



**PURPOSE OF THE CEEES JUNIOR CLASS ANNUAL FIELD TRIP:** To expose students to some of the biggest and most innovative infrastructure design and construction efforts going on in the United States; to provide an opportunity to see first-hand that the need to rebuild our often failing infrastructure is huge; to learn about the complexity of the structural, transportation, water resources, and environmental projects that keep our nation productive, efficient and healthy; and to interact one on one with project and design engineers. These trips help students see the wide range of opportunities available to become innovative leaders and also help connect the classroom to the outside world.

### WEDNESDAY, NOVEMBER 8

5:00am Bus to **NYC**, meet at Eck Visitor Center bus stop (by bookstore)

*(11 hour drive, 1 - 2 hours of stops, estimate 1 1/2 hours for traffic delays)*



7:30pm Dinner at [Katz's Delicatessen](#)  
205 E. Houston Street, New York, NY 10002  
*Founded in 1888, one of New York's oldest kosher-style delis, each week serves 10,000 pounds of pastrami, 5,000 pounds of corned beef, 2,000 pounds of salami and 12,000 hot dogs. Yes, the deli in When Harry Met Sally...*

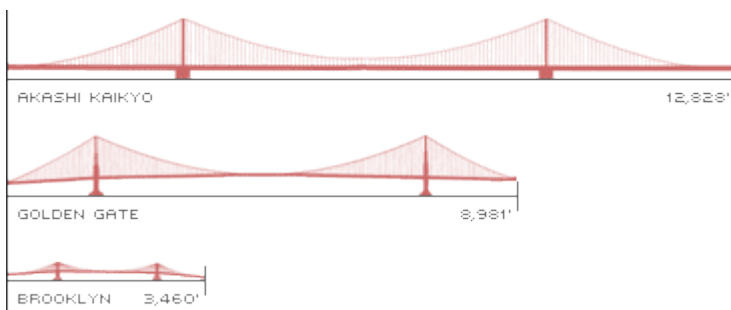
9:00pm Bus to [Brooklyn Bridge](#) (15 minutes) and walk to midway point of bridge for views of Manhattan and to see this iconic bridge up close, back to bus by 10pm

## BROOKLYN BRIDGE

Considered a brilliant feat of 19th-century engineering, the Brooklyn Bridge was a bridge of many firsts. It was the first suspension bridge to use steel for its cable wire. It was the first bridge to use explosives in a dangerous underwater pressurized containment structure called a caisson. At the time it was built, the 3,460-foot Brooklyn Bridge was also crowned the longest suspension bridge in the world. But the Brooklyn Bridge was plagued with its



share of problems. Before construction even began, the bridge's chief engineer, John A. Roebling, died from tetanus which resulted from a construction site accident. The project was taken over by his son, Washington Roebling. Three



years later, Roebling developed a crippling illness called caisson's disease, known today as "the bends," caused by a person going too quickly from the pressurized caisson to the surface. Bedridden but determined to stay in charge, Roebling used a telescope to keep watch over the bridge's progress. He dictated instructions to his wife, Emily, who passed on his orders to the workers. During this time, an unexpected blast damaged one caisson, a fire damaged another, and a cable snapped from its anchorage and crashed into the river. Despite

these problems, construction continued at a feverish pace. By 1883, 14 years after it began, Roebling successfully guided the completion of one of the most famous bridges in the world -- without ever leaving his apartment. The bridge opened to the public on May 24, 1883, at 2:00 p.m. A total of 150,300 people crossed the bridge on opening day. Each person was charged one cent to cross. The bridge opened to vehicles on May 24, 1883, at 5:00 p.m. A total of 1,800 vehicles crossed on the first day. Vehicles were charged five cents to cross.

[www.pbs.org/wgbh/buildingbig/wonder/structure/brooklyn.html](http://www.pbs.org/wgbh/buildingbig/wonder/structure/brooklyn.html)

**Today, according to the New York City of Transportation, more than 120,000 vehicles, 4,000 pedestrians and 2,600 bicyclists cross the Brooklyn Bridge every day.**



10:00pm

Bus to Hilton Garden Inn New York/West 35<sup>th</sup> Street, 63-67 W. 35<sup>th</sup> Street

10:30pm

Check-in [Hilton Garden Inn New York/West 35<sup>th</sup> Street](https://www.hilton.com/en/hotels/ny-nyc-hgtn-w35/)

63-67 W. 35<sup>th</sup> Street, New York, NY 10001, 212-594-3310

*(Bus driver to stay at the Hilton Meadowlands, Two Meadowlands Plaza, East Rutherford, NJ 201-896-0500 – all items must be taken off of the bus)*



**THURSDAY, NOVEMBER 9**

**(Construction attire today (proper footwear!) until dinner time, need valid government issued, casual for dinner, coat/raingear/umbrella if needed)**

**Group One and Group Two – MTA East Side Access Tour**

- 6:30am-8:00am Breakfast available in hotel (use coupons provided)
- 8:15am Group One and Group Two meet in lobby
- 8:30am Walk to 347 Madison Ave., [MTA headquarters](#), between 44<sup>th</sup> and 45<sup>th</sup>, 6<sup>th</sup> floor (15 minute walk) for beginning of East Side Access tour

**Group Three – Severud Associates and One Vanderbilt Tour**

- 9:00am Group Three meet in lobby (need to bring waivers)  
Bagels and coffee served at Severud
- 9:10am Walk to Severud Associates Consulting Engineers, 469 Seventh Ave – Suite 900 (5 minute walk)



**Group One and Group Two**

- 9:00am – 11:30am [Grand Central Terminal – East Side Access Tour](#)  
Guided tour through the GCT caverns

**The EAST SIDE ACCESS PROJECT (ESA)** is being undertaken by the Metropolitan Transportation Authority (MTA) and is designed to bring the Long Island Rail Road (LIRR) into a new East Side station to be built below, and incorporated into, Grand Central Terminal. The new connection will increase the LIRR's capacity into Manhattan, dramatically shorten travel times to Long Island and eastern Queens, and will provide easier access to JFK airport from Grand Central Terminal. When completed, East Side Access will serve approximately 162,000 customers a day, providing a faster and easier commute from Long Island and Queens to the east side of Manhattan in a new 8-track terminal and concourse below Grand Central Terminal. **EAST SIDE ACCESS** is one of the largest transportation infrastructure projects currently underway in the United States with a history that reaches back to the 1950's when discussions were first held regarding regional transportation planning. The project encompasses work in multiple locations in Manhattan, Queens and the Bronx and includes more than eight miles of tunneling.



**EAST SIDE ACCESS PROJECT ELEMENTS:**

**Tunneling and Excavation:** The dense bedrock beneath Manhattan and the mixed-face soil under Queens has been excavated and cleared to make room for new train tunnels, platforms, service facilities and ventilation and access shafts. Techniques include tunnel boring, cut-and-cover, drilling and blasting.

**Concourse and Terminal Construction:** At Grand Central Terminal, a new passenger

concourse will be constructed in space currently occupied by Metro-North’s Madison Avenue Yard. Eight tracks and four passenger platforms will be constructed, along with mezzanines and concourses, beneath Park Avenue below Grand Central Terminal’s existing lower level.

**Track Realignment, Reconfiguration and Modernization:** Along the length of the ESA alignment, new tracks are being built and old tracks are being replaced. In Harold Interlocking – one of the busiest train interlockings in the United States – work is being done to reconfigure and modernize the complex system of switches and tracks that serve four commuter rail systems and a cargo freight rail with the goal of smoothing and speeding travel through the area. Benefits from this work will impact rail passengers using the northeast corridor.

**Power and Ventilation Facilities:** New facilities for ventilating the tunnels and concourse and powering trains are being constructed. In addition, numerous existing facilities are being modernized and improved.

**Storage and Maintenance Facilities:** In Queens and the Bronx, new facilities for storing and maintaining trains are being constructed.



[http://web.mta.info/capital/esa\\_alt.html](http://web.mta.info/capital/esa_alt.html)

East Side Access Facts
New eight Track LIRR Terminal at Grand Central Terminal
25,000 square feet of new retail space
47 escalators and 22 elevators
Scheduled Completion December 2022

The ESA project is also projected to reduce crowding at Penn Station and nearby subway stations and provide easier access from East Midtown to JFK International Airport via the AirTrain at LIRR’s Jamaica station. The completion of the ESA project will also free up LIRR tracks in Penn Station, allowing trains from the MTA Metro-North Railroad’s New Haven Line access to Penn Station through Queens. The Penn Station Access project will construct four new stations in the East Bronx, significantly cutting travel times to and from Manhattan. The revised budget for the East Side Access project is \$10.178 billion.



