

**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, OCTOBER 31**

photo credit: Barbara Johnston 2017

**5:00am**

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

***(13 hour trip, 11 hours of driving time)***



**7:30pm**

Dinner at [KATZ'S DELICATESSEN](#)

205 E. Houston Street, New York, NY 10002

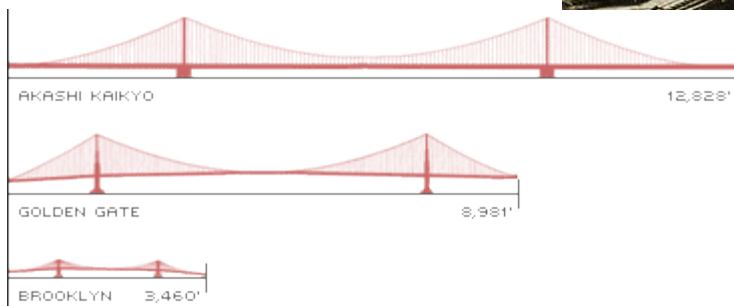
***Founded in 1888, one of New York's oldest kosher-style delis, each week serves 10,000 pounds of pastrami, 5,000 pounds of corned beef, 2,000 pounds of salami and 12,000 hot dogs. Yes, the deli in When Harry Met Sally...***

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 125,000 vehicles, 4,000 pedestrians and 2,600 bicyclists cross the Brooklyn Bridge every day.

10:00pm

Bus to [Hilton New York Fashion District, 152 W. 26<sup>th</sup> Street, New York NY 10001](#)

10:30pm

Check-in to hotel

*(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 1**

Are you in Group One or Group Two? The groups will split in the afternoon.

**IMPORTANT:** Only Group One will need to bring PPE. Both groups construction attire/shoes.

Wear: Both groups: *Construction attire today until dinner time, coat/raingear/umbrella if needed*

Wear for dinner: *casual clothes, comfortable walking shoes*

**6:30am-8:15am** Breakfast available (*use coupons provided*)

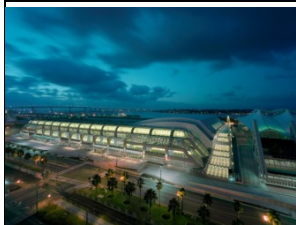
*7am, 7:45am*

*Mass times at St. Francis of Assisi, 135 W 31<sup>st</sup> St., for those wishing to attend an All Saints' Day Mass (10 minute walk), there are many other local options*

**8:30am** Both Groups Leaving from lobby to walk to the [Empire State Building](#) to HNTB's design offices – need valid government issued ID for entrance to ESB (*15 minute walk*)

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

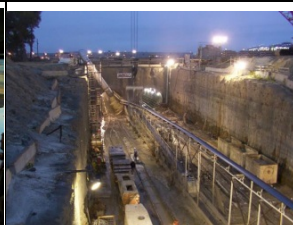
photo credit: Barbara Johnston, 2017



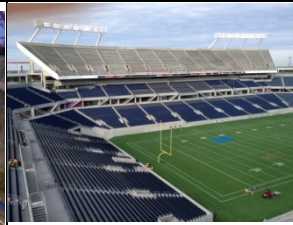
San Diego Convention Center Expansion



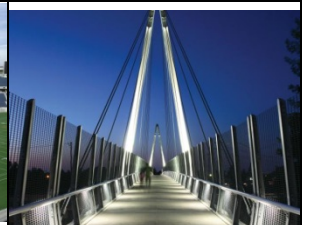
Tres Rios Ecosystem Restoration and Flood Control Project, Phoenix



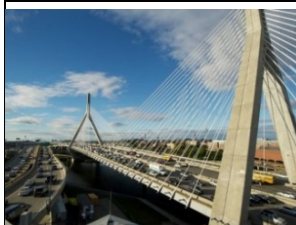
Minneapolis St. Paul International Airport Light Rail



Florida Citrus Bowl Reconstruction



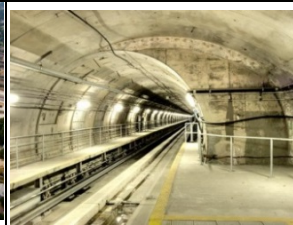
Mary Ave Bicycle Footbridge, Cupertino CA



