SEPTEMBER 2020

Version 3

VOLUME 3

Specific Project Requirements

Queens Garage & Community Space

QN

NYC Borough-Based Jails Program

A DESIGN-BUILD PROGRAM

PIN: 8502020 CR 0040 P-42 P

NYC DDC Department of Design and Construction

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AUGUST 2020

VOLUME 3 / PART A

Scoping Documents

Queens Garage & Community Space

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Executive Summary

1.1 Borough-Based Detention centers Program Background

New York City has embarked on the biggest justice reform effort in its history, expressed in one of the largest public works projects it has undertaken in decades. The City has committed to closing the detention centers on Rikers Island and building four new smaller, safer and fairer borough-based detention center at a time when New York City has the lowest crime and incarceration rates of any large city in the United States. This is part of a once in many generations opportunity to build a smaller and more humane justice system that includes grounded in dignity and respect, offering better connections to and space for families, attorneys, courts, medical and mental health care, education, therapeutic programming and service providers.
The construction must realize these values through innovative and high-quality design that will foster safety and well- being for those incarcerated, their families and for staff, through normalized environments. It must be a beacon of high-quality civic architecture that integrates into the immediate neighborhood context and is an asset to all New Yorkers.
The City will build four modern, humane facilities in the Bronx, Brooklyn, Manhattan and Queens by 2027 that will house no more than 3.300 people in total. The Department of Design and Construction (DDC) intends to award a separate design-build contract for each of the four structures, as well as three early works packages at the Queens and Brooklyn sites. This RFP is for the Queens early work, specific to the Queens Garage and Community Space.

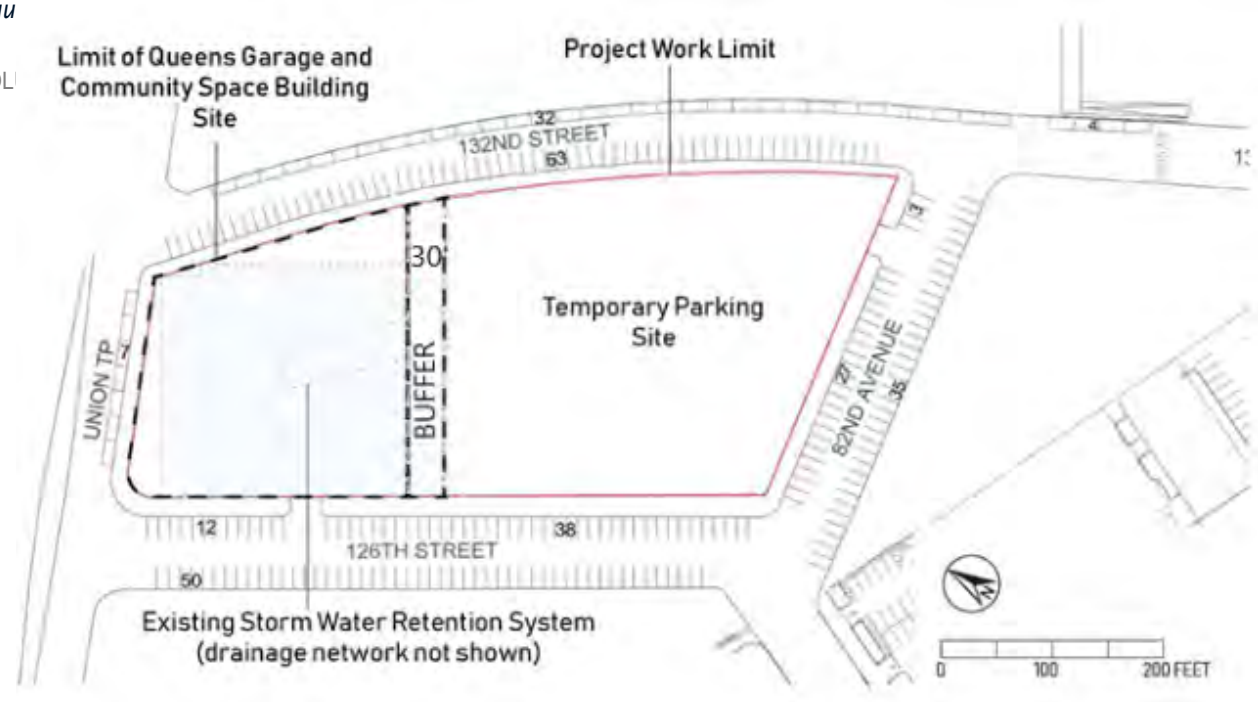
1.2 Project Overview and Goals

This Project is for the design and construction of a parking garage and community space in the Queens civic center adjacent to Queens Borough Hall and the Queens County Criminal Courthouse. The Queens Garage and Community Space will serve the public, the future detention facility, existing courts and municipal offices in the civic center and the surrounding communities. The new multi-level garage will provide a minimum of 600 parking spaces, with a provision for temporary parking during construction. The 25,000 square foot community space will be prepared to a white box finish to enable its future fit-out and use by a community operator(s).

The Project Work Limit Diagram (figure 1) describes the extent of the site identified for the garage and community space with a minimum 30-foot buffer which will receive walkway surfacing in this project to for use until completion of the future detention facility which will include final hardscape and amenities for a pedestrian passageway. To minimize impacts on the community during construction, the Design-Builder must optimize the construction footprint to preserve as much parking as feasible, modifying the remaining existing surface parking lot to remain operational. Construction of the Queens Garage and Community Space must be completed within the timeframe provided in this RFP to enable a separate project that will dismantle the existing Queens Detention Complex and final project that will create a new detention facility in the southeast portion of the zoning lot.

To accomplish this Project successfully, the Design-Builder must balance design, functionality, cost, constructability, and durability, exemplifying the principles of Project Excellence and providing the best value to the city.

Figu



The project goals include:

1. Create a design that achieves the goals expressed in the Design Principles and Guidelines while meeting functional requirements including but not limited to sustainability, design integration and community impact;
2. Exemplify the principles of Project Excellence, including excellence in design, construction, and project delivery;
3. Provide value to the City through innovative design, that focuses on constructability and long-term maintenance;
4. Provide safety in and around the Project site;
5. Minimize construction and operations-related impacts to the community at large and to neighboring properties, including civic and municipalities (e.g., police, correctional, buses, trains, and subways);
6. Minimize loss of parking during construction;
7. Seek innovative solutions to accelerate the project schedule while controlling cost and maintaining quality and safety;
8. Maximize Minority and Women-owned Business Enterprise (M/WBE) participation; and
9. Complete the Project within the budget and schedule.

1.3 Site Description

The Project Site (figure 2) for the Queens Garage and Community Space is located at 80-25 126th Street, in the heart of the Queens Civic Center, where it is separated by major roadways from the nearby residential neighborhoods of Kew Gardens, Briarwood, and Forest Hills. The Project Site occupies an approximately 40,770 square foot area at the northwest portion of the zoning lot. The Uniform Land Use Review Process (ULURP), approved by the New York City Council on October 17, 2019, defines zoning and land use parameters for the zoning lot and is included in this RFP. The zoning lot combines the existing parking lot (Block 9657, Lot 1), portions of the existing Queens County Criminal Court Complex including the existing detention facility at 126-02 82nd Avenue (Block 9653, part of Lot 1 and 100), and a de-mapped 82nd Avenue Lot.

The garage site is currently operated by the Department of Transportation (DOT) as the Queens Borough Hall Municipal Parking Lot, which provides 302 surface parking spaces for the nearby public structure in the civic center campus and will remain partially operational throughout construction. To facilitate vehicular circulation in and around the garage, community space and future detention facility, the City will permanently convert 126th and 132nd Streets to two-way traffic.

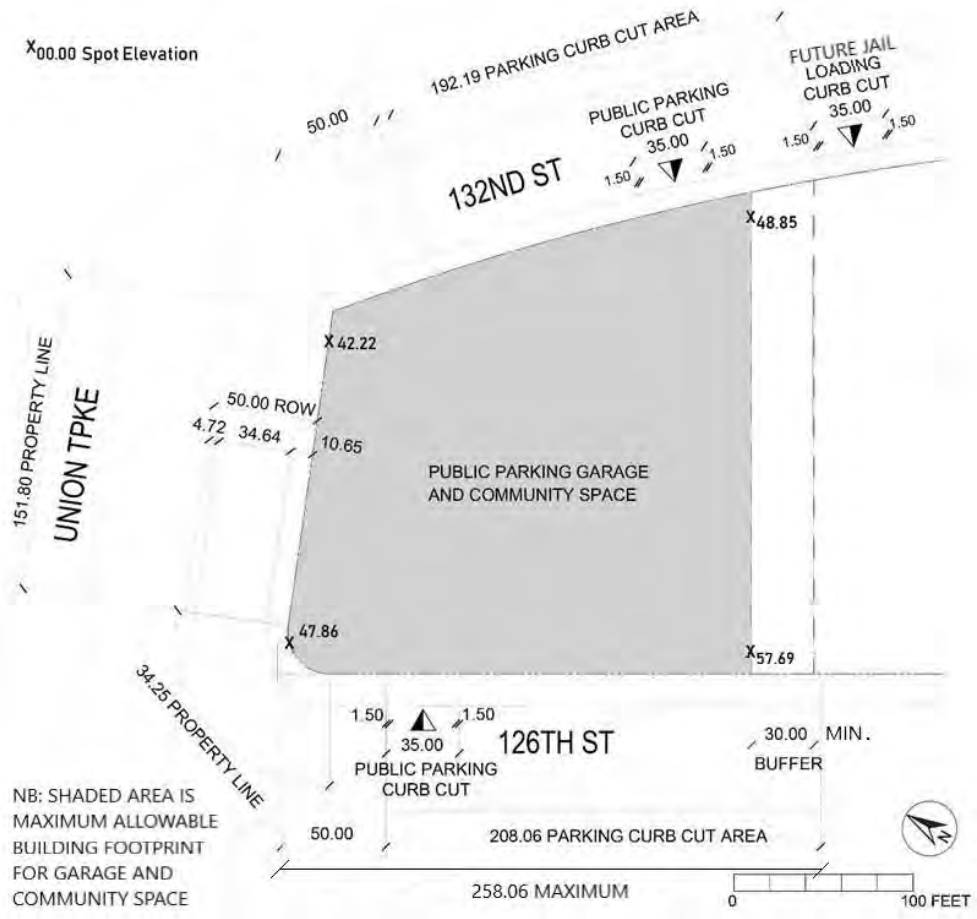


Figure 2. Project Site Plan – we want to edit this pic to clarify setback

The existing surface parking lot was completed in 2019 and incorporates high performance green infrastructure including bioswales with subgrade detention for stormwater infiltration, hardy and diverse native planting, recycled asphalt, and electric vehicle charging. It incorporates a grade change of nearly 25 feet from the high point at 82nd Avenue and 126th Street to the low point at Union Turnpike and 132nd Street, with approximately 9 feet of grade change occurring over the portion of the site dedicated to the new garage.

The Queens Garage and Community Space will be bordered by the grounds of Queens Borough Hall across 126th Street to the west, Grand Central Parkway and Union Turnpike to the north, 132nd Street and the Van Wyck Expressway to the east, and the site for the future detention facility to the south (figure 3). The approved ULURP drawings establish a maximum envelope of 195 feet above the ground floor elevation. Mandatory frontage on 126th Street is required for the - 25,000 SF community space, facing Queens Borough Hall and the civic campus. Also established in the ULURP for the garage, curb cuts providing both vehicular entry and exit will be located at 126th Street and 32nd Street.

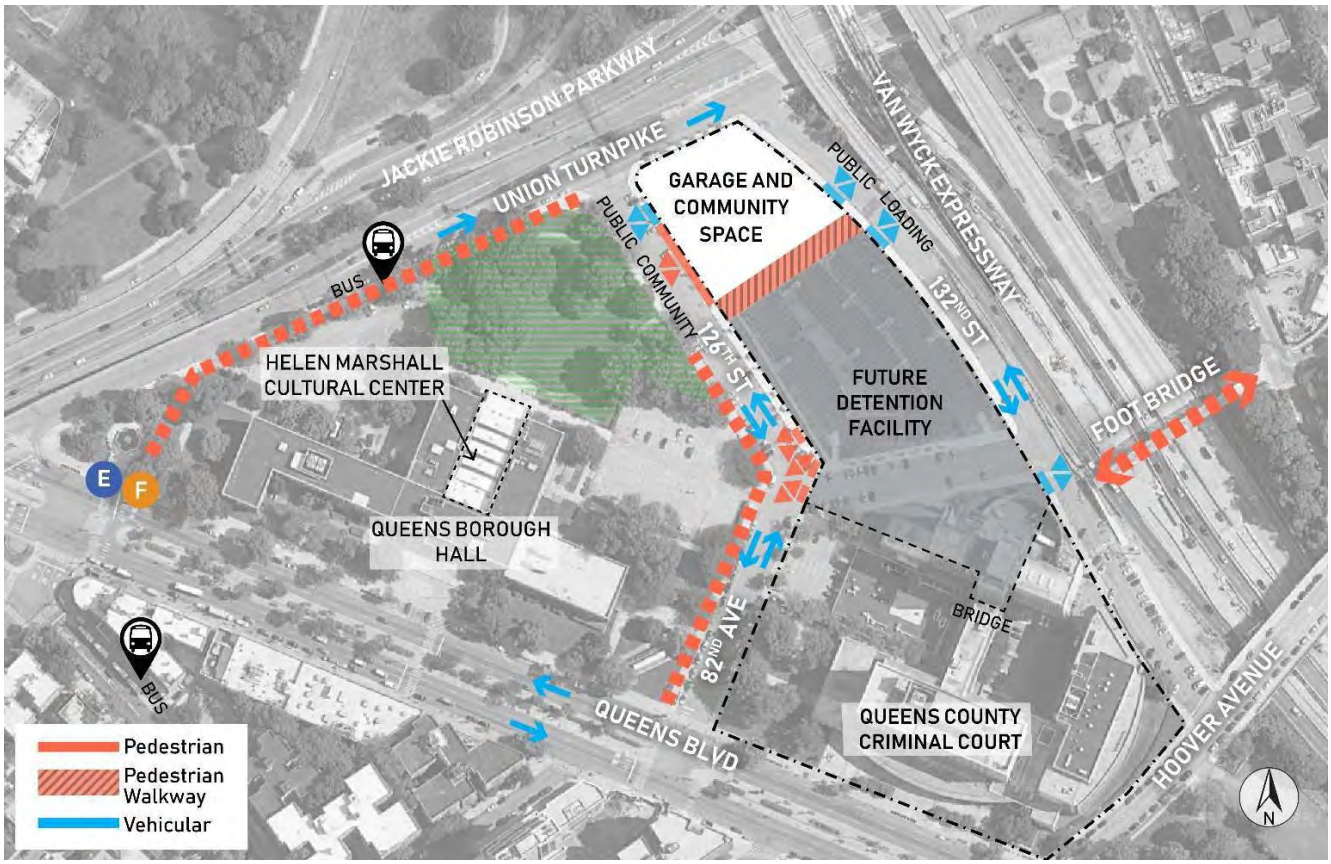


Figure 3. Site Circulation

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1.4 Scope Summary

The Project is for the construction of a parking garage and community space and related activities, including the provision of temporary parking during construction, as described below. Approved ULURP drawings identify a maximum FAR of 3.71 for the zoning lot, within which 25,000 square feet is required for community facility use and 202,800 zoning square feet above grade is allowed for parking.

COMMUNITY SPACE

The community space must be 25,000 square feet with 140 feet of mandatory frontage and access along 126th Street per ULURP drawings. The community space is to be delivered as an unfinished tenant space and achieve LEED Gold Certification, further described in the Basis of Design. The fit-out of the community space is not included in this project.

PARKING

The new parking garage must provide a minimum of 600 parking spaces with levels both above and below grade. During construction, the remaining portion of the existing at-grade parking lot will require modifications to maximize surface parking, providing a minimum of 140 spaces, and provide operational continuity for the duration of this Project. The at- grade parking lot will serve the existing civic institutions and surrounding community until the garage is operational. The parking garage must include an office and accessible restroom, elevator machine room, electric closet, and storage space for maintenance equipment and supplies with custodial slop sink.

MECHANICAL, ELECTRICAL, PLUMBING AND SYSTEMS

Mechanical, electrical, and plumbing systems for the parking structure, office, and community space will be required, with the parking garage and community space having separate heating and cooling systems. Systems including CCTV, fire (including sprinkler systems), lighting, parking payment and parking management systems will also be required.

CONVEYANCE

The parking garage will require elevator(s) providing ADA access to all levels. If the unfinished, community space is on multiple levels, a separate elevator will be provided for ADA access to all levels.

SITE PREPARATION AND REMOVALS

Site work will include demolition, removal, and preparation of the Project Site while maintaining parking and functional access to the remainder of the existing surface parking lot. Work to the Project Site will include demolition and removal of the existing sheet pile retaining structures, demolition, clearing, and site preparation of portions of the parking lot and associated structures, and removal of contaminated soil and materials. Work on the temporary parking area will include the modification of any site drainage to maintain positive runoff, DOT-required revenue devices, entry/exit control devices, lighting and other infrastructure required for continuous operation of the temporary parking area.

Site work will include the removal of an existing underground stormwater retention system affected by the construction of the new facility. The new garage and site will require appropriate stormwater management.

UTILITY WORK

Utility work includes services for the new garage and community space. Connections to services within the community space will be made by others in a future contract. Services must include water, sanitary, electric, and telecommunications (telephone and internet).

ROADWAYS AND LANDSCAPE

The parking garage and community space will be separated on the site from the future detention facility by a 30-foot minimum buffer to be used as pedestrian walkway. This Project will include walkway surfacing of the buffer area that is intended to remain in use until completion of the new detention facility project, which will include final hardscape, landscape, site lighting, and other amenities within this area. Streetscape landscape including paving, planting, street trees, and site furnishings for the parking garage site is included in this Project. Site lighting is required for the temporary parking lot, sidewalks and public spaces around the parking garage facility and must be coordinated with security requirements.

The Project will require replacement of any damaged or removed street roadwork and complete sidewalk replacement in accordance with applicable codes and requirements.

SUSTAINABILITY

The City is committed to promoting and implementing sustainable design in public buildings, with the goals of reducing energy use, conserving water and other natural resources, and creating a healthy and resilient city. Environmentally sustainable, energy efficient design and construction standards must be fully integrated into this Project. With this in mind, the long-term operations of this Project should be considered.

In performing the Work, the Proposer is responsible for complying with Applicable Law and other Standards of Performance as stated in the Contract Documents. The following are applicable to the Project. Please refer to Volume 2 Section 12 for additional information.

The Design-Builder must comply with Local Law 32-2016 and Local Law 31-2016, as codified in Chapter 9: Capital Projects and Budget, Section 224.1: Green Building Standards of the New York City Charter and Chapter 10: Green Building Standards of Title 43 of the Rules of the City of New York, which apply to all City projects.

The Design-Builder must also comply with direction on LL31 and LL32 of 2016 as provided by the Mayor's Office of Environmental Coordination (MOEC) in the letter dated June 30, 2020, which applies only to this Project and has been included with the Reference Documents.

QUALITY AND PERFORMANCE CRITERIA

The design of the parking garage and community space must be guided by the Design Principles and Design Guidelines and by DDC's Project Excellence criteria.

Approval by the Public Design Commission of the City of New York (PDC) will be required for all elements under PDC jurisdiction.

ANTICIPATED WORK TO BE PERFORMED BY OTHERS

Relocation of utilities outside the work limits of the site and within the 30-foot buffer, fit-out of the community space and demolition of the remaining southern section of the existing site will be performed by others contracted by DDC. The Design-Builder must coordinate the Work pursuant to the Coordination Plan required by the Agreement.

1.5 Community and Neighborhood Context

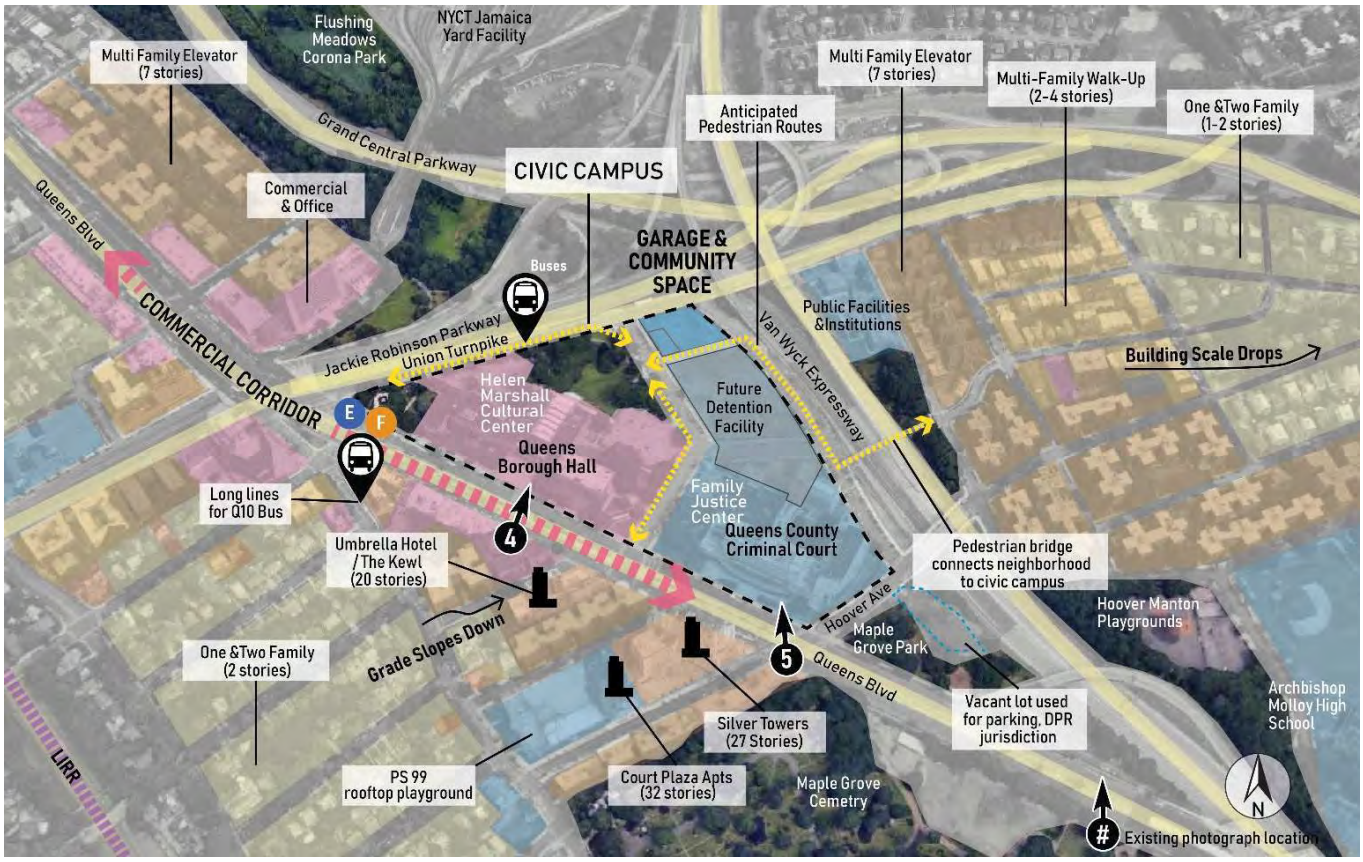

Figure 4. Campus Context Map

TRANSIT CONNECTIONS

The civic campus (figure 4) is served by two subway lines, five bus lines, and regional rail. This includes bus lines Q10, QM18, Q37, Q46 and Q60 which provide vital north-south connection in the borough and to nearby JFK airport, a major transportation and employment center. The Union Turnpike/Kew Gardens station of the E and F subway lines is located at Queens Boulevard near the corner with Union Turnpike. Multiple bus lines run along Queens Boulevard and Union Turnpike, with the bus stop closest to the site located at Union Turnpike adjacent the Queens Borough Hall grounds. Three blocks further south is the Kew Gardens station of the LIRR, which runs from Grand Central Terminal in Manhattan to points on Long Island.

CIVIC CAMPUS

Southwest of the Project Site, the civic campus is composed of public structure including Queens Borough Hall (figure 5), Queens County Criminal Court (figure 6), Queens District Attorney's Office, and the New York City Family Justice Center. Constructed in 1941, Queens Borough Hall is a three-story brick and limestone building with central portico fronting onto a busy pedestrian plaza along Queens Boulevard. Designed by architects William Gehron and Andrew J. Thomas, it was

built to house the Queens Borough President's office and other municipal offices under one roof including the Department of Buildings (DOB), Department of City Planning (DCP), Queens Economic Development Corporation (QEDC), Department of Transportation (DOT), and Community Board 9 among others. The grade slopes down from Queens Boulevard to expose five stories at the rear façade, and a 2016 atrium addition housing the Helen Marshall Cultural Center encloses the courtyard between the building's two north wings. Recent events held in the atrium include Haitian Independence Day Celebration, Pride Month Celebration, Veterans Day Observance Ceremony and Women's Herstory Month Celebration. The interior of the Queens Borough Hall campus comprises a park-like landscape of pathways, lawns, and mature trees interspersed with surface parking lots. This outdoor space is a popular location for local wedding photography. A plaza with planted fountain occupies the busy corner of Queens Boulevard and Union Turnpike.

Further southeast at the corner with Hoover Avenue, the Queens County Criminal Court comprises several interconnected structures and additions housing 500,000 SF of court space. The complex also houses the Queens District Attorney's Office, Department of Probation (DOP) and Department of Correction (DOT). The original building, completed in 1961, includes the eight-story limestone-clad Main Building visible along Queens Boulevard, the ten-story Queens Detention Complex on 82nd Avenue, and a narrow, six-story structure connecting the two wings. The six-story East Annex completed in 1991 borders Hoover Avenue with a curved glass curtainwall. An entry addition completed in 1993 provides access to the complex from Queens Boulevard with a wide stair and plaza.

Figure 5. Queens Borough Hall

Figure 6. Queens County Criminal Court

Set within the west courtyard of the Courthouse building, a single-story structure constructed in 1991 and fronting onto 82nd Avenue houses the New York City Family Justice Center, which provides comprehensive legal, counseling, and support services for victims of abuse and trafficking.

Notable uses found throughout the campus context include the Briarwood Residence, a 91-unit family shelter complex located along the corner of 134th Street and the Grand Central Parkway (figure 17); the Court complex surrounding the Project Site, as described above; and the Queens Library at Briarwood. Local schools include the three-story P.S. 99; the single-story P.S. 99 Annex, located along Kew Gardens Road; and Archbishop Molloy High School located across the Van Wyck Expressway.

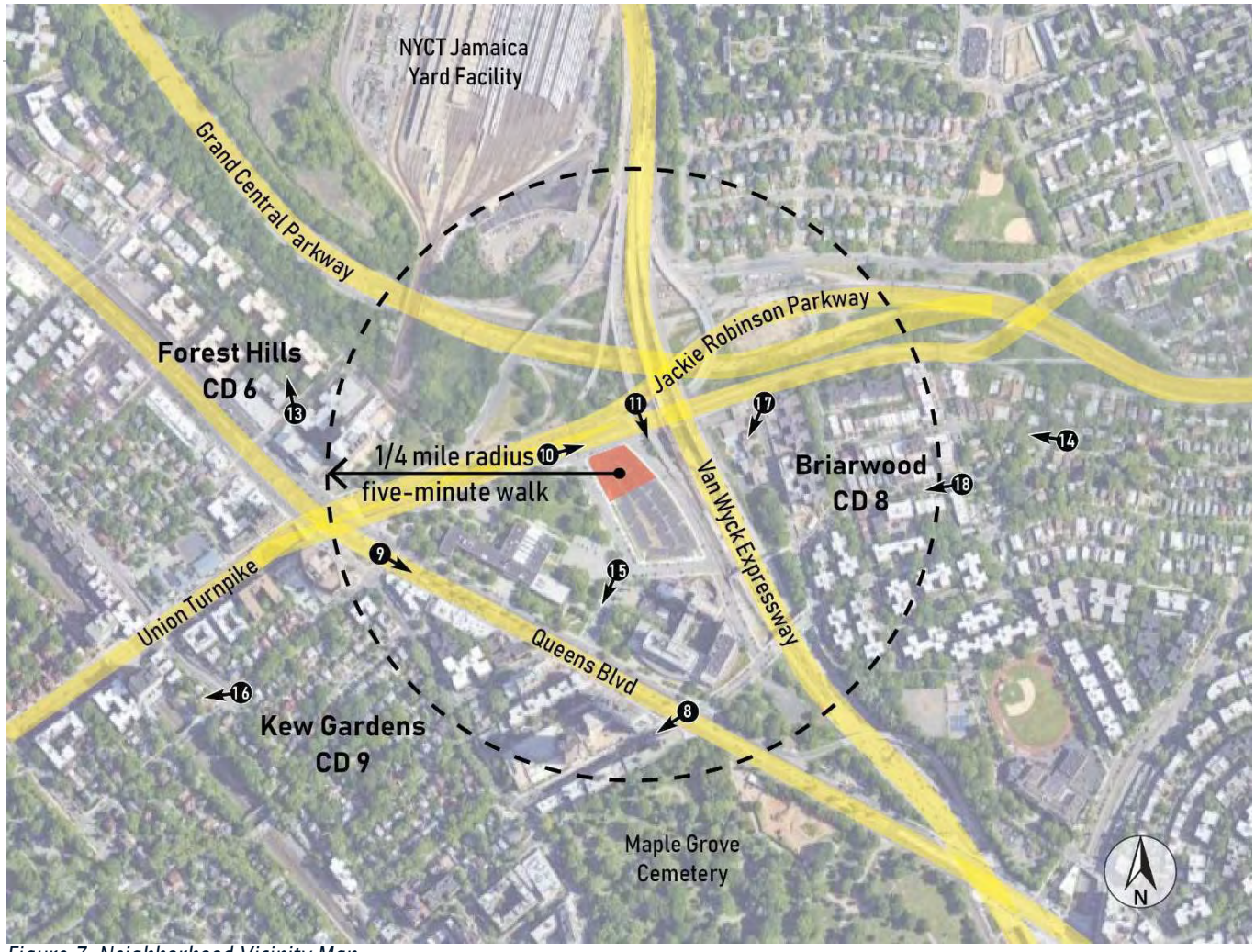

Figure 7. Neighborhood Vicinity Map

QUEENS BOULEVARD, KEW GARDENS, AND FOREST HILLS

Bordering the civic campus to the southwest, Queens Boulevard (figure 8) is a commercial thoroughfare with a wide planted median separating three lanes of traffic in each direction (figure 9). The corridor is undergoing a "Great Streets" transformation into a safe, green, multimodal boulevard as part of New York City's Vision Zero Action Plan. Buildings along Queens Boulevard are characterized by retail uses at the ground floor with residential, office, and institutional uses above. Across from the civic center, buildings are primarily four to five stories in height near Union Turnpike, eight stories at 82nd Avenue, and 20-32 stories near Hoover and 83rd Avenues.

The area to the west of the Project Site contains several additional high-rise commercial office buildings along Queens Boulevard and 80th Road, while tall, mixed-use residential and commercial buildings are located to the south, such as the 27-story Silver Towers and the 32-story Court Plaza, located along 83rd Avenue, a hotel constructed in 2016 is

located along 82nd Avenue. These higher density uses (figure 15) separate the site from the detached single-family homes on moderately sized lots of the Kew Gardens neighborhood to the southwest (figure 16). Kew Gardens, one of seven planned garden communities developed in the early 20th century in Queens, is characterized by many houses designed in revival styles such as Arts & Crafts and Tudor.

Figure 8. View west on Queens Blvd. at Hoover Ave.

Figure 9. View northwest on Queens Blvd.

Figure 10. View north from Union Turnpike at 126th St.

Figure 11. View of site from Van Wyck Expressway

Farther north of the Project Site lies the New York City Transit (NYCT) Jamaica Yard Facility and the southern edge of Flushing Meadows-Corona Park. A tall commercial office building, the Forest Hills Tower, is located along Queens Boulevard, situated among other commercial buildings to the northwest. Further northwest, the Forest Hills neighborhood includes a mix of single-family homes, attached townhouses, and low- and high-rise apartment buildings (figure 13). Forest Hills is home to Forest Hills Gardens, another planned garden community with many Tudor-style homes. The residential neighborhood of Kew Gardens Hills is located north of Union Turnpike and contains a mix of single-family homes and low-scale apartment buildings.

The area to the south of the Project Site contains Maple Grove Park and the adjacent Manton Playground across the Van Wyck Expressway, while the remainder of the southern portion of the study area contains Maple Grove Cemetery.

UNION TURNPIKE, VAN WYCK EXPRESSWAY, AND BRIARWOOD

North and east of the Project Site, Union Turnpike (figure 10) and the Van Wyck Expressway (figure 11) are high-speed, regional arterial roadways that intersect beyond the northeast corner of the Project Site (figure 12). Running parallel to 132nd Street east of the site, the Van Wyck Expressway transitions from an elevated portion to a trenched portion that divides the civic center from the residential neighborhood of Briarwood, which is accessible to the site via a pedestrian bridge at 82nd Avenue and a vehicular and pedestrian bridge further south on Hoover Avenue. These routes provide important connection from Briarwood to municipal services, retail, and transit links.

The Briarwood neighborhood is bordered by several blocks of six- to eight-story multi-family housing (figure 14) located on large lots along 134th Street to the west, 83rd Avenue to the south, and the Jackie Robinson to the north before transitioning to the decreasing density and scale of detached single-family homes further east (figure 18). Interspersed throughout the center of this residential neighborhood, small to medium-sized lots contain three-story multi-family homes along with newer construction apartment buildings ranging in height from four to five stories. Along the eastern edge of the area, single-family homes on larger lots predominate.

Figure 12. 113-17 78th Ave., Forest Hills

Figure 13. Looking west on Coolidge Ave. at 82nd Ave., Briarwood

Figure 14. View south on 82nd Ave. toward Kew Gardens Rd.

Figure 15. 70-80th Road at Austin St., Kew Gardens

Figure 16. View southwest of 8020 134th St., homeless shelter

Figure 17. View west on 82nd Ave., Briarwood

Design Principles and Guidelines

2

Design Principles and Guidelines

2.1 Introduction

The following Design Principles and Guidelines are intended to identify essential qualitative goals to aid teams in preparing proposals, inspire creative solutions, and support the evaluation and selection process. They are organized in two sections:

1. Design Principles represent the broadest goals for achieving high-quality and enduring civic design.
2. Design Guidelines expand upon these principles with criteria specific to the program and site.

2.2 Design Principles

CIVIC ASSETS

The Facility must exemplify outstanding and distinctive civic architecture that is well integrated with the fabric of existing neighborhoods. The design must inspire pride and contribute to a sense of place, celebrating the unique character, history, and culture of the surrounding communities.

Establish civic presence. Communicate the public nature of the building, instilling a sense of identity and presence in the public realm. Massing, fenestration, and materiality should form a coherent image that expresses the building's civic character. Public entrances should be welcoming and accessible to all.

Complement the neighborhood. Respond to the scale and character of the neighborhood through strategies that complement, rather than strictly match, surrounding buildings. Massing and façade articulation should be used to reduce the appearance of bulk, respond to the urban and pedestrian scale, and relate to adjacent building heights. The design should consider the multiple vantage points from which the building will be perceived.

Optimize Connections. Activate the site in response to nearby mobility networks and neighborhood amenities, including the location of transit, parks, and other destinations. Entries, community space, and public open space should be visible and accessible from pedestrian and transit routes.

