Next Stop: Rosa Parks Transit Center

DeMaria Builds the Golden Triangle of Transit

By Mary Kremposky, Associate Editor **Photos by Clayton Studio**

A bus station equipped with a GPS system tracking coach arrivals in real time? A soaring canopy, awash in a kaleidoscope of lights, suspended over 15 bus bays? A bus depot soon to host a restaurant, coffee shop and convenience store along with art exhibits and family fun days? Incredibly, "taking the bus" has never been more comfortable or delightful thanks to the recently unveiled Rosa Parks Transit Center in downtown Detroit. The Detroit Department of Transportation (DDOT) and the Economic Development Corporation of the City of Detroit (EDC) have put this new definition of a bus station into motion. The construction savvy of DeMaria Building Company, Inc., a Detroit-headquartered business, and the inspired design of Parsons Brinckerhoff Michigan, Inc., (PBM), also of Detroit, have turned this bright idea into a wonderful new transportation hub abuzz with new possibilities for public transit. USA Shade & Fabric Structures, Inc. of Costa Mesa, CA capped off the project with the fabrication and installation of the sail-like canopy.

"It changes the whole image of bus ridership," said Timothy C. Miles, EDC project manager and construction facilitator. "The bus system now has a nationally recognized home in a landmark, signature building. This new transit center definitely moves us forward in terms of technology and customer service."

The triangular building, flanked by two pods of the same geometry, has a sleek, aerodynamic line almost suggesting an airplane poised for flight. Evoking the angled wings of an airplane in form and an airport in function, the facility uses GPS technology called the Automatic Vehicle Location System to track and display the arrivals and departures of 21 different bus routes in LED-lit panels placed on the outdoor bus-way, or island concourse, and on two 55-inch monitors within the transit station. "It is the first city-owned operation to have a GPS system fully displayed to the public," said Miles. "The display is electronically updated every second to tell the rider the timing and location of the buses."

The transit center is technologically advanced and visually captivating. The canopy adds an almost magical element to the city's tableau of buildings. Seeming to float over the bus-way, this series of sail-like tensile structures are formed of over 55,000 square feet of a highly durable blend of Teflon and fiberglass with a glass coating.

Illuminating the canopy gives Detroit a phenomenal "night light" near the heart of the city. The canopy also provides shelter and shade during the day. "It is probably 5 to 10 degrees cooler underneath the canopy," said Miles. The fabric and the polycarbonate skylights, following the arc of the trusses, offers shade but still allows in natural light. The canopy also serves as giant rain barrels for the green space below these unconventional umbrellas. "The rain actually collects in the steel bail rings of the canopy structure and ejects water through about 15 to 20 small water nozzles," added Miles. These miniature streams fall on ovals of decorative brick housing catch basins and a swath of greenery.

Obviously, this is not your average construction project. Fortunately a construction firm with 40 years of experience, namely DeMaria Building Company, was selected as the general contractor in this traditional design-bid-build project. "The City of Detroit thanks the DeMaria team," said Miles. "They were very aggressive in their schedule. They were flexible and able to make changes on the fly when need be. Also, very few sites have two major general contractors (DeMaria and USA Shade) working within the same small footprint. DeMaria's coordination and ability to work together made the project a success. It was DeMaria's get-it-done attitude that drove the schedule."

DeMaria successfully delivered this complex project, working over 80,000 labor hours without a recordable incident or lost time injury. "We are proud of our safety record," said Darren Murray, DeMaria vice president, commercial & industrial groups. "As a Detroit-headquartered business, we are tremendously proud of the fact that we were able to build a landmark in the City of Detroit and in honor of a civil rights icon like Rosa Parks."

FIRST STOP: SITE SELECTION AND UTILITIES

The City of Detroit invested $22.5 million dollars in federal and state grants in this new transit triangle bordered by Times Square, Cass Avenue, and Michigan Avenue, one of the major spokes in Detroit's radial street grid. The chosen site offers a contiguous

Three triangular structures – the main transit center and two pods – create a dynamic convergence angle and line.

