

PORT OF MIAMI TUNNEL

AWARD WINNING INNOVATION SAVES TIGHT SCHEDULE

**Customer: Nicholson Construction Company**

**Birmingham Personnel: Mike Justason, Stefano Gabaldo, Steven England, Jeff Organ, and Patrick Birmingham**

Often referred to as the “Cruise Capital of the World” the Port of Miami is one of the busiest cargo and cruise ship ports in the United States. French Contractor, Bouygues, was retained to drill a tunnel under the harbour to reroute container traffic away from the busy tourist access bridge. The karstic rock was full of voids that presented

*Birmingham Foundation Solutions provided invaluable assistance to the success of the Port of Miami Tunnel (POMT) Grouting project.*

— Luca Barison  
Nicholson Construction

a challenge to tunneling, so Nicholson Construction Company was subcontracted to grout the holes.

THE CHALLENGE:

Given the magnitude of cruise ship traffic in the area, the work windows were typically only one to two days per week – so work was carried out 24 hours per day in these tight timeframes. Production efficiency was critical in meeting the schedule. Nicholson turned to Birmingham to significantly improve the rates they were getting with traditional drill rigs. After much collaboration between Birmingham and Nicholson staff, a plan was conceived to allow the drilling and grouting processes to be completed with a single pass; meaning one insertion of the drill bit and string.

A 130-foot long dual walled drill string was utilized on Birmingham’s vertical travel lead

system for reverse circulation drilling. A 7-inch diameter crossover was designed to adapt between the drill string and the tri-cone bit. Water was injected through the outer casing and diverted through three passages into the center of the tri-cone bit. Cuttings were then brought back up through three separate passages in the crossover and into the center of the drill string for discharge. Having reached the proper depth, grout was then pumped in through the inner passage in the drill string and back through the crossover to fill the hole. The system was unique in its ability to convert drilling to grouting without removing any part of the bit or drill string from the hole. **By employing this method, Birmingham’s system more than tripled conventional land-based drilling production rates.**

Birmingham designed all components with 3D CAD software and analyzed stresses with

Finite Element Analysis (FEA). Computational Fluid Dynamics (CFD) was also performed to calculate velocities, flow paths and pressure drops for the drilling. All components were designed, fabricated, machined and assembled by the Birmingham team.

*We value Birmingham as a true partner in our success at the POMT project*

— Luca Barison  
Nicholson Construction



▲ Photos courtesy of Bouygues Civil Works Florida

CEO’S MESSAGE



Once again we have had a very successful year!  
Thank you to all of our employees, clients, suppliers and partners who have helped to make 2012 one of our best ever! Our company is poised for growth and ready to tackle new challenges like the driving and drilling of 185 foot long (56 m) by 6 foot diameter (1.8 m) steel piles and rock sockets for the Port of Sept Isle,

working in a joint venture with Pomerleau, from Quebec. I am proud to commit over \$3 Million in the expansion of our manufacturing facilities. This new plant will reduce costs and improve deliveries of our products.  
It is our expectation to continue to attract the brightest and most professional individuals in our foundation industry and together work towards

building a very exciting and successful future for our company and clients. Together we are working to reinforce a proactive culture of safety that permeates everything we do on all projects, big and small. It is my expectation that 2013 will again be a standout year!