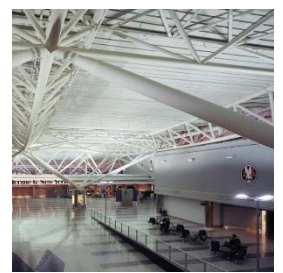
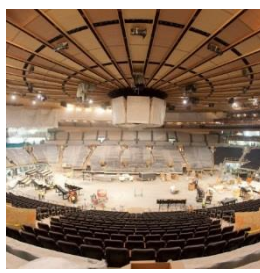
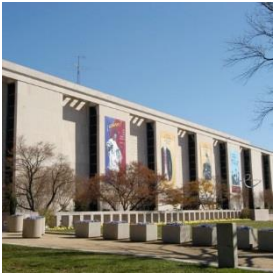
## Group Three

9:30am – noon

Presentation at [Severud Associates](#) offices and site visit to [One Vanderbilt](#)



**SEVERUD ASSOCIATES Consulting Engineers P.C.** Started in 1928 by Fred N. Severud, an engineer known for his skill at devising structural solutions for damaged masonry on the masonry and brick facades of buildings around NYC. Later the firm became known for its bold and ingenious designs, developing a reputation for engineering innovative structural designs for complex and unusual buildings. Renowned architects such as Eero Saarinen, Mies van der Rohe, Charles Luckman, and Philip Johnson became faithful clients. Together, these architectural innovators and the firm's talented engineers designed many iconic structures, including the Gateway Arch in St. Louis, the Seagram Building and Madison Square Garden in NYC, and the Crystal Cathedral in Garden Grove, California. Severud Associates has also designed more buildings on the National Mall in Washington, DC than any other structural engineering firm. Recent notable projects include 20 Times Square, the Bank of America Tower at One Bryant Park, and the Transformation of Madison Square Garden, all in New York City; the Novartis East Hanover Campus and redevelopment of Terminal A at Newark Liberty International Airport, both in New Jersey; and the Los Angeles Forum renovations in California.



[One Vanderbilt](#), on the corner of 42<sup>nd</sup> Street and Vanderbilt, right next to Grand Central Terminal, and scheduled to be completed in 2020, is a 58-floor, 1,600,000-square-foot skyscraper whose roof will be 1301 feet high and spire will be 1401 feet high, the tallest office tower in Midtown. Mostly office space, this skyscraper will have an observation deck at 1020 feet. There will be fewer stories than in other skyscrapers of similar height because each floor will have a ceiling that is 14.6 to 20 feet high. The façade and design is intended to integrate with Grand Central, across the street. According to the architect KPF's webpage on the project <https://www.kpf.com/projects/one-vanderbilt>, "One Vanderbilt fits into the city's network of public transport more than any other building in the city, blending private enterprise and the public realm. The base of the building becomes part of the spatial sequence of Grand Central and a doorstep to the city, greeting thousands of commuters daily. An integrated complex of below grade conditions offers connections to the terminal, the new East Side Access and an active urban base. Formally, the building's massing is comprised of four interlocking and tapering volumes that spiral toward the sky,



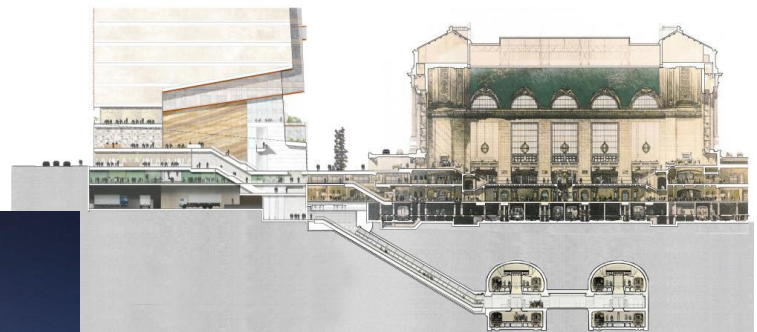
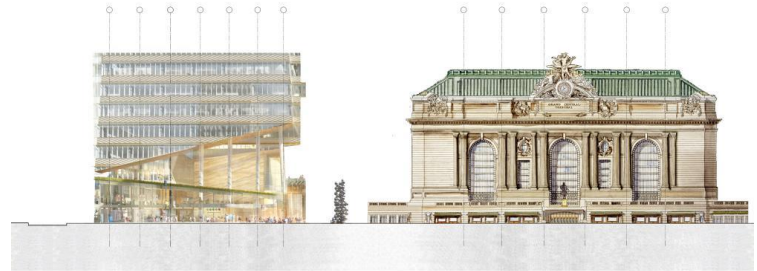
an elegant shape in sympathetic proportion to the nearby Chrysler Building. At the base, a series of angled cuts organize a visual procession to Grand Central, revealing the Vanderbilt corner of the terminal's magnificent cornice – a view that has been obstructed for nearly a century.”

[www.kpf.com/projects/one-vanderbilt](http://www.kpf.com/projects/one-vanderbilt)

Demotion of existing buildings at the site began in 2015. Foundation pours occurred in February 2017, with the first steel column installed in June 2017. The total cost of the project is projected to exceed \$3 billion.



**Height to Tip:** 427 m / 1,401 ft  
**Height to Architectural Top:** 427 m / 1,401 ft  
**Observatory Height:** 310.9 m / 1,020 ft  
**Floors Above Ground:** 58  
**Total Gross Floor Area:** 162,600 m<sup>2</sup> / 1,750,212 ft<sup>2</sup>



“Those first 100 feet show what the public can demand from a big corporate office tower: not just a machine for making money, but a juncture in the city’s life. One Vanderbilt, designed by Kohn Pedersen Fox, is that rarity, a civic-minded Goliath. A ceiling clad with concave terra-cotta tiles tilts up from west to east, like a mouth opening to swallow Grand Central. Those who step inside can slip down the building’s gullet and into the transit system. The street outside, for years a dark forgotten alley, will become a pedestrian-only thoroughfare, adding to the area’s scarce stock of genuinely public space.” [New York Magazine](#)

[The Council on Tall Buildings and Urban Habitat](#)

developed the international standards for measuring and defining tall buildings, and is recognized as the arbiter for bestowing designations such as the “World’s Tallest Building.” There are three measures of height:

**Height to Architectural Top** (includes spires, but not antennae, signage, flag poles or other functional-technical equipment)

**Highest Occupied Floor** (the finished floor level of the highest occupiable floor within the building)

**Height to Tip** (highest point of the building, irrespective of material or function of the highest element)

<http://www.ctbuh.org/HighRiseInfo/TallestDatabase/Criteria/tabid/446/language/en-GB/Default.aspx>





## All Groups

Noon – 1:15pm

Time to explore [Grand Central Terminal](#) – meeting up point for Group One, Two and Three. You're on your own to look around, and you're on your own to pick up something for lunch, and explore this historical structure.

1:15pm

**Meet at the clock on the main concourse** promptly at 1:15pm

Commonly referred to as 'Grand Central Station,' [Grand Central Terminal](#) is one of the busiest train stations in the world. 750,000 people pass through every day. Opening in 1913, it was preceded by Grand Central Depot (1871) and Grand Central Station (1900), both of which were demolished. It is home to 44 train platforms, several great restaurants, and some of the most beautiful Beaux-Arts architecture in NYC. Grand Central is where NYC subway trains originate and terminate, hence "Terminal." Based on the number of platforms, Grand Central Terminal is the largest train station in the world. In the 1960's, it was nearly torn down, but with the help of first-lady Jacqueline Kennedy, it was designated as a historic American



landmark. Renovations at the Grand Central Terminal were completed in 1998, and once more in 2007, with this Beaux-Arts NY landmark receiving an extensive cleaning of its ceiling.

<http://www.nyctourist.com/grandcentral1.htm>

[http://www.huffingtonpost.com/travel-leisure/secrets-of-new-york-citys\\_b\\_8916528.html](http://www.huffingtonpost.com/travel-leisure/secrets-of-new-york-citys_b_8916528.html)



### Things to look for in Grand Central Terminal

**Clocks:** Outside on the station's façade is the world's largest Tiffany clock, 1,500 tons and spanning thirteen feet in diameter, made of brass and stained glass, surrounded by a statue depicting Roman gods Mercury, Hermes and Minerva. Inside the main hall, the four-sided ball clock is worth an estimated \$10 million, its four faces made of opal set in brass with a brass acorn on top – the Vanderbilt family's symbol.

**Whispering Gallery:** If two people stand on opposite corners of the vaulted archway in the passageway near the Oyster Bar they can communicate, their voices reverberating like a game of telephone that no one else can hear.

**Tennis Courts:** On the fourth floor, and open to the public, anyone willing to pay \$200 - \$280 an hour can reserve time on the courts and in the fitness center.

