Sustainable Design Charrette

Final Report

Miami Dade Housing Agency
Scott/Carver Homes
HOPE VI Revitalization

Funded by the U.S. Department of Energy,
U.S. Environmental Protection Agency, and
Miami Dade Department of Resource Management
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US Department of Energy
US Environmental Protection Agency
US Housing and Urban Development
Florida Department of Community Affairs
Florida Power and Light
Florida Solar Energy Center
MPO –Bike/Pedestrian Fund
Oak Ridge National Laboratory
South Florida Water Management District
Southface Energy Institute
University of Florida Center for Construction & Environment
University of Florida –Florida Yards and Neighborhoods
University of Georgia

Miami-Dade County agencies:
Housing Agency
Department of Environmental Resources Management
Water and Sewer
Metro Transit System
Building Department
Parks and Recreation
Metropolitan Planning Organization
Public Works
Police Department
Planning and Zoning

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The United States Environmental Protection Agency (US EPA), Department of Energy (DOE), Miami Dade Department of Resource Management (DERM), and Miami Dade Housing Agency (MDHA) sponsored a sustainable design charrette to generate green design ideas and strategies for the redevelopment of the Scott/Carver Homes. Southface Energy Institute facilitated the charrette, held December 10-12, 2001 at the Clarion Hotel in Miami, Florida.

The Scott/Carver Homes redevelopment, financed by a US HUD HOPE VI grant, presents a unique opportunity to create a healthy, safe, sustainable community for residents. The recommendations and environmental goals listed in this report were collaboratively generated by a diverse group of participants, prioritized, and presented during the charrette. The charrette was organized into four working groups: site, water, energy–building science, and materials–deconstruction.

Using the recommendations produced during the sustainable design charrette, the newly redeveloped Scott/Carver Homes will improve resident health and safety, decrease resident utility costs, reduce environmental impact of the community, and create an effective demonstration for future HOPE VI funded public housing redevelopments.

An advisory committee will be set up to coordinate implementation of the sustainable design recommendations included in this report. Please contact US EPA Liaison Officer Ernesto Perez (305-372-6437 or perezer@miamidade.gov).

The following environmental goals and strategies were recommended for this project:

Energy/Building Science

Environmental Goal 1: Achieve a 50% reduction in energy use as compared to minimum code compliant designs within the budgeted cost of units

Achieving this goal concurrently accomplishes the following goals: ensuring affordable operation for residents, providing superior indoor air quality for residents, providing a durable and low maintenance design, pollution prevention, achieving US Department of Energy Building America goal of HERS > 90, achieving FPL Build Smart Gold designation, and achieving the Florida Green Home Standard Designation.

Committing to this level of energy efficiency will enable the project to take advantage of resources providing benefits other than those inherent to energy conservation. Potential benefits include: affordable operation, healthy indoor environments, durable low maintenance design, and pollution prevention through reduction in emissions from power generation. Resources include: performance testing, inspection, and commissioning provided by the FPL Build Smart Program for the new and rehab single-family detached projects, and qualification for energy efficient mortgage products that Fannie Mae will be developing for use within the HOPE VI project. The design team needs to look at design features list and complete preliminary design for each housing type (single family, townhouse, apartment style) to submit for interactive review, energy analysis, and recommendations.

Once preliminary designs are achieved, Energy/Building Science Team will work with the design team through the process of selecting equipment, amenities, and other features such that buildings will achieve the goals. This will be an iterative process between the Design Team and the Energy/Building Science Team. Once final designs are developed, the Energy/Building Science Team will assist with the development of energy-related construction specifications, and ensure design intent is constructed through implementation of inspection and commissioning. Various design features are provided here that the design team should consider immediately while the buildings are in the design stage:

SPECIFICATIONS:

- **Design Features**

While the structures are in the design stage, provisions should be made by the design team to incorporate the following elements that will not be able to be incorporated at later stages. Assistance with incorporating these design features will be provided by the Energy/Building Science Team. All measures have no added cost unless otherwise noted.

Solar Orientation: To the maximum extent possible, structures should be located such that the buildings are oriented on an east-west axis and the bulk of the windows should be oriented to face north and south. This will minimize solar gain on the building envelope.

Window Shading: All overhangs should be designed to extend a minimum of 2 ft. from the building exterior. Two story structures should incorporate architectural features to shade first story windows such as porches and window gables. Second story overhangs are not effective at shading first story windows. This will minimize solar gain through windows as well as increasing the durability of the structure by keeping rain water away from the building. Architectural features may add minimal cost.

Reasonable Window Area: Windows should be designed to total no more than 12% of the conditioned floor area. This will minimize solar gain through windows. Limiting window area will keep window costs reasonable.

Exterior Colors: All exterior colors including roof and walls should be white or "light" colored. Such colors will reflect more solar radiation than dark colors.

Design for Natural Ventilation: As much as possible, operable windows should be placed on at least two walls of every room. Windows on opposite walls are preferred, with adjacent walls as a second choice. "Exterior rooms" should be incorporated that provide comfortable outdoor living environments. Examples include roofed porches with at least 3 sides open and balconies/verandas in two story structures. Proper design will reduce reliance on cooling systems.

Incorporate Daylighting Strategies: Adequate window area should be provided by not deviating far below the 12% window area with respect to conditioned floor area recommendation. Colors of interior walls, floors, and ceilings should be chosen as white or "light". Hard surface flooring should be incorporated for added reflectivity. This will reduce reliance on artificial lighting.

Unconditioned Utility Room: If a hookup will be provided for a washer and dryer, an unconditioned utility room that is sealed and insulated from the rest of the house should be incorporated into the design to house the appliances. This room should be designed with an operable window and a door that leads to the outside for easy clothesline access. The water heater tank should also be located within this room. This extra room will present an added cost.

Roof Framing: Raised heel trusses for roof framing will allow for desired thickness of ceiling insulation to extend to the outer edge of the exterior walls. R-30 insulation is recommended for the ceiling. Raised heel trusses present a small-added cost over conventional trusses.

Second Story Floor Framing: Two story structures should incorporate open web floor trusses such that ducts and other mechanicals can be routed through their conditioned environment.

Roof Slope: Roof slope should be no less than 3:12 but no more than 5:12. 3 ½:12 is already recommended by the design team. Sloped roofs keep rain water away from building walls. Low sloped hip roofs are also typical of the Florida cottage style

vernacular, and are well suited for this Traditional Neighborhood Design (TND) concept master plan.

Interior Air Handler: Provisions should be made to place the air-handling unit within the conditioned space and not in an attic or unconditioned utility room. This will increase the performance of the HVAC system. A small added cost will be incurred to enclose the unit.

Interior Duct System: Provisions should be made to install all supply ductwork within the conditioned space through the creation of chases or by using dropped ceilings, which will pose a small added cost. This will minimize efficiency losses due to duct leakage and duct heat gain. (**See Appendix E**)

Right Size HVAC Equipment: Provisions should be made to ensure that the HVAC equipment is sized using Manuals J and S. Equipment sizing calculations will incorporate upgraded envelope specifications to produce accurate outcomes. Oversized systems can consume more energy than right sized systems, and do not adequately dehumidify under non-peak load conditions.

Duct System Design: Provisions should be made to ensure that the duct system is designed using Manual D. The design should also employ compact duct distribution strategy with supply registers located adjacent to interior walls with airflow directed to building perimeter. This is facilitated by an interior duct system. **(See Appendix E)**

Adequate Return Air Pathways: Building interiors should be designed to provide adequate return air pathways to limit pressure differences of greater than 2.5 Pa between rooms with doors closed. Pressure balancing will limit infiltration of outside air that can lead to moisture problems, and will contribute to greater occupant comfort.

- **Design Review and Modification**

Preliminary building designs should be sent to FSEC and FPL for review during developement to finalize strategies for achieving the 50% energy use reduction goal. Anticipated cost/ft^2 for each design should also be submitted. The Energy/Building Science Team will review the designs and make recommendations on equipment and amenity specs such that cost and performance goals can be achieved. This will be an iterative process until final designs are reached. Reviewers will provide estimates for any added cost of recommendations as well as a list of suppliers for the good or service. Design Team should investigate the use of Department of Energy's and/or the National Association of Housing & Redevelopment Official's bulk purchasing programs when buying refrigerators, other appliances, lighting, etc. If possible, cost allowances should be set aside for the following items:

Upgraded Roof Covering: The design team is already considering a metal (aluminum) roof for the project. The preferred color that will reflect the most solar radiation is white. Bare metal (silver) roof and white tile are also acceptable, but less desirable. Light

colored asphalt shingles should be avoided, and considered a last choice. Metal roofs can cost 2-3 more times a shingle roof, and tile can cost 3-4 times more than a shingle roof.

HVAC Equipment Upgrades: The minimum efficiency of the HVAC system should be SEER 13 (air conditioning). Variable speed air handlers perform better than single speed. Costs to upgrade to SEER 14 are approximately $300/system.

Water Heating Equipment Upgrades: Water heaters with an energy factor of at least 0.91 should be chosen over the code minimum of 0.88 since it generally is a $0-10 option. Desuperheaters may be considered, and can cost $400-500. Since they utilize a portion of the heat removed from the building by the AC system, their benefits vary greatly depending on the resident's use of the AC. Other options that are less dependent on occupant behavior include heat pump water heaters (approximately $800) and solar water heaters (approximately $1500). (**See Appendix F**)

Window upgrades: Window upgrades include adding tint, or employing double pane glass with a spectrally selective (low-e) coating. Adding tint (shading coefficient of 0.6-0.7) to single pane, metal frame windows can cost $1-2/square foot of window. Double pane units with spectrally selective coatings can add $3-4/square foot of window.

Mechanical Ventilation: Due to the relatively tight building envelope produced by concrete block construction, mechanical ventilation may be required to maintain recommended 0.35 air changes per hour. Adding mechanical ventilation will improve the indoor air quality within the building. This can be accomplished by adding a 6" diameter duct that runs from the air handler/return to the outside with appropriate termination cover. While the air handler fan is operating, fresh air will be drawn into the system and dehumidified. An air recycler can also be added that will provide fresh air to the building when the air handler fan has not activated for a long time. Mechanical ventilation represents $100-200 added cost. During times of more mild weather ventilation is provided through operable windows.

Spot Ventilation: All bathroom and range hood vent fans should be ducted to the outside of the building. Quiet (< 1.0 sonne) and Energy Star® models should be selected where available. Bathroom fans should be operated with timer controls. Efficient fans can cost $25-50 more than standard fans, and extra ductwork represents a minimal cost if incorporated in the design stage. Ductwork can be run horizontally (through the wall) rather than vertically if desired.

Lighting and Controls: Fluorescent lighting in the form of tubes or compact fluorescent bulbs should be chosen over incandescent for installed fixtures for both indoor and outdoor applications. Although compact fluorescent bulbs can fit in most standard fixture sockets, dedicated fluorescent fixtures prevent retrograding to incandescent lighting at a later date by residents. Compact fluorescent bulbs do cost more than incandescent ($4-8 per bulb) but offer a significantly extended lifetime. Single bulb fixtures are encouraged in bathrooms. Motion sensors and/or timers are encouraged for outdoor lighting and for select indoor applications such as bathrooms. It is recommended

to have at least 75% of all installed lighting as fluorescent, and to design lighting such that there is no more than 0.5 watts of installed lighting per square foot of conditioned living space.

Ceiling Fans: Ceiling fans are recommended in every major living area of the homes for the added comfort allows thermostats to be set back 2 degrees or more.

- **Create Specifications and Other Contract Language**

Once final designs have been completed, Energy/Building Science team will provide assistance with the creation of technical construction specifications to ensure that designs are implemented as expected by contractors/subcontractors, and that contractors/subcontractors can be held accountable for their quality of installations, or lack thereof. Detailed information will also be provided on energy-related inspections and performance testing that will be completed during construction. Education of contractors/subcontractors will be available.

- **Inspection, Rating, and Commissioning**

Energy-related inspection and commissioning will take place both during and after construction is completed. The Energy/Building Science Team will help identify energy-related design elements that need to be inspected and help develop inspection procedures/implementation strategies. FPL, FSEC, and others will be involved with performance testing the homes and providing all energy related ratings and certificates. Other inspectors may be identified and trained as well, as described under the education goals.

ADDITIONAL RESOURCES AVAILABLE:

Design Assistance, training, commissioning:

- Florida Solar Energy Center, Eric Martin (321-638-1450 or martin@fsec.ucf.edu)
- Florida Power and Light, Beverly Musser (954-321-2068 or beverly_musser@flp.com)
- Department of Energy (Building America and Rebuild America), Greg Andrews (404-562-0593 or greg.andrews@ee.doe.gov)
- US Department of Housing and Urban Development (PATH), Bill Zoeller (203-857-0200 or wzoeller@swinter.com)
- Miami-Dade DERM
- Energy Star® (www.energystar.gov)
- National Association of Housing & Redevelopment Officials (www.nahro.org)

Financing:

- Fannie Mae –Katrina Wright (305-603-2304 or katrina_wright@fanniemae.com)
- Energy Efficient Mortgages –Nanci Sharifi, Central Florida Partnership Office (407-481-8323 or nanci_i_sharifi@fanniemae.com)

Environmental Goal 2: Create a multi-faceted education program targeted toward community, contractors, subcontractors, inspectors, and other area builders and developers to achieve energy efficient construction and home operation

Credit counseling will prepare HOPE VI residents financially for home ownership. Homeowner manuals, workshops, and videos, will inform HOPE VI residents about the features included in their homes and provide details on proper operation of features. This will ensure that energy goals are maintained over time by encouraging proper operation and discouraging retrograding of equipment. Such topics will be put in the context of the continuing costs of energy to maximize affordable operation of the homes, as well as preventative maintenance to maximize durability of the homes. Procedures will be set forth to guide the residents through the process of receiving continuing support, so that support can be provided in an efficient manner. Training will be implemented for contractors, subcontractors, and inspectors to ensure that all strategies are incorporated as specified. Education materials will also be used to conduct outreach to ensure that principles and successes are extended beyond this HOPE VI project.

