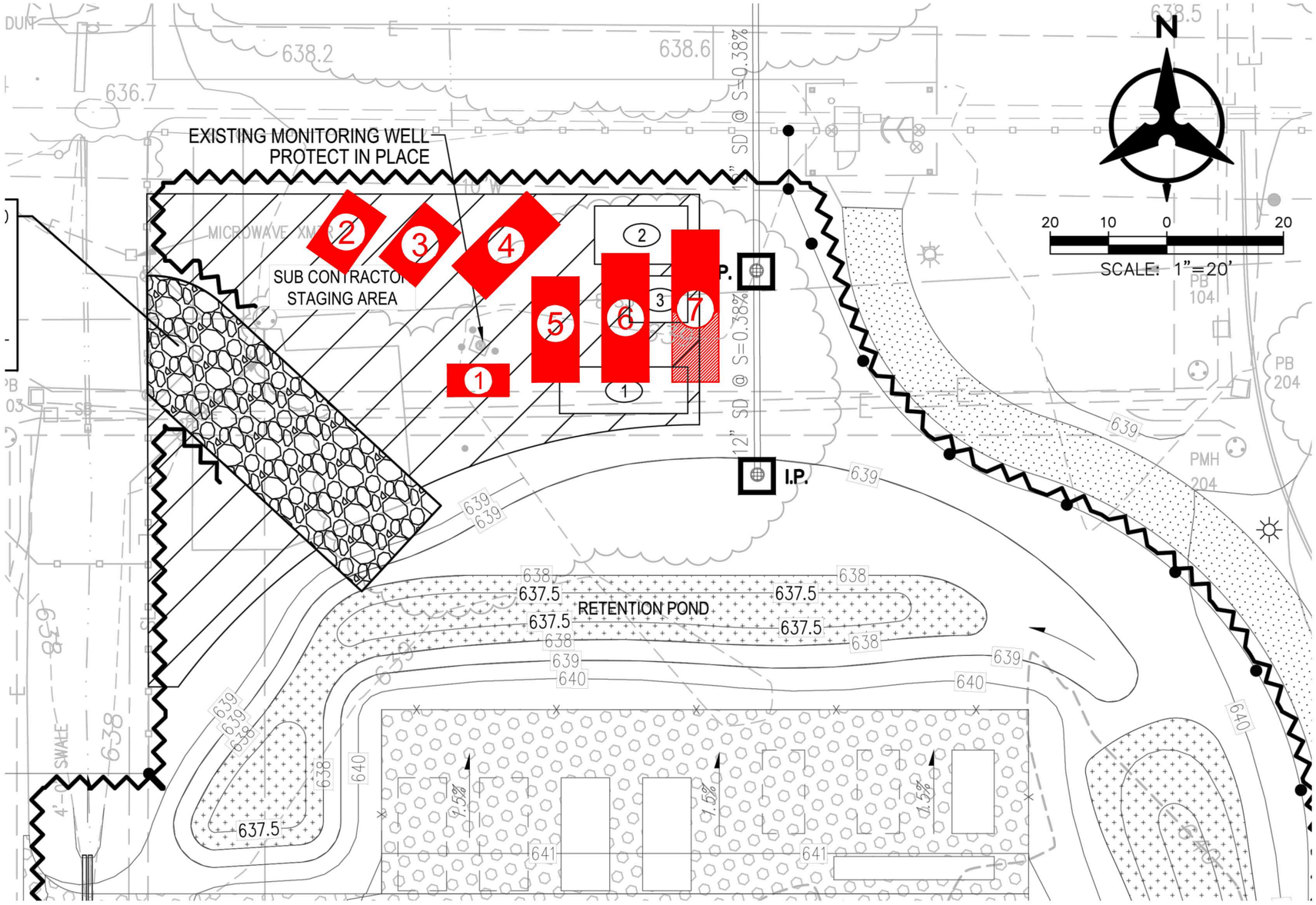
The following is a diagram of the site indicating the recycling/waste container location for this project:

RECYCLING FACILITIES

Based on the materials identified for recycling on this project, list the refuse hauler for each material. Provide the name, location, phone number and permit/license number for each recycling facility used for the project.

