UNDERPINNING FILING REQUIREMENTS

presented by

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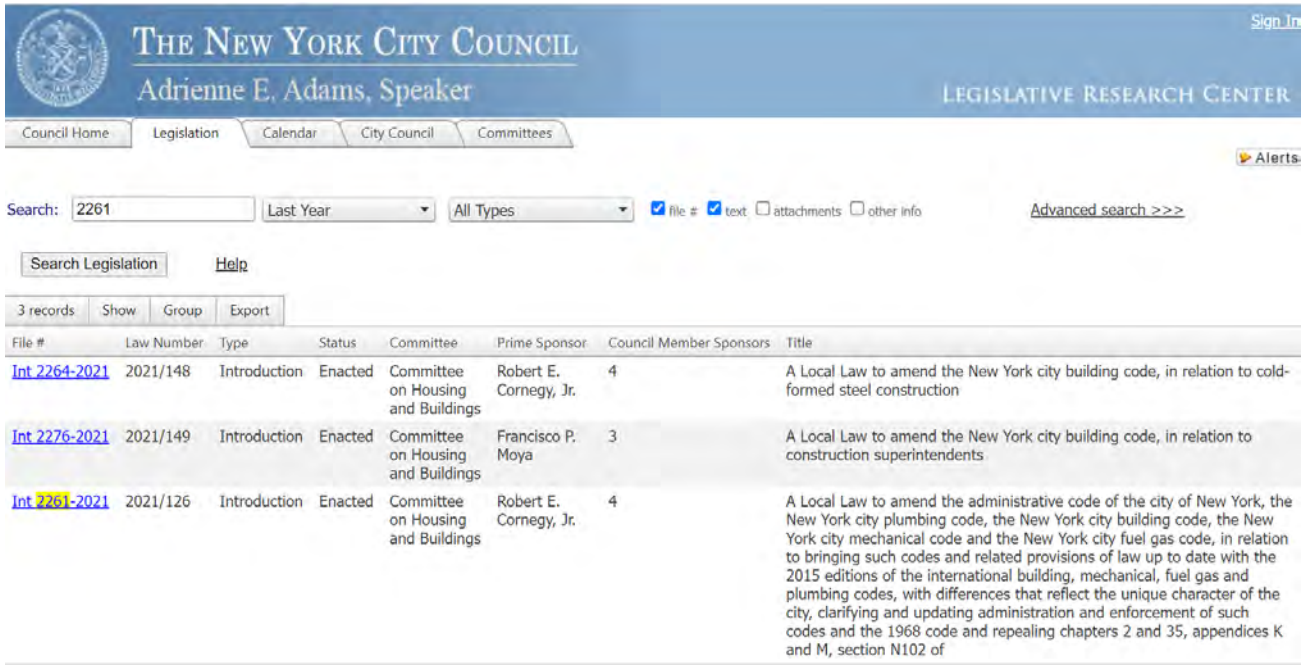
PRESENTATION DESCRIPTION

In an effort to protect the health, safety and welfare of building occupants, workers and the public, this presentation discusses important changes to Chapter 18 as a result of the 2022 Building Code updates with respect to underpinning of existing buildings. In addition, the presentation analyzes new provisions for underpinning and review the submission requirement of construction documents associated with underpinning work.

2022 CONSTRUCTION CODE IMPLEMENTATION



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File #	Law Number	Type	Status	Committee	Prime Sponsor	Council Member Sponsors	Title
Int 2264-2021	2021/148	Introduction	Enacted	Committee on Housing and Buildings	Robert E. Cornegy, Jr.	4	A Local Law to amend the New York city building code, in relation to cold-formed steel construction
Int 2276-2021	2021/149	Introduction	Enacted	Committee on Housing and Buildings	Francisco P. Moya	3	A Local Law to amend the New York city building code, in relation to construction superintendents
Int 2261-2021	2021/126	Introduction	Enacted	Committee on Housing and Buildings	Robert E. Cornegy, Jr.	4	A Local Law to amend the administrative code of the city of New York, the New York city plumbing code, the New York city building code, the New York city mechanical code and the New York city fuel gas code, in relation to bringing such codes and related provisions of law up to date with the 2015 editions of the international building, mechanical, fuel gas and plumbing codes, with differences that reflect the unique character of the city, clarifying and updating administration and enforcement of such codes and the 1968 code and repealing chapters 2 and 35, appendices K and M, section N102 of

12 Months

November 7, 2021
Council approval LL 126 of 2021*

Implementation & Training

November 7, 2022
Effective date

*Also amends **LL 14 of 2020** (aka **2022 NYC Plumbing Code**)

2022 NYC BUILDING CODE CHAPTER 18: SOILS & FOUNDATIONS

UPDATES TO BC CHAPTER 18

- 1803.5.2 Alternative Investigative Methods
- 1803.6 Geotechnical Reports
- 1811.7 Structural Steel Piles
- 1812.3 Drilled, Drilled Displacement. or Augered Uncased Piles
- 1815 Permanent Prestressed Rock and Soil Anchors
- 1817 Underpinning and Alternate Methods of Support of Buildings and Adjacent Property
- 1818 Geotechnical Peer Review

BC 1803.5 SOIL AND ROCK SAMPLING

1803.5.2 Alternative Investigative Methods

- Revised quantity of alternative investigation methods – more for economy of subsurface investigation
- Cone penetrometer testing (CPT) now permitted as an “as of right”

- CPTs may replace borings on a one to one (1:1) basis, but in no case shall there be fewer than half the required standard borings and no less than two standard borings
  NOTE: 2014 Code; 1.5 CPT’s could replace 1 boring
- Will ease need for CCD1s by accepting an already established and recognized technology

BC 1803.5 SOIL AND ROCK SAMPLING

1803.5.2 **Alternative investigative methods** (Shallow Foundation) Examples

20,000 sq ft Footprint		
	# Borings	# CPT
2014 BC	(*8) 4	6
2022 BC	(*8) 4	4

50,000 sq ft Footprint		
	# Borings	# CPT
2014 BC	(*14) 7	11
2022 BC	(*14) 7	7

100,000 sq ft Footprint		
	# Borings	# CPT
2014 BC	(*24) 12	18
2022 BC	(*24) 12	12

(all borings)*

BC 1803.6 GEOTECHNICAL REPORTS

- Previously, geotechnical reports were only required to be submitted to the Department under certain conditions
- With this revision, a geotechnical report shall be prepared and submitted to the Department for all sites with the exception of some 1- and 2-famly homes
- Geotechnical reports are required for 1- and 2-family homes where underpinning or dewatering is required or where the property falls in the special flood hazard area

BC 1803.6 GEOTECHNICAL REPORTS

1803.6.1 Information Required in Geotechnical Reports

- The report shall include the foundation system shown on the drawings submitted to the department

- **New Requirements**
  - Base Flood Elevation
  - Soil stiffness parameters for design of the foundations
  - Foundation type and design criteria: mapped spectral response accelerations (SS and S1); site class; spectral response coefficients (SDS and SD1)