Leonard Zakim Bunker Hill Memorial Bridge, Boston



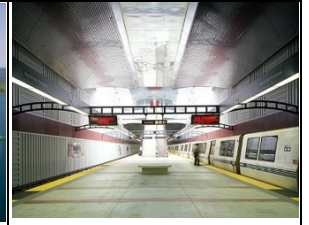
Interstate 465 Reconstruction, Indiana



Washington Dulles International Airport Tunnel



Tacoma Narrows Bridge



San Francisco BART Station

**9:00am – 11:30am** [HNTB](#) Design offices

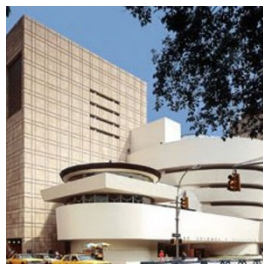
HNTB Corporation is an architecture, engineering, planning, civil engineering consulting management firm that was founded in 1914. Their areas of expertise range from architecture, aviation, bridges, construction management, design build, highways, intelligent transportation systems, program management,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

**11:30am – 12:30pm** Box lunches in HNTB offices

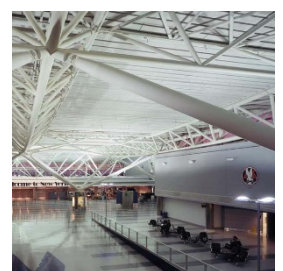
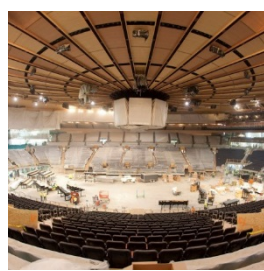
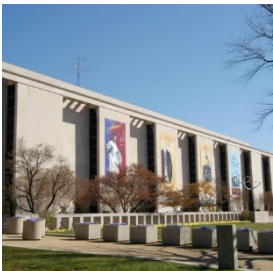
For the afternoon, we'll be split into Two Groups.

Group One will go to Severud Associates Consulting Engineers design offices followed by a construction site tour of One Vanderbilt.

Group Two will take a bus to Brooklyn to the Newtown Creek Wastewater Treatment Facility.



**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.



**Check out the earthcam! 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

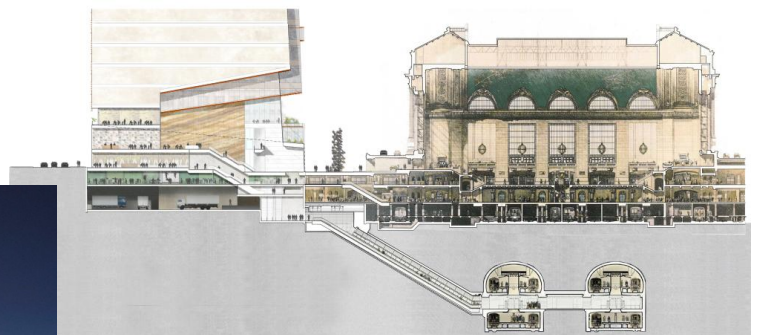
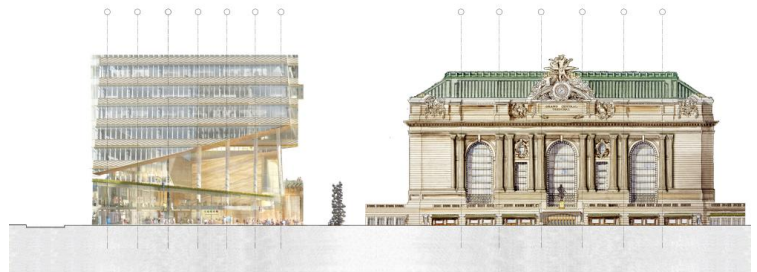


daily. An integrated complex of below grade conditions offers connections to the terminal, the new East Side Access and an active urban base. Formally, the building's massing is comprised of four interlocking and tapering volumes that spiral toward the sky, an elegant shape in sympathetic proportion 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](http://www.nytimes.com/2017/02/02/realestate/one-vanderbilt.html)

[The Council on Tall Buildings and Urban Habitat](http://www.ctbuh.org) 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>

**Group One:**

**1:00pm – 1:30pm**      **Walk to Severud Associates Consulting Engineers, 469 Seventh Ave (between W35th and W36th) for office visit followed by construction site tour.**