Patrick Birmingham, CEO



# EGLINTON WEST LAUNCH SHAFT

## BERMINGHAM TACKLES DEEP CAISSONS WITH PRECISION

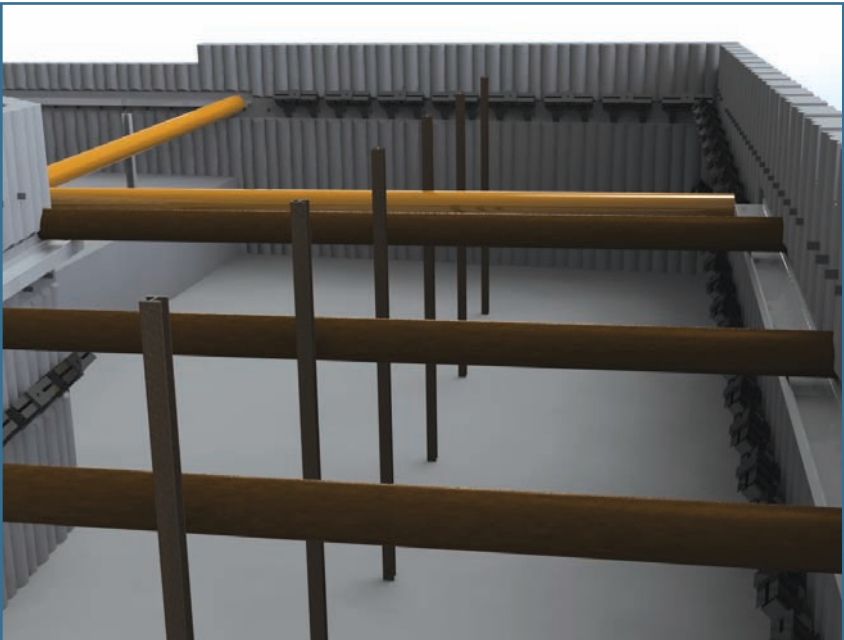
The Eglinton Crosstown, being one of North America’s largest current infrastructure projects, is a light rail transit line (LRT) that will run 19 kilometers through the heart of Toronto. In 2011, Kenaidan subcontracted Bermingham for the purpose of constructing caisson walls required for the West Launch Shaft – the below ground entry point of a multi-million dollar tunnel boring machine.

A unique challenge of this foundation project entailed the accuracy with which the deep caisson holes needed to be drilled in terms of verticality. The project required 0.5% verticality and location of the bottom of the hole to be measured at 5 mm (less than ¼ of an inch) precision. With drilling reaching a depth of 36 m (120 feet), this presented added difficulty to the project’s scope. To address this precise measurement, Bermingham’s Jon

Brierley designed custom technology capable of delivering the required precise measurements. The new tool allowed Bermingham to monitor the verticality requirements within the strict parameters given. This technique has been added to Bermingham’s wealth of practical construction solutions.

A total of 305 caissons were drilled, ranging in size from 880 to 1300 mm in diameter.

These caissons were some of the deepest Bermingham has drilled to date. With a range in depth from 20 – 36 m, a total of 3 rigs ran simultaneously, 24 hours a day, during optimal production. With a focus on precision and keen attention to detail, not only was the project a success, but it also established a first for Bermingham. We look forward to continued growth in the area of precision drilling.



▲ *Bermingham redesign of the West Eglinton Launch shaft concept.*



▲ *Completed redesign of the West Eglinton Launch shaft.*

# INTERNATIONAL BORDER CROSSING - WINDSOR ESSEX PARKWAY

## BERMINGHAM TEAM MEETS ENVIRONMENTAL AND PRODUCTION CHALLENGES

In an effort to improve traffic flow at Canada’s premier trade gateway – the Windsor to Detroit border crossing, Bermingham had been contracted to assist in the \$1.4 billion construction project. Upon completion the Parkway will provide a direct connection from Ontario’s Highway 401 to Interstate 75.

In April 2012, Bermingham began foundation work on the bridge, tunnel piers and abutments. The work involved driving more than 1500 HP310 x 110 (HP12 x 74) piles, varying 80’ to 110’ in length utilizing two Terex HC165 cranes equipped with a B5505 diesel hammer on 120’ of L18 Vertical Travel Lead and Bermingham’s new three stage spotter.

Given the job site’s close proximity to residential neighborhoods, noise levels were an ongoing concern. When interviewed by The Windsor Star, Cindy Prince (spokesperson

for the Parkway Contractors Group) noted, “We have not received a lot of neighborhood complaints with respect to that activity. It is our goal and intent that situation remains that way”. Cindy credited the new state-of-the-art Bermingham equipment for running quieter than many had originally anticipated.

In an effort to ensure the project flowed smoothly, much coordination and collaboration was needed by all parties. By committing and adhering to the original timeframe and configured drawings Bermingham was able to handily beat expectations in terms of ensuring that the next pier and/or abutment were ready and in place for the excavation company and General Contractor (PIC) to do their part. The piles pre-ordered by the General Contractor were often too short, but with a combination of efficient splicing and continuous planning, the project was completed ahead of time.



▲ *St. Clair College East portion of the Windsor Essex Parkway*  
*Rendering by the Windsor Essex Mobility Group*



▲ *L18 Vertical Travel Leads with BK3-1840 kicker/spotter*



# TORONTO AIRPORT TO DOWNTOWN LINK

## BERMINGHAM PLAYS KEY ROLE IN TRANSPORTATION TO PAN AM GAMES

In 2015, Toronto will step in the global sports arena and play host to the Pan Am Games. In an effort to provide high quality rail service to the venue, Bermingham was contracted to assist in widening the Metrolinx tracks on Black Creek Drive. The two-stage project is part of a program to link Toronto Pearson International Airport to the downtown Union Station.