**Secret Entrance to the Waldorf:** A two-story train shed concealed under the station contains 33 miles of tracks. VIPs who want to avoid the public gaze have used a top-secret track, known as Track 61, to get around. It connects to an elevator that goes directly into the Waldorf Astoria Hotel. President Franklin D. Roosevelt is believed to have used it to hide his polio from the public.

**Windows Have Hidden Walkways:** The giant windows visible from the main concourse have hidden walkways that offer bird's eye views of the station, allowing employees who work in the offices above to navigate and avoid the crowds below.

**The Constellations on the Main Hall Ceiling are Backwards:** Whether intentional or not, the otherwise accurate depictions of the Mediterranean winter sky are painted in reverse.

**Oak Tree and Acorn Motifs:** The Vanderbilt family motto was “Great oaks from little acorns grow,” and Cornelius Vanderbilt wanted everyone to know that he was responsible for the magnificent station. You can find the motifs on arches reaching up to the ceiling in the main concourse and on the giant bronze chandeliers.

**Top-Secret Room:** It wasn’t until the 1980s that officials acknowledge the existence of a top-secret room known as M42, though its exact location remains a well-guarded secret to this day. The 22,000 square-foot chamber ten stories below the main concourse doesn’t appear on any blueprints or maps of the station.



**Places to Eat in Grand Central Terminal**

Bien Cuit – Café Grumpy – Café Spice – Central Market New York – Chirping Chicken –Eata Pita – Financier Patisserie – Frankies Dogs on the Go – Golden Krust Patties – Great Northern Deli/Danish Dogs – Great Northern Food Hall – Hale and Hearty Soups – Irving Farm Coffee Roasters – Jacques Torres Chocolate & Ice Cream – Joe Coffee – Juice Press – La Chula – Magnolia Bakery – Mendy’s Kosher Delicatessen and Dairy – Neuhaus Belgian Chocolate – O&Co. –Prova Pizzabar – Shake Shack – Shiro of Japan – Starbucks – Sushi by Pescatore - Tri Tip Grill – Zaro’s Family Bakery – The Market

1:15pm Meet up with your group at the clock on the main concourse!!



1:15pm – 1:45pm Walk to [Farley Post Office Building redevelopment](#) into the [Moynihan Train Hall](#)  
*For site visit: Enter the James A. Farley Building at 31<sup>st</sup> Street between 8<sup>th</sup> and 9<sup>th</sup> avenue located directly across the street from the DMV. The middle door marked Skanska will lead to a stairway that goes up to the 2<sup>nd</sup> floor. Entrance on right. (30 minute walk)*



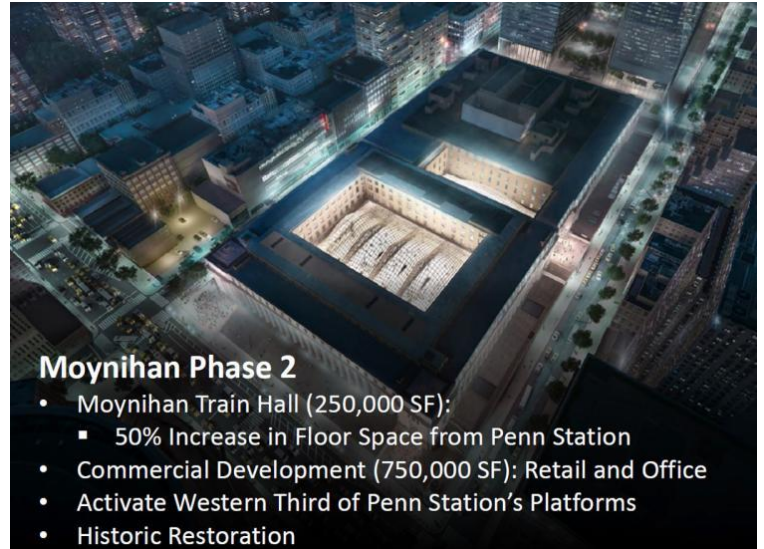


*"For decades, passengers were promised a world-class train hall worthy of New York - today, we are delivering on that promise and turning that dream into a reality," said Governor Andrew M. Cuomo. "We are transforming the Farley Post Office into a state-of-the-art transit hub to get travelers where they need to go faster and more comfortably. With better access to trains and subways, vibrant retail and business opportunities and stunning architectural design, we are bringing Penn Station into the 21st century."*

<https://www.governor.ny.gov/news/governor-cuomo-announces-major-construction-begin-new-grand-moynihan-train-hall>

The Moynihan Train Hall is part of the \$2.5 billion transformation of the Pennsylvania Station – Farley Complex to dramatically modernize, upgrade and redesign America’s busiest transit hub into a world-class facility. Located within the existing James A. Farley Building, the new 255,000 square foot Train Hall will serve as the new concourse for Amtrak and Long Island Railroad passengers, while an additional 700,000 square feet will be dedicated to commercial, retail and dining spaces. Designed by SOM, the renovation will feature a new 92 foot tall one-acre skylight located within the center of the Beaux Arts building. The train hall will service nine platforms with 17 tracks. While demolition and preparatory work on the project began in September of 2016, construction is now underway on the \$1.6 billion project, with a completion date targeted for 2020.

<http://www.archdaily.com/878010/construction-begins-on-penn-stations-moynihan-train-hall-transformation>



### Moynihan Phase 2

- Moynihan Train Hall (250,000 SF):
  - 50% Increase in Floor Space from Penn Station
- Commercial Development (750,000 SF): Retail and Office
- Activate Western Third of Penn Station’s Platforms
- Historic Restoration



landmark, and its unpopular replacement, is often cited as a catalyst for the architecture preservation movement in the U.S. Within a decade of the demotion, Grand Central Terminal was protected under the city’s new landmarks preservation act. Governor Cuomo believes that Farley Hall will restore the “elegance” of the original Penn Station.

The Farley building, built in 1912 and which was the former General Post Office, was designed by McKim, Mead and White as a sister to their masterpiece – the original Pennsylvania Station. Penn Station opened in 1910, and was designed to accommodate 200,000 daily passengers, but in practice, it serves more than 650,000 per day, and is considered the busiest passenger transportation hub in the Western Hemisphere. The cost of maintaining this original Penn Station became prohibitive, so it was demolished in 1963 and replaced with Penn Plaza and Madison Square Garden. **The controversy over demolition of such a well-known**



*"One of the main challenges our team faced in the first phase was executing the work while keeping Penn Station open to the public and minimizing disruption to trains," says John Sullivan, lead project manager at Skanska USA for the west end concourse and Farley building projects. That led to a strategy that focused staging outside of the normal weekday bustle, with 106 weekend outages over the course of the project schedule, particularly in 55-hour shifts from Friday nights to early Monday mornings.*

<http://www.enr.com/articles/42323-ny-penn-station-expansion-finally-rolls-into-motion>

2:00pm – 4:00pm **Farley Train Hall project site visit – hosted by [Skanska USA](#)**  
2pm – arrivals  
2:15pm – Job presentation  
2:45pm – PPE setup  
3:00pm – Walk through  
4:00pm – Headcount, closing, departures

**It's all about passenger access; no new train lines are being built at this time:** The new West End Concourse of Penn Station, completed this past summer by Skanska USA's civil contracting group after a five year construction period, and part of Phase One of the project, opened two major entry and exit points for passengers using Penn Station, stretching passageways to the west under Eighth Avenue to the Farley Building, and also added Americans with Disabilities Act improvements, fire-safety features, new platform emergency ventilation systems, new elevators and staircases, energy-efficient lighting, digital train information screens and navigational aids.

**Even after the second phase is done,** Penn Station will still lack adequate capacity to handle its current passenger flow—relying on the narrow, crowded platforms currently in use, says Denise Richardson, executive director of the General Contractors Association of New York. “The fundamental capacity constraints at Penn Station are not changing with this phase of Moynihan,” she says. “You’ve still got your 21 tracks and platforms.” Addressing those issues would require completion of other planned but unsettled projects, such as Amtrak’s Gateway program to build a new two-track tunnel under the Hudson River and expand related station infrastructure to handle the new train traffic. (<http://www.enr.com/articles/42323-ny-penn-station-expansion-finally-rolls-into-motion>)



The [Related Companies–Vornado Realty LP–Skanska USA joint venture](#) is one of the few major New York City construction projects to be performed under the design–build delivery method, along with the Jacob K. Javits Center and the Tappan Zee Bridge. New York Gov. Andrew Cuomo has consistently praised design–build as a way to get projects done on schedule and within budget and proposed legislation that would allow it to be used throughout the state, with the exception of New York City. Despite many city officials expressing a desire to use design–build, critics argue that it could reduce the participation of unions and that city engineers, who are a significant part of the design process, could lose their jobs. <http://www.constructiondive.com/news/ny-cements-16b-moynihan-train-hall-deal-with-skanska-related-vornado/445289/>



## SKANSKA

Based in a small fishing village in southern Sweden more than 125 years ago, today Skanska is one of the world's leading project development and construction companies --- Incorporated in New York since 1971 --- Four business units operate in the U.S.: USA Building, USA Civil, Infrastructure Development and Commercial Development --- Offices in 31 metro areas across the country --- Over 10,000 U.S. employees working everyday --- More than 400 LEED® Accredited Professionals and more than 125 projects that have achieved or are seeking LEED certification --- 3rd largest building/manufacturing contractor by revenue (ENR) --- 3rd largest heavy contractor by revenue (ENR) --- Excellent safety record - in 2016 the average industry contractor had more than three lost time accidents for every one experienced at Skanska USA --- Among the first U.S. construction firms to have all operations ISO 14001 certified --- Client base consists of transportation, power, industrial, water/wastewater, healthcare, education, sports, data centers, government, aviation and commercial development sectors.



