G. INDOOR ENVIRONMENTAL QUALITY

1.0 Carbon Dioxide Monitoring

Indoor Environmental Quality Credit 1.0: 1 (one) point

Objective: Provide capacity for indoor air quality (IAQ) monitoring to sustain long-term occupant health and comfort.

Narrative: CO_2 sensors have been provided at four locations within each building as shown on the attached floor plans (see Attachment 'N'). The sensors monitor the indoor CO_2 levels and report back to the Building Management Systems (BMS). An additional sensor has been installed on the roof of Building A to monitor ambient levels at the outside air inlet. This sensor also provides monitoring data to the BMS. The system has been programmed to compare the measured indoor CO_2 levels with the outdoor levels and to adjust the outside air intake dampers and cubic feet per minute (cfm) to maintain indoor levels within 530 ppm of ambient levels.

Projects and Activities: A permanent carbon dioxide (CO2) monitoring system was installed to provide feedback on space ventilation performance in a form that affords operational adjustments, and specified initial operational set point parameters. This maintains the indoor carbon dioxide at levels no higher than outdoor levels by more than 530 parts per million at any time.

The table below provides information on products considered and a list of companies that supply these products. **Please note**: this list should not be considered as a recommendation. Individuals/organizations using this information are responsible for researching the products and companies prior to engaging in any business agreement.

Product Used	Company	Address	Phone	Fax	Web Site
Carbon Dioxide Sensor	Honeywell	101 Columbia Road Morristown, NJ 07962	973-455-2000	973-455-4807	www.honeywell.com

2.0 Construction Indoor Air Quality Management Plan, During Construction

Indoor Environmental Quality Credit 3.1: 1 (one) point

Objective: To prevent indoor air quality problems resulting from the construction/renovation process, to sustain long-term tradesman and occupant health and comfort.

Narrative: The project implemented a construction IAQ management plan in accordance with the requirements of the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) IAQ Guidelines. All ducts, equipment and absorptive materials were protected during the construction process to prevent contamination. Air handlers were not operated during construction. The contractor installed a Minimum Efficiency Reporting Value (MERV) of 15 filters in the air handlers prior to start-up for testing and balancing (following the completion of all interior construction).

The project also contracted with Healthy Building International to provide an IAQ site inspection during construction to provide feedback on IAQ management practices being employed on site. The inspection found that the site was in compliance with the IAQ management plan for the project. A few minor deficiencies were noted in this report regarding building openings and water on the slab. All of these items were remedied by TG Construction within three days of the initial report. All testing and balancing was conducted following the completion of interior construction. The contractor installed MERV 14 filters in all units prior to operation.

During construction, the rules and regulations stated in the Indoor Air Quality Management Plan were strictly followed and these rules and regulations are listed below:

Pollution Source Control

1. Protection against moisture exposure: building materials shall be kept dry to avoid the introduction of moisture into the building interior.

2. Avoid the use of moisture-damaged materials: any porous materials that have been exposed to moisture should be dried before being installed. Any porous material that has remained wet longer than 48 hours, or shows signs of visible mold shall be discarded and replaced.

3. Ensure that the construction process will not result in moisture intrusion: if it begins to rain or groundwater is coming into the building, please notify TG superintendent immediately.

4. Use low-emitting products: No product substitution is allowed unless authorized and stamped by TG Construction. All products used shall comply with Volatile Organic Compound (VOC) requirements of the South Coast Air Quality Management District. For questions see TG LEED™ Engineer. All Material Safety Data Sheets (MSDS) shall be approved by TG Construction and stamped before materials enter the building (paints, glues, caulking, etc.).

5. Avoid tracking pollutants into work areas: Once stud framing and drywall begin, as well as the installation of the mechanical equipment, access to the building interior shall be limited to reduce the likeliness of contaminants entering the building. **NO SMOKING IN BUILDINGS.**

6. Allow high-VOC materials to off-gas prior to installation: New plastic, fabric, laminates, or assembled materials that are packaged or rolled-up shall be opened up and ventilated for a minimum of four days outside of buildings. Subcontractors shall off-gas materials in their shop and supply a Letter of Certification to TG Construction prior to its arrival on site. There is no covered space on site to off-gas.

HVAC Protection

1. Store HVAC equipment in a clean, dry location: Until the HVAC system is fully installed, all parts of the system shall be covered or stored in a location where contaminants are not introduced.

2. Seal all HVAC inlets and outlets: Use of the HVAC system during construction is strictly prohibited until drywall construction is complete. All air inlets and outlets shall be scaled during construction.