BC 1803.6 GEOTECHNICAL REPORTS

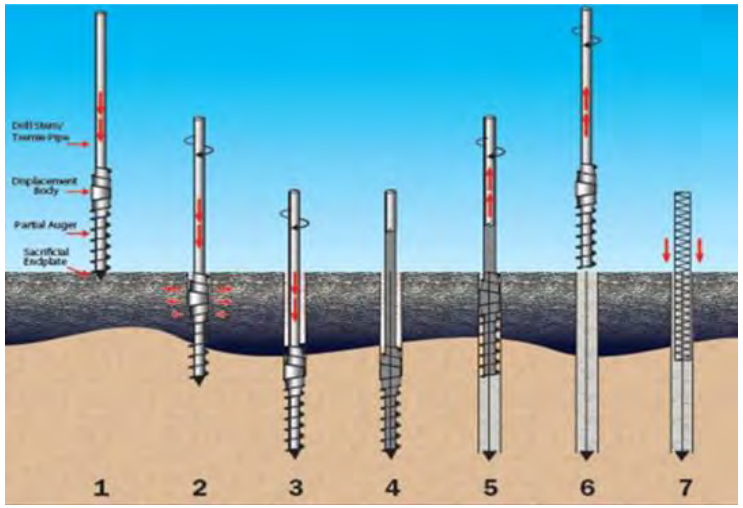
(continued)

- New requirements
  - Design lateral earth pressures on foundation walls and other retaining walls
  - Recommendations for the evaluation of adjacent properties potentially impacted by the proposed construction
  - Where dewatering required, recommendations for the maximum permissible drawdown outside the site
  - For permanent prestressed rock and soil anchor reports
  - Soil and rock parameters to be used to determine the safe slope of temporary excavations

BC 1812.3 DRILLED, DRILLED DISPLACEMENT, OR AUGURED UNCASED PILES

1812.3.2 Dimensions

- Minimum diameter of drilled, drilled displacement piles shall be 8 inches, and for augured uncased piles the minimum diameter shall be 12 inches



1812.3.3 Installation

- Insert steel liner where shafts for drilled pile piles are formed through unstable soils and concrete is placed in an open-drilled hole
- Maintain level of concrete above bottom of liner at sufficient height where steel line is withdrawn during concreting (to offset hydrostatic or lateral soil pressure)
- Where drilled displacement piles used, auger segments shall be installed with both a vertical force and torque such that the soil is displaced laterally. Fill void created with grout or concrete

BC 1815 PERMANENT PRESTRESSED ROCK AND SOIL ANCHORS

1815.2 Additional geotechnical investigation and report requirements

1815.3 Materials

1815.4 Design

1815.5 Load Testing

1815.6 Installation

1815.7 Grout Sampling and Testing

1815.8 Special inspection

BC 1815 PERMANENT PRESTRESSED ROCK AND SOIL ANCHORS

1815.2 Additional geotechnical investigation and report requirements

- Suitable anchor types and capacities.
- Suitable center-to-center spacing
- Minimum unbonded and bonded lengths
- The effects of groundwater or voids
- Installation procedures.
- Load test requirements.
- Durability of anchor materials
- Lock-off & lift-off load requirements
- Reductions for group action
- Protection of adjacent structures

BC 1815 PERMANENT PRESTRESSED ROCK AND SOIL ANCHORS

1815.8 Special Inspection

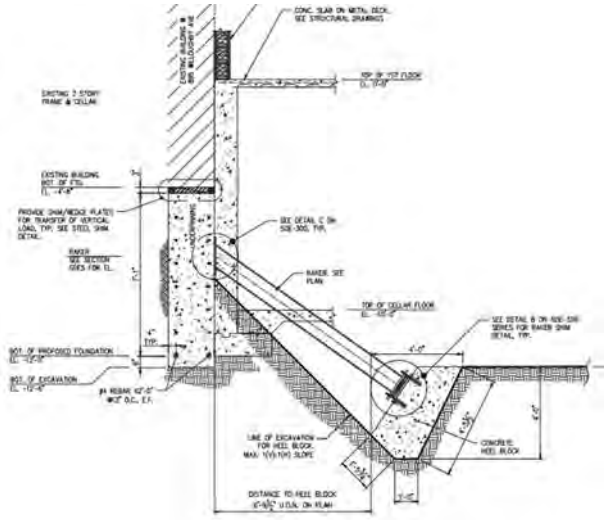
- The installation and testing of prestressed rock and soil anchors shall be subject to special inspection in accordance with the requirements of Section 1704.9

BC 1817: UNDERPINNING & ALTERNATE METHODS OF SUPPORT OF BUILDINGS AND ADJACENT PROPERTY

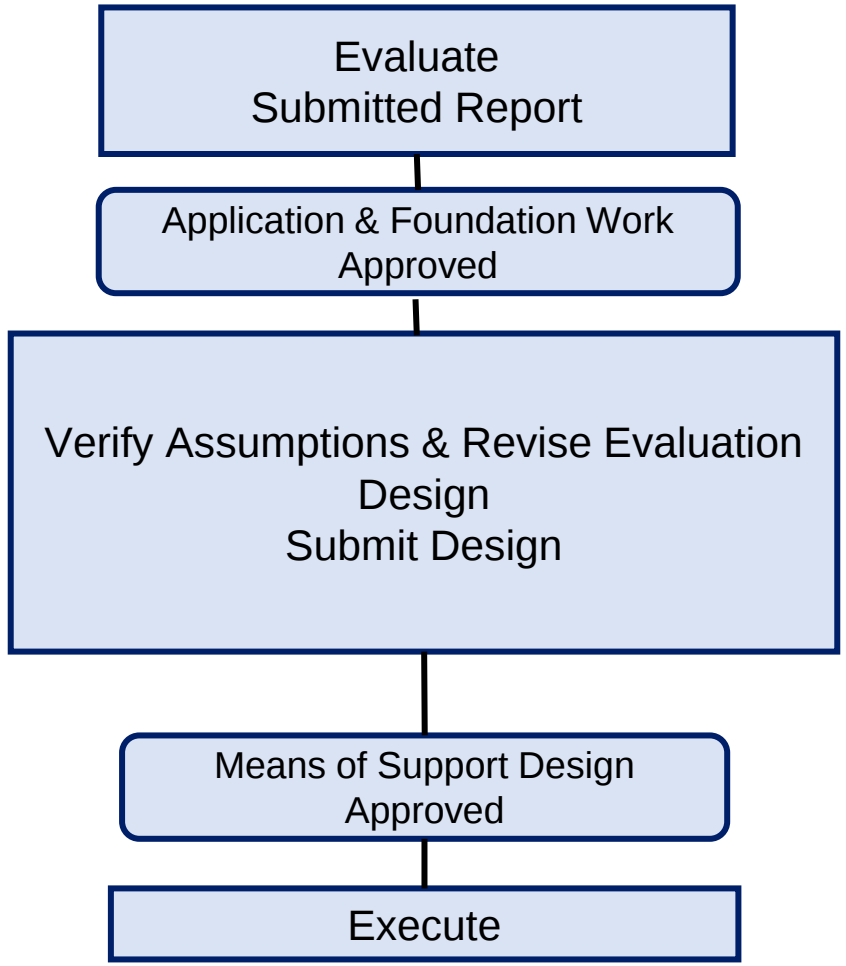
OVERVIEW

- Where proposed work may create a disturbance, an engineer shall evaluate the need for and methods to maintain the stability and integrity of the building(s), utilities or soil adjacent
- Specific parameters for evaluation and report creation