4:00pm – 4:30pm Walk back to hotel (*15 minute walk*)

4:30pm – 5:30pm Free time

5:30pm Meet in lobby for walk to dinner (*15 minute walk*)

6:00pm – 7:30pm **Dinner at [John's of Times Square](#)**  
*all you can eat NY pizza and calzones*  
 260 W. 44th Street New York, NY 10036



### FRIDAY, NOVEMBER 10

**(Need ID, construction attire today until dinner time, dressier clothes for dinner (but we will be walking 15 minutes to our dinner spot so choose shoes accordingly), coat/raingear/umbrella if needed)**

6:30am-8:45am Breakfast available (use coupons provided)

8:45am Meet in lobby for walk to Empire State Building

8:45am – 9:00am Walk to the [Empire State Building](#) to [HNTB's](#) bridge design offices – need valid government issued ID for entrance to ESB (*15 minute walk*)

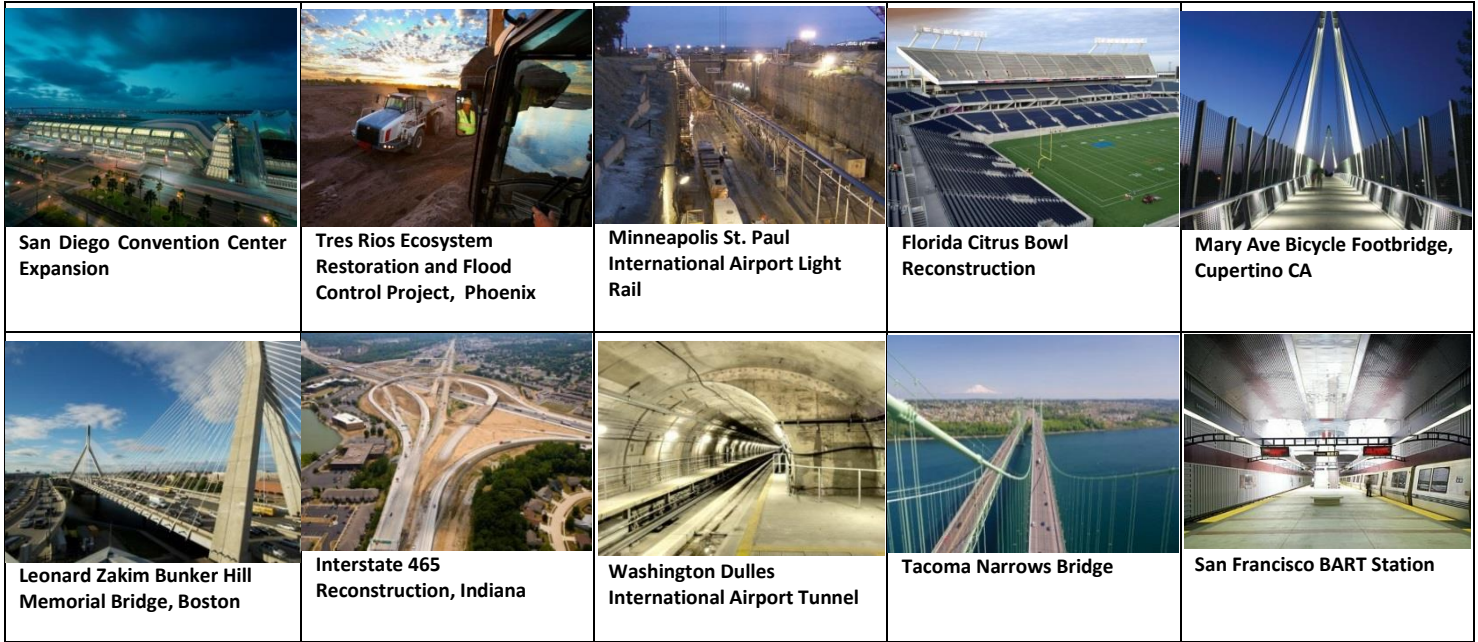
9:00am Check in and escorted up to HNTB offices



[Ted Zoli, PE](#) is one of the bridge engineering and design industry's most recognized figures. He is the subject of profiles in magazines, such as Esquire and Popular Mechanics, as the first structural engineer to receive the prestigious MacArthur Foundation Genius Award. As HNTB's national bridge chief engineer, Zoli brings international acclaim as the innovator behind numerous bridges — long span, movable, pedestrian and rail. Among his most notable projects are the cable-stayed Leonard P. Zakim Bunker Hill Bridge in Boston, the curved cable-stayed Bob Kerrey Pedestrian Bridge in Omaha, Nebraska, and the Lake Champlain Bridge between New York and Vermont.



A few examples of HNTB projects follow, check out their [website](#) for the full range of their many complex infrastructure projects across the country and world.



9:00am – 11:30am [HNTB](#) bridge design offices – presentation of some current projects

HNTB Corporation is an architecture, engineering, planning, civil engineering consulting management firm that was founded in 1914. Their areas of expertise range from architecture, aviation, bridges, construction management, design build, environmental planning, highways, intelligent transportation systems, program management, tolls, transit and rail, tunnels and water.

11:30am – noon Market Crate box lunches in HNTB offices


12:15pm Gather at bus pick-up spot

12:30pm Pick up by bus to go to Goethals Bridge project, 137 Bayway Avenue, Elizabeth, NJ, Kiewit complex (*approx. one hour drive*)

1:30pm – 2:00pm Arrival [Goethals Bridge](#) – hosted by [Kiewit](#)

2:00pm – 4:00pm Site visit

One of the “firsts” in the Port Authority legacy, the Goethals Bridge was built as part of an overall project to accommodate greatly increased automobile traffic following World War I, and was one of the first facilities constructed by the Port Authority. The 140-foot channel clearance permitted passage of deep-sea vessels through the Arthur Kill.






[Goethals Bridge](#) is one of three Staten Island bridges linking New York and New Jersey. The current bridge, a steel truss cantilever, opened in 1928, and was named in memory of Major General George W. Goethals, builder of the Panama Canal and the first consulting engineer for the Port Authority. It has two ten foot wide lanes in each direction, short of the twelve foot requirement of modern highway design, and there are no shoulders for emergency traffic or for pedestrian or bike traffic. [Kiewit Weeks Massman](#) AJV is building the new cable-stayed bridge, three twelve foot lanes in each direction, a twelve foot outer shoulder and a five foot inner shoulder in each direction, and a ten foot



walkway/bikeway. The area between the eastbound and westbound roadways will be capable of accommodating a possible future mass transit link.

The Goethals replacement also provides state-of-the-art smart bridge technology, including Roadway Weather Information Systems that collect environmental data such as wind speed, visibility, and pavement temperature. A Traffic Detection System uses sensors to provide alerts on traffic build-ups so incident response plans can be quickly implemented.

**Check out Andrew Geisel, (ND alum, B.S., CEEES '16) CEEES blog post story as an early career engineer working on the Goethals Bridge**

[For the Love of Bridges: An Interview with an Early Career Engineer](#)

MARIJKE WIJNEN APRIL 27, 2017



Andrew Geisel has been passionate about bridges for years. In high school he did a research project on the Brooklyn Bridge and he still remembers many of the facts about its construction and design. He therefore feels incredibly fortunate that his first job after graduating with a degree in civil engineering from Notre Dame is working on the construction of the new Goethals Bridge, which spans the Arthur Kill Strait, connecting Elizabeth, New Jersey to Staten Island, New York. I got a chance to talk to him about his new job, the transition from being a student to a working professional and of course bridges.

[Read More...](#)



This **\$1.5 billion dollar project** has been in the works since 2003. Construction began in 2014, following an extensive **six-and-a-half-year Environmental Impact Study**. The use of **drilled shafts** on the project is an example of environmental precautions that were taken, by minimizing the amount of excavation that needed to be done, wetlands could be preserved and on the New Jersey side it minimizing the exposure to contaminated soil from the industrial sites there.