The following is a list of recycling venues for this project:

Vision Recycling Livermore, 30 Greenville Rd, Livermore, California. 94550
Vulcan Materials Company, 50 El Charro Rd. Pleasanton, CA. 94588
Premier Recycling, 348 Phelan Ave, San Jose, CA 95112



KEYED NOTES:

1. HAZARDOUS MATERIALS STORAGE
   ESTIMATED DIMENSIONS 5'-6" x 10'-6"
2. DRYWALL/PLASTER DEBRIS CONTAINER
   10 YD., ESTIMATED DIMENSIONS 12'-0" x 8'-0"
3. PAPER/CARDBOARD DEBRIS CONTAINER
   10 YD., ESTIMATED DIMENSIONS 12'-0" x 8'-0"
4. WOOD DEBRIS CONTAINER
   20 YD., ESTIMATED DIMENSIONS 18'-0" x 8'-0"
5. METALS DEBRIS CONTAINER
   20 YD., ESTIMATED DIMENSIONS 18'-0" x 8'-0"
6. REFUSE/TRASH CONTAINER
   </= 40 YD., ESTIMATED DIMENSIONS 22'-0" x 8'-0"
7. CONCRETE WASHOUT STATION
   5.5 YD., ESTIMATED DIMENSIONS 14'-0" x 8'-0"
   (26'-0" X 8'-0" w/ RAMPS EXTENDED)

1 / TP-1.0

PROPOSED PLAN - CONSTRUCTION WASTE MANAGEMENT PLAN

SCALE: AS NOTED

PLAN NORTH

Issues & Revisions:

No.:	Date:	Issues & Revisions:
1.0	09/27/2019	FOR CLIENT REVIEW

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Project Title:
Sandia National Labs
SNL-CA C902 Data Center Replacement Facility

Drawing Title:
Sandia National Labs
Proposed Traffic Plan

CONSTRUCTION WASTE MANAGEMENT PLAN

Design By:	Drawn By:
JDM	JDM
Check By:	**Scale:**
JV	AS NOTED

File Name:
Project No.: PTS-0419-007317
Drawing No.:

TP-1.0

PAGE NUMBER: 1 OF 1

PROJECT CLOSEOUT

All haulers must provide both weight (tons) and volume (cubic yards) for all shipments of refuse and recyclable/reusable materials. A record of all disposition activity for recyclables and refuse, including permits, landfill receipts, weights, weight tickets, and any other receipts, will be maintained by the Contractor. A Construction Waste Log will be used to track and summarize the quantities of waste generated by the Project and shall be maintained by the Contractor. A copy of the waste/recyclable tickets and report of recycling status shall be delivered to the LEED AP concurrent with each Pay Application.

Upon completion of the project, the following shall be submitted to the LEED AP:

1. A copy of the Project Construction Waste Management Plan
2. Summary of solid waste and diversion
3. Name, location, phone number and permit/license number for each recycling facility
4. A narrative describing the project's construction waste management approach

Indoor Air Quality Management Plan

SNL CA New Data Center Building 902

7011 East Avenue Livermore, CA 94550

For compliance with LEED EQ Construction Indoor Air Quality Management Plan and Indoor Air Quality Assessment

Based on The Sheet Metal and Air Conditioning Contractors' National Associate, Inc. (SMACNA) published IAQ Guidelines for Occupied Buildings Under Construction

OBJECTIVES

The Contractor has established this plan to clearly define the minimum practices which are to be employed on this jobsite to assure a healthy work environment during construction and a healthy work environment for eventual building occupants. This plan defines the strategies and project specific requirements to ensure these goals are achieved. The construction employees on the jobsite and the eventual occupants of the building will expect a pollutant-free workspace. The existence of construction dirt, dust, toxins and objectionable odors in the occupant's workspace is unacceptable.

This plan is based on the recommended Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3. LEED has adopted these guidelines as the basis for earning EQ Credits Construction Indoor Air Quality Management Plan and Indoor Air Quality Assessment. Please refer to the SMACNA Guidelines for further definitions, explanations, and methodologies.

IMPLEMENTATION

Each construction employee on the jobsite will be trained on the *Construction Indoor Air Quality Management Plan* for this project. The status of the IAQ Plan shall be discussed at regular project meetings and recorded in the meeting minutes. IAQ management must be discussed during weekly jobsite meetings with the subcontractors to assess progress and address problems. Any problems associated with the IAQ Plan must be reported to the Contractor immediately. A copy of this plan will be available in the jobsite trailer.

The person accountable for managing the day to day operation of the construction IAQ plan on the job site is John Mycek . Any construction employee or visitor to this jobsite may notify the Contractor when an observation of a violation of this plan has occurred. The Contractor will be responsible for immediate remediation of the violation.

HVAC PROTECTION-DURING CONSTRUCTION

Ductwork, prior to arriving on site, will have all ends of each section or fitting covered with plastic coverings. Ductwork and equipment on site, prior to installation, is to be physically protected and absorptive insulating materials is to be weather protected from moisture damage. Ductwork sections, fittings, fan terminal units, VAV boxes, air valves, etc. on site will be staged in a clear area, free from other construction activities, on wood blocking supports, a minimum of 4 inches off the work floor surface and protected with plastic, shrink wrap or tarps until installed.