**1:30pm – 5:00pm**      **Arrive at Severud Associates Consulting Engineers, 469 Seventh Ave – Suite 900 for an overview presentation on the One Vanderbilt project, followed by 20 minute walk to the construction site of One Vanderbilt and site tour.**

**Group Two:**

**1:00pm**                      **Meet at bus for travel to [Newtown Creek Wastewater Treatment Plant](#) (30 minute bus ride)**

**2:00pm – 3:30pm**      **Tour of Newtown Creek Wastewater Treatment Plant, 329 Greenpoint Avenue, Greenpoint, Brooklyn**

**3:30pm – 4:30pm**      **Visit Newtown Creek Nature Walk**

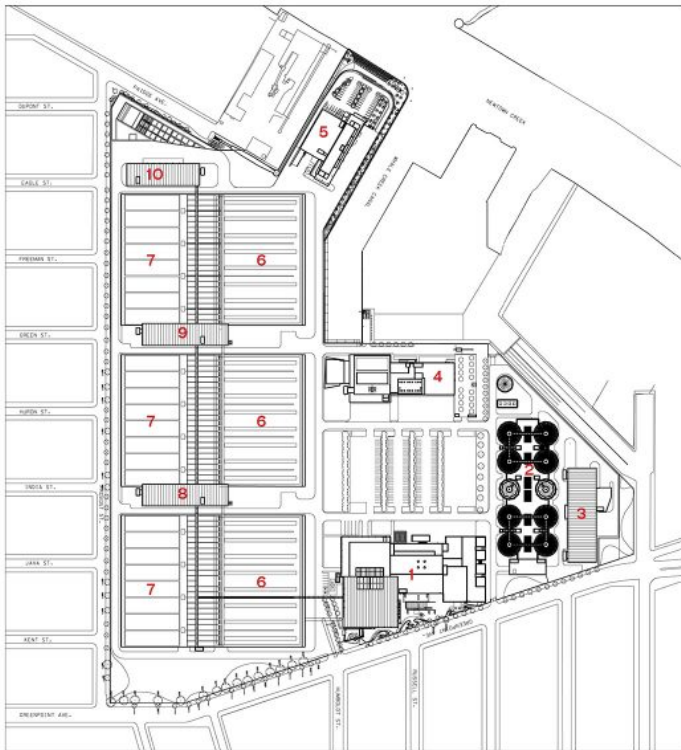
**4:30pm**                      **Bus back to Manhattan**



[New York City Department of Environmental Protection](#)

Located in Brooklyn’s Greenpoint neighborhood, [Newtown Creek Wastewater Treatment Plant](#) is the largest of New York City’s 14 wastewater treatment facilities. It is situated on 53 acres and serves more than 1 million people in parts of Brooklyn, Queens, and Manhattan. On average, the facility treats about 18% of New York City’s wastewater, or 310 million gallons, each day. When it rains, the capacity more than doubles, to about 700 million gallons. New York City’s wastewater treatment system treats approximately 1.3 billion gallons of wastewater daily.

Among the most dramatic elements of the Newtown Creek Wastewater Treatment Plant are its eight futuristic, stainless steel-clad digester eggs. Processing as much as 1.5 million gallons of sludge every day, the eggs are visible from vantage points in Brooklyn, Queens and Manhattan and serve as a landmark for travelers on several of the city’s highways and bridges. The digesters play a critical role in processing sludge, the organic material removed from sewage. Inside the digesters—given heat, lack of oxygen and time—bacteria break down the sludge into more stable materials. This natural process converts much of the sludge into water, carbon dioxide and methane gas, leaving what is called “digested sludge.” This material is then dewatered to form a “cake,” which, after additional processing, can be used as fertilizer. At night, the dramatic lighting of the digester eggs reminds all who see them of their elegant combination of engineering and art. Lighting designer Hervé Descottes used a layer of blue light to identify and unify the water treatment plant and to set it apart from the surrounding city. He also used other lights as well. Bright white lights define the plant’s various functional areas, such as the loading docks, which blaze in contrast to the blue monochromatic field. Shimmering lines, some of them yellow, are used to demarcate pedestrian walkways and to contrast with the blue light. [http://www.nyc.gov/html/dep/html/environmental\\_education/newtown\\_digesters.shtml](http://www.nyc.gov/html/dep/html/environmental_education/newtown_digesters.shtml).