The bridge itself is designed to last more than a century, while the major components, such as the towers and main foundations, are **designed to last 150 years**.

Both east bound and west bound structures of the new bridge are expected to be substantially completed later in 2017, with full project completion, including demotion of the old bridge, projected for 2018.

The bridge is being built by a **P3, or public private partnership**. The developer takes the assignment of risk for the project. They build it as a team. The contractor works for the developer and the designer works for the contractor. **This is the first and currently only transportation P3 that's being done by any of the area's DOTs (New Jersey, New York, Connecticut) or the Port Authority**. Another significant aspect of a P3 is the financing. The developer bids basically a fixed price to the Port Authority, and the developer finances the job up to the point where the Port Authority accepts the job, at which point the Port Authority starts paying the job back over a period of 35 years, and the developer has to maintain the structure for the 35 years.

A total of **144 steel stay cables**, each up to 400 feet long and 13 inches in diameter, will be installed on both of the new bridge's twin spans, connecting the **272 feet tall towers**.



**Kiewit**

Founded in 1884 and based in Omaha, Nebraska, Kiewit Infrastructure Co. provides construction, engineering and mining services, and consistently ranks among the top five contractors by Engineering News-Record. Their work throughout the United States, Canada and Australia includes Building, Mining, Oil, Gas & Chemical, Power, Transportation, Water & Wastewater projects.

[Read about their vast array of challenging projects.](#)

4:00pm	Bus back into hotel ( <i>approximately one hour drive</i> )
5:00pm – 7:00pm	Free time
7:00pm	Meet in lobby for walk to dinner ( <i>10 minute walk</i> )
7:30pm	Dinner at <a href="#">The Capital Grille Chrysler Center</a> 155 East 42nd Street New York, NY 10017





**SATURDAY, NOVEMBER 11**

**(Casual clothes, comfortable walking shoes, raingear/umbrella if needed)**

7:00am – 9:15am Breakfast available in hotel (use coupons provided)

9:30am Meet in lobby to gather for walk to the [High Line](#), Gansevoort & Washington Streets (35 minute walk)

10:00am – 11:00am A walk along the High Line – [check out the e-pocket guide](#)

**[High Line](#): Out of Use Railroad Trestle to Public Landscape** (from [thehighline.org](#))

*The High Line is a public park built on a historic freight rail line elevated above the streets on Manhattan's West Side. The High*



*Line is now one continuous 1.45 mile long greenway that features 500+ species of plants and trees. High Line Art commissions and produces 30+ public art projects each year, including site-specific commissions, exhibitions, performances, and video programs. Check out the [High Line Pocket Guide](#).*

**1934** As part of the West Side Improvement Project, the High Line opens to trains. It runs from 34th Street to St John's Park Terminal, at Spring Street. It is designed to go through the center of blocks, rather than over the avenue, carrying goods to and from Manhattan's largest industrial district.



**1980s** Following decades-long growth in the interstate trucking industry, the last train runs on the High Line in 1980, pulling three carloads of frozen turkeys. A group of property owners lobbies for demolition while Peter Oblatz, a Chelsea resident, activist, and railroad enthusiast, challenges demolition efforts in court.

**1999-2014** From conception by two residents of the High Line neighborhood, Joshua David and Robert Hammond, to planning studies, to ideas competition, to design selection, to ownership transfer to the City, to groundbreaking, and finally development in four stages/sections, the dream becomes a reality.

**SUSTAINABLE PRACTICES:** Self-seeded grass, trees and other plants grew on the out-of-use elevated rail track during the 25 years after the trains stopped running. These grasses and trees inspired the plating designer Piet Oudolf to “keep it wild.” Nearly half of the plant species and cultivars planted on the High



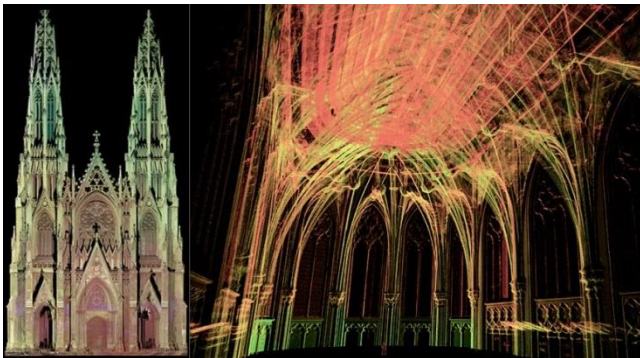
Line are native to the United States. **HOW ARE THE PLANTS WATERED?** The High Line's green roof system is designed to allow the plants to retain as much water as possible. In addition, there is an irrigation system installed with options for both automatic and manual watering. **HOW IS THE HIGH LINE SUSTAINABLE?** The High Line is inherently a green structure. It re-purposes a piece of industrial infrastructure as a public green space. The high Line landscape functions essentially like a green roof; porous pathways contain open joints, so water can drain between planks and water adjacent planting beds, cutting down on the amount of storm-water that runs off the site into the sewer system. The High Line has on-site **COMPOSTING FACILITIES**, an **INTEGRATED PEST MANAGEMENT PROGRAM**, uses **GREEN SEAL CERTIFIED CLEANING SOLUTIONS** and **POST-CONSUMER PAPER PRODUCTS**.



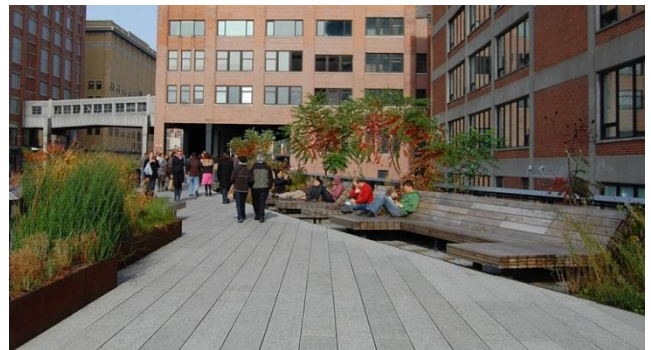
11:00am – 12:30pm Meet Art Alzamora at the curve in the High Line (over 30<sup>th</sup> street) to walk to [Langan](#), 21 Penn Plaza, 360 West 31<sup>st</sup> Street, 8<sup>th</sup> floor  
 For presentation about some of their work around the city. Among many other projects, Langan is providing civil, geotechnical consulting and land surveying services for One Vanderbilt.



[Langan](#), an engineering and environmental consulting firm, was founded as a geotechnical specialty firm in 1970, and is now in its 47<sup>th</sup> year. Their projects include airports, brownfield redevelopment, colleges and universities, energy, environmental remediation, environmental compliance, hospitals and healthcare, infrastructure, residential, renewable energy, tall buildings, waterfront and marinas, among others. The company provides services in Site/Civil, Geotechnical, Environmental, Earthquake/Seismic, Demolition, Traffic and Transportation, Surveying and 3D Scanning, Information Management, Landscape Architecture and Planning, Environmental Planning, Natural Resources and Permitting. ***We will learn about some of their ongoing work, but here are a couple of their projects involving places that we will see on this trip.***



St. Patrick's Cathedral publicly announced its restoration in 2012 after years of pollution critically deteriorated both the interior and exterior. Langan performed 3D laser scans of the façade, sanctuary, and attic spaces to document the conditions and model the building's unique layout. This highly detailed data saved the project team time and money, and the deliverables were regularly compared to the base survey to maintain accuracy.



An abandoned railroad structure spanning 19 blocks on Manhattan's West Side, the High Line overpass, became the nation's first elevated park. Langan site/civil engineers assisted with the design and permitting of three plazas within the High Line (the Gansevoort Street, 19th Street, and 10th Avenue Square plazas). Working with the developers, Langan obtained DEP drainage plan permits to connect drains for the project areas and at street level for the length of the high line structure. Langan environmental engineers provided remediation design and oversight.





Pier 57, an approximately 560,000-GSF pier, a once abandoned shipping and passenger terminal, is now the proposed site for public

green space, rooftop beach, rock-climbing wall, and 200 stores and businesses. Langan’s environmental engineers performed extensive due diligence services for this location, including a Phase I Environmental Site Assessment and Phase II Environmental Site Investigation. As a result of flooding associated with Superstorm Sandy, Lagan provided an emergency spill response team when six above-ground storage tanks became buoyant and spilled approximately 31,000-gallons of fuel oil into the pier’s Head House caisson and elevator pits.



Hudson Yards Redevelopment, under the joint guidance of the City, the Metropolitan Transportation Authority, and State of New York initiatives, is in the process of reinventing the Hudson Yards area in midtown Manhattan. Langan has been retained by multiple teams to provide geotechnical, site/civil, environmental, and traffic engineering, seismic design analysis, and surveying services during the pre-design phase of development.