Enhance pedestrian experience. Enrich the public realm by designing open spaces and ground-level facades to engage the public and contribute to the character of the streetscape and public realm. Pedestrian routes within and adjacent to the project site should be accessible, inviting, and safe, and should support the community with amenities such as planting, shade, seating, and wayfinding.

Integrate building systems and services. Thoughtfully integrate security, lighting, mechanical systems, utilities, waste disposal, and vehicular queuing into the design of the building exterior. Security measures should be unobtrusive, avoiding the appearance of a fortified facility. Appropriate lighting should be used to enhance the nighttime environment while controlling the spread of light to neighboring windows. Building systems and associated access points should be discreet, secure, and screened from view. Vehicular entrances and exits should be designed to minimize traffic impacts and pedestrian-vehicle conflicts.

ENDURING RESOURCES

The Facility must stand the test of time, performing optimally over and beyond the course of its 50-year life span. As a long-term community asset, the design must achieve the highest levels of energy performance and environmental sustainability, hold up well to regular use, and possess the flexibility to adapt to future change.

Optimize performance. Utilize innovative and multilayered solutions to achieve the highest standards of environmental sustainability. The design should use natural resources responsibly by optimizing energy performance, minimizing greenhouse gas emissions, limiting water use, and reducing construction waste, and should meet and exceed established standards for green buildings and infrastructure.

Promote sustainable urban ecology. Mitigate impacts on local and regional ecosystems by managing stormwater, offsetting heat island effect, utilizing native vegetation, and considering impacts on fauna such as migratory birds. The design should consider local microclimate effects to contribute to a comfortable surrounding environment.

Design for longevity. Enable simple, cost-effective operations and maintenance and select high-quality materials with demonstrated durability. Materials and fixtures should be easy to clean and should stand up to high levels of traffic without appearing harsh or institutional. Building systems, features, and equipment should be easy to maintain, update, and replace when needed.

Embrace resiliency. Respond to emergent and long-term risks, including changing climate and public safety conditions. The building and site must perform effectively during extraordinary and unforeseen circumstances and be able to maintain or quickly regain functionality in the face of operational stress or disturbance.

Consider Future Change. Attempt to design and construct the building and site in such a way that they can adapt to changing conditions and future needs through considerations such as program layout and stacking, structural and building systems, and construction assemblies.

2.3 Design Guidelines

The following design guidelines build upon the broader design principles by outlining key qualitative goals for the design of the Queens Garage and Community Space.

Area	Design Guidelines
Urban Relationships	Design the building and open spaces to enhance the Queens Civic Center and reinforce the sense of a campus at the heart of Queens. Design pedestrian entrances, primary frontages, and sight lines to provide convenient and clear pedestrian access to destinations within the civic campus, including the future detention facility. Design the community space and its entrance to be prominently visible from major pedestrian routes and transit stops, including from Queens Boulevard and along Union Turnpike. Design vehicular access points to minimize impacts on the sidewalk by providing clear sight lines for exiting vehicles and ample space for queuing within the facility.
Streetscape and Open Space	Design to create clear, safe, and accessible pedestrian connections that anticipate the full build-out of the future detention facility. The design should consider relationships beyond the site boundary, including the streetscape experience along Grand Central Parkway, 126th Street and 132nd Street, and linkages from the Briarwood neighborhood over the pedestrian bridge. Design to activate the public passage between the garage and detention facility as a future pedestrian plaza through strategies such as wrapping the corner with active use frontage, locating welcoming pedestrian entrances along this side, and employing lighting and transparency. The design should not hinder any future opportunity to create a lively and active environment. Design to accommodate grade changes, integrate mechanical and support spaces, and mitigate potential blank wall conditions in ways that enliven the pedestrian experience, such as through building articulation, screening, and planting.

Area	Design Guidelines
	Design security infrastructure to be discreet and well-integrated such that the garage, community facility, streetscape and open spaces feel welcoming to the public. Design to create the sense of a continuous campus with the Queens Borough Hall grounds by allowing park uses to extend visually and programmatically across 126th Street. Design to incorporate green infrastructure, native planting, and habitat support selected for its ability to thrive in local microclimatic conditions.
Building Exterior	Design, the building to feel like a cohesive and inviting public facility while expressing a unique identity for the Community Space. Design to animate the facade while screening the view of parked cars by employing strategies such as solid-void façade structure, screening, planting, and art. The facade should be active on all exposures, particularly at the ground level. Design to respond to the human scale by articulating the façade, such as through setbacks or other breaks in the massing, separation between ground and upper floors, and material differentiation. Design to consider views from the pedestrian bridge and Briarwood neighborhood, as well as from vehicles traveling along Union Turnpike and the Van Wyck Expressway. Design with high-quality, durable, and easily maintained materials that perform well over the long term. Design exterior lighting to respond to the distinct nighttime character and lighting environments that surround the building.

Area	Design Guidelines
	Design the rooftop to advance sustainability goals while enhancing the view from other nearby structures, including through planting, urban agriculture, on-site energy generation, or other strategies. Rooftop structures such as any solar canopies should feel integral to the design of the building.
Community Space	Design to create a highly visible and welcoming facility with a prominent entrance, providing ease of pedestrian access and landscaping that enriches the pedestrian experience. Design to enable the community operator(s) to install graphics, signage, and security systems. The design should provide ways to incorporate elements to complement the appearance of the building exterior Design to enhance the quality and flexibility of the community space through strategies such as maximizing the ceiling height and providing ample natural light. Design to promote active spaces through the placement and design of stairs, elevators, and indoor and outdoor spaces.
Parking Garage	Design a safe environment for pedestrians by creating visible and well-marked pedestrian routes, clear sight lines with minimal visual obstructions, and wayfinding that guides visitors easily between parking stalls and points of exit. Emergency communications devices should be clearly visible and accessible. Design lively and engaging stair and elevator environments that are safe, well-lit, easily maintainable. Design high-impact, cost-effective ways to animate the garage interior, such as the use of natural light, graphics and wayfinding, and lighting. Design with an eye towards incorporating features that will contribute to future adaptability of the garage.

Area	Design Guidelines
Building Systems	Design to embrace the spirit of innovation exemplified by the existing surface parking lot by employing high-performance energy, lighting, landscape, water, and material strategies. Design to enable the garage to adapt as technologies change, including changes to the payment and ticketing process, information capture and display, and use of electric and autonomous vehicles.

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Supporting Information

3

Supporting Information

3.1 Project Excellence

The City of New York is committed to achieving excellence in design and construction across its portfolio of public works by delivering quality infrastructure and public buildings that contribute to a thriving, equitable, sustainable and resilient city for all New Yorkers. As part of this commitment, the Department of Design and Construction's Project Excellence program builds on a strong tradition of innovation in architecture and engineering through strategies and practices that balance aesthetics, functionality, cost, constructability, and durability to bring form and meaning to public space.

Project Excellence encompasses all aspects of project delivery, from capital project planning through design, construction, commissioning, and close-out, to ensure on time and on budget delivery of exemplary civic projects. Integrated project delivery practices include enhanced project initiation and management tools, Quality-Based Selection (QBS) and best value procurements, performance evaluation and management, knowledge sharing, and continuing education. Together, these strategies ensure that all capital projects delivered to the City are inspiring, enduring, practical, constructible, and economical.

Achieving Project Excellence requires all team members to engage collaboratively in the capital project delivery process, prioritizing strategies that make responsible use of public funds and offer the best value for the City. DDC's project managers, technical reviewers, and support staff work to guide projects through complex and demanding project delivery processes in partnership with the most creative and experienced design and construction professionals. DDC and our partners share a commitment to Project Excellence in the public realm as characterized by the following overarching concepts:

Project Excellence utilizes the power of design and construction to positively transform our public space, inspiring pride in the people and City of New York. The design of public buildings and infrastructure must be guided by a civic consciousness and social responsibility to provide spaces that promote discourse, exemplify accessible government, and inspire pride in our communities. The design and construction process must reflect a collaborative effort that is inclusive of all stakeholders, including sponsor, partner, and regulatory agencies, and the community.

Project Excellence shapes the city we envision for today and the future by creating enduring and inclusive public spaces. With design and construction of public projects comes the responsibility of shaping the City for generations to come. Dignified, universally accessible, and community-oriented, public spaces must make all New Yorkers feel welcome and valued, comfortable and secure. By thoughtfully responding to surrounding context, including neighborhood character and natural systems, the design must create and reinforce a sense of place that is enhanced by strong connections to existing community resources and mobility networks. The design and construction process must engage relevant stakeholders and experts to consider cultural context and integrate artwork wherever possible in support of meaningful public spaces.

Project Excellence protects the legacy of our public space by carefully considering practical solutions that address the needs of our City. Public projects must be well suited for their intended use and adaptable to future needs. Our public buildings and infrastructure must meet the needs and aspirations of New York City's public agencies as expressed in their individual missions, goals, standards, and requirements. The design must seek a creative balance between functional and programmatic requirements, operational and maintenance protocols, construction practices, and performance and innovation. Sustainable, resilient, durable, and easily maintained, the project must be guided by a holistic view of the capital asset over its expected lifespan. The design must consider solutions to long-term and emergent risks and opportunities, such as changing climate and public safety conditions, as well as new technologies and ways of living and working.

Project Excellence strengthens the character of our public space by delivering constructible capital projects with safety and integrity. Building New York City requires the ability to execute projects in a safe, effective, and timely manner while maintaining the integrity of the design throughout construction. The design of our public buildings and infrastructure must be represented by complete, comprehensive, and accurate contract Documents that are clearly detailed and coordinated across disciplines, and that meet or exceed requirements of code, zoning, accessibility, and local laws. Specifications must be carefully coordinated with drawings and material schedules and be tailored to the requirements of each project. Materials and systems must be proven, readily available, and achievable with local construction practices to minimize lead times, eliminate cost overruns, and prevent construction delays.

Project Excellence supports the value of our public space by employing an economical approach that leverages City resources to build lasting community assets. Design and construction by and for the City requires conscientious attention to schedule, budget, and operational costs to ensure that public funds are well spent, and communities well served. The project must incorporate a life-cycle cost analysis approach and prioritize selection of long-lasting systems and assemblies that are achievable within the allocated budget. Systems must perform to the highest standards of human health, comfort and efficiency, meet or exceed energy requirements, and operate as designed. The project must be calibrated to reduce construction and operating costs and complexity, positively impact the health of the environment, and use natural resources wisely. Using City-wide and agency standards and best practices, innovative methodologies, and appropriate technologies, the design must add value and do more with less.

To support Project Excellence, DDC seeks architects, landscape architects, planners, designers, engineers, construction managers, contractors, and design-build teams who are dedicated, responsive, and collaborative, and who possess the management skills necessary to complete work on time and on budget. DDC's partners must have a proven track record of delivering quality projects while resolving complex requirements and navigating unforeseen circumstances. Team-oriented and adept at balancing competing demands, these professionals must go beyond the creation of contract Documents to serve as facilitator, mediator, and interpreter, building trust among the many stakeholders throughout the life of a project.

3.2 Community and Stakeholder Input

Input from stakeholder groups, communities, professionals, and public agencies has been gathered over the course of more than three years of engagement, activation and visioning prior to the Uniform Land Use Review Procedure (ULURP). Preliminary reports, engagement, and thought leadership, alongside comprehensive work undertaken by the Mayor's Office of Criminal Justice (MOCJ) provides the backbone for the design guidelines. In addition, more recent efforts to understand how to best integrate these structures in the local communities have been refined by the Design Advisory Group (DAG*), as well as the Neighborhood Advisory Committees (NAC) in Brooklyn, Bronx, Manhattan and Queens.

The City is committed to ongoing community engagement following the approval of the ULURP by City Council on October 17, 2019. A meeting with the Queens Advisory Committee (QAC) was held on January 8th. 2020, at Queens Community House, Kew Gardens Community Center to present the schedule of the project and engagement opportunities, including community input on the Design Guidelines which was solicited specifically for those areas in the project related to enhancement of the public realm and external, publicly accessible urban spaces.

Continuing to engage the community, the Borough-Based Detention centers Community Workshop for the Queens Garage and New Detention center Facility was held at the Queens Borough Hall across from the site on February 13, 2020. The workshop purpose was to gather more locally-driven ideas on improving how the Queens structure wi integrate into the surrounding neighborhoods, and other recommendations for the Design-Build Teams. At the workshop, community stakeholders had an opportunity to share their perspective of the community's special characteristics and provide recommendations for aspects of the facility's appearance and other design features. Participants were also asked to explore potential uses for the community space. Recommendations from the Community Workshop related to the appearance of garage facility, community space, and the exterior elements are included in these design guidelines.

The design guidelines reflect input from source Documents and stakeholder input including Justice Implementation Task Force, Van Alen Institute, Neighborhood Advisory Committees, Department of City Planning, Capital Program Scope Document and input from local communities, people impacted by the justice system, advocates, service providers and all those affected by the borough-based detention centers.

*The Design Advisory Group (DAG) consists of representation from Mayors Office of Criminal Justice (MOCJ), NYC Department of Design and Construction (DDC), NYC Department of Correction (DOC), Department of City Planning (DCP), Public Design Commission (PDC), representatives from the Bronx, Brooklyn, Manhattan and Queens Borough President's Offices, and representative from the City Council Speaker. The DAG has met regularly throughout the process to steward the development of these guidelines.

Characteristics to be respected and maintained	Preferred Community Space Uses
It's a diverse community (ethnically, religiously, socio-economic backgrounds, ages, etc.)	Multipurpose community space run by non-profit organization providing services for people.
Vibrant and safe neighborhood with a low-key vibe.	Community meeting spaces
Historical, low-rise buildings, like an urban village, where people know each other.	Health care facility
	Technology professional school (STEM, IT, Coding)
	Cafeteria for visitors (retail not allowed)

Key Takeaways relevant to the garage and community space are listed below:

- A variety of seating options with low-maintenance landscaping accommodating small and large groups.
- Seating areas and public space need to be comfortable so people of all ages and abilities can gather.
- The community is open to creative lighting alternatives that make the space warm and colorful. "Light, space and color are important." Reduces fear for the individuals who live in the community.
- Recommending "a building that looks functional, appears bright, and visible to the community."
- Encourage green roofs and consider ivy, which is low maintenance.
- The community facility needs to have its own identity apart from being within a garage.
- The community center should be welcoming and the design should allow visitors to meet inside or out.

This multifaceted stakeholder and community engagement approach incorporated feedback from community meetings and Queens DAG Breakout meetings. Key takeaways that have been incorporated are:

- Interest in a flexible space – as-needed use can be applied.
- Uses for the space that make visiting the detention facility less institutional (Daycare or community center.)
- This community space may not be a destination but serve as a resource to visitors/the surrounding community. Consideration for access to free meeting space for non-profits.

3.3 List of Participants

Sponsor Agencies: New York City Department of Correction (DOC), Mayor's Office of Criminal Justice (MOCJ)

Contracting Agency: New York City Department of Design and Construction (DDC)

NYC Agencies

Department of Design and Construction (DDC)

Mayor's Office of Criminal Justice (MOCJ)

Department of Transportation (DOT)

Department of City Planning (DCP)

Department of Correction (DOC)

Department of Environmental Protection (DEP)

Fire Department of New York (FDNY)

Office of Management and Budget (OMB)

Department of Buildings (DOB)

Public Design Commission (PDC)

Elected Officials and Representatives
Borough Presidents City Council

City Planning Commission (CPC)

Board of Corrections (BOC)

Public Design Commission (PDC)

Community-Based Organizations

Neighborhood Advisory Committees (NACs)

Community Boards (CBs)

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Sasha Ginzberg, Executive Director, Borough-Based Detention centers Program

Mayor's Office of Criminal Justice (MOCJ)

Elizabeth Glazer, Director

Nadine Maleh, Executive Director, Capital Projects

3.4 Acronyms, Definitions and Terms

The following are relevant to the Scoping Documents.

Acronym, Term	Definition
ACCO (Agency Chief Contracting Officer)	The position delegated authority by the Agency Head to organize and supervise the procurement activity of subordinate Department staff in conjunction with the City Chief Procurement Officer
Act	New York City Rikers Island Detention center Complex Replacement Act. Design-Build Authorizing legislation.
Addenda/Addendum	Written supplemental additions, deletions, and modifications to the provisions of the RFQ or RFP issued by DDC, after the date of issuance.
Agency Head	The Commissioner of the New York City Department of Design and Construction
AHJV	AECOM-Hill Joint Venture
ADA (Americans with Disabilities Act)	The ADA is a civil rights law (1990) that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public. Title III is mostly associated with the design of public accommodations and will be mostly relevant in the development of the new detention centers. This title is regulated and enforced by the U.S. Department of Justice.
ADAAG	ADA Accessibility Guidelines
APS	Automatic Parking System
Architect-of-Record (Firm)	identified in Section 4 of the RFQ, means the entity that has primary responsibility for signing and sealing design packages, and for certifying that work has been performed in accordance with the requirements of the Contract Documents
Architect-of-Record (Individual)	Identified in Section 4 of the RFQ, means the individual that has the primary responsibility for design services for the Project.
ATC	Alternative Technical Concepts
BBJ Program (Borough-Based Detention centers Program)	DDC's Design-Build program for the City's Borough Based Detention center System to design and build a network of modern and humane borough-based detention centers
BOD (Basis of Design)	This section concisely captures the requirements and vision of the Project into the technical approach and design parameters by discipline for the Design-Build Team.
Building	A vertical construction

Acronym, Term	Definition
Building grossing factor	Multiplier used on space allotment lists. It accounts for building structure, mechanical and electrical rooms, vertical circulation (stairs and elevators), and internal horizontal circulation (e.g., corridors between housing units, departments).
CB	Community Board
CCPO	New York City Chief Procurement Officer
CDM	Confidential Design Meeting or Collaborative Design Meeting
CHS	New York City Correctional Health Services, which is part of NYC Health + Hospitals
Circulation/efficiency factor	See departmental factor.
City	City of New York
Clarification	A written or oral exchange of information that takes place between a Proposer and DDC after the receipt of all SOQs and/or Proposals during the evaluation process. The purpose of Clarifications is to address minor ambiguities, omissions, errors or mistakes and clerical revisions in a SOQ or Proposal
CCTV (Closed circuit television)	Television systems used by custody and treatment program staff for video surveillance in designated areas of the buildings.
Commissioner	The Commissioner of the New York City Department of Design and Construction
Comptroller	The Comptroller of the City of New York, their successors, or duly authorized representatives
Conflict of Interest	A Person or organization: (1) had or has relations with Persons: (2) engaged or is engaging in activities; or (3) performed or is performing services for DDC or another entity concerning the Project or a related project, that afford such Person or organization with a competitive advantage or that might otherwise impair the Person or organization's objectivity, or that render such Person or organization unable, or potentially unable, to render impartial assistance or advice on the Project
Consultant Support Team	The Persons who will support the City in connection with the pre-award activities, including procurement, and/or management of the Project(s)
Contract	The written agreement between DDC and the Design-Builder setting forth the obligations of the parties with respect to the Project, including, but not limited to, the performance of the Work and the basis of payment, and including all provisions required by law to be inserted in the Contract whether actually inserted or not
Contract Documents	The Documents identified as such in the Contract, including all provisions required by law to be inserted in the Contract whether actually inserted or not.

Acronym, Term	Definition
CPC	New York City Planning Commission
CPSD	Capital Project Scope Development
CTMP	Construction Transportation Monitoring Plan
DAG	Design Advisory Group
Day / Days	Calendar days unless otherwise specifically noted to mean business days
DB Team (Design-Build Team)	Principal Participants, Key Personnel, Subcontractors, and all other Persons making up the team and acting on behalf of, or at the direction of, the Design-Builder to provide the Work
DB Design-Build	A Project delivery methodology by which a single Design-Builder has responsibility for the design and construction of the Project under a single contract with DDC
DB-D	Design-Build Dismantle
DB-F	Design-Build Facility
DBIA	Design Build Institute of America
DB-SS	Design-Build Swing Space
DCAS	New York City Department of Citywide Administrative Services
DCP	Department of City Planning
DDC	Department of Design and Construction of the City of New York acting by and through the Commissioner thereof, or their duly authorized representative
DEP	Department of Environmental Protection Agency
Department	Department of Design and Construction of the City of New York acting by and through the Commissioner thereof, or their duly authorized representative
Departmental Factor	Multiplier used to account for the typical amount of circulation space required for corridors and the movement of people, goods, and services. It varies by the type of function (e.g., offices, medical clinics, kitchens, warehouses).
Design Lead (Firm)	The entity that has primary responsibility for creative architectural design for the Project
Design Lead (Individual)	The individual that has primary responsibility for creative architectural design for the Project
Designated Representative	The individual identified in Section 1.12(1) of the RFQ
Design-Builder	The Person selected pursuant to the RFP that enters into the Contract with DDC to design and construct the Project

Acronym, Term	Definition
Designer(s)	The Principal Participant(s), Subcontractor(s), or in-house designer(s) that provide design services for the Project(s)
Designer-of-Record (Firm)	Identified in Section 4 of the RFQ, means the entity that has primary responsibility for signing and sealing design packages, and for certifying that work has been performed in accordance with the requirements of the Contract Documents
Designer-of-Record (Individual)	Identified in Section 4 of the RFQ, means the individual that has the primary responsibility for design services for the Project.
DOB	New York City Department of Buildings
DOC	New York City Department of Correction
DOITT	New York City Department of Information Technology and Telecommunications
DOT	New York City Department of Transportation
EAO	Engineering Audit Office
Early Works	The design and construction work for demolition, swing space, and a new parking garage in this Boroughs of Queens and Brooklyn in advance of design and construction of new detention structure
Engineer-of-Record (Firm)	Identified in Section 4 of the RFQ, means the entity that has primary responsibility for signing and sealing design packages, and for certifying that work has been performed in accordance with the requirements of the Contract Documents
Engineer-of-Record (Individual)	Identified in Section 4 of the RFQ, means the individual that has the primary responsibility for design services for the Project.
FDNY	Fire Department of the City of New York
FEIS	Final Environmental Impact Study
FMS	File Management System
FSEP	Food Service Establishment Permit
High-rise Building	A building with an occupied floor located more than 75 feet above the lowest level of fire department vehicle access.
ISOP	Interim Submittal of Proposal
GSF (Gross Square Feet)	The total area, which includes both the usable space (net square feet) and required building structure and circulation needed to support that usable space.
JTF	Joint Task Force

Acronym, Term	Definition
Key Personnel	The individuals identified pursuant to in Section 4.4.4 of the RFQ and those additional individuals that may be designated as such in a subsequent RFP or by DDC's designated project manager at a later date
Lead Contractor	The Person or Persons primarily responsible for the construction of the Project
LEED	Leadership in Energy and Environmental Design, a green building certification program developed by the U.S. Green Building Council.
LL	Local law
M/WBE MWBE	Minority and Woman-Owned Businesses Enterprises certified by the City Department of Small Business Services
MDC	Manhattan Detention Complex
Mezzanine	A small floor between two main stories of a building.
MOCJ	New York City Mayor's Office of Criminal Justice
MOCS	New York City Mayor's Office of Contract Services
MTA	Metropolitan Transportation Authority
NAC	Neighborhood Action Committee
NSF (Net Square Feet)	Usable area within a room or space.
NOI	Notice of Intent
NYPD	New York City Police Department
OATH	New York City Office of Administrative Trials and Hearings
OCA	Office of Court Administration
OMB	New York City Office of Management and Budget
OSHA	Occupational Safety and Health Administration
PDC	Public Design Commission of the City of New York
Person	Any individual, firm, corporation, company, sole proprietorship, limited liability company (LLC), joint venture, voluntary association, partnership, trust, unincorporated organization, or other legal entity.
Phase I	RFQ phase of the procurement process
Phase II	RFP phase of the procurement process

Acronym, Term	Definition
PLA (Project Labor Agreement)	The project labor agreement entered into or designated by the City for the Program or any Project. The PLA will be included with the RFP
PMC (Program Management Consultant) Owner's Representative	AECOM-Hill=JV, which entity is providing program and project management services to DDC
PMIS	Program Management Information System
PMO	Program Management Office
POA	Points of Agreement
PPB (Procurement Policy Board)	The board established pursuant to New York City Charter § 311 whose function is to establish comprehensive and consistent procurement policies and rules which have broad application throughout the City
PPB Rules	The rules of the Procurement Policy Board as set forth in Title 9 of the Rules of the City of New York ("RCNY"), § 1-01 et seq.
Principal Participant	Means any of the following entities: A) If the Proposer is a corporation, the Proposer; B) If the Proposer is or will be a consortium, partnership or any other form of joint venture, each member of the consortium, partnership or joint venture; C) If the Proposer is or will be a limited liability company, each member or owner of such entity.
Project(s)	The improvements to be designed and constructed by the Design-Builder and all other Work product to be provided by the Design-Builder in accordance with the Contract Documents
Project Excellence	DDC's priorities and criteria described in Volume 3, Part A, Section 1 of this RFP.
Proposal	Proposal submitted by a Proposer in response to the RFP, including any revisions thereto. If the RFP requests submittal of best and final offers, the term "Proposal" means the best and final offer submitted by the Proposer, including any revisions thereto
Proposer(s)	Person or Persons submitting a SOQ(s) in response to this RFQ or a Proposal in response to an RFP
QAC	Queens Advisory Committee
RFP (Request for Proposals)	A written solicitation, including all Addenda thereto, seeking Proposals (including quality and price) to be used to identify the Proposer offering the best value to DDC. The RFP will be issued only to Persons who are on the Short-List

Acronym, Term	Definition
RFP Evaluation Criteria	The criteria and standards that constitute the basis for evaluating Proposals. RFP Evaluation Criteria will be defined in the RFP
RFQ (Request for Qualifications)	The written solicitation issued by DDC, including all Addenda thereto, issued by DDC seeking SOQs in order to identify and Short-List the Proposers to receive the RFP for the Project
RFQ Evaluation Criteria	The criteria and standards set forth in the RFQ, which constitutes the basis for evaluating the SOQs and determining the Shortlisted Proposers
Round / Rounds	Refers to the organization of the RFQ process whereby Proposers are invited to submit SOQs for Projects 1 and 2, in Round 1, and Projects 3 and 4, in Round 2.
SCOC	New York State Commission of Correction
Selected Proposer	The Proposer determined to be the most qualified based on the RFP Evaluation Criteria and whose Proposal is found to provide the best value to the City
Short-list	The list of Proposers that the City determines are the most highly qualified potential Design-Builders for a Project, based on an evaluation of the SOQs submitted by such Proposers
Short-listed Proposers	Proposers deemed most qualified to perform the Work based on the RFQ Evaluation Criteria
SOQ (Statement of Qualifications)	The information prepared and submitted by a Proposer in response to an RFQ.
Subcontractor	Acronyms/Abbreviations Definition Subcontractor Person or Persons, other than Principal Participants and employees of the Proposer or Principal Participants, who or which contracts or will contract with the Proposer to furnish, or actually furnishes services, labor, or labor and materials, or labor and equipment hereunder
ULURP	Uniform Land Use Review Procedure
VRJS	Voorhies-Roberson Justice Services
Work	All of the administrative, design, engineering, utility support services, procurement, legal, professional, manufacturing, supply, installation, construction, supervision, management, testing, verification, labor, materials, equipment, maintenance, warranty, Documentation, and other duties and services to be furnished and provided by the Design-Builder as required by the Contract Documents, including all efforts necessary or appropriate to achieve final acceptance of the Project and to fulfill the Design-Builder's warranties. In certain cases, the term is also used to mean the products of the Work

AUGUST 2020

VOLUME 3 / PART A / SECTION 2

Basis of Design

Queens Garage & Community Space

QN NYC Borough-Based Detention centers Program

A DESIGN-BUILD PROGRAM

PIN: 8502020CR0040P-42 P

NYC DDC Department of Design and Construction

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Introduction & Summary

1.1 Introduction

The Design Guidelines which are part of this RFP provide a framework and understanding of what the goals of the project are and how important it is that the structure respond to their neighborhood community. The requirements in this Basis of Design define the level of quality of spaces and systems. The DB is encouraged to present creative and innovative solutions to achieve the goals of the project. The DB must keep the Design Guidelines in mind when following the requirements described in this Basis of Design.

1.1.1 EARLY WORKS

Early Works involves specific tasks that must be packaged and completed before construction of the new detention facility is able to start. The tasks are site specific and the approach/goal is to maintain the project schedule and completion date.

The north end of the Queensboro Hall Municipal Parking Field, located at 80-25 126th Street Kew Gardens, NY 11415, is the proposed site for a new multi-story parking garage structure and community space (See Figure 1 below). Both functional usages are to be stand-alone and independent.

The New York City Department of Transportation (DOT) will continue to operate the at-grade municipal parking lot within the remaining footprint of the existing Queensboro Hall Municipal Parking Field during construction. This will require the Design-Builder (DB) to modify the remainder of the municipal lot as necessary, with the intent of utilizing as many of the existing 302 parking spaces as possible while maximizing parking lot capacity. The modified parking lot must be fully operational before the start of garage and community space construction.

A feasibility study was performed to identify the existing parking capacity and alternative approaches to maintain parking. Currently there are 302 parking spaces available at the Queensboro Hall Municipal Parking Field. The DB shall maximize the parking within the remaining Municipal parking lot throughout the duration of construction. The construction is to be phased with minimal downtime and disturbance to the parking lot and community use.

The existing entrance from 82nd Avenue into the parking lot is to remain. The entrance from 126th Street will require modification/relocation based on the DB proposed parking field solution. Any new curb cuts shall be approved by all regulatory agencies before existing parking field construction begins. The remaining parking field must have a dedicated stormwater management system the DB team is encouraged to utilize as much of the existing system as possible. The DB is required to develop engineered shoring plans that separate the new parking garage construction footprint from the remaining municipal parking field. Existing exterior lighting, security systems and NYC DOT equipment must be modified as necessary to accommodate new layout configurations. Existing exterior lighting, security systems and NYC DOT equipment not reused shall be handed over to the respective agencies having jurisdiction. The remaining modified parking field must have the required ADA accessible, electric vehicle charging spaces, and bicycle parking. The remaining parking field must comply with all NYC DOT standards and the standards of all local and state regulatory agencies.

1.1.2 QUEENS PARKING GARAGE DESIGN AND CONSTRUCTION CONCEPT

The new garage and community space for the Borough Based Detention center Program is to be built on a site currently occupied by the above-referenced surface parking lot. This site is art of the Queens County civic campus, and eventually will include a new Queens Borough Detention Facility that will be delivered through a separate Design-Build process. The

allowable floor area ratio (FAR) calculation for the entire site will ultimately include the garage, new detention facility, and the existing Queens County Criminal Court building. The remainder of the campus (not included in the FAR for this site) consists of the Queens Borough Hall, the Queens District Attorney's Office, a surface parking lot, and the New York City Family Justice Center. The garage building area must not exceed 202,800 GSF. The DB is to refer to the ULURP for the overall requirements for the site.

The garage must have a minimum capacity of 600 parking spaces including the ADA required spaces and 35 NYC DOT-approved universal electric charging station spaces. The garage must also provide motorcycle spaces, van spaces, and bicycle storage racks. The garage must have entrances from both 126th Street and 132nd Street. It must have dedicated stair(s) and elevator services, as well as independent stormwater management, fire protection, electrical, fire alarm, plumbing, and communications services. The garage must be designed and constructed in compliance with all local and state regulatory agency requirements and must be ADA compliant. The NYC DOT specifications are included in the appendix.

The Design Build team should consider opportunities to develop the roof of the garage to for compliance with energy reduction requirements. Opportunities may exist for green roof or blue roof systems. Public use of this roof is encouraged and the DB should consider creative solutions to allow for this.

1.1.3 COMMUNITY SPACE DESIGN AND CONSTRUCTION CONCEPT

The community space to be built out as unfinished tenant space with occupational classification as Business Use Group B, is to be designed and constructed as part of the new garage. The community space must be pronounced and read as visually distinct from the garage to allow for maximum presence and flexibility of use. Per the FEIS, the community space must consist of a minimum of 25,000 SF. The main entrance must be from 126th Street. If on multiple levels, the community space must have dedicated stair(s) and elevators services and code compliant access. The community space must have independent metering for all utilities.

Sustainability requirements for the community space, and garage as a whole, are detailed in Volume 2, Section 12. The Design-Builder is fully responsible for achieving LEED Gold Core + Shell Certification for the project under LL32-2016, as described in the MOEC letter. This certification is to be achieved by the Design-Builder independently from the LEED certification of the future Queens Detention Facility. The LEED boundary is to include the entire scope of Work by the Design-Builder. However, in accordance with USGBC regulations, the LEED certification will exclude the parking garage in the total gross square footage. The Design-Builder is also fully responsible for meeting the requirements of LL31-2016 for the entire building project. Please refer to Volume 2, Section 12.

1.1.4 SITE PLAN PHASING AND CONSIDERATIONS

A key consideration for the DB must be to ensure that the ongoing operations of the parking field remain uninterrupted during the construction of the new parking garage to the fullest extent possible. The parking lot is a key element for the community and access to the surrounding Queens Courthouse and civic buildings. The existing parking lot perimeter roadways are utilized for government parking, which needs to be taken into consideration during construction phasing. All road access must be maintained and uninterrupted during construction. A minimum 30'-0" landscape buffer is scheduled to be provided between the parking garage (south elevation) and the future detention facility. This buffer area is expected to be excavated for utility work concurrent with garage contract but will be available during construction of the garage and community space as a staging area prior to and after completion of utility work.

1.1.5 ENVIRONMENTAL/GEOTECHNICAL SUMMARY

For information about the existing site, environmental and geotechnical conditions, detailed reports are

included in the appendix. Environmental testing was performed for potentially hazardous site conditions. A full spectrum of geotechnical borings is included identifying conditions such as location of water table(s), bedrock and soil characteristics, soil contamination, etc.

The DB is required perform their own due diligence and obtain their own geotechnical and environmental independent testing as required for all regulatory agency submission and approvals.