Educational Videos - DERM

The creation of educational videos began with the community charrette. The goal is to document the process of sustainable design in order to show the residents, as well as other builders and developers, the process involved with creating this community so it will be understood and recreated. Subject matter will continue to be added to the videos throughout the design, construction, inspection, and commissioning phases. The videos will be used as part of the homeowner workshops to educate the residents about the proper operation of their homes.

ADDITIONAL RESOURCES AVAILABLE:

- Sean McCrakine, DERM (305-372-6770 or mccras@miamidade.gov)
- Mayra Flagler, DERM (305-372-6495 or flglm@miamidade.gov)
- Patricia Gomez, DERM (305-372-6494 or gomezp@miamidade.gov)

Credit Counseling – Fannie Mae, MDHA

During the design phase of the project credit counseling will be provided to potential residents to prepare them for home ownership/rental, as well as the continuing costs of energy and water. Existing programs will be leveraged and tailored to this project.

ADDITIONAL RESOURCES AVAILABLE:

- Katrina Wright, Fannie Mae (305-603-2304 or katrina_wright@fanniemae.com)

Contractor/Subcontractor/Inspector Training – Department of Energy (Rebuild America and Building America), FSEC, MDHA

Once the final specifications of the homes are decided upon, the Department of Energy and MDHA will assist with identifying energy-related training needs, identifying local resources, and training contractors and subcontractors in any areas where local expertise does not exist. It is expected that most features will be conventional, and that little training will be needed in the area of new techniques. Training will most likely be necessary in order to ensure that conventional tasks (installation of insulation and

windows, air sealing, etc.) are completed properly and that common mistakes are avoided. The Department of Energy and FSEC will assist with training of inspectors such as energy raters, building officials, and FPL inspectors such that they have all the necessary expertise to verify the residences have been built to energy specifications, and that all energy ratings and certifications can be achieved.

Home Owner/Renter Manual and Workshops – DERM, MDHA, FPL, DCA, DOE Rebuild America

The manuals and workshops will be prepared once all specifications have been finalized. They should be tailored to the specific equipment and features of the residences. Their goal will be to educate the residents on minimizing the continuing costs of energy and water and maximizing the durability of their investment. The elements of the manuals/workshops will include:

- Lighting/controls
- Manual thermostat operation
- Natural ventilation vs. A/C use
- Preventative maintenance
- Continuing maintenance
- Moisture control
- Appliance operation/purchase options
- Water conservation
- Utility bill analysis and comparison
- Strategies to reduce cooling loads
- Options for improvement
- On-going support

Home owner/renter manuals will be prepared primarily by DERM with input from the Energy/Building Science Team. Workshops will be prepared with input from the Energy/Building Science Team and delivered by DERM, FPL, MDHA, and DCA. Existing programs will be leveraged and tailored to this project.

ADDITIONAL RESOURCES AVAILABLE:

- Mayra Flagler, DERM (305-372-6495 or flglm@miamidade.gov)
- Patricia Gomez, DERM (305-372-6494 or gomezp@miamidade.gov)
- Beverly Musser, FPL (954-327-3159 or beverly_musser@fpl.com)

Ongoing Support – FPL, MDHA, Community Action Agency, DOE Rebuild America

Procedures and mechanisms will be implemented to provide the HOPE VI residents with continuing support. Various agencies will coordinate to determine who will respond to items such as maintenance issues, failures, callbacks, and high bill complaints. A program will be developed to provide follow up visits and assistance after initial homeowner orientation, possibly using housing authority residents.

Site Planning

Environmental Goal 1: Use Lighting for Sustained Good Visibility, Safety, and Security

Residents of the Scott/Carver Homes stated that security was one of their primary concerns. Using security lighting and proper light placement, surveillance by community residents can become a valuable resource for crime prevention in the area. Low maintenance, energy efficiency, and durability should also be goals given the cost and difficulty of maintaining community light sources. Additional information on economic benefits of energy efficient lighting and optimized controls (both unit and system) to maximize efficiency and security is needed.

IMPLEMENTATION:

- Determine placement and height for lighting fixtures in order to achieve adequate distribution
- Select fixture and pole assembly capable of withstanding physical assault & weather impact
- Use energy efficient; long-life, low-maintenance light source ballast systems
- Select and place parking lot lighting to withstand abuse and limit distribution of light (to avoid light trespass for residents)
- Use porch lighting to increase identification and blend with site lighting
- Identify local availability for compact florescent lamps –for routine lamp replacement by residents
- Determine initial cost of energy savings and rough service products

SPECIFICATIONS:

Roadways & Walkways

Select pole/luminaire:

- Low mount height (10'-12' typically)
- Light distribution to complement tree plan –provide high tree canopy (typically 8') to ensure light passes under and through to walkway and front yard
- Use metal halide lamp for low energy, high efficiency, long life, good color rendering –e.g. 150 watt = 12,000 to 15,000 lumens/15,000 hour rated life, 65 CRI
- Heavy-duty materials –concrete pole, cast aluminum fixture, polycarbonate lens/diffuser, tamper-resistant hardware

Parking Lots

Similar pole/luminaire selection to roadways and walkways except:

- Light distribution confined to parking area –no light trespass into houses
- "Cut-off" luminaries
- Pole height selected to achieve proper light distribution
- Lens shielding (polycarbonate sheet) added to protect against breakage

Porch Lights

- Wall mount fixtures using 4-pin compact florescent (typically 13 watt-900 lumens which is comparable to a 60 watt incandescent –10,000 hour rated life, 80 CRI)

- Outdoor rated fixture with heavy duty construction features –e.g. "wet location"
- Photo control for automatic on/off function –roadway and parking area lighting fixtures will not spill light into houses, porch lights will help complete the safety and security lighting plan
- Soft lighting to help identify approaching visitors as well as encourage residents to use front porches

Interior Lighting:

- Compact florescent lighting throughout
- Kitchen –4' fixture, 2 lamps
- Bath –2' or 4' fixture above mirror
- Wall & Ceilings –4-pin lamp and electronic ballast

ADDITIONAL RESOURCES AVAILABLE:

- Lithonia Lighting, Jim Nelson (770-922-9000 or jnelson@lithonia.com)
- EPA's Energy Star® program (www.energystar.gov)
- Rebuild America (http://www.eren.doe.gov/buildings/rebuild/) or Greg Andrews (404-562-0593 or greg.andrews@ee.doe.gov)
- Illuminating Engineering Society of North America (IESNA) (http://www.iesna.org/)
- Lighting & Manufacturers' websites

Environmental Goal 2: Traffic Calming to Favor Pedestrians & Bicycle Mobility

Creating a walkable community encourages interaction among neighbors, fosters a sense of ownership among community residents, and allows for the enjoyment of the area in ways that are often not possible in vehicles. Implementation of this goal will create a safe, walkable community that favors pedestrians and bicycles over vehicles.

IMPLEMENTATION:

- Separate pedestrian walkways from the street
- Slow traffic with narrow lanes (12' lanes) and parallel parking
- Incorporate path edges & round corners at turns and intersections
- Use traffic circles where appropriate
- Line all streets with well-lighted sidewalks
- Make walkways wide enough for multiple uses

ADDITIONAL RESOURCES AVAILABLE:

- David Henderson-Metropolitan Planning Organization (MPO)-Bike/Pedestrian Fund (305-375-1647 or davidh@miamidade.gov),
- Miami-Dade Office of Community Development-Traditional Neighborhood Development Ordinance (305-375-3431)
- Dover Kohl & Partners (305-666-0446)

Environmental Goal 3: Provide Transportation Alternatives for Residents

The HOPE VI redevelopment area offers many possibilities for resident transportation other than private cars. Jitney and rail service as well as ample bus route opportunities can help

transport residents to job opportunities as well as maintain a safe and healthy environment in the Scott/Carver Homes.

IMPLEMENTATION:

- Contact Miami-Dade Transit to request feasibility of using one or more existing jitney routes in the Scott/Carver community
- Determine the feasibility of a private jitney to service the community
- Investigate the Metropolitan Planning Organization's program to provide funding for a van for local neighborhood transportation.

ADDITIONAL RESOURCES AVAILABLE:

- Mario Garcia-Miami Dade Transit (305-375-1193 or garica@miamidade.gov)
- Jesus Guerra-Metropolitan Planning Organization (305-375-4507 or guerraj@miamidade.gov)

Water

Environmental Goal 1: Eliminate Flooding of Houses

Currently the homes in the Scott/Carver developments are subject to periodic flooding during storm events. Site planning and landscape measures can reduce the negative impact of water on buildings. Using strategies to avoid flooding, the community will enjoy reduced repair and rehabilitation costs from flood damage, as well as more habitable housing for residents. Plan barriers include potential contamination of soil where lake would be enlarged. Therefore determining the local flood elevations and existing areas draining to the current lake is critical.

IMPLEMENTATION:

- Raise floor elevations in flood prone areas
- Limit areas that drain to the lake during storms
- Enlarge lake for stormwater storage

ADDITIONAL RESOURCES AVAILABLE:

- FEMA "Quality Neighborhood Improvement Program" grants (http://www.fema.gov/impact/cities/im_fl04.htm)
- Metric Engineering, Julio Menache (305-235-5098 or jmenache@metriceng.com)
- Bruce Ferguson, (706-542-0709 or bfergus@arches.uga.edu)
- Camilo Ignacio, DERM (305-372-6671 or ignacc@miamidade.gov)

Environmental Goal 2: Conserve Water -Indoor & Outdoor Use

Landscape irrigation can account for up to 50% of a household's total water use. In addition, using plant species that are indigenous, having originated in or occurring naturally in the region, has many potential benefits ranging from water and energy conservation to lower maintenance needs. Furthermore, low flow appliances and fixtures are currently required by Florida building codes. Employing water saving strategies will reduce demand for off-site water, an added cost, and reduce operating costs for housing residents. Areas visible and used by community residents should be identified and landscaped.

IMPLEMENTATION:

- Plant low water-use plants, native to Florida
- Utilize low water-use irrigation hardware
- Install low water-use indoor appliances
- Limit community irrigation to critical visible areas
- Plan landscaping based on topography, geography, and use of greenspace
- Utilize flood tolerant plants in swales and for stormwater retention –which provides for both aesthetics and stormwater removal
- Maximize shading over windows and air conditioning units by planting shade trees on eastern, western, and southern exposures of buildings

ADDITIONAL RESOURCES AVAILABLE:

- South Florida Water Management District Xeriscape Guide (561-682-6883 or http://www.sfwmd.gov/newsr/3_publications.html#xeri to order)
- Cooperative Extension Standards for South Florida Yards
- Miami-Dade County Landscape Manual
- Jody Haynes, University of Florida-Florida Yards & Neighborhoods (352-248-3311 or jlh@gnv.ifas.ufl.edu) (www.miami-dade.ifas.ufl.edu/programs/fyn.htm)

Environmental Goal 3: Integrate Stormwater Features into Landscape

By integrating stormwater features into the landscape, landscaped areas become a resource for the community. Vegetated swales, rather than continuous street gutters, can be used to redirect stormwater and reduce potential infrastructure costs involved in building or refurbishing stormwater catchment systems. By regrading and vegetating the existing lake's slopes for safe community access, the lake could act as a catchment basin, further reducing the need for additional stormwater sewer infrastructure. There is some risk of contamination of soil underlain by waste material from a former landfill. Phase II environmental assessment results will aid in the determination of potential areas of contaminated material. There is valuable, but limited, land on the community site plan available to be used for landscaping.

Other benefits of using stormwater features as a part of the community landscape include:

- Multi-purpose use for community
- An attractive landscape
- Flood control
- Positive drainage
- Stormwater quality improvement
- Groundwater recharge.

ADDITIONAL RESOURCES AVAILABLE:

- South Florida Water Management District Xeriscape Guide (561-682-6883 or http://www.sfwmd.gov/newsr/3_publications.html#xeri to order),
- Jody Haynes, University of Florida-Florida Yards & Neighborhoods (352-248-3311 or jlh@gnv.ifas.ufl.edu) (www.miami-dade.ifas.ufl.edu/programs/fyn.htm),
- Miami-Dade County Landscape Manual, and
- Curtis & Rogers Design Studio (305-442-1774)

Environmental Goal 4: Reuse Existing Water and Sewer Infrastructure

By utilizing existing infrastructure, development costs can be drastically reduced. Maps of site infrastructure and a statement of condition from Miami County Water & Sewer Department will aid in the determination of size and condition of existing infrastructure. Employing all available information will minimize potential conflicts with master site plan.