- 1 Main Building
- 2 Soils Handling Facility
- 3 Centrifuge Building
- 4 Residuals Facility
- 5 Support Building
- 6 Aeration Batteries
- 7 Sediment Batteries
- 8 South Control Building
- 9 North Control Building
- 10 Disinfection Facility



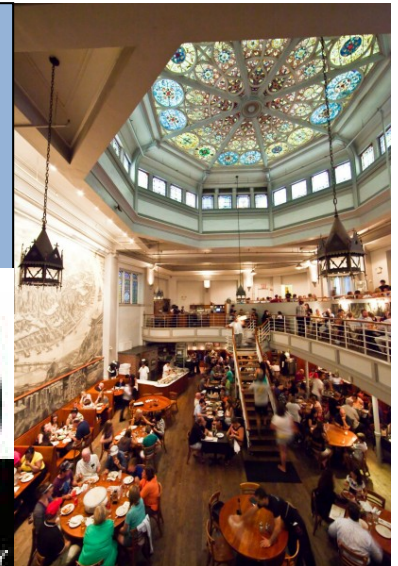
<http://www.ennead.com/work/newtown>, [http://www.nyc.gov/html/dep/html/environmental\\_education/newtown.shtml](http://www.nyc.gov/html/dep/html/environmental_education/newtown.shtml)

The plant was originally built in the 1960s, and was upgraded from 1998 – 2014 in order to increase plant capacity by 50% and to comply with the U.S. Clean Water Act. When some Greenpoint residents resisted the expansion of the plant and wanted waterfront access, the city responded by appointing a group of local residents to represent the community's interests during the design and construction. The participation of this group, as well as a city law that requires one percent of expenditures on public works to go to public art, led to this beautiful combination of form and function. The site includes a manmade waterfall, a waterfront park and nature walk along the Newtown Creek, and the dramatic aesthetic elements of stainless steel, glazed ceramic tile, glazed brick and glass of the digester eggs and spectacular blue and white lighting. Awards for this facility include the 2012 Award of Excellence, Society of American Registered Architects/New York Council; the AIA Tri-State Design Awards, Honor Award; the Merit Award, AIA/New York Chapter; the AIA New York State Excellent in Design; and Building Brooklyn Award, Brooklyn Chamber of Commerce.

**Both Groups:**

**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***

Located in a 19<sup>th</sup>-century church, John's is the country's largest pizzeria, capable of seating 400 people. Nearly 100 years before it started serving pizza in Times Square, this was home to the Gospel Tabernacle church, as well as a missionary training college and bookstore. The church flourished mid-century, but by the 1990s it was abandoned and in a state of decay. It was converted into a pizzeria in 1995, keeping its stained glass and balcony.



**Both Groups Continued:**

**7:30pm -**                    **Open time for homework (as many have requested time in the schedule for this)**  
**or**  
**Group/partner exploring.**

**\*\*\*You must stay with at least one other person from our group\*\*\***

**If it's clear, it would be a great night to go up the Empire State Building Observation Deck (\$20) or go to the Top of the Rock (\$36), or take in a show on Broadway (prices vary), visit Carnegie Hall (same day tickets often \$10), be part of a live TV audience at Rockefeller Center, ride the Staten Island Ferry (free).**



## FRIDAY, NOVEMBER 2

Are you in Group One or Group Two? The groups will split for the afternoon.

**IMPORTANT:** ALL will need to bring your PPE with you today.

**Wear:** Construction attire and shoes today until dinner time, coat/raingear/umbrella if needed, PPE

**Bring:** need valid government issued ID, PPE

**Wear for dinner:** dressier clothes for dinner (but shoes that are comfortable for a 30 minute walk)

**6:30am-8:15am** Breakfast available in hotel (use coupon provided)

**8:30am** Both Groups Leaving from lobby to walk to 347 Madison Ave., [MTA headquarters](#), between 44<sup>th</sup> and 45<sup>th</sup>, 6<sup>th</sup> floor (30 minute walk) for East Side Access tour

**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 have 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 is being 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.

**11:30am – 1:00pm** Walk into [Grand Central Terminal](#) to look around, and you’re on your own to pick up something for lunch, and explore this historical structure. (*\$ provided*)

**1:00pm** \*\*\*Meet at the clock on the main concourse promptly at 1:00pm\*\*\*  
 Group One will walk to bus to visit Newtown Creek Wastewater Treatment Plant.  
 Group Two will walk to Severud Associates, 469 Seventh Ave.