1.1.6 ENHANCEMENTS

Possible enhancements to the Project may include the following:

1. License Plate Recognition (LPR) System
2. Completely Functional Electric Charging Stations for all Vehicle Parking Spaces
3. An Expedited Construction Schedule
4. Cathodic Protection of Steel and Concrete.
5. Painting of the Sprinkler Pipes and the Underside of the Floor Slabs
6. Artwork or Art Installation
7. Provisions for Future Adaptability of the parking garage structure
8. Parksmart Certification at any level

Introduction & Summary

1.1 Introduction

1.1.7 SITE PLAN

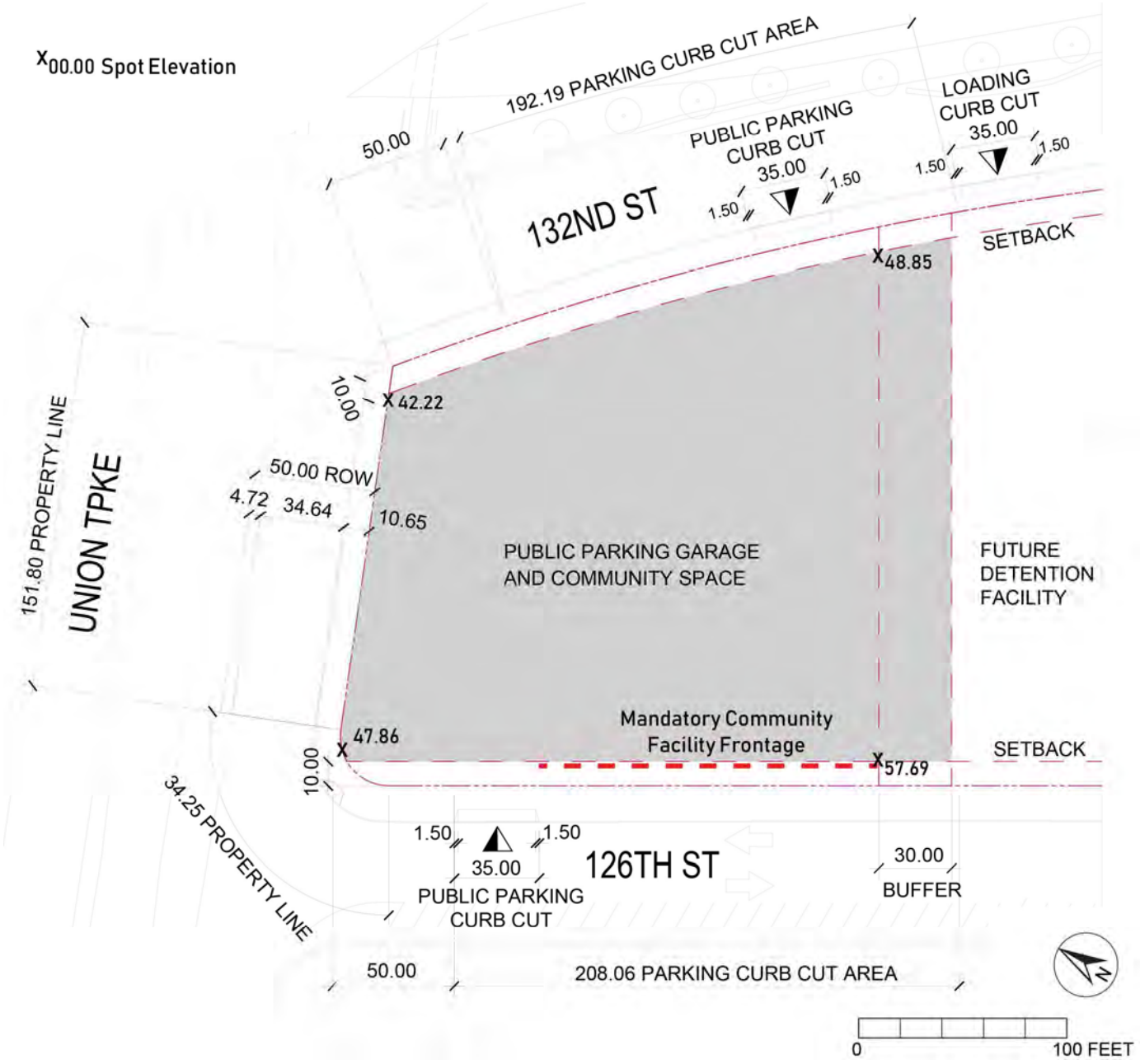

Figure 1

Architectural

2

Architectural

2.1 Codes & Standards

2.1.1 CODES AND STANDARDS

The Project must comply with all prevailing and applicable codes.
New York City:
NYC Building Code
NYC Energy Conservation Code
NYC Fire Code
Rules of the City of New York:
New York City Zoning Resolution (Text and Maps) PDC Guidelines

2.2 Design Criteria

2.2.1 BUILDING AND SITE CONFIGURATION

The Project is to be located at the western end of the overall lot. The garage building must fit completely within the lot line at the site's northwest corner along Union Turnpike, 132nd Street, 126th street and the 30' buffer. The dimension of the garage in the east to west direction must be no larger than as shown in Figure 1. The DB for the garage must complete all final curb street and sidewalk work for the three sides bordered by 126th street, Union Turnpike and 132nd street.

There will be a 30-foot-wide buffer, which will eventually serve as a publicly accessible area, connecting 126th and 132nd Streets, between the Parking Garage/Community Center and the future Detention Facility. The area of this 30-foot-wide buffer is included in the scope of this package and will be available for use by the Design-Builder for the first 365 calendar days of its Contract Duration beginning with Notice to Proceed. This buffer area will be turned over to a 3rd-party Contractor for excavation and installation of new a 48-inch diameter trunk water main running the full length of the buffer between tie-in points on both 126th Street and 132nd Street. See Figure 1 (attached) for the extents of the water main installation and proposed alignment and tie-in points. DDC will complete the design of the trunk water main alignment and will keep the Design-Builder informed of the planned scheduling and phasing of the water trunk main work. During the construction of the trunk water main, the Design-Builder will have limited vehicular access within the streets (see Figure 1) that accommodate the trunk water main alignment due to the trunk water main construction.

During this initial one year of occupancy of the 30-foot buffer, the Design-Builder will be responsible for preparing the 30-foot-wide buffer for installation of the 48-inch water main while maintaining the use of the at-grade parking area situated immediately south of the 30-foot-wide buffer as follows:

1. No permanent features related to the Design-Build of the Parking Garage will be permitted within this buffer zone.
2. Any temporary features (materials and/or equipment) in support of the Design-Build of the Parking Garage must be removed from the 30-foot buffer prior to the turnover of the buffer to the water main contractor.
3. The Design-Builder must remove/pull existing perimeter sheet piling associated with the existing at-grade parking lot adjacent to the buffer area as necessary and re-grade the 30-foot-wide buffer zone to provide for a constant elevation transition from the back of 126th Street sidewalk to the back of 132nd Street sidewalk.

4. A surface course of 12" of gravel/Recycled Concrete Aggregate (RCA) shall be provided within the buffer zone including applicable drainage and erosion control measures within the buffer zone.
5. The Design-Builder will be responsible for the design and installation of a transition between the south edge of the 30-foot buffer from the back of sidewalk at 126th Street to the back of sidewalk at 132nd Street. This transition (sheet pile, retaining wall, slope, etc.) must be engineered to accommodate the resulting change in grades between the buffer zone and adequately support the adjacent at-grade parking lot (which must maintain at least 140 parking spots).
6. In consideration of the 3rd-party trunk water main work that will be installed within the buffer zone adjacent to the new Parking Garage facility, the Design-Builder must provide any measures necessary to accommodate the installation of this 48-inch water with regard to protecting both the trunk water main and its own appurtenant structures from zones of influence related to excavation operations. For the purposes of addressing zones of influence, the Design-Builder will assume an excavation depth of 12 feet below finished grade for installation of the 48-inch main.

There is a significant slope traversing the site such that the grade elevation along 132nd Street (at the rear of the future building) is approximately ten feet lower than the grade along 126th Street (at the front). The approved Uniform Land Use Review Process (ULURP) application defines two vehicular garage entrance/exits; one at the northeast corner of the rear elevation of the building on 132nd Street, and the second on 126th Street. The pedestrian access to the community space is to be located on the 126th Street side.

The final requirements for the community facility are not included in this project. The project only requires a "Whitebox." The disposition of the space to be developed by others at a future date.

2.2.2 DESIGN CRITERIA

1. General:
    a. The design is to be sustainable, resilient, durable, and easily maintained.
    b. Innovation and creativity are encouraged.
    c. The DB is to employ the professional services of a Lighting Consultant.
    d. Refer to the NYC Zoning Resolution and the Uniform Land Use Review Procedure (ULURP) which describes a number of planning parameters which must be observed and defines the site entrances/curb cuts, Floor Area Ratio (FAR), and other requirements.
    e. Per DOT requirements, the two entrance driveways to the garage must be a minimum of 28 feet wide each. Entrance/exit area with parking control equipment must not exceed a slope of 3%.
    f. The exterior facade must be an attractive design (see Design Guidelines).
    g. Car headlights in the garage must be screened from the street. Lighting of the perimeter must be provided. Exterior Insulation and Finish Systems (EIFS) is NOT permitted. Design of exterior must foster the development of a cohesive character in the complex of civic and justice in the Queens Civic Center.
    h. The facade must be thought of as a design element that creates visual interest and complements the civic design role of the future detention facility and the civic campus as a whole. The façade must be resistant to corrosion from exterior weather and road generating elements (road salts etc.) on the exterior and interior side of the garage. Water must be drained away from the exterior wall system. No standing water is permitted. Façade and roof elements must allow for movement at connections in the parking structure. The facade must feature lighting for the facade itself and surrounding pavements. The exterior walls and the

walking surface around the project must have lighting that promotes visibility and safety.

i. Below grade levels which cannot achieve the required open areas must be mechanically ventilated (see mechanical section).

j. Pedestrian entrances and exits must be located to provide convenient access to major pedestrian destinations, as well as the future detention facility building. The entrances must be welcoming and a primary design consideration, not simply dictated by the layout of the parking spaces. Entries to the garage and community space must be prominently visible from major pedestrian routes.

k. Provide garage entrance control booths, gates and parking fee collection services as pursuant to DOT standards.

l. The building must conform to Local Law (LL) 92-94. The DB must give attention on providing creative solutions to sustainability requirements.

m. If a photovoltaic (PV) panel array is provided, it must be integrated into the design of the structure to present a cohesive architectural design. The PV system must meet all applicable codes and requirements.

n. Roof drainage must be located so that runoff does not have to cross any expansion joints to reach the drain. Drains must have sediment buckets that can be removed and emptied during regular maintenance. Areas on the main roof where snow may be piled must be identified and/or snow chutes should be considered.

o. A comprehensive signage and wayfinding system must be provided to provide ease of use and circulation within the garage and parking lot. The DB must employ the professional services of a Graphic Arts consultant. Consistency in signage, graphics, interior features, and lighting can have a profound effect on spatial orientation for both the driver and pedestrian. Signs must be provided for entry/exits, vehicular wayfinding, pedestrian wayfinding, stairs/elevators/level indicators, accessibility, regulatory signs, and height clearance. The exterior walls must have illuminated identification signage for the parking facility at each of the two entrance/exits. A dynamic signage car counting system must be provided.

p. If cars are driving on top of the community space, provisions must be made to eliminate noise and vibration into the community space while ensuring a watertight enclosure.

q. Separate utility systems are required for the garage and Community space. All utilities will be separately metered for the garage and the community space.

2. Garage:

a. 600 parking spaces total (minimum) are required.

b. 5% of the total number of spaces must include electric vehicle charging stations. The charging machines must be for universal use by any vehicle. An additional 15% of the total parking spaces must be furnished with the necessary infrastructure (conduits, stub ups, floor plates and wiring) for the installation of future electric charging stations. The ultimate total of charging stations will be 20% in conformance with Local Law (LL) 130. The increased size of these spaces is to comply with applicable standards.

c. The DB must protect pedestrians and wheelchair users' path of movement from parked vehicles to and at elevator waiting areas, payment machines, exits, and the management office from vehicular impact by the careful and strategic placement of devices and installations such as bollards, railings, and curbs.

d. The ability to re-purpose the garage in the future should be considered but is not required.

e. Provide two passenger elevators; both of which must be accessible. (See Vertical Transportation section).

f. The DB team is encouraged to consider how to safeguard the levels of garage not exposed directly

to the elements and on the levels which are exposed to the elements.

g. The garage must include a 120 SF management office for 4-5 staff members adjacent to traffic control. DB must provide heating and cooling for this space. The office must include lighting, and flooring and be outfitted with telephone and data service.

h. One unisex restroom with a water closet and lavatory, with suitable finishes to allow for sanitary conditions. The rest room must be provided adjacent to the management office. A janitor's closet with slop sink, shelving, and hooks, must be located in the same area.

i. Two, 100 SF storage rooms must be provided for materials or equipment

j. "Blue Light" stations for distress calls must be provided on each garage level near entrances and elevators and be clearly visible.

3. Community Space:

a. The 25,000 SF community space must have a distinct character from the garage and be easily recognizable from the street.

b. The first floor must front on 126th Street, occupying the entire frontage except that portion required for the garage entrance/exit at the southwest corner.

c. The exterior facing walls of the community space must present a distinctive appearance with a prominent entrance that provides weather protection. The exterior walls must conform to the parameters of LL 31.

d. The DB is to provide a white box finish including two interior egress stairs and two elevators if the community space occupies multiple floors

e. The community space is to be fit-out through a separate contract once an end user is identified. The unfinished space must have a complete weather-tight enclosure including floors, walls, and roof.

f. Storm lines are not to traverse the community space.

4. Furniture Fixtures and Equipment Criteria:

a. The purpose of this section is to set out high-level parameters for Furniture, Fixtures, and Equipment (FF&E) in order to assist the City and the Design-Build teams (DB) the procurement and design requirements for the FF&E.

b. FF&E Procurement Categories. There are three potential categories of FF&E:

CFCI = Contractor furnished, contractor installed

OFCI = Owner furnished, contractor installed

OFOI = Owner furnished, owner installed

To assist the DB team in a broad understanding of the City's approach to FF&E by equipment type, below is at table of the FFE requirements.

FFE Table

Space Name	CFCI	OFCI	OFOI	Item Name	Quantity	ALLOWANCE
Office Space	X			Phone	2	
	X			6' x 8' Modular Workstation	2	
	X			Chair - Task	2	
	X			Chair - Stackable Guest Chair	4	
	X			Computer/Monitor/Keyboard	2	X
	X			Phone	2	X
	X			Black/White Board 4' x 4'	1	
	X			Network Printer	1	X
	X			Monitor Arms	2	X
	X			Task Lighting	2	
	X			File Cabinets	2	
	X			Small Garbage/Recycling bins	2	
	X			Safe	1	
	X			Lockers	4	
Restroom	X			Mirror	1	
	X			Soap dispenser	1	
	X			Hand towel dispenser/air-dryer	1	
	X			Trash Receptacle	1	
	X			Toilet seat cover & toilet paper dispenser	1	
	X			ADA Grab Bar	1	
Storage Room	X			Fixed shelving (6' min.)	1	
	X			Lockable Cabinet	1	
Janitor's Closet	X			Fixed shelving (6' min.)	1	
	X			Mop/Broom hangers secure to wall	1	
			X	Biohazard kit	1	
			X	Mop Bucket	1	
			X	Wet Floor Codes	1	
Misc. Equipment	X			Commerical grade snow blower	1	X
	X			Cones/Barricades	20	
Security Booths	X			Stools (chairs)	2	
	X			Small Garbage/Recycling bins	2	

Structural

3

Structural

3.1 Introduction

This chapter describes the structural basis of design of the proposed building. Recommendations affecting structural systems and materials to be used in construction are provided. Special considerations, such as vibration monitoring, dewatering, support of excavation and preconstruction planning must be considered.

3.2. CODES AND STANDARDS

The Parking Garage, Community Space, and Temporary Parking must be designed in strict compliance with rules, regulations, standards, codes, ordinances, and laws of local and state governments, and other authorities with lawful jurisdiction.

(1) The structural system shall be designed in strict compliance with the latest New York City Building Code, its amendments, references including all AISC, ACI and all other applicable standards.

(2) Both foundation and superstructure systems shall be designed to meet all structural integrity, strength, serviceability and appearance criteria as defined by code. Serviceability criteria includes deflections, drift, vibrations, and progressive collapse as applicable. The design sall ensure durability by means of crack control, resistance to corrosion, water tightness, fire-resistance etc.

3.3. STRUCTURAL DESIGN CONSIDERATIONS

1.General Considerations

(a) Preliminary geotechnical testing has been conducted by the New York City Department of Design and Construction. This testing is for preliminary reference only. All required testing for DOB approval must be provided by the DB

(b) Existing topography and site utilities are available for preliminary reference. Utilities and underground conditions may vary due to the site's development history. Extreme care is warranted in the handling of underground utilities through all phases of the project.

(c) The preliminary geotechnical testing information can be found in Volume 5 of this document.

3.4 SPECIAL DESIGN CONSIDERATIONS

The DB team is encouraged to consider the following project enhancements for longevity.

1. For slabs on grade: The Consultant shall design, detail, and adequately specify all new slabs on grade to minimize or eliminate cracking and curling.
2. Structural Synthetic Macro-Fibers should be used as a substitute for welded wire fabric reinforcement to minimize cracking in concrete from both plastic shrinkage and temperature shrinkage.
3. The design shall meet the requirements of ACI 360 R, Design of Slabs on Grade, and other applicable guidelines.
4. Concrete that can be exposed to the elements shall have an integral water proofing compound added to it. Manufacturer shall issue a written warranty on all integral waterproofing compounds.
5. Joints: All expansion, contraction and construction joints shall be designed and located by the structural engineer in coordination with the architects to ensure their effectiveness in controlling cracks and working effectively.
6. Epoxy coated reinforcing bars shall be specified for all concrete foundations and other structural elements subject to water and chloride penetration.
7. The use of levelling plates between the foundations and column shall be avoided.

3.5. SUPERSTRUCTURE DESIGN CONSIDERATIONS

Superstructure consists of multi-level parking levels and with community space at the ground floor and first level above grade. The DB team should use care and consideration of the community space thermal and acoustical isolation from the garage.

1. DESIGN LOADS

a. Load Requirements

All dead and live Load requirements shall be calculated based on the latest version of NYC Building Code and all loads shall be clearly tabulated on the design documents.

1. Snow Load
   a. Consideration should be given to how snow is stored and how runoff is handled.
   b. Barrier Load
      i. Vehicle barrier systems must comply with the NYC Building Code.
      ii. Consider how the barrier system and exterior cladding may interact.

3.6. OTHER CONSIDERATIONS

3.6.1Durability

1. The anticipated building life span is a minimum of 50 years.
2. Concrete exposed to salt and/or water must be protected against corrosive conditions. A topping slab should be used on top of the structural slab to protect the underlying structure from salts and other contaminants.
3. Addition of the topping slab would be considered an enhancement to the project.
4. Admixtures containing chlorides, fluorides, aluminum, zinc, or nitrates are not recommended.
5. Coordination of drains, expansion joints, blockouts, and embedded items is necessary properly detail such structures
6. All items that require to be anchored to the structure (handrails, posts, signs etc.) should be attached by post-drilled anchors (and not be embedded or attached with sleeves into the structure during construction).

3.7 PRE-CONSTRUCTION PLANNING

3.7.1PRE-CONSTRUCTION PLAN

1. Prior to the start of Construction, the DB must provide a pre-construction plan for the erection of the garage building. The plan must address the following items:
    a. Determining site access, erection direction and sequencing.
    b. Identifying hazards.
    c. Determining size and weight limitations.
    d. Storage at site.
    e. Erection sequence planning.
    f. Coordination between production delivery and erection schedule.
    g. Equipment selection.
    h. Developing an erection safety plan.
    i. Field layout and verification.
    j. Special handling requirements.
    k. Special lifting hardware.
    l. Interacting with other trades.

2. The Erection Plan must, as a minimum, describe the following items:

    a. Crane locations and safe setting distances with sufficient clearances.

b. The manner in which each element is to be safely handled, secured, braced or otherwise tied off before unhooking from the crane.

c. The minimum number of bolted or welded connections required for the temporary stability of the partially completed structure during the erection process and at what point all back up connections are required to be made.

d. Any temporary structural system bracing (in addition to connections) necessary to ensure the stability of the partially completed structure during the erection process.

e. All load path requirements for gravity loads (e.g. bearing pads, shimming, grouting) required to resist intermediate gravity loads developed during the erection process, considering the maximum load capacity of any vertical load- bearing element prior to grout placement and cure.

f. Provisions to address project specific situations that could make compliance verification more difficult (e.g. tagging system for potentially hidden, obscured, or submerged areas).

g. Sequence of erection.

3.7.2DEWATERING

1. The DB must design, furnish, operate, maintain, and remove temporary dewatering systems to control groundwater and surface water to maintain stable, undisturbed subgrades, and permit work to be performed under dry and stable conditions. Work to be done as part of dewatering includes, but is not limited to:

a. Lower the groundwater level.
b. Prevent surface water from entering the excavation during construction.
c. Implement erosion control measures for disposing of discharge water.
d. Provide groundwater recharging systems as specified and as indicated.
e. Provide and monitor observation wells

2. DB must be responsible for obtaining discharge permits and all permits required for dewatering operations.

Structural

3.7.3SUPPORT OF EXCAVATION

1. A Support of Excavation system will be required for the project or building boundaries including Union Turnpike, 126th Street and 132nd Street on three sides

and adjacent to the temporary parking area. If deemed feasible, the DB may design the support of excavation to be permanent and to serve dual purposes i.e., to support the excavation of the basement as well as to act as the final retaining basement wall.

3.7.4 VIBRATION AND NOISE MONITORING

1. DB must hire the services of Vibration Consulting Firm.
2. Furnish specified instrumentation to be installed, operated and interpreted by the vibration consulting firm's personnel.
3. Noise monitoring stations must be installed at a minimum of three (3) locations distributed across the site. Mitigation measures must be considered to reduce the noise level if the noise level is not per code requirements.
4. Take initial background readings of all noise stations one week before construction activity in the area begins.
5. Monitor vibrations and record the entire particle velocity wave train, not just peak velocities. Obtain accurate, legible seismometer records of monitored vibrations.
6. Perform all vibration-inducing operations so that vibrations reaching adjacent structures are within specified limits.

3.7.5 PRE-CONSTRUCTION SURVEY

1. Prior to the commencement of all construction activity at the sites, the DB must engage the services of a firm capable of furnishing a New York State licensed Professional Engineer to oversee the performance of a pre-construction building condition survey of the surrounding existing buildings, infrastructure, subway tunnel, and any other surrounding structure that could be damaged during construction operations.
    a. This survey will document the interior and/or exterior pre-construction conditions of structures within a 100-ft radius of the construction site to establish a pre-construction baseline condition.
    b. Details must not be limited to areas showing pre-existing damage.
    c. If a structure is designated as fragile, historic, or sensitive to vibrations by the DB, additional measures must be employed to monitor and protect said structures.
    d. Additional post - condition survey(s) must be required after completion of work, and at locations and times during construction. The DB must identify sensitive structures which must be monitored.

Mechanical

4

Mechanical

4.1 Introduction

The Heating, Ventilation, & Air Conditioning (HVAC) systems must be designed and installed to provide adequate ventilation, heating, and cooling of all spaces to meet or exceed the prevailing, applicable codes and standards. The systems shall provide the required comfort conditions for all spaces and shall be designed to minimize their impact on the natural and physical environment through the use of energy efficient mechanical equipment, optimization of system design such as piping and ductwork, optimization of available resources and must exceed or be in compliance with the latest energy codes requirements.

The mechanical systems must be designed to ensure continual operation. Water, glycol, and all other fluids used in mechanical systems must be treated to prevent corrosion, algae growth, buildup of deposits, disease, and bacteria, and to prolong equipment life.

Mechanical systems must be designed to provide seismic protection and vibration isolation to the building structure and other components of the building structure from, earthquakes, equipment vibrations and noise transmission.

Mechanical

4.2 Codes & Standards

The Mechanical Equipment, Materials and systems must be designed in strict compliance with rules, regulations, standards, codes, ordinances, and laws of local and state governments, and other authorities with lawful jurisdiction. Mechanical Equipment, Materials and Systems must comply with, but are not limited to, the latest following codes and standards:

- The City of New York Building Code (NYCBC)
- The City of New York Mechanical Code (NYCMC)
- The City of New York Fuel Gas Code (NYCFGC)
- The City of New York Energy Conservation Code (NYCECC)
- City of New York Local Rules and Regulations.
- ASHRAE Handbooks and Standards
- NFPA Standards

Mechanical

4.3 Design Considerations

4.3.1 BUILDING HVAC LOAD CALCULATIONS

Computerized heat gain and loss calculations must be performed in accordance with the current edition of the ASHRAE Handbook of Fundamentals. The load calculations must be in accordance with ASHRAE non-residential Cooling and Heating Load Calculations.

4.3.2 ENERGY USE AND LEED NC GUIDELINES

With recent passage of numerous Local Laws related to Energy use and Sustainability, the DB team is encouraged to carefully review those applicable and be creative in their response to the requirements.

1. Calculations must be submitted for review in substantiation of the design selected.

4.3.3 Other considerations

1. Exhaust Duct Locations
   a. Exhaust ducts must be located as per the NYCBC and NYCMC requirements and taking into consideration potential bioterrorism.
   b. Location of exhaust louvers on the façade is under the jurisdiction of the NYC Public Design Commission. The DB team is encouraged to carefully consider placement and visual impact on the surrounding area.
2. Maintenance and Cleaning
   a. All equipment and installations should be located with consideration for maintenance access
   b. Consideration in locating access should consider the frequency of maintenance required.

i) HVAC EQUIPMENT AND ACCESSORIES

(1) HVAC System – General

1. When choosing systems, The DB team should consider;
   i. Life-cycle cost-
   ii. Ease of maintenance,
   iii. Longevity
   iv. Availability of parts and service

Mechanical

4.4 Other Considerations

2. Air Filtration
   a. A filter system must be located in the air-handling equipment. Construction/temporary filters must be provided in all air-handling equipment being installed. Final filters must not be installed until all testing, balancing, commissioning, and cleaning of the buildings and the HVAC equipment / ductwork has been completed. In accordance with the requirements in the specifications. In addition, a 1-year supply of replacement filters (Pre-filters and Final filters) for all air-handling systems must be provided and turned over to the owner prior to the beneficial occupancy date

3. Fire and Fire/Smoke Dampers
   a. Fire and Fire smoke dampers access should be unencumbered with interference from other installations that may impede the ability to routinely check and clean the dampers and provide other necessary. The DB must consider layout of piping and conduit and other equipment during construction to provide the proper access.

4. Diffusers, Grilles, and Registers
   a. Noise must be considered and minimized as appropriate to the use of the space.

5. Access Panels
   a. Access panels/doors must be provided and sized as required for valves, fan coils, dampers, fire dampers, fire/smoke dampers, and all devices requiring maintenance, cleaning, repair, and access to the HVAC system. The minimum size of access panels must be 24 inches by 24 inches, and the access panels must be coordinated with the architectural ceiling plan.

6. Commissioning of HVAC System and Controls
   a. Commissioning of HVAC systems and controls must be in accordance with the Commissioning of HVAC Systems Guide Specification and LEED-NC requirements.
   b. List of equipment to be commissioned, must include, but must not be limited to the following:
      1) Energy recovery, gas fired air handling units with D/X cooling coils, Enthalpy wheel, supply/ exhaust fans, dampers, air flow stations, Carbon dioxide monitoring system and economizer system.
      2) Variable air volume (VAV) boxes with electric heating coils.
      3) Low and Medium pressure duct-work including room balancing.
      4) Parking garage supply and exhaust fans and ductwork system.
      5) CO monitoring system for parking garage.
      6) Split-system air handling units and duct-work.
      7) Controls for all systems including Building Management system Integration.

Electrical

5

Electrical

5.1 Introduction

The power distribution system must be designed and installed to support the parking garage, community space and temporary parking lot and meet or exceed all applicable codes and standards.

To accommodate the needs of each space within the scope of the project, it is important that the new power distribution system be designed for each specific area. The permanent garage and community space must be designed with the focus on security, resiliency, operations, maintenance, and long-term reliability. The community space must offer flexibility to accommodate future use and changing needs of the users over time. During construction, sufficient power must be provided to support the needs of the temporary parking lot.

Electrical

5.2 Codes & Standards

The Electrical systems must be designed in strict compliance with rules, regulations, standards, codes, ordinances, and laws of local and state governments, and other authorities with lawful jurisdiction. Electrical systems must comply with, but are not limited to, the following codes and standards:

- National Fire Protection Association (NFPA) 70: National Electrical Code (NEC)
- New York City Electrical Code (NYCECC)
- New York City Building Code
- New York City Fire Code
- National Fire Protection Association (NFPA) Standards
- All applicable Local Laws

Electrical

5.3 Design Criteria

5.3.1 TEMPORARY PARKING LOT

1. The DB must provide temporary power to temporary parking lot. The main distribution power equipment for the temporary parking facility must be located in the garage. Power will be required for site lighting, parking and revenue control system and cashier control booth.

5.3.2 PARKING GARAGE

1. The garage and community space must be metered separately

5.3.3 COMMUNITY SPACE

1. The community space will be a un finish with dedicated utility space as required by code

5.3.4 PROJECT SITE

1. Electrical provisions must be provided for the project site to cover all site and landscape lighting. Electrical loads will also include provisions for security cameras and other site requirements for the Temporary Parking lot.

5.3.5 ELECTRICAL POWER MONITORING SYSTEM

1. All major electrical equipment must be monitored. The electrical power monitoring system must include at a minimum, volt, ampere, kilovolt-ampere, kilowatt, kVAr, power factor, and hertz for both single and three-phase equipment.
2. Monitoring must be available in real time, and historical data must be stored and be available for a minimum of 30 days.
3. Power quality data related to harmonic content must be collected for current, voltage and total distortion up to the 30th harmonic.

5.3.6 SECURITY SYSTEM

1. Provide 120 Volt power supply, low voltage power, UPS and battery backup for the Security System. See also part 9 Security Systems

5.3.7 GROUNDING AND BONDING

5.3.7 GROUNDING AND BONDING

1. Provide Ground Test Wells

5.3.8 LABELING

1. All electrical material and equipment must be listed and labeled by UL or another nationally recognized testing laboratory.

5.3.9 PHOTOVOLTAIC ANALYSIS

1. A solar photovoltaic rooftop system may be provided to the garage roof

5.3.10 BUILDING AND EXTERIOR LIGHTING

1. Energy efficiency must be a prime consideration for all lighting applications. Lamp and fixture types and construction will be selected to achieve the highest efficiency consistent with the application.
2. Lighting for exterior security will be designed for high contrast suitable for quality video recording. All exterior lighting must be designed to avoid discomfort and minimize glare with respect to adjacent properties.
3. Lighting must be designed to illuminate all areas, including recesses formed by buildings and other structures.

5.3.11 BUILDING LIGHTING POWER DENSITY

1. Comply with all applicable Local Laws

5.3.12 LIGHTING FIXTURE TYPES

1. The DB must consider the cost-effectiveness of fixtures with integral lighting controls and must examine the NYCECC thoroughly for all lighting requirements, where applicable.
2. Consideration should be given to ease of maintenance and minimize number of types and lamping requirements.

5.3.13 EMERGENCY POWER REQUIREMENTS

1. Emergency lighting shall be provided utilizing centralized battery banks.
2. Emergency back-up power for life-safety systems
3. Provide back-up power sources of the appropriate voltage and amperage capacity to sustain the functionality of parking garage camera, intercom, intrusion alarm, card reader, gate arm operation, and facility management and security systems for 24-hours in the event of a mains power outage.

5.3.14 LIGHT FIXTURES AND CONTROLS SYSTEMS DESIGN OBJECTIVES

1. Light fixtures and associated controls to comply with the NYCECC.

5.3.15 LIGHTNING PROTECTION SYSTEM

1. Master Label Lightning protection system must be provided

5.3.16 FIRE ALARM

1. The facility will have fully addressable Fire Alarm System that will serve the community building and garage as required by NYC Fire Code and other applicable codes

5.3.17 COMMISSIONING

1. Commissioning must be performed on all systems Lighting controls, fire alarm system, etc. See Article 11 LEED and Sustainability in this document (Vol 3) and Vol 2.

Plumbing

6

Plumbing

6.1 Introduction

Plumbing systems must be designed to minimize impacts on the natural and physical environment, through energy efficiency and optimization of resource use. Component selection, system design, and installation of the plumbing systems must allow for future changes without major disruption to operation or alteration of the infrastructure. All systems are to be commissioned. The system must be designed such that maintenance of areas can be isolated to prevent shut down entire area of floors. The plumbing systems must be designed to ensure continual operation. Vibrating equipment must have vibration isolation to minimize noise and vibration through the structure or other components of the facility. No plastic pipes and fittings. Services are to be provided to accommodate any possible configuration.

6.2 Codes & Standards

The plumbing systems must be designed in strict compliance with all prevailing rules, regulations, standards, codes, ordinances, and laws of local and state governments, and other authorities with lawful jurisdiction. Plumbing systems must comply with, but not be limited to the following codes and standards:

- New York City Building Code, (NYC BC).
- New York City Plumbing, (NYC PC).
- New York City Fuel Gas Code, (NYC FGC).
- New York City Energy Conservation Code, (NYC ECC).
- Occupational safety and Health Administration (OSHA).
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
- American Society of Mechanical Engineers (ASME).
- American National Standards Institute (ANSI).
- American Society of Sanitary Engineering (ASSE).
- American Society of Plumbing Engineers (ASPE).
- Plumbing & Drainage Institute Standards (PDI).
- Americans with Disabilities Act (ADA).
- New York City Department of Buildings (NYC DOB).
- New York City Department of Environmental Protection (NYC DEP).
- New York City Fire Department (FDNY).

Any additional requirements by the NYC DOB and all other authorities having jurisdiction must be incorporated into the design as they are received and identified.

Plumbing

6.3 Design Criteria

6.3.1 PARKING GARAGE

1. Potable Water System
    a. The DB must provide a domestic water system service with backflow preventer devices such as Reduced Pressure Zone (RPZ) assemblies in full compliance with NYC DEP Cross Connection Control Unit's requirements. The services must be provided with separate meters and appurtenances for the garage and community space as required per NYC DEP. All branches of the domestic water distribution for service to non-potable equipment or systems must be equipped with secondary backflow preventers (e.g. make-up water for mechanical systems) as required by NYC DOB. Potable water is to serve all plumbing fixtures, hot water heaters, hose bibs, and wall hydrants. Fixtures include but are not limited to water closets, lavatories and janitor sinks.
    b. The DB must request hydrant flow tests from the DEP to confirm available capacity and pressure of the existing water infrastructure. The hydrant flow tests used for calculations and sizing must not be more than a year old.
    c. The potable water branch piping must be sized to maintain the manufacturers recommended pressures at the most hydraulically remote equipment and fixtures. Zoning of the water distribution system and pressure reducing valves (PRV) must be used where necessary to make sure water pressures do not exceed code regulated limits while maintaining adequate pressure.
    d. Water velocity in the potable water distribution piping must not exceed best practices and code. Provisions must be made to arrest hydraulic shock as per PDI standards. System capacities for potable water must be based on fixture unit values, with appropriate factors and actual equipment demands as prescribed in the code.
    e. Provide domestic water sub-meters to monitor and measure the total potable cold and hot water use. Additional sub-metering of plumbing fixtures and other water uses to be included as indicated by LEED. See the Sustainability Basis of Design section.
2. Non-Potable Water System
    a. The non-potable water system must provide service for all HVAC requirements through a separate backflow preventer to provide a non-potable cold water supply main. The DB must size the non-potable water piping per manufacturer's recommendations, best practices and code so that adequate pressure is supplied at the most hydraulically remote HVAC equipment. Water velocity in the non-potable water distribution piping must not exceed best practices, code, or the manufacturer's recommendations. Additionally, provisions must be made to arrest hydraulic shock based on PDI standards. System capacities for non-potable water should be based on actual equipment demands. Non-potable water piping must be clearly distinguishable from potable water as per code and labeled.

6.3 Design Criteria

3. Potable Hot Water System

    a. The DB must design and install the hot water supply to provide adequate amounts of water at the prescribed temperature to all fixtures and equipment at all times of use. Fixtures include, but are not limited to, lavatories and janitor sinks. The system must maintain a velocity not to exceed best practices, code, or the manufacturer's recommendations. All hot water supply piping must be insulated per NYC ECC. The hot water piping must be sized to maintain the manufacturers recommended pressures at the most hydraulically remote equipment and fixtures. The hot water system must be balanced with the cold-water system and the zoning matched to avoid pressure imbalances. Provisions must be made to arrest water hammer based on PDI standards. System capacities for hot water must be based on fixture unit values with appropriate factors of actual equipment demands. Hot water must be stored and delivered at code prescribed temperatures and not to exceed the temperature limits set for specific types of use. The DB must design the hot water circulation system for a maximum velocity not to exceed best practices and code to prevent pipe erosion as well as to enable hot water to be delivered quickly to all fixtures. The location of mixing valves must be as per code requirements. Temperature maintenance must be provided for hot and tempered water piping as per NYC ECC. Only code approved the methods of temperature maintenance may be used.