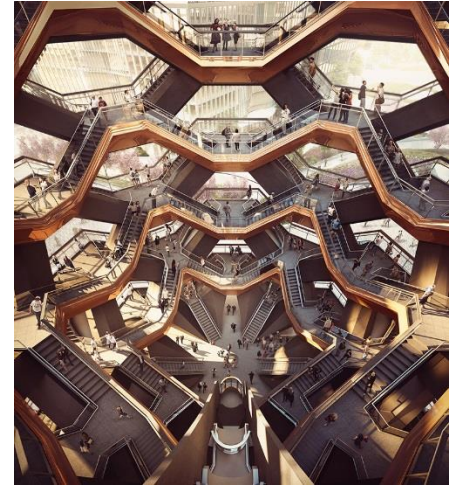
<http://livehudsonyards.com/>

## HUDSON YARDS New York

**Hudson Yards is the largest private real estate development in the history of the United States** and the largest development in New York City since Rockefeller Center. When completed in 2025, 125,000 people a day will work in, visit, or call Hudson Yards their home. **The site will include more than 17 million square feet of commercial and residential space, state-of-the-art office towers, more than 100 shops** including New York’s first Neiman Marcus, and a collection of restaurants curated by Chef Thomas Keller. The urban development will include approximately 4,000 residences, The Shed, a new center for artistic invention, 14 acres of public open

space, a 750-seat public school and an Equinox® branded luxury hotel with more than 200 rooms—all offering unparalleled amenities for residents, employees and guests. The development of Hudson Yards will create more than 23,000 construction jobs. <http://www.hudsonyardsnewyork.com/about/the-story/>

**THE VESSEL:** Thomas Heatherwick **has unveiled plans for an engaging public landmark that will form the centerpiece of the Hudson Yards development.** Named “Vessel,” the interactive structure is intended to be climbed, explored, and experienced. Comprising 154 interconnecting flights of stairs, the installation will offer a variety of ways to engage with the city’s urban landscape. In total, the design — with its almost 2,500 individual steps and 80 landings — will offer a mile’s worth of pathway above a sprawling public garden. **The geometric lattice of intersecting flights of stairs,** made from painted steel frame, will rise from a 50 foot diameter base and widen at the top to 150 feet, with an underside clad with a polished copper-colored skin. Vessel will form **the centerpiece of a public square and gardens designed by landscape architects Nelson Byrd Woltz, in collaboration with Heatherwick Studio.** Informed by Manhattan’s rich ecological



history, the site will feature more than five acres of plazas with groves of trees, woodlands plants, perennial gardens and a 200-foot-long fountain that mirrors the flow of a river. The platform itself serves as a ventilating cover over the working rail yards below and is engineered to support large-scale plantings, while simultaneously acting as a reservoir for site storm-water management and reuse.

<http://www.designboom.com/architecture/thomas-heatherwick-vessel-hudson-yards-new-york-09-14-2016/>

1:00pm – 1:30pm

Pick up by the bus on W. 31<sup>st</sup> Street, between 9<sup>th</sup> and 8<sup>th</sup> Ave, drop off at **Tour Bus Passenger Loading/Unloading at West St. and Barclay St.** in Lower Manhattan (on east side of road) (across the road from Goldman Sachs headquarters 200 West St)

5 minute walk to [The Solaire](#), 20 River Terrace, New York

2 minute walk to [The World Trade Center 9/11 Memorial](#) site

1:30pm – 3:45pm

Our two sites visits for this time period are:

[The Solaire](#), 20 River Terrace, New York (5 minute walk from bus drop-off)  
Peter Luciano, 212-528-2200

[The World Trade Center 9/11 Memorial](#) site (2 minute walk from bus drop-off)

**10 minute walk in between the two sites – allow 15 minutes**

We will be divided into our three groups, as The Solaire can accommodate approximately 15 – 20 visitors at a time.



Group 1:	1:30pm – 2:15pm	The Solaire
	2:30pm – 3:45pm	The World Trade Center Memorial Site
Group 2:	1:30pm – 2:00pm	The World Trade Center Memorial Site
	2:15pm – 3:00pm	The Solaire
	3:15pm – 3:45pm	The World Trade Center Memorial Site
Group 3:	1:30pm – 2:45pm	The World Trade Center Memorial Site
	3:00pm – 3:45pm	The Solaire

3:45pm – 4pm **Gather at bus pick up spot.** Bus cannot linger, so we need to be all assembled by 4pm for pick-up

[Battery Park City](#) and [The Solaire](#): Begun in the late 1960s with landfill from the excavations of the World Trade Center, **Battery Park City** was developed according to an evolving series of master plans and built largely in the 1980s and 1990s. Today, its 92 acres have been almost fully built out as a mixed-use community with a north and south residential neighborhood set within landscaped public parks and a commercial core of skyscrapers, the World Financial Center.

In 2000, the Hugh L. Carey Battery Park City Authority, the New York State authority that oversees the development and operation of Battery Park City, instituted **mandatory green guidelines for all new residential buildings**. The first to be erected under these standards for design, construction, and operation was **The Solaire**. Completed in 2003, it was the first green apartment building in the United States and won Gold LEED status and numerous international awards. Other LEED high-rises followed in the following years.

[http://www.skyscraper.org/EXHIBITIONS/GREEN\\_TOWERS/gt\\_bpc.htm](http://www.skyscraper.org/EXHIBITIONS/GREEN_TOWERS/gt_bpc.htm)



**The Solaire**, 20 River Terrace in North Park is the **first ever LEED-certified residential high-rise**. Designed by the Albanese Corporation and completed in 2003, the building stands 27 stories high and has beautiful views overlooking Battery Park City and the Hudson River. With nearly 300 units and 600 residents, the building provides an amazing opportunity to live green. **The building has since earned LEED Platinum certification** and continues seeking ways to improve.

The Solaire was designed with a green mission right from the start. All materials were imported from within a 500-mile radius in order to reduce transport waste, and after the completion the building was able to recycle 85% of the waste produced during construction. Part of what makes The Solaire so unique is that it strives to reuse and recycle wastewater. The wastewater from bathrooms and kitchens goes through a multi-stage filtration process and is cycled back into use to flush toilets and as makeup water for cooling towers. This not only allows The Solaire to use less water, but also to save and reuse about 50% of the total water it uses. Solar panels on the roof help to produce about 5% of the energy used throughout the building. In addition, scattered among the planted grass surface on the roof are rainwater collection holes, where storm water drains down to a container in the basement to be cleaned, sanitized, and reused. Inside the units, an example of green building is the low-E glass which acts to reflect rather than absorb sunlight, in turn helping with insulation and lowering heating and cooling costs. Many more green energy features, energy efficiency features, green products, water conservation features, and transportation considerations are incorporated into The Solaire. <http://bpcn.ny.gov/community/bpc-did-you-know-green-living-at-the-solaire/>

**In partnership with BMW Group's ReachNow, The Solaire just recently launched a car-sharing program for residents of The Solaire.**



Water Environment Research Foundation  
*Collaboration. Innovation. Results.*

**Case Study: Battery Park City Urban Water Reuse**

**Collection:** Each building in Battery Park City has its own internal wastewater collection system that is interconnected to the New York City (NYC) sanitary wastewater collection and treatment system. This system consists of pipes in the public right-of-way that existed before construction of these buildings. The NYC water and sewer systems were upgraded or relocated where necessary, but their previous function and capacity remained unchanged. The stormwater system was built independently and discharges directly to the Hudson River. The sanitary wastewater system discharges to a NYC combined sewer that serves the lower portion of Manhattan.

**Treatment:** Each project provides adequate treatment for the intended use of the reclaimed rainwater or wastewater. Rainwater is collected from vegetated green roofs and membrane roofs and stored in tanks that include varying degrees of filtration and disinfection. Wastewater and, in certain cases, combined rainwater and wastewater, is treated using membrane bioreactor (MBR) technology. The primary means of disinfection is UV and ozone which is used primarily to eliminate color by oxidizing any remaining low-concentration organic compounds, and it also provides an additional means of disinfection. Product disposition: Product reuse water is typically stored in individual reservoirs located in each building and subsequently distributed based on demand. The nonpotable water distribution system draws water from the reservoirs, which are then replenished with additional reuse water from the treatment process. Reclaimed water is used for toilet flushing, cooling, laundry, and irrigation. Potable water is provided by the NYC public water supply system.



## WORLD TRADE CENTER HISTORY OF THE TWIN TOWERS

**1939** - At the World's Fair in Flushing, NY the "World trade center" pavilion is dedicated to "world peace through trade."