IMPLEMENTATION:

- Retention & reuse of existing sanitary sewer pump stations and lines
- Retention & reuse of existing water lines except where size increase is required.

ADDITIONAL RESOURCES AVAILABLE:

- Miami County Water & Sewer Department (WASD) (305-669-3704 or http://www.co.miami-dade.fl.us/wasd/)
- Metric Engineering, Julio Menache (305-235-5098 or jmenache@metriceng.com)
- Bruce Ferguson (706-542-0709 or bfergus@arches.uga.edu)

Environmental Goal 5: Protect Stormwater & Groundwater Quality

Protecting both stormwater and groundwater quality will not only protect the community's drinking water supply, but will also positively impact the regional and state water supply. Landscape areas within the site plan, such as the existing lake, can be made available for stormwater retention and infiltration. Additionally, paved surfaces such as sidewalks, driveways, and other low traffic paved areas can be used for stormwater retention and infiltration. Throughout the site vegetated swales can be used for drainage rather than stormwater gutters located on the street. It would also be prudent to limit the areas outside of the community's borders draining to the site during storm events.

Potential barriers and risks include buried trash and the cost of treating the excess water draining into the site from outside the community's defined borders. Areas that have been polluted by residual landfill contamination, drainage patterns within the site plan, and off-site relevant drainage patterns need to be defined.

IMPLEMENTATION:

Where soil is not contaminated by trash:

- Recharge stormwater to groundwater, using soil ecosystem for treatment
- Utilize porous pavements for treatment and retention.

Where soil is contaminated by trash:

- Do not use porous pavement or exfiltration
- Employ lined swales, railroad buffers, and roadside swales for drainage

ADDITIONAL RESOURCES AVAILABLE:

- Miami County Water & Sewer Department (WASD) (305-669-3704 or http://www.co.miami-dade.fl.us/wasd/)
- Metric Engineering, Julio Menache (305-235-5098 or jmenache@metriceng.com)
- Bruce Ferguson (706-542-0709 or bfergus@arches.uga.edu)

Environmental Goal 6: Recharge Groundwater

The site plan allows many opportunities for utilizing landscaping and paved areas to maintain regional water supply. Maintenance of an adequate depth above the groundwater level is necessary to protect water quality. Landscaped areas can include vegetated swales and retention areas to allow water from storm events to percolate back to the water supply. Low traffic paved areas, such as areas used for parking and sidewalks, could utilize porous pavement that will allow water from storm events to recharge groundwater supplies.

Additional information about the extent of contamination of soil by buried landfill material is necessary. Information on micro-areas of the site suitable for porous pavement as well as hydraulic conductivity of the soil should be gathered.

In sections of the site not underlain by buried landfill material options include:

- Porous pavement
- Exfiltration trenches, preceded by pollutant traps
- Unlined vegetated swales

ADDITIONAL RESOURCES AVAILABLE:

- Bruce Ferguson (706-542-0709 or bfergus@arches.uga.edu)

Environmental Goal 7: Recycle Greywater

Greywater, the wastewater produced from baths and showers, clothes washers, and sinks, should be captured and stored in a community-level greywater supply. The captured water could then be used for community-level irrigation rather than irrigation on private lots. Plan barriers include added cost for infrastructure, potential health risks, permitting requirements, and cultural intolerance. A cost-benefit evaluation is needed to determine the cost-effectiveness of utilizing greywater. Evaluation should be focused on costs of infrastructure as compared to residents' savings on landscaping irrigation.

ADDITIONAL RESOURCES AVAILABLE:

- Potential funding mechanism –Alternative Water Supply grant administered by SFWMD (305-372-6828)

Environmental Goal 8: Use Rainwater

Utilizing rainwater reduces the demand for off-site water. Throughout the site opportunities exist to direct rainwater into planted swales for passive irrigation of landscape. The existing or potentially enlarged lake can also act as a source for community landscape irrigation water. In order to achieve this goal, the site plan must include swales aligned with water-demanding planted areas.

Cost-benefit evaluations for rainwater landscape irrigation and investigation into potential lake contamination must be determined.

ADDITIONAL RESOURCES AVAILABLE:

- Potential funding mechanism –Alternative Water Supply grant administered by SFWMD (305-372-6828)

Materials & Construction Waste-Deconstruction & Demolition

Environmental Goal 1: Optimize Existing Materials

Given the totality of the Scott/Carver Homes redevelopment, a number of opportunities exist to reduce costs by reusing on-site materials currently owned by Miami-Dade Housing Agency. Additionally, job training and employment opportunities, which are an essential part of HOPE VI funding, exist in materials abatement and deconstruction as the homes are redeveloped. Abatement of all asbestos, a federal, state, and local requirement, presents opportunity for job creation as well as reduced need for materials purchase.

A cost analysis of non-friable asbestos with two methods of disposal should be completed. The two disposal methods are:

- No abatement of asbestos –more waste to dispose of at a lower price, or
- Abatement of asbestos only –less volume to dispose of and generation of recycled materials already on site for use during construction.

In order to most efficiently utilize materials on-site there must also be a process shift to create a staging plan taking advantage of the planned demolition and construction schedule of the four sectors. Cost savings to the Housing Agency can be substantial, however cooperation, commitment, and coordination on the part of the design team are essential to a successful demolition and the reuse of on-site materials.

A staging plan must:

- Determine from contracted civil engineering firm how much concrete is needed & what forms will be used (i.e. chunks, rubble, slabs)
- Anticipate needs, create construction staging and storage schedule, and plan for the details of the process. If needed, locate off-site storage facilities nearby (potentially Poinciana Industrial Center).

Staging should consider:

- Abatement requirements (permits and clearance),
- A softstrip of appliances, code compliant, and fixtures in good condition for other applications –possibly by MDHA,
- Contracting with an external salvager to do complete soft strip (for doors, windows, remaining appliances & fixtures),
- The possibility of public auction as an alternative to the external salvager soft strip,
- Opportunities for tongue and groove ceiling removal by carpentry program, and
- Recovery of 2x6s, 2x4s, and 2x10s from roof structure by carpentry program

ADDITIONAL RESOURCES AVAILABLE:

- Local advisor –Leslie Pope, DERM Solid Waste (305-372-6804 or popel@miamidade.gov),
- Brad Guy, University of Florida Center for Construction & Environment (352-392-7502 or minou@grove.ufl.edu),
- "A Report on the Feasibility of Deconstruction –An Investigation of Deconstruction Activity in Four Cities" US HUD Office of Policy Development & Research (http://www.huduser.org/publications/pdf/deconstruct.pdf) pp. 99-107
- Building salvage success story (Fort McCoy) (http://www.smartgrowth.org/library/ft_mccoy.html)
- Bernard Broussard, Miami Dade Public Schools –Office of Workforce Development Education (305-995-1463) –source of labor/training
- Lawrence Wright (305-632-4444) –interested in setting up a training facility in the area

Environmental Goal 2: Concrete Reuse and Recycling

Utilizing concrete currently found on-site and owned by the Miami-Dade Housing Agency represents a significant opportunity for cost savings. The Housing Agency can use specification language to indicate how concrete taken from the demolition and deconstruction should be used. This powerful tool can be crafted to conform to the anticipated materials needs of new construction on-site as well as shape any demolition RFP.

ADDITIONAL RESOURCES AVAILABLE:

- Brad Guy, University of Florida Center for Construction and Environment (352-392-7502 or minou@grove.ufl.edu) -will provide example RFP for demolition bidding process

Environmental Goal 3: Minimize Indoor Air Quality Contamination Through Construction

The United States Environmental Protection Agency reports that indoor air can be more polluted than outdoor air. As a result, many individuals suffer respiratory problems, allergies, and other health problems related to poor air quality inside their homes. Potential air quality threats to health include dust mites, carbon monoxide, volatile organic components, mold, mildew, radon, and other pollutants.

IMPLEMENTATION:

- Protect ductwork during construction by sealing ducts & protecting on-site absorptive materials from moisture damage
- Provide a flush-out of building before occupancy with 100% outside air –two weeks is recommended
- Change to new filter media both after construction is completed and immediately before occupancy begins
- Enforce proper housekeeping during construction
- Manage construction sequencing in order to install absorptive materials after dry or cure time of finishes

The success of achieving this goal depends on accountability. The architect and Housing Agency should be responsible for the specifications and requirements for indoor air quality

protection, while the contractor should be responsible for the management and execution of specifications.

ADDITIONAL RESOURCES AVAILABLE:

- US Green Building Council Leadership in Energy and Environmental Design (LEED™) Reference Guide 2.0 (www.usgbc.org) –pages 237-242 or see **Appendix G**
- Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), James Keen (945-961-0440 or www.smacna.org)

Environmental Goal 4: Minimize Construction Waste

While the minimization of construction waste has important environmental implications, it also presents cost savings to the Housing Agency in the form of reduced disposal fees as well as business opportunities for local entrepreneurs prioritized in the HOPE VI funding. Focusing on the minimization of waste from the site redevelopment will require a change of process, but can be achieved with commitment and cooperation from all of the stakeholders.

IMPLEMENTATION:

- Create Construction Waste Management Plan
- Minimize new waste created during the construction process
- Use materials salvaged during deconstruction and demolition –for example, drywall waste can be used as soil amendment
- Reuse concrete forms
- Use leftover concrete on-site –for example, leftover concrete masonry units (CMUs) can be used for landscape or rubble
- Use cleared trees on-site as mulch, or replanted elsewhere
- Use 2' increments for dimensions –which can reduce waste generated and labor by matching design dimension and material supply sizes
- Locate on-site waste exchange or reuse in central location –reduces amount of materials purchased and disposal fees

ADDITIONAL RESOURCES AVAILABLE:

- Florida Green Building Guide Recommendations pages 33-34,
- Florida Green Home Designation Standard Reference Guide on Waste Management.
- Brad Guy, University of Florida Center for Construction and Environment (352-392-7502 or minou@grove.ufl.edu)

Environmental Goal 5: Roof Deconstruction

Among the salvageable items on-site, wood structures in the roofs of the existing structures are some of the most valuable. Salvage of this wood material presents a financial prospect as well as an opportunity for job training. Local schools teaching construction and carpentry could prove valuable partners in this endeavor. It might be possible to partner with local job training academies such as D.A. Dorsey as a means to further involve current residents and provide hands-on training opportunities. The most formidable barriers to a successful roof deconstruction are labor and time. By taking advantage of local job training initiatives both the environmental goals and the mandated local job creation included in the HOPE VI funding can be achieved.

IMPLEMENTATION:

- Strip shingles to be recycled or disposed of –asphalt shingle recycling could become a successful business venture for local entrepreneurs
- Strip 1x1 tongue and groove ceiling deck and remove to a predetermined staging area
- Detach trusses from walls –load to a flat bed truck with a long arm excavator and move to a predetermined staging area
- Use predetermined staging area to process **or** remove truss boards one at a time

Some additional information is needed including:

- Site plans in order to locate a realistic and successful staging area and
- Investigation into the possibility of using the Poinciana Industrial Center area for staging and/or storage

ADDITIONAL RESOURCES AVAILABLE:

- "A Report on the Feasibility of Deconstruction –An Investigation of Deconstruction Activity in Four Cities" US HUD Office of Policy Development & Research (http://www.huduser.org/publications/pdf/deconstruct.pdf) (p 105 Report Appendix F-7)
- Brad Guy, University of Florida Center for Construction and Environment (352-392-7502 or minou@grove.ufl.edu)
- Bernard Broussard, Miami Dade Public Schools –Office of Workforce Development Education (305-995-1463) –source of labor/training
- Lawrence Wright (305-632-4444) –interested in setting up a training facility in the area

Environmental Goal 6: Design for Deconstruction and Recycling –Minimize Future Waste

The redesign of the Scott/Carver Homes represents an opportunity not only to achieve significant environmental successes during the current design process, but also a chance to shape the future. As virgin resources become scarcer, reused and recycled materials from existing structures will become more profitable. The Scott/Carver structures can include many elements that will make deconstruction and recycling easier, and therefore more cost-effective, in the future.

IMPLEMENTATION:

- Use materials that are of recyclable quality and easily separated
- Minimize coatings, sealers, glues, contaminant materials, and inaccessible construction
- Add redundant elements

ADDITIONAL RESOURCES AVAILABLE:

- Brad Guy, University of Florida Center for Construction and Environment (352-392-7502 or minou@grove.ufl.edu)

Materials & Construction Waste-Products & Materials

Environmental Goal 1: Specify Environmentally Preferable & Locally Produced Materials Through Contract Language

Most environmental products perform as well or better than their counterparts. Utilizing environmentally friendly products is often simply employing "State of the Shelf" technology, due to the fact that products are readily available from suppliers, home improvement, and hardware stores. The added benefits of environmental products include increased durability and improved occupant health and safety. Use of environmentally friendly materials can be effectively included into contract language when working with vendors and bulk suppliers.

