



# 2012 Public Works Project of the Year

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## A W A R D N O M I N A T I O N

March 1, 2012



**Transit Operations Facility**  
City of Raleigh  
North Carolina



**PUBLIC WORKS PROJECT OF THE YEAR**  
**AWARD NOMINATION**

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# Introduction

The City of Raleigh began operating its bus transit system out of a new, state of the art, \$24.5 million facility on May 27, 2011. This new facility is designed and constructed to be energy efficient, environmentally sustainable, and to use the most up-to date Green Building technologies. The project has been submitted to the Green Building Council (GBC) for review and approval. At submittal of this application, the GBC has completed their design review and is conducting construction review.

The project is anticipated to achieve LEED Platinum, the first such integrated facility in the nation to do so.

## Background

The City of Raleigh obtained a private bus transit system in the mid 70s and moved the 50-bus fleet operation into a facility located on 4 acres of a former landfill.

By 2008, Raleigh's transit system had long outgrown the original facility, resulting in operational inefficiency. The City searched for a suitable site with sufficient space to house an expanding system for another four decades.

In December 2008, Raleigh secured a 23-acre site, east of Downtown, convenient to developed transportation corridors. The expectation was that this project would follow the usual multi-year process for large capital projects.

Two months later, on February 17, 2009 the President signed the American Recovery and Reinvestment Act (ARRA), and Raleigh officials along with their State and Federal counterparts, quickly moved to bring this critical project to the forefront of the many competing needs in our area.

## Meeting the Challenge

Staff from Raleigh's Public Works Department, in conjunction with NC DOT and FTA's Division 4, researched new legislation to determine necessary steps for inclusion of this, at the time, conceptual project. Critical to those early discussions was the designation "Shovel Ready."



### **Shovel Ready**

The term “Shovel Ready” was prominently mentioned in ARRA since the project’s main priority was to create new jobs and retain existing jobs. Failure to achieve any of these tasks below risked failure to obtain ARRA funding.

Obstacles to overcome to obtain this critical designation included the following:

- the Design Build delivery method
- Funding Packages
- Property Rezoning

### **Design Build**

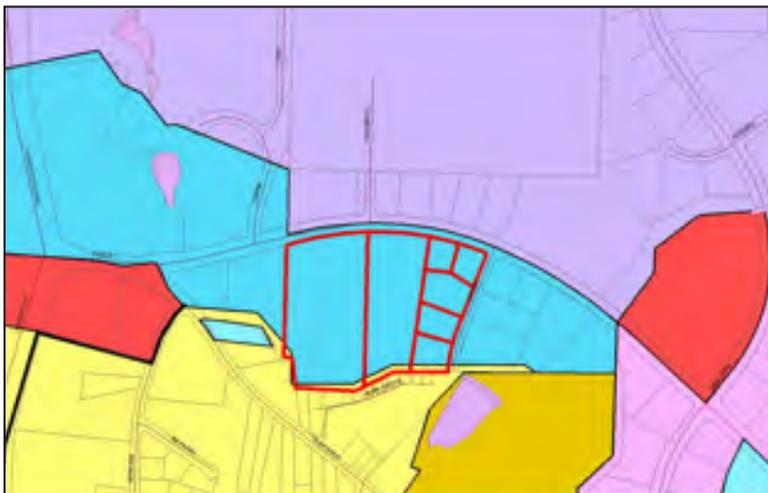
Design Build delivery method is rarely utilized for public building projects in North Carolina and requires the approval of the State Building Commission. The local team appeared before the SBC on April 28, 2009 and received their approval for Design Build, paving the way to secure necessary funding.

### **Funding**

Funding available through ARRA totaled \$11.6 million of the \$24.5 million project cost. Other sources were scrutinized to assemble the funding package, combining Local, State, and Federal funds to make up the rest.

### **Rezoning the Property**

The 23-acre site had been previously subdivided into seven commercial lots zoned for low density commercial, with some residential zones serving to provide a buffer between homes and a church along the south side of the property.



*Original Zoning Map,  
Blue is Low Density Office,  
Yellow is Residential*

### **Rezoning the Property (cont'd)**

Property rezoning in Raleigh, as is typical in many cities and towns, is a formal and deliberate process. Several bodies from city staff, citizens, neighborhood groups, the Planning Commission, and the City Council serve to thoroughly evaluate the merits of any changes to the adopted land use plan. The process can be cumbersome, but is necessary to assure desirable and orderly patterns of growth.