Detroit's new "night light" is a dramatic addition to the downtown area.

parcel of land with frontage along a major spoke and close proximity to the city's center point of Campus Martius, said Miles.

The site serves both current bus routes and future transit plans. "The inbound and outbound routing plan needed accessible streets for buses, and Cass, Michigan and nearby Grand River Avenue offered the best routing options," said Miles. "It is DDOT's goal for this facility to be connected to a future light rail system."

DDOT has connected all the dots in planning this new city-owned international, intermodal facility in downtown Detroit. The Rosa Parks Transit Center has bays for DDOT buses, SMART, Transit Windsor, and the MegaBus to Chicago and Ann Arbor, as well as a taxi stand and two nearby People Mover Stations.

Although the ideal location for this new public transit crossroads, the site's small size and its oddly angled configuration challenged the design team. "Because the complex is first and foremost a bus transit facility, accommodation of vehicular circulation and functioning took precedence over all other functions," said Tushar Advani, AIA, PBM design architect. "Given the awkwardly shaped site and the need to accommodate the maximum number of bus bays, the facility's bus-way and loading platforms were placed in the largest and most flexible portion of the site. The actual building was then placed on the remainder of the site, which is an acute triangular sliver along Cass Avenue and Times Square." In configuration, only a triangular building, filling the entire triangular tip of the site, offered sufficient square footage to house transit services and proposed activities.

In turn, the site's impossibly perplexing web of underground utilities impacted construction. The main culprit was State Street, a now closed thoroughfare slicing through the site, along with the underground utilities that commonly snake beneath a roadway. Because of the presence of immovable utilities, the building is half slab on grade and half full basement, said Murray. Unfortunately, a hidden duct bank was still discovered 10 feet below grade during excavation of the 14-foot-deep full basement.

Despite discovery of a rogue duct bank, creative problem solving and teamwork kept construction of the transit center rolling. AT&T suspended and shored the duct bank, working with DeMaria to devise a shoring system that minimized interference with construction. "We then built around the shored duct bank by creating window-like openings in the foundation walls aided by the design and engineering of Parsons Brinckerhoff," said Murray. Following this strategy, DeMaria was able to continue building the foundations even as AT&T spliced thousands of communication lines running directly through the foundation walls.

AT&T built a bypass around the old clay crock-encased pipe. "AT&T worked 24/7 for almost 10 to 12 weeks splicing 20,000 communication lines until the rogue duct bank was bypassed," said Trey Neubauer, DeMaria project manager, commercial & industrial groups. "The duct bank was then demolished and the 'windows' were sealed."

SECOND STOP: CONCRETE CRAFTSMANSHIP

DeMaria self-performed all the structural concrete work, beginning with the reinforced, cast-in-place foundations for this three-story building formed mainly of steel columns and trusses supporting composite concrete floor decks and a metal roof deck. DeMaria applied its concrete craftsmanship

to the footings, foundations, poured walls, and plinths, one of three custom forms for this 27,500-square-foot complex.

First, DeMaria had a custom form built for the formation of the 50-foot-tall oval forming the apex of the triangular building. Secondly, both building exterior and interior contain expanses of board form finish concrete. "A board form finish leaves an imprint of wood grain and panel joints in the concrete, turning concrete into a simulated wood panel," explained Murray. DeMaria generated the imprint with a vinyl liner, taking care to properly position the liner within the form to create uniform joints simulating evenly spaced wood boards.

As a third concrete application, DeMaria used a custom form to create 16 triangular concrete pillars or plinths. The plinths directly perch on three-foot-thick mat foundations; in turn, the mats rest on 20-foot-deep caissons that serve as points of attachment for the canopy's steel columns, explained Neubauer.