Examples of environmentally friendly materials include:

- Re-used materials:
  - Drywall –harvested from structure deconstruction, no cost difference
  - Steel –which can be used for roof trusses & studs
  - Engineered Wood –with no urea or formaldehyde
- No CCA wood –should not be treated with arsenic
- Recycled plastic lumber –can be used for porches, railings, decks, fences; higher first costs but extremely durable and less energy intensive
- Insulation with recycled content –rigid, tailored foam, blown cellulose; generally not more expensive and less energy intensive overall

ADDITIONAL RESOURCES AVAILABLE:

- EPA's EPP Database--
  Green Building contract language, voluntary standards, and case studies:
  (http://yosemite1.epa.gov/oppt/eppstand2.nsf/pages/pickaisle.html?Open&Hardware%20Store),
- Environmental Product Resources –**Appendix H**
- Alison Kinn, US EPA (202-564-8859 or kinn.alison@epa.gov)
- Building for Environmental and Economic Sustainability - a life cycle costing and environmental impact decision support software.
  (http://www.epa.gov/oppt/epp/bees.htm)

Environmental Goal 2: Provide Pre- and Post Redevelopment Education to Community

Project success often hinges on community commitment. This makes Materials Perception Education –in order to get residents' buy-in on quality, beauty, and environmental benefit of materials selected for use in redevelopment –an even more critical piece of creating a sustainable HOPE VI redevelopment.

IMPLEMENTATION:

- Display material options and provide "touch and feel" opportunities
- Create a model home furnished and replete with labeled environmental products
- Provide a photomontage of "million dollar" homes employing similar products and technologies to address quality perceptions

- Show video of footage shot during community and sustainable design charrettes to showcase transparency of decision-making

Operation and Maintenance Practices Education –to maintain a healthy environment for residents, emphasis in continuing education should be place on:

- Healthy cleaning products (natural or homemade),
- Air filters (3M filters or other accordion filter),
- Appropriate and healthy methods of pest management (indoor and outdoor pests), and
- Furniture choices as they relate to indoor environmental quality

ADDITIONAL RESOURCES AVAILABLE:

- DERM education program
- Green & Lean, Designing and Building an Affordable, Resource-efficient Home (202-544-5336 or www.greenhome.org)
- Vendor marketing materials
- Environmental Building News (www.buildinggreen.com)

Environmental Goal 3: Provide Good Indoor Environmental Quality (IEQ) for Residents

Poor indoor air quality causes occupant illness, increases expenses, and results in more resident complaints. Americans spend, on average, more than 80% of their time indoors. Indoor Environmental Quality (IEQ) includes Indoor Air Quality (IAQ) issues such as ventilation effectiveness and potential contaminants.

IMPLEMENTATION:

- **Select and specify low or no Volatile Organic Components (VOC) paints and finishes**

Paints can off-gas harmful VOCs for up to 6 years causing health complications ranging from headaches and nausea to metabolic disorders. VOCs can also aggravate respiratory problems. Though choosing materials with zero or low VOC contents represents a modest increase in first costs, the long-term health of residents is of major concern. Most major paint vendors manufacture low or no VOC paints. In order to achieve the goal of minimal VOC off-gassing the following recommendations should be followed:

  - Choose paints with "Green Seal" approval,
  - Choose adhesives & sealants that meet or exceed limits of South Coast Air Quality Management rule #1168(http://www.aqmd.gov/rules/html/r1168.html) and exceed Bay Area Resources Board Regulation 8, Rule 51 (http://www.baaqmd.gov/regs/rg0851.pdf), **Appendix I**
  - Choose carpets that meet or exceed "Green Label" specifications, and
  - Use composite wood products that have no added urea or formaldehyde

- **Select hard flooring surfaces in non-bedroom areas**

Hard flooring surfaces are more durable, easier to clean, and have a more appropriate lifecycle cost. Using concrete or ceramic tile may face resistance due to community perceptions, however education can play a critical role. Concrete as a finished floor will reduce overall

square footage costs, but requires cure time for slab prior to curing. Ceramic tile has a higher first cost, but is easier to clean and more durable than carpet.

- **Select cabinets that are not made from particleboard or MDF or alternatively coat all sides of particleboard cabinets with no VOC paint**. Coating particleboard may impact construction schedule and using non-particle board materials may have higher first costs.

- **Install and upgrade air filters**

- **Design a separate usable entry with seating area to allow removal of outerwear prior to entering home**. This will decrease dirt and particulate matter brought into the homes providing a cleaner environment for residents.

ADDITIONAL RESOURCES AVAILABLE:

- US Green Building Council Leadership in Energy and Environmental Design (LEED™) Reference Guide 2.0 (www.usgbc.org) –pages 237-242 or see **Appendix I**
- Green Spec (www.greenspec.com)
- Environmental Building News (www.buildinggreen.com)

Environmental Goal 4: Use Durable Structures & Materials

Providing the residents with durable structures and materials will serve many purposes. It will afford lower operation and maintenance requirements as well as maintain longer service lives, requiring fewer maintenance service calls and problems for residents. Using life cycle costing products and materials can be accurately compared. Many specifications for materials used in the structures and products used in the newly redeveloped homes can help to achieve this goal.

IMPLEMENTATION:

- Use durable countertops for kitchen & bathroom,
- Use durable roof system –metal or concrete,
- Use durable wall system –stucco with recycled content (fly ash), and
- Use durable outdoor deck & railing material –recycled plastic lumber, no finishing necessary

ADDITIONAL RESOURCES AVAILABLE:

- Building for Environmental and Economic Sustainability - a life cycle costing and environmental impact decision support software (http://www.epa.gov/oppt/epp/bees.htm)
- Alison Kinn, US EPA (202-564-8859 or kinn.alison@epa.gov)

Sustainable Design Charrette participants included a few overarching goals for the redevelopment of the Scott/Carver Homes.

Goal 1: Addressing energy and environmental issues, while at the same time creating jobs
This will require creativity, commitment, and coordination. The site-planning group recommended identifying a point person to coordinate job training, planning, scheduling, and specifications to support sustainability.

Goal 2: Overall community safety and security
This goal requires the creation of a far-reaching plan to address crime prevention through environmental design. Elements of the plan should include:

- Natural access
  - Marked designated roadways and pedestrian pathways that encourage and direct traffic flow
  - Traffic calming patterns such as roundabouts.

- Natural surveillance –
  - Ground cover and shrubs with mature height no higher than 3 feet
  - Shade/canopy tree branches no lower than 8 feet
  - Large trees recessed from houses and designated pedestrian pathways
  - Lighting that encourages good visibility –metal halide, top hat lighting with minimum light trespass and good color rendition
  - Well lit pedestrian walkways
  - Windows on units placed to allow residents to clearly observe greenspace, parking lots, and walking areas

- Territorial reinforcement
  - Landscaping of yards that clearly identifies private from semi-private areas
  - Greenspace clearly defined by lighting and landscape to encourage use
  - Clearly identified areas to enter and exit public and private areas
  - Signage

- Maintenance

Goal 3: Buffer Railroad from Community
- Sculptural sound barrier
- Landscaping
- Reuse of salvaged materials

Goal 4: Aesthetically Pleasing & Functional Signage for Community
Signage can help to facilitate vehicular and pedestrian traffic as well as differentiate private residences from public space and community services. It can also be used to create a community sense of ownership.

Appendix A

Attendees

Rick Herrera, *MDHA*
Joe Scafuti, *MDHA*
Robert Levis, *MDHA*
Leonard Freeman, *MDHA*
Alyce Robertson, *DERM*
DougYoder, *DERM*
Ernesto Perez, *DERM*
Julio Calle, *DERM*
Camilo Igancio, *DERM*
Sean McCrackine, *DERM*
Mayra Flagler, *DERM*
David Bromfield, *DERM*
Patricia Gomez, *DERM*
Leslie Pope, *DERM*
Maria Crowley, *Miami Dade Planning & Zoning*
Michael Bregman, *Miami Dade Planning & Zoning*
David Henderson, *MPO-Bike/Pedestrian Fund*
Bill Dobson, *Miami Dade Water & Sewer*
Maribel Balbin, *South Florida Water Management District*
Mario Garcia, *Miami Dade Transit*
Harry Stultz, *Miami Dade County Building Department*
Marshall Gilreath, *Miami Dade Police Department*
Karen Chaney, *Miami Dade Parks & Recreation*
Marcus Hepburn, *Florida Department of Community Affairs*
Steve Hortin, *Department of Energy*
Greg Andrews, *Department of Energy*
Terri Roberts, *Department of Energy*
Alison Kinn, *Environmental Protection Agency*
Neil Hall, *The Architects Hall Designers, Inc*.
Margaret Marshall, *Dover Kohl & Partners*
Andrew Georgiadis, *Dover Kohl & Partners*
Edgar Espinoza, *Metric Engineering*
Julio Menache, *Metric Engineering*
Beverly Musser, *Florida Power & Light*
Robin Vieira, *Florida Solar Energy Center*
Eric Martin, *Florida Solar Energy Center*
Dennis Creech, *Southface Energy Institute*
Jules Paulk, *Southface Energy Institute*
Robin Deutsch, *Southface Energy Institute*
Maria Nicholl, *Southface Energy Institute*
Brad Guy, *Center for Construction & Environment, University of Florida*
Mark Ternes, *Oak Ridge National Laboratory*
Jody Haynes, *Florida Yards & Neighborhoods, University of Florida*
Bill Zoeller, *US HUD/PATH -Steven Winter Associates*
Bruce Ferguson, *University of Georgia*
Jennifer Languell, *Construct Green*
Jim Nelson, *Lithonia Lighting*
Charles Lecusay, *Southeast Florida Lighting*
Dan Williams, *Architect*
Kris Rengert, *Fannie Mae Foundation*
Audrey Ordenes, *Citizens for a Better South Florida*
Jay Shavin, *H.J. Russell & Company*

Day One –December 10, 2001
Location: Clarion Hotel, 100 SE 4th Street, Miami, Fl.

Time	Activity
3:00-3:30 pm	Welcome from Miami-Dade Housing Agency
3:30-4:00 pm	Overview of Scott/Carver Homes and Results from Community Charrette Neil Hall & Design Team
4:00-4:10 pm	Overview of Charrette Process- Dennis Creech
4:10-5:00 pm	Site Tour
5:00-6:30 pm	Return to Hotel and Transportation to Restaurant (Optional)

Day Two –December 11, 2001
Location: Clarion Hotel, 100 SE 4th Street, Miami, Fl.

Time	Activity
8:00-8:30 am	Coffee & Continental Breakfast
8:30-8:40 am	Welcome from Miami-Dade, Environmental Resources Management
8:40-9:00 am	Introductions
9:00-9:30 am	Florida Green Building Successes Composite Case Study Robin Vieira –Florida Solar Energy Center
9:30-10:00 am	Update from Community Charrette Neil Hall
10:00-10:20 am	Break into 4 Working Groups Resource Advisor Issue Presentations
10:20-Noon	Working Groups- Brainstorm Environmental Goals
Noon-1:00 pm	Working Lunch Groups report on Goals
1:00-2:30 pm	Working Groups- Brainstorm “How-to” Strategies for Goals
2:30-2:45 pm	Stretch Break
2:45-3:45 pm	Working Groups- “How-to” Strategy Brainstorming Con’d
3:45-4:00 pm	Summary & Closing Dennis Creech

Day Three –December 12, 2001
Location: Clarion Hotel, 100 SE 4th Street, Miami, Fl.

Time	Activity
8:00-8:30 am	Coffee & Continental Breakfast
8:30-8:35 am	Welcome Dennis Creech
8:35-9:35 am	Working Group Reports Question & Answer Session
9:35-10:30 am	Discussion of Cross-Cutting Issues & Points for Clarification
10:30-10:45 am	Stretch Break
10:45-Noon	Working Groups- Create Implementation Plan (including barriers, resources needed, resources available, costs)
Noon-1:00 pm	Working Lunch- Working Groups Continue Plan Development
1:00-2:35 pm	Working Groups- Continue Plan Development & Prioritize Features of Plan
2:35-2:50 pm	Stretch Break
2:50-3:50 pm	Working Group Reports
3:50-4:00 pm	Closing Remarks & Adjournment Dennis Creech

Appendix B

Sustainable Design Charrette Evaluation Results

All items were evaluated separately for effectiveness and importance. Categories were evaluated on a 4-point scale (1 as the least important or effective and 4 as the most important or effective). Evaluations were completed by 23 out of 52 participants (44% return rate).

	Importance				Effectiveness			
Category	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Overall Charrette	0	0	2	20	0	0	9	13
Pre-charrette communication	0	0	3	20	0	2	10	11
Project Background	0	0	3	14	0	2	7	7
Briefing Book	0	0	6	17	1	1	12	9
Site Visit	0	1	0	17	0	2	2	12
Resource Advisors	0	0	1	21	0	1	1	19
Charrette Facility	0	1	9	13	1	2	7	13
Facilitation	0	0	2	21	0	1	1	21
Food	0	0	5	17	0	0	3	19

Comments

"…Amazing commitment from MDHA, DERM, and other county agencies. I hope that the architect will also commit to sustainability –as sustainability is one of the best ways to provide healing to the people of the Scott/Carver Homes."

"Would have been more effective if design team could have had more of a presence."

"…Excellent direction! May want to raise the bar more i.e. to [make Scott/Carver Homes] off the grid or even…sell back to the grid."

"Good charrette…[needed] clearer statement of benefit (who & how many would benefit). This was unclear at first –many of the present residents will not live at the HOPE VI project."