There were also other factors that complicated the project. The City was operating under an extremely compressed time frame, which dictated that some steps be accomplished out of the usual order of process. For instance, the initial presentation to the Planning Commission and City Council occurred before presentations to the neighborhood organization.

Rezoning requests in essentially every case include conditions intended to more narrowly define the extent of new development and alleviate concerns of neighbors. Since the project was in the earliest stages, the department needed to seek a very broad zoning classification without conditions. One Planning Commission member remarked that he had never encountered such a bold request during his tenure.

Rezoning of the property was achieved, although not without objections and apprehension by Planning Commission members. City Council approval was unanimous.

# Completion Date

At award of contract, the project was to be completed within 550 calendar days. Subsequent change orders increased contract time by 35 calendar days to 585. Substantial completion was obtained on day 585 in accordance with the contract.

Construction Start Date	October 19, 2009
Original Contract Completion Date	April 22, 2011
Substantial Completion Date	May 27, 2011

Extensions of contract time were evaluated and granted as follows:

Weather delays	5 days
Miscellaneous site changes and utility relocations	30 days



# Construction Schedule, Management, & Control Techniques

## **Design Build Delivery Method**

The project was constructed utilizing a Design Build delivery method. Authority to pursue Design Build was granted by the NC State Building Commission. Although the SBC allowed the use of Design Build, they were not empowered to waive the requirement for competitive bidding. This meant that the department could not engage the standard practice of securing a Design Build team based on qualifications.

To assure fairness and protection of City interests, a solicitation for pre-qualification of interested Design Build teams was employed. Interest was high with sixteen teams pre-qualified.

Design Build bridging documents would typically be limited to the schematic phase. To improve the schedule and better level the field for potential bidders, the department developed bridging documents through Design Development and provided a 100 percent site/civil package.

This approach meant Design Build teams were preparing proposals based on much more complete information. Permits for the site work had been obtained, so the successful Design Build team could proceed immediately with clearing, grading, utilities, storm water control, tree protection, and site preparation. The site work occurred at the same time as completion of construction documents.

Ultimately, ten teams submitted bid proposals. The successful Design Build team was headed by Brasfield & Gorrie, LLC and Cline Design Group, Inc.

## **Bridging Document Team Assistance - Compliance and Quality Oversight**

Early in the process, Raleigh assembled a team of consultants to assist with the development of Design Build Bridging documents. The team was headed by Williard Ferm Architects, PA and supported by WSP Sells, Maintenance Design Group, and Talbot and Associates.

There was a natural connection and overlap between the design development bridging documents with the full site/civil package and the Design Build Team. The bridging document team was retained for the duration of the project to assure strict compliance with the bridging documents and the quality of the final product.

This step positioned the bridging document team to act as an extension of the owner, making for a smooth transition as the project team expanded and construction started. This partnering was particularly effective during the review of submittals for mechanical and equipment systems.

### **Utilization of Design Charettes**

Design Charrettes were utilized to develop the initial master plan for the project. These were held in a central Downtown location and included members of the facility staff, Planning & Inspections staff, members of the bridging document team, and interested citizens. These were concentrated over one week of intensive brainstorming resulting in a preferred option, upon which the city focused a more detailed evaluation and cost analysis. This critical step facilitated a sense of ownership and helped to build momentum among all parties.



*Design Charrette focused on developing a conceptual plan and securing stakeholder ownership*

### **Geotechnical Exploration for Rock Excavation**

The site was located in an area known for rock, and there were visible rock outcroppings. During the concept development phase, geotechnical exploration was performed and the resulting report was included in the bid proposal documents. The report indicated areas of significant boulders.

Prior to receipt of bid proposals, Design Build teams were allowed to enter the site with equipment to perform their own exploratory efforts. There was a bid alternate that was accepted for unclassified excavation. This was a very beneficial move because it eliminated disputes regarding rock excavation.



*Rock Excavation*

### **Bid Alternates**

The project team identified seven bid alternates. In addition, partly due to questions raised by the design side of the Design Build teams, bidders were offered the opportunity to include up to four voluntary bid alternates.