  GOAL: *Ensure sufficient investigation be performed to ensure building and foundation system align with existing condition*



OVERVIEW



1817.3.1 Assessment of building and subsurface

EOR Applic. or subconsultant

1817.5 Design requirements

1817.6 Minimum requirements for construction documents

1817.7 Additional requirements for pit-pier underpinning

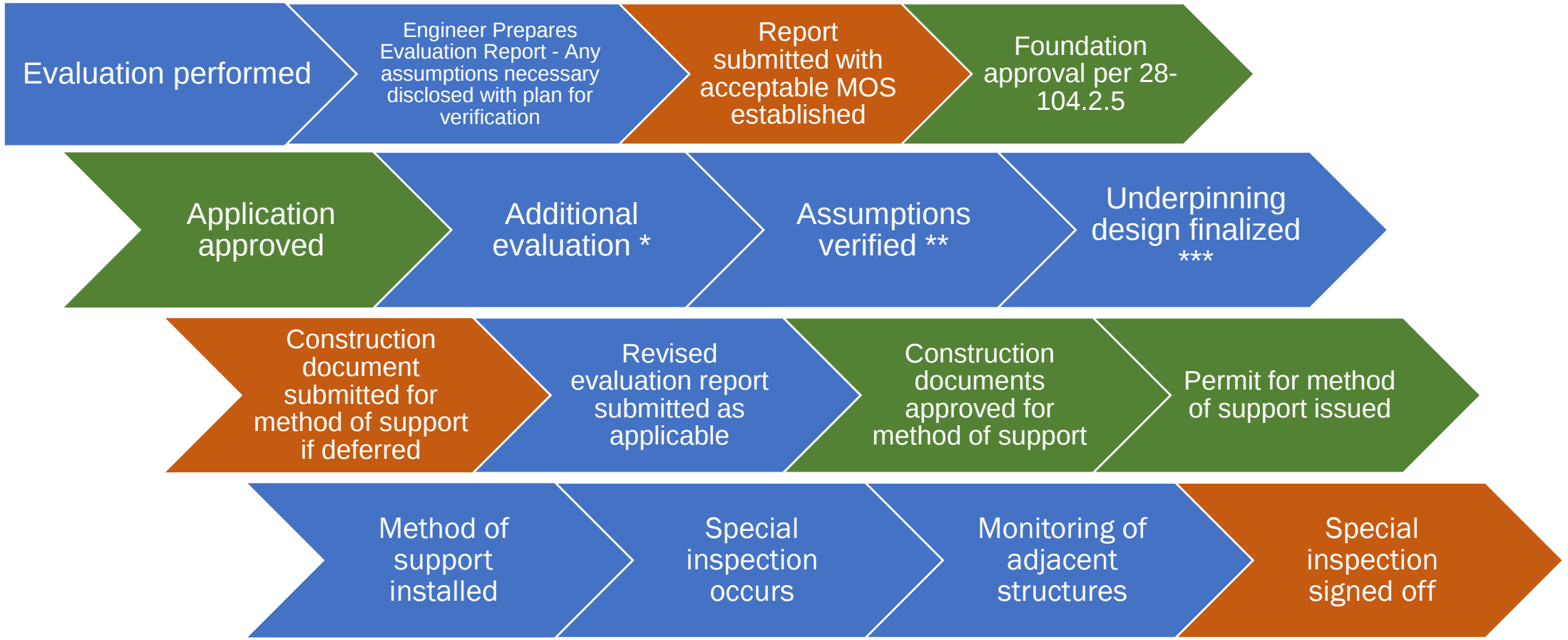
1817.8 Deep foundation elements

EOR Method of Support

1817.9 Monitoring

Special Inspector

TIMELINE



*Additional evaluation may include execution of required load testing where deep foundation elements are proposed as a method of support
**Where adequate information can be obtained and no assumptions required method or support can be designed and submitted for approval at the time of foundation approval
***Method of support designer may be the same or different engineer as compared to author of evaluation report

BC 1817.2 MINIMUM REQUIREMENTS FOR UNDERDEVELOPED ADJACENT PROPERTY

Minimum requirements for construction docs for adjacent empty lots, court yards, front yards, or rear yards:

- Existing grade of the adjacent property
- Plans, cross-sections, and elevations showing:
  - Subsurface conditions
  - Surcharge loading
  - The proposed method of support
  - Sequence of construction
  - Required material properties
- Details and criteria for monitoring
  - Thresholds for movements
  - Dewatering
  - Elevation of the water table
  - Maximum permissible drawdown outside of the project site

BC 1817.3 EVALUATION OF ADJACENT BUILDINGS FOR SUITABLE METHOD OF SUPPORT

- At the time of foundation plan approval, an engineer shall submit an evaluation report assessing the condition of the existing building and the subsurface conditions of the construction site and adjacent property
- The report shall also identify acceptable method(s) of support, including underpinning or alternate methods of support, for the building

BC 1817.3 EVALUATION OF ADJACENT BUILDINGS FOR SUITABLE METHOD OF SUPPORT

1817.3.1 Assessment of the building and the subsurface conditions

- Assessment shall be based on:
  - Visual observations
  - Calculations
  - Review of the geotechnical report
  - Review of other available documentation
- An evaluation of the vertical and lateral load path of the building as it relates to the location of the proposed underpinning
- Calculations of the loads at the foundations to be underpinned
- Type and condition of elements to be supported or potentially affected
- A survey of deviations from plumb or horizontal position of the building

BC 1817.3 EVALUATION OF ADJACENT BUILDINGS FOR SUITABLE METHOD OF SUPPORT

(continued)

1817.3.1 Assessment of the building and the subsurface conditions

- Identification of conspicuous structural defects
  - Bowing
  - Significant cracking
  - Structural degradation
  - Unusual slenderness
- A determination of acceptable thresholds for maximum vertical and lateral movement, maximum permissible vibrations, the required monitoring, the protocols for exceedances, and foundation elements to be supported by the work
- A determination of the type and condition of the foundation elements to be supported or potentially affected by the work

BC 1817.3 EVALUATION OF ADJACENT BUILDINGS FOR SUITABLE METHOD OF SUPPORT

(continued)