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

<p><b>Clocks:</b> 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.</p>	<p><b>Secret Entrance to the Waldorf:</b> 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.</p>
<p><b>Whispering Gallery:</b> 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.</p>	<p><b>Windows Have Hidden Walkways:</b> 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.</p>
<p><b>Tennis Courts:</b> 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.</p>	<p><b>The Constellations on the Main Hall Ceiling are Backwards:</b> Whether intentional or not, the otherwise accurate depictions of the Mediterranean winter sky are painted in reverse.</p>
<p><b>Oak Tree and Acorn Motifs:</b> 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.</p>	<p><b>Top-Secret Room:</b> 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.</p>



### Places to Eat in Grand Central Terminal

Café Spice – Central Market New York – Chirping Chicken – Eata Pita – Frankies Dogs on the Go – Golden Krust Patties – Hale and Hearty Soups – Jacques Torres Chocolate & Ice Cream – La Chula – Magnolia Bakery – Mendy’s Kosher Delicatessen and Dairy – Prova Pizzabar – Shake Shack – Tri Tip Grill – Wok Chi Stir Fry Kitchen  
 - Zaro’s Family Bakery

1:00pm

Meet up with your group at the clock on the main concourse!!



1:00pm

Group One and Group Two Leaving!

**Group One:**

1:00pm

Meet at clock on the main concourse promptly at for walk to bus to Newtown Creek Wastewater Treatment Plant, 329 Greenpoint Avenue, Greenpoint, Brooklyn

3:00pm – 4:30pm

Tour of Newtown Creek Wastewater Treatment Plant (see previous pages for description)

4:30pm – 5:30pm

Visit Newtown Creek Nature Walk

5:30pm – 7:00pm

Travel back to hotel to drop off PPE, change for Capital Grille dinner

**Group Two:**

1:00pm

Meet at the clock on the main concourse promptly at 1:00pm, for walk to the Severud Associates Consulting Engineers, 469 Seventh Ave – Suite 900 (see previous pages for description)

1:30pm – 5:00pm

Arrive at Severud Associates Consulting Engineers, 469 Seventh Ave for an overview presentation, followed by 20 minute walk to construction site of One Vanderbilt and site visit.

5:00pm – 7:00pm

Walk back to hotel to drop off PPE, change for Capital Grille dinner

**Both Groups:**

7:00pm

Meet in lobby for walk to dinner (30 minute walk)

7:30pm

Dinner at [The Capital Grille Chrysler Center](#), 155 East 42nd Street, New York





**SATURDAY, NOVEMBER 3**

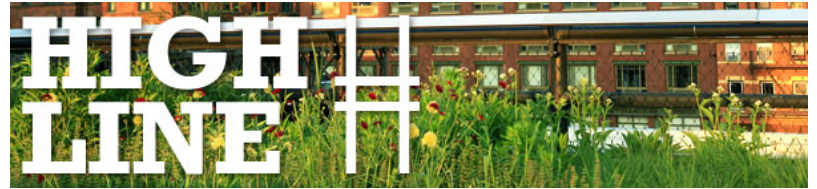
*Wear: Comfortable (but appropriate for design office) clothes, comfortable walking shoes, coat/raingear/umbrella if needed*

**7:30am – 9:15am** Breakfast available in hotel *(use coupons provided)*

**9:30am** Meet in lobby for walk to the [HIGH LINE](#) *(25 minute walk)*, entrance at the corner of Gansevoort & Washington Streets

**10:00am – 11:00am** A walk along the High Line, see meeting point on map that will be distributed.

[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 Obletz, a Chelsea resident, activist, and railroad enthusiast, challenges demolition efforts in court.

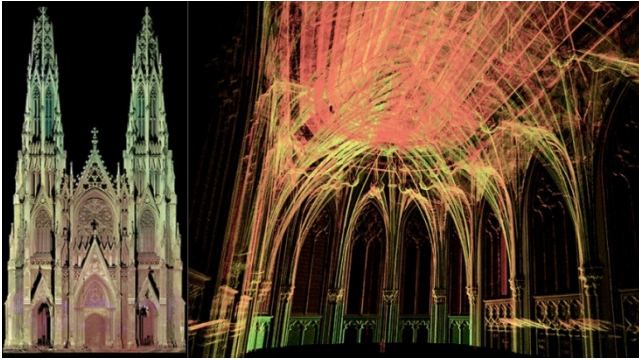
**1999-2014** From conception by two residents of the High Line neighborhood, Joshua David and Robert Hammond, to planning studies, to ideas competition, to design selection, to ownership transfer to the City, to groundbreaking, and finally development in four stages/sections, the dream becomes a reality.