Construction employees are to keep all supply, return and exhaust ductwork free of dust, dirt, mold and air-borne contaminants. For all projects, all open ends of installed supply, return, exhaust ductwork or return air shaft openings are to be sealed by the mechanical contractor with plastic materials to prevent contamination, until startup or testing/operation of system.

Rooftop openings to rooftop units and exhaust fans are to remain covered with plywood and plastic at all times until installation of equipment. Openings for all HVAC air moving equipment located within the building will be wrapped and protected with plastic prior to startup. Mechanical contractor shall be responsible for covering protection, securing and maintaining and removal and disposal.

The supply side of the HVAC system is to be kept clean. When the HVAC system is off, all ducts and diffusers are to be covered, inspected and cleaned as necessary. Ductwork and/or insulation, which contain moisture or is wet, are not to be installed. Installed ductwork and/or insulation, which is wet, is to be removed and replaced with new.

All piping, ductwork and conduit system openings are to be closed at the end of each work day when HVAC equipment is shut off. All VAV and FTU boxes while in storage are to be wrapped in plastic and covered completely. All fresh air intake louvers, openings, ductwork, etc. for indoor air handling units, perimeter louvers, exhaust openings, etc. are to be covered with plywood and plastic until ready to be operational. All condensate drain flows from mechanical equipment are to be constantly monitored for proper flow and blockage prevention.

When the air distribution systems will be operating during construction, temporary filtration media will be included on all return air openings and will be checked/replaced during construction by the mechanical contractor. Steps are to be made to upgrade or change filters frequently to maintain air quality. Daily monitoring of filters during heavy construction activity shall be performed by mechanical contractor. All temporary filtration media must have a rating of MERV 8 or better and 100% outdoor makeup air will be utilized in lieu of return air from construction spaces. If an unducted plenum over a construction zone must be used, the plenum must be isolated. Leaks in the plenum, return ducts and air handlers must be repaired promptly. All return air systems are to be shut down during the heaviest periods of construction to avoid dust and odors from entering the system and being released throughout the building.

For projects with special minimum or maximum indoor humidity level requirements for proper preparation or installation environment for millwork, casework, wood finishes and furnishings, etc. project construction team will collectively plan means and methods to achieve minimum or maximum humidity levels.

All filtration media must be replaced with new MERV 13 filtration at the end of construction, prior to occupancy.

SOURCE CONTROL-DURING CONSTRUCTION

A concurrent approach for maintaining construction indoor air quality is source/pollution control.

The use of equipment during construction will affect the IAQ such as converting from gas to electric powered equipment will improve the air quality. A good faith effort will be made to utilize electric equipment in lieu of fuel powered equipment to limit combustion discharge into the construction site.

The exhausting of all contaminants out of the building and away from intakes will improve the IAQ levels. Objectionable odors created as a part of construction process such as installation of epoxy flooring, etc. will be properly identified during construction and signage will be posted to advise workers of potential hazards or personal protective equipment requirements. An alternative method to consider is local recirculation of air by filtering out all odors and dust; all filters are to be properly selected for the materials they will be controlling. Determination of odor control and ventilation means will be made by and at the expense of the installing subcontractor.

Construction areas that create a large amount of contaminants as defined the (SMACNA) IAQ Guideline for Occupied Buildings under Construction and OSHA Guidelines, whether air borne dust, drywall dust are to be properly ventilated away from other construction activities to reduce the transfer of the contaminants from one work area to another work area. Temporary exhaust fans directed to the building exterior are to be provided by at the expense of the installing subcontractor.

All finish materials (i.e. carpet, ceramic tile, paints, stains, etc.) are to be covered or contained prior to installation and after installation as much as possible, along with all waste material by the installing subcontractor.

Construction activities will be inspected for visible moisture when installing drywall by the installing subcontractor. Upon identification of moisture in drywall by the installing subcontractor and with the assistance of the Contractor, the source of the moisture is to be verified and eliminated and specific measures to remediate will be followed. No materials will be covered up which are wet or can absorb moisture. Wall vapor barriers will be checked constantly by the installing subcontractor for proper installation.

PATHWAY INTERRUPTION-DURING CONSTRUCTION

All project equipment and material staging areas will be located away from critical air flow pathways. Mechanical rooms and air handling equipment areas will not be used as storage space for construction materials and/or waste.

HOUSEKEEPING-DURING CONSTRUCTION

Construction waste, debris and rubbish are to be cleaned up during all phases of construction.

All lunch papers, cups and other litter will be placed into trash receptacles. Food and drinks, other than drinking water, will not be allowed in the building interior.

Cigarette smoking, cigar smoking or chewing tobacco will not be allowed in the building interior.

Before sealing up a vertical shaft or chase, the bottom area and all surfaces are to be cleaned of trash, dust, dirt and debris by shaft construction and installing subcontractor.

Loose insulation media material installation is to be controlled and monitored by the installing subcontractor to prevent fiber discharge or particle release.