4. Sanitary Waste and Vent Systems

    a. The DB must provide sanitary drainage by gravity wherever it is feasible. Drainage for fixtures include, but are not limited to, water closets, lavatories and janitor sinks. Fixtures and floor drains located below the gravity sewer level must be connected to a duplex sewage ejector system for pumping to the gravity sewer. Ejector pumps must connect on the street side of the building house trap as per code. Sanitary waste piping must be sized and sloped per code and located under floor with vertical sanitary and vent risers located in chases as required. Floor drains to be provided in toilet rooms and mechanical equipment rooms. These floor drains to be connected to the sanitary system of the building.

    b. Provide sump pumps for hydraulic elevator pits indirectly connected to the plumbing system. An automatic shutdown system must be installed on the sump pumps to prevent accidental discharge of oil-laden waste water into the sanitary system. The venting system's primary design consideration must be the proper ventilation of the piping system along with protection of the plumbing fixture traps. The main vent stack(s) must be designed to remove the expected air with pressure loss as per code and industry best practices.

Plumbing

6.3 Design Criteria

5. Stormwater System
    a. The DB must provide a complete gravity storm water drainage system for the building. Area, floor, roof and trench drains in the parking area are to drain by gravity to the storm drainage system. Pipe size, pitch and material should follow the latest NYC BC and NYC DEP requirements. The DB must coordinate the location of drains and drainage piping with all building systems and obtain approval prior to construction.
6. Natural Gas System
    a. The DB must provide natural gas as required for equipment throughout the building. Contact the natural gas utility and coordinate the installation of a new natural gas service. Coordination with the utility company will include but not be limited to the service size, location, service valve, meter assembly, and service access. Separate meters are required for the garage and community space. The DB will get the utility's approval and submit any required load letters. If required, a gas pressure booster or gas pressure regulator must be installed to service mechanical equipment. Local gas pressure regulators must be placed near equipment to provide low pressure gas for the equipment. All gas pressure regulators installed within the building must be properly vented to the atmosphere as per code.

6.3.2 FUTURE COMMUNITY SPACE

1. Potable Water System
    a. The DB must provide a separate dedicated domestic water system service and meter with backflow preventer devices such as Reduced Pressure Zone (RPZ) assemblies in full compliance with NYC DEP Cross Connection Control Unit's requirements. The services must be provided with meters and appurtenances as required per NYC DEP.
    b. A dedicated service on a separate street main from the garage requires the DB to request separate hydrant flow tests from the DEP to confirm available capacity and pressure of the existing water infrastructure. The hydrant flow tests used for calculations and sizing must not be more than a year old.
    c. The DB must provide a capped main from the dedicated domestic water service to the community space. The dedicated main must be sized to meet the space's potential domestic water needs and to meet code and manufacture requirements for water distribution

Plumbing

6.4 Other Considerations

6.4.1 SUSTAINABLE DESIGN FEATURES

The DB team must incorporate sustainable design features into the systems. Refer to section on LEED and Sustainability for balance of information. Plumbing fixtures must meet NYC BC, NYC ECC, and utilize LEED strategies to reduce water consumption to the extent feasible

6.4.2 COMMISSIONING

The DB must coordinate with the Commissioning Authority as needed to pursue third-party sustainability certification and assure that the building systems have been installed in the prescribed manner and operate within the performance guidelines.

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Fire Protection

7

Fire Protection

7.1 Introduction

The DB will be responsible for providing all fire protection systems described in this Basis of Design (BOD. The DB's design must use the BOD, Performance Specifications, and all other documents from the Department of Transportation (DOT) to ultimately determine the fire protection systems applicable to all spaces. The f ire protection systems must be designed to ensure immediate use and activation during an emergency. Redundancy of system equipment must be provided including power and water supplies. Equipment must be protected against seismic events in accordance with NYC BC and NFPA codes and standards. Design drawings and calculations for all systems including, but not limited to, wet standpipe, wet sprinkler, and dry systems must be submitted for approval during the DB's design phase. The DB must design the fire protection and life safety systems in accordance with NYCBC and local standards in order to provide the protection of life and property and facilitate the response of fire department personnel. The fire protection systems must be designed to ensure immediate use and activation during an emergency.

7.2 Codes & Standards

The Fire Protection systems must be designed in strict compliance with prevailing rules, regulations, standards, codes, ordinances, and laws of local and state governments, and other authorities with lawful jurisdiction. Fire Protection systems must comply with, but not be limited to, the following codes and standards:

- New York City Building Code (NYCBC).
- New York City Fire Code (NYCFC)
- New York City Department of Buildings (DOB)
- New York City Department of Environmental Protection (DEP)
- New York City Fire Department (FDNY)

Any additional requirements by the NYC DOB, FDNY, and all other authorities having jurisdiction must be incorporated into the design as they are received and identified.

All materials and equipment must be the standard catalogued product of manufacturers regularly engaged in production of such materials and equipment and must be the manufacturer's latest standard design. All ire protection components, equipment, materials, placement of all devices and ratings must comply with the requirements of, but not be limited to:

- Underwriters Laboratories, Inc. (UL)
- Factory Mutual (FM)
- American Society for Testing and Materials (ASTM)
- National Electric Manufacturers Association (NEMA)
- American National Standards Institute (ANSI)
- National Fire Protection Association (NFPA)

Fire Protection

7.3 Design Criteria

7.3.1 PARKING GARAGE

1. Fire Protection Service & Supply
    a. The system must consist of (2) independent fire water supplies with backflow preventers (DDCA) in full compliance with NYC DEP Cross Connection Unit's requirements, including fire pump (if determined to be required from the hydraulic calculations and hydrant flow test), fire department connections, cross-connection, risers, control valves, hose valves, roof manifold, and other essentials to the system. Fire department connections (FDC) must be provided as per NYCBC and other applicable codes. The FDC piping must be provided with a check valve and ball-drip valve for indirect drainage to sanitary system.
    b. The DB must obtain a Hydrant Flow test Per NYC DEP requirements. The test must be done within one year of the formal NYC DOB issuance. Fire Department Connections for the automatic sprinkler system and standpipe system must be provided in the locations approved by the FDNY.
    c. Fire pumps, if deemed necessary from hydraulic calculations must be provided with an alternate supply of electric power. An ATS must be provided to switch from primary to secondary power. The fire pump, driver, and controller must be protected, in accordance with NFPA 20, against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism, and other adverse conditions. Fire-pump rooms must be separated from all other areas of the building by 2-hour fire-rated construction. Temperature of the f fire-pump room must never be less than the minimum recommended by the f fire-pump manufacturer. The location and access to the f fire-pump room must be pre-planned with the fire department.

2. Fire Standpipe System

   a. The building must be provided with a Class I standpipe system as allowed by NYCBC. Each required egress stairwell will require a standpipe riser with Class I Hose Valves at each landing. Each standpipe riser must be provided with a control valve and all control valves must be electronically monitored in the open position. The DB must coordinate the valve locations with other trades to confirm appropriate clearances. Hose valves must be located on floors so that travel distance to a hose valve from any remote point does not exceed NYC BC requirements of hose length and spray. The distances from a hose connection must be measured along the path of travel.

   b. The fire standpipe system must be hydraulically designed in order to provide a minimum residual pressure of 65 psi at most remote valve. Pipe sizing for the standpipe system must be based on hydraulic calculations, with input from the local fire department on the responding fire apparatus pumping capacity. The system is estimated to operate at a working pressure higher than the standard 175 psi but not higher than 250 psi. Pressure restricting devices must be installed at hose valves when the pressure exceeds 100 psi.

3. Fire Sprinkler System

   a. The system must be designed for the applicable occupancies where required by the building code. Above ground open parking areas do not require fire sprinklers unless stated otherwise by code. See the "Other Considerations" section for possible methods of protecting enclosed and below ground parking. Pipe sizing for the sprinkler system must be based on hydraulic calculations. Sprinklers must be used in accordance with their listed spacing limitations.

   b. Sprinklers must be new, quick-response type, where permitted per code and their listing. A stock of spare sprinklers must be provided in accordance with NFPA 13 and the NYC Fire Code. Sprinklers must be provided with sprinkler guards in areas subject to mechanical damage. Elevator hoistways must be protected in accordance with NFPA 13 and sprinkler heads must be omitted from elevator machine rooms per NYC BC.

   c. All valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressure, and waterflow switches on all sprinkler systems must be electrically supervised by a listed fire alarm control unit. Control valves must be locked in the open position, and electronically supervised so that an audible and visual alarm sounds at a constantly attended location when the valve is shut.

Fire Protection

7.3 Design Criteria

7.3.2 COMMUNITY SPACE

1. Fire Protection Service & Supply

    a. The DB must provide a separate dedicated fire service for the community space, with a separate meter. The system must consist of independent fire water street supplies with backflow preventers (DDCA) in full compliance with NYC DEP Cross Connection Unit's requirements, including sprinkler booster pump if determined to be required from the hydraulic calculations and hydrant flow test, fire department connections, cross-connection, risers, control valves, hose valves, roof manifold, and other essentials to the system. The secondary water supply and number of sources required must be determined from the code requirements.

    b. Dedicated services on street mains that are different from the garage require the DB to request separate hydrant flow tests for those street mains. The tests must be done within one year of formal NYC DOB issuance. Fire Department Connections for the automatic sprinkler system must be provided in locations approved by the FDNY.

    c. A sprinkler booster pump, if deemed necessary from hydraulic calculations, must be provided with an alternate supply of electric power. An ATS must be provided to switch from primary to secondary power. The pump, driver, and controller must be protected, in accordance with NFPA 20, against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism, and other adverse conditions. The fire-pump room must be separated from all other areas of the building by a 2-hour fire-rated enclosure. Temperature of the fire-pump room must never be less than the minimum recommended by the ire-pump manufacturer. The location and access to the ire-pump room must be pre-planned with the fire department.

2. Fire Sprinkler System

   a. A full wet sprinkler system with dedicated floor control valve assembly and drain connection must be provided for the community space. This system must be separate and dedicated for the community space. The building design pressure and low must be based on the final approved hazard occupancy for the space. The system must be designed for the applicable occupancies were required in the building by code. Pipe sizing for the sprinkler system must be based on hydraulic calculations. Sprinklers must be used in accordance with their listed spacing limitations.

   b. Sprinklers must be new, quick-response type, where permitted per code and their listing. A stock of spare sprinklers must be provided in accordance with NFPA 13 and the NYC Fire Code. Sprinklers must be provided with sprinkler guards in areas subject to mechanical damage.

   c. All valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressure, and waterflow switches on all sprinkler systems must be electrically supervised by a listed fire alarm control unit. Control valves must be locked in the open position, and electronically supervised so that an audible and visual alarm sounds at a constantly attended location when the valve is shut.

Fire Protection

7.4 Other Considerations

Enclosed and below grade areas of the parking garage building must be provided with an automatic sprinkler system. Coverage of additional areas shall adhere to NYC BC and appendix Q modified NFPA 13. Areas subject to freezing (the below grade garage) shall be provided with appropriate sprinkler coverage in accordance with NFPA and NYC codes such as a dry sprinkler system. Sprinklers in high heat areas or in close proximity to unit heaters shall have a temperature classification in accordance with NFPA 13. Sprinklers in non–air-conditioned spaces such as equipment rooms shall be intermediate-temperature–rated, unless a higher temperature rating is required per NFPA 13.

The DB shall coordinate with the Commissioning Authority as needed to assure that the building systems have been installed in the prescribed manner and operate within the performance guidelines set in the design intent documents. Commissioning shall be in accordance with the Commissioning Guide Specifications and include System Verification Checklists, Start-up, Functional Performance Tests, Owner Orientation/Training, and Warranty Review. The fire protection items to be commissioned must include, but not be limited to: sprinkler hydrostatic pressure, main drain operation, fire pump, jockey pump, standpipe hydrostatic pressure and flow, and any dry or pre-action valve systems. Coordinate the testing and commissioning of the fire protection system with that of the interlocked fire alarm system.

Telecommunications

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Telecommunications

8.1 Introduction

The Basis of Design for Telecommunications is to facilitate the telecommunications requirements for the parking garage and the community space. This also covers the telecommunications requirements for the temporary parking lot.

8.2 Codes & Standards

Adopt and incorporate the latest published revisions and amendments of City building codes, New York City Department of Transportation (NYCDOT) standards, New York City Department of Information Technology & Telecommunications (DOITT), National Electrical Codes (NEC), New York City Electrical Code, American National Standards Institute, Telecommunications Industry Association and the Electronic Industries Association (ANSI/TIA/EIA) standards, Institute of Electrical and Electronics Engineers (IEEE), National Institute of Standards and Technology (NIST), Security Industry Association (SIA), National Fire Protection Association (NFPA), Underwriters Laboratories (UL), and Telecommunications best practices and standards including, but not limited to:

1. DOITT Cybersecurity Requirements for Vendors & Contractors
2. ADA – Americans with Disabilities Act
3. American National Standards Institute (ANSI) / Telecommunications Industry Association (TIA) / Electronic Industries Association (EIA)
    a. ANSI INCITS 92 Data Encryption Algorithm
    b. ANSI X3.92 Data Encryption Standard - Alphanumeric Machines/Keyboard Arrangement
    c. ANSI X9.52 Triple Data Encryption Algorithm Modes of Operation
    d. EIA 445 Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices
    e. EIA/TIA-455-B Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components
    f. ANSI/TIA/EIA-568-A Commercial Building Telecommunications Cabling Standard.
    g. ANS1/TIA/EIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces
    h. ANSI/TIA/EIA-598-B Optical Fiber Cable Color Coding
    i. ANSI/TIA/EIA-604-2 Fiber Optic Connector Intermateability ST-Style Connectors
    j. ANSI/TIA/EIA-604-3-A Fiber Optic Connector Intermateability SC-Style Connectors
    k. ANSI/TIA/EIA-604-12 FOCIS 3A Fiber Optic Connector Intermateability Standard
    l. ANSI/TIA/EIA-606-A Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
    m. ANSI/TIA/EIA-606 The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings

Telecommunications

8.2 Codes & Standards

n. ANSI-J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

o. ANSI/TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications

4. Institute of Electrical and Electronics Engineers (IEEE)
   a. IEEE 802 Standards
   b. IEEE Std 81 Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
   c. IEEE Std 100 The Authoritative Dictionary of IEEE Standards Terms
   d. IEEE Std 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems - IEEE Green Book (Color Book Series)
   e. IEEE C2 National Electrical Safety Code
   f. IEEE C62.41 Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits
5. National Fire Protection Association (NFPA)
   a. NFPA 70 National Electrical Code
   b. NFPA 72 National Fire Alarm Code
   c. NFPA 101 Life Safety Code
   d. NFPA 262 Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces
6. Underwriters Laboratories (UL)
   a. UL 50 Electrical Cabinets and Boxes
   b. UL 83 Thermoplastic-Insulated Wires and Cables
   c. UL 444 Communications Cables
   d. UL 464 Audible Signal Appliances
   e. UL 467 Standard for Grounding and Bonding Equipment
   f. UL 497B Protectors for Data Communication and Fire Alarm Circuits
   g. UL 796 Printed-Wiring Boards
   h. UL 797 Electrical Metallic Tubing -- Steel
   i. UL 910 Standard for Safety Test for Flame-Propagation and Smoke-Density Values for Electrical and Optical-Fiber Cables Used in Spaces Transporting Environmental Air

j. UL 969 Standard for Marking and Labeling Systems

k. UL 1581 Reference Standard for Electrical Wires, Cables, and Flexible Cords

Telecommunications

8.3 Design Criteria

8.3.1 TELECOMMUNICATIONS SPACES

Provisions must be made to bring in telecommunications utilities and Cable TV providers from the street such as Verizon, Comcast, Spectrum, RCN, etc. This is to support communications (internet and private networks) and cable TV requirements of the parking garage and community space. Separate meters are required for the garage and community space. All telecommunications utilities and Cable TV providers must have a single Main Point of Entry (MPOE). The MPOE must have multiple empty conduits from the utilities'/providers' manhole/vault in the street to support the utilities'/providers' cabling current and future needs. The conduit and room size needs must be coordinated with the utilities/providers and owner/stakeholders by the DB.

The MPOE must be co-located with and share a common wall with the Main Distribution Frame (MDF) room, temperature controlled (HVAC) and provided with emergency power, grounding and surge protection (Electrical). It must also be protected by a dry fire protection system.

8.3.2 MAIN DISTRIBUTION FRAME

Space in the parking garage must be provided for the Main Distribution Frame (MDF) where the various agencies (DOT, etc.) bring their cables and equipment in for the facility. This space serves as the main communications and Cable TV distribution for the parking garage and community space.

The MDF must have adequate space to house all systems and communications equipment for the garage and future Community Space.

The MDF must have adequate conduit sleeves to the MPOE for cables from the utility/provider equipment and the various agency systems.

The MDF must have adequate conduits to the Intermediate Distribution Frame (IDF) rooms/enclosures within the garage (if any).

The MDF must have cable trays connecting the racks of equipment to the conduits/sleeves to the IDF rooms/enclosure and MPOE.

The MDF must have adequate UPS power and grounding (electrical).

The MDF must have adequate heating, ventilation and air conditioning (HVAC).

The MDF must be protected by a dry system fire protection.

The MDF must be at a level that is above the flood zone.

8.3.3 INTERMEDIATE DISTRIBUTION FRAME

The Intermediate Distribution Frame (IDF) must house the various equipment and cabling for the parking garage, AV and electronic security. This includes, but not limited to the parking garage entrance/exit control equipment, security equipment, network switches, etc.

The IDF must be room(s) or outdoor NEMA4X enclosures within the parking garage to accommodate the various communications and security devices for the parking garage.

Multiple empty conduits must be installed between the MDF and IDF room/enclosure adequate to support communication cables and future cables.

Multiple empty conduits must be installed from the MDF to 12" within the community space. This is to support the communications and cable TV requirements of the community space.

The design of the IDF for the community space and extending the conduits from the MDF to the IDF within the community space shall be included in the future community space it-out design.

The IDF must have adequate UPS power and grounding (electrical).

The IDF must have adequate heating, ventilation and air conditioning (HVAC).

The IDF room(s) must be protected by a dry system fire protection. IDF Enclosures do not require fire protection.

8.3.4 ADDITIONAL ROOM DESIGN SPECIFICATIONS

All communication rooms and enclosures must be properly secured, locked and alarmed with electronic security.

Telecommunications

8.3 Design Criteria

8.3.5 PATHWAY

All cables outside of the communication rooms must be in conduit. All conduits must be a minimum of 3/4" and follow appropriate code for ill capacity.

8.3.6 FIBER BACKBONE CABLING

Fiber cables must be installed between the MDF and each IDF room and enclosure. All fiber optic cable outside of the MDF or IDF must be in an inner duct and enclosed in a conduit. The cable must remain in an inner-duct inside the MDF or IDF up to within 6" of where the fiber cables are terminated. Fiber cables must be adequate to support the design communication needs plus fifty percent (50%). All fiber cables must be properly terminated in fiber optic patch panels, tested and labeled.

8.3.7 END-DEVICE OUTLET LOCATION

All horizontal copper cabling from the MDF or an IDF to an end-device location must be in conduit to a junction box near the end-device and in flex conduit from the junction box to the end-device. Location of the end-device (e.g. camera, network outlet) must be determined by the function and requirements for that device. Horizontal copper cabling must be plenum rated category 6 cable regardless of installation environment. All copper cables must be properly terminated in category 6 patch panels, tested and labeled. Multiple horizontal communication cables for the same system (e.g. cameras) that run the same direction can be installed in the same conduit.

8.3.8 TELECOM EQUIPMENT

All fiber and copper cables and termination materials and equipment must be compatible with each other and certified. Patch cables from patch panels to network equipment or end device must be included. Equipment racks must be 2- or 4-post rack or cabinets.

8.3.9 NETWORK EQUIPMENT

All network equipment, including but not limited to, network switches, firewalls, routers, etc. must be included to provide a complete communications system. All electronic equipment must be on UPS.

8.3 Design Criteria

8.3.10TESTING AND COMMISSIONING

1. All copper and fiber cables installed must be tested to comply with industry standards
2. All network equipment and connections including Layer 1, Layer 2 and Layer 3 related equipment and connections.
3. All network equipment must be tested to demonstrate network equipment and subsystem functionality.

Telecommunications

8.4 Other Considerations

8.4.1 SPECIAL STRUCTURES

The temporary parking area is part of this package and its design and construction may be ahead of the parking garage. To accommodate this, the MPOE, MDF and IDF for the temporary parking area must all be NEMA4X outdoor enclosures. The same requirements as above for the parking garage apply.

There is no need to provide conduits from the temporary parking area MPOE/MDF to the community space.

Electronic Security

9.1 Introduction

The Basis of Design for electronic security is to facilitate the electronic security system requirements for the parking garage and the community space. This also covers the electronic security requirements for the temporary parking area.

The following items must be considered and included in the project in addition to other requirements stated in this section and adherence to all applicable codes, rules, regulations and standards:

1. Video Surveillance System (CCTV system with indoor and outdoor cameras
2. Access Control System (card readers, electrified locks
3. 120 volt Power supply, low voltage power supplies UPS and battery backup system
4. Control and power cables in conduit.
5. Security Panels in Security Distribution Frames in NEMA enclosures

Electronic Security

9.2 Codes & Standards

The DB must follow the New York City Department of Transportation (NYCDOT) standards and specifications for parking structure and spaces including, but not limited to, vehicle gates, access control, parking payments, emergency call box, etc.

Adopt and incorporate the latest published revisions and amendments of prevailing City building codes, New York City Department of Information Technology & Telecommunications (DOITT), National Electrical Codes (NEC), New York City Electrical Code, American National Standards Institute, Telecommunications Industry Association and the Electronic Industries Association (ANSI/TIA/EIA) standards, Institute of Electrical and Electronics Engineers (IEEE), National Institute of Standards and Technology (NIST), Security Industry Association (SIA), National Fire Protection Association (NFPA), Underwriters Laboratories (UL) and Electronic Security best practices and standards including, but not limited to:

1. DOITT Cybersecurity Requirements for Vendors & Contractors
2. ADA – Americans with Disabilities Act
3. American National Standards Institute (ANSI) / Telecommunications Industry Association (TIA) / Electronic Industries Association (EIA)
4. Institute of Electrical and Electronics Engineers (IEEE)
5. National Institute of Standards and Technology (NIST)
6. Security Industry Association (SIA)
7. National Fire Protection Association (NFPA)
8. Underwriters Laboratories (UL)
9. National Electrical Manufacturers Association (NEMA)
10. Open Network Video Interface Forum (ONVIF) [MAKE THIS OPTIONAL]

9.2 Design Criteria

The Electronic Security System (ESS) must include Cameras, License Plate Readers (LPR), Video Surveillance System (VSS), Access Control System (ACS) and Blue Light Stations (BLS) in addition to the NYCDOT requirements.

9.3.1 APPLICATION DESIGN

1. Security Cameras for Garage and Temporary Parking Area:
    a. Vehicle Entrance/Exit – Security cameras must be placed at all garage and parking vehicle entrance and exit points. The cameras must capture the vehicle entering and exiting the facility/area.
    b. Pedestrian Stairways and Entrance / Exit – Security cameras must be placed at all garage and parking pedestrian stairs and entrance / exit points. The cameras must be positioned to capture the pedestrian from head to toe with a field of view and resolution for potential facial recognition, but no facial recognition system is to be implemented.
    c. General surveillance – Security cameras must be placed throughout the garage and parking areas for general surveillance. Cameras must be placed to view general pedestrian and vehicular movements within the area.
2. Access Control Doors and Alarms
3. Secure access control area and alarms are required. Remote network monitoring infrastructure is required.
4. Blue Light Stations (BLS) for garage and temporary parking area.

Electronic Security

9.3 Design Criteria

5. Community Space
    a. Electronics Security infrastructure for the community space must be defined and provided.

9.3.2 SECURITY SYSTEMS, DEVICES, AND EQUIPMENT

Provide cloud uploading system, device and equipment.

9.3.3 OPERATIONS

The ESS/VSS must be operated from the NYCDOT Control Center. Alarms for cameras, tamper, forced open, etc. must all be connected and routed through the ACS to the Control Center.

Blue Light Stations must call the appropriate party on a call button. The glass break or scream detector sensors must automatically call the panic number and call up the appropriate camera at the receiving facility.

9.3.4 MATERIALS

All equipment used for this package must be hardened to withstand extreme temperatures. Computers and network equipment must be installed in NEMA4X enclosures except those inside the garage MDF or IDF rooms. All IDF enclosures must be NEMA4X.

9.3.5 TESTING AND COMMISSIONING

1. The DB must develop and execute an owner-approved test plan for each ESS subsystem and as an integrated system.
2. The test plan shall include test schedule, lists of tests to be conducted, test equipment to be used, expected test results and test documents produced, and copies of any certified test data to be used in lieu of testing.
3. The DB must prepare a complete test of all physical components, connections, inspection and testing of all installed equipment.
4. All individual subsystems, connections, software programming functions, hardwired connections, monitoring and reporting, time management, user identification must be tested.
5. The complete ESS, all graphics controls, interfaces and call-ups must be tested.
6. Provide staff to test all devices and all operational features of the subsystems for witness by the Owner's representative and authorities having jurisdiction as applicable.
7. Correct deficiencies until satisfactory results are obtained.
8. Submit written copies of test results.

Electronic Security

9.4 Other Considerations

9.4.1 SPECIAL STRUCTURES

The modification of the existing parking area is part of this package and its design and construction. To accommodate this, the ESS for the existing parking area must be independent from the garage. For existing parking area, assess the current level of security and provide the same to new temporary parking area.

Vertical Transportation

10

Vertical Transportation

10.1 Introduction

This section presents guidelines for the vertical transportation (VT) system for the Queens parking garage and community space. The elevators must utilize solely non-proprietary equipment, traction elevator hoist machines or hydraulic pump/motors, modern microprocessor controllers, and closed-loop door operators.

Final determination of elevator capacity, speed, and quantity must be justified via an analysis of the elevator system interval and handling capacity.

Words in the singular apply to all elevators as appropriate installed under this contract.

10.2 Codes & Standards

The Elevator Equipment, Materials, and Systems must be designed in strict compliance with prevailing rules, regulations, standards, codes, ordinances, and laws of local and state governments, and other authorities with lawful jurisdiction. Elevator Equipment, Materials, and Systems must comply with, but are not limited to, the following codes and standards:

1. The governing code is the New York City Building Code (NYCBC) with amendments to the Building Code as applicable.
2. The applicable governing Elevator code is ASME A17.1 – Safety Code for Elevators and Escalators, latest edition with supplements A17.1a-02 and A17.1b-03 as referenced by Chapter 30 of the NYCBC and modified by Appendix K of the NYCBC.
3. Inspections are to be carried out in accordance with NYCBC and ASME A17.2 – Guide for Inspection of Elevators, Escalators and Moving Walks.
4. All electrical equipment must comply with ASME A17.5 - Elevator and Escalator Electrical Equipment, 2004 edition.
5. Elevators must be designed in accordance with the accessibility requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
6. The elevator contractor must inform the local authorities of any and all pending code changes that may be applicable to this project prior to fabrication.

Materials used in the work must conform to the following standards:

- Carbon Structural Steel – ASTM A36
- Galvanized Iron and Steel – ASTM A123
- Stainless Steel Plate or Sheets (Type 304 or Type 316) – ASTM A240
- Stainless Steel Bars and Shapes – ASTM A276
- Aluminum Sheets and Plates – ASTM B209
- Aluminum Bars, Rods, Wires – ASTM B211
- Aluminum Extrusions – ASTM B221
- Safety Glazing (Glass) – ANSI Z97.1

Vertical Transportation

10.2 Codes & Standards

All exposed metal parts must be cleaned of oil, grease, scale, and other foreign matter and provided with a single coat of factory-applied rust-resistant primer. After installation, provide at least two finish coats of paint. Galvanized metals and stainless steel may not be painted.

10.3 Design Criteria

10.3.1 DEFINITIONS

The definitions of all elevator terms will be as written in ASME A17.1 and the NYCBC.

Average Interval (Interval): The average time between elevator departures from the main/designated landing during the peak traffic period. This may be calculated as the average round trip time for a single elevator in a bank and dividing by the number of elevators in that bank.

Handling Capacity: The total number of passengers or percentage of total population that can be carried by the elevators in a five (5) minute period. This may be calculated as dividing a 5-minute period by the Interval and multiplying the result by the number of passengers in the elevator(s).

10.3.2 ELEVATOR TRAFFIC ANALYSIS

The elevator system design is to be based on a thorough traffic analysis of the parking facility. The analysis for the parking facility will be approved by NYC DOT prior to subsequent development of the elevator equipment. This traffic analysis must include, but not be limited to, the following:

1. Facility building population by floor
2. Passenger flows, including how many passengers will choose the elevators compared to stairs at each floor
3. Elevator round trip time, including door times, dwell times, loading times, travel times
4. Average Interval during Peak facility loading and unloading period
5. Handling Capacity during Peak facility loading and unloading period
6. Recommendation on quantity of elevators, capacity of elevators, speed of elevators, and type of elevators.

The elevator system for the parking facility must be capable of meeting the following criteria:

1. Average Interval: Not to exceed 45 seconds.
2. Handling Capacity must meet one of the following two scenarios
    a. Be not less than 10% of population moved in a 5-minute period, or,
    b. The elevator system must be able to meet or exceed the maximum possible inflow/outflow of cars based on the garage geometry. (Vehicles capable of physically entering/exiting the facility per hour)

Vertical Transportation

10.3 Design Criteria

10.3.3ELEVATOR TYPES

Overhead traction elevators are the preferred elevator configuration for elevators with rises exceeding 30 feet. Gearless

traction machines are preferred over geared traction applications.

Machine room-less (MRL) elevators may be considered with appropriate justification and engineering backup, including overall design implications, including compliance with NYCBC requirements for MRLs; lifecycle cost impacts, and maintenance implications.

Hydraulic elevators may not be used for vertical travel distances exceeding 50 feet.

The elevators must be sized to accommodate an emergency stretcher 24" wide by 84" long with not less than 5" radius rounded corners.

10.3.4ELEVATOR EQUIPMENT (GENERAL)

All elevators in the facility must utilize non-proprietary equipment throughout.

All equipment exposed to the public, including elevator fixtures, fasteners, doors, entrances, etc. must be vandal-proof/tamper-proof and protected against rain, snow, sleet, deicing salts, direct sunlight, dust, and debris.

The garage elevators must be sized to handle as IBC-sized stretcher.

All exposed metal parts must be cleaned of oil, grease, scale, and other foreign matter and provided with a single coat of factory-applied rust-resistant primer. After installation, provide at least two finish coats of pain. Galvanized metals and stainless steel must not be painted.

10.3 Design Criteria

Provide energy saving features for all elevators, including but not limited to regenerative drives for gearless traction elevators, the use of LED cab lights, and a "time-out" feature for the elevator cabs where the cab fan and cab lights are automatically shut off after a user-defined period of non-use and then automatically turned on upon any call.

A complete and code-compliant system must be provided. This includes, but is not limited to, T-section guide rails including inserts and brackets; hoist machine and sheaves; control equipment including all limit switches, leveling device, and hoistway wiring; hoist ropes; buffers and pit equipment including compensation (if necessary); sling/platform; elevator cab including two-speed ventilation fan, lighting, and roller guides; governor, car safeties and governor rope; hoistway entrances; cab and hoistway door panels; door operators; and fixtures, including hall call stations, hall lanterns, position indicators, main car operating panels, auxiliary operating panels for cars with center opening doors and top of car station.

Provide a two (2) year warranty maintenance with 24-hour call-back service including full repair and parts.

10.3.5 HOIST MEANS

All hoist machines must use AC power. The use of DC machines, with or without a motor-generator or DC filter is not permitted. Provide a solid-state, current limiting motor starter for each elevator, installed in-line between the motor and the main disconnect switch. These starters must be provided with an adjustable setting for the inrush current limit.

Gearless traction hoist machines are preferred. Such machines must include a variable-voltage variable-frequency (VVVF) drive, motor, brake, drive sheave, and deflector sheave, if necessary, mounted in proper alignment on a common, isolated bedplate. Secondary or deflector sheaves must be installed above the machine room floor to facilitate access and maintenance. Gearless machines include direct-drive, digital, closed-loop encoders. The hoist machine must provide a dual brake system to provide ascending overspeed and unintended motion protection as required by code. Provide a regenerative drive system for all gearless traction elevator machines.

Vertical Transportation

10.3 Design Criteria

Geared traction hoist machines, if provided, must be the single worm-gear type with VVVF drive, motor, brake, gearing, drive sheave, and deflector sheave, if necessary, mounted in proper alignment on a common isolated bedplate. Secondary or deflector sheaves must be installed above the machine room floor to facilitate access and maintenance. The worm must be of hardened and ground steel, integral with the worm shaft. The ring gear must be hobbed from a bronze rim, accurately fitted and bolted to the gear spider. The system must be provided with an emergency braking system for compliance with ascending overspeed and unintended motion protection as required by code.

For hydraulic elevators, self-contained, dry-type power units are preferred with a structural steel base and tank supports, an oil tight drip pan, vibration isolated inner base for the motor/pump assembly, and sound isolating unit enclosure panels.

Submersible pumps, suspended inside the tank, are not permitted for units greater than 40HP. The control valve must be the down-speed-regular (DSR) type to maintain rated speed in the down direction under all loading conditions. The motor must be rated for 120 starts/hr.

All elevators must utilize solid-state starters.

10.3.6CONTROLLERS

The controllers must utilize non-proprietary equipment. All components must be readily available from the original equipment manufacturer for purchase by any company without restriction. Any special tools, diagnostic manuals, or other equipment required to fully operate and maintain the controller must be provided, in full, upon elevator completion.

Elevator controllers utilizing microprocessor-based controls are preferred. The controllers must include a digital screen capable of displaying the following information: operating mode, car location, car speed, door condition, car calls, hall calls, and event/fault history. The screen must also provide access to all user-adjustable settings.

The controllers must provide automatic (normal) service, independent service, inspection service, Fire Service (Phase I and Phase II), and Rescue/Battery Lowering Provisions, if provided.

10.3 Design Criteria

10.3.7DOOR EQUIPMENT

Provide a high-speed, heavy-duty, closed-loop, door operator with VVVF drive the elevators. The door operator must maintain consistent, smooth, and quiet operation at all floors, regardless of door weight or air pressure. The door operator must be the MOVFR II as manufactured by GAL or approved equal.

The doors must be provided with a door reversal device which causes the car and hoistway doors to reverse if an obstruction is detected. The door reversal device must interface seamlessly with the door operator and must be provided with quick disconnect terminals to facilitate replacement. The reversal device must consist of a protected infrared detector field extending from 1½" above the car sill to a height of not less than 68". Provide a fail-safe system to prevent closing of the elevator doors in case of power loss to the detector. Provide a one-piece full door height protective lens cover designed to be waterproof and vandal-proof.

Vertical Transportation

10.4 Other Considerations

10.4.1 RELATED WORK

The elevator design and construction will require close coordination with work designed and built by other trades. The following is provided as a convenience to the Design-Builder to ensure all applicable elevator requirements by the other trades are included in the design. It should not be considered as an all-inclusive list.