3. Use temporary filters: Temporary filters shall be used while work is being done if air-handling equipment is operated. All temporary filtration media shall comply with MERV 8. During construction, filters shall be inspected weekly and replaced as needed. After construction is complete, a filter with MERV 13 shall be installed.

4. Avoid contaminated air entry: When dust is produced from heavy outside work, outside air supplies shall be closed.

Everyday House Keeping

1. Minimize dust: All methods of minimizing dust from cut-off saws, drywall sanders, etc., shall be used. This means using dust collection system on these tools and emptying them into receptacles located outside of the building. Use damp rags, mops or vacuum cleaners to clean up dust.

2. Minimize dirt: Sweeping compounds shall be used to keep floors clean of dirt and dust.

3. Keep work area dry: If leaks occur, promptly mop areas dry.

4. Seal containers containing VOCs: Containers of fuel, paints, finishes and solvents shall be kept tightly sealed when not in use. If possible, these items shall remain outside of the buildings.

Sequencing Work

1. Porous materials shall be installed after building is closed in and dried-in.

2. Carpeting and furnishings shall not be installed until after interior finishes have fully cured.

Projects and Activities: An Indoor Air Quality (IAQ) Management Plan was developed and implemented during the construction and preoccupancy phases of the building as follows: during construction minimum requirements of the SMACNA IAQ Guideline for Occupied Buildings under Construction were met or exceeded, and on-site stored or installed absorptive materials were protected from moisture damage, and all filtration media were replaced immediately prior to occupancy. Filtration media had a MERV of 13 as determined by ASHRAE 52.2-1999.

3.0 Construction Indoor Air Quality Management Plan, After Construction

Indoor Environmental Quality Credit 3.2: 1 (one) point

Objective: To prevent indoor air quality problems resulting from the construction/renovation process, to sustain long-term tradesman and occupant health and comfort.

Narrative: The project followed the alternative indoor IAQ testing approved in a Credit Interpretation Ruling (CIR) dated October 8, 2002. Air samples were taken in both buildings following the completion of construction. All air samples were tested in accordance with the approved protocol and have met the criteria. A copy of the final test report from Healthy Building International (June, 24, 2003) has been included in this submittal as Attachment 'O.'

Projects and Activities: An Indoor Air Quality (IAQ) Management Plan was developed and implemented during the construction and preoccupancy phases of the building. One of the following procedures was performed: Conduction of a minimum of two-week building flush out with new filtration media at 100% outside air after construction completion and prior to occupancy, or a baseline indoor air quality testing consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445.

4.0 Low-Emitting Materials, Adhesives and Sealants

Indoor Environmental Quality Credit 4.1: 1 (one) point

Objective: Reduce the quantity of indoor air contaminants that are odorous or potentially irritating in order to provide installer and occupant health and comfort.

Narrative: All adhesive used inside the building are in compliance with the VOC limits of SCAQMD Rule 1168. All sealant used inside the building are in compliance with the VOC limits of BAAQMD Reg, Rule 51. The attached adhesive and sealant summary spreadsheet lists all indoor adhesive and sealant products used on the project (see Attachment 'P').

Projects and Activities: VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems were met or exceeded as follows: Adhesives met or exceeded the VOC limits of South Coast Air Quality Management District Rule #1168 by, and all sealants used as fillers met or exceeded Bay Area Air Resources Board Reg. 8, Rule 51.

The table below provides information on products considered and a list of companies that supply these products. **Please note**: this list should not be considered as a recommendation. Individuals/organizations using this information are responsible for researching the products and companies prior to engaging in any business agreement.

Product Used	Company	Address	Phone	Fax	Web Site
Liquid Nails Adhesive	MACCO Adhesive Division	925 Euclid Ave. Cleveland, OH 44115	800-634-0015	216-344-7319	www.liquidnails.com
Grid Set Green Glue 2000	Re: Source Technologies	327 Industrial Dr. Rockmart, GA 30153	706-625-0025	706-625-0026	none
CHAPCO Safe Set Adhesives	Chicago Adhesive Products Corporation	1165 Arbor Dr. Romeoville IL 60446	630-621-9100	630-679-9155	www.chapco.com
Sheetrock Brand Acoustical sealant	United States Gypsum Company	125 S. Franklin St. Chicago, IL 60606	312-606-4000	888-874-2348	www.usg.com
AC -20 + Silicone	Pecora Corporation	165 Wambold Rd. Harleysville, PA 19438	215-721-6051	215-721-0286	www.pecora.com
Pro-Series HM-270 Construction Silicone Sealant	White Cap Industries	1625 W. Washington Blvd. Montebello, CA 90640	800 whitecap	323-724-6226	www.osiproseries.com

5.0 Low-Emitting Materials, Paints

Indoor Environmental Quality Credit 4.2: 1 one (point)

Objective: Reduce the quantity of indoor air contaminants that are odorous or potentially irritating in order to provide installer and occupant health and comfort.