### PILE DRIVING IN AN URBAN ENVIRONMENT

Bermingham's role in the Black Creek project was to drive approximately 430 piles (at a depth of 33.5 m) to support the 6-span bridge expansion. In assessing the feasibility of the

Changes included a shift from drilling to a more efficient pile driving approach, thereby reducing equipment needed and more importantly ensuring safety for users of public roadways and railway in close proximity.

To successfully complete Stage One of the project Bermingham employed a B5505 Berminghammer on a L18 lead system. Bermingham also tackled the challenge of reducing noise while pile driving in a densely populated urban area. Noise reduction was accomplished in two ways: Bermingham designed and manufactured a new custom noise reducing Direct Drive Housing for the B5505 hammer as well as utilized an

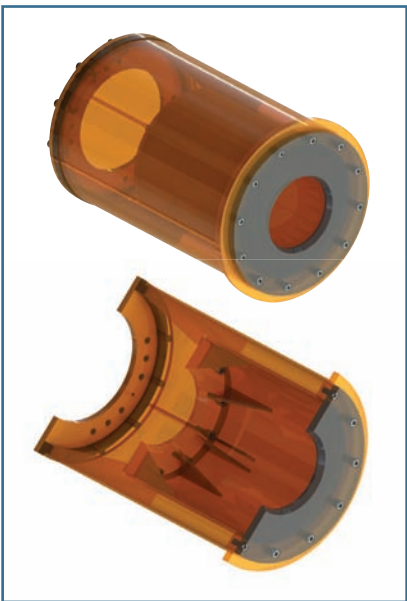
HPSI 500 Vibratory Hammer. Noise levels were monitored by both the owner and Bermingham to ensure the regular levels complied with the specifications.

With the Pan Am Games quickly approaching Bermingham continues to work on Stage Two of the project and is proud to help pave the way in broadening access to the global games.

*From start to finish Bermingham lead the way by understanding the client's concerns and offering effective engineered solutions*

— Eddy Marin  
District Manager at Dufferin Construction

original plans, Bermingham utilized a 3D model and determined that several modifications were required to address a number of issues and challenges. These issues included: accessibility to tough to get at areas, and more importantly, public safety when pile driving in an urban environment. Using their 3D model, 75% of the original plans were modified to ensure these issues were addressed in an efficient, safe and professional manner.



▲ **Bermingham noise reducing Direct Drive Housing**



# SUPPORTING MAJOR WIND FARM PROJECT

## BERMINGHAM BEATS LOGISTIC CHALLENGE TO MEET TIGHT DEADLINE

In June 2012, Bermingham Foundation Solutions Limited was retained by H.B. White Canada Corp. (an EPC contractor) to supply and install foundations for 55 wind turbine towers for the East Lake St. Clair Wind Farm project. The turbines, to be spread over a 110 square kilometer area on privately owned farmlands, are to provide some 100 Megawatts of power upon completion (enough energy to power nearly 55,000 homes each year); and the piling was scheduled to be completed in just under four months.

With the project came several unique challenges - with the wide geography, soil conditions varied and the quantity of piles required for each base had to be determined by PDA testing. To meet the deadline, time on each site was limited, so getting the right number and length of piles to each site was the challenge as soon as the PDA results were received. Many sites also had soft earth conditions which were further complicated by the farm tile drainage networks that effectively drained the entire field into the work zone. To maintain working platforms, Bermingham's cranes often had to work from mats.

As specified by the contract, piles were driven in a circular configuration on a 1:4 fore batter alignment. In total 1,500 H-piles, with varying lengths from 17 to 29 meters,

were driven to refusal at the underlying shale bedrock. As a testament to Bermingham, the project was completed on time within the aggressive four month scheduled period. At peak production, four cranes equipped with Bermingham Vertical Travel Lead Systems and B-32 Direct Drive Diesel Pile Driving Hammers were utilized to install piles from within the pile ring at the underside of the pile cap elevation. Despite wet and soft soil conditions and restricted confines of the foundation limits, production rates were effectively maintained at each of the sites. As proud supporters of clean energy Bermingham was pleased to work in conjunction with H.B. White to help bring renewable energy to Canadian families.