**1964** - The Port Authority unveils an architectural plan for the WTC featuring the world's tallest buildings.

**1966** - Construction begins at the WTC site with the demolition of 78 Dey Street. Excavation work begins for the WTC. First use of "slurry wall" method in the United States.

**1970** - The North Tower of the WTC exceeds the height of Empire State Building at 1,368 feet, making it the tallest building in the world.

**1971** - The South Tower of the WTC is topped off at 1,362 feet.

**1973** - The World Trade Center is dedicated.

**1974** - Tightrope artist Philippe Petit performs an unauthorized walk between the Twin Towers.

**1975** - Top of the World Observation Deck opens, South Tower.

**1976** - Windows of the World Restaurant opens, North Tower.

**1993** - Terrorists detonate 1,500 pounds of explosives in a van parked in the underground public parking lot of the WTC, two levels below the southern wall of the North Tower. The attack kills six people, injures more than 1,000 people and creates a five-story crater beneath the towers, resulting in hundreds of millions of dollars of damage. The Port Authority implements a \$250 million upgrade plan focusing on life safety and security.

**1994** - The WTC is designated one of the "Seven Wonders of the Modern World" by the American Society of Civil Engineers. The WTC is visited by every U.S. president between the time of its opening and the time of its destruction at least once, as well as by many dignitaries and heads of state.

**1995** - A memorial fountain is dedicated in the WTC plaza to the victims of the 1993 bombing.

**1998** - The Port Authority announces plans to seek a 99-year net lease of the complex.

**2000** - The WTC reaches its highest occupancy rate.

**July 2001** - The WTC is net-leased to private developer Silverstein Properties, Inc. for approximately \$3.2 billion. A three-to-six month transition period commences.

**September 2001** – On September 11, two planes hijacked by terrorists crash into the Twin Towers, destroying the complex. One World Trade Center is struck at 8:46 a.m.; Two World Trade Center at 9:03 a.m. [A timeline of events of that day.](#)

**2002** - Six-month anniversary of the September 11 attacks is marked with beams of light. On May 30, the WTC recovery ends with a public Last Column Ceremony.

**2002** - The 9-11 Commission is created to study the events leading up to the September 11 attacks and to provide recommendations on emergency preparedness and response. The 9-11 Commission issues its report on July 22, 2004.

**2003** - On November 23, a temporary World Trade Center PATH station opens to replace the one destroyed on September 11.

**2006** - The newly constructed 7 World Trade Center opens on May 23, the first building to be rebuilt in Lower Manhattan after the September 11 attacks.

<http://www.panynj.gov/wtcprogress/history-twin-towers.html>



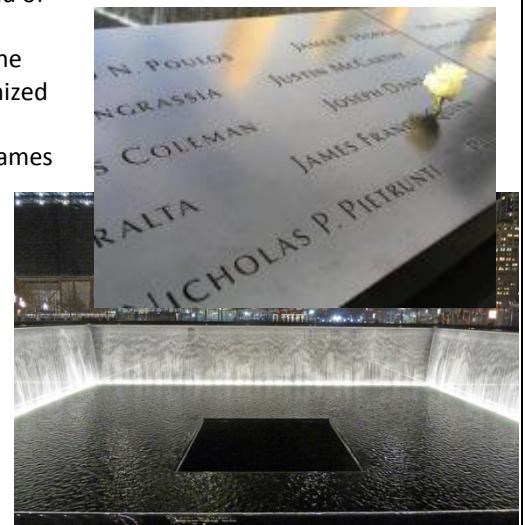
**The 9/11 Memorial**

**The Reflecting Pools** – These pools and cascading waterfalls are set in the exact footprints of the North and South World Trade Center Towers which were destroyed on September 11, 2001. The pools are the largest man-made waterfalls in the North America. The pools are one of the most moving memorials in the world. It is nearly impossible to view the pools without experiencing overwhelming emotions.

The Memorial honors those who died on 9/11, including those who perished at the World Trade Center, the Pentagon in Washington D.C. and the victims of hi-jacked Flight 93 that crashed in Pennsylvania. Also included are the oft-forgotten six victims of the 1993 World Trade Center bombing.

The victims' names are inscribed around the bronze edges of the pools. Instead of being arranged alphabetically, the names are organized by "meaningful adjacencies." Names are grouped together based on their relationships with other victims, such as co-workers, family members, friends, and even those

who commuted together. <http://www.freetoursbyfoot.com/visit-911-memorial-nyc/#tickets>



### The 9/11 National September 11th Memorial Museum



Through interactive technology, archives, narratives and a collection of artifacts, the Museum recounts the events of 9/11. Unlike the Memorial, you must purchase tickets to enter. Information about visiting: <https://www.911memorial.org/visit>



### One World Trade Center



Nick-named the “Freedom Tower,” One World Trade Center is the tallest skyscraper in the Western Hemisphere and, as of 2016, is the 6th tallest in the world. It’s no coincidence that its height is 1,776 feet. The Observatory on the 100th and 101st floors is open and is quite an amazing experience. For

information on visiting click on this link: [One World Observatory \(“Freedom Tower”\)](#). Floors 1-19 are the base of the building with a 65-foot-high (20 meter) public lobby. Rented office space begins on the 20th Floor and continues to the 64th Floor. On Floor 65 is a sky lobby and then office floors resume on Floor 65 to Floor 90. Floors 91–99 and 103–104 are mechanical floors.

### The World Trade Center Transportation Hub – the Oculus

The recently opened \$4 billion World Trade Center Transportation Hub serves 250,000 Port Authority Trans-Hudson (PATH) commuters daily and millions of annual visitors from around the world. At approximately 800,000 square feet, the Hub, designed



by internationally acclaimed architect Santiago Calatrava, is the third largest transportation

center in NYC. The Hub’s concourse will ultimately connect visitors to 11 different subway lines, the PATH rail system, the Battery Park City Ferry Terminal, the National September 11 Memorial & Museum, World Trade Center Towers 1, 2, 3, 4 and Brookfield Place.

The “Oculus” serves as the centerpiece of the World Trade Center Transportation Hub, incorporating 78,000 square feet of multi-level state-of-the-art retail and dining. The concourses emanating from the Oculus link the entirety of the site above and below grade. With an additional 290,000 square feet of multi-level retail and dining space, the World Trade Center site is the focal point of Lower Manhattan.

**2 World Trade Center** is, after 15 years, still not complete due to many delays in design. The currently agreed upon design is for a 90-story tower standing 1,270 feet tall encompassing 2.8 million square feet.



**3 World Trade Center** is near completion and will be 80 stories tall rising to 1,079 feet.



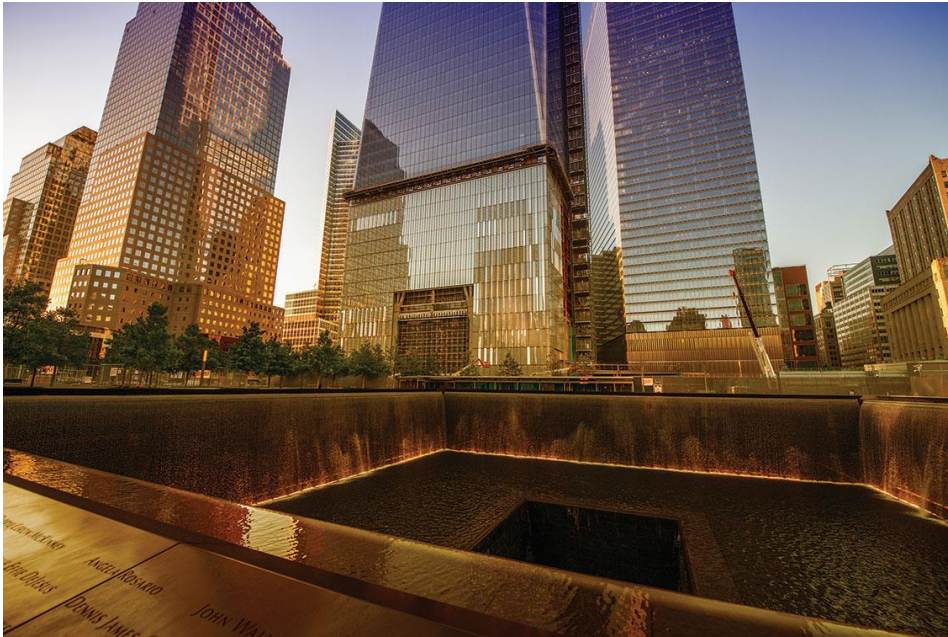
The completed and opened **4 World Trade Center** is a light, ephemeral vision, facing directly onto the World Trade Center Memorial Plaza. Rising 977 feet, by Maki and Associates, the 72-story tower is intended to assume a quiet but dignified presence at the site



**7 World Trade Center** was completed in 2006 and was the first tower rebuilt after the attacks. Standing 741 feet and 52-stories tall it sits on the same site as the original 7 World Trade Center.