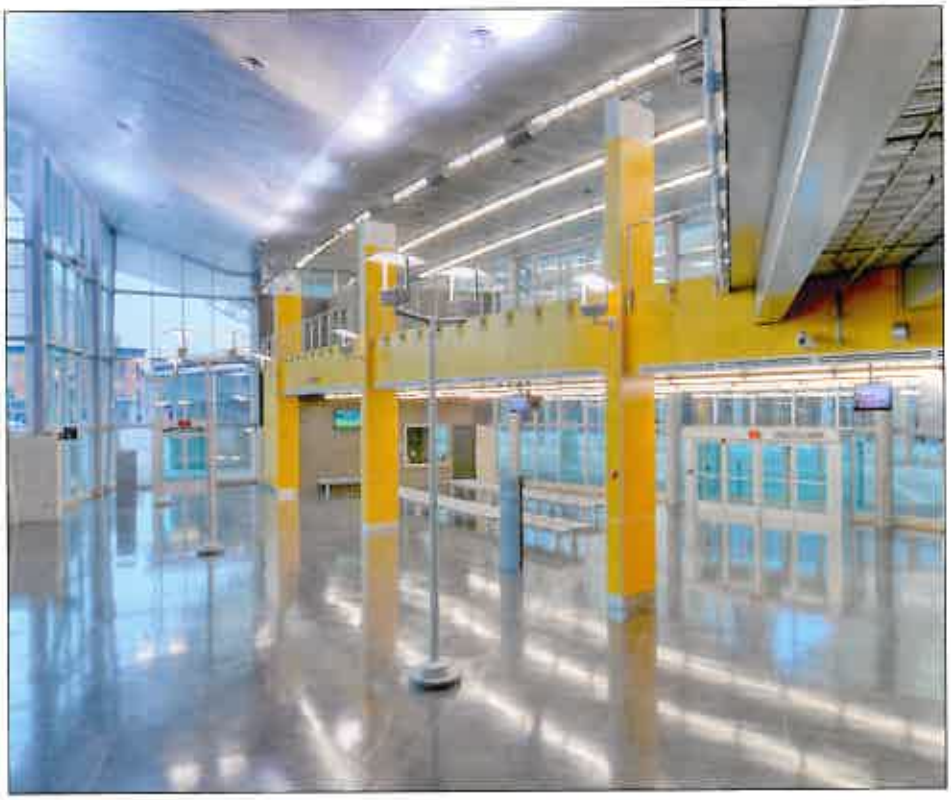
A high level of concrete craftsmanship was called into play within the building interior. Broadcast Design, Mt. Clemens, performed the interior and exterior flatwork, while DeMaria handled floor protection. As a structural and finished product, the polished concrete floor required protection throughout the entire project. "The floor is actually a color-impregnated concrete that had to be protected throughout the winter and for the entire duration of the project," said Murray. "We had to seal it after it was poured, and install a temporary masonite flooring across the entire first floor and on the mezzanine."

THIRD STOP: FINISHING TOUCHES

DeMaria has constructed a welcoming facility for thousands of transit patrons. A 50-foot-high glass curtain wall dominates the west face, its height a product of the roof's sharp upward tilt. "The roof slopes upward and outward, opening the transit center to Cass Avenue and Times Square in order to be welcoming to the street and to be the public face of the city that it serves," said Advani. A white reflective roof with a TPO membrane caps the building and reduces the Heat Island Effect, added Neubauer.

Black terra cotta, burnished block, and board form finished concrete compose the building's exterior and interior assembly of high-quality cladding. The interior's beautiful level of finishes include prefinished hardwood veneer panels of Baltic birch, stained a light yellow on the main floors and brown on the lower level. In

Waiting in a climate-controlled building that may soon house a major coffee and breakfast food vendor is the beginning of "a smooth ride" for mass transit users.