Narrative: All interior paint products used on the project are in compliance with the VOC limits set forth in the Green Seal GS 11.

Projects and Activities: VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems were met or exceeded as follows: paints and coatings met or exceeded the VOC and chemical component limits of Green Seal requirements.

The table below provides information on products considered and a list of companies that supply these products. **Please note**: this list should not be considered as a recommendation. Individuals/organizations using this information are responsible for researching the products and companies prior to engaging in any business agreement.

Product Used	Company	Address	Phone	Fax	Web site
Eco Spec Interior Latex Flat, Eco Spec Interior Latex Eggshell Enamel, Eco Spec Interior Latex Semi-Gloss Enamel and Eco Spec Interior Latex Primer Sealant Liquid Nails Adhesive	Benjamin Moore Paints	51 Chestnut Ridge Rd. Montvale, NJ 07645	888-236-6667	201-573-1984	www.benjaminmoore.com

6.0 Low-Emitting Materials, Carpet

Indoor Environmental Quality Credit 4.3: 1 (one) point

Objective: Reduce the quantity of indoor air contaminants that are odorous or potentially irritating in order to provide installer and occupant health and comfort.

Requirements: Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows: carpet systems must meet or exceed the Carpet and Ring Institute (CRI) Green Label Indoor Air Quality Test Program.

Narrative: The project has installed Collins and Aikman Powerbond (C&A) custom pattern modular carpeting throughout. The C&A product is certified under the CRI Green Label Indoor Air Quality Testing Program.

The table below provides information on products considered and a list of companies that supply these products. **Please note**: this list should not be considered as a recommendation. Individuals/organizations using this information are responsible for researching the products and companies prior to engaging in any business agreement.

Product Used	Company	Address	Phone	Fax	Web Site
Nylon Pre-Dyed/SBR Backing, Nylon Post-Dyed/SBR Backing Nylon Pre-Dyed with Urethane Nylon Post-Dyed with Urethane	Atlas Carpet Mills, Inc.	2200 Saybrook Ave. Los Angeles, CA 90040	800-372-6274 323-724-9000	323-724 4526 800-272-8527	www.atlascarpetmills.com
Nylon Pre-Dyed/SBR Backing Olefin Pre-Dyed/SBR Backing	Barrett Carpet Mills	2216 Abutment Rd. Dalton, GA 30722	800-241-4064	706-277-3250	www.barrett-cpt.com
Nylon Pre-Dyed/SBR Backing Nylon Post-Dyed/SBR Backing Polyester with SBR Backing Olefin Pre-Dyed/SBR Backing	Beaulieu Group, LLC	1502 Coronet Dr. PO Box 1248 Dalton, GA 30722	800-227-7211	706-226-7211	www.beaulieu-usa.com
Nylon Pre-Dyed/SBR Backing, Nylon Post-Dyed/SBR backing Wool Pre-Dyed with PVC Nylon Pre-Dyed with PVC Hardback	Blue Ridge Industries, Inc.	100 Progress Rd. Ellijay, GA 30540	800-241-5945	706-276-2005	www.blueridgecarpet.com
Pre-Dyed Wool /SBR Backing	Brintons U.S. Axminster, Inc.	1856 Artistry Lane Greenville, MS 38702	662-332-1581	662-332-1594	www.brintonsusax.com
Nylon Pre-Dyed/SBR Backing Nylon Post-Dyed/SBR Backing Nylon Pre-Dyed/PVC Hardback Nylon Post-Dyed with EVA Nylon Pre-Dyed with EVA	Burlington/Lees Carpets	3330 W. Friendly Ave. Greensboro, NC 27410	800-523-5647	336-379-3397	www.leescarpets.com