The design side of the potential Design Build teams expressed concerns that they weren't being fully utilized because the bid packages were so fully developed. The inclusion of voluntary alternates afforded Design Build teams a chance to offer ideas for project improvements.

This step was successful because it gave the owner a chance to glean ideas from a pool of professionals. Because the process had been fast tracked, there was the sense that some important considerations may have been overlooked. This step improved our level of comfort, that the project, as laid out, was headed in the right direction.

### **Durable Materials**

The use of durable materials are key to a quality product. For this project, the expectation was a 40-50 year service life. Ultimately, decisions were made to include pre-cast construction for all exterior building walls and rigid concrete pavement in all bus travel and parking areas.

### **Strategic Utilization of Change Orders**

Strategic utilization of Change Orders allowed time to seek additional funding opportunities and enhancements for inclusion in the project. One of the top priorities was energy efficiency and use of sustainable practices.

Around the time of receipt of bid proposals, there were indications that the NC Department of Transportation (NCDOT) was interested in assisting in our pursuit of green building principles. Working with the selected Design Build team, a plan was developed to include an extensive geothermal system, high performance glass, extra insulation, and LED lighting. In exchange, \$1 million of deferred equipment purchases were identified and backed out of the originally awarded contract.

Four weeks prior to awarding the contract, the project team made a presentation before the NCDOT Board of Transportation, who granted \$940,000 to be applied toward energy efficiency and sustainability features. Because of the lag time between their approval and receipt of the funds, Raleigh and the Design Build team agreed to withhold the deferred equipment for five months. Once the funds were deposited, a change order was forwarded for approval to pull the equipment back into the project scope.

Subsequent change orders included Phase II paving and storage building, furnishings, and traffic signal installation.

The perception that change orders denote mistakes, errors, and omissions was a complication frequently encountered.

# Safety Performance

## Zero Accidents

Health and safety are principal considerations for every project, and this was a prominent component beginning with the pre-qualification process. Our Design Build team was led by Brasfield & Gorrie, LLC, a leader in safety, with an active, integrated, and ongoing effort to assure project safety. With a total of 154,012 man hours, there were zero recordable accidents, zero restricted day cases, and zero lost-time accidents.

## Safety and Health Policy Manual

A project specific Safety and Health Policy Manual was developed by the contractor. This identified unique situations and hazards distinctive for the site and project. This was shared with each new employee and subcontractor working on the project.

## Safety Training

Specialized training was provided, including 10-hour OSHA training for foremen and lead carpenters, traffic control, fire extinguishers, forklift, and 30-hour OSHA training for management.

## Substance Abuse Policy

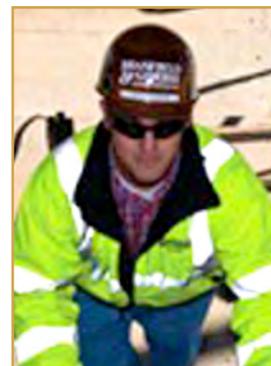
The contractor enforced a Substance Abuse Policy, which was utilized for all workers on the job. Copies of the Substance Abuse Policy were provided in both English and Spanish.

## Partnership with NC Department of Labor and OSHA

The contractor partnered with the NC Department of Labor and OSHA for overall project safety. Every four weeks a subcontractor working on site was selected for complete review of their safety program.

Subcontractor participation was mandatory and included upper management ownership, project management, safety, and onsite field supervision.

This was followed by onsite review of the field operations, including discussions with field labor. The subcontractor was then provided with a list of recommended additions or mandatory changes to their safety program and operations.



### **Weekly Safety Toolbox Meetings**

All workers were encouraged to openly discuss and actively participate in safety meetings. Brasfield & Gorrie employed a system of educating all supervisors through regularly scheduled safety meetings and OSHA training seminars. They, in turn, relayed information obtained at these training sessions to their field employees at weekly Safety Toolbox Meetings that were attended by all staff and subcontractors on the project.

Each meeting was documented and attendees signed a form stating that they attended the meetings and agreed to abide by safety rules and guidelines.

With steady dialogue established at these weekly meetings, every worker had the opportunity to openly discuss situations encountered during the week and offer solutions to improve safety conditions.