**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 planting 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** Walk to and presentation at [LANGAN](#), 21 Penn Plaza, 360 West 31<sup>st</sup> Street, 8<sup>th</sup> floor, about their work on the High Line and [Hudson Yards](#) projects. 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 48<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.



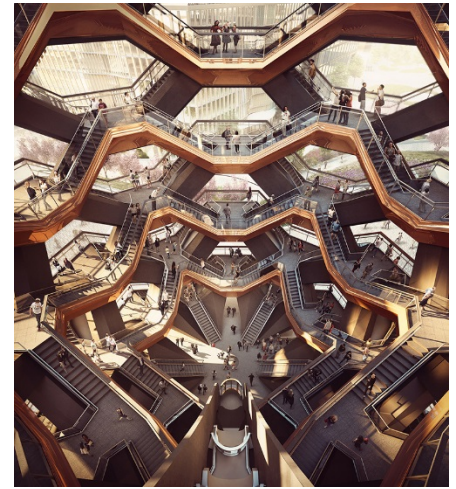
Hudson Yards Redevelopment, under the joint guidance of the City, the Metropolitan Transportation Authority, and State of New York initiatives, is in the process of reinventing the Hudson Yards area in midtown Manhattan. Langan has been retained by multiple teams to provide geotechnical, site/civil,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

## HUDSON YARDS

**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 designed this engaging public landmark that forms 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 offers 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 — offers a mile’s worth of pathway above a sprawling public garden. **The geometric lattice of intersecting flights of stairs, made from painted steel frame, 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 forms 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 features 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/>

Curbed New York: “[Hudson Yards wants to become NYC’s next great neighborhood](#)” by Emily Nonko, Sep 19, 2018.

**1:00pm – 1:30pm**

**Pick up by the bus on W. 31<sup>st</sup> Street, between 9th 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) Note Location! This will be the bus pick-up site.**

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

**1:30pm – 5pm**

**Free time at the World Trade Center Memorial Site to tour the memorial, the transportation hub, to walk around Battery Park City or lower Manhattan, to pick up lunch if desired.**

**Some suggested places to eat near WTC: Hudson Eats, Brookfield Place food hall; Kaffe 1668, 275 Greenwich St.; Shake Shack, 215 Murray St.; Sweetgreen, 413 Greenwich St., El Vez and Burrito Bar, 259 Vesey St.; Whole Foods Market, 270 Greenwich St., among many others.**

**5pm**

**Bus back to hotel in Midtown – be at bus pick up by 5pm! (at same location where dropped off)**



## 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.

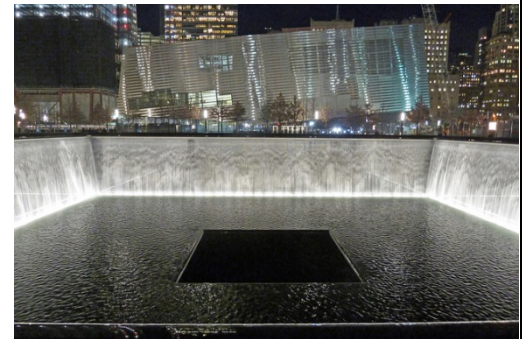
**2006** - The newly constructed 7 World Trade Center opens on May 23, the first building to be rebuilt in Lower Manhattan after the September 11 attacks.

<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.



**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. Opened 2014.

**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 not complete due to many delays in design. The currently agreed upon design is for an 80-story tower standing 1,340 feet tall. Although the foundation has been in place since 2013, investors are still being sought for the tower.



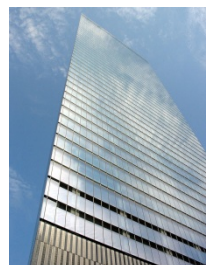
**3 World Trade Center** is near completion and will be 80 stories tall rising to 1,079 feet.



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.