Make sure you walk inside of the World Trade Center Transportation Hub Oculus!





4:00pm

Bus ride back up to Midtown (approx. 30 minute drive)

TBD

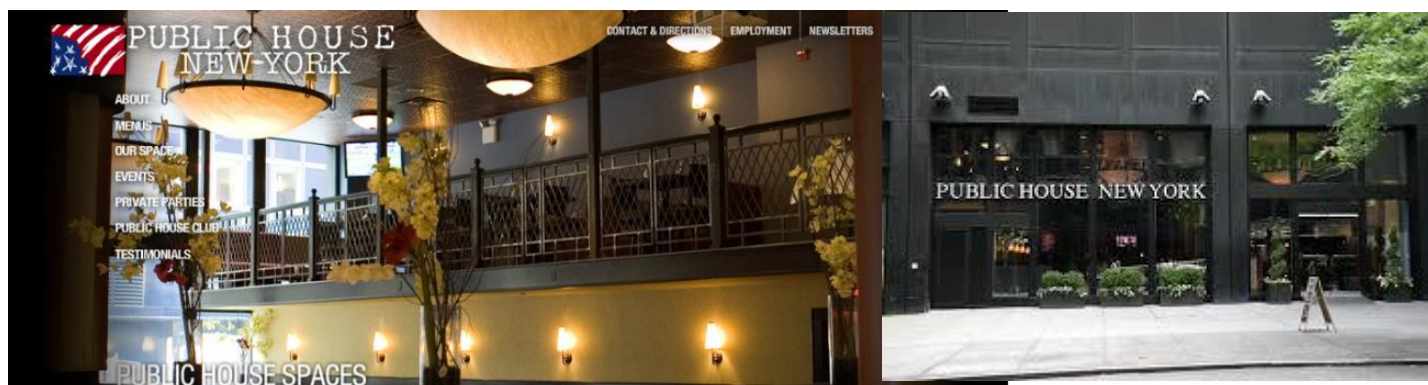
[Public House NYC](#)

140 E 41st St, New York, NY 10017

(212) 682-3710

We gather here on the mezzanine to watch the Notre Dame vs. Miami game. This is the location of the Notre Dame Club of New York game watch, so we'll be among fans. There will be plenty of food!

Free time after the Public House – Hilton Garden Inn is a 15 minute walk from the Public House



at Miami (FL) Hurricanes  
Hard Rock Stadium, Miami Gardens, FL





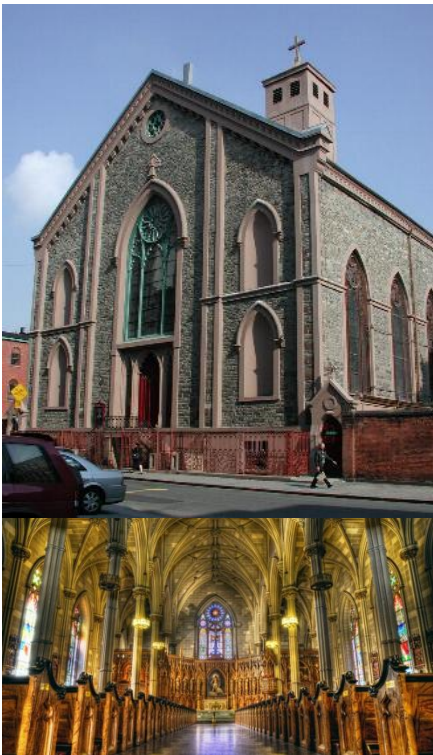
## SUNDAY, NOVEMBER 12

(clothes for Mass, gather all luggage and come to the lobby ready to check-out)

7:00am – 8:00am Breakfast available (use coupons provided)

8:15am Meet in lobby **with all luggage – checking out of hotel** to board bus for St. Patrick's Cathedral (15 minute drive)

9:00am Mass at [St. Patrick's Cathedral](#)



### New York City has two Saint Patrick's Cathedrals

The Basilica of St. Patrick's Old Cathedral, located in lower Manhattan, is the original Cathedral of the Archdiocese of New York and was built in 1840 to replace the original wood frame building of St. Peter's Church, the first Catholic house of worship in the city. St. Peter's was built in 1785 at time when there were only two hundred Catholics and one priest in the city. In 1805, Mrs. Elizabeth Bayley Seton, founder of the Sisters of Charity in this country, was converted to Catholicism and made her profession of faith, received her first communion, and was confirmed in the old Saint Peter's Church. In the early 1800s, the Diocese of New York was created, which inspired the increasing Catholic population. In 1842, Bishop John Hughes became Bishop of New York. At that time, his cathedral was the largest

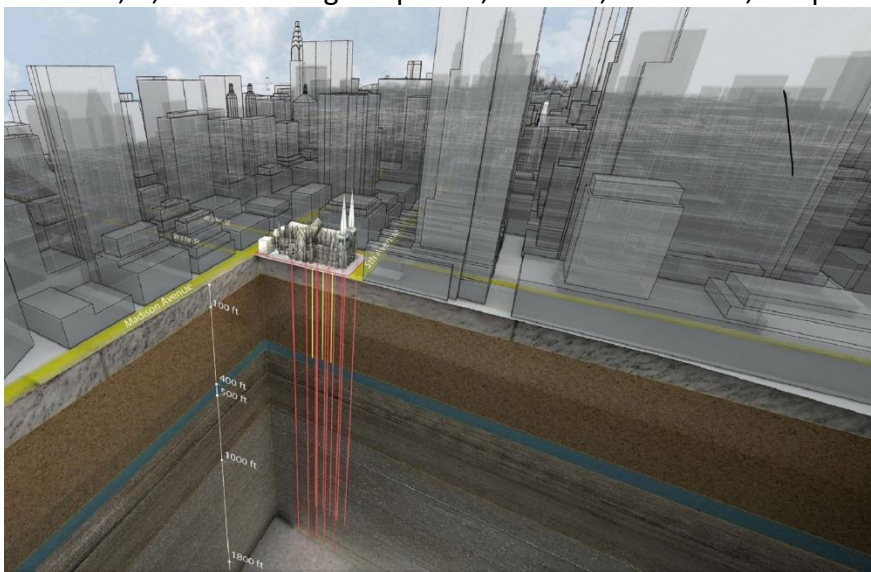


church structure in New York City. When New York became an archdiocese in 1850, Bishop Hughes became the first archbishop.

In 1853, when Archbishop John Hughes announced his ambition to build a new St. Patrick's Cathedral, the idea was ridiculed as "Hughes' Folly," as the proposed, near-wilderness site was considered too far outside of the city. Archbishop Hughes, nonetheless, persisted in his vision to build the most beautiful Gothic Cathedral in the New World in what he believe would one day be "the heart of the city."

Construction started in 1858, but was stalled for five years because of the Civil War and the need for additional funding. The workers needed to go fight in the war, and the war put a financial strain on the entire country. Money was so tight that the archdiocese had to settle for a plaster ceiling for the cathedral rather than continuing to use marble. The Cathedral was formally opened in 1879.

**St. Patrick Cathedral facts:** More than five million visitors each year step inside; the cathedral seats 2,400 people and conducts seven masses on weekdays on eight on Sundays; there are 9,000 organ pipes, more than 20 altars, 3,700 stained-glass panels, 19 bells, and the 9,000 pound bronze doors at the main entrance were designed to be opened using only one hand.



<https://inhabitat.com/nycs-st-patricks-cathedral-goes-green-with-new-geothermal-plant/>

it make temperature easier to regulate, but the system is also poised to shrink the massive stone building's energy needs by more than 30 percent and cut its CO2 emissions by 94,000 kilograms. Environmental considerations like these have been encouraged by Pope Frances and other high-ranking members of the Catholic Church in recent years."

"A consistent ethic of life does not compartmentalize these issues. It prioritizes life and the preservation of life at every level," said Cathedral Rector Monsignor Robert T. Ritchie. "One of the most basic ways in which we are called to do so is through responsible stewardship of our natural resources."

<https://www.curbed.com/2017/3/17/14951952/new-york-city-historic-landmark-st-patricks-cathedral> <http://saintpatrickscathedral.org/cardinals-welcome>, <http://www.amny.com/secrets-of-new-york/secrets-of-st-patrick-s-cathedral-1.9613804> [http://www.architectmagazine.com/technology/st-patricks-cathedral-gets-an-update-fit-for-the-pope\\_o](http://www.architectmagazine.com/technology/st-patricks-cathedral-gets-an-update-fit-for-the-pope_o)

10:00am

Drive back to Notre Dame (11 ½ hour drive without stops, but we will be stopping)

Trip Coordinators: Diane Westerink, 574-286-9696; Joannes Westerink, 574-532-3160