Durable and attractive finishes fill the interior, including polished **concrete floors and pre-finished hardwood veneer panels of Baltic birch stained a light** yellow.

addition to durability, performance and cost efficiency, "our general desire was to use a diverse variety of natural colors, textures and forms that were both juxtaposed and harmonized," said Advani. "This was meant to represent the diversity of the community surrounding the transit center and the spirit of the civil rights movement that was championed by Rosa Parks."

A radius mezzanine, a canted glass wall and angled ceilings animate the interior. Turner-Brooks, Inc., Madison Heights, installed this complicated ceiling's framing system and aluminum tiles. "The overall roof has a 1:12 slope that rises at a slight angle from east to west then 'takes off' at a sharper angle just beyond the mezzanine," explained Neubauer. "The ceiling then converges at different angles from north to south." Thanks to a skilled team, the ceiling system can now perform its job: managing acoustics in an interior of hard surfaces via an insulation backer and hundreds of barely visible perforations.

FOURTH STOP: GIVING THE BUILDING WINGS

The canopy is the crowning achievement of this remarkable transit center. "Our goal was to have the facility maintain a presence commensurate with the other larger buildings in the area," said Advani. "The visual impact could not reasonably be achieved by brute force of size, so we attempted to achieve a similar effect by the juxtaposition of straight and curvilinear forms, setting the sharply angled transit building against the backdrop of the organic tensile canopy."

The 73-foot-high canopy is a lightweight, durable structure that lends "the facility verticality at a relatively low cost," Advani added. Parsons developed the schematic concept and FTL Design Engineering Studio, a New York City firm specializing in tensile structures, developed the design concept and construction documents of the canopy.

Advani briefly explains the canopy's engineering: "The canopy is a true tensile structure; its fabric is held in tension by brackets, trusses and cables, while the A-frames (angled columnar members that support the brackets and trusses) are mostly in compression. The A-frames transfer their load to concrete foundations, which are below at the passenger-loading platform. Uplift is minimized by keeping the fabric of the canopy taut, and by allowing air to flow around the structure rather than catching it like a sail or parachute."

DeMaria and USA Shade closely coordinated their respective tasks, beginning with

determining the exact placement of the anchor bolts in the concrete plinths. DeMaria set the anchor bolts in preparation for the arrival and installation of the steel masts or A-frames. February 2009 marked the assembly of the three-piece trusses now attached to the masts via steel cables.

The actual fabric pieces arrived on site in pre-cut sections, were attached to gables, and then hoisted upward like a tent. "Once they get two pieces into place, specially trained personnel heat weld the seams with a iron heated to 800 degrees F," said Miles. Added Murray, "This part of the job is temperature sensitive. Because the outside temperature has to be at least 40 to 50 degrees F, the heat welding began in the spring of 2009." The last step is the final tensioning of each canopy after the seams cool and meld together.

DeMaria then coordinated installation of the light rings in each funnel with Alpha Electric closely following USA Shade's work sequence. The canopy was originally filled with the glow of white light. At publication time, the LED lighting system was being programmed for a mid-August launch that will bathe the canopy in a rainbow of colors.

Work on the canopy, the lighting, and the elements below the canopy had to be carefully woven together to create this new transit center in a timely manner. "There was work that needed to be done underneath the canopy, such as irrigation systems, exposed aggregate concrete work on the bus island, brick pavers, and caulking, that we didn't want to do early in order to avoid any possible damage by the rigging," said Neubauer.

ARRIVAL: SUMMER 2009

Unveiled in July, this innovative complex is one of the only city-owned transit centers in the country, said Miles. The future holds more in store for transit patrons and Detroit residents. Rotating art exhibits, arts & crafts shows, and family events will fill the interior. In the summer, the mezzanine housed a Rosa Parks exhibit assembled by the Detroit Public Library.

Miles outlines other benefits and opportunities: "Leasing four retail commercial spaces in the facility will give DDOT the opportunity to offset some of their maintenance costs. The first floor may house a major coffee and breakfast food vendor, plus a convenience store."