1817.3.1 Assessment of the building and the subsurface conditions (cont.)

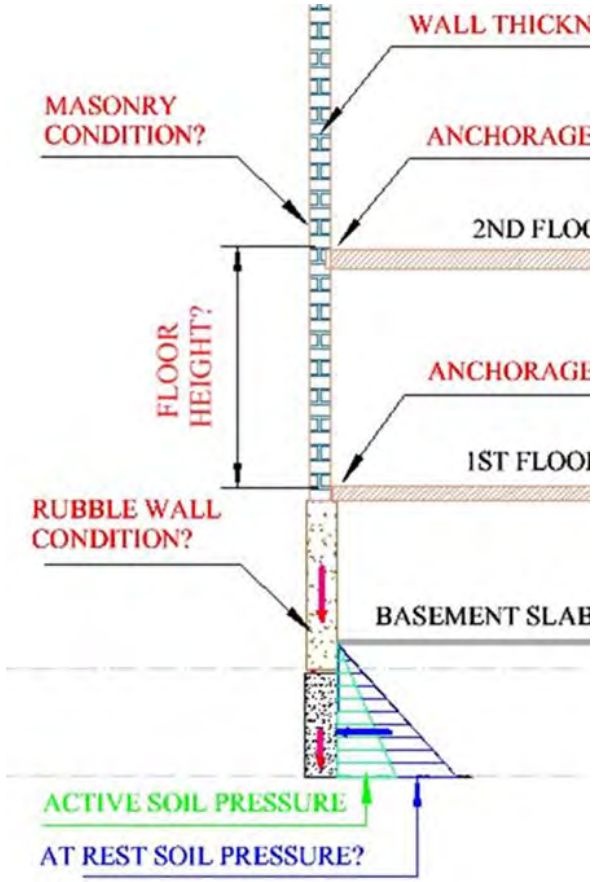
- A test pit at each substantial change in foundation type
  - A description of the construction materials and condition of the footing
  - The bottom elevation of the wall(s) and/or footing(s)
  - The classification of the soil or rock the foundation bears upon
  - Photographs and sketches of the test pit
- Allowable bearing pressure for the existing foundation(s)
- Potential reductions to the allowable bearing pressure to the proposed excavation
- The pressures that will be presented on the proposed underpinning or MOS
  - earth, wind, surcharge

BC 1817.3 EVALUATION OF ADJACENT BUILDINGS FOR SUITABLE METHOD OF SUPPORT

(continued)

1817.3.1 Assessment of the building and the subsurface conditions

- An analysis of potential effect of the subsurface condition
  - High water table and need for dewatering
  - Loose soils
  - Potentially running soils
  - Presence of boulders
- Allowable bearing pressure of the soils supporting the underpinning
- The anticipated settlement during soil and foundation work



BC 1817.3 EVALUATION OF ADJACENT BUILDINGS FOR SUITABLE METHOD OF SUPPORT

1817.3.2 Condition of rubble foundation elements

- Investigate the condition of the rubble foundation

1817.3.3 Additional requirements for unreinforced masonry buildings

- Where the building being supported is of unreinforced masonry construction, the lateral stability of the masonry walls and their ability to resist the loads imposed shall be verified

  ***Exception*:** if not possible to verify the lateral stability, lateral support shall be provided at the floor levels of the adjacent building prior to installation of the underpinning

BC 1817.3 EVALUATION OF ADJACENT BUILDINGS FOR SUITABLE METHOD OF SUPPORT

1817.3.5 Evaluation Report

- Specifies the content of the evaluation report to be filed
- Summary of the assessments required to be performed
- Statement of what methods of support are acceptable given the assessed conditions

1817.3.6 Responsibility for the Report

- Specifies the party responsible for the evaluation report and the methodology for relying on the work and judgement of additional engineers

BC 1817.5 DESIGN REQUIREMENTS

1817.5.4.1 Loads from the Existing Building

- Loads and load combinations shall be computed in accordance with BC Chapter 16 or where permitted for loads of prior codes for prior code buildings

1817.5.4.1.1 Unconfirmed Load Path

- Where the evaluation is unable to visually confirm the load path from the existing building, pit-pier underpinning where all horizontal loads are transferred directly to a raker or tension anchor bracing system that braces every pit-pier is permissible
- *Exception:* Raker bracing or tension anchors need not be installed where the underpinning system, analyzed as a retaining wall that supports the soil and water behind it, has satisfactory bearing pressures and is stable. This exception is not applicable for URM in which access to verify the lateral stability of masonry walls was not performed.

BC 1817.5 DESIGN REQUIREMENTS

1817.5.4.2 Soil and water pressures

- The design shall include at rest soil pressures, water pressures and any surcharge pressures

1817.5.1 New construction

- Materials and design in accordance with this Code

1817.5.2 Incorporation of the evaluation report

- The design shall incorporate the findings of the evaluation. If the evaluation report did not conclusively demonstrate the suitability such method of support shall not be used

BC 1817.5 DESIGN REQUIREMENTS

1817.5.3 Deviations from the Evaluation Report

- The engineer designing the MOS may be an engineer other than the engineer who submitted the evaluation report
- If the engineer designing the MOS does not accept the evaluation report or finds it insufficient, a new evaluation report shall be submitted
- Different MOS other than the evaluation report is proposed for use, an additional evaluation report shall be submitted. (along with the construction documents for the design of the method of support)

1817.5.5 Anticipated Deflection

- A calculation shall be performed for the anticipated deflection of the method of support system and its effect on the supported building

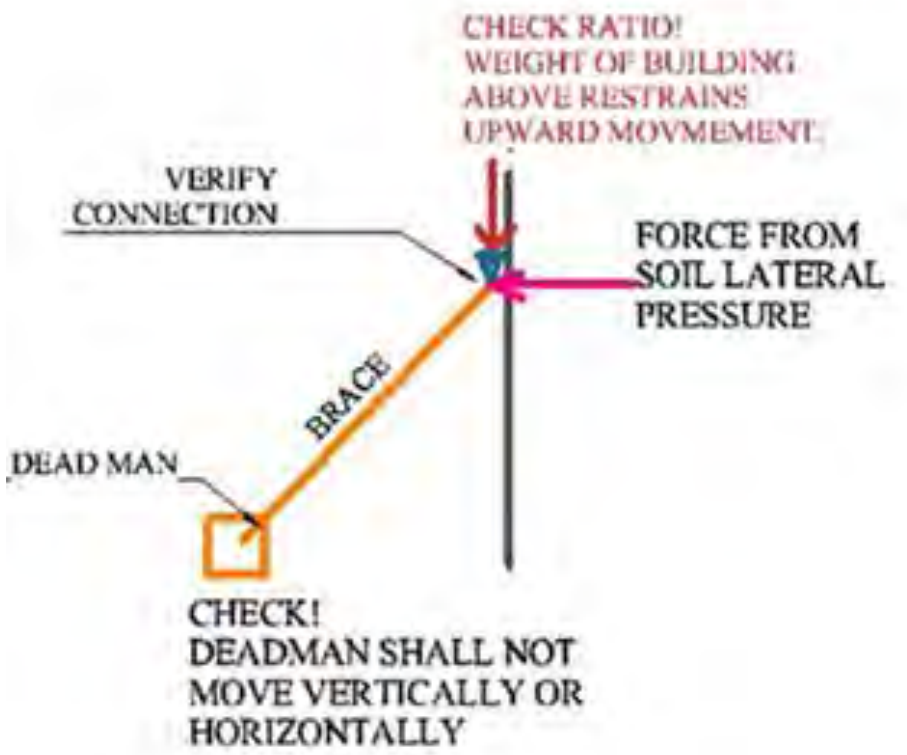
BC 1817.5 DESIGN REQUIREMENTS

1817.5.6 Factor of Safety

- Methods of support shall provide a minimum factor of safety of 1.5 for sliding and overturning for all loads and all anticipated interim conditions

1817.5.7 Sequence

- The design of the method of support shall account for the means and methods of installation, sequence of operations, and all the load transfers and associated support conditions for all phases of the work



BC 1817.6 MINIMUM REQUIREMENTS FOR CONSTRUCTION DOCUMENTS

- Type of adjacent foundation
- Bearing elevation(s) soil classification
- Top and bottom elevations of deep foundation elements
- Elevations of all floor levels at grade and below
- Plans, cross-sections, and elevations views as necessary
- Details for monitoring
- Design of the method of support including bracing
- A step-by-step procedure describing the installation of the support