**5pm**

**Bus back to hotel in Midtown – be at bus by 5pm! (where dropped off)**

**Evening is open.**

**Museums, touring, dinner. You must stay with at least one other person from our group.**

**Or ND vs. Northwestern 7:30pm. Info on two ND game watches below.**

## A Few Places You Might Consider Visiting

<p><a href="#">Staten Island Ferry</a> free views city, bridges, <a href="#">Statue of Liberty</a></p> 	<p><a href="#">Ellis Island</a> and <a href="#">Guastavino Tile Arches</a> in the Registry Room</p>  <p>Guastavino tiles can be found at over 250 locations in NYC!</p>	<p><a href="#">One World Trade Center</a> (amazing observation deck)</p> 	<p><a href="#">World Trade Center PATH station</a></p> 	<p><a href="#">National September 11 Memorial and Museum</a></p> 
<p><a href="#">Metropolitan Museum of Art</a></p>  <p>or</p> <p><a href="#">Museum of Modern Art</a></p> 	<p><a href="#">Walk through Central Park</a></p> 	<p><a href="#">Skinny high rise buildings</a> that Jon Galsworthy talked about in Challenges: 432 Park Avenue and 111 West 57<sup>th</sup> Street</p> 	<p><a href="#">Top of the Rock</a> – spectacular views – 3 levels – you can see St. Patrick’s Cathedral, Yankee Stadium, WTC, Brooklyn Bridge, Central Park – civil engineering in every direction!</p> 	<p><a href="#">The Newtown Creek Digester Eggs and nature walk, Greenpoint, Brooklyn</a></p>  
<p><a href="#">Bryant Park</a> – called the most beautiful four acres in Manhattan</p> 	<p><a href="#">American Museum of Natural History</a></p> 	<p><a href="#">New York’s Catholic Heritage: St. Peter’s Roman Catholic Church, St. Elizabeth Ann Seton Shrine, Tammany Hall, Lower East Side Tenement Museum</a></p> 	<p><a href="#">New York Public Library</a></p> 	<p><a href="#">Battery Park City</a></p> 

### Notre Dame vs. Northwestern, 7:30pm ET

#### Two places that hold ND game watches:

The ND Club of New York has their official game watch at the **Public House, 140 East 41<sup>st</sup> St**, but this is limited to over 21.

**Tir na nOg, 315 W. 39<sup>th</sup> St. (between 8<sup>th</sup> & 9<sup>th</sup>)** shows every ND game with 12-foot-screen and large screen HD flat panels, and they have booths and areas for under 21. (The bar area is 21 and over.)

## SUNDAY, NOVEMBER 4

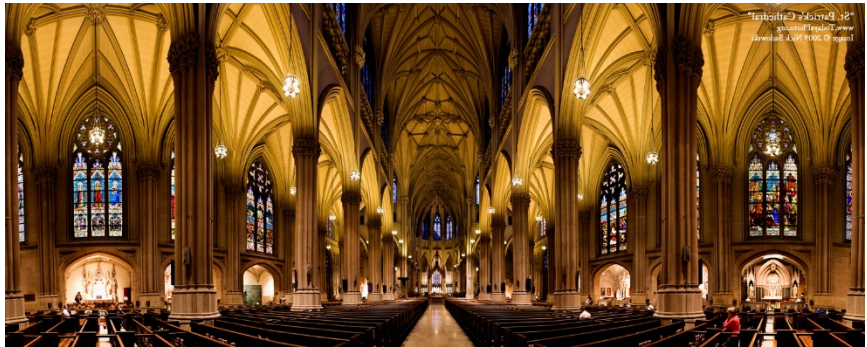
Wear: *Clothes for Mass*

Bring: *All luggage, everything from your room, we'll be checking out of hotel before we head to Mass. We will be stopping once we are on our way back to campus, and you can change clothes then if you would like.*

**7:30am – 8:00am** Breakfast available (*use coupons provided*)

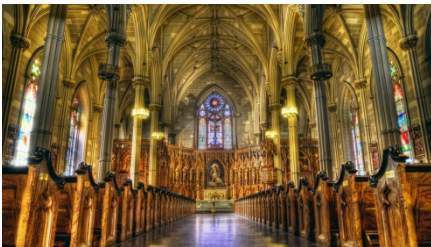
**8:15am** Meet in lobby for departure! *with all luggage – checking out of hotel to board bus for St. Patrick's Cathedral (15 minute drive)*