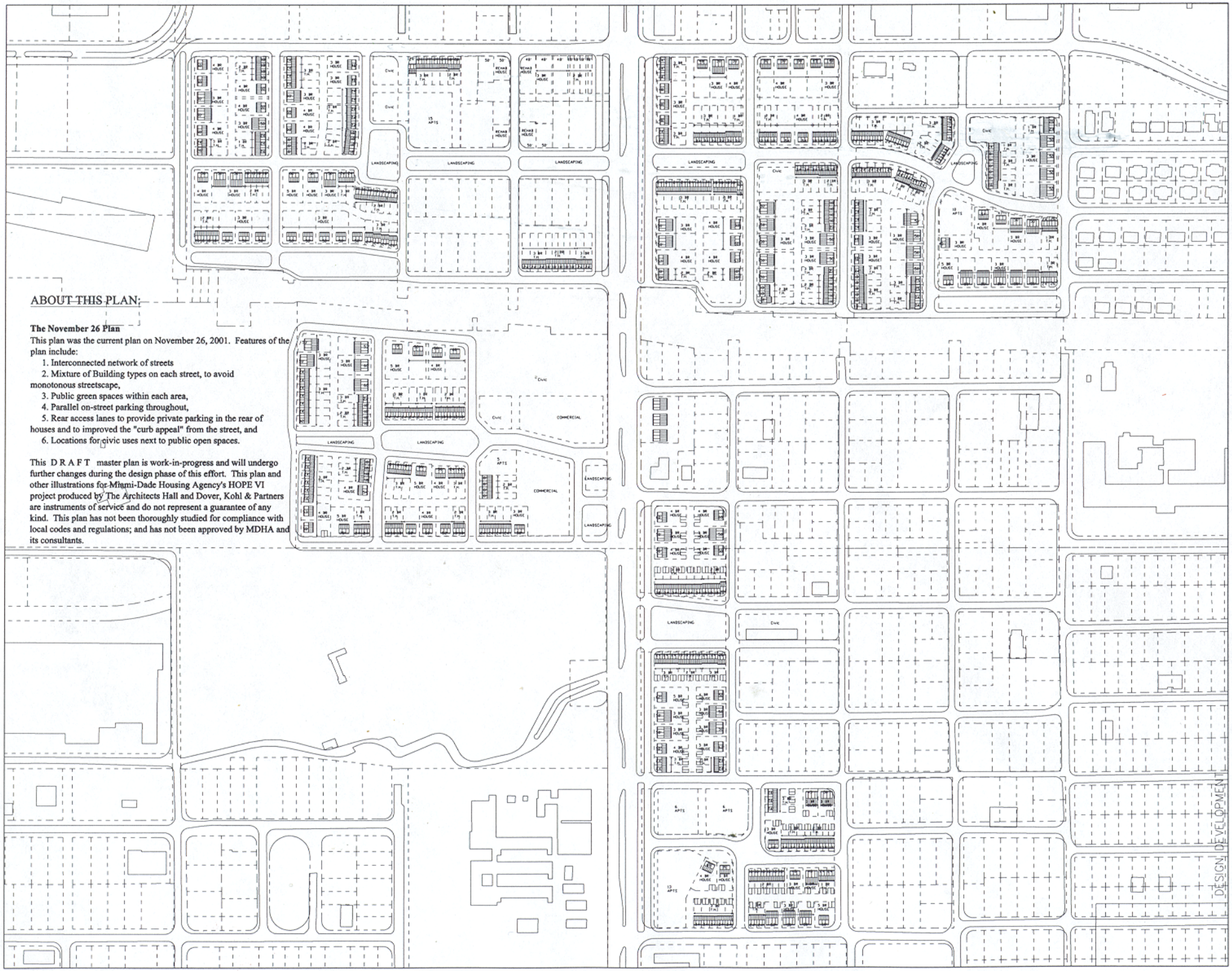
"Data on site environmental conditions was badly needed pre-charrette and badly missing: topography, soils, site boundaries, groundwater quality and lake water quality."

"This charrette was highly beneficial to those involved. I only hope that this benefit translates to actual implementation of sustainable design concepts in the development plan."

"…Excellent job of organization and of participant selection."

"…Computers for each group would have been great –cuts down on paper and information processing."

Appendix C



ABOUT THIS PLAN:

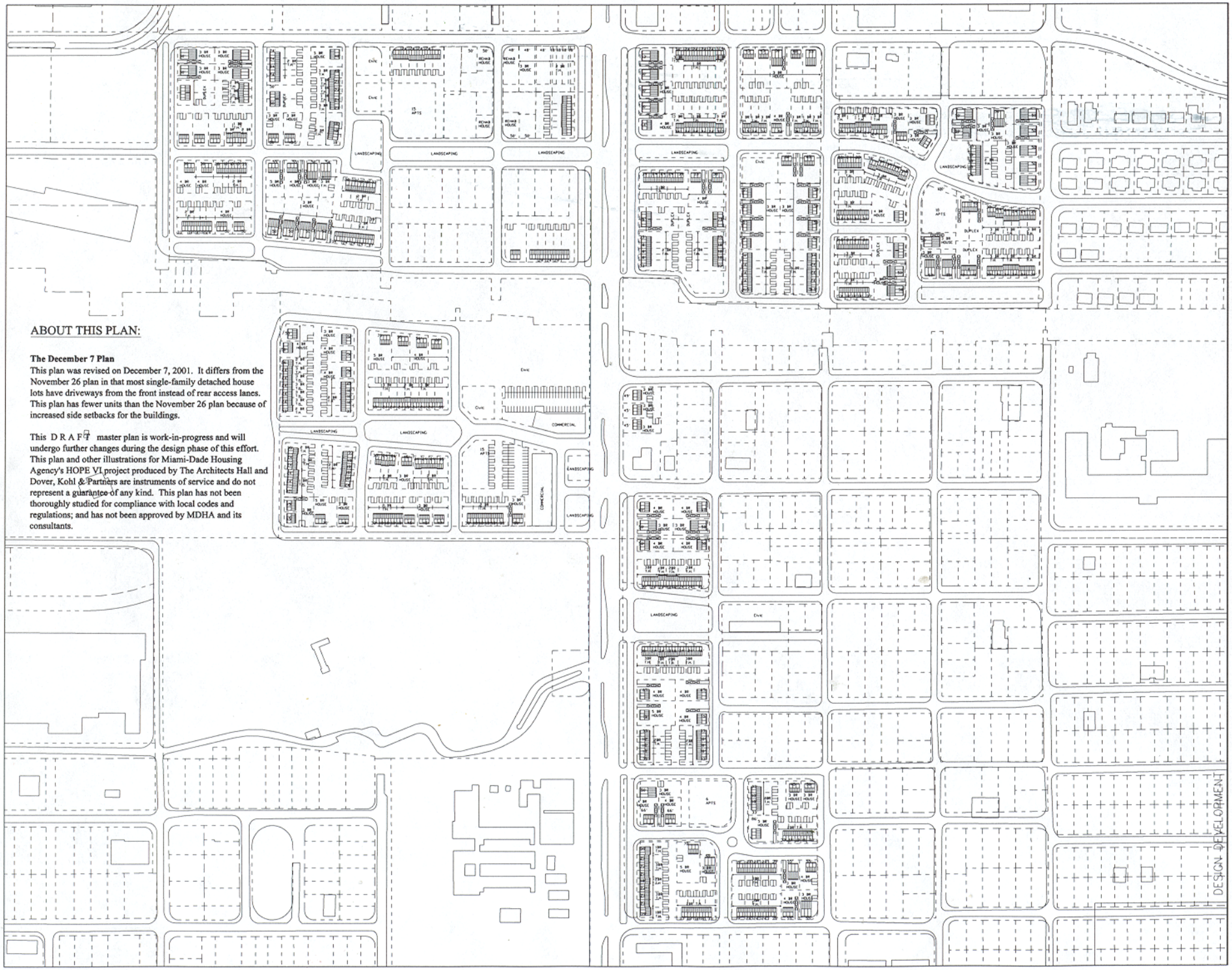
The November 26 Plan

This plan was the current plan on November 26, 2001. Features of the plan include:

1. Interconnected network of streets
2. Mixture of Building types on each street, to avoid monotonous streetscape,
3. Public green spaces within each area,
4. Parallel on-street parking throughout,
5. Rear access lanes to provide private parking in the rear of houses and to improved the "curb appeal" from the street, and
6. Locations for civic uses next to public open spaces.

This D R A F T master plan is work-in-progress and will undergo further changes during the design phase of this effort. This plan and other illustrations for Miami-Dade Housing Agency's HOPE VI project produced by The Architects Hall and Dover, Kohl & Partners are instruments of service and do not represent a guarantee of any kind. This plan has not been thoroughly studied for compliance with local codes and regulations; and has not been approved by MDHA and its consultants.

Appendix D



ABOUT THIS PLAN:

The December 7 Plan
This plan was revised on December 7, 2001. It differs from the November 26 plan in that most single-family detached house lots have driveways from the front instead of rear access lanes. This plan has fewer units than the November 26 plan because of increased side setbacks for the buildings.

This DRAFT master plan is work-in-progress and will undergo further changes during the design phase of this effort. This plan and other illustrations for Miami-Dade Housing Agency's HOPE VI project produced by The Architects Hall and Dover, Kohl & Partners are instruments of service and do not represent a guarantee of any kind. This plan has not been thoroughly studied for compliance with local codes and regulations; and has not been approved by MDHA and its consultants.

HOPE VI

REVITALIZATION OF SCOTT / CARVER HOMES

THE ARCHITECTS HALL DESIGNERS INC.

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TESTING / SOIL ANALYSIS

CURTIS & RODGER DESIGN STUDIO
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LANDSCAPE ARCHITECTURE

THE PACO GROUP
COST ESTIMATING / SCHEDULING

JUAN CORBELLA
SPECIFICATIONS

H.J. RUSSELL & COMPANY
2337 NW 79TH STREET, MIAMI, FLORIDA 33147
PROGRAM MANAGERS

SUBMITTALS	DATE

REVISIONS	

SEAL

DRAWING TITLE
DECEMBER 7 MASTER PLAN

DATE	08-28-01
JOB	MIA771A
DRAWN	
CHECK	
MDAD NO.	
DC NO.	
SHEET	

Appendix E

Building Interior Duct Systems

Overview

The fundamental objective of building interior duct systems is to isolate the duct system itself from unconditioned spaces. The benefits, like those for sealed duct systems, include reduced impact of duct leakage and reduced heat gain/loss to the duct system. This approach is appropriate for either new or existing homes.

An interior duct system is usually either installed in a dedicated chase or hung from the finished ceiling, in plain view. Exposed ducts regularly appear in food service, lodging, and retail buildings as decorative features. But enclosed duct chases are more common in residential buildings. Properly done, either approach provides the same result: the duct system is protected from the heat loss/gain as well as air exchange with unconditioned spaces.

Hallway furdown under construction for duct chase in ranch home

Visually, a finished duct chase looks like a furred down ceiling, similar to a soffit above kitchen cabinets. However, if you look inside a duct chase, you would see airtight drywall and possibly some of the framing supporting the drywall; conversely, inside a cabinet soffit, you would see attic/ceiling framing and probably some insulation, no drywall. Hence, the air in the duct chase is isolated from unconditioned space but the air in the cabinet soffit is not.

Generally the duct chase houses the entire duct system, supply and return, and physically joins to the air handler closet. Ideally, the duct never passes through an unconditioned space so that any leakage is basically leakage of conditioned air to the conditioned space. So, functionally, the chase must be physically separated from unconditioned spaces including the obvious areas like attics, crawlspaces and garages as well as hidden unconditioned spaces.

To construct an interior duct chase, the builder must do three things:

- Coordinate communication among trades- clearly communicate the intent and specifics of an interior duct system to framing and finishing crews and the mechanical contractor

- Construct continuous air and thermal barriers- crews must be careful to insure good sealing and insulation, and a supervisor needs to regularly check progress and chase integrity

- Protect the chase after completion- protect chase from cable, phone and other installers who may want to use it as a convenient way to run wires, as the holes that typically result will compromise the air barrier.

Specifics

Design

The location of the air handler and the duct chase needs to be determined during design. The air handler should be either centrally located (implies a main supply trunk that extends toward both ends of the house) or located at one end of the duct chase. It must be inside the conditioned space as the air handler is at the heart of the duct system.

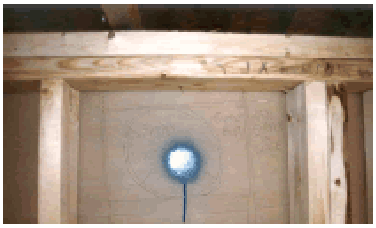
The duct chase itself should trace a path from the air handler to each space to be conditioned. For example, in a ranch style home, the air handler could be at the end of the hall with one central return and the duct chase would run the length of the hall and out into the living space. One specification to keep in mind here is maintaining the code-required 7 foot ceiling height.

Prior to breaking ground, the builder should discuss the intent of building an interior duct system and solicit input from the mechanical contractor, the framing crew, the drywall crew, the insulation crew, and the air sealing crew. This is paramount. Each will have to understand what the end goal is in order to see how, if at all, their job will be affected.

Construction

There are two critical points of communication in the construction process for the duct chase.

1.) Clearly indicate the chase on plans and at the construction site. Most of the chase is built after rough framing and before the mechanical rough in. A copy of the mechanical system plan showing the duct chase location in hatch marks should be posted in the house for reference. Additionally, Ken Fonnorow of Gainesville, Florida devised a way to mark the location of the chase for the crew building it. Imagine standing in a dried-in house, looking at the air handler closet space. The construction supervisor responsible for the chase spray paints the floor along the bottom plate of all the walls where the chase is to be built. He starts at the air handler and traces the path of the chase to its end.