BC 1817.6 MINIMUM REQUIREMENTS FOR CONSTRUCTION DOCUMENTS

(continued)

- The elevation of the water table, need for dewatering, etc.
- References alerting to the evaluation report of the adjacent building
- Plans, sections, and elevation views of all methods of support
- A load table/diagram indicating total gravity and lateral load in underpinning piers or alternate method of support

BC 1817.7 ADDITIONAL REQUIREMENTS FOR PIT-PIER UNDERPINNING

When the method of support selected is pit-pier underpinning, the design shall meet certain minimum criteria:

- After installation, the approach pit shall be back filled
- The site excavation should not expose more than 1/3 of the total height of a pit-pier, unless:
  - A pit-pier bracing system designed by the engineer is installed
  - The calculated capacity of the individual pit-pier to resist lateral loading at a greater depth is identified on the drawings
- Pit-piers shall be preloaded by wedging, use of permanent jacks, etc.
- Voids between the bottom of the foundation and the top of the pit-pier shall be filled with dry-pack

BC 1817.7 ADDITIONAL REQUIREMENTS FOR PIT-PIER UNDERPINNING

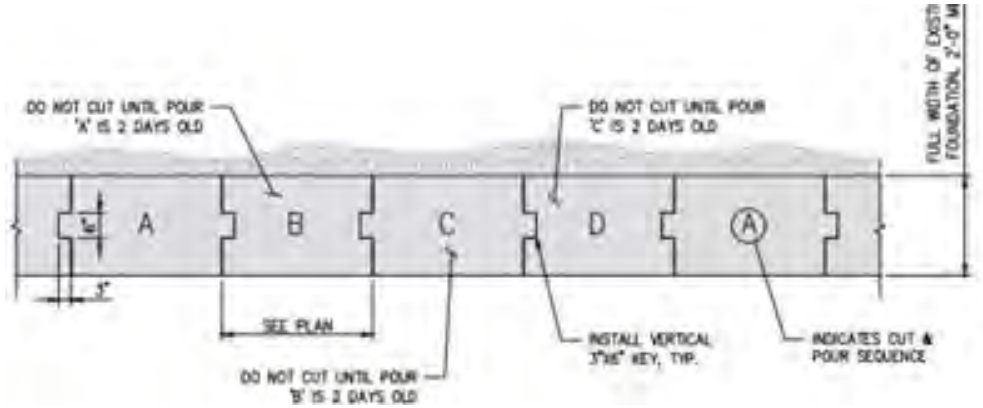
(continued)

- The need for jacking shall be determined by the engineer responsible for the underpinning design
- Width of pit-piers shall not exceed 4 feet
- Shear transfer shall be designed and installed between adjacent pit-piers.
- Bottom of pit-pier elevation shall be a minimum of 1 foot below the bottom of the future adjacent excavation

BC 1817.7 ADDITIONAL REQUIREMENTS FOR PIT-PIER UNDERPINNING

Pit-pier excavation is subject to several requirements

- Excavation shall be performed using handheld tools
- Clear distance between open pits shall be determined by the evaluation report and shall not be <12 feet
- Lagging boards installed as the excavation proceeds to limit soil loss
- Backpacking of any voids shall be performed at each excavation lift
- Pit excavation shall not proceed below the water table.



BC 1817.7 ADDITIONAL REQUIREMENTS FOR PIT-PIER UNDERPINNING

(continued)

Pit-pier excavation is subject to several requirements

- Where construction requires adjacent pits to be excavated to differing depths, the deeper pit-pier shall be constructed first
- Where multi-tier pit-pier underpinning is utilized, upper piers shall be braced prior to the excavation of the lower pier
- When tension anchors are utilized, must account for effects of vertical and horizontal force components

BC 1817.8 ADDITIONAL REQUIREMENTS FOR DEEP FOUNDATION ELEMENTS USED IN UNDERPINNING

Where the method of support includes deep foundation systems such as pile supported underpinning or tie anchors, several requirements shall be met related to:

- Pile design
- Load testing
- Eccentric pile loads
- Spanning between piles
- Piles used as excavation support elements

BC 1817.9 MONITORING

- Adjacent structures and properties shall be monitored in accordance with a plan prepared by the engineer
  - Scope of the monitoring program
  - Location and type of instruments
  - Frequency and duration of readings and reporting
  - Maximum allowable time to report readings (timely report)
  - Reporting requirements
  - Permissible movement and vibration criteria
- Take into account buildings or property to be monitored and its conditions
- Address exceedances
- Notifying the Commissioner
- Where a building is subject to underpinning, the monitoring plan shall be determined by the engineer

BC 1817.10 SPECIAL INSPECTION

- Special inspection for underpinning shall be conducted in accordance with **BC Chapter 17**
  - **1704.20.3 Underpinning**
  - **1704.20.3.1 New foundations**
    - In addition to the special inspection for structural stability, and new foundation elements installed as part of underpinning operations shall be subject to special inspection as a permanent installation
  - **1704.20.6 Inspection program**
  - **1704.20.7 Design documents**
  - **1704.20.8 Inspection during construction operations**
  - **1704.20.9 Records of special inspections**
  - **1704.20.10 Special requirements for work in occupied multiple dwellings**

BC 1818 GEOTECHNICAL PEER REVIEW

BC 1818 GEOTECHNICAL PEER REVIEW

1818.2 Where Required

- As per **BC 1617 Structural Peer Review**
- Structures of Occupancy Category III or IV where the Seismic site is classified as Site Class F
- Performance based foundation design is utilized
- If required by the Commissioner

1818.3 Geotechnical Peer Review Qualifications

- Qualified independent geotechnical engineer who has been retained by or on behalf of the owner

1818.4.1 Scope

- Review the plans and specifications submitted with the permit application for general compliance with the foundation design provisions of this code

BC 1818 GEOTECHNICAL PEER REVIEW

1818.5 Geotechnical Peer Review Report

- The reviewing engineering shall submit a report stating that the geotechnical design shown on the plans, reports and specifications generally conforms to the requirements of this Code
- Need not be submitted concurrently with the structural peer review report

1818 GEOTECHNICAL PEER REVIEW

1818.6 Responsibility

- The engineer of record for the foundation design shall retain sole responsibility for the geotechnical design
- The geotechnical peer reviewer's report states an opinion regarding the design by the engineer of record for the foundation design
- Geotechnical peer reviewer is not responsible for the accuracy of the subsurface investigation data or the conclusions of the structural peer review reports
- When revisions to design are made, the engineer of record for the foundation design must identify that a new review is required

2022 NYC BUILDING CODE CHAPTER 33: SAFEGUARDS DURING CONSTRUCTION OR DEMOLITION

BC 3304 SOIL AND FOUNDATION WORK

3304.4.1 Support of Excavation

- the sides of all excavations, including rock faces and soil slopes, must be supported by means of sheeting, shoring, bracing, sloping, benching, or other retaining structures or bracing systems required to support the excavation face or foundation work before permanent supports are provided.
- Creating a general duty to support excavations in all cases.
- The section today only requires protection if the excavation is 5ft or deeper.
- Added prescriptive requirements that are worked into the design requirements and revised to avoid conflict with OSHA requirements.

