DVGI 2024-25 GEOTECHNICAL PROJECT OF THE YEAR

Submitting Company:	**Peirce Engineering, Inc.**
Submitting Person(s):	**Jennifer Peirce Brandt, P.E.**
Project Name:	**Roberts Children's Health at Children's Hospital of Philadelphia**
Owners:	**Children's Hospital of Philadelphia Philadelphia, PA**
Contractor:	**JPC Group, Inc., Blackwood, NJ LFDPR, JV**
Geo-Structural Engineer:	**Peirce Engineering, Inc., Phoenixville, PA**

Project Description:

Children's Hospital of Philadelphia (CHOP) is expanding its Philadelphia campus in University City to include an inpatient tower building connected to its flagship hospital, slated to open in 2028. Peirce Engineering, Inc. (PEI), LF Driscoll/DPR Construction Joint Venture (LFDPR, JV), and JPC Group, Inc. (JPC) collaborated to provide geo-structural services required to jumpstart the project which will provide the community with an inpatient bed tower and a diagnostic and treatment podium. Geo-structural design began in 2020 with the integrated project delivery (IPD) method and the geo-structural support systems were completed in 2024.

The building, part of CHOP's $3.4 billion expansion project to improve facilities and increase capacity, highlighted by the $1.9 billion patient tower, is located at the Osler Circle, including the footprint of the former CHOP Wood Center. The state-of-the-art facility will provide 1.3 million square-feet of space and offer over 500 private rooms along with cutting-edge technology and enhanced services for families. At 434 feet tall, 26 floors above street level and 1 floor below, the tower will make an impact on the West Philadelphia skyline.

The project required several types of Geo-structural support systems for excavations up to thirty-six feet deep. Along the project North, West, and South sides, adjacent to two Biomedical and Research Buildings and CHOP's Seashore House and Abramson Pediatric Research Center, a system of soil nails through the existing Osler Garage foundation walls in addition to hand dug concrete soldier beams and rock bolts was designed. The East side of the project required drilled-in soldier beams and timber lagging with steep tieback anchors to miss existing buildings. The Osler Circle, north and south access roads between Curie Blvd. and Civic Center Blvd. and temporary construction access ramps required drilled-in soldier beams and timber lagging. Temporary drilled shaft foundations were designed at the North and South entrances to support motorized gates.

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Geotechnical Challenges:

The biggest challenges for the design were the congested city location surrounded by medical buildings, the unknown geotechnical conditions, and the adjacent research buildings and potential noise & vibration impacts. The proposed work was installed from inside the existing parking garage and within the limits of previous building excavations with ground anchors to be installed in unknown fill material. The possibility of encountering abandoned excavation support was a concern. The presence of both the existing garage foundation walls and bedrock above subgrade was a challenge in designing the temporary soil nails and concrete soldier beams. Due to neighbor access agreements and the proposed patient tower footprint, there was no space to accommodate a traditional support system, therefore a soil nail system incorporating the existing foundation walls was selected.

The key takeaways from this project include:

- Planning and coordination were critical for work within proximity of acute care medical and research facilities and critical infrastructure.
- Low clearance and restricted working conditions due to limited structural capacity of the existing floor slabs required the use of small drilling equipment in the Osler Garage structure.
- Construction methods in the dense urban environment required alternative means and methods to mitigate noise and vibration impacts.
- Noise and vibration monitoring are critical near hospitals and research facilities.

Figure 1: Aerial rendering of Roberts Children's Health (Credit: Ballinger/ZGF/AEI from chop.edu)

Figure 2: Low overhead clearance inside the existing Osler Garage.

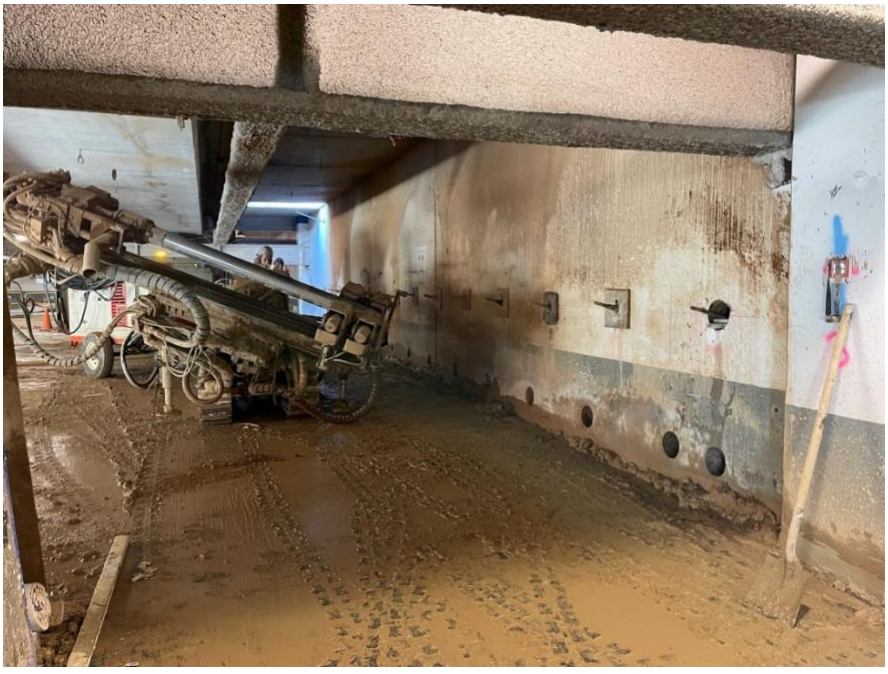

Figure 3: Osler Garage foundation wall soil nailed with existing floor slab removed.