*As a testament to Bermingham, the project was completed on time within the aggressive four-month scheduled period.*

— Project Manager, Rob Low  
June-October 2012



▲ **Vertical Travel Leads with B32 Diesel Hammer on 1:4 fore batter alignment**



# EDMONTON ANTHONY HENDAY PARKWAY

## TACKLING POWER LINES ON THE ANTHONY HENDAY PARKWAY

Anthony Henday Drive, officially designated Alberta Provincial Highway 216, is a ring shaped highway around Edmonton named after the Alberta explorer Anthony Henday. The current contract boasts a total of 46 bridge structures, nine interchanges, two road flyovers, eight rail crossings and two bridges across the North Saskatchewan River. The successful bidder, The Capital City Link General Partnership (including Flatiron, Dragados, Aecon and Lafarge) was slated to start construction in June 2012 with a completion date projected for autumn 2016. In April, Birmingham was contacted by Flatiron Corp to rent custom pile driving equipment for the bridge foundation work.

Flatiron had several concerns regarding the type of lead equipment to be utilized. The two primary obstacles included: existing power lines, and underground utility corridors. In discussions with Flatiron, Birmingham decided to design systems that could be easily assembled and disassembled, disconnected and reconnected to the cranes or remain attached while the systems were boomed down and the cranes could be walked with the systems remaining attached. Secondly, Flatiron required reusable sections of box lead that could be utilized as hanging leads on subsequent jobs. Drawing on experience from previous projects of this nature, Birmingham determined the best type of system to employ would be 33.5 m

of BL32 Lead outfitted with all vertical travel components mounted on the lead. This allowed for easy disconnection from the crane as required.

Due to site and design requirements in which piles needed to be driven far below the crane travel height, vertical travel leads were the only option. The project also required in and out batters in which vertical travel leads were an added benefit.



▲ Henday VTL Systems



▲ BL32 VTL with HHH-21.5 kicker/spotter

## BERMINGHAM INVESTS \$3 MILLION TO IMPROVE CUSTOMER SERVICE

Birmingham acquired 60,000 square feet of manufacturing space and 4 acres of open storage when its neighbour, Labatts, shut down their Hamilton operations. The buildings were used as cold storage so were well insulated but not well set up for manufacturing. Patrick Birmingham saw the potential and authorized a \$3 million upgrade — new lighting, heating and air extraction, large doors and the major expenditure — overhead cranes; installing 9 cranes, with up to 30 tons lifting capacity. CEO Birmingham stated “I wanted our employees to have a first class work space and our customers to benefit from this plant upgrade”.

Product Manager Mike Justason explains “We’ve always prided ourselves in “practical innovation” but have frankly been disadvantaged as a manufacturer with several small separate fabrication facilities - spending

a lot of time moving assemblies from one building to the next with forklifts. This new facility with its wide open bays and full craneage makes for ideal material flow, reducing process time and costs. One of our key advantages as a supplier has been our nimbleness; this will only improve our response time. Moving all of fabrication, assembly and the parts department under one roof has been a goal for some time, and the team is excited about how it will improve our customer service.”

The move, including new lunch room will be complete in the second quarter of 2013. The machine shop and field mechanics are growing into the vacated space. Birmingham’s expansion plans continue as a new office facility is next on the agenda.



### BERMINGHAM FOUNDATION SOLUTIONS SINCE 1897

**HOW TO CONTACT US**  
**1-905-528-7924 / 1-800-668-9432**  
**Fax: 1-905-528-6187 or visit [www.berminghammer.com](http://www.berminghammer.com)**

**BERMINGHAM**  
**FOUNDATION SOLUTIONS**  
**SINCE 1897**

Patrick Birmingham - CEO	ext. 228
Peter Smith - President	ext. 222
Louis Fritz - Sales Engineer	ext. 227
Michael Justason - Product Manager	ext. 245
Stefano Gabaldo - European Sales	ext. 247
Warren Waite, U.S. Sales	
Karl Christensen - Operations Manager	ext. 242
Milan Brestovacki - Technical Sales Coordinator	ext. 229
Todd Barlow - Project Manager	ext. 240
Ken Wiebe - Project Manager	ext. 219
Andrew Weltz - Project Manager	ext. 218

#### EQUIPMENT DISTRIBUTORS

Birmingham Foundation Solutions has over 20 agents and distributors around the world providing sales and service support.