REQUIREMENTS & COMMON OBJECTIONS

ADMINISTRATIVE

- Submit a site survey, signed and sealed by a licensed surveyor, to verify lot coverage, lot area, and dimensions, per **BC 107.3**
- Provide plan view, cross sectional, elevation and detail drawings and notes to indicate ground structure's layout, construction and materials needed, including its footings/foundation
- NB/ALT1 zoning approval is required prior to issuance of SOE/FO approval
- SOE and underpinning must be filed **separately**.
- Be consistent with DOBNOW job description and comments
- **OBJECTION:** Elevations provided on the construction documents are not NAVD88 as required by **AC 28-104.7.6**

SCOPE OF WORK

- Provide complete drawings including written description of proposed scope of work on the plans, as required by **AC 28-104.7**, **AC 28-104.8**, and **BC 107.1**
- Provide List of Tests, Special Inspections and Progress Inspections, as per **AC 28-104.7.7**

SPECIAL INSPECTIONS

1. A SPECIAL INSPECTOR AND/OR AGENCY SHALL HAVE RESPONSIBILITIES AND TASKS IDENTIFIED IN CHAPTER 17 OF THE NEW YORK CITY BUILDING CODE. THE REFERENCE STANDARDS, AND ELSEWHERE IN THE CODE.

2. REQUIRED SPECIAL INSPECTIONS:
   - 2.1. SHEETING, SHORING AND BRACING – BC 1704.20.2, BC 3304.5.
   - 2.2. UNDERPINNING – BC 1704.20.3, 1814
   - 2.3. CONCRETE – CAST IN PLACE – BC 1704.4
   - 2.4. STRUCTURAL SAFETY – STRUCTURAL STABILITY – BC 1704.19
   - 2.5. STRUCTURAL STEEL – HIGH STRENGTH BOLTS – BC 1704.3.3
   - 2.6. SOIL – INVESTIGATION (BORINGS/TEST PITS) BC 1704.7.4
   - 2.7. FINAL INSPECTION – 28-116.2.4.2 AND BC 110.5

3. SPECIAL INSPECTORS AND AGENCIES SHALL SUBMIT REPORTS AS REQUIRED BY THE NEW YORK CITY BUILDING CODE.

SPECIAL INSPECTIONS

	SPECIAL INSPECTION	BUILDING CODE
	STRUCTURAL STEEL – WELDING	BC 1705.2.1
	STRUCTURAL STEEL – DETAILS	BC 1705.2.2
	STRUCTURAL STEEL – HIGH STRENGTH BOLTING	BC 1705.2.3
	POST-INSTALLED ANCHORS	BC 1705.37
X	CONCRETE – CAST-IN-PLACE	BC 1705.3
	SUBGRADE INSPECTION	BC 1705.6 (Table 1705.6, Item 4)
	SUBSURFACE CONDITIONS – FILL PLACEMENT	BC 1705.6 (Table 1705.6, Item 2)
	SUBSURFACE CONDITIONS – IN PLACE DENSITY	BC 1705.6 (Table 1705.6, Item 3)
	SUBSURFACE INSPECTIONS (BORINGS/TEST PITS)	BC 1705.6 (Table 1705.6, Item 1)
X	EXCAVATIONS	BC 1705.25.3 BC 3304.4.1 BC 3304.5.2 BC 3304.12
X	UNDERPINNING AND ALTERNATE METHODS OF SUPPORT OF BUILDINGS AND ADJACENT PROPERTY	BC 1705.25.4 BC 1817.10
	CONCRETE DESIGN MIX (TR3)	BC 1905.3
	CONCRETE SAMPLING AND TESTING (TR2)	BC 1905.6

PROGRESS INSPECTIONS

	PROGRESS INSPECTION	BUILDING CODE
X	FOOTING AND FOUNDATION	BC 110.3.1
X	FINAL INSPECTION	BC 110.5

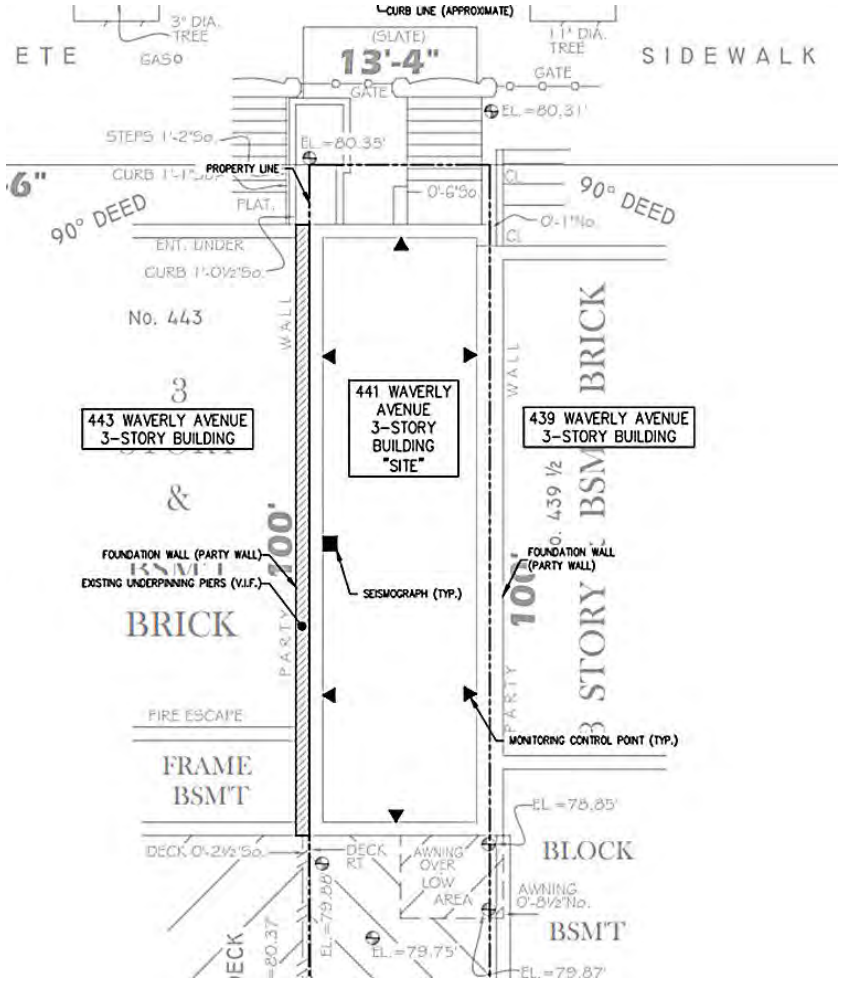
SCOPE OF WORK: UNDERPINNING PLAN IN CONJUNCTION WITH FOUNDATION FOR BUILDING EXTENSION

GEOTECHNICAL INVESTIGATION

- Clearly demonstrate on drawing, that a percolation test has been performed and provide notes and details indicating if a dewatering plan will be required during the excavation
- Provide borings and boring logs indicating the character and minimum class of the soil strata required for the support of the foundation; the allowable soil pressure used for the design of footings; and the character, class, minimum soil class and bearing capacity of the soil **BC 1704.7.4**. Borings indicate inadequate soil lateral load, provide a geotechnical report, as per **BC 1610.1**. Provide notes indicating code compliance
- Specify the water table elevation. Is dewatering anticipated? Provide monitoring protocol. **BC 1814**
- **OBJECTION:** Geotechnical investigation/report and related diagrams for test pits and borings are either not provided, or do not clearly demonstrate compliance with the quantity and location of borings or test pits, and class of soil, required by **BC 1803.2**, **BC 1803.4**, **BC 1803.6**, **BC 1704.7.4**. and **BC 1806**.