## **Environmental Considerations**

### **Energy Conservation**

Energy conservation and the application of Green Building techniques and technologies was a major consideration from the beginning of the project. A facility such as this can be a huge energy consumer contributing to higher costs for the life of the operation. Raleigh's City Council had recently adopted a requirement that all new building projects achieve a minimum of LEED Silver.

An extensive geothermal system, consisting of 150 wells each at a 300 foot depth, was utilized to provide both heating and cooling for the 28,769 square foot Administration/Operations Building. Chilled beams and a radiant floor system were used for the 61,484 square foot of the Maintenance Building. This system is projected to have a payback period of just over six years.



*Multiple drilling rigs helped maintain production on schedule*

Use of concrete pavement for all bus areas in lieu of asphalt, in conjunction with white membrane roofing, reduced the Heat Island Effect.



*Chilled Beam with hot and cold water, supply, and return provides heat and cooling for Buildings*

The Project Team incorporated a number of measures to improve the interior environment for personnel, including utilizing 100 percent fresh air intake coupled with high efficiency heating/cooling recovery units for exhaust air, extensive daylighting, and low Volatile Organic Compound (VOC) paints and adhesives.

### **Natural Riparian Buffer**

The site is partially bisected by a natural riparian buffer, which required protection in this area. In addition, compliance with local development ordinances required 10 percent of the total site be set aside for tree conservation. Tree conservation was concentrated within the riparian buffer and along a forested barrier strip at the south side of the property.

### **Water Quality**

A facility of this size and type contains a great deal of impervious surfaces. Over the 23-acre site, the project has two acres of roofing and 12.9 acres of pavement. Maximizing efficiency of the relationship between buildings, circulation, and parking helped minimize total impervious surface area. These efficiencies helped achieve 8.3 acres of open space representing 36 percent of pervious area.

Attention to water quality and stormwater runoff was addressed through a system of three oil/water separators and four stormwater BMP's. These systems assure that downstream properties receive the same quantity and quality of runoff they experienced before the construction of this project.

### **Water Conservation**

Water conservation is another important consideration. Raleigh, like many other cities, wrestles with the issue of increasing demand of water. To address this issue, Raleigh's Public Utilities Department developed a "Grey Water" distribution system for industrial customers. The re-use system will be extended to our site in a few years. In anticipation of this, the City installed stub lines to make easier connections to the new system.

To meet more immediate needs, the project has a 15,000 gallon underground cistern that captures roof rainwater. The captured rainwater is then utilized for irrigation.

The Bus Wash recycles 70 percent of water used.

### **Plug-In Electric Vehicles and Biodiesel Fuel Systems**

Transit operations frequently require shuttling of drivers between the new facility and Raleigh's central transfer point. These short runs make this process a good candidate for use of Plug-In Electric Vehicles. A total of three charging units were installed, one in the general parking lot for public use and a dual charger outside Dispatch for the facility's Plug-In Electric Vehicles.



*Dual Plug In Electric Vehicle  
Charging Station*

Fueling for buses included systems to deliver Biodiesel 5 percent and Biodiesel 20 percent fuel. Before project completion, the EPA mandated the use of Diesel Exhaust Fluid (DEF), a urea fuel supplement for new engines, and the project team moved quickly to accommodate this feature.

### **Solar and LED Lighting**

A new Bus Shelter was constructed in front of the new facility to accommodate expanded service to the area. The Shelter's roof is made up of an array of twenty-two solar photovoltaic panels capable of generating approximately 6.28 mWh of AC energy each year. This power is directed back into the building's electrical system.

The Bus Shelter also utilizes LED lighting and a message board providing real time bus arrival information.



*Bus Shelter with Solar PEV roof, LED lighting, and real time arrival message board*



*Rear view of the Bus Shelter with a roof made of solar photovoltaic panels*

# Community Relations

## **Citizen Advisory Councils (CAC)**

Raleigh has established a network of Citizen Advisory Councils (CAC) to give the public an opportunity to participate in decisions affecting the City as a whole as well as localized design such as property development and rezoning.

To achieve the “Shovel Ready” designation with rezoning the property, the CAC played a crucial role in rezoning decisions.