Product Used	Company	Address	Phone	Fax	Web Site
Nylon Pre-Dyed/PVC Backing, Cushion/RS Tile Nylon Pre-Dyed/PVC Backing, ER3 Tile Nylon Pre-Dyed/PVC Backing Cushion/RS	C&A Floor Coverings, Inc.	311 Smith Industrial Blvd, Dalton, GA 30722	800-248-2878 706-259-9711	706-259-2610	www.powerbond.com
Nylon Post-Dyed/SBR Backing	Camelot Carpet Mills	17111 Red Hill Ave. Irvine, CA 92614	800-481-5900	949-553-8238	www.camelotcarpetmills.com
Post-Dyed Nylon with SBR Backing	Catalina Carpet Mills, Inc	14410 Best Ave. Santa Fe Springs, CA 90670	562-926-5811	562-404-3925	www.catalinacarpetmills.com
Post-Dyed Nylon/SBR Backing	Constantine/ Product Concepts	525 Callahan Road Dalton, GA 30722	800-308-4344	706-278-6892	www.constantine-carpet.com
Polypropylene/Pre-Dyed with SBR	Creative Carpets, Inc	110 Bee Mountain Rd. Oxford, CT 06478	203-888-5566	203-881-0655	none
Nylon Pre-Dyed/SBR Unitary Nylon Post-Dyed/SBR Backing Nylon Pre-Dyed/SBR Backing	Crossley Carpet Mills Ltd	435 Willow St. Truro, Nova Scotia B2N 5G2	800-667-8181	902-893-4779	www.crossley.ca

Headquarters Boardroom

7.0 Low-Emitting Materials, Composite Wood

Indoor Environmental Quality Credit 4.4: 1 (one) point

Objective: Reduce the quantity of indoor air contaminants that are odorous or potentially irritating in order to provide installer and occupant health and comfort.

Narrative: All composite wood products used on the project contained no urea-formaldehyde resins. The following is a list of all composite wood materials used on this project: Mediate II MDF-no formaldehyde; Ainsworth OSB-No Urea-formaldehyde; Potlatch Oxboard, OSB-No urea Formaldehyde.

Projects and Activities: VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems were met or exceeded as follows: composite wood and agrifiber products contained no added urea-formaldehyde resins.

The table below provides information on products considered and a list of companies that supply these products. **Please note**: this list should not be considered as a recommendation. Individuals/organizations using this information are responsible for researching the products and companies prior to engaging in any business agreement.

Product Used	Company	Address	Phone	Fax	Web Site
Medite II MDF-No Formaldehyde	SierraPine, Composite Solutions	West Coast Sales Roseville, CA	800-676-3339	858-455-9060	www.sierrapine.com
Ainsworth OSB - No Urea Formaldehyde	Allied Blower & Sheet Metal Ltd.	12224 - 103A Avenue, Surrey, B.C., V3V 3G9 Canada	604-930-7000	604-581-4159	www.alliedblower.com
Potlatch Oxboard OSB No Urea Formaldehyde	Potlatch Corporation	601 West Riverside Ave. Suite 1100 Spokane, WA 99201	509- 835-1516	509-835-1559	www.potlatchcorp.com

Lobby Reception Area using Composite Wood Paneling

8.0 Indoor Chemical and Pollutant Source Control

Indoor Environmental Quality Credit 5.0: 1 (one) point

Objective: Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Narrative: The project has installed recessed, permanent entryway systems at all high volume building entries. Additionally, all chemical usage areas (copy rooms and janitor closets) have been sealed with gypsum board ceilings and provided with exhaust systems to ensure that fumes and contaminants are removed from the buildings. All sinks in the janitors' closets have been connected as the final point prior to entering the sewer system. IEUA contracted with La Canada Design Group for design consulting services.

Projects and Activities: The facility was designed to minimize cross-contamination of regularly occupied occupancy areas by chemical pollutants. Permanent entryway systems were employed (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, and to provide areas with structural deck-to-deck partitions with separate outside exhausting. There were no air re-circulation and negative pressure where chemical use occurred (including housekeeping areas and copying/print rooms), and drains plumbed for appropriate disposal of liquid waste in spaces were provided in areas where water and chemical concentrate mixing occurred.

The table below provides information on products considered and a list of companies that supply these products. **Please note**: this list should not be considered as a recommendation. Individuals/organizations using this information are responsible for researching the products and companies prior to engaging in any business agreement.

Product Used	Company	Address	Phone	Fax	Web Site
Design Consulting	La Canada Design Group	630 N. Rosemead Blvd. Suite 400 Pasadena, CA 91107	626-351-4301	626-351-4302	www.lcdg.com

9.0 Thermal Comfort, Compliance with ASHRAE 55-1992

Indoor Environmental Quality Credit 7.1: 1 (one) point

Objective: Provide a thermally comfortable environment that supports the productive and healthy performance of the buildings' occupants.