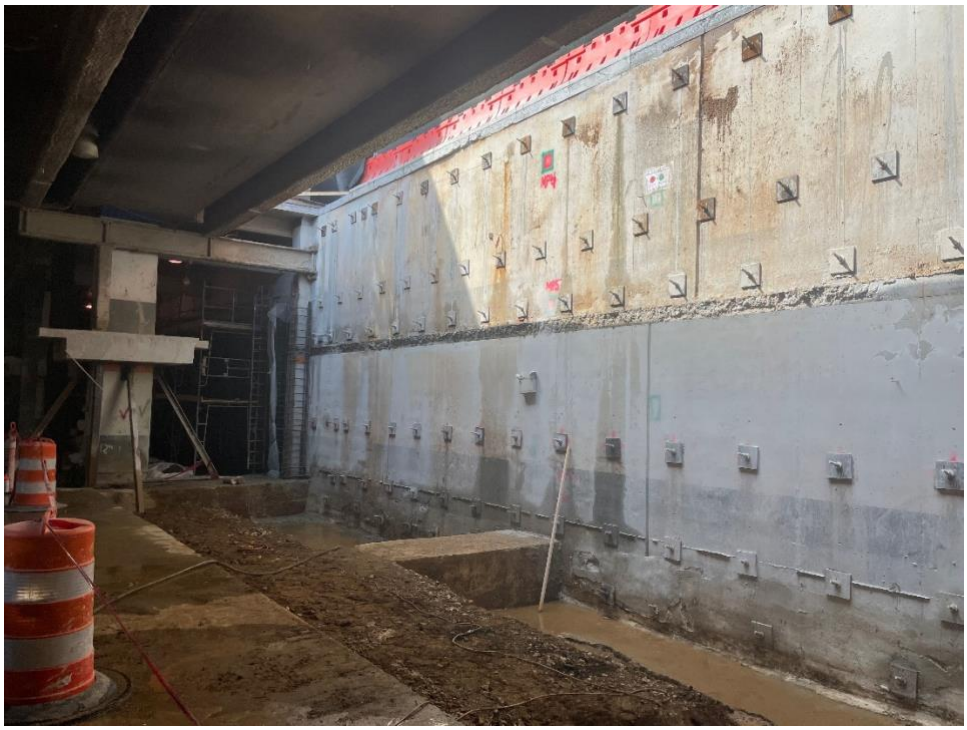

Figure 4: North view of existing foundation wall with floor and roof slabs removed, concrete soldier beams, rock excavation, and temporary SOE construction access ramp. Proximity of adjacent Research Facility and actual work area.

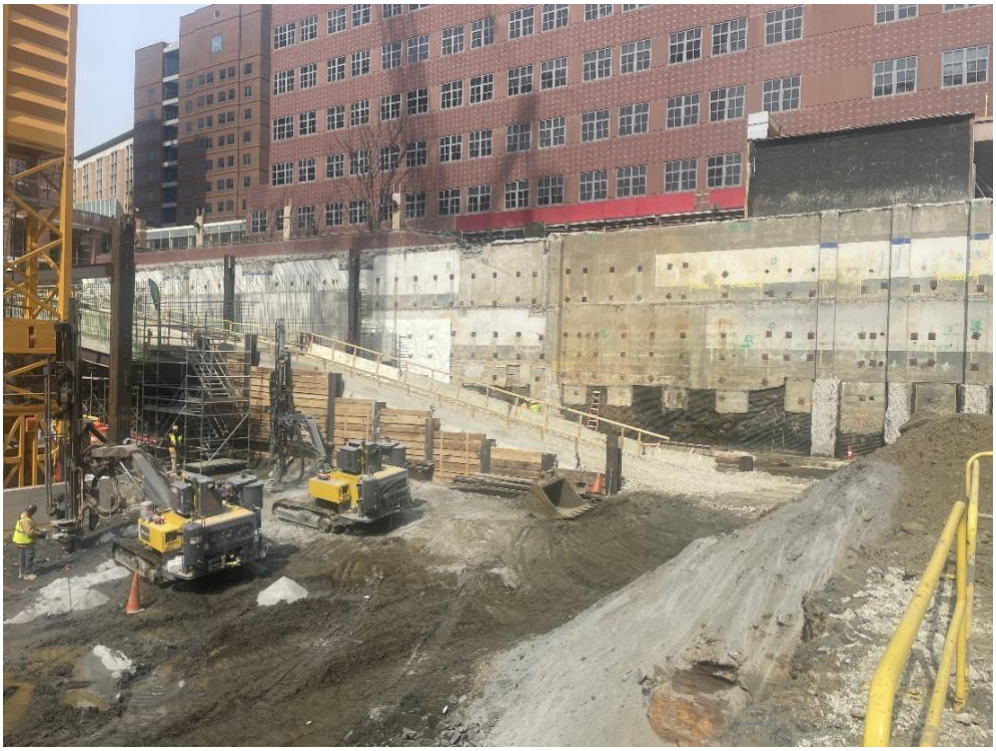

Figure 5: East Service Drive support of excavation in low overhead conditions required steep tieback anchors to clear CHOP Main Hospital basement foundations.