SAFEGUARDS: MONITORING PLAN

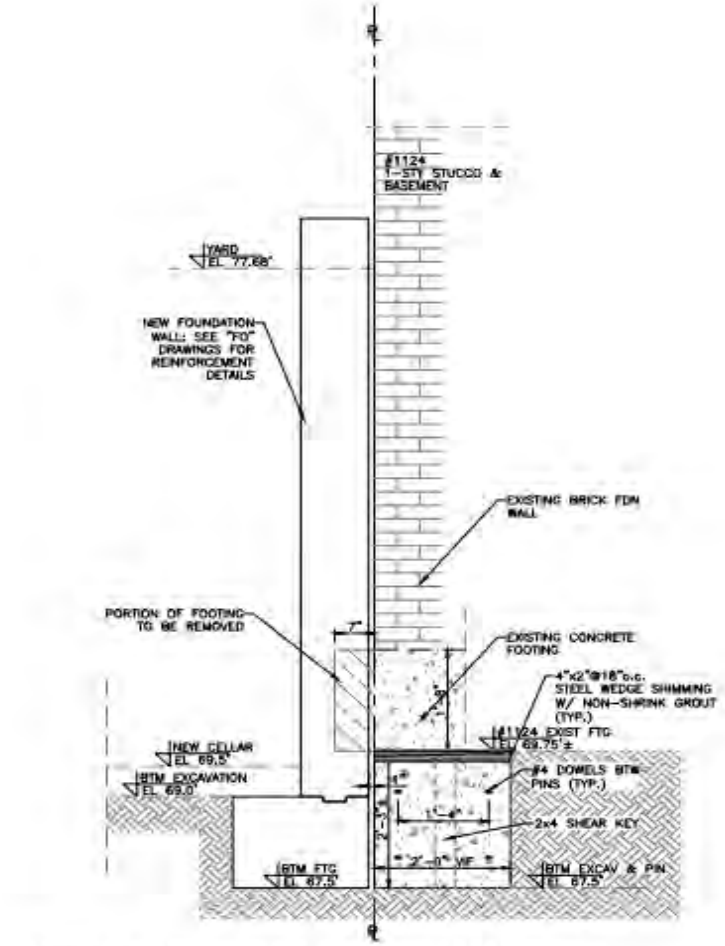
- Adjoining buildings, when impacted by excavation depth as outlined in **BC 3309.4.4(1)** and **BC 3309.16**, require a monitoring plan. Plan shall include excavation and shoring details, calculations, and technical details about the locations, inspection frequency, and types of monitoring devices.
- Indicate monitoring protocol including all operations, frequency of monitoring, acceptable thresholds, acceptable tolerances, and reporting criteria for exceedances. Indicate required locations of proposed monitoring operations.

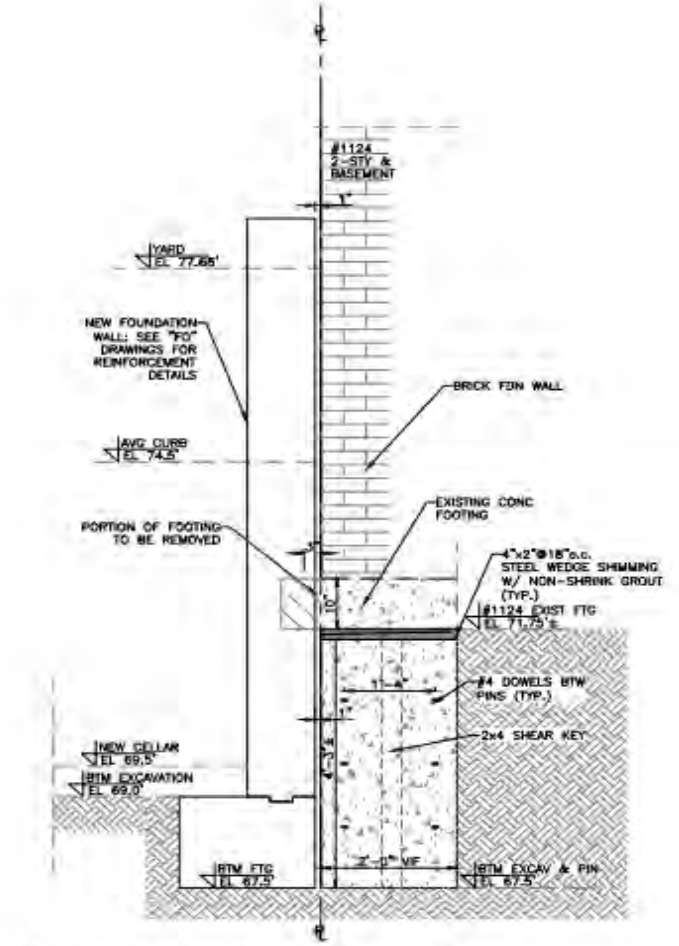


PROTECTION OF ADJOINING PROPERTY

- Show angle of repose in section, when excavating adjacent to adjoining footing/structures as required by OSHA and **BC 3309.7**.
- Project involves excavation work within 10 feet of an adjacent building, or over 10 feet in depth. Provide a preconstruction survey as required in **BC 3309.4.3**.
- Indicate mechanism for load transfer on sections, elevations and sequence.
- Revise sequence for multi-tier underpinning to clearly identify the unique installation requirements.
- Revise sequence for multi-tier underpinning to clearly identify bracing of upper pins during installation of lower pins. There have been historic failures when bracing was not implemented.
- Pins in upper and lower tiers that are directly aligned have a history of slipping. Demonstrate how the upper tier has continuity and will be able to span over the excavation of the lower tier or revise the design to have staggered pins.

PROTECTION OF ADJOINING PROPERTY





PROTECTION OF WORKERS, PEDESTRIANS AND ADJOINING PROPERTIES

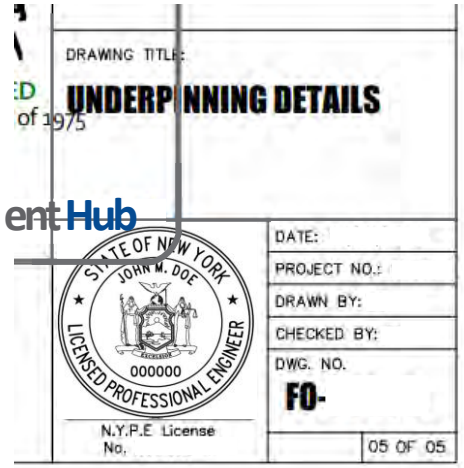
- No pedestrian protection provided and/or no separate filings/ details indicated, as per sections **BC 3307.2** and **BC 3307.6.2**.
- Provide Street tree protection details, for existing trees, in compliance with DPR standards, per **BC 3309.11**.