Each construction entry location will have pedi-mats or clean gravel to limit foot traffic dirt from migrating into the building.

SCHEDULING

Scheduling of activities will help control indoor air quality. The installation schedules of all sealants, caulks, paints, etc. will be sequenced such that proper venting of objectionable odors will be accomplished to keep levels below acceptable levels.

DEMONSTRATION OF COMPLIANCE

It is important to demonstrate how compliance was achieved to attain the LEED credits associated with the IAQ plan. Photographing proper materials storage, sealed ductwork, and correct filter usage, for example, is a necessary part of achieving compliance.

Conduct regular IAQ Field Reports on site to assess achievement or non-compliance and to provide ongoing documentation for final submittal. Take photos of IAQ measures and label to identify the highlighted approach.

INDOOR AIR QUALITY - POST CONSTRUCTION, PRIOR TO OCCUPANCY

Option 1a – Flush-out

After construction ends and prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14,000 cu. ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60%. Replace all air filters immediately prior to flush-out. Replacement filters shall have a MERV 13 according to ASHRAE 52.2.

PROJECT CLOSEOUT

EQ Construction Indoor Air Quality Management Plan

For compliance with EQ Credit Construction Indoor Air Quality Management Plan, submit the following items to the LEED AP:

1. A copy of the Project's Indoor Air Quality Management Plan.
2. Photos highlighting the implemented construction IAQ practices.
3. If the permanently installed air handling equipment was used during construction, document that filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 was used at each return air grille, as determined by ASHRAE 52.2-1999.
4. List all filtration media installed during construction including:
    - Manufacturer
    - Model #
    - MERV (minimum efficiency reporting value) rating
    - Location of installed filter
    - Confirmation that all filtration media was replaced immediately prior to occupancy.
5. A narrative describing any special circumstances or non-standard approaches.

EQ Indoor Air Quality Assessment

For compliance with EQ Credit Indoor Air Quality Assessment, submit the following items to the LEED AP:

1. Confirmation regarding the approach taken by the project.
2. A copy of the Project's Indoor Air Quality Management Plan.
3. A narrative describing the project's specific flush-out procedures and/or IAQ testing process and results.

JOB NAME SNL 902 CA Data Center

IAQ Preliminary Flushout Calculations

September 30, 2019

Option 1a: Flushout prior to occupancy

RATE (CFM): VAV-specific ventilation rates are based on Design Rates from mechanical schedule.

Notes:

1. Additional supplemental fans may be provided in select locations to reduce flushout time, provided all conditions of the flushout are met.

2. Flushout may only begin after all construction work, including punch list items, is complete.

3. Commissioning activities may occur during the flushout if they do not introduce any additional contaminants into the building.

4. The flushout procedure may use the building's HVAC system or temporary supply and exhaust systems. If the central HVAC system is used, remove any temporary filters and duct coverings. Replace the filtration media with new media. If attempting LEED IEQ credit 3.1, filters must be MERV 8 or better. If attempting LEED IEQ credit 5, filters must be MERV 13 or better. Provide filter cutsheet to verify compliance.

5. Provide dates and times of flushout to verify that the required hours have been met.

6. Affirm that the internal building temperature was maintained at 60 degrees F and relative humidity no higher than 60% for the duration of the flushout.

7. If any of the above conditions cannot be met, please notify the architect prior to commencement of the flushout.

8. Contractor shall complete the verification items at the end of this document upon completion of flushout activities.

ZONE	AREA	CFM REQUIRED	RATE (CFM)	MINUTES	HOURS	DAYS REQUIRED FOR FLUSHOUT
AHU1-3	5,020.00	70,280,000.00	42430	1656.38	27.61	1.15
FCU-1	521.00	7,294,000.00	600	12156.67	202.61	8.44
FCU-2	562.00	7,868,000.00	494	15927.13	265.45	11.06
FCU-3	752.00	10,528,000.00	600	17546.67	292.44	12.19
FCU-4+5	745.00	10,430,000.00	5600	1862.50	31.04	1.29
SUP1	562.00	7,868,000.00	13000	605.23	10.09	0.42
SUP2	809.00	11,326,000.00	13000	871.23	14.52	0.61

TO BE SUBMITTED BY CONTRACTOR UPON COMPLETION OF FLUSHOUT

All punchlist items were complete prior to commencement of the flushout: Yes / No

Verification of Duration of Flushout

Commencement - Date: _____ Time: _____

Completion - Date: _____ Time: _____

Total Duration: _____ hours

Verification of Filtration Requirements

HVAC System was utilized: Yes / No

If, yes - list filter rating: MERV _____

Verification of Thermal Conditions

Internal building temperature for duration of flushout: _____

Relative humidity inside building for duration of flushout: _____