1. General
    a. Only machinery and equipment used directly in connection with the elevator is permitted in the elevator hoistway and machine room.
    b. The installation of any equipment in the elevator hoistway and elevator machine room must be coordinated with the elevator manufacturer prior to installation.
2. Architectural & Structural
    a. The elevator hoistways must be constructed clear and plumb in accordance with manufacturer's requirements.
    b. The hoistways cannot contain any ledges, setbacks, recesses, etc. exceeding two inches (2") along any wall. Any ledges, setbacks, recesses, etc. exceeding 2" shall be beveled at an angle not less than 75 degrees to the horizontal. (This does not apply to divider beams between elevators sharing a hoistway.)
    c. The hoistways must be designed to support elevator guide rails, with inserts, embeds, or structural steel supports located along the shaft as required by the elevator manufacturer.
    d. A fre-rated machine room must be provided for the elevators in accordance with manufacturer's and code requirements.
    e. The machine room must provide a minimum of 84" clear headroom throughout and have sufficient height to contain all elevator equipment and structural equipment including trolley beams.
    f. Provide self-closing and self-locking machine room access doors with code-appropriate signage.
3. Electrical
    a. All electrical equipment must be installed in weatherproof enclosures and use wiring identified for use in wet locations.
    b. A single means for disconnecting the main power supply for the elevator must be provided. The disconnecting means must be a listed device; either an enclosed externally operable fused motor circuit switch or a circuit breaker capable of being locked in the open position and must be located adjacent to the machine room access door. A label on the disconnect is required to show the location of the overcurrent protection.

c. Provide an auxiliary contact on the mainline disconnect when an emergency lowering device is provided.

d. Provide a separate branch circuit and disconnect for the elevator car lights, receptacles, emergency lights, and ventilation. It must be a lockable fused switch / breaker and located in the elevator machine room. A label on the disconnect is required to show the location of the overcurrent protection.

e. Provide GFCI receptacles in the elevator machine room and pit.

f. Provide a single non-GFCI receptacle in the elevator pit for the sump pump, if provided.

g. Provide permanently installed lighting fixtures in the elevator machine room with a minimum illumination level of not less than 200lx (19fc) at floor level and adequate to work on all equipment without shadows. The light switch shall be located inside the room, near the access door.

h. Permanently installed lighting shall be provided in the elevator pit. Minimum illumination shall be not less than 100lx (10fc) at the pit floor. Bulb(s) must be externally guarded to prevent contact and accidental breakage. Locations must be coordinated with elevator contractor so that fixture(s) are out of the way of all elevator equipment. The pit light switch must be a minimum of 18" above the lowest landing door sill and adjacent to (not behind) the pit ladder.

i. The elevator pit must have a separate branch circuit supplying the pit lights and receptacles, and a separate circuit for the sump pump, if provided.

j. The machine room lights and receptacles must be supplied by a dedicated circuit.

k. Provide a smoke detector inside the elevator machine room and at each elevator lobby. If ambient conditions preclude the use of a smoke detector (i.e. at street level), other detection means may be used (heat detectors).

l. All electrical conduit must be run overhead or in a manner which does not restrict access to or around any equipment.

m. Provide communications conduit in the elevator machine room to the elevator controller for the handsfree phone/intercom installed in the elevator cab.

4. Mechanical (HVAC)

a. Elevator machine room environment must be maintained between 50°F – 104°F (10°C – 40°C) with no more than 95% humidity non-condensing. HVAC equipment must not be installed directly above elevator equipment.

b. If machine room-less elevators are utilized, the hoist machine must be heated/cooled as necessary to maintain temperature and humidity control as specified by the machine manufacturer.

Vertical Transportation

10.4 Other Considerations

5. Plumbing

   a. Provide a sump pump or drain in the elevator pit with a capacity of at least 3,000 gal/hr per elevator. This pump or drain must be provided with a positive means to prevent water, gasses, and odors from entering the hoistway (indirect connection).

6. Fire Protection (Sprinkler)

   a. Sprinklers cannot be provided in an elevator machine/control room in accordance with NYCBC Appendix K.

7. Communications

   a. Provide a two-way hands-free intercom system inside the cab, with additional intercoms in the machine room and in an authorized, permanently manner location as directed by the Client.
   b. Provide CCTV in the elevator cab to permit authorized personnel to view the cab in real time.

8. Fire Alarm
   a. Provide elevator recall.

LEED &Sustainability

11

LEED & Sustainability

11.1 Introduction

The new Queens garage and community space provides the opportunity to design a high-performance facility that focuses on occupant comfort, health and wellbeing, energy and water conservation, and material choices that minimize environmental impacts. The current New York City green building regulatory climate includes a number of local laws that drive improved energy performance, third-party certification, evaluation of the potential for renewable energy technologies, installation of green and solar photovoltaic roofs, and strategies for meeting future greenhouse gas emission reduction targets.

The Design-Builder is directed to Section 12.6 (Sustainable Design Requirements) of the Standard Project Requirements (Volume 2) for LEED and sustainability requirements for the Project.

The LEED boundary is to include the entire scope of Work by the Design-Builder. However, in accordance with USGBC regulations, the LEED certification will exclude the parking garage in the total gross square footage.

In addition to LL31 and 32/16, other sustainability-related regulations apply to the project including but not limited to those relating to geothermal, green infrastructure, electric vehicle capacity, sustainable roofing, and active design.

11.2 Codes & Standards

1. The latest applicable codes and standards apply.

LEED & Sustainability

11.3 Design Criteria

11.3.1 REQUIRED CREDITS AND STRATEGIES

1. All LEED v4 prerequisite credits must be achieved.
2. All LEED v4 minimum program requirements must be met.
3. Energy modeling must be undertaken to achieve at least 25% energy cost reduction to contribute to EA credit Optimize Energy Performance.
4. At least 20% water savings must be achieved to contribute to WE Indoor Water Use Reduction.
5. Restroom fixtures and fittings must be low-low and WaterSense labeled where available.
6. Waterless urinals must not be installed.
7. Roofs not covered by green roofs or solar photovoltaic array to have a minimum initial solar reflectance index of 82.
8. Electric vehicle charging stations will be provided for 5% of the spaces and infrastructure must be provided for the remaining 15% of spaces. The future total goal is for at least 20% of parking spaces.
9. Preferred parking for green vehicles to be assigned for 5% of total parking spaces, located in preferential locations after ADA spaces.
10. Secure bicycle parking must be provided in accordance with occupancy requirements of LEED LT credit Bicycle Structure. Bicycle racks to be sheltered and support bicycle in at least 2 places with the rack itself being securely anchored.
11. The garage roof must include a green roof system or roof/canopy system that supports a solar photovoltaic array or combination to comply with Local Law 94/2019.
12. The community space roof must include a green roof system or solar photovoltaic array or combination to comply with Local Law 94/2019.
13. Landscape plantings must be native and/or adapted to the local environment.
14. The community space must be designed for daylight and glare control considerations, with daylight and occupancy controls.
15. The garage lighting must include controls for daylight and occupancy.
16. Exterior lighting for the temporary parking lot must be energy efficient and incorporate daylight controls.
17. Clean construction and demolition waste is to be recycled/salvaged to achieve a maximum number of LEED points for MR credit Construction and Demolition Waste Management.

11.3 Design Criteria

18. The garage and community space must be individually metered (for all utilities) for energy use.
19. Life Cycle Cost Analysis (LCCA) is to be considered to evaluate different system and constructions elements.
20. A Whole Building Life Cycle Assessment (LCA) is to be considered per LEED MR credit Building Life-Cycle Impact Reduction.
21. Indoor air quality testing must be undertaken for community space after construction completion but before occupancy.
22. Demand controlled ventilation must be included in air handling units for community space with automatic increase in fresh air when required (not just an alarm).

LEED & Sustainability

11.4 Other Considerations

11.4.1THIRD-PARTY CERTIFICATION STRATEGY

1. Designate a LEED Coordinator who is a LEED Accredited Professional with BD+C specialty (LEED AP BD+C).
2. The DB must achieve LEED version 4 Building Design and Construction for Core and Shell Gold Certification for the Community space. See Volume 2, Section 13 for LEED and Sustainability requirements.
3. The DB must target at least 5 additional points above the certification threshold to provide a buffer in case some third- party credits become unachievable during design and/or construction or are rejected during third-party review.
4. The project must meet all relevant local laws.
5. The DB must determine if temporary parking should be included or excluded in third-party certification assessment.
6. The DB is wholly responsible for all registration and certification fees payable to the third-party for LEED and/or, if applicable, Parksmart certification process.

Civil

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Civil

12.1 Introduction

The scope of this work includes the new Queens parking garage and community space construction, and reconfiguration of existing surface parking. Demolition of existing retaining wall structures and civil site work is involved. Work also includes, but is not limited to, site cleaning, site grading, and utility work to accommodate the proposed structures functionality.

12.2 Codes & Standards

12.2.1 APPLICABLE CODES & STANDARDS

The project including equipment, materials and systems must be designed in strict compliance with prevailing rules, regulations, standards, codes, ordinances, and laws of local and state governments, and other authorities with lawful jurisdiction. Equipment, materials and systems must comply with, but are not limited to, the following codes and standards:

12.2.2 NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION – BUREAU OF WATER AND SEWER OPERATIONS

1. Water Main Standard Drawings
2. Sewer Design Standards (For New York City Department of Design and Construction)
3. Criteria for Detention Facility Design
4. Guidelines for The Design and Construction of Stormwater Management Systems (NYBDOB)
5. Revised Supplement to The New York State Department of Health Handbook for Cross Connection Control
6. General Specifications
7. Rules Governing the Design and Construction of Private Sewers or Private Drains
8. Appendix A, Checklist for The Submissions of Drainage Proposals

12.2.3 NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION – BUREAU OF ENGINEERING DESIGN AND CONSTRUCTION

1. Standard Designs and Guidelines for Green Infrastructure Practices

12.2.4 NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION

1. Design Directives and Technical Supplements
2. Standard Details of Construction
3. Systems Engineering – Specifications – Traffic Signals and ITS
4. Maintenance and Protection of Traffic Standards
5. Guiding Principles
6. General Requirements

Civil

12.2 Codes & Standards

12.2.5 NEW YORK CITY DEPARTMENT OF TRANSPORTATION

1. Street Design Manual
2. Division of Street Lighting – Street Lighting Standard Drawings
3. Standard Highway Specifications
4. Typical Pavement Markings
5. Typical Bike Path Design

12.2.6 NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION – DIVISION OF WATER

1. Standards and Specifications for Erosion and Sediment Control

12.2.7 NEW YORK CITY DEPARTMENT OF PARKS AND RECREATION

1. Standard Drawings and Details – TYLA/146-R8

12.2.8 NEW YORK CITY DEPARTMENT OF CITY PLANNING

1. Changes to The City Map, Version 6.0

12.2.9 CITY ENVIRONMENTAL QUALITY REVIEW (CEQR) TECHNICAL MANUAL (MARCH 2014)

12.2.10 NEW YORK STATE DEPARTMENT OF TRANSPORTATION

1. Standard Sheets
2. Standard Specifications

12.2.11 METROPOLITAN TRANSIT AUTHORITY

1. Standard Sheets

2. Standard Specifications

12.2.12 CITY OF NEW YORK – FIRE DEPT

1. New York City Fire Code
2. Fire Communications Standards and Specifications

12.2.13 CITY OF NEW YORK – POLICE DEPARTMENT

1. Engineering Security – Protective Design for High Risk Buildings
2. Police Communications Standards and Specifications

12.2.14 PRIVATE UTILITY COMPANIES (CON EDISON, VERIZON, EMPIRE CITY SUBWAY, CABLE TV, OTHER)

1. Standard Sheets
2. Standard Specifications

Civil

12.3 Design Criteria

12.3.1SITE DEMOLITION AND REMOVALS

1. The DB must remove and dispose of existing site structure including, but not limited to, existing building foundations, steel sheet pile retaining wall, stormwater detention system, parking lot, curb, sidewalk, utility service connections, and water and electric lines in accordance with NYCDOT and NYCDEP standard requirements.
2. Fill material must be removed and disposed of away from the project site.
3. Remove existing concrete pile caps and piles from previous building construction as required.
4. See other sections for additional information.

12.3.2SITE GRADING

12.3.3

1. The DB must review existing geotechnical data provided and supplement as necessary to comply with design requirements.
2. See Geotech report for nature of existing soil conditions and disposal requirements.
3. The DB must use the existing curb and back of sidewalk elevations for building siting.
4. After construction of the facility, the site must be re-graded to meet sidewalk elevations.

12.3.4SITE UTILITIES (GARAGE AND COMMUNITY SPACE UTILITY SERVICES)

1. Provide a test pit program to determine design-critical unknown utilities and structures.
2. The garage and the community space must have individual dedicated utility services.

3. Provide cross connection control devices/equipment for all building water services. Provide drainage for all Reduced Pressure Zone (RPZ) devices to existing sewer. Locate RPZ port above 100-year flood elevation. The DB must locate the RPZ behind an attractive mechanical screen enclosure out of sight of pedestrian pathways.
4. The number of service lines and redundancy must be designed per NYC Building Code and public/private agencies rules and regulations.
5. Coordinate removal and replacement of existing street utilities with other contracts.
6. Street fire hydrants must be reviewed by NYCDEP and New York Fire Department and new hydrants will be installed, if required.
7. DB to determine electrical and gas design loads as required by NYCDOT, prepare load letters, and submit to Con Edison to determine lines sizing's. See electrical section.
8. Coordinate work with street infrastructure improvement projects.

12.3.5 SANITARY SEWER COLLECTION SYSTEM

1. All work must comply with NYCDEP standards and regulations.
2. The existing parking lot site (bounded by Union Turnpike Service Rd., 132nd St., 82nd Ave. and 126nd St.) requires mitigation of stormwater runoff when it was recently constructed in 2017. The existing site drainage consists of a series of catch basins which discharge to a 48-inch diameter linear detention system. Bioswales have also been incorporated into the site design. Consideration of bioswales and green or stormwater detention roof must be included in the flow calculations.
3. The invert of the detention system is approximately 10 ft below grade and discharges to the existing 42-inch diameter combined sewer in 132nd St. via 6-inch diameter DIP regulated controlled flow outlet pipe.
4. The first stage of the garage construction will require modification of the existing parking lot, stormwater detention structure for the remaining lot and area lighting. Site excavation for building foundation including demolition of the existing detention system can then be initiated. A new gravity type detention system must be provided by the DB on the project site. Location of detention tank and alternative routings must be determined by the DB.
5. A new Site Connection Proposal must be prepared by the DB for the new garage and temporary parking lot, as required. The DB must coordinate and obtain all required NYCDEP approvals for abandoning the existing detention and staging/phasing the combined or separate one with the garage, temporary parking lot and new detention center.

Civil

12.3 Design Criteria

12.3.6 WATER DISTRIBUTION SYSTEM

1. All work will comply with NYCDEP standards and regulations.
2. Cross connection control devices must be installed in accordance with NYCDEP requirements and standards for all new water services.
3. Fire and domestic water supply service lines must be installed to the garage and community space.
4. The DB must coordinate and obtain NYCDEP approvals for water service for irrigation for planting green areas.

12.3.7 SITE DRAINAGE STORMWATER DETENTION SYSTEM

1. All work must comply with NYCDEP and NYCDOT standards and regulations.
2. Relocate, abandon or remove existing site drainage. Install temporary drainage as required.
3. Excavation/relocation of existing 48-inch HDPE stormwater detention system under proposed garage structure.
4. Install new detention system including outlet control structures within the 30 ft buffer or other suitable location designed for the new garage.
5. Provide temporary detention system for temporary parking lot.
6. Coordinate roof downspouts with site plan.
7. Stage construction of components between permanent garage, temporary parking and future detention center.
8. Contractor to provide proposed construction staging and means and methods.
9. Provide dewatering of site, as required, to build garage foundation. See Geotech and Structural sections.
10. Coordinate drainage of the lowest level of garage basement and elevator pits.
11. The DB must install cistern-rainwater harvesting for irrigation or other green infrastructure techniques on site. Bioretention soils for green infrastructure measures can be sited locally must be in accordance with NYCDEP standard details, specifications and testing requirements.
12. If a perforated detention system is implemented, provide soil borings, groundwater levels, testing including permeability testing, as required.

13. Locate detention system a minimum of 10 feet from building foundations.
14. Design of underground detention system within 30 ft buffer area must allow for the future design flexibility of passageway layout, pedestrian thoroughfare and maintenance of structure, vehicle access, road surface, FDNY access, grading, landscaping, seating, lighting and other plaza or pedestrian amenities. Edge plantings of low-level shrubs can be considered along building edges.

12.3.8 SOIL EROSION AND SEDIMENTATION CONTROL

1. It is anticipated that more than 1 acre of ground surface will be disturbed. A NYSDEC Storm Water Pollution Prevention Plan and Notice of Intent documents must be prepared by the DB and approved by NYSDEC prior to start of work. These documents will denote limits of work and specific devices which must be installed and maintained by the contractor during construction. An MS4 permit will also be needed and accepted prior to start of construction and approved by NYCDEP.
2. Provide temporary drainage plans and staging plans during construction.
3. Protect existing trees within the project site and adjacent streets and remove dead trees or trees which interfere with the new construction. Any trees that are removed must be replaced per NYC requirements.

12.3.9 TEMPORARY PARKING LOT AND PARKING GARAGE

1. Provide minimum of 4-inch asphalt concrete wearing surface on 6-inch gravel bedding for temporary parking lot pavement.
2. Provide temporary drainage system under existing parking lot including detention system and new connection to existing 6-inch outfall pipe.
3. Maintain existing driveway exit on 82nd Ave. Provide new driveway entrance, including retaining walls, if required on 126th St.
4. Provide electrical conduit and pull boxes for temporary lighting.
5. Provisions for bike storage for the temporary lot and garage must be provided in accordance with NYCDOT standards, as required. Location and number of storage spaces to be determined by NYCDOT and NYCDDC. Maintain existing structure and supplement as needed per NYCDDC direction.
6. Provide control access to parking lot as determined by Owner including but not limited to:
    a. Control Gates with Card Readers.
    b. Security Booths.
7. See structural section for garage Basis of Design (Structural) requirements.

Civil

12.3 Design Criteria

8. Drains must be located such that runoff does not have to cross expansion joint seal to reach the drain.
9. Drains must have sediment bucket that can be removed and emptied during regular maintenance.
10. Consider the capture of grey water for use in landscaped area or using cistern/rainwater harvesting.
11. Consider installing gutter system beneath expansion joints to redirect runoff if joints fail.
12. Provide directional pavement marking for ease of circulation.
13. Pedestrian and vehicular conflicts must be minimized by providing pedestrian walkways adjacent to exits and/or entry lanes.
14. Gates must be located far enough from the sidewalk so that another vehicle behind the vehicle service position can stand without blocking the sidewalk.
15. Lane width on the roof must consider snowplow maneuverability and turning radius.
16. A Parking Access and Revenue Control System with pay-on-foot station kiosk on each level to reduce idling time must be provided.
17. Provide a minimum 28 feet driveway width access to the garage.

12.3.10 PAVING, SIGNAGE, STRIPING AND RESTORATION

1. Construct steel faced concrete curbs, concrete sidewalk, concrete driveways, curb cuts, pedestrian ramps, bollards, roadways, retaining structures (if applicable) and applicable appurtenances in accordance with NYCDOT and Americans with Disabilities Act (ADA) standards.
2. Existing street lighting / traffic signal equipment will be relocated/maintained or replaced based on NYCDOT Traffic and Street Lighting requirements.
3. Remove any dead trees or trees which interfere with the new construction and replace existing trees as required per NYCDPR requirements. Protect all existing trees to remain per NYCDPR requirements.
4. All pedestrian structure and egress flow paths must be in compliance with the ADA requirement.
5. Provide ground stabilization/crushed stone in the 30 ft. buffer area between the new garage and the temporary parking lot.
6. Provide site landscaping and green areas in accordance the NYCDOB requirements. See Landscape section for tree plantings, vegetation and additional requirements.
7. Re-stripe temporary parking lot, as required, with thermoplastic pavement markings to denote parking stalls, traffic arrows, handicap parking spaces. Install regulatory signage for the revised operations of the temporary lot.

12.2.2 TRAFFIC AND CIRCULATION

1. Driveway access to parking garage must be in accordance with ULURP approvals and traffic movements and be in accordance with NYCDOT
2. Access during Construction: provide staged access to parking, maintain approximately half of existing site parking while new garage is being constructed. Once the garage is completed, demo the remainder of the existing parking lot (Package 5 Work). Construction new stormwater management during early stages of construction. Relocate entrances as required. A 30-ft permanent buffer will be provided between the new garage and the new detention facility.
3. Traffic on the streets adjacent to construction must be maintained. Discussion as to the use of existing parking shall be addressed with meetings at NYCDOT-OCMC.
4. Maintain the existing sidewalks at all times during construction. When an existing sidewalk cannot be maintained, pedestrians must be detoured to the nearby sidewalk, as required. Layout of detour and signage shall be in coordinate with NYCDOT standards.
5. Coordinate any work adjacent to the Van Wyck Expressway with NYSDOT.

12.2.3 ADJACENT UNDERGROUND UTILITY WORK BY OTHERS

As a consequence of the de-mapping of a portion of 82nd Avenue between 126th Street and 132nd Street for construction of the new Detention Facility, the City, in coordination with the NYC DEP, will be re-rerouting a section of an existing 48-inch water main out from 82nd Avenue. The upgrading of existing sewer mains along 132nd Street as a result of the new structure is planned as well. Options are presently being studied for the best overall approach.

The DB must be aware to coordinate with the water main work by other contractors which is anticipated to occur concurrently with the construction of the parking garage and community space.

Civil

12.4 Other Considerations

12.4.1 TOPOGRAPHIC AND UTILITY SURVEY

A Topographic and Utility Survey is required prior to the commencement of any construction activity at the site, the DB shall engage the services of a New York State licensed Professional Surveyor to update, as required, or provide a new topographic digital terrain survey and above ground and below grade utility survey of the existing project site and the adjacent roadways. in accordance with NYCDOT and NYCDDC standards.

The survey shall document existing conditions within a line 100 ft outside the project limits and to the nearest utility manhole or vault for the project site. Provide profiling of existing roadways, curbs, and street sewers. Survey data must be coordinated and reported in the Queens Borough President's Office (BPO) monument system. A survey control plan and report must be provided. Provide As-Builts of all installed work per NYC Department of Transportation (DOT) requirements.

12.4.2 MAINTENANCE AND PROTECTION OF TRAFFIC (MPT)

The DB must prepare and submit a Maintenance and Protection of Traffic plan to NYCDOT-OCMC for approval prior to the start of construction. All work shall be coordinated with future BBJ projects adjacent to the site.

Landscape

13

Landscape

13.1 Introduction

The Landscape Basis of Design for this package covers the construction of the new parking garage / community space and its surrounding sidewalk/landscape, the slight modification to the temporary parking lot, and the 30 feet publicly accessible area between the garage and temporary parking lot.

13.2 Codes & Standards

The Equipment, Materials and Systems must be designed in strict compliance with rules, regulations, standards, codes, ordinances, and laws of local and state governments, and other authorities with lawful jurisdiction. Equipment, Materials and Systems must comply with, but are not limited to, the following codes and standards:

1. NYC Street Design Manual (2015 or later. https://www1.nyc.gov/html/DOT/html/pedestrians/streetdesignmanual.shtml);
2. NYC Street Tree Planting Standards (Department of Parks and Recreation [DPR], 2016. https://www.nycgovparks.org/pageiles/53/Tree-Planting-Standards.pdf);
3. High Performance Landscape Guidelines: 21st Century parks for NYC (Design Trust for Public Space and DPR, 2011);
4. High Performance Infrastructure Guidelines (Design Trust for Public Space and Department of Design and Construction [DDC], 2005);
5. DPR Website on Trees Selection, Approved Species List, and Maintenance (https://www.nycgovparks.org/trees/street- tree-planting);
6. Draft Public Right-of-Way Access Guidelines (PROWAG) Standards (https://www.access-board.gov/guidelines-and- standards/streets-sidewalks/public-rights-of-way);
7. NYC Department of Transportation [DOT] Rules and Specifications (https://www1.nyc.gov/html/DOT/html/about/DOTlibrary.shtml#spec);
8. NYC DOT Standard Construction Drawings, Specifications, and Specification Bulletin (https://www1.nyc.gov/site/ddc/resources/publications.page#infra);
9. Standard Specifications for New York City Public Works Construction (DOT/DDC, 2015);
10. Sustainable Urban Site Design Manual (DDC Office of Sustainable Design, 2008);
11. American Public Works Association (APWA) Standard Plans;
12. Federal Americans with Disabilities Act (ADA) as detailed in ADAAG (2010);
13. NYC and NYS Departments of Health (DOH) Code Regulations
14. Fire Department of New York (FDNY)
15. Local Laws of the Rules of the City of New York
16. Public Design Commission (PDC) Guidelines

Landscape

13.2 Codes & Standards

Note: All serving utilities must be installed on site prior to landscape work.

13.3 Design Criteria

The landscape design shall encourage visual openness and interest through texture, color, size, and materiality.

13.3.1STREET LEVEL OPEN SPACES

Any open space around the new parking garage/community space on the designated lot, excluding the 30 feet publicly accessible buffer area between the garage and future detention facility, must be part of the streetscape landscape design as part of the garage construction phase. The landscape must extend the character of the existing Civic and Justice Complex campus and surrounding neighborhoods, streets, and highways. The streetscape must consider all vehicular and pedestrian access points to the parking structure, community space, and existing remaining parking lot that is to remain. The DB must sequence work for all finished pavement surfaces to allow for occupancy and ADA compliance, but the final sidewalk pavement to be installed to proposed design will be installed in the subsequent Queens detention facility construction phase. Considerations must also be given as to how the sidewalk landscape design will continue along the length of 126th Street and 132nd Street. The paving, planting, and site furnishings palette must follow an overall design theme throughout the project. Any security measures should be seamlessly integrated into the landscape / streetscape design.

As part of the stormwater management strategy, the use of bioswales and rain gardens should be considered in the wider open spaces around the parking garage within the property boundary. Temporary planting, seating, and other landscape elements can be incorporated as part of the Garage construction phase before the landscape construction is finalized as part of the subsequent Queens Detention Facility construction. Existing street trees that are appropriate for the parking structure/community space must be protected (see Section 13.4.2 Landscape Planting for more details).

The 30 feet publicly accessible area will be turned over to another DB contract for the installation of the 48” trunk water main construction. This 30 feet publicly accessible area will be subsequently developed as part of the Queens Detention Facility design and construction phase. The DB team will coordinate their work to allow for the transfer approximately 1 year after the notice to proceed for the project.

13.3.2TEMPORARY PARKING LOT

As the temporary parking lot is being modified and reduced in size to accommodate the new parking garage, considerations must be made to ensure there is minimal earthwork around the parking lot planted boundary. Existing planting areas used as stormwater management basins must remain and continue to operate where possible – any new connections required to be per Civil Basis of Design. Existing pedestrian access points, access ramp, landscape planting, and parking lot must be maintained as much as possible.

Landscape

13.3 Design Criteria

13.3.3 ROOFTOP SPACES OF PARKING GARAGE

The rooftop space that is not occupied by building assembly, mechanical equipment and systems must be designed to comply with NYC Local Law 94 of 2019. The building must conform to Local Law (LL) 92-94. Refer to the LEED & Sustainability section of this document. The DB must focus attention on providing creative solutions to sustainability requirements. These could take the form of a solar photovoltaic electricity generating system, a vegetated green roof, a blue roof, urban agriculture, or a combination thereof. All planted areas on the rooftop space require irrigation. The roof could also harvest water, thereby also reducing the building's water use and reduce stormwater runoff. Furthermore, this helps to reduce the urban heat island effect, increases biodiversity, and sequesters carbon. The DB design must consider that there may be public access to the roof.

13.3.4 BLANK EXTERIOR WALLS OF THE PARKING GARAGE

The BD must consider a landscape strategy to mitigate the potentially unpleasant visual impact of blank walls on the exterior of the garage building. particularly where significant grade change occurs.

13.4 Other Considerations

13.4.1 PAVING MATERIALS

The DB must consider high quality, durable materials that will withstand the high-traffic of the sidewalk and will withstand vehicular traffic where needed (such as entrances/exits of the garage). Acceptable materials for paving and surfacing are: architectural concrete, sealed integral color interlocking precast pavers, precast pavers, stone pavers, and permeable pavers (on sidewalk within property boundaries). All paving and surfacing materials must adhere to applicable NYC Department of Transportation (DOT) and Department of Design and Construction (DDC) standards, including color and surface texture.

1. Design for on-site pavements must complement or relate to the surrounding sidewalks and character of adjacent Civic and Justice Complex campus.
2. Along the edges of the designated zones for improvement - pavement patterning and materials can be extended or transitioned/matched to existing.
3. Concrete pavements are to be installed to ACI (American Concrete Institute) and NYC standards for pavement design with jointing layout to control cracking and pavement failure.
4. Removal of any type of paving material must be restored or replaced with similar or improved materials.
5. Permeable Pavements: permeable pavements that are used as part of the stormwater management strategy are to be durable and easy to clean. The type of permeable paving materials includes:
    a. Poured-in-Place - Fine grain (3/8 inch minus aggregate design) suitable for ADA compliance for walking surfaces.
    b. Precast Concrete Pavers - Paver systems including pavers made from permeable concrete allowing installation of hand tight joints between pavers or jointed paver system with permeable with permeable infill between joints. Jointed permeable paver system to provide joints with a maximum width of 3/8 inches.
6. Fixed Paver Systems: Pavers including stone and/or precast that are fixed are to be mortared in place with suitable base of concrete or acceptable aggregate base. Layout of joints are to control cracking and expansion of the paving system.
7. Vegetated green roofs are to be of architectural quality and must be compatible with building waterproofing systems.

Landscape

13.4 Other Considerations

13.4.2 LANDSCAPE PLANTING

All plant specifications must follow DOT requirements and guidelines. All plants must be sourced from a regional location.

1. General Planting
    a. Planting must be designed for security, safety, and comfort of all users. The form and layout of plants must promote and aid in the security and surveillance of the site. The planting must not provide any hiding places, and all planting that can potentially be weaponized must be excluded.
    b. Maintaining visibility is a large consideration and design intent for the planting selected. The plants selected must take into consideration the growth, final height, and habit of the plants to ensure original lines of sight do not get obscured overtime.
    c. All planting must be appropriate for planting in Zone 7b, as noted by USDA Plant Hardiness Zone requirements for Queens.
    d. All planting selected must be suited to specific microclimate conditions around the project site.
    e. All planting must be native and diverse species so they will be low maintenance and resilient to environmental changes.
    f. All planting must be proven to withstand urban conditions.
    g. All planting must be drought, frost and salt tolerant
    h. Only nursery-grown plant materials are acceptable.
    i. No plant species listed as invasive as defined and identified by the New York State Department of Environmental Conservation can be used.
    j. All nursery grown materials for planting must be in conformance with the New York State Department of Agriculture's regulations of inspections for nursery stock. Plants must be healthy, vigorous, and free of insect infestations, plant diseases, sun scalds, frost burns, abrasions, and other disfigurement. Plants must have vigorous fibrous root systems that are not root-bound or pot-bound.
    k. Plants must be spaced to ensure each plant has adequate space to grow based on their expected size at maturity (to avoid excessive pruning), and for maintenance access.
    l. Plants/flowers that are toxic or irritating to the touch must be excluded.

m. Plant palettes must include shrubs, grasses, and ground covers providing stormwater treatment as deemed necessary, through the reduction and filtering of water runoff from paved areas. These plants must be able to withstand both periodic inundation and drought.

n. In the selection of plant species, attention must be given to their color, form, foliage, and texture and how these can be combined to create year-round interest.

2. Trees

   i. An arborist must be consulted for tree survey, analysis, and health/safety report for tree removal and replacement. This must also inform the removal and replacement of all street treess.

   ii. Planting design, specifically trees, must improve air quality and reduce heat island effect and ambient temperatures of the site through shading of pavement and hardscape areas in summer months.

   iii. Existing street trees that are appropriate for the parking structure/community space must be protected, and all work performed in compliance with Local Law 3 of 2010 and the NYC Parks Tree Protection Protocol approved by the NYC Parks Borough-specific Forester to minimize potential adverse impacts to existing trees that will remain in place.

   iv. Additional trees along the street must be planted in accordance with city guidelines. Per NYC DPR Street Tree Planting Standards (2016 or latest version) for new buildings, one street tree must be provided for every 25 feet of building road frontage. When placing additional trees, consider the window locations of community facility to optimize and enhance outdoor views. The remaining number of required trees that are not suitable for the building site must be provided off-site or paid into a fund pursuant to ZR Section 26-40.

   v. The selected tree form must inhibit the ability to climb, the canopy and foliage must be open and porous enough to allow visibility through and prevent hiding spots, and it must be of a height that will not create security concerns such as obscuring clear lines of sight or security cameras/CCTV footage of streets.

   vi. All street tree species must be selected from the DPR Street Tree Approved Species List.

   vii. New street tree pits and beds must meet NYC DPR criteria.

Landscape

13.4 Other Considerations

viii. Space trees so that their mature canopy does not overhang or touch any buildings, fences, or walls. All clearance requirements between street trees and other site elements must meet NYC DPR criteria and NYC DOT Street Design Manual guidelines.

13.4.3 SOIL

1. All site soil and imported soil intended for landscape use must be tested for fertility and agricultural suitability after rough grading has been completed. Soil testing must be done for initial review of soil intended to be used during the preparation and import, and at project closeout to assist in the future management of implemented landscape improvements. The soil report must include pH measurement, measurement of nutrients and elements, and soil texture (i.e., gravel, sand, silt, and clay) to determine organic matter content by the measurement of organic carbon and total nitrogen, and interpretation and recommendations for correction of nutritional deficiencies/excesses and potential toxicities.
2. Native site or imported soils to be used in landscape areas or to backfill planters must be clean, fertile, loamy soil, free of stones, sticks, stumps, or other deleterious matter 1 inch in diameter or larger. It must also be free from wire, plaster, construction debris, trash, or similar objects that would be a hindrance to planting or maintenance.
3. Soils intended for use within bio-retention planting structure must be blended for use in such structure and must follow NYC standards for Rain Gardens or Dry Swale in accordance to DOT/DPR standards.
4. Soil amendments must be applied per Soils Report recommendations.
5. The soil to be used on the rooftop space must be a lightweight growing medium as part of a proved green roof buildup system such as, but not limited to, Rooflite.
6. Extensive green roof system must have a minimum of 6 inches soil depth.
7. All trees must have adequate soil volume for good healthy tree growth. The DB must provide adequate rooting volume for trees and other plants through the use of imported soils, structural soil, or soil cells under adjacent hardscape with Client direction.