At publication time, EDC was considering several proposals for eateries on the mezzanine. The main expanse of the mezzanine will be a café-like setting for transit users and restaurant patrons. "The south pod may house a florist or fresh fruit market (the north pod contains the generator and maintenance equipment)," Miles added.

This stunning transit center literally casts the city in a glowing light. "I believe that along with the project team and its delivery of state-of-the-art design and construction, the facility stands as an example of what Detroiters are capable of," said Miles. "We are capable of creating some of the most fantastic, state-of-the-art buildings using cutting-edge construction technology."

ROSA PARKS TRANSIT CENTER

DESIGN BUILD CONTRACTOR

- Canopy - USA Shade & Fabric Structures, Inc., Costa Mesa, CA

CONSULTANTS AND DESIGN TEAM

- Landscape Architects and Construction Drawing Support - Hamilton Anderson Associates, Inc., Detroit
- Detailed Canopy Design – FTL Design Studio, New York, NY
- Mechanical Electrical and Plumbing Engineers - Scales and Assoc., Detroit
- Geotechnical Engineers - SOMAT Engineering, Inc., Detroit
- Phase I Environmental Assessment - Madison and Madison International of Michigan, Detroit
- Phase II Environmental Assessment – Enviro Matrix, Detroit
- Design Phase Surveyors - ABE Associates, Inc., Detroit
- Construction Phase Surveyors – Metco Services, Detroit
- Construction Phase Inspection and Administration Support - Community Development Solutions, Detroit

TRADE CONTRACTORS

- HVAC – Great Lakes Mechanical, Dearborn
- Unit Masonry – Dixon, Incorporated, Detroit
- Footings, Foundations, Poured Walls – DSP Constructors, Detroit
- Piles – Toledo Caisson Corporation, Ottawa Lake
- Structural Steel – Taft Steel, New Hudson
- Glazing – Chamberlain Glass & Metal, Detroit
- Concrete Flatwork - Broadcast Design, Mt. Clemens
- Excavation – Blaze Contracting, Inc., Detroit
- Electrical – Alpha Electric, Sterling Heights
- Surveying & Layout – Kem-Tec & Associates, Eastpointe
- Wet/CO2 Fire Protection – Tri Star Fire Protection, Plymouth
- Testing and Quality Control – ATC Associated, Inc., Novi
- Metal Doors & Frames – R.K. Hoppe Corporation, New Hudson
- Temporary Fencing – Keystone Fence & Supply Co., Redford
- Waterproofing – Michigan Restoration Group, Livonia
- Membrane Roofing – Roofcon, Inc., Brighton
- Elevators – ThyssenKrupp Elevator Corp., Cincinnati, OH
- Furniture and Accessories – Architectural Building Components, Oak Park
- Gypsum Board Assembly – Turner-Brooks, Inc., Madison Heights
- Temporary Site Signage – State Barricades, Inc., Warren
- Louvers – Construction Specialties, Taylor
- Exterior Wall Assembly – C.L. Rieckhoff Co., Inc., Taylor
- Plumbing – D & M Plumbing, Inc., Farmington Hills
- Coiling Doors and Grills – Detroit Door & Hardware, Chicago, IL
- Signage – ASI Sign Systems (ASI Modulex), Troy
- Trees, Plants and Ground Cover – Reliable Landscaping, Inc., Canton
- Carpeting – Tri-State Industrial Floors, Toledo, OH
- Special Systems – Edwards Service/Carter Brother, New Hudson
- Voice & Data Systems – Telecom Technicians, Inc., Sterling Heights
- Form Suppliers – USA Form, Inc., West Chicago, IL; Patent Construction Systems, Detroit; and FormTech Concrete Forms, Inc., Wixom

Consultants and subcontractors listed in the Construction Highlight are identified by the general contractor, architect or owner.