To obtain the necessary rezoning, the team had to present the request outside the typical process that takes the project to the neighborhood. Complicating this effort, the community was already upset with a water tower, which had been recently installed in a prominent location with little notice or input. This put the community in an adversarial mood from the beginning of the project development.

The City quickly solicited the aid of the CAC officers and were afforded the opportunity to present the project before the neighborhood. There was a great deal of skepticism from the neighborhood group that this project would benefit the community, and representatives from the department knew they were going to have to make a strong presentation of the project to succeed.

There was a perception that the area where our site was located had benefitted less than other City neighborhoods in terms of employment, economic development, and public improvements. The presentation focused on the quality of the finished product, the employment of construction workers, the 200 permanent employees in the new facility, the 40-50 year useful life, new bus routes, and opportunities for businesses to provide support for the new facility.

Ultimately, the CAC appointed a four-member liaison team that the City could work with closely. As the project developed, the team and the department met frequently to review progress. Once construction started, the group toured the facility on several occasions. The team also returned to regular CAC meetings to provide updates and answer questions.

What began as an adversarial relationship concluded with mutual respect, satisfaction, and pride.

## **Employment of Small Disadvantaged Minorities and Women Owned Business (SDMWOB)**

Raleigh has a 15 percent goal for participation of Small Disadvantaged Minorities and Women Owned Business Enterprises in construction projects. One of the concerns expressed by the community was the amount of SDMWOB participation that could be achieved. Expectations were to exceed the minimum goals. The ARRA legislation was intended to help stimulate the economy through local job creation and retention.

Soon after pre-qualification, the Design Build Teams participated in a SDMWOB Outreach Seminar, this afforded subcontractors and suppliers the opportunity to meet all the teams

ving for the project. The purpose was not only to attract local SDMWOBs to the project and assist with their certification, but also to introduce them to the teams assembled for consideration in future projects.

The process of including MWBE's in the project was an ongoing system of outreach throughout the project. Monthly reports were provided with each pay application, and the City made sure to keep open lines of communication. Ultimately, participation topped 26 percent.

### **Public Art**

During the early stages of the project, the City of Raleigh was beginning to implement a program of public art in City projects. This had not been a consideration when work began, but later became an element for inclusion.

Fortunately, Raleigh's Transit system had already implemented a successful program called "Art On The Move" where local artists submitted designs to be incorporated on bus wraps. The City contracted with these local artists on selected pieces for reproduction on banners, which were hung in prominent locations throughout the facility.



*Lobby with Public Art Pieces by Local Artists*

### **Training Room for Public Use**

The old facility lacked training space, so training could only be performed off site, or by displacing the break room. The new facility features state of the art training rooms, the largest of which seats up to 96 people, has a location just off the main lobby, and is available for use by other City Departments, agencies, and community organizations.

# Unusual Accomplishments

## LEED Platinum

The goal was to achieve LEED Silver, a City Council mandated requirement for all new Raleigh projects. After inclusion of many energy efficiency and sustainable building practices, the project was within reach of LEED Platinum.

Particular effort was placed on achieving the extra LEED points required to meet the Platinum level. These included greater use of rapidly renewable resources, such as domestic wool carpets and bamboo millwork, more efficient plumbing fixtures, Park and Ride spaces, measurement devices to track actual performance and utility usage, compliance with ASHRAE 55-2004 and post occupancy evaluation.

Achieving LEED Platinum will be the first for such an integrated facility in the nation.

## ARRA Funding Achievement

The project met an extremely aggressive schedule to achieve ARRA funding. ARRA legislation was approved February 17, 2009, with the project only having recently acquired the property. Bid proposals were received six months later on August 13, 2009.

## Expedited Property Rezoning

The property required expedited rezoning to the broadest category with no conditions. Industrial-2 zoning allows virtually any use except residential.

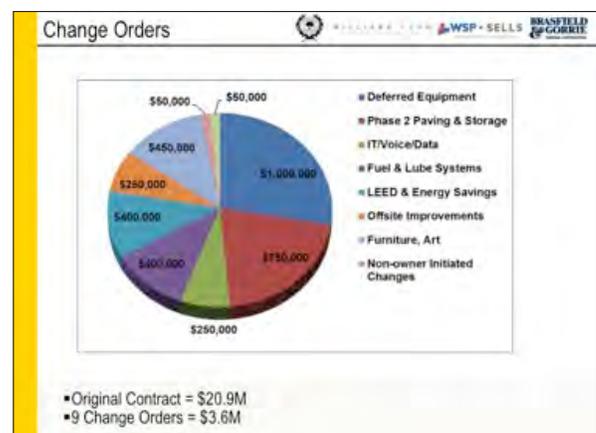
## Effective Management of Adversity

Site work accounted for about 20 percent of the project. About halfway through, the prime site grading contractor went bankrupt. Another contractor was brought on board to complete the work without adversely affecting the schedule.