**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

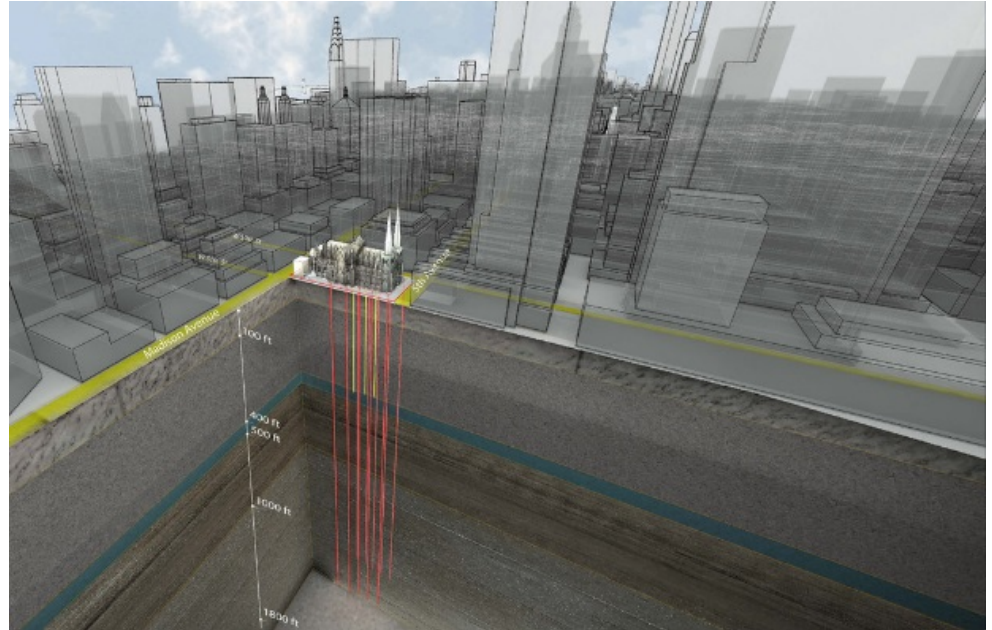


archdiocese had to settle for a plaster ceiling for the cathedral rather than continuing to use marble. The Cathedral was formally opened in 1879.

**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. **Going Green:**

From [“The New, Green Pride of St. Patrick’s Cathedral Is Underground,” Sharon Otterman, NYTimes, March 4, 2018:](#)

“One year ago, as part of its almost \$200 million dollar renovation, St. Patrick’s Cathedral launched a state-of-the-art geothermal heating and cooling system to replace its system of steam radiators and 1960s-era air conditioning. Around the cathedral’s perimeter are now 10 wells as deep as 2,200 feet into the Manhattan bedrock, collecting groundwater that helps the church efficiently heat and cool. The cathedral now reaches six



times deeper than its Gothic spires soar high...At the heart of St. Patrick’s new system is its geothermal plant, a tightly packed former boiler room under the church’s campus that is loaded with pumps, compressors and other equipment that makes the system work. A computer system automatically determines whether to cool or heat based on thermostats set around the 76,000-square-foot cathedral campus. It can switch various wells on and off, and it can heat some areas while cooling others...Four separate loops of water propel heat and cooling through the system. The first loop brings the groundwater, measuring about 55 degrees year round, from the wells into the geothermal plant. The second loop leads to a machine that cools the water down to about 45 degrees in summer, or heats it up to 130 degrees in winter. That water is then piped through the campus and into fan coils scattered around the buildings.

With a system this complex, its designers weren’t sure if it was going to work all the time. What about a heat wave? Or in a cold snap? So they also installed a traditional cooling tower and a natural gas boiler system as backup. But the backup has not yet been necessary. Since the geothermal launched in February 2017, it has provided all of the cathedral’s heating and cooling, to the delight of its engineers. The project, designed by the Landmark Facilities Group and P.W. Grosser Consulting, won a 2018 honor from the New York Chapter of the American Council of Engineering Companies...[T]he engineers estimate that the new system will reduce energy use over a traditional system by about 30 percent annually. For St. Patrick’s, that totals roughly 94,000 kilograms in the carbon dioxide emissions, or about as much created when burning 218 barrels of oil. According to the mayor’s office, approximately 20 geothermal systems have been installed in New York City in the past five years, but St. Patrick’s is believed to be the largest.”

**10:00am**                      **Drive back to Notre Dame (11 ½ hour drive without stops, but we will be stopping)**

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