13.4 Other Considerations

13.4.4 IRRIGATION SYSTEMS

1. All planting areas that require irrigation must be installed with fully automatic irrigation systems.
2. All control equipment is to be secured in a locked cabinet or secured room in the garage.
3. The irrigation backflow equipment can be concealed in the garage if possible but must comply to City standards on maximum distance from point of connection.
4. The irrigation system equipment must include low-flow irrigation heads, weather-tracking automatic controllers, master valves, and high-efficiency / low-flow nozzles.
5. The available water pressure must be verified with the appropriate agencies before the irrigation system is designed.
6. The DB must provide irrigation system that utilizes a 2-Wire Decoder System that connects to central irrigation controller and site irrigation valves.
7. Appropriate irrigation equipment must be used when located near pedestrian paths and gathering areas.
8. Irrigation water source could draw from harvested rainwater from the roof space partially or entirely. Water harvesting would also reduce the building's water use and reduce stormwater runoff. This could help the facility achieve water efficiency goals for high performance (Refer to Sustainability section for LEED requirements and discussion). If this approach is pursued, the DB must provide an irrigation system that follows City codes and standards for reclaimed water irrigation and health standards for use of gray water in irrigation.
9. As an addition to the fully automatic irrigation systems, a water source/connection can be provided from the garage to allow for a maintenance worker to deploy a hose to perform any necessary watering and maintenance/cleaning.
10. See Plumbing Basis of Design section for additional requirements.

13.4.5 SITE FURNISHINGS

1. The DB must maintain existing outdoor bike parking at corner of 132nd Street and 82nd Ave in the temporary parking lot.
2. Site furnishings must be provided in all areas, along pedestrian paths, and in the proposed garage plaza entry area.
3. A uniform group of site furnishing must be used project-wide along the pedestrian paths and in the entry area. Site furnishings must follow the NYC Street Design Manual and streetscape standards for areas that fall within the right-of-way.

Landscape

13.4 Other Considerations

4. All pedestrian and vehicular entrances must be kept clear of site furnishings, except protective design elements such as bollards as needed.
5. All site furnishing must be permanently attached to concrete pads and be vandal-proof. They can be no parts that could be removed and potentially weaponized.
6. The type of finish and coating used for site furnishing materials must consider anti-vandal and anti-graffiti techniques to enable ease of maintenance.
7. Benches and seating areas (including companion seating per ADA requirements), and trash/ash receptacles must be provided as needed within public spaces, and preferably away from the building to mitigate against blast. Blast-resistant trash cans can be considered with client's direction.
8. All planters in the public right-of-way must be provided as fixed (permanent) modular units and follow the design parameters and guidelines (shape, placement, materials, color) set by NYC DOT and NYC PDC (Public Design Commission). Planters must); be adequately sized for proposed planting; be less than 30 inches high; have waterproofing on all sides; have adequate drainage; and be designed to prevent efflorescence. All exposed concrete must be sealed and have an anti- graffiti coating.
9. Skateboard deterrents must be integrated and incorporated in all walls, planter walls, and seat walls as part of the furnishing design. The use of skateboard deterrents may be waived per client direction.

13.4.6 LANDSCAPE LIGHTING

1. Lighting must be provided on all sidewalks and public spaces around the building. Pedestrian routes leading from the parking garage / community space to the detention facility must be well lit and adhere to NYC DOT Streetscape Design Guidelines. See Civil Basis of Design for more details.
2. Pedestrian-oriented lighting must be scaled for pedestrian comfort.
3. Lighting must comply with Crime Prevention Through Environmental Design (CPTED) strategies.

4. Consider including landscape lighting design (intended only to enhance the landscape planting) in the entry area of garage and in high-use pedestrian areas to increase illumination as needed to increase pedestrian comfort and improve safety.
5. Energy-efficient lighting must be used per the City guidelines and as required per LEED.
6. All lighting fixture selections in the right-of-way must meet DOT requirements, including, but not limited to, streetlight and pedestrian poles with various luminaires.
7. Lighting must be coordinated with security requirements.
8. Refer to Section 5 - Electrical Basis of Design for more exterior lighting requirements.

13.4.7 PROTECTIVE DESIGN - SITE PERIMETER SECURITY

The site perimeter security for landscape is meant to supplement Section 14 - Protective Design: Blast & Anti-Terrorism section in the Basis of Design. The main role that landscape site perimeter security offers is against vehicular-borne threats that might be in too close proximity to the planned detention facility.

1. The DB must provide (and require the supplier to provide) certified barriers in all locations deemed necessary. During design, input from a supplier must be sought to confirm the locations where certified barrier products can be installed. The proposed product and its location must be reviewed with the DOT and DDC to understand where certified barriers will be achievable and required.
2. In the absence of any specific performance criteria, site perimeter security elements must satisfy M50/P1 crash rating as defined by ASTM F2656.
3. The spacing and location of certified barriers must meet security requirements, supplier recommendations, and adhere to city sidewalk standards.
4. Protective design must be coordinated with DOT and the NYPD to determine the type and level of threats.

13.4.8 MAINTENANCE PERIOD

1. All landscape areas in the project site must have a 2-year minimum maintenance period.
2. The maintenance period will start once all construction, planting, and irrigation are fully installed and field walk punch-list items are verified by the Owner's Representative as completed.
3. The maintenance period must continue until final acceptance of the work by the City. Improper maintenance or poor condition of planting at the termination of the scheduled maintenance period may cause postponement of the final completion date of the Contract.

Landscape

13.4 Other Considerations

4. Any day in which the planting is not adequately maintained, unsuitable or dead plants are not replaced, or weed control or other maintenance work as determined necessary by the City is not performed, will not be credited as one of the maintenance-period working days.
5. Maintenance must be performed according to the following standards:

    a. All areas must be weeded and cultivated at intervals of not more than 10 days.

    b. Water, trim, fertilize, spray, and perform pest and rodent control, as required.

    c. Fertilizers weed and pest control products must be verified for safe application in close proximity to native plants and ornamental grasses, and near pedestrian walkways and gathering areas.

    d. All project plant material must be guaranteed for a period of 2 years minimum. Plants found to be 3/4 dead or in poor condition due to faulty materials or workmanship, as determined by the City, must be replaced at no cost to the City. Plants must be replaced with the originally-specified species, unless approved by the City's Authorized Representative and agreed to by the City.

    e. Material rejected during the Guarantee period must be replaced within 15 days of written notification by the City, and at no cost to the City.

Protective Design: Blast & Anti-Terrorism

14

Protective Design: Blast & Anti-Terrorism

14.1 Introduction

The proposed garage will be separated from the future Queens detention facility by a 30 foot wide buffer and consists of multiple floors above grade. The garage is planned for public use.

This garage might have several implications on the design of the detention center facility, including the following:

1. The threat can potentially be located on the roof of the garage. This might require higher floors of the detention center system be considered for blast mitigation.
2. Due to the height of the garage, collapse or damage to the garage (due to any man-made, or accidental threats) might cause collateral damage to the nearby detention facility.

The purpose of these guidelines is to provide recommendations to mitigate effects of threats initiated inside the garage facility on the adjacent detention facility.

14.2 Codes & Standards

The garage / community space facility must be designed in accordance with applicable laws, good engineering and construction practice, the New York City Building Codes, standards and specifications and the adopted revisions of recognized Codes of Practice, Standards and Specifications, and their addenda, as noted below.

1. The governing code is the New York City Building Code (NYC BC 2014) with amendments to the Building Code as applicable.
2. The minimum design loads for structural system and its components are determined based on ASCE 7-05 for all structural loadings except for seismic load, which shall be determined based on ASCE 7-10.
3. Reinforced Concrete Design Standard: American Concrete Institute (ACI) 318-11
4. Structural Steel Design Standard: American Institute of Steel Construction (AISC) 360-05
5. Structural Steel Seismic Design Standard: Seismic Provisions for Structural Steel Buildings Standard: AISC 341-05
6. Cold Formed Steel Design Standard: American Iron and Steel Institute (AISI) S-100-07
7. Precast Concrete Specifications: ACI 318-11 and Precast Concrete Institute (PCI) Design Handbook
8. Masonry Design Standard: ACI 530-08
9. Aluminum Design Standard: Aluminum Association (AA) Aluminum Design Manual (ADM) ADM 1-05
10. The Design-Basis Threat – an Interagency Security Committee Report.

Protective Design: Blast & Anti-Terrorism

14.3 Design Criteria

While the garage / community space might not require blast design and no site specific Design Basis Threat (DBT) is required, the detention facility will. The following mitigation strategies are proposed to mitigate effects on the detention facility:

1. The garage facility must be designed to preclude disproportionate progressive collapse scenarios that might cause collateral damage to the adjacent detention facility. Additionally, any potential damage to the garage must not impede or hinder emergency evacuation, rescue, and recovery (ERR) systems associated with the detention facility. These systems may include, but are not limited to, fire suppression, fire detection, post-event smoke purge, CBR filtration HVAC, exit passageway and stair pressurization, emergency lighting, voice communications, vehicle access control, video
   surveillance, and emergency power systems.
2. The construction material and detailing of the garage must eliminate the potential for structural or non-structural components to become airborne during a blast event. This might require special anchorage of those components.
3. The garage must limit access of large vehicles. If such vehicles are desired, parking spots must be designated on the farthest point from the Queen's detention center.
4. The design of the garage must incorporate the 4 "D" strategies mitigate against potential undesirable man-made events. The 4 "D" strategies include Deter, Deny, Detect, and Defend.
   a. Deter. Visible protection measures send a strong message that actions have been taken to protect the facility. Potential aggressors would realize that their chances of success are reduced. Such realization is likely to deter attackers. Deterrence measures include visible Closed Circuit Television cameras (CCTVs), guard stations, cleared lines of sight to critical components, and visible structural protection measures such as barriers.
   b. Deny. The most successful method to minimize the effects of threats is to keep potential attackers as far from a target as possible. This might include imposing parking restrictions in close proximity to the detention center facility.
   c. Detect. The key to a quick response to any threat is being able to detect it before it materializes into an actual attack. Detection measures do not need to be visible to potential attackers. Closed circuit television, police patrols, and other detection methods may be used to identify potential threats. Alarmed doors and hatches may be used to detect unauthorized entry to restricted spaces. Detection measures are valuable in mitigating threats only if a response is possible and timely.
   d. Defend. The last line of defense includes structural mitigation strategies to lessen the attack effects. These measures are intended to be improvements in ductility, robustness, and redundancy of structural components, which are desirable characteristics that lead to improvement in structural performance under extreme loading conditions.

Environmental

15

Environmental

15.1 Introduction

The garage and community center construction will have the potential to cause temporary environmental impacts on the adjacent community. According to the final Environmental Impact Statement (EIS), construction period air pollution and noise control must be implemented according to the city control codes. This chapter describes the applicable city codes and control measures required and/or implemented to the extent practicable during the construction.

15.2 Codes & Standards

New York City has developed various codes to regulate construction period air pollution and noise with specific requirements applicable to the construction activities. The building construction plan must comply with the following city codes:

1. New York City Air Pollution Control Code - all projects are required to comply with the New York City Air Pollution Control Code, which regulates fugitive dust under Section 1402.2-9.11, "Preventing Particulate Matter from Becoming Air-Borne; Spraying of Asbestos Prohibited; Spraying of Insulating Material and Demolition Regulated" (Title 24 of the Administrative Code of the City of New York, Chapter 1, Subchapter 6, Section 24-146). Local Law 77 of 2003 requires that any diesel-powered nonroad equipment, fifty horsepower or greater, that is owned by, operated by or on behalf of, or leased by a City Agency be powered by Ultra Low Sulfur Diesel (ULSD) and utilize Best Available Technology (BAT).
2. New York City Noise Control Code (also known as Chapter 24 of the Administrative Code of the City of New York, or Local Law 113) and the Department of Environmental Protection (DEP) Notice of Adoption of Rules for Citywide Construction Noise Mitigation (also known as Chapter 28 of the Administrative Code of the City of New York) - The requirements established by the code mandate that specific construction equipment and motor vehicles meet specified noise emission standards; that construction activities be limited to weekdays between the hours of 7:00 AM and 6:00 PM; and that construction materials be handled and transported in such a manner as not to create unnecessary noise. For weekend and after hour work, permits would be required.

Environmental

15.3 Design Criteria

15.3.1 AIR QUALITY

Various control measures are required to control air pollution during the construction period including:

1. Dust Control - a dust control plan including a robust watering program is required as part of contract specifications. The plan must include measures such as:
    a. All trucks hauling loose material must be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the project site.
    b. Water sprays must be used for all demolition, excavation, and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air.
    c. Loose materials must be watered, stabilized with a chemical suppressing agent, or covered.
    d. All measures required by the DEP's Construction Dust Rules regulating construction-related dust emissions must be implemented.
2. Idling Restriction - as required by local law, all stationary vehicles on roadways adjacent to the project site will be prohibited from idling for more than 3 minutes. However, the idling restriction excludes vehicles that are using their engines to operate a loading, unloading, or processing device (e.g., concrete-mixing trucks) or otherwise required for the proper operation of the engine.
3. Clean Fuel - ULSD fuel must be used exclusively for all diesel engines throughout the project site.
4. Best Available Tailpipe (BAT) Reduction Technologies - nonroad diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the project) including but not limited to concrete mixing and pumping trucks must utilize the BAT for reducing particulate emissions. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. Construction contracts must specify that all diesel nonroad engines rated at 50 hp or greater would utilize DPFs, either installed by the original equipment manufacturer or retrofitted. Retrofitted DPFs must be verified by USEPA or the California Air Resources Board. Active DPFs or other technologies proven to achieve an equivalent reduction may also be used.
5. To the extent practicable, all diesel-powered non-road construction equipment with a power rating of 50 hp or greater must meet the Tier 4 engine emissions standard.
6. To extent practicable, equipment that could use electric engines in lieu of diesel engines includes, but may not be limited to, welders and rebar benders.

15.3 Design Criteria

15.3.2 NOISE

Various noise control measures are required to control noise during the construction period including:

1. As required under the New York City Noise Control Code, a site-specific noise mitigation plan for the proposed project must be developed and implemented that may include noise source and path controls.
2. Additionally, the project sponsor has committed to additional noise control measures beyond the minimum required by code as described above in order to reduce potential noise effects on the surrounding receptors. Specific noise control measures must be incorporated in noise a mitigation plan(s) required under the Code. These measures must include a variety of source and path controls.
    a. In terms of source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures must be implemented:
        i. Equipment that meets the sound level standards specified in Subchapter 5 of the New York City Noise Control Code and Table 22-1 of the CEQR Technical Manual must be utilized from the start of construction.
        ii. Since electric power is expected to be available throughout the project site, electrically powered equipment such as welders and saws must be used over diesel-powered versions of that equipment, to the extent feasible and practicable.
        iii. Where feasible and practicable, the construction site must be configured to minimize backup alarm noise.
        iv. In addition, trucks will not be allowed to idle more than 3 minutes at the construction site based upon Title 24, Chapter 1, Subchapter 7, Section 24-163 of the New York City Administrative Code.
        v. Contractors and subcontractors will be required to properly maintain their equipment and mufflers.
    b. Path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), must meet the local noise code requirements and implement measures to the extent feasible and practicable such as:
        i. Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations.
        ii. Noise barriers constructed from plywood or other materials surrounding the construction site must be utilized to provide shielding. The barriers must be at least 8 feet tall.
        iii. Where logistics allow, truck deliveries must take place behind the barriers.
        iv. Other path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) will be required for certain dominant noise equipment to the extent feasible and practical (i.e., generators, compressors, and pumps).

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AUGUST 20 20

Performance Specifications

Queens Garage & Community Space

QN NYC Borough-Based Detention centers Program

A DESIGN-BUILD PROGRAM

PIN: 8502020 CR 0040 P-42 P

NYC DDC Department of Design and Construction

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Figures & Tables

Tables

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Sustainable Design Requirements

1

Sustainable Design Requirements

1.1 Construction Waste Management and Disposal

1.1.1 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

1. Summary
    a. Salvaging nonhazardous demolition and construction waste.
    b. Recycling nonhazardous demolition and construction waste.
    c. Disposing of nonhazardous demolition and construction waste.
2. Performance Requirements
    a. End-of-Project Rates for Salvage/Recycling: 75 percent across at least 4 waste streams.
3. Waste Management Plan
    a. Types and quantities of demolition and construction waste.
    b. Type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator.
    c. Net additional cost or net savings resulting from waste management plan.
4. Plan Implementation
    a. Engage a waste management coordinator.
    b. Train workers, subcontractors, and suppliers on proper waste management procedures.

1.2 Sustainable Design Requirements

1.2.1 SUSTAINABLE DESIGN REQUIREMENTS

1. Performance
   a. Design-Builder is directed to Section 12.6 (Sustainable Design Requirements) of the Standard Project Requirements (Volume 2) for LEED and sustainability requirements for the Project.
2. Action Submittals
   a. Documentation Submittals: Product Data, receipts, certification letters, chain-of-custody certificates, and other Documentation needed to show compliance with requirements.
3. Informational Submittals
   a. Project Materials Cost Data: For building materials used for Project, excluding mechanical, electrical, and plumbing components, and specialty items, such as elevators and equipment.
      i. For wood-based materials used for Project.
   b. Action Plans: Submit within 30 days of date established for the Notice to Proceed.
      i. Products with Environmental Product Declarations (EPDs).
      ii. Products complying with requirements for multi-attribute optimization.
      iii. Products complying with requirements for raw material and source extraction reporting.
      iv. Products complying with requirements for leadership extraction practices.
      v. Products complying with requirements for material ingredient reporting.
      vi. Products complying with requirements for material ingredient optimization.
      vii. Products complying with requirements for product manufacturer supply chain optimization.
      viii. Waste management plan.
   c. Construction indoor-air quality (IAQ) management plan.
   d. Progress Reports: With each Application for Payment, comparing construction and purchasing with action plans.
   e. LEED and, if applicable, Parksmart scorecards and any required back up data
4. Quality Assurance

Sustainable Design Requirements

1.2 Sustainable Design Requirements

a. Sustainability Consultant: Engage an experienced LEED AP BD+C.

5. Products
   a. Select materials to comply with the following:
      i. Environmental Product Declarations (EPD).
      ii. Multi-attribute optimization.
      iii. Raw material source and extraction reporting.
      iv. Material ingredient reporting.
      v. Material ingredient optimization.
      vi. Manufacturer supply chain optimization.
      vii. Leadership extraction practices.
      viii. Extended producer responsibility program.
      ix. Recycled content.
   b. Low-Emitting Materials:
      i. Interior paints and coatings.
      ii. Interior adhesives and sealants.
      iii. Flooring.
      iv. Composite wood.
      v. Ceilings, walls, and thermal insulation.
6. Construction Indoor-Air-Quality (IAQ) Management
   a. Credit IEQ 3.1: SMACNA's "IAQ Guideline for Occupied Buildings under Construction."
   b. Credit IEQ 3.2: Indoor air flush-out or air-quality testing.

Shell

2

Shell

2.1 Foundations

2.1.1 STEEL PILES (IF USED)

1. Summary
    a. Section Includes:
        i. Steel H-Piles
        ii. Steel pipe piles
        iii. Steel casings
        iv. Coating
        v. Driving Points
2. Performance
    a. Foundations must meet the requirements of NYC Department of Buildings Code requirements
    b. Static pile tests must be performed in accordance with NYC Department of Buildings Code requirements for axial, lateral and uplift loading.
    c. Pile-driving records compiled by professional engineer as part of a Specialty Inspection Agency in accordance with NYC Department of Buildings.
    d. Certified as-installed pile survey by a licensed Surveyor in the State of New York.
3. Materials
    a. Steel H piles.
        i. ASTM A572.
    b. Steel Pipe Piles
    c. Steel Shapes and Plates (for splices and tip reinforcement)
        i. ASTM A572.
    d. Coating for Steel H Piles
        i. Scotchkote 206N manufactured by 3M, St. Paul, MN, or approved equal.
    e. Pile Accessories: Driving points.
4. Field Quality Control
    a. Special Inspections: Pile foundations
    b. Testing by Design-Builder's hired agency.

2.1.2 TIMBER PILES (IF USED)

1. Summary
    a. Section Includes:
        i. Timber Piles
        ii. Pressure treatment
        iii. Driving Shoes
2. Performance
    a. Foundations must meet the requirements of NYC Department of Buildings Code requirements
    b. Static pile tests must be performed in accordance with NYC Department of Buildings Code requirements for axial, lateral and uplift loading.
    c. Pile-driving records compiled by professional engineer as part of a Specialty Inspection Agency in accordance with NYC Department of Buildings.
    d. Certified as-installed pile survey by a licensed Surveyor in the State of New York.
3. Materials
    a. Round timber piles must be either Southern Yellow Pine or the Coastal species of Pacific Coast Douglas Fir, conforming with ASTM D 25.
    b. Pressure Treatment:
        i. Service Condition: Foundation.
    c. Pile Accessories: Driving shoes.
    d. Spliced piles are not permitted
4. Field Quality Control
    a. Special Inspections: Pile foundations
    b. Testing by Design-Builder's hired agency.

2.1.3 COMPOSITE PILES (IF USED)

1. Summary
    a. Section Includes:

Shell

2.1 Foundations

i. Steel Pipe Piles
ii. Steel Reinforcement
iii. Concrete
iv. Steel Shapes.

2. Performance
   a. Foundations must meet the requirements of NYC Department of Buildings Code requirements
   b. Static pile tests must be performed in accordance with NYC Department of Buildings Code requirements for axial, lateral and uplift loading.
   c. Pile-driving records compiled by professional engineer as part of a Specialty Inspection Agency in accordance with NYC Department of Buildings.
   d. Certified as-installed pile survey by a licensed Surveyor in the State of New York.
3. Materials
   a. Steel pipe piles. ASTM A 252, Grade 2. Pipe piles must be either seamless pipe or full penetration electric resistance butt welded with straight or spiral seams. Pipe shall be welded in a manner that welding must not crack or fail when the pile is subjected to its intended use, including during driving. The weld seam of each length of pipe shall be tested for acceptance by ultrasonic testing in accordance with the provisions for Nondestructive Electric Test of Weld Seam of ASTM A 53.
   b. Steel Reinforcement: ASTM A 615, Grade 60
   c. Concrete: 5000 psi with air entraining.
   d. Steel Shapes and Plates (for tip closure or pile point) ASTM A 36,
4. Field Quality Control
   a. Special Inspections: Pile foundations
   b. Testing by Design-Builder's hired agency.

2.1.4 DEWATERING

1. Summary
   a. Section Includes:
      i. Design of Dewatering System

ii. Permits

iii. Monitoring

2. Performance

a. Design-Builder to design dewatering system.

b. The dewatering system must be capable of lowering and controlling the ground water level and hydrostatic pressure to permit the excavation and other Work to be performed in the dry, to preclude disturbance to soil at or below foundation subgrade and to prevent uplift of the construction due to hydrostatic pressure.

c. Maintain adequate control so that: the stability of excavated and construction slopes is not adversely affected by storm water or runoff; erosion is controlled; and flooding of excavations or damage to structures does not occur. The control of all ice and snow must be considered as part of the dewatering requirements.

d. Where excavations extend below the water table, lower the water table and hydrostatic head to a minimum of two feet below the elevation of the required subgrade and maintain this condition during construction.

e. To monitor effectiveness of dewatering system, install instrumentation for confirmation,

f. Design-Builder to survey adjacent construction before and during dewatering.

g. Design-Builder must set up a monitoring program to monitor existing structures within 100 feet of the dewatering operations to ensure the dewatering operations do not effect the existing structures in regard to settlement and movement.

2.1.5 EXCAVATION SUPPORT AND PROTECTION

1. Summary

a. Section Includes:

i. Performance

ii. Submittals

iii. Installation

2. Performance

a. Contractor to design excavation support and protection. All work must be stamped and signed by a Registered professional Engineer licensed in the State of New York.

Shell

2.1 Foundations

b. Design, furnish and install excavation support systems to maintain lateral support, prevent loss of ground, limit soil movements to acceptable limits and protect from damage existing and proposed improvements including pipelines, utilities, structures, roadways, railroads and other structure.

c. Construction of the excavation support systems must not disturb the existing structures or the completed proposed structures. Damage to such structures shall be repaired at Contractor's expense.

d. Contractor to provide a vibration monitoring plan showing vibration limitations to be implemented for the project.

3. Materials

a. Structural steel.

b. Steel sheet piling.

c. Wood Lagging: Nominal rough thickness of 3 or 4 inches.

d. Shotcrete.

e. Cast-in-place concrete.

f. Tiebacks.

4. Quality Insurance

a. Conform to the requirements of the OSHA Standards and Interpretations: "Part 1926 Subpart P - Excavation, Trenching, and Shoring".

b. Prepare design, including calculations and drawings, under the direction of a Professional Engineer registered in the State of New York.

2.1.6SECANT PILES (IF USED)

1. Summary

a. Section Includes:

i. Concrete Guide Walls

ii. Concrete

iii. Reinforcing Bars

iv. Steel Shapes.

v. Centralizers and Spacers

vi. Steel Casing

vii. Slurry

2. Performance
    a. Foundations must meet the requirements of NYC Department of Buildings Code requirements
    b. Installation records must be compiled by professional engineer as part of a Specialty Inspection Agency in accordance with NYC Department of Buildings.
    c. Certified as-installed pile survey by a licensed Surveyor in the State of New York.
3. Materials
    a. Steel Reinforcement: ASTM A 615, Grade 60
    b. Concrete: 5000 psi with air entraining.
    c. Steel Shapes and Plates (for tip closure or pile point) ASTM A 36
4. Field Quality Control
    a. Special Inspections: Pile foundations
    b. Testing by Design-Builder's hired agency.

Shell

2.2 Vertical Structure

2.2.1 VERTICAL STRUCTURE

1. Summary
    a. Section Includes:
        i. Form Liners.
        ii. Reinforcing Materials.
        iii. Prestressing Tendons.
        iv. Concrete Materials.
        v. Supplementary Cementitious Materials.
        vi. Chemical Admixtures.
        vii. Steel Connections.
        viii. Stainless-Steel Connections.
        ix. Wall Connections.
        x. Bearing Pads.
        xi. Grout.
        xii. Mixing Water.
        xiii. Fire Proofing.
        xiv. Expansion Control.
2. Performance Requirements
    a. Basic Function:
        i. Provide structural elements, above grade capable of supporting all anticipated loads without failure or damage.
        ii. The structure comprises:
            1) Roofs: Roof construction, including canopies, and elements required for their support, insulation, fireproofing and fire stopping.
            2) Floors: Including all below-grade and above-grade levels.
            3) Walls: Including all bearing, retaining and shear wall structural elements.
            4) Columns: Including all posts, hangers or other vertical load carrying elements that are not walls.

iii. Where structural elements must function as elements defined within another element group, the construction will meet requirements of both element groups.

b. Amenity and Comfort:

i. Water penetration and weather resistance: provide supplementary waterproof construction providing protection.

c. Health and Safety:

i. Fire: Provide fire resistance in accordance with code.

ii. Firestopping installer must have a minimum of 5-years' experience installing Underwriters Laboratories (UL) listed firestopping systems in similar type construction.

iii. Fireproofing installer must have a minimum of 5-years' experience installing UL listed fireproofing systems in similar type construction.

iv. Where fire resistance integrity of superstructure assemblies is impaired by subsequent installation of other construction elements, restore fire resistance using identical materials or other materials tested under ASTM E814.

v. Provide fire stopping at openings in fire-rated superstructure elements that is rated at not less than the required fire resistance of the penetrated element.

d. Structure:

i. Capacity: Provide the structure load-bearing structural members of capacities required by the New York City Building Code and by any specific project requirements.

ii. Design and construct the structure to resist loads from weights of building including, but not limited to, construction materials, mechanical-electrical-plumbing systems, equipment and fire protection.

iii. Design and construct roof, floor, column and wall elements to resist uniformly distributed, concentrated, and impact loads in accordance with the Building Code.

iv. Environmental Loads:

1) Wind: Basic wind speed, importance factor, and exposure in accordance with the NYC BC 2014.

2) Earthquake: In compliance with provisions of the building code for the appropriate building occupancy based on building type and function.

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2.2 Vertical Structure

3) Structural Design: In addition to the requirements of the code, design and construct to comply with any more stringent requirements within the Client Provided Scoping documents.

v. Thermal Performance: Design external (perimeter) components of subsystem either directly or indirectly exposed to weather to resist applicable potential ambient air differential temperature with adequate provisions for noiseless movement in expansion and contraction and prevention of binding, buckling, joint-opening, breakage or undue stress in and between members. Control and separation joints should be shown on structural drawings.

vi. Design structure to limit defections to meet the requirements of governing code.

e. Durability:

i. Garage building service life is expected to be greater than 50 years.

ii. Moisture resistance of load-bearing members: Use materials that are not damaged by contact with water or moisture vapor.

1) Materials that will corrode in the presence of water may be used if protected from water.

2) Materials that will rot or be damaged by fungus may be used if protected from water.

3) All cast-in-place concrete and precast slabs and beams in parking decks areas that are exposed to the weather, water, snow, freezing and thawing and deicing salt must be designed to prevent the deterioration and corrosion of the concrete and reinforcing steel.

4) In areas where water and snow are carried from the outdoors, a sacrificial topping above waterproofing membrane which protects the surface from salt penetration is recommended.

5) Water resistance: Design and select materials to provide resistance to normal wear-and-tear in accordance with code and the following:

a) Elements within reach of pedestrians: Minimize degradation from rubbing and scratching caused by pedestrians.

b) Minimize degradation caused by windblown sand, acid rain, normal operation and maintenance.

6) Substantiation:

a) Design development: Identification of building elements required to resist wear, quantification of wear criteria, materials to be used, and methods of substantiation.

b) Construction documents: Proven in use or proven by mockup data.

iii. Impact resistance of load-bearing members: Use materials that are not easily damaged by common hand tools.

iv. Applied Fireproofing Materials:

1) In locations where Concealed by Permanent Construction:

a) Density: 10 lb./cu ft minimum.

b) Impact Strength: Passing ASTM E760.

2) Interior Locations, where exposed to air but out of reach of people above 10 ft:

a) Density: 14 lb./cu ft minimum.

b) Impact Strength: Passing ASTM E760.

c) Bond Strength: 300 psf minimum, tested in accordance with ASTM E736.

3) Exterior Locations, where exposed to air but out of reach of people above 10 ft:

a) Density: 21 lb./cu ft minimum.

b) Impact Strength: Passing ASTM E760.

c) Moisture Resistance: Not affected by precipitation or freeze-thaw.

4) Exposed locations on exterior and interior within reach of people below 10 ft:

a) Density: 39 lb./cu ft minimum.

b) Impact Strength: Passing ASTM E760.

c) Moisture Resistance: Not affected by precipitation or freeze-thaw.

3. Materials (as applicable to design)

a. Form Liners:

i. Material must be selected to provide precast concrete surfaces within the allowable fabrication tolerances. The material must be rigid, nonreactive with concrete and suitable for producing required surface finishes.

b. Reinforcing Materials:

i. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

ii. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

iii. Galvanized Reinforcing Bars may be used where corrosive environment or severe exposure conditions: ASTM A 615/A 615M, Grade 60 or ASTM A 706/A 706M, deformed bars, ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized and chromate wash treated after fabrication and bending.

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2.2 Vertical Structure

iv. Epoxy-Coated Reinforcing Bars may be used where corrosive environment or severe exposure conditions: ASTM A 615/A 615M, Grade 60, ASTM A 706/A 706M, deformed bars, ASTM A 775/A 775M or ASTM A 934/A 934M epoxy coated.

v. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, ASTM A 706/A 706M, deformed bars, assembled with clips.

vi. Welded Wire Reinforcement: ASTM A 185/A 185M, or ASTM A 1064/A 1064M, fabricated from as-drawn and/or galvanized steel wire into flat sheets.

c. Prestressing tendons:

i. Prestressing Strand: ASTM A 416/A 416M, Grade 270, uncoated, 7-wire, low-relaxation strand or ASTM A 886/A 886M, Grade 270, indented, 7-wire, low-relaxation strand (including supplement).

ii. Unbonded Post-Tensioning Strand: ASTM A 416/A 416M, Grade 270, 7-wire, low-relaxation strand with corrosion inhibitor conforming to ACI 423.7, with polypropylene tendon sheathing. Include anchorage devices.

iii. Prestressing Strand: ASTM A 910/A 910M, Grade 270, uncoated, weldless, 2-and 3-wire, low relaxation strand.

d. Concrete Materials:

i. Portland Cement: ASTM C150/C150M, Type I or Type III.

ii. Performance-Based Hydraulic Cement: ASTM C1157/C1157M: Type GU, general use; Type HE, high early strength; Type MS, moderate sulfate resistance; Type HS, high sulfate resistance; Type MH, moderate heat of hydration; Type LH, low heat of hydration.

iii. For surfaces exposed to view in finished structure, use same type, brand, and mill source throughout the precast concrete production.

e. Supplementary Cementitious Materials:

i. Fly Ash: ASTM C 618, Class C or F with maximum loss on ignition of 3%.

ii. Metakaolin: ASTM C 618, Class N.

iii. Silica Fume: ASTM C 1240 with optional chemical and physical requirements.

iv. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

f. Face-Mixture Coarse Aggregates:

i. Uniformly or Gap graded to achieve the required strength and durability requirements.

g. Chemical Admixtures:

i. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

ii. Retarding Admixture: ASTM C 494/C 494M, Type B.

iii. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

iv. Water-Reducing and Accelerating Admixture ASTM C494/C 494M, Type E.

v. High Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

vi. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

vii. Plasticizing Admixture for Flowable Concrete: ASTM C 1017/C 1017M.

viii. Corrosion Inhibiting Admixture: ASTM C 1582/C 1582M

ix. Air-entraining admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

h. Steel Members and Connections:

i. Steel connections may be Galvanized or Painted to achieve the durability requirements of the structure.

ii. Steel Plate and Bars: ASTM A36

iii. Carbon-Steel Shapes:

1) W-Sections: ASTM A992

2) M-Sections: ASTM A36

3) S-Sections: ASTM A36

4) Channels: ASTM A36

5) MC-Sections: ASTM A36

6) Angles: ASTM A36

7) Rectangular HSS Sections: ASTM A500 Gr. B, Fy = 46 ksi

8) Round HSS Sections: ASTM A500 Gr. B, Fy = 42 kis

9) Pipe Sections: ASTM A53 Gr. B

iv. Steel Fasteners:

1) High-Strength Bolts: ASTM A325 and ASTM A490

2) Nuts: ASTM A563

3) Washers: ASTM F436

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4) Threaded Rods: ASTM A36

5) Steel Headed Stud Anchors: ASTM A108

i. Stainless-Steel Connections:

i. Stainless-Steel Plate: ASTM A666, Type 304, Type 316, or Type 201, of grade suitable for application.

ii. Stainless-Steel Bolts and Studs: ASTM F 593, alloy 304 or 316, hex-head bolts and studs; stainless-steel nuts; and flat, stainless-steel washers.

iii. Stainless Chromium Steel Clad-Plate: ASTM A263-12(2019), Standard Specification for Stainless Chromium Steel-Clad Plate.

iv. Stainless Chromium-Nickel Steel-Clad Plate: ASTM A264-12(2019), Standard Specification for Stainless Chromium-Nickel Steel-Clad Plate.

j. Wall Connections:

i. ASTM E283 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

ii. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

iii. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Wall, and Doors by Uniform Static Air Pressure Difference.

k. Bearing Pads:

i. Elastomeric Pads: AASHTO M251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 Shore A durometer according to ASTM D 2240, minimum tensile strength 2250 psi per ASTM D 412.

ii. Other types of bearing pads may be allowed for application as recommended by the precast fabricator.

l. Grout:

i. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144, or ASTM C 404. Manufacturer's instructions should be followed.

ii. Nonshrink Grout: Premixed, prepackaged ferrous and non-ferrous aggregate shrink-resistant grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for dry pack and Grades B and C for flowable grout. Manufacturer's instructions should be followed.

iii. Epoxy-resin grout: Two-component mineral-filled epoxy-resin: ASTM C 881/C 881M of type, grade, and class to suit requirements. Manufacturer's instructions should be followed.

m. Mixing Water:

i. Mixing Water: ASTM C1602/ C1602M Standard specification for mixing water used in the production of Hydraulic Cement Concrete.

n. Fireproofing:

i. Where applied fireproofing is required, use one of the following:

1) Concealed:

a) Sprayed-on cementitious.

b) Sprayed on fibrous.