The location of supply register is marked (from the room to be served) prior to the mechanical rough in

2.) Mark the location of the supply registers on the drywall before the mechanical contractor arrives.

<u>Establishing Continuous Air and Thermal Barriers</u>

In most cases, the air barrier will be made of an air tight material (e.g. drywall) sealed at the edges and seams, and the thermal barrier will be ceiling insulation installed over the top of the chase. The air barrier keeps air from moving between unconditioned spaces and the chase and the thermal barrier minimizes conduction between unconditioned spaces and the chase. So any leakage of the duct itself will then be to conditioned space. The joints and seams of the duct chase top and sides must be sealed as well as any penetrations in the chase that intersect an

unconditioned space. Note that unconditioned spaces are any cavity or room that is not served by a supply register, and they include obvious spaces such as attics, garages and storage rooms as well as hidden areas.

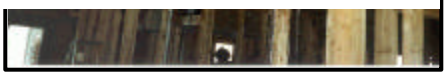
Visualize a duct chase running the length of a hall in a typical ranch style house. A runout supply duct would serve each bedroom from the main supply trunk (inside the chase). The supply runout goes through the side of the chase to a supply register on the interior wall shared by the hall/chase and the bedroom. The penetration in the chase wall for the supply runout intersects an unconditioned space - the interior wall cavity. To prevent air from coming down from the attic between the drywall and the top plate, the joint between the chase wall and the interior wall framing must be sealed OR the joint between the top plate and the drywall must be sealed. Without this continuous air barrier, any duct leakage will be in communication with an unconditioned space, either the attic directly or the interior wall cavity. This type of sealing is especially important in the air handler closet since the return side of the air handler induces strong negative pressures, significantly increasing the leakage through any gaps.

Strategies

In split plan homes the duct chase can serve as an aesthetic as well as functional element of the home. In this style home, the parts of the chase that extend down hallways are constructed in the same way as a hallway in a ranch home, but the sections of the duct chase that cross through the main living space warrant a different approach. Whereas the hallway furdown makes use of the upper portion of the hall walls, a chase in an open living area are built out from one wall (see photo) or down from the ceiling framing.

For the chase built out from one wall, after rough framing and before the mechanical system rough in, dry wall is installed to form one side and the top of the chase. The other side of the chase and a nailer for the drywall bottom may be installed before or after the mechanical rough in, which ever is easier for the mechanical contractor. If installed before, sections of the main supply trunk are slid into the chase from the bottom. If installed after, the main supply trunk is strapped to the top/side of the chase. This approach is also used in ranch plans for the living areas.

Duct chase in open living area built out from one wall



Protecting the Chase After Completion

Identifying the chase as a space intended to be separate from surrounding unconditioned spaces is difficult at best. Researchers have not yet seen a consistently effective method. Communication is again an important factor. Advisory notices to cable, security, and phone installers should be posted in conspicuous locations such as the panel box, attic access hatch, or wiring service entrance. Since these cannot clearly identify the location of the boundary in the attic, they should advise the installer to seal any penetrations to drywall made from unconditioned spaces. Sealing the penetrations should be standard practice regardless, but often it isn't.

Appendix F

SOLAR WATER HEATING

Solar water heating systems reduce water-heating costs by 50 to 80 percent over electric resistance and gas water heaters. When the cost of the solar system is amortized in a 30 year mortgage, the monthly utility bill savings can more than offset the small increase in monthly mortgage costs. This provides the homeowner with a positive cash flow from date of move-in. Those savings continue to accrue and provide a hedge against rising electric and gas rates. In an affordable housing (low-income or subsidized housing) scenario, installing a solar water heater will reduce the eventual expenditure of LIHEAP funds, which assist residents with a stipend to offset the cost of their energy bills.

In Florida, two types of solar heaters, active and passive systems, are most frequently used by homebuilders and homeowners. They work like this:

Active Solar Water Heater
In an "active" system, sunlight heats the roof collector, which activates a pump and controller. The pump moves cool water from the bottom of the water heater to the collector for sun warming. The heated water circulates from the collector to the tank. When the water in the tank is warmer than the collector water, the controller switches off the pump.

Passive Solar Water Heater
An Integral Collector Storage "passive" system (ICS) combines a storage tank and collector in one unit. Sunlight heats water in the ICS throughout the day. When hot water is used in the home, it is delivered directly from the water heater then replaced by solar heated water from the ICS. This system requires no pumps or controls for operation.

Active & Passive Systems
In both active and passive solar systems, a gas or electric water heater provides backup during periods of prolonged cloudy weather or excessive demand. This assures a seamless supply of household hot water. Since the 1920's, Florida home builders and home owners have been successfully using solar water heaters as an affordable water heating technology. The Florida solar industry, which offers state certified solar systems and licensed contractors, is the most regulated water-heating provider.

BENEFITS

Consumer Demand

- 43% of consumers, responding to a Department of Energy (1998) sponsored survey, said solar should be a standard new home feature.
- 78% said they would have seriously considered solar if it was recommended by their builder.
- 40% reported that if solar had been a standard feature in their new home, they would have been willing to pay, on average, $21 more a month on their mortgage payment.
- It helps maximize credit points on the Florida Energy Code.
- A solar water heater gives you the greatest number of "credit points," in the Florida Energy Code, of all the water heating options. When trying to reduce points for code compliance, a solar water heating system often is the most cost-effective solution.
- It provides market differentiation. By installing a solar water heater, a home can be marketed as "energy efficient" and purchasers can access preferential energy efficient loans. Due to the savings from the energy efficient improvements, the buyer with the energy efficient mortgage can afford to include additional upgrades. So for the same monthly outlay, the energy efficient home buyer gets more for their money than the standard home buyer.

Avoided Emissions

According to the US Environmental Protection Agency's emissions calculator, the average solar water heater will avoid 22 pounds of Nitrogen Oxides, 45 pounds of Sulfur Dioxide, and 8,237 pounds of Carbon Dioxide per system,

per year. As a corollary, using a solar water heater reduces carbon dioxide emissions equal to the emissions from driving approximately 10,296 miles in an average passenger car.

NOTABLE PROJECTS

SWAP

The Solar Weatherization Assistance Program (SWAP) was a joint effort of the U.S. Department of Energy (DOE), the Florida Department of Community Affairs (DCA) and the Florida Solar Energy Center (FSEC) to provide solar water heating systems for low-income residents in Florida. Raising families, incurring everyday bills and purchasing common necessities are all part of daily life that can rapidly drain a family's budget. This is especially burdensome for low-income and elderly residents on a fixed income. A major part of the budgetary concerns are the recurrent and unavoidable electric bills. In northern colder climates, weatherization programs assist low-income clients in reducing their energy costs by conducting weatherization on existing homes.

Very often many northern weatherization measures such as caulking and weatherstripping are not cost-effective in warmer climates. Therefore, Florida developed a pilot weatherization program to take advantage of Florida's abundant and everlasting solar energy resource to help reduce energy costs in low-income residences.

Several types of solar systems were installed under the SWAP program. The primary ones were the Integral Collector Storage (ICS) and the direct pumped systems. Of course, both ICS and pumped systems include a back-up electric water heater for use during inclement weather.

The SWAP Program installed 800 systems throughout Florida, with an average system cost of $1555 (excluding hot water tank, including labor).

For more information, go to http://alpha.fsec.ucf.edu/swap/index.htp

SunBuilt

The Florida Solar Energy Research and Education Foundation, in cooperation with the Florida Homebuilders Association, instituted the SunBuilt program, which provided a financial incentive to large Florida home builders (i.e., build at least 50 homes per year) to install solar water heaters on their model homes. In exchange for the incentive the homebuilder agreed to offer solar water heating as an option to their customers. To date, over 40 builders have embraced the program. The average system cost is $1575 (including hot water tank, excluding labor). This past year, the Florida Home Builders Association recognized SunBuilt builders with its prestigious Aurora Award for the first time.

For more information, go to www.sunbuilt.org

Appendix G

IEQ Credit 3: Construction IAQ Management Plan — 1-2

INTENT:
Prevent indoor air quality problems resulting from the construction/renovation process, to sustain long term installer and occupant health and comfort.

REQUIREMENT:
Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

- ☐ During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy (Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999). (1 point)
- ☐ Conduct a minimum two-week building flushout with new filtration media at 100% outside air after construction ends and prior to occupancy, OR, conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445. (1 point)

TECHNOLOGIES/STRATEGIES:
Specify containment control strategies including protecting the HVAC system, controlling pollutant sources, interrupting pathways for contamination, enforcing proper housekeeping and coordinating schedules to minimize disruption. Specify the construction sequencing to install absorptive materials after the prescribed dry or cure time of wet finishes to minimize adverse impacts on indoor air quality. Materials directly exposed to moisture through precipitation, plumbing leaks, or condensation from the HVAC system are susceptible to microbial contamination. Absorptive materials to protect and sequence installation include; insulation, carpeting, ceiling tiles, and gypsum products. Appoint an IEQ Manager with owner's authority to inspect IEQ problems and require mitigation as necessary.

Appendix H

Environmental Product Resources

General Green Building
(http://yosemite1.epa.gov/oppt/eppstand2.nsf/Pages/DisplayAisle.html?OpenDocument&Hardware%20Store&Green%20Building)

Carpet
(http://yosemite1.epa.gov/oppt/eppstand2.nsf/Pages/DisplayAisle.html?OpenDocument&Hardware%20Store&Carpet)

Heating and Air
(http://yosemite1.epa.gov/oppt/eppstand2.nsf/Pages/DisplayAisle.html?OpenDocument&Hardware%20Store&Heating%20%26%20Air)

Lights
(http://yosemite1.epa.gov/oppt/eppstand2.nsf/Pages/DisplayAisle.html?OpenDocument&Hardware%20Store&Lights)

Paints
(http://yosemite1.epa.gov/oppt/eppstand2.nsf/Pages/DisplayAisle.html?OpenDocument&Hardware%20Store&Paints%20and%20accessories)

Plumbing
(http://yosemite1.epa.gov/oppt/eppstand2.nsf/Pages/DisplayAisle.html?OpenDocument&Hardware%20Store&Plumbing)

Sustainable Design Resources

	Description	Web Site/ Contact Information
General Information		
E-Mail Services		
Green Clips	GreenClips is a free e-mail clipping service providing summaries of news on sustainable building design and related government and business issues published every two weeks by e-mail.	Subscribe at: http://www.greendesign.net/greenclips/index.html (this is currently a free publication).
Green Building Discussion Group	The Green Building is a discussion forum for anyone interested in green building issues. The intent of this forum is to discuss and promote green building principles and practices on all types of projects. Subscribers may initiate questions regarding green building, or respond to other subscriber's inquiries. The web site includes archives of past discussions. Environmental Building News sponsors the site.	Subscribe at: http://www.buildinggreen.com/elists/gb_signup.html For a discussion specific to large buildings, check out the Big Green Discussion Group at http://www.buildinggreen.com/bg_signup.html
Manuals/Books		
Sustainable Building Technical Manual	This manual helps designers, builders, owners, and operators of public and private facilities implement green strategies. Produced by Public Technologies Inc., the U.S. Green Building Council, and the U.S. Department of Energy, with additional support from the U.S. Environmental Protection Agency, the manual offers step-by-step guidelines for energy- and resource-efficient building during pre-design, design, construction, operations, and management. It also includes chapters on sustainable building economics and future issues and trends.	This manual can be ordered from the US Green Building Council's web site at: http://www.usgbc.org/programs/sbtm.htm. (The guide can be downloaded at no charge by USGBC members.) It can also be viewed from the Dept. of Energy site: http://www.sustainable.doe.gov/freshstart/articles/ptipub.htm
Organizations		
AIA Committee on the Environment (COTE)	COTE promotes environmental leadership among architects and seeks to make environmental considerations and sustainable design integral to the practice of architecture.	http://www.aia.org/pia/cote/
Sustainable Buildings Industries Council	The Sustainable Buildings Industry Council (SBIC) is an independent, nonprofit organization whose mission is to advance the design, affordability, energy performance, and environmental soundness of residential, institutional and commercial buildings.	http://www.sbicouncil.org

Sustainable Design Resources

U.S. Green Building Council	The US Green Building Council a nonprofit, consensus coalition promoting the understanding, development, and accelerated implementation of "Green Building" policies, programs, technologies, standards and design practices. There are over 275 members including manufacturers, A/E firms, environmental organizations, retail and business owners, and financial institutions.	http://www.usgbc.org

Publications

Environmental Design & Construction Magazine	ED&C magazine covers all aspects of environmentally sound building design and construction including recycled building products, energy efficiency, alternative energy sources, indoor air quality, systems of waste disposal and re-use, and more.	http://www.edcmag.com. This is currently a free publication.
Environmental Building News (EBN)	EBN is a highly regarded publication in the green building industry. Subscriptions are $127/1 year or $229/ 2 years. EBN also publishes a catalog of green building materials called GreenSpec (see Sustainable Material resources).	Subscribe at: http://www.buildinggreen.com