An existing electrical transmission pole required quick replacement with a new metal pole to eliminate long down guy wires that encroached onto the building footprint. This initial construction obstacle was accomplished thirty days after start of construction, avoiding delay.

## Minimization of Change Orders

Change orders, not related to Project Enhancements, accounted for only 1.3 percent of all change orders, 0.2 percent of the project cost.



### **Exceed SDMWOB Goal**

Raleigh's Small Disadvantaged Minorities and Women Owned Business Enterprises goal was 15 percent.

Through continuous efforts by the design build team and the city, the project ultimately reached 26 percent SDMWOB participation.

*Utility Company replacing transmission pole while lines remain energized*



### **Serpentine Retaining Wall**

The site contained 60 feet of elevation change from front to back with areas of extensive rock. This challenge was turned into an asset by constructing a serpentine cast in place retaining wall, which reached over 25 feet in some areas. The retaining wall served as a natural divider between the lower public space and the upper secure operational area.

An existing side street was raised almost four feet to avoid lowering the site an extra two feet, helping to balance cut and fill.



*Serpentine retaining wall separates public spaces from secure areas. Side road was raised to avoid lowering site, balancing cut and fill.*

### **High Profile Economic Stimulus Project**

This was a very high profile “brick and mortar” Federal Transit Administration Stimulus funded project. This meant several visits from high-ranking State and Federal officials as well as Congressional visits. Each visit and tour involved accommodating the delegations along with TV and press entourages. Such events can be disruptive because they often involve groups ranging from a few individuals to several dozen as well as safety and security for these groups. The highest-level visits usually involved the shortest notice, affording little time for preparation.



*TSA Explosives Detection K-9 Teams conducting security sweep in advance of VIP visit.*

# Additional Considerations

## **Buy America**

Federal Transit Administration requirements included strict “Buy America” provisions, which involved an exhaustive search and compliance effort for products and systems manufactured in the United States.

## **Quarterly Reporting**

The ARRA program required extensive quarterly reporting that included the types of work performed during the period, the amount of labor and trades involved, total man-hours, and progress. This information was inserted in their formula to determine the number of jobs created by the project.

## **Secure Additional Funding**

The search for funding continued after the start of construction and resulted in Raleigh being able to take advantage of low pricing to construct portions of Phase II improvements.

## **High Qualification of Design Build Teams**

The project benefitted, by coming on line just as the market was bottoming out, in the spring/summer of 2009. This afforded extremely competitive and aggressive pursuit of the project by highly qualified Design Build Teams.

## **Healthy Place to Work**

A primary consideration for the facility was to create a work environment that is safe, efficient, and healthy for employees. Together with natural lighting and 100 percent fresh air systems, the project incorporated break rooms, an exercise room, and a staff vegetable garden. Many of the employees are required to maintain DOT certifications that can be affected by overall health. These enhancements aid facility staff in maintaining a healthy lifestyle. The facility is also Smoke Free, not just indoors but campus wide.

## **Local Regional Awards**

The project received the Sir Walter Raleigh Award for Community Appearance, the Associated Builders and Contractors of the Carolinas Award of Merit, and the Carolinas Green Awards.

## **Training Rooms Equipped with New Technologies**

One deficiency of the old facility was no suitable space to conduct employee training. The new facility features a large training room in the Administration/Operations Building available for use by other organizations and a new training room in the Maintenance Building. The Maintenance Training Room affords space for classroom or workspace setups. There is a roll up door allowing for large vehicle components such as complete engines or transmissions to be brought in for “hands on” education training.

The Maintenance Training Room is in high demand and has been used by other area transit systems to conduct their training.



**2012 Public Works Project of the Year**  
**A W A R D N O M I N A T I O N**

March 1, 2012