2) Exposed:

a) Intumescent.

ii. Sprayed-on cementitious at exposed areas out of reach.

4. Concrete Mixtures

a. Normal-Weight Concrete Strength:

i. Footings and Grade Beams: minimum 4000 psi

ii. Foundation Walls: minimum 4000 psi

iii. Slabs-on-Ground: minimum 4000 psi

iv. Suspended Slabs: Normal-weight concrete: minimum 4000 psi

v. Concrete Toppings: minimum 4000 psi

vi. Building Frame Members: minimum 4000 psi

vii. Building Walls: minimum 4000 psi

b. Using Supplementary Cementing Materials:

i. If part of the Portland cement to be replaced with other cementitious materials, then use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume to reduce Portland cement by 40 percent.

c. Water/Cementitious Materials Ratio:

i. Comply with ACI 318 minimum water-cementitious materials ratios for the applicable exposure category and class.

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d. Air Content:

i. Comply with ACI 318 total air content for the applicable exposure class.

5. Field Quality Control

a. Special Inspections:

i. Engage a qualified special inspector to perform any special inspections.

b. Testing Agency:

i. Engage an accredited independent testing agency.

ii. Testing Agency Inspector for Precast Prestressed Concrete: Personnel must be accredited by the Precast Concrete Institute (PCI).

iii. Testing Agency Inspector for Post-Tensioned Concrete: Personnel must complete Post-Tensioning Institute (PTI) Level 1 - Field Fundamentals course.

6. Concrete Repair

a. Concrete repair with packaged, cementitious; packaged, rapid-strengthening cementitious; packaged, polymer-modified cementitious and packaged, polymer-modified, silica-fume-enhanced cementitious patching mortar(s) formulated to match existing, adjacent, exposed concrete.

b. Floor joint repair with patching mortar and epoxy joint filler.

c. Epoxy crack injection of in-place concrete.

d. Corrosion-inhibiting treatment applied to in-place concrete.

e. Polymer-overlay epoxy adhesive with surface-applied aggregate applied to in-place concrete.

f. Polymer Sealer: Low-viscosity epoxy or high-molecular-weight methacrylate penetrating sealer and crack filler applied to in-place concrete.

g. Composite structural reinforcement with carbon or glass-fiber reinforcement in the form of tow sheet with field-applied saturant or pre-impregnated sheet.

7. Methods of Construction

a. Superstructure:

i. DB may utilize concrete or steel design methodologies provided all vertical and lateral support and serviceability conditions meet the code requirements for each building. These criteria must account for all height, load, and irregularity conditions which affect material selection and system type.

b. Floor Structure:

i. For elevated slabs double-T precast concrete panels that satisfy the requirements of New York City Building Code can be used. The precast panels must be certified by Precast and Prestressed Concrete (PCI). Post-tensioning concrete slabs and beams may be considered as an alternative. Wood is not an acceptable material for structural elements on this Project.

c. Roof Structure:

i. Similar to floor structure. Wood is not an acceptable material for structural elements on this Project.

8. Sustainability Requirements

a. Refer to Section 01 for Sustainable Design Requirements.

2.2.2 EXTERIOR STEEL PAINTING

1. Related documents

a. The following documents apply to all required Work for the Project:

i. The Design-Build Agreement
ii. Standard Project Requirements
iii. Specific Project Requirements
iv. Reference documents
v. Available documents

2. Summary

a. Section includes surface preparation and shop and field painting of exterior steel.

3. Sustainability Requirements

a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements for requirements.

4. Quality Assurance

a. Conform to The Masters Painters Institute (MPI) - Architectural Painting Specification Manual.

b. Applicator Qualifications: Engage an experienced applicator who has completed large high-performance coating system applications, having a record of successful in-service performance, and is licensed to install coating systems by selected coating manufacturer.

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c. Regulatory Requirements: Coating products must meet Federal, State, and Local Environmental Protection Agency (EPA) requirements for maximum Volatile Organic Compounds (VOC).

5. Project Conditions
   a. Apply waterborne paint only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.
   b. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
   c. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
      i. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.
6. Extra Materials
   a. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
7. Quantity
   a. Furnish Owner with an additional 7 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.
8. Paint, General
   a. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
   b. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
9. Examination
   a. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in Painting and Decorating Contractors of America (PDCA P4).
   b. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
   c. Start of painting will be considered as Applicator's acceptance of surfaces and conditions within a particular area.

10. Preparation
    a. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
        i. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
        ii. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
            1) Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/National Association of Corrosion Engineers (NACE) No. 3 (shop operation).
            2) Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat (field operation).
            3) Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods (shop operation).
11. Application
    a. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
    b. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
        i. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
        ii. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
        iii. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
    c. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

Shell

2.2 Vertical Structure

12. Cleaning

    a. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

    b. After completing painting, clean glass and paint spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

13. Protection

    a. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting.

2.3 Floor

2.3.1 FLOOR

1. Summary
    a. Section Includes:
        i. Form Liners.
        ii. Reinforcing Materials.
        iii. Prestressing Tendons.
        iv. Concrete Materials.
        v. Supplementary Cementitious Materials.
        vi. Chemical Admixtures.
        vii. Bearing Pads.
        viii. Grout.
        ix. Concrete Mixtures
        x. Mixing Water.
        xi. Fire Stopping.
        xii. Expansion Control.
2. Performance Requirements
    a. Basic Function:
        i. Structural Performance: Fabricator to design structural members in accordance with the New York City Building Code (NYC BC) and project requirements.
        ii. Precast double-T roof panels reinforced concrete beams and concrete topping capable of supporting specified loads. Equivalent reinforced concrete system may be considered.
        iii. Expansion control.
        iv. Fire ratings of components.
    b. Structure:
        i. Loads:
            1) Design loads must be determined with reference to the latest version of New York City Building Code and Amendments.

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2.3 Floor

2) Superimposed dead load: 25 psf minimum, which accounts for suspended utilities including feature allowance or actual superimposed dead load, whichever is greater.

3) Mechanical unit load: 35 psf at the designated mechanical area or actual weights of units, whichever is greater.

4) Seismic loads: As required by NYC BC.

5) Wind loads: As required by NYC BC.

ii. Provide structural members and connections capable of withstanding design loads indicated within limits and under conditions indicated on Drawings.

iii. Deflection:

1) Deflection perpendicular to the floor must be limited to 1/360 of clear span under live loads or 1/240 of clear span under total loads. Special consideration must be given to the spandrel beams supporting exterior cladding system.

c. Health and Safety:

i. Fire: Provide fire resistance in accordance with code.

1) Determine fire resistance rating by testing in accordance with ASTM E119.

2) Determine flame spread index by testing in accordance with ASTM E84.

3) Determine smoke developed index by testing in accordance with ASTM E84.

ii. Firestopping installer must have a minimum of 5-years' experience installing UL listed firestopping systems in similar type construction.

d. Durability:

i. Floor structure service life span: same as building service life.

ii. Firestopping: Systems that are produced and installed to resist the spread of fire, and the passage of smoke and other gases.

1) Upon curing, do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time.

2) Sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.

3. Materials
    a. Form Liners:
        i. Material must be selected to provide precast concrete surfaces within the allowable fabrication tolerances. The material must be rigid, nonreactive with concrete and suitable for producing required surface finishes.
    b. Reinforcing Materials:
        i. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
        ii. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
        iii. Galvanized Reinforcing Bars may be used where corrosive environment or severe exposure conditions: ASTM A 615/A 615M, Grade 60 or ASTM A 706/A 706M, deformed bars, ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized and chromate wash treated after fabrication and bending.
        iv. Epoxy-Coated Reinforcing Bars may be used where corrosive environment or severe exposure conditions: ASTM A 615/A 615M, Grade 60, ASTM A 706/A 706M, deformed bars, ASTM A 775/A 775M or ASTM A 934/A 934M epoxy coated.
        v. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, ASTM A 706/A 706M, deformed bars, assembled with clips.
        vi. Welded Wire Reinforcement: ASTM A 185/A 185M, or ASTM A 1064/A 1064M, fabricated from as-drawn and/or galvanized steel wire into flat sheets.
    c. Prestressing tendons:
        i. Prestressing Strand: ASTM A 416/A 416M, Grade 270, uncoated, 7-wire, low-relaxation strand or ASTM A 886/A 886M, Grade 270, indented, 7-wire, low-relaxation strand (including supplement).
        ii. Unbonded Post-Tensioning Strand: ASTM A 416/A 416M, Grade 270, 7-wire, low-relaxation strand with corrosion inhibitor conforming to ACI 423.7, with polypropylene tendon sheathing. Include anchorage devices.
        iii. Prestressing Strand: ASTM A 910/A 910M, Grade 270, uncoated, weldless, 2-and 3-wire, low relaxation strand.
    d. Concrete Materials:
        i. Portland Cement: ASTM C150/C150M, Type I or Type III.
        ii. Performance-Based Hydraulic Cement: ASTM C1157/C1157M: General Use (Type GU); High-Early Strength (Type HE); Moderate Sulfate Resistance (Type MS); High Sulfate Resistance (Type HS); Moderate Heat of Hydration (Type MH); Low Heat of Hydration (Type LH).
        iii. For surfaces exposed to view in finished structure, use same type, brand, and mill source throughout the precast concrete production.

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e. Supplementary Cementitious Materials:
   i. Fly Ash: ASTM C 618, Class C or F with maximum loss on ignition of 3%.
   ii. Metakaolin: ASTM C 618, Class N.
   iii. Silica Fume: ASTM C 1240 with optional chemical and physical requirements.
   iv. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

f. Face-Mixture Coarse Aggregates:
   i. Uniformly or Gap graded to achieve the required strength and durability requirements.

g. Chemical Admixtures:
   i. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   ii. Retarding Admixture: ASTM C 494/C 494M, Type B.
   iii. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   iv. Water-Reducing and Accelerating Admixture ASTM C494/C 494M, Type E.
   v. High Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   vi. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   vii. Plasticizing Admixture for Flowable Concrete: ASTM C 1017/C 1017M.
   viii. Corrosion Inhibiting Admixture: ASTM C 1582/C 1582M
   ix. Air-entraining admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

h. Steel Members and Connections:
   i. Steel connections may be Galvanized or Painted to achieve the durability requirements of the structure.
   ii. Steel Plate and Bars: ASTM A36
   iii. Carbon-Steel Shapes:
      1) W-Sections: ASTM A992
      2) M-Sections: ASTM A36
      3) S-Sections: ASTM A36
      4) Channels: ASTM A36
      5) MC-Sections: ASTM A36

4) Angles: ASTM A36
5) Rectangular HSS Sections: ASTM A500 Gr. B, Fy = 46 ksi
6) Round HSS Sections: ASTM A500 Gr. B, Fy = 42 kis
7) Pipe Sections: ASTM A53 Gr. B

iv. Steel Fasteners:

1) High-Strength Bolts: ASTM A325 and ASTM A490
2) Nuts: ASTM A563
3) Washers: ASTM FF436
4) Threaded Rods: ASTM A36
5) Steel Headed Stud Anchors: ASTM A108

i. Stainless-Steel Connections:

i. Stainless-Steel Plate: ASTM A666, Type 304, Type 316, or Type 201, of grade suitable for application.
ii. Stainless-Steel Bolts and Studs: ASTM F 593, alloy 304 or 316, hex-head bolts and studs; stainless-steel nuts; and flat, stainless-steel washers.
iii. Stainless Chromium Steel Clad-Plate: ASTM A263-12(2019), Standard Specification for Stainless Chromium Steel-Clad Plate.
iv. Stainless Chromium-Nickel Steel-Clad Plate: ASTM A264-12(2019), Standard Specification for Stainless Chromium-Nickel Steel-Clad Plate.

j. Wall Connections:

i. ASTM E283 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
ii. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
iii. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Wall, and Doors by Uniform Static Air Pressure Difference.

k. Bearing Pads:

i. Elastomeric Pads: AASHTO M251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 Shore A durometer according to ASTM D 2240, minimum tensile strength 2250 psi per ASTM D 412.

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2.3 Floor

ii. Other types of bearing pads may be allowed for application as recommended by the precast fabricator.

l. Grout:

i. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144, or ASTM C 404. Manufacturer's instructions should be followed.

ii. Non-shrink Grout: Premixed, prepackaged ferrous and non-ferrous aggregate shrink-resistant grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout. Manufacturer's instructions should be followed.

iii. Epoxy-resin grout: Two-component mineral-filled epoxy-resin: ASTM C 881/C 881M of type, grade, and class to suit requirements. Manufacturer's instructions should be followed.

m. Mixing Water:

i. Mixing Water: ASTM C1602/ C1602M Standard specification for mixing water used in the production of Hydraulic Cement Concrete.

n. Firestopping:

i. Through-Penetration Firestop Systems: Provide system components that are compatible with each other, the substrates forming openings, and the items, if any penetrating firestops under conditions of service and application, based on testing and field experience.

ii. Firestopping materials and systems must be listed and labeled in accordance with requirements of Underwriters Laboratories, Inc. (UL) Building Materials Directory.

1) Firestopping Materials: Comply with ASTM E814 and UL 1479.

2) Firestopping Sealants: Comply with ASTM C719 and ASTM C920.

iii. Fire stopping materials must be asbestos free and must not incorporate nor require the use of hazardous solvents.

1) Penetrations in ire-resistance-rated walls.

2) Penetrations in horizontal assemblies.

3) Penetrations in smoke barriers.

4) Sealants for 1-hour rated walls.

o. Interior Expansion Control:

i. Floor Types: Rated and non-rated as required:

1) Metal-plate floor joint cover.
2) Center-plate floor joint cover.
3) Glide-plate floor joint cover.
4) Hidden-sightline floor joint cover.
5) Seismic-pan floor joint cover.
6) Elastomeric-seal floor joint cover.
7) Dual-elastomeric-seal floor joint cover.

ii. Acceptable Materials:

1) Aluminum.
2) Stainless steel.

4. Concrete Mixtures

a. Normal-Weight Concrete Strength:

i. Suspended Slabs: Normal-weight concrete: minimum 4000 psi
ii. Concrete Toppings: minimum 4000 psi
iii. Building Frame Members: minimum 4000 psi
iv. Building Walls: minimum 4000 psi

b. Using Supplementary Cementing Materials:

i. If part of the Portland cement to be replaced with other cementitious materials, then use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume to reduce Portland cement by up to 40 percent.

c. Water/Cementitious Materials Ratio:

i. If part of the Portland cement to be replaced with other cementitious materials, then comply with ACI 318 minimum water-cementitious materials ratios for the applicable exposure category and class.

5. Field Quality Control

a. Special Inspections:

i. Engage a qualified special inspector to perform any special inspections.

b. Testing Agency:

Shell

2.3 Floor

i. Engage an accredited independent testing agency.

ii. Testing Agency Inspector for Precast Prestressed Concrete: Personnel must be accredited by the Precast Concrete Institute (PCI).

iii. Testing Agency Inspector for Post-Tensioned Concrete: Personnel must complete Post-Tensioning Institute (PTI) Level 1 - Field Fundamentals course.

6. Concrete Repair

   a. Concrete repair with packaged, cementitious; packaged, rapid-strengthening cementitious; packaged, polymer-modified cementitious and packaged, polymer-modified, silica-fume-enhanced cementitious patching mortar(s) formulated to match existing, adjacent, exposed concrete.

      i. Floor joint repair with patching mortar and epoxy joint filler.

      ii. Epoxy crack injection of in-place concrete.

      iii. Corrosion-inhibiting treatment applied to in-place concrete.

      iv. Polymer-overlay epoxy adhesive with surface-applied aggregate applied to in-place concrete.

      v. Polymer Sealer: Low-viscosity epoxy or high-molecular-weight methacrylate penetrating sealer and crack filler applied to in-place concrete.

      vi. Composite structural reinforcement with carbon or glass-fiber reinforcement in the form of tow sheet with field-applied saturant or pre-impregnated sheet.

7. Liquid Concrete Floor Treatment at Garage

   a. Penetrating Liquid Floor Sealer: Clear, chemically reactive, waterborne solution of inorganic siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces and offers the following concrete slab protection:

      i. Water repelling.

      ii. Protects against roads salts and deicing fluids.

      iii. Reduces staining including oil, gas, and other automotive fluids.

      iv. Mold and mildew resistance.

      v. Breathable, water based and low in VOC's.

      vi. Helps to prevent pitting, spalling, and surface cracks from water absorption.

8. Sustainable Requirements

   a. Refer to Section 01 for Sustainable Design Requirements.

2.3.2 TRAFFIC COATING SYSTEM

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement
        ii. Standard Project Requirements
        iii. Specific Project Requirements
        iv. Reference documents
2. Summary Available documents
    a. This Section includes traffic coating for all parking garage paved surfaces, including roadways and parking stalls.
3. LEED Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements for LEED Requirements.
4. Performance Requirements
    a. Fire-Test-Response Characteristics: Provide traffic-coating materials with the ire-test-response characteristics as determined by testing identical products per test method below for deck type and slopes indicated by an independent testing and inspecting agency that is acceptable to authorities having jurisdiction.
        i. Class A roof covering per ASTM E 108 or UL 790.
    b. Energy Performance: Provide traffic coating with an initial Solar Reflectance Index of not less than 78 when calculated in accordance with ASTM E 1980, based on the testing of identical products by a qualified testing agency.
    c. VOC Content: Traffic coating must have a VOC content of 150 g/L or less, when calculated in accordance with 40 CFR 59, Subpart D (EPA Method 24).
5. Quality Assurance
    a. Manufacturer Qualifications: Manufacturer must be an entity who has been producing the products specified in this Section for a minimum of ten (10) years.
    b. Installer Qualifications: Installer must be an entity who has been trained by the manufacturer and is approved by manufacturer for the type of installation specified in this Section.

Shell

2.3 Floor

6. Traffic Coating
    a. Traffic Coating: Manufacturer's standard, traffic-bearing, seamless, high-solids-content, cold liquid-applied, elastomeric waterproofing membrane system, with integral wearing surface for vehicular traffic in accordance with ASTM C957.
    b. A three-coat minimum system with aggregate broadcast, with a total thickness of 54 mil.
    c. Aggregate Content: As recommended in writing by traffic-coating manufacturer for substrate and service conditions indicated. Aggregate: Manufacturer's standard aggregate for each use indicated of particle sizes, shape, and minimum hardness recommended in writing by traffic-coating manufacturer.
    d. Topcoat: Polyurethane.
7. Installation
    a. Prepare vertical and horizontal surfaces at terminations and penetrations through traffic coatings and at expansion joints, drains, and sleeves in accordance with ASTM C 1127 and manufacturer's written instructions.
    b. Prepare, treat, rout, and ill joints and cracks in substrates in accordance with ASTM C 1127 and manufacturer's written recommendations. Before coating surfaces, remove dust and dirt from joints and cracks in accordance with ASTM D4258
    c. Apply traffic coating in accordance with ASTM C 1127 and manufacturer's written instructions.

2.4.1 ROOF STRUCTURES

1. Summary
    a. Section Includes:
        i. Form Liners.
        ii. Reinforcing Materials.
        iii. Prestressing Tendons.
        iv. Concrete Materials.
        v. Supplementary Cementitious Materials.
        vi. Chemical Admixtures.
        vii. Bearing Pads.
        viii. Grout.
        ix. Mixing Water.
2. Performance Requirements
    a. Basic Function:
        i. Structural Performance: Fabricator to design structural members in accordance with the New York City Building Code (NYC BC) and project requirements.
        ii. Precast double-T roof panels reinforced concrete beams and concrete topping capable of supporting specified loads. Equivalent reinforced concrete system may be considered.
        iii. Expansion control.
        iv. Fire ratings of components.
    b. Structure:
        i. Loads:
            1) Design loads must be determined with reference to the latest version of New York City Building Code and Amendment (NYC BC.)
            2) Superimposed dead load: 25 psf minimum, which accounts for suspended utilities including feature allowance or actual superimposed dead load, whichever is greater.
            3) Roof live load: 20 psf minimum, reducible per Code.
            4) Mechanical unit load: 35 psf at the designated mechanical area or actual weights of units, whichever is greater.

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2.4 Roof Structures

5) Seismic loads: As required by NYC BC 2014.

6) Wind loads: As required by NYC BC 2014.

7) Roof structure must account for compliance with LL 92-94.

ii. Provide structural members and connections capable of withstanding design loads indicated within limits and under conditions indicated on Drawings.

iii. Deflection:

1) Deflection perpendicular to the floor must be limited to 1/360 of clear span under live loads or 1/240 of clear span under total loads. Special consideration must be given to the spandrel beams supporting exterior cladding system.

c. Health and Safety:

i. Fire: Provide fire resistance in accordance with code.

1) Determine fire resistance rating by testing in accordance with ASTM E119.

2) Determine flame spread index by testing in accordance with ASTM E84.

3) Determine smoke developed index by testing in accordance with ASTM E84.

d. Durability:

i. Roof structure service life span: same as building service life.

3. Materials

a. Form Liners:

i. Material must be selected to provide precast concrete surfaces within the allowable fabrication tolerances. The material must be rigid, nonreactive with concrete and suitable for producing required surface finishes.

b. Reinforcing Materials:

i. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

ii. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

iii. Galvanized Reinforcing Bars may be used where corrosive environment or severe exposure conditions: ASTM A 615/A 615M, Grade 60 or ASTM A 706/A 706M, deformed bars, ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized and chromate wash treated after fabrication and bending.

iv. Epoxy-Coated Reinforcing Bars may be used where corrosive environment or severe exposure conditions: ASTM A 615/A 615M, Grade 60, ASTM A 706/A 706M, deformed bars, ASTM A 775/A 775M or ASTM A 934/A 934M epoxy coated.

v. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, ASTM A 706/A 706M, deformed bars, assembled with clips.

vi. Welded Wire Reinforcement: ASTM A 185/A 185M, or ASTM A 1064/A 1064M, fabricated from as-drawn and/or galvanized steel wire into at sheets.

c. Steel Members and Connections:

i. Steel connections may be Galvanized or Painted to achieve the durability requirements of the structure.

ii. Steel Plate and Bars: ASTM A36

iii. Carbon-Steel Shapes:

1) W-Sections: ASTM A992

2) M-Sections: ASTM A36

3) S-Sections: ASTM A36

4) Channels: ASTM A36

5) MC-Sections: ASTM A36

6) Angles: ASTM A36

7) Rectangular HSS Sections: ASTM A500 Gr. B, Fy = 46 ksi

8) Round HSS Sections: ASTM A500 Gr. B, Fy = 42 kis

9) Pipe Sections: ASTM A53 Gr. B

iv. Steel Fasteners:

1) High-Strength Bolts: ASTM A325 and ASTM A490

2) Nuts: ASTM A563

3) Washers: ASTM FF436

4) Threaded Rods: ASTM A36

5) Steel Headed Stud Anchors: ASTM A108

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2.4 Roof Structures

d. Prestressing tendons:

i. Prestressing Strand: ASTM A416/A416M, Grade 270, uncoated, 7-wire, low-relaxation strand or ASTM A886/A 886M, Grade 270, indented, 7-wire, low-relaxation strand (including supplement).

ii. Unbonded Post-Tensioning Strand: ASTM A 416/A 416M, Grade 270, 7-wire, low-relaxation strand with corrosion inhibitor conforming to ACI 423.7, with polypropylene tendon sheathing. Include anchorage devices.

iii. Prestressing Strand: ASTM A910/A910M, Grade 270, uncoated, weldless, 2-and 3-wire, low relaxation strand.

e. Concrete Materials:

i. Portland Cement: ASTM C150/C150M, Type I or Type III.

ii. Performance-Based Hydraulic Cement: ASTM C1157/C1157M: Type GU, general use; Type HE, high early strength; Type MS, moderate sulfate resistance; Type HS, high sulfate resistance; Type MH, moderate heat of hydration; Type LH, low heat of hydration.

iii. For surfaces exposed to view in finished structure, use same type, brand, and mill source throughout the precast concrete production.

f. Supplementary Cementitious Materials:

i. Fly Ash: ASTM C 618, Class C or F with maximum loss on ignition of 3%.

ii. Metakaolin: ASTM C 618, Class N.

iii. Silica Fume: ASTM C 1240 with optional chemical and physical requirements.

iv. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

g. Chemical Admixtures:

i. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

ii. Retarding Admixture: ASTM C 494/C 494M, Type B.

iii. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

iv. Water-Reducing and Accelerating Admixture ASTM C494/C 494M, Type E.

v. High Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

vi. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

vii. Plasticizing Admixture for Flowable Concrete: ASTM C 1017/C 1017M.

viii. Corrosion Inhibiting Admixture: ASTM C 1582/C 1582M

ix. Air-entraining admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

h. Bearing Pads:

i. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 Shore A durometer according to ASTM D 2240, minimum tensile strength 2250 psi per ASTM D 412.

ii. Other types of bearing pads may be allowed for application as recommended by the precast fabricator.

i. Grout:

i. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144, or ASTM C 404. Manufacturer's instructions should be followed.

ii. Nonshrink Grout: Premixed, prepackaged ferrous and non-ferrous aggregate shrink-resistant grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout. Manufacturer's instructions should be followed.

iii. Epoxy-resin grout: Two-component mineral-filled epoxy-resin: ASTM C 881/C 881M of type, grade, and class to suit requirements. Manufacturer's instructions should be followed.

j. Mixing Water:

i. Mixing Water: ASTM C1602/C1602M Standard specification for mixing water used in the production of Hydraulic Cement Concrete.

4. Concrete Mixtures

a. Normal-Weight Concrete Strength:

i. Suspended Slabs: Normal-weight concrete: minimum 4000 psi

ii. Concrete Toppings: minimum 4000 psi

iii. Building Frame Members: minimum 4000 psi

b. Using Supplementary Cementing Materials:

i. If part of the Portland cement to be replaced with other cementitious materials, then use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume to reduce Portland cement by up to 40 percent.

c. Water/Cementitious Materials Ratio:

i. If part of the Portland cement to be replaced with other cementitious materials, then comply with American Concrete Institute (ACI) 318 minimum water-cementitious materials ratios for the applicable exposure category and class.

Shell

2.4 Roof Structures

5. Field Quality Control
    a. Special Inspections:
        i. Engage a qualified special inspector to perform any special inspections.
    b. Testing Agency:
        i. Engage an accredited independent testing agency.
        ii. Testing Agency Inspector for Precast Prestressed Concrete: Personnel must be accredited by the Precast Concrete Institute (PCI).
6. Concrete Repair
    a. Concrete repair with packaged, cementitious; packaged, rapid-strengthening cementitious; packaged, polymer- modified cementitious and packaged, polymer-modified, silica-fume-enhanced cementitious patching mortar(s) formulated to match existing, adjacent, exposed concrete.
        i. Floor joint repair with patching mortar and epoxy joint filler.
        ii. Epoxy crack injection of in-place concrete.
        iii. Corrosion-inhibiting treatment applied to in-place concrete.
        iv. Polymer-overlay epoxy adhesive with surface-applied aggregate applied to in-place concrete.
        v. Polymer Sealer: Low-viscosity epoxy or high-molecular-weight methacrylate penetrating sealer and crack filler applied to in-place concrete.
        vi. Composite structural reinforcement with carbon or glass-fiber reinforcement in the form of tow sheet with field-applied saturant or pre-impregnated sheet.
7. Liquid Concrete Floor Treatment at Garage
    a. Penetrating Liquid Floor Sealer: Clear, chemically reactive, waterborne solution of inorganic siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces and offers the following concrete slab protection:
        i. Water repelling.
        ii. Protects against roads salts and deicing fluids.
        iii. Reduces staining including oil, gas, and other automotive fluids.
        iv. Mold and mildew resistance.
        v. Breathable, water based and low in VOC’s.
        vi. Helps to prevent pitting, spalling, and surface cracks from water absorption.

8. Sustainability Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.

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2.5 Exterior Cladding

2.5.1 CMU PARTITIONS (IF USED)

1. Section Includes:
    a. Concrete masonry units.
    b. Mortar and grout.
    c. Steel reinforcing bars.
    d. Masonry-joint reinforcement.
    e. Ties and anchors.
2. Performance
    a. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
        i. Where fire-resistance-rated construction is required, units must be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.
    b. Sustainability Requirements
        i. Refer to Section 01 for Sustainable Design Requirements.
    c. Fire-Test-Response Characteristics:
        i. Perform penetration firestopping system tests by a qualified testing agency acceptable to the requirements if the New York City Building Code
        ii. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
            1) Penetration firestopping systems must bear classification marking of a qualified testing agency.
                a) UL in its "Fire Resistance Directory."
                b) Intertek Group in its "Directory of Listed Building Products."
                c) FM Global in its "Building Materials Approval Guide."
3. Materials
    a. CMUs: ASTM C 90.
        i. Integral Water Repellent: Provide units made with integral water repellent at all units exposed to the exterior.
    b. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.

c. Hydrated Lime: ASTM C 207, Type S.
d. Aggregate for Mortar: ASTM C 144.
e. Aggregate for Grout: ASTM C 404.
f. Water: Potable.

4. Reinforcement
   a. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
   b. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.
5. Ties and Anchors
   a. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.
   b. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.

2.5.2 EXTERIOR ALUMINUM LOUVERS (IF USED)

1. Summary
   a. Section Includes:
      i. Extruded aluminum louvers for mechanical ventilation.
2. Performance Requirements
   a. Structural Performance:
      i. Wind Loads: As required by the New York City Building Code
   b. Seismic Performance: Seismic Performance: must withstand the effects of earthquake motions determined according to The New York City Building Code.
   c. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   d. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to Air Movement and Control Association (AMCA) 500-L.
3. Fixed Extruded-Aluminum Louvers
   a. Horizontal, Storm-Resistant Louver:
      i. Louver Performance Ratings:

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1) Wind-Driven Rain Performance: When facing exterior exposed to wind driven rain.

ii. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

4. Louver Screens
   a. General: Provide screen at each exterior louver.
5. Aluminum Finish
   a. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604.

2.5.3 HOLLOW METAL DOORS AND FRAMES

1. Summary
   a. Interior and exterior hollow metal doors and frames.
   b. Door hardware
2. Performance Requirements
   a. Fire-Rated Assemblies: Complying with National Fire Protection Association (NFPA) 80
      i. Smoke- and Draft-Control Assemblies: based on testing according to UL 1784 and installed in compliance with NFPA 105.
      ii. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   b. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 based on testing according to NFPA 257 or UL 9.
   c. Sustainability Requirements:
      i. Refer to Section 01 for Sustainable Design Requirements.
3. Doors and Frames
   a. Commercial Doors and Frames: National Association of Architectural Metal Manufacturers-Hollow Metal Manufacturers Association (NAAMM-HMMA) 861.
      i. Physical Performance: Moderate Duty; Level 2
   b. Galvanize all exterior doors and frames.

4. Materials
    a. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
    b. Grout: ASTM C 476.
    c. Mineral-Fiber Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
    d. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating
5. Hardware
    a. Hinges: Builders Hardware Manufacturers Association (BHMA) A156.1. .
        i. Ball bearing type
    b. Mortise Locks: BHMA A156.13
    c. Exit Devices and Auxiliary Items: BHMA A156.3
    d. Surface Closers: BHMA A156.4
    e. Standard Lock Cylinders: BHMA A156.5
    f. Thresholds: BHMA A156.21
    g. Weather-stripping

2.5.4 ALUMINUM ENTRANCES & STOREFRONTS (IF USED)

1. Summary
    a. Section Includes:
        i. Storefront framing.
        ii. Manual swing entrance doors
        iii. Power door operators
2. Quality Assurance
    a. Safety Glass Standards: Tempered glass conforming to testing requirements CPSC 16 CRF Part 120 II.
    b. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1
3. Performance Requirements
    a. Structural Loads:

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i. As required by the New York City Building Code

b. Deflection of Framing Members: At design wind pressure, as follows:

i. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.

ii. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

c. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

i. Fixed Framing and Glass Area:

1) Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m)at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

d. Entrance Doors:

i. Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

e. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

i. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa)

ii. Seismic Performance: must withstand the effects of earthquake motions determined according to The New York City Building Code.

iii. Thermal Performance based on 1 inch insulating glass when tested in accordance with AAMA 1503.1 and NFRC 102

1) Condensation Resistance Factor (CRFf): A minimum of 58.

2) Thermal Transmittance U-Value: 0.52 BTU/HR/FT²/°F.

4. Materials

a. Framing:

i. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1) Sheet and Plate: ASTM B 209.

2) Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.

b. Construction: Thermally broken.

c. Glazing: Double glazed insulated units as applicable.

i. Safety glass

ii. Heat absorbing

iii. Spandrel

iv. Low-E

d. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

e. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

f. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

5. Entrance Door Hardware

a. Standard: BHMA A 156.19

b. Performance Requirements:

i. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.

ii. Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.

c. Configuration: Operator to control single swinging door

i. Traffic Pattern: Two way.

ii. Operator Mounting: Surface

d. Operation: Power opening and power-assisted spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.19. When not in automatic mode, door operator must function as manual door closer, with or without electrical power.

e. Operating System: Electromechanical

f. Microprocessor Control Unit: Solid-state controls.

g. Features:

i. Adjustable opening and closing speed.

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ii. Adjustable opening closing force.

iii. Adjustable backcheck.

iv. Adjustable hold-open time from zero to 30 seconds.

v. Adjustable time delay.

vi. Adjustable acceleration.

vii. Obstruction recycle.

viii. On-off/hold-open switch to control electric power to operator; key operated.

6. Door Operators and Controls

a. General: Provide operators and controls, which include activation and safety devices, according to BHMA standards, for condition of exposure, and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.

b. Door Operators: Provide door operators of size recommended by manufacturer for door size, weight, and movement.

i. Door Operator Performance: Door operators must open and close doors and maintain them in fully closed position when subjected to Project's design wind loads.

ii. Electromechanical Operators: Concealed, self-contained, overhead unit powered by fractional-horsepower, permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor; with solid-state microprocessor controller; UL 325; and with manual operation with power of.

c. Push-Plate Switch: Momentary-contact door-control switch with flat push-plate actuator with contrasting-colored, engraved message.

i. Configuration: Square push plate with 4-by-4-inch junction box.

ii. Mounting: Surface mounted on wall.

iii. Push-Plate Material: Stainless steel as selected by Architect from manufacturer's full range.

iv. Message: "Push to Open."

d. Key Switch: Recess-mounted, door-control switch with key-controlled actuator; enclosed in 2-by-4-inch junction box. Provide faceplate engraved with letters indicating switch functions.

i. Face-Plate Material: Painted metal as selected by Architect from manufacturer's full range.

ii. Functions: Two-way automatic, hold open, one-way exit, of, full open, and partial open.

iii. Mounting: As required.

e. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.5.5 EXTERIOR MASONRY CAVITY WALL (IF USED)

1. Summary
   a. Section Includes:
      i. Exterior veneer
      ii. Insulation
      iii. Air barrier
      iv. Weep holes
      v. Sheathing.
2. Performance
   a. Fire-Resistance Ratings: Comply with requirements for ire-resistance-rated assembly designs for fire separation walls.
      i. Where ire-resistance-rated construction is required, assembly must be listed and labeled by a qualified testing agency acceptable the New York City Building Code requirements
   b. Exterior Cavity Wall Construction: Construct exterior cavity in accordance with the Concrete Masonry Association TEK-05-01B using a 2 inch cavity.
   c. Sustainability Requirements
      i. Refer to Section 01 for Sustainable Design Requirements
3. Minimum Acceptable Veneers for Consideration
   a. Clay face brick
   b. Stone
   c. Metal Panels
4. Face Brick
   a. Clay Face Brick: hollow brick complying with ASTM C 652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area).
5. Stone
   a. Granite: ASTM C 615/C 615M.