Where to Order Publications

OIKOS Web Site	Information on sustainable products and manufacturers are featured on this site, including an on-line bookstore. This site also provides current green building news, updated weekly.	http://www.oikos.com
Rocky Mountain Institute	Order sustainable design resources from this web site.	http://www.rmi.org/sitepages/pid99.php

Construction Waste Management

California Integrated Waste Management Board	The California Integrated Waste Management Board site has a lot of information specific to California, however their Construction and Demolition Debris Recycling Program is a model that will be useful to anyone.	http://www.ciwmb.ca.gov/ConDemo/
King County	The King County, Washington's Department of Natural Resource's Solid Waste Division web site has extensive information on sustainable design and construction waste.	http://dnr.metrokc.gov/market/rcweb/susbldgs.htm
Waste Spec.	Model Specifications for Construction Waste Reduction, Reuse, and Recycling developed by the Triangle J Council of Governments.	http://www.tjcog.dst.nc.us/cdwaste.htm

Sustainable Design Resources

Design Tools

Web Sites

Building Energy Software Tools	Described on this DOE Energy Efficiency and Renewable Energy web site page are 151 energy-related software tools for buildings, with an emphasis on using renewable energy and achieving energy efficiency and sustainability in buildings. Includes EnergyPlus, a new generation energy simulation program.	http://www.eren.doe.gov/buildings/tools_directory/

Software

DOE2	DOE2. DOE-2 is a widely used and accepted building energy analysis program that can predict the energy use and cost for all types of buildings. DOE-2 uses a description of the building layout, constructions, usage, conditioning systems (lighting, HVAC, etc.) and utility rates provided by the user, along with weather data, to perform an hourly simulation of the building and to estimate utility bills. The newest DOE-2 building energy simulation and cost calculation engine is DOE-2.2.	You can review an Overview of DOE-2.2 on this web site: http://www.doe2.com/.
Energy10	Energy10. Energy-10 software is a powerful design tool that analyzes and illustrates the energy and cost savings that can be achieved through more than a dozen sustainable design strategies. Hourly energy simulations help you quantify, assess, and clearly depict the benefits of daylighting, passive solar heating, natural ventilation, well-insulated envelopes, better windows, lighting systems, mechanical equipment, and more. Energy-10 software calculates 'whole building performance' and is best suited to buildings with one or two zones.	See http://www.sbicouncil.org/ for more information.

Life-Cycle Cost Analysis

Building for Environmental and Economic Sustainability (BEES)	BEES is a tool that helps in the identifying of building materials that will reduce energy use, improve air quality and other conditions that could improve the environmental performance of buildings. The software program was developed under a federal interagency agreement by the National Institute of Standards and Technology with funding from EPA.	The BEES program runs on a Windows-based system. Currently available free on disk from the Pollution Prevention Information Clearinghouse at 202-260-1023, or online at http://www.bfrl.nist.gov/oae/bees.html

Sustainable Design Resources

Material Selection

Comprehensive Procurement Guidelines		http://www.epa.gov/cpg/
Environmentally Preferable Purchasing		http://www.epa.gov/opptintr/epp/
GreenSpec	The GreenSpec Binder provides up-to-date information on more than 1,200 green building products selected by the editors of Environmental Building News. Available in hard copy or an on-line version.	http://www.greenspec.com
AIA Environmental Resource Guide (ERG)	The ERG is a comprehensive reference on the environmental performance of building materials. The ERG draws on information from available sources (as distinct from independent testing). During its development, the ERG obtains information from product manufacturers, works with their representative trade associations, and uses knowledgeable individuals from manufacturing, design, research, and academic sectors to participate in the review of the information. The information in the manual addresses various phases of a building material's life-cycle. However, there is a vast amount of information and the reader is left to draw many of their own conclusions regarding material comparisons.	http://www.aia.org
Resources for Environmental Design Index (REDI)	REDI is an on-line database of green building products featuring more than 1,800 companies. Also available at this web site is a Product Gallery, with highlights of new products that save energy, natural resources and personal health.	The database is available at http://www.oikos.com/
National Park Service Sustainable Design & Construction Database	This database has approximately 1,300 product listings from over 550 manufacturers, listings of over 7,000 recyclers of construction debris nationwide, and expanded listings of books, periodicals, organizations, and on-line sources of sustainable information. Last updated in 1996, it is still a useful tool.	http://www.nps.gov/dsc/dsgncnstr/susdb/

Sustainable Design Resources

Rating Systems

Leadership in Energy and Environmental Design (LEED)	LEED™ is a self-assessing system designed for rating new and existing commercial, institutional, and high-rise residential buildings. It evaluates environmental performance from a "whole building" perspective over a building's life cycle, providing a definitive standard for what constitutes a "green building." LEED™ is based on accepted energy and environmental principles and strikes a balance between known effective practices and emerging concepts.	May be downloaded from http://www.usgbc.org Or http://www.leedbuilding.org

Sustainable Design Strategies

Green Building Advisor (GBA)	Green Building Advisor (GBA). GBA is an interactive software program that helps identify actions to reduce the environmental impacts of a building project, while ensuring healthy and productive indoor spaces. Provides sustainable strategies for various aspects of sustainable design including energy efficiency, site planning, safeguarding water, conserving materials and resources, and indoor environmental quality.	Currently $179.00 apiece, available through the Environmental Building News web site. http://www.buildinggreen.com/orders/gba_info.html
Whole Building Design Guide	The WBDG is a comprehensive, Internet-based portal to a wide range of Federal and private sector, building-related guidance, criteria and technology. The Guide describes the whole building design approach and its relationship to the quality of the buildings the Federal Government wants to procure. The Internet-based Guide will replace outdated, redundant paper-based criteria documents.	www.wbdg.org

Sustainable Principles

Energy Financing

Green Energy Financing	This site is sponsored by the U.S. DOE and the U.S. EPA, and developed by the Center for Renewable Energy and Sustainable Technology. This database is a one-stop shop of energy efficiency financing resources for the homeowner, building manager, architect, lending institution, or other user interested in clean energy financing.	http://www.energyfinance.org
Database of State Incentives for Renewable Energy	The U.S. Department of Energy initiated the National Database of State Incentives for Renewable Energy (DSIRE) through the Interstate Renewable Energy Council to survey each of the 50 states for available information on financial and regulatory incentives that are designed to promote the application of renewable energy technologies.	http://www.dcs.ncsu.edu/solar/dsire/dsire.cfm

Sustainable Design Resources

Energy Efficiency

EPA Energy Star	ENERGY STAR offers a suite of programs designed to assist those who wish to pursue energy-efficient upgrades. These programs include: Energy Start Buildings and Green Lights Partnership; Energy Star Products; Energy Start Building Allies; Energy Star Purchasing.	http://www.energystar.gov

Renewable/ Alternative Energy

American Solar Energy Society (ASES)	ASES is a national organization dedicated to advancing the use of solar energy for the benefit of U.S. citizens and the global environment.	http://www.ases.org
The Sustainable Buildings Industry Council (SBIC)	SBIC is a nonprofit organization whose mission is to advance the design, affordability, energy performance, and environmental soundness of residential, institutional, and commercial buildings nationwide. SBIC offers professional training, consumer education, and energy analysis tools. SBIC provides guidelines, software, and general information about energy conservation measures, energy efficient equipment and appliances, daylighting, and sustainable architecture.	http://www.sbicouncil.org
Renewable Energy Policy Project	REPP supports the advancement of renewable energy technology through policy research, including our Issue Briefs, Research Reports, and Initiatives. They seek to define growth strategies for renewables that respond to competitive energy markets and environmental needs.	http://www.repp.org. Also see the guide to understanding green energy at http://www.repp.org/greene/greeneduhome.html.

Safeguarding Water

Rainwater Catchment	American Rainwater Catchment Systems Association.	http://www.nku.edu/~biosci/arcsa/arcsa.html
Rainwater Harvesting	A Texas Guide to Rainwater Harvesting from the Texas Water Development Board.	http://www.twdb.state.tx.us/assistance/conservation/Rain.htm

Water Reuse	The Water Reuse Association of California is dedicated to increasing the amount of water recycling in California.	http://www.webcom.com/h2o/

Indoor Environmental Quality

Lawrence Berkeley Lab's Indoor Environment Program	The lab is directed toward greatly reducing the energy used for thermally conditioning and distributing ventilation air in buildings and simultaneously improving indoor air quality (IAQ), thermal comfort and the health and productivity of building occupants.	http://eande.lbl.gov/IEP/
Occupational Safety and Health Administration	The Indoor Air Quality page at this site includes information on recognizing indoor air quality problems, controls, compliance, evaluation, and related technical links.	http://www.osha-slc.gov/SLTC/indoorairquality/index.html
U.S. Environmental Protection Agency	This Indoor Air Quality page at this site includes an introduction to indoor air quality (IAQ); IAQ in homes, schools, and offices; IAQ publications, and links.	http://www.epa.gov/iaq

Specifications

GreenSpec	Environmental Building News' GreenSpec. GreenSpec includes a manual on green specifications.	May be ordered at http://www.buildinggreen.com.
Green Building Materials: A Guide to Product Selection and Specification	Green Building Materials: A Guide to Product Selection and Specification. A book by Ross Spiegel and Dru Meadows. Published by John Wiley & Sons.	
Sustainable Building Technical Manual	There is a chapter on sustainable specifications in this manual (see reference in General Information section of this spreadsheet).	http://www.sustainable.doe.gov/freshstart/articles/ptipub.htm

Federal Programs

Energy Star Buildings for Federal Agencies	Energy saving tools, resources and success stories for Federal agencies.	http://yosemite1.epa.gov/estar/business.nsf/webmenus/FederalAgencies
Greening Federal Facilities Web Site	A resource guide for Federal facility managers to assist them in reducing energy consumption and costs, improving the working environment of the facilities they manage, and reducing the environmental impacts of their operations.	http://www.eren.doe.gov/femp/greenfed/

Additional Resource List

Architectural Resource Database
A CD-ROM of sustainable, resource efficient products.
ADPSR@aol.com or call 510-273-2428 (CA)

Austin's Green Building Site
Contains sustainable building sourcebook.
www.greenbuilder.com

Building for Environmental and Economic Sustainability
Decision tool for selecting building product based on environmental attributes and economics.
www.bfrl.nist.gov/oae/bees.html

Center of Excellence for Sustainable Development
Contains articles, case studies, resource database and links on sustainable development.
http://www.sustainable.doe.gov/

Clean Washington Center
www.cwc.org/briefs/construction.html

EPA's Energy Star Program
This program is a dynamic government/industry partnership that makes it easy for businesses and consumers to save money and protect the environment. Includes information on how to benchmark the energy performance of your building or home.
www.energystar.gov

EPA's WasteWise Website
WasteWise is a free, voluntary, EPA program through which organizations eliminate costly municipal solid waste, benefiting their bottom line and the environment. WasteWise is a flexible program that allows partners to design their own solid waste reduction programs tailored to their needs.
www.epa.gov/wastewise

Earthcraft House Program
Greater Atlanta Home Builders Association's environmental certification program for homebuilders.
www.southface.org/home/ech/echintro.htm

HOK Sustainable Building
http://www.hok.com

North Carolina Green Building Council
Contains publications and products directory
www.recycle.net/recycle/ncra/GBCHome.html

Renewable Energy Policy Project and Center for Renewable Energy and Sustainable Technology (REPP-CREST)
Documents and databases on sustainable living (including the environment and green products and practices) supplement the primary energy focus of this site. Archives from Greenbuilding, GreenClips and other mailing lists and discussion groups are available, and most are searchable. The site also includes case studies and numerous links to other sites.
www.solstice.crest.org

Smart Growth Network
www.smartgrowth.org

U.S. Department of Energy's Building America Program
This program works with members of the home building industry to produce quality homes that use up to 50% less energy without costing more to build.
www.eren.doe.gov/buildings/building_america/relatedsites.shtml

U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) System
USGBC's Green building rating system.
www.usgbc.org/programs/index.htm

Government and Military

Army Environmental Policy Institute (AEPI)**
http://aepi.gatech.edu/

Department of Energy
www.eren.doe.gov

Department of the Navy Environmental Programs
http://enviro.navy.mil/

Federal Energy Management Program
http://www.eren.doe.gov/femp/

Federal Technology Alerts
Gives federal technology alerts with a focus on energy efficiency, water conservation, and renewable energy.
www.pnl.gov/fta

Ft. Ord Military Base Pilot Deconstruction Project
http://www.fora.org/pilot.html

Government of British Columbia – Ministry of Advanced Education Training and Technology
(sustainable building guidelines)
http://www.aett.gov.bc.ca/environmental/data/environt/sec-one.htm#toc

Greening Federal Facilities Guidebook
http://www.eren.doe.gov/femp/greenfed/

Seattle's Sustainable Building Policy
http://www.ci.seattle.wa.us/oem/SBP.htm
http://www.ci.seattle.wa.us/oem/spcfpolicies.htm
http://clerk.ci.seattle.wa.us/~public/RESN1.htm

Thoreau Center for Sustainability - Presidio
http://www.thoreau.org/design.html

US EPA's Office of Solid Waste – Comprehensive Procurement Guidelines
Outlines Comprehensive Procurement Guidelines (CPG), which designate recycled content items and recommend purchasing practices for agencies using Federal funds. Includes Recovered Material Advisory Notices (RMAN), which recommend recycled-content levels for CPG designated items. Provides product information, supplier lists and case studies.
www.epa.gov/cpg