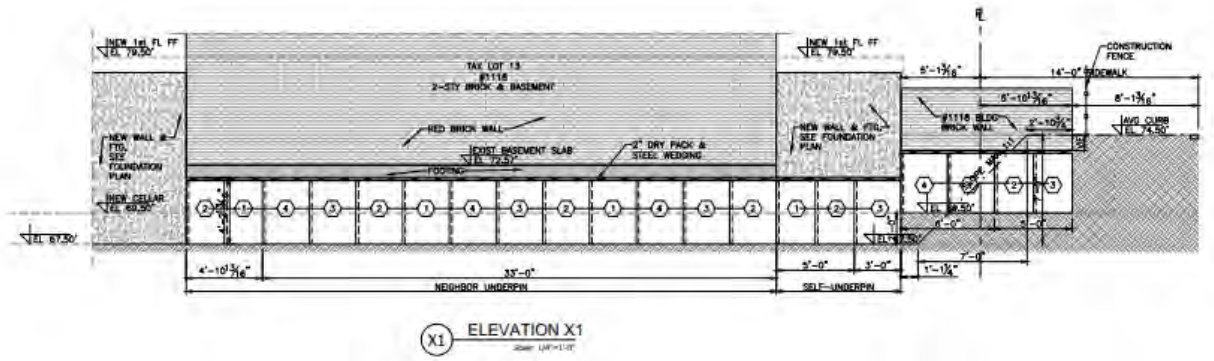
SUPPORT OF EXCAVATION

- Provide SOE drawings, per **BC 107.8** and **AC 28-105.2.1**.
- Provide sequence of work for excavations as required in **BC 107.8**.
- The material of the subject and adjoining foundations should be indicated (rubble, concrete, etc.) per **BC 107.7.1**.
- Provide sequence of work for excavations as required in **BC 107.8**. Provide Grading Plans indicating topographic elevations. The material of the subject and adjoining foundations should be indicated (rubble, concrete, etc.) per **BC 107.7.1**. Indicate tie-backs, lateral bracing, and/or pins as required per **BC 3304.2**. Provide elevation at the bottom of all adjacent buildings' footings per **BC 107.8**. Indicate all utilities within the influence of the excavation operation on plans and sections. If utilities have been investigated and have been determined to not to be present, indicate such. **BC 3304.2**. When adjoining properties are being supported by the excavation system: Submit the preconstruction report required for support of adjoining properties. The report must be signed and sealed by a New York State Registered Professional Engineer. **BC 1814.1**
- Drainage during excavation not indicated, as required by **BC 3303.14.2**.

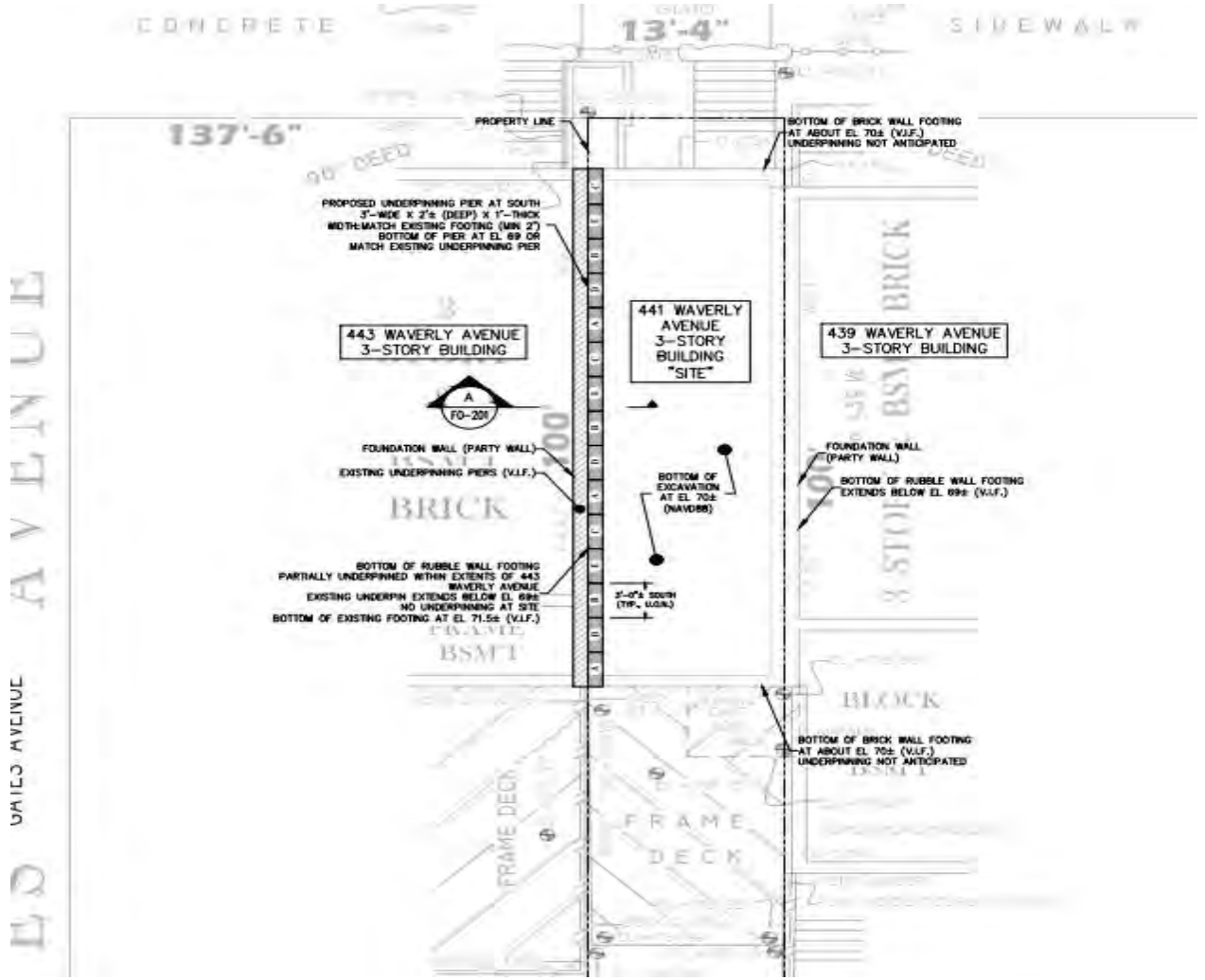
UNDERPINNING

- Indicate underpinning height and depth. Provide project specific details and elevations. **BC1814.1**
- Indicate lateral bracing requirements for the top tier to prevent overturning/sliding during installation of bottom tier. **BC 1814.1**
- Provide drawings with notes and show sequence and narrative of underpinning installation, load parameters, and details, signed and sealed by a PE as per **BC 1814** and **BC 3309.5**.





UNDERPINNING



COMMON QUESTIONS: FOUNDATION

What kind of work is included in the Foundation (FO) work type?

The FO work type is for all foundation work, which includes: Deep Retaining Wall, Shallow, Tie Backs and Anchors, Underpinning and Other.

Do I file Underpinning under the Earthwork (EA) or Foundation (FO) work type?

All underpinning work is filed under Foundation (FO) since it includes digging. If Underpinning is selected, then no other subcategory can be selected, and no other work type can be included in the filing.

Why can’t a Support of Excavation (SOE) filing be combine filed with a Foundation (FO) filing?

They cannot be combine filed because SOE filings are reviewed by a special technical team.

PAST EXCAVATIONS/UNDERPINNING ACCIDENTS

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