Narrative: Relative humidity in habitable space preferably should be maintained between 30% to 60% relative humidity to minimize growth of allergic or pathogenic organisms. Based on ASHRAE Standard 55-1992, the risk draft should be less than 15% at every point in the occupied zone. The risk draft is a function of air temperature, mean air speed and turbulence intensity. The ceiling diffusers in the building are provided with four-way adjustable blades to distribute air above occupant level and prevent excessive draft. System designs provide maximum air speed of 50fpm or less at room elevations less than seven feet above finished floor.

Active humidification and dehumidification equipment and automated sequence are not a part of the design since the outdoor environment under normal conditions does not require active humidity control to maintain the space within the comfort envelopes specified by ASHARAE Standard 55-1992. However, during extreme weather conditions such as the Santa Ana winds, or exceptionally cold and dry winter days, Direct Digital Control (DDC) system through use adjustment of space temperature set points and reduction of outside air levels to Title 24 minimum would afford some measure of humidity control in order to help bring levels into compliance with ASHARAE Standards 55-1992 during rare periods when the building might otherwise not be in compliance.

Project and Activities: The project was in compliance with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. To achieve a thermally comfortable environment that supports a healthy and productive environment, the building was designed to accommodate the changes in weather conditions as described below:

Summer Design

Worst summer conditions were used as a basis for sizing the HVAC system. The interior environment based on the Summer Design Condition falls within the summer comfort envelope. While no active humidity controls have been installed, lowering of the space temperature to 73 degrees Fahrenheit by user adjustment of the building DDC Control System would provide for some additional dehumidification during exceptionally humid summer periods.

Summer conditions were taken from Climatic Data for ASHRAE Zone 10.

Winter Design

Psychrometric analysis was performed and plotted for a typical January morning. Under these weather conditions, the system will operate in economizer mode. However, outside air will not be 100% since a small portion of returned air is blended with outside air to increase the supply air temperature to the design level of 55 degrees Fahrenheit. The room conditions generally fall within the winter comfort envelope. While active humidity control is not part of the design, reduction of the outside air quantity to pre-set Title 24 minimum quantities and decreasing the space temperature up to 2 degrees Fahrenheit by adjustment of the building DDC controls would help increase humidity in the building during abnormally cold and dry winter days by retaining additional moisture of the building latent loads.

Intermediate Season Design (Spring and Fall)

Psychrometric analysis was performed and plotted for a typical spring and fall day (April and November at midday). At these conditions, the system will be in the economizer mode. Since the outside air temperature is higher than the design supply air temperature of 55 degrees Fahrenheit, refrigeration assistance will be utilized to cool the outside air to the design supply air temperature. The room condition falls within the overlap area of the summer and winter envelopes.

Clammy Outside Condition

Since the outside air temperature is higher than the design supply air temperature of 55 degrees Fahrenheit, refrigeration assistance will be utilized to cool the outside air to the design supply air temperature. The room condition falls within the overlap area of the summer and winter envelopes.

While active humidity control is not part of the design, reduction of the outside air quantity to pre-set minimums and lowering the space temperature to 73 degrees Fahrenheit by user adjustment of the building DDC controls would help to decrease humidity levels in the space during excessively humid conditions during which the interior levels would otherwise exceed the comfort envelopes.

10.0 Daylight and Views, Distribution Quality

Indoor Environmental Quality Credit 8.1: 1 (one) point

Objective: To provide a connection between indoor spaces with the outdoor environment through the introduction of sunlight and views into the occupied areas of the building.

Narrative: To achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all the space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where the tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight.

Projects and Activities: The project has achieved a minimum of 2% day lighting factor in 77% of the regularly occupied spaces within the buildings. Day lighting was achieved through the installation of dual-pane, Low-E glazing (PPG Solarban® 60 visible light transmittance) at the perimeter of the building. In larger spaces, translucent, insulating skylights (Kalwall-.15 visible light transmittance), were installed to provide day lighting to the interior spaces of the buildings. Lighting systems were equipped with daylight dimming controls to maintain illumination levels at pre-determined levels throughout the space.

The table below provides information on products considered and a list of companies that supply these products. **Please note**: this list should not be considered as a recommendation. Individuals/organizations using this information are responsible for researching the products and companies prior to engaging in any business agreement.

Product Used	Company	Address	Phone	Fax	Web Site
Kalwall Translucent Panels	Carmel Architectural Sales	1173 N Armando St. Anaheim, CA 92806	714-630-7221	714-630-0668	www.carmelsales.com
Solar Control Low-E Clear Insulating Glass	PPG Architectural	One PPG Place Pittsburg, PA 15272	800-872-3157	800-628-0299	www.ppg.com

Layout to optimize energy Performance and thermal comfort