Rebuild America
Link to the "College and University Sector" section of the home page.
http://www.rebuild.org/strategic/oncampus/oncampus.htm

Sustainability at University of British Columbia, see deconstruction project and Liu Building
http://www.sustain.ubc.ca/whatsnew_archive.html

Construction and Demolition

A Guide to Deconstruction - HUD
http://www.huduser.org/publications/destech/decon.html

Air Force Center for Environmental Excellence (AFCEE):
This site contains a wealth of environmental information including resources on sustainable construction.
http://www.afcee.brooks.af.mil

Building Savings: Strategies for Waste Reduction of Construction and Demolition Debris from Buildings. **EPA530-F-00-001. June 2000.**
This series of case studies on construction materials diversion provides valuable tips on C&D reuse and recycling. The case studies, covering projects ranging from an apartment complex to a grocery store, provide details on implementation costs, cost savings, and tips for replication.
www.ilsr.org/recycling/buildingdebris.pdf

C&D Recycler.
This bimonthly journal includes feature stories; industry, product, and equipment news; and editorials on the construction and demolition recycling industry. Articles from the current issue are available online.
www.cdrecycler.com/rtsite1/cdmagindex.asp

C&D - U.S. Army Corp of Engineers:
http://grn.com/grn/library/gloss.htm

California Integrated Waste Management Board (CIWMB)
CIWMB's construction and demolition recycling Web site is an excellent resource, providing commodity profiles, online reports, case studies, and sample C&D recycling ordinances for local governments.
www.ciwmb.ca.gov/condemo/

Characterization of Building-Related Construction and Demolition Debris in the U.S. EPA530-R-98-010. June 1998.
This report characterizes the quantity and composition of building-related C&D debris generated in the U.S. and summarizes management practices for this waste stream. It focuses on construction, demolition, and renovation of residential and nonresidential buildings.
www.epa.gov/epaoswer/hazwaste/sqg/c&d-rpt.pdf

Deconstruction Guide – U.S. Department of Housing and Urban Development
www.huduser.org/publications/destech/decon.html

INFORM Reports: Building for the Future: Strategies to Reduce C&D Wastes in Municipal Projects
http://www.informinc.org/

Naval Facilities Engineering Service Center
Contains construction and demolition information.
http://www.nfesc.navy.mil

OSHA Demolition Guidelines
http://www.osha-slc.gov/SLTC/demolition/index.html

Smart Growth Network – Series of Reports on Deconstruction
http://www.smartgrowth.org/ISSUEAREAS/buildings.html

Sustainable Architecture Compendium. **National Pollution Prevention Center for Higher Education, University of Michigan. August 1998.**
Part of the Pollution Prevention in Architecture Series, this instructive group of reports features recycling and reuse "modules" on topics such as C&D recycling, adaptive reuse, and design for materials recovery.
www.umich.edu/~nppcpub/resources/compendia/architecture.html#ranr

University of Florida Center for Construction and Environment
One of the few academic centers of its kind in the country, the Center for Construction and Environment conducts research and undertakes projects to minimize environmental impacts from building construction and demolition. The Web site includes case studies on past and current deconstruction projects.
www.cce.ufl.edu

Wilmot and Associates, Inc.
http://www.wilmotandassociates.com/

Specs

Air Force Center for Environmental Excellence (AFCEE)
Has sample waste management plans and excel spreadsheets designed to assist in comparing costs or recycling and disposal options as well as Construction Waste Management Pocket Guide and Environmentally Responsible Facilities Guide.
www.afcee.brooks.af.mil

Inform
www.informinc.org/cdreport.html

Navy
http://criteria.navfac.navy.mil/criteria/guidespecs
Waste management specs include 01572A and 01572N.
www.ccb.org/ufgs/ufgs.htm

Research Triangle Park
Sample environmental specs by CSI Section
www.epa.gov/rtp/new-bldg/environmental

Sample Statements of Work
www.afcee.brooks.af.mil/EQ/p2cd/sow.htm

University of Texas – Houston "Sustainable" Design Health Sciences Center
Under first heading "BSA costs".
http://www.uth.tmc.edu/ut_general/admin_fin/ss/FPD/BSA_Docu/BSAindex.html

Recycling and Procurement

2000 Buy-Recycled Series: Construction Products. EPA530-F-00-009. June 2000.
This fact sheet lists EPA's recommended post-consumer recycled content percentages of various construction products. Though geared toward federal facilities seeking assistance in complying with EPA's Comprehensive Procurement Guidelines, the information provided is applicable to a wide audience. The fact sheet includes short case studies on local, state, and federal government construction projects.
www.epa.gov/cpg/const-00.pdf

American Forest and Paper Association
This industry association produces the "National Wood Recycling Directory", an on-line searchable database including over 700 wood recycling facilities.
www.afandpa.org/recycling/Rec_introduction.html

America Recycles Day
National movement supported by EPA, which promotes buying recycled products. The website includes an interactive tour of the American Green Dream House, a house with many recycled components given away to the winner of their annual contest.
www.americarecyclesday.org

Asphalt Recycling and Reclaiming Association
An association of businesses involved in the recovery of asphalt, especially from road paving projects.
www.arra.org

California Integrated Waste Management Board
Contains clip art on recycling.
http://www.ciwmb.ca.gov/gallery/

Construction Materials Recycling Association (CMRA)
This organization supports the needs of the rapidly expanding North American construction waste and demolition debris processing and recycling industry.

www.cdrecycling.org

EPA's Comprehensive Procurement Guidelines
This site has information on recycled-content construction products appropriate for government or commercial buildings.
www.epa.gov/cpg/products.htm#construct

EPA's Jobs Through Recycling Program - Construction Materials Commodity Page
This Web site profiles construction materials reuse and recycling, and provides links to various reports, organizations, and list server postings covering everything from asphalt to particle board.
www.epa.gov/jtr/comm/construc.htm

Environmental Council of Concrete Organizations
This organization is a coalition of concrete industry associations focused on concrete and the environment. ECCO's catalog includes several publications on concrete recycling issues.
www.ecco.org

Environmentally Preferable Products List Serve
The EPPNET provides an open forum for the posting and discussion of news and information relating to the procurement of environmentally-preferable products--information such as product specifications, vendor lists, pricing, strategies to achieve EPP goals, and federal procurement policies.
Contact: Rebecca Bartlett at NERC--802-254-3636 or rbartlet@sover.net

Florida Dept. of Environmental Protection
This State of Florida site contains construction and demolition debris recycling resources.
www.dep.state.fl.us/dwm

Georgia Dept. of Natural Resource - Pollution Prevention Assistance Division
This State of Georgia site contains construction and demolition debris recycling resources.
www.ganet.org/dnr/p2ad/const_demo.html

General Services Administration
GSA's Federal Supply Service offers a wide range of environmentally oriented products and services.
www.fss.gsa.gov/environ

Global Recycling Net (includes Construction Materials Recycling Association):
http://grn.com/

GreenOrder.com
A new online product service. Easy to use customer/order interface.
http://www.greenorder.com

H2E - AHA/EPA Initiative
www.h2e-online.org

Institute for Local Self Reliance's (ILSR's) Building Deconstruction Page
Part of ILSR's Waste to Wealth waste reduction and recycling-based economic development program, the building deconstruction page highlights some of the organization's projects and publications.
www.ilsr.org/recycling/builddecon.html

Janitorial/Cleaning Products
www.westp2net.org/janitorial/jp4.htm

Lists of links
Buy-recycled links
http://www.resource-recycling.com/buyrecyc.html

National Association of State Purchasing Officials
This database provides a central repository for contract and commodity information concerning recycled products. Of particular use for purchasing agents.
http://fcn.state.fl.us/bpsr/drc_notice.html

Pennsylvania Department of Environmental Protection
Information university and college waste reduction opportunities, recycling, tip sheets and other resources.
http://www.dep.state.pa.us/dep/educators/default.htm

Plastics Sourcebook
Web site with numerous recycled content plastic products.
http://sourcebook.plasticsresource.com/entire/index.phtml

Steel Recycling Institute
An industry association, has information about recycling and buying recycled steel building products.
www.recycle-steel.org/index2.html

Reuse Development Organization (ReDO)
Non-profit organization promoting reuse of numerous materials, including building products.
www.redo.org

Surplus and Scrap Wood Products Exchange
This is an online service for exchanging wood byproducts between sellers and buyers.
www.woodexchange.com

The Harris Directory
An online database of recycled building products available by subscription only.
www.harrisdirectory.com

The Recycling Data Network
A subscription service. More than 4,500 products listed. Searches and sorts by state.
http://www.recyclingdata.com/

The Sourcebook for Sustainable Design, 1992
This directory of environmentally responsible materials and processes contains listings of over 100 recycled products used in construction applications. Sorted by CSI division. To order, contact the Boston Society of Architects, 52 Broad Street, Boston, MA 02109-4301. Phone: 617 951-1433.
http://www.architects.org

This is a national center created in partnership with the Federal Highway Administration (FHWA) to promote the wise use of recycled materials (pavements, secondary, waste, byproduct materials) in the highway environment.
www.rmrc.unh.edu

Used Building Materials Association
http://www.ubma.org/

General Healthcare P2 and Recycling Sites

American Hospital Association/ American Society for Healthcare Environmental Services for the AHA (ASHES) –
www.aha.org

Healthcare Without Harm
www.noharm.org

Hospital for Healthy Environment
Home page for joint initiative between EPA and AHA. Contains information on procurement, chemical waste minimization, and mercury waste reduction.
www.h2e-online.org

Sustainable Hospitals
www.sustainablehospitals.org

Wheelchair Recycling Program
www.wrp.org

Laboratory P2 Sites/Publications

American Chemical Society. (1993) **Less is Better: Laboratory Chemical Waste Management for Waste Reduction** (2nd ed.) Washington D.C.

Biomedical Laboratory Code of Practice
http://www.p2pays.org/ref/04/03283.htm/

EPA – Enforcement Alert
July 2000 issue on compliance issues at institutions.
http://es.epa.gov/oeca/ore/enfalert/vol3num7.html

Laboratory Waste Minimization and Pollution Prevention
Direct link to chapter containing numerous links on laboratory waste reduction.
http://www.p2pays.org/ref/01/00779/ch15.htm

National Research Council – Prudent Practices for Disposal of Chemicals from Laboratories, National Academy Press, Washington, D.C.

University of Illinois at Urbana
http://www.ehs.uiuc.edu/~chem/

Center for Safety in the Arts: On-line Publications

Center for Safety in the Arts Books, Videos and Other Publications
http://gopher.artswire.org:70/1csa/books

"**Checklist for Art Schools and Departments**" Michael McCann
"**Health Hazards Manual for Artists**" Michael McCann
http://artsnet.heinz.cmu.edu:70/0/csa/arthazards/genarthaz/

"**Making Art Safely**" Merle Spandorfer, Deborah Curtiess, Jack Snyder
http://artsnet.heinz.cmu.edu:70/0/csa/books/spandorfer.toc

"**School Safety Procedures for Art and Industrial Art Programs**"
http://artsnet.heinz.cmu.edu:70/0/csa/books/schools/school10.txt

Vendors

Bayview Technology
Sells VendingMiser and other productions that help save energy in vending machines and other devices.
(800) 770-8539
http://www.bayviewtech.com/

Applied Ordnance Technology, Inc.
Provides support for HSMS systems.
Paul Clark
(703) 769-4725

ENMAX
Sells and offers support for HMMS systems.
(801) 547-1551 ext. 353

Upcoming Conferences

Greenprints 2002 – Sustainable Communities by Design
February 20-23, 2002
Hyatt Regency
Atlanta, Georgia
The 5th Annual Greenprints Conference and Green Tradeshow continues to provide cutting edge curriculum that invokes new thought and action to improve our built environment. More hands-on interaction and networking opportunities. Experience the southeast's premier conference on sustainable design and construction.
www.greenprints.org

Appendix I

IEQ Credit 4:
Low-Emitting Materials

1-4

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

REQUIREMENT:
Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:

- ☐ Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51 (1 point)
- ☐ Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements. (1 point)
- ☐ Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. (1 point)
- ☐ Composite wood or agrifiber products must contain no added urea-formaldehyde resins. (1 point)

TECHNOLOGIES/STRATEGIES:
Evaluate and preferentially specify materials that are low emitting, non-irritating, nontoxic and chemically inert. Request and evaluate emissions test data from manufacturers for comparative products. Ensure that VOC limits are clearly stated in specifications, in General Conditions, or in each section where adhesives, sealants, coatings, carpets, and composite woods are addressed.

IEQ Credit 5:
Indoor Chemical and Pollutant Source Control

1

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

REQUIREMENT:
Design to minimize cross-contamination of regularly occupied areas by chemical pollutants:

- ☐ Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

TECHNOLOGIES/STRATEGIES:
Design to physically isolate activities associated with chemical contaminants from other locations in the building, providing dedicated systems to contain and remove chemical pollutants from source emitters at source locations.

Applicable measures include eliminating or isolating high hazard areas; designing all housekeeping chemical storage and mixing areas (central storage facilities and janitors closets) to allow for secure product storage; designing copy/fax/printer/printing rooms with structural deck to deck partitions and dedicated exhaust ventilation systems; and including permanent architectural entryway system(s) to catch and hold particles to keep them from entering and contaminating the building interior.