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b. Limestone: ASTM C 568/C 568M,

c. Cast Stone: General: Comply with ASTM C 1364.

6. Mortar Grout Materials

a. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

i. Alkali content must not be more than 0.1 percent when tested according to ASTM C 114.

b. Hydrated Lime: ASTM C 207, Type S.

c. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

d. Aggregate for Mortar: ASTM C 144.

7. Ties and Anchors

a. Materials: Provide adjustable ties and anchors specified in this article that are made from materials that comply with the following:

i. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.

8. Embedded Flashing Materials

a. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual".

i. Material: Stainless steel.

b. Weep/Cavity Vent Products:

i. Rectangular Plastic Weep/Vent Tubing: Clear butyrate.

c. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

2.5.6 RAIN SCREEN (IF USED)

1. Summary

a. Section includes:

i. Exterior cladding

ii. Thermally broken cladding system

iii. Insulation

iv. Air barrier

v. Sheathing

2. Exterior Cladding Performance

a. Exterior Cladding

i. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:

1) Wind Loads: As required by the New York City Building Code

2) Deflection Limits: For wind loads, no greater than 1/180 of the span.

ii. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:

1) Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).

iii. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1) Test-Pressure Difference: 2.86 lbf/sq. ft. (137 Pa).

iv. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1) Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

b. Seismic Performance: Seismic Performance: must withstand the effects of earthquake motions determined according to The New York City Building Code.

c. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

i. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

3. Thermally Broken Cladding System Performance

a. System to be designed to provide a thermally broken cladding support system for the exterior cladding to the structural supporting system.

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i. Structural Design:

1) Wind Loads and Dead Loads: Wind Loads: As required by the New York City Building Code.

b. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

i. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

c. Effect on Wall Assemblies Thermal Resistance: Comply with ANSI/ASHRAE 90.1

4. Exterior Cladding for Consideration as baseline options

a. Factory formed metal panel: Factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed or exposed fasteners.

b. Metal composite panels: factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core.

c. Insulated Metal Panels: Metal panels bonded to ridged foam insulation.

d. Exterior Grade Wood: When conforming to the New York City Building Code requirements.

i. Select exterior wood materials for that are durable and will withstand the New York City climate.

ii. Sustainability Requirements:

1) Refer to Section 01 for Sustainable Design Requirements.

e. Precast Panels: Architectural precast panels

5. Support System for Thermal Broken Cladding System

a. Material:

i. Alloy-6005 T4

ii. Steel Classification: Structural Steel (SS), Grade 50, 50 ksi Yield.

1) Coating Material: ASTM A1046, Zinc-Aluminum-Magnesium, minimum thickness ZM40

iii. Thermal Breaks: High performance plastics.

b. CAVITY WALL INSULATION

i. Use ridged or semi ridged insulation that will provide a total U-value conforming to the requirements of the New York City Energy Code.

6. Air Barrier
    a. Air-Barrier Performance: Provide air-barrier assembly and seals with adjacent construction to be capable of performing as a continuous air barrier. Air-barrier assemblies must be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage.
7. Sheathing
    a. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
    b. Air-Barrier and Water-Resistant Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M, Type X, coated fiberglass mat gypsum sheathing with integral weather-resistant barrier and air barrier complying with ASTM E 2178.
8. Finishes
    a. Aluminum Finish: High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604.

2.5.7 VENTILATED FACADE (IF USED)

1. Summary
    a. Section includes
        i. Metal ventilated panels
        ii. Glass ventilated panels
        iii. Supporting elements
2. Performance
    a. General: Garage to conform to a Ramp-Access Open Parking Garage according to the requirements of the New York City Building Code.
    b. Structural Performance: .
        i. Wind Loads: As required by the New York City Building Code
    c. Seismic Performance: Seismic Performance: must withstand the effects of earthquake motions determined according to The New York City Building Code.

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d. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

i. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

3. Metal Ventilated Panel Materials

a. Expanded Metal: ASTM F1267.

b. Perforated Metal: Aluminum sheet, ASTM B209 (ASTM B209M), Alloy 6061-T6Perforated Metal: Cold-rolled steel sheet, ASTM A1008/A1008M, or hot-rolled steel sheet, ASTM A1011/A1011M, commercial steel Type

c. Perforated Metal: Galvanized-steel sheet, ASTM A653/A653M, G90 (Z275) coating, commercial steel Type B.

i. Powder coating finish

d. Woven-Wire Mesh: Woven-wire mesh complying with ASTM A510/A510M.

e. Open Wire mesh.

4. Glass Ventilated Panel

a. Safety Glass Standards: Tempered glass conforming to testing requirements CPSC 16 CRF Part 120 II.

i. Glass panels

i. Self cleaning glass

5. Supports

a. Steel: Plates, Shapes, and Bars: ASTM A36/A36M.

b. Aluminum: Bars and Shapes: ASTM B221 (ASTM B221M), Alloy 6063-T5/T52.

6. Finishes

a. Aluminum Finish: High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604.

b. Steel Finish: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2.5.8 COILING GRILLES & CORNER PROTECTION

1. Summary
    a. Section includes
        i. Overhead coiling grilles
        ii. Corner protection
2. Performance
    a. Heavy duty, high performance overhead coiling grille for garage application.
    b. Operation Cycles: Grille components and operators capable of operating for not less than 300,000. One operation cycle is complete when a grille is opened from the closed position to the fully open position and returned to the closed position.
    c. Seismic Performance: Overhead coiling grilles must withstand the effects of earthquake motions determined according to The New York City Building Code requirements.
    d. Sustainability Requirements:
        i. Refer to Section 01 for Sustainable Design Requirements.
3. Materials
    a. Grille Curtain Material:
        i. Aluminum
        ii. Galvanized steel.
    b. Operation: General: Electric grille operator assembly of size and capacity recommended and provided by grille manufacturer for grille and operation cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking grille, and accessories required for proper operation.
        i. Electric grille operator:
        ii. Obstruction-Detection Device: Automatic.
        iii. Emergency Manual Operation:
            1) Push-up
            2) Chain
            3) Crank

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iv. Safety Interlock Switch: Equip power-operated grilles with safety interlock switch to disengage power supply when grille is locked.

4. Grille Finish
   a. Aluminum Finish: Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
   b. Galvanized Finish: Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pre-treatment, application, and minimum dry film thickness.
5. Corner Protection
   a. Metals:
      i. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
      ii. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40)
   b. Metal Bollards
      i. Fabricate metal bollards from Stainless Steel #304
      ii. Finish #4 satin (as a minimum)
   c. Corner Guards
      i. Fabricate from galvanized steel angles with steel strap anchors or studs welded to angles for concrete embedment.

2.5.9 METAL RAILINGS

1. Related documents
   a. The following documents apply to all required Work for the Project:
      i. The Design-Build Agreement.
      ii. Standard Project Requirements.
      iii. Specific Project Requirements.
      iv. Reference documents.
      v. Available documents.

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2. Summary
    a. Section includes decorative guard and handrail with perforated and solid screen panels and profiled metal design, for horizontal barriers - painted, galvanized steel and stainless steel.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements for requirements.
4. Performance Requirements
    a. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
        i. Handrails: Uniform load of 50 lbs. / ft. applied in any direction and a concentrated load of 200 lbs. applied in any direction.
        ii. Top Rails of Guards: Uniform load of 50 lbs. / ft. applied in any direction and a concentrated load of 200 lbs. applied in any direction.
        iii. Infill of Guards: Concentrated load of 50 lbs. applied horizontally on an area of 1 sq. ft.
        iv. Uniform and concentrated loads need not be assumed to act concurrently.
    b. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss:
        i. Temperature Change (Range): 120 deg. F, ambient; 180 deg. F, material surfaces.
5. Materials
    a. Stainless Steel:
        i. Tubing: ASTM A554, Grade MT, 304, for interior use; Grade MT, 316, for exterior use.
        ii. Pipe: ASTM A312, Grade TP 304, for interior use; Grade TP 316, for exterior use.
        iii. Castings: ASTM A743, Type 304, Grade CF8 or CF20, for interior use; Type 316, Grade CF8M, for exterior use.
        iv. Plate: ASTM A666, Type 304 for interior use; Type 316 for exterior use.
        v. Bar Stock: ASTM A276, Type 304 for interior use; Type 316 for exterior use.
    b. Steel and Iron:
        i. Tubing: ASTM A500, Grade B, ASTM A618 or A501.

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ii. Plates, Shapes, and Bars: ASTM A709 Grade 36 or 50, ASTM A588, Grade 36 or 50.

iii. All components must be hot-dipped galvanized (per ASTM A 123 coating weight of 2 oz./sq. ft.) after fabrication.

c. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

6. Accessories

a. Fasteners: Type 304 stainless-steel fasteners.

b. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

c. Provide concealed fasteners for interconnecting railing components and for attaching railings to other Work.

d. Provide tamper-resistant flat-head machine screws for exposed fasteners.

e. Anchors: Provide torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified testing agency.

7. Finish

a. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

b. Steel Finish: Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pre- treatment, application, and minimum dry film thickness.

c. Stainless Steel must receive an AISI #4 brushed finish.

2.5.10 METAL FASCIA AND CEILING/ SOFFIT PANELS (IF USED)

1. Related documents

a. The following documents apply to all required Work for the Project:

i. The Design-Build Agreement.

ii.i Standard Project Requirements.

ii. Specific Project

iv. Requirements. Reference

v. documents.

2. Summary Available documents.

a. Section includes removable metal fascia and ceiling/soffit panels, for exterior and interior use.

3. Sustainability Requirements

a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.

4. Performance Requirements

a. Loading: Design components to resist anticipated wind, seismic, and impact loads.

b. Acoustical Requirements (at interior areas with perforated panels): The ceiling system must provide a noise reduction co-efficient (NRC) of no less than 0.80 when tested in accordance with ASTM C423-84a in an E-400 mounting as defined in ASTM E795-83 for perforated panels.

c. Comply with ASTM C 636, as modified by the NYC Building Code.

5. Materials

a. Ceilings and soffits must be fabricated from one of the following:

i. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1) Nominal Thickness: 0.052 inch (1.32 mm).

2) Finish: High-Performance Organic Finish: Four-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

ii. Aluminum Sheet: Coil-coated sheet, ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.

1) Thickness: 0.040 inch (1.02 mm).

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2.5 Exterior Cladding

2) Finish: High-Performance Organic Finish: Four-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

iii. Stainless-Steel Sheet: ASTM A240/A240M, Type 304 at interior spaces and Type 316 at exterior spaces. Stainless steel must be fully annealed.

1) Nominal Thickness: 0.50 inch (1.27 mm).

2) Exterior Finish: #4, brushed (as a minimum).

6. Accessories

a. Acoustical Insulation: 2 inches thick, fine fibered, fibrous glass, having a density of not less than 1.5 pounds per cubic foot. The insulation will be encapsulated in Class A rated, sealed sheet, per ASTM E84, black polyethylene, 1.5 to 2 mil.

7. Ceiling Suspension System

a. Provide Torsion Spring Type suspension system, with Tees exposed in reveals, suspension attached to black iron with up-tight clips. Panels will be removable with a special tool.

b. The suspension system must support the ceiling assembly, with a maximum deflection of 1/360 of the span, in accordance with ASTM C635.

c. Hanger for suspension system must be 1" x 3/16", hot dip galvanized steel flats or diameter galvanized pencil rods spaced maximum 4'-0" o.c.

d. Main carrying channels, to which suspension systems must be fastened, must be hot dip galvanized steel channel, spaced maximum 4'-0" o.c. Channel must be 2" at exterior and 1 1/2" at interior.

e. Provide ceiling clips and inserts to receive hangers, type as recommended by suspension system manufacturer, sizes for pull-out resistance of not less than five (5) times the hanger design load, as indicated in ASTM C635.

f. Hot dip galvanizing on steel support members must conform to ASTM A 153 with coating weight of 2.00 oz/sq. ft of surface.

8. Construction Features

a. Provide formed aluminum fascia and ceiling/so t panels designed and fabricated to it applications, and to perform optimally with respect to weather resistance, water tightness, durability, strength and uniform appearance.

b. Expansion Provisions: Fabricate fascia and ceiling/soffit to allow controlled expansion in running lengths not only for movement of metal components in relationship to one another, but also to adjoining dissimilar materials in a manner which is sufficient to prevent water leakage, deformation or damage.

9. Fabrication

a. Formed Aluminum Panels: Manufacturer's standard modular panels formed from aluminum sheets. Include trim, closure strips and other accessories as required for proper installation. Provide aluminum sheet of 0.040-inch minimum thickness as a basis of design.

b. Fascia and Ceiling/Soffit Panel Support System: Manufacturer's standard metal support system consisting of girts and support framing members including special connectors; of proper type for, and by manufacturer of, fascia and ceiling/soffit panel system. Provide components and spacing designed to withstand 100 mph wind, per ANSI A58.1, Exposure C.

c. Fabricate curved fascia from extruded aluminum.

d. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

2.5.11 LOUVERS (IF USED)

1. Related documents

a. The following documents apply to all required Work for the Project:

i. The Design-Build Agreement.

ii. Standard Project Requirements.

iii. Specific Project Requirements.

iv. Reference documents.

v. Available documents.

2. Summary

a. Section includes exterior fixed and operating louvers and frames, including bird and insect screening.

3. Sustainability Requirements

a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.

4. Performance Requirements

Shell

2.5 Exterior Cladding

a. Intake Louver: Permit passage of air at a maximum velocity of 500 ft/min without blade vibration or noise, with maximum static pressure loss of 10 percent. Fail closed on loss of power.

b. Exhaust Louver: Fixed louver with size as shown on the Drawings, fail closed on loss of power. Permit passage of air at a velocity of 600 ft/min without blade vibration or noise, with maximum static pressure loss of 10 percent.

c. Loading: Louvers must be designed to resist anticipated wind, seismic, and impact loads.

5. Quality Assurance

   a. Compliance: Perform installations to comply with ANSI / AMCA 500-L-07.

   b. Manufacturer's Qualifications:

      i. Company specializing in manufacturing products specified in this Section with minimum 5 years Documented experience.

      ii. Manufacturer must be capable of providing field service representation during construction.

   c. Installer's Qualifications: Louvers must be installed by an entity that has not less than 5 years of experience in the installation of systems involving quantities and complexities at least equal to those required for the Work.

6. Materials

   a. Aluminum Extrusions: Alloy and temper as required for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

   b. Aluminum sheet alloy: must meet the requirements of ASTM B209.

7. Screens

   a. Bird screens, if required must be at a minimum 1/2-inch square mesh, of 0.063-inch diameter aluminum wire, ASME A17.1 2007.

   b. Insect screens, if required must be at a minimum 18 by 18 mesh, of 0.009-inch diameter stainless steel wire.

8. Aluminum Finishes

   a. Interior and Exterior Aluminum Surfaces (including screens and blank-out sheeting: High-Performance Organic Finish: Four-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

   b. Concealed surfaces must receive one coat of the same primer as that specified for exposed surfaces.

2.5 Exterior Cladding

2.5.12 OVERHEAD COILING DOOR (IF USED)

1. Summary
   a. This Section includes: automatic, overhead coiling door.
2. Sustainability Requirements
   a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
   a. Loading: Design components to resist anticipated wind, seismic, and impact loads.
   b. Deflection Limits: Design overhead coiling doors to withstand anticipated loading, without evidencing permanent deformation or disengagement of door components.
4. Door Curtain Materials and Construction
   a. Door Curtains: Fabricate overhead insulated coiling-door curtain of interlocking metal slats, in a continuous length for width of door without splices.
   b. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A 653/A 653M, with G90 (Z275) zinc coating
   c. Door Curtain Slats: Solid.
   d. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats.
   e. Electric Door Operator:
5. Hoods
   a. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head.
      i. Galvanized Steel: Nominal 0.028-inch- (0.71-mm-) thick, hot-dip galvanized-steel sheet with G90 (Z275) zinc coating, complying with ASTM A 653/A 653M.
6. Accessories
   a. Locks: Provide locks with cylinders, Master-keyed into the facility Master- or Grand-Master-keying system.
7. Finish
   a. Powder coat, minimum 2.0 mil dft.

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2.5 Exterior Cladding

2.5.13 EXTERIOR MASONRY WALL (IF USED)

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement.
        ii. Standard Project Requirements.
        iii. Specific Project Requirements.
        iv. Reference documents.
        v. Available documents.
2. Summary
    a. This Section includes:
        i. Brick masonry units.
        ii. Concrete masonry units, including ground-face and split-face units.
        iii. Masonry mortar and grout.
        iv. Steel reinforcing bars.
        v. Masonry-joint reinforcement.
        vi. Ties and anchors.
        vii. Embedded lashing.
        viii. Miscellaneous masonry accessories.
        ix. Rigid board insulation and fibrous acoustic insulation.
        x. Slotted, acoustical block.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements for Requirements.
4. Performance Requirements
    a. Masonry Units at Non-Security Areas:

i. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Comply with Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

ii. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

1) For Concrete Unit Masonry: f'm = 2500 psi.

iii. Provide slotted units, specifically designed and tested for noise reduction, complete with fibrous inserts, at spaces with same treatment on interior partitions.

5. Materials

a. Face Brick: ASTM C 216, Grade MW or SW, Type FBA.

i. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.

ii. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

iii. Surface Coating: Brick with colors or textures produced by application of coatings must withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet.

b. Concrete Masonry Units: ASTM C 90 and as follows:

i. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

c. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.

d. Hydrated Lime: ASTM C 207, Type S.

e. Aggregate for Mortar: ASTM C 144.

f. Aggregate for Grout: ASTM C 404.

g. Water: Potable.

6. Masonry Joint Reinforcement

a. General: ASTM A 951 and as follows:

i. Hot-dip galvanized, carbon-steel wire for both interior and exterior walls.

b. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units

c. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.

7. Steel Reinforcing Bars

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2.5 Exterior Cladding

a. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

b. Provide at Security areas at 8" on center, both vertically and horizontally, connected with wire ties.

8. Mortar and Grout Materials

a. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

i. Alkali content must not be more than 0.1 percent when tested according to ASTM C 114.

b. Hydrated Lime: ASTM C 207, Type S.

c. Aggregate for Mortar: ASTM C 144.

d. Aggregate for Grout: ASTM C 404.

9. Ties and Anchors

a. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.

b. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.

10. Integral Water Repellent

a. Integral Water Repellent: For all masonry mortar specified in this Section, as well as all mortar and grout, incorporate (during batching/manufacture) integral water repellent.

i. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen.

11. Foam-Plastic Board Insulation

a. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

2.5.14 EXTERIOR GLAZING (IF USED)

1. Related documents

a. The following documents apply to all required Work for the Project:

i. The Design-Build Agreement.

ii. Standard Project Requirements.

iii. Specific Project Requirements

iv. Reference documents

2.5 Exterior Cladding

2. Summary Available documents
    a. This Section includes glass and glazing that has been produced, fabricated and installed to withstand normal thermal movement, wind loading, seismic loading and impact loading, without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects. This Section includes glazing for windows, curtainwall, storefront and entrance doors and includes ceramic frits and all accessories.
2. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
3. Performance Requirements
    a. Loading: Design components to resist anticipated wind, seismic, and impact loads.
4. Quality Assurance
    a. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
    b. Glass Testing Agency Qualifications: A qualified testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
    c. Sealant Testing Agency Qualifications: A testing agency qualified according to ASTM C1021 (Standard Practice for Laboratories Engaged in Testing of Building Sealants) to conduct the testing indicated.
    d. Source Limitations for Glass: For each structure obtain ultraclear float glass and laminated glass from single source from single manufacturer for each glass type.
    e. Source Limitations for Glazing Accessories: For each structure obtain from single source from single manufacturer for each product and installation method.
    f. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

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2.5 Exterior Cladding

i. Glass Association of North America (GANA) Publications: GANA "Laminated Glazing Reference Manual" and GANA "Glazing Manual."

ii. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."

iii. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."

iv. IGMA Publication for Insulating Glass: IGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use.

g. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label must indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

5. Glass Products - General

a. Thickness: Provide glass lites in thicknesses as needed to comply with requirements indicated in Performance Requirements Article.

i. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

b. Strength: Float glass must be annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

c. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below

i. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.

ii. For laminated-glass lites, properties are based on products of construction indicated.

d. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).

e. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.

f. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

6. Glass Products
    a. Float Glass: ASTM C1036 (Standard Specification for Flat Glass), Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
    b. Heat-Treated Float Glass: ASTM C1048 (Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass); Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
        i. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
        ii. For uncoated glass, comply with requirements for Condition A.
        iii. For coated vision glass, comply with requirements for Condition C (other coated glass).
    c. Tempered Glass: ASTM C1048 (Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass), Kind FT (fully tempered), Type II, Class 1 (clear), Form 3. Where heat soaking is required follow manufacturer's established procedures, including special testing.
7. Ceramic Frits
    a. Ceramic-Coated Vision Glass: ASTM C 1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in GANA's "Engineering Standards Manual."
8. Laminated Glass
    a. Comply with ASTM C1172 (Standard Specification for Laminated Glass).
    b. Plastic Interlayer must be polyvinyl butyral sheets.
    c. Laminated Safety Glass: Two panes of glass of equal thickness, laminated together with 0.030-inch-thick plastic interlayer to produce glass free of foreign substances and air or glass pockets and complying with the following requirements:
    d. Glass Characteristics: Float glass, complying with requirements for Class 1 (clear), Kind HS (Heat Strengthened), with clear interlayer. See Glazing Schedule below for minimum acceptable glass thicknesses.
9. Sealed Insulating Glass Units
    a. Comply ASTM E774 performance classification Class A.
    b. Units must be dual seal and must be tested in accordance with ASTM E773.
    c. Provide 1/2-inch airspace, unless otherwise required.

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2.5 Exterior Cladding

10. Glazing Tapes
    a. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 (Standard Specification for Preformed Tape Sealants for Glazing Applications) and AAMA 800 for products indicated below:
        i. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
        ii. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
11. Miscellaneous Glazing Materials
    a. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
    b. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
    c. Setting Blocks: Neoprene: EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
    d. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated and compatible with glazing sealant.
    e. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking) and compatible with glazing sealant.
    f. Compressible filler rods: Closed cell or waterproof jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5 10 psi compression strength for 25 percent deflection.
    g. Elastomeric Sealant:
        i. Provide one-part moisture curing silicone.
12. Glazing Gaskets
    a. Dense Compression Gaskets: ASTM C864, ASTM C1115, Neoprene, EPDM, or Silicone.
    b. Soft Compression Gaskets: ASTM C509, Neoprene, EPDM, or Silicone.
13. Fabrication of Glazing Units
    a. Fabricate glazing units in sizes required to it openings indicated, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

b. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

2.5.2 SCREEN WALLS (IF USED)

1. Summary
   a. This Section includes screen walls at perimeter of open parking garages and other exterior locations. Walls could consist of a variety of materials, including precast concrete, decorative glass panels, aluminum extrusions, and/or other decorative elements and includes the support system.
      i. The assembly could be a “green” wall.
      ii. Exterior Insulation Finishing Systems (EIFS) cannot be used.
2. Sustainability Requirements
   a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
   a. Loading: Design components to resist anticipated wind (exterior only), seismic, and impact loads.
   b. Thermal expansion/contraction: Design system to withstand temperature ranges with no detrimental effects.
   c. Select materials and their connections to be corrosion resistant.
4. Constructions Features
   a. Free area of wall must comply with requirements for an open garage.

2.5.3 REVOLVING DOOR (IF USED)

1. Related documents
   a. The following documents apply to all required Work for the Project:
      i. The Design-Build Agreement.
      ii. Standard Project Requirements.
      iii. Specific Project Requirements.
      iv. Reference documents.
      v. Available documents.

Shell

2.5 Exterior Cladding

2. Summary
    a. Section includes an exterior revolving entrance door with power-assist feature.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Maintenance Service
    a. The manufacturer must offer a dispatch procedure that must be available 24 hours per day, 365 days per year to facilitate proper service capability.
5. Materials
    a. All metal components must be stainless steel Type #304.
    b. Finish: #4 satin.

2.5.4 EXTERIOR WINDOWS (IF USED)

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement.
        ii. Standard Project Requirements.
        iii. Specific Project Requirements.
        iv. Reference documents.
2. Summary Available documents
    a. This Section includes fixed steel or aluminum-framed windows for exterior locations. Windows must have speak through's and transaction drawers as required.
3. Sustainability Requirements
    a. Refer to Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Performance Requirements
    a. Loading: Windows must be designed to resist anticipated wind, seismic, and impact loads.

2.5 Exterior Cladding

5. Materials
    a. General Metals:
        i. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
    b. Steel and Iron: Furnish steel and iron in the necessary form, complying with the following requirements:
        i. Tubing: Cold-formed, ASTM A500; or hot-rolled, ASTM A501.
        ii. Steel Plate, Shapes, and Bars: ASTM A36.
    c. Aluminum:
        i. Extrusions: Alloy and temper must be as recommended by aluminum producer or finisher with not less than the strength and durability properties specified in ASTM B 221 for 6063 T5.
    d. Provide sealant type recommended by window manufacturer for joint size and movement, to remain permanently elastic, nonshrinking and nonmigrating.
6. Fasteners
    a. General: Provide the following:
        i. All screws and fasteners must be tamper-resisting type.
        ii. Anchors must be a minimum 3/16" plated steel angle or plate.
    b. Aluminum Components: Stainless-Steel Components: Type 304 stainless-steel fasteners.
    c. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.
    d. Galvanized Steel Components: Plated-steel fasteners complying with ASTM B633, Class Fe/Zn 25 for electrodeposited zinc coating.
    e. Dissimilar Metals: Type 304 stainless-steel fasteners.
7. Finishes - General
    a. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
    b. Iron and Steel Finishes:
        i. Galvanizing: Hot-dip galvanize all items specified in this Section, complying with applicable standard listed below:

Shell

2.5 Exterior Cladding

1) Iron and steel products made from rolled, pressed and forged steel shapes, castings, plates, bars and strips: ASTM A123.

2) Iron and steel hardware: ASTM A153.

ii. Fill vent drain holes that will be exposed in the finished Construction, unless indicated to remain as weep holes, by plugging with zinc solder and filing of smooth.

iii. Preparation for Shop Priming: After galvanizing, thoroughly clean Sheet Metal Fabrications of grease, dirt, oil, flux and other foreign matter and treat with metallic phosphate process.

iv. Factory Primed Finish: Apply air-dried primer immediately following cleaning and pre-treatment, to provide a minimum dry film thickness of 2.0 mils per applied coat to surfaces that will be exposed after assembly and installation, and to concealed, nongalvanized surfaces.

v. Apply an air-dried primer and all successive coats in shop,

c. Aluminum Finishes

i. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

ii. Concealed surfaces must receive one coat of the same primer as that specified for exposed surfaces.

8. Glazing

a. Provide glass, specified in another Section titled EXTERIOR GLAZING.

2.6 Roofing

2.6.1 ROOFING SYSTEM

1. Related documents
    a. The following documents apply to all required Work for the Project
        I. The Design-Build Agreement
        II. Standard Project Requirements
        III. Specific Project Requirements
        IV. Reference documents
2. Summary Available documents
    a. This Section specifies cold fluid-applied reinforced unsaturated polyester roofing system, for entire building roof, including broadcast mineral aggregate topcoat, and all related flashings/penetrations.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements for Requirements.
4. Performance Requirements
    a. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated to comply with ASCE / Structural Engineer (SEI 7).
5. Materials
    a. System must consist of a primer, scrim sheet and topcoat. Areas subjected to traffic must receive broadcast sand aggregate.
    b. Provide roof insulation, flashing, terminations, and all other elements needed for a complete roof system.

Shell

2.7 Waterproofing

2.7.1 BELOW-GRADE WATERPROOFING

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement.
        ii. Standard Project Requirements.
        iii. Specific Project Requirements.
        iv. Reference documents.

2. Summary Available documents
    a. This Section specifies waterproofing systems and supplementary items necessary to complete the installation.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Performance Requirements
    a. General: Provide waterproofing that prevents the passage of liquid water under hydrostatic pressure and complies with requirements as demonstrated by testing performed by an independent testing agency of manufacturer's current waterproofing product.
5. Physical Properties of Waterproofing
    a. Puncture Resistance: 40 lb. minimum; ASTM E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
    b. Hydrostatic-Head Resistance: 150 feet minimum; ASTM D5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
    c. Vapor Permeance: 0.05 perms; ASTM E96/E96M Standard Test Methods for Water Vapor Transmission of Materials, Water Method.
    d. Maximum VOC: 440 grams per liter.

2.7 Waterproofing

6. Auxiliary Materials
    a. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use that meet VOC limits of authorities having jurisdiction.
7. Protection Course Installation
    a. Apply protection course in compliance with waterproofing and protection course manufacturers' latest published recommendations, requirements and specifications.
8. Backfilling
    a. Place and compact backfill to required density; prevent damage to the waterproofing and protection board.

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Interior

3

Interior

3.1 Interior Partitions

3.1.1 UNIT MASONRY PARTITIONS

1. Summary
    a. This Section includes:
        i. Concrete masonry units.
        ii. Structural glazed facing tile.
        iii. Steel reinforcing bars.
        iv. Masonry-joint reinforcement.
2. Sustainability Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.

3.1.2 GYPSUM BOARD ASSEMBLIES

1. Summary
    a. Section Includes:
        i. Gypsum board.
        ii. Abuse resistant gypsum board.
        iii. Tile backer board.

Interior

3.1 Interior Partitions

iv. Cementitious backer units.

v. Shaft wall.

vi. Metal stud framing and ceiling suspension systems.

2. Sustainability Requirements
   a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
   a. Fire-Test-Response Characteristics: Assemblies tested according to ASTM E 119 by an independent testing agency.
   b. STC-Rated Assemblies: Assembly tested according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency to meet project requirements.
   c. Assemblies must meet specified NRC ratings.
   d. Seismic: Ceiling must withstand the effects if earthquake motion determined by ASCE/SEC 7.
4. Gypsum Board
   a. General: Complying with ASTM C 1396/C 1396M.
   b. Tile Backer Board: Glass-Mat Interior Gypsum Board, ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
   c. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M
   d. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M, with moisture and mold-resistant core and paper surfaces.
   e. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325
5. Shaftwall
   a. Structural Performance: Provide gypsum board shaft-wall assemblies capable of withstanding the full air-pressure loads for maximum heights of partitions without failing and while maintaining an airtight and smoke-tight seal.
   b. Steel Framing: ASTM C 645.
      i. Protective Coating: ASTM A 653, G40 hot-dip galvanized coating.
   c. Gypsum Liner Panels: Manufacturer's proprietary liner panels in 1-inch thickness and with moisture-resistant paper faces.
   d. Gypsum Wallboard: ASTM C 36, core type as required by ire-resistance-rated assembly.

6. Joint Treatment Materials
    a. General: Comply with ASTM C 475/C 475M.
7. Auxiliary Materials
    a. Laminating Adhesive.
    b. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
    c. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing).
    d. Acoustical Joint Sealant: Manufacturer's standard complying with ASTM C 834.
    e. Interior Trim: ASTM C 1047
8. Non-Structural Metal Framing
    a. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
        i. Steel Sheet Components: Comply with ASTM C 645 requirements for metal.
    b. Studs and Runners: ASTM C 645.
    c. Deflection Track: Steel sheet top runner to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above.
9. Suspension System
    a. General: Install gypsum board ceilings to comply with ASTM C 636, as modified by the NYC Building Code.

3.1.3 THERMAL INSULATION

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement.
        ii. Standard Project Requirements.
        iii. Specific Project Requirements.
        iv. Reference documents.
        v. Available documents.

Interior

3.1 Interior Partitions

2. Summary
    a. This Section includes thermal barrier materials at building enclosure elements accompanied with a vapor retarder and the following:
        i. Foam-plastic board insulation for foundation walls, concrete slabs on grade, outdoor plazas, and rooftop gardens.
        ii. Slag-Wool-Fiber/Rock-Wool-Fiber blanket insulation for walls and ceilings.
        iii. Mineral-wool board insulation for walls and underside of floor or roof structures.
        iv. Fiberglass blanket insulation for walls and ceilings.
        v. Radiant barriers.
        vi. Vapor retarders.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements for requirements.
4. Basic Function
    a. Insulation must be concealed from view, in the final construction.
5. Products
    a. Foam-Plastic Board Insulation
        i. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
    b. Slag-Wool-Fiber/Rock-Wool-Fiber Blanket Insulation
        i. Unfaced, Slag-Wool-Fiber/Rock-Wool-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
    c. Mineral-Wool Board Insulation
        i. Foil-Faced, Mineral-Wool Board Insulation: ASTM C 612; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 25 and 5, respectively, per ASTM E 84.
    d. Glass-Fiber Blanket Insulation

i. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum lame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

ii. Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class B (faced surface with a lame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

iii. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:

1) Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.

2) Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

6. Accessories

a. Adhesive for Bonding Insulation:

i. Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

ii. Adhesives must have VOC levels, in grams per liter, less than or equal to the thresholds established by the South Coast Air Quality Management District Rule 1168.

7. Installation

a. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

b. Install insulation in areas and in thickness indicated, or as required to produce R-values indicated, enveloping entire area be insulated. Cut and it tightly around obstructions and ill voids with insulation. Remove projections that interfere with placement.

c. Extend insulation in thickness required to produce required R-values to entire area to be insulated. Cut and it tightly around obstructions and ill voids with insulation. Remove projections that interfere with placement.

d. Upon completion of insulation installation, notify PMC so they can inspect exposed insulation before it is covered by other construction.

Interior

3.1 Interior Partitions

8. Protection
    a. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
    b. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.2.1 HOLLOW METAL DOORS AND FRAMES

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement
        ii. Standard Project Requirements
        iii. Reference documents
2. Summary Available documents
    a. This Section includes hollow metal doors and frames., including door lites and transom panels.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Performance Requirements
    a. Fire-Rated Assemblies: Complying with NFPA 80 (where ire-rated assemblies are required by code).
        i. Smoke- and Draft-Control Assemblies: based on testing according to UL 1784 and installed in compliance with NFPA 105.
        ii. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled ire-rated door assemblies except for size.
    b. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 based on testing according to NFPA 257 or UL 9.
5. Doors and Frames
    a. Commercial Doors and Frames: NAAMM-HMMA 861.
        i. Physical Performance: Level A according to SDI A250.4.

Interior

3.2 Doors

6. Hollow-Metal Panels
    a. Same materials, construction, and finish as adjacent door assemblies.
7. Materials
    a. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
    b. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B.
    c. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
    d. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.
    e. Grout: ASTM C 476.
    f. Mineral-Fiber Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
    g. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
    h. Glazing at Door Lites and Transom Panels: Comply with requirements in Section on "Glazing."
    i. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
    j. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.
    k. For concealed overhead door closers, provide space, cutouts, reinforcement and provisions for fastening in top rail of doors or head of frames, as applicable.
8. Construction Features
    a. Core construction: Manufacturer's standard kraft paper honeycomb, polystyrene, polyurethane, mineral board, or vertical steel stiffener core that produces door complying with ANSI A250.8
    b. Thermal-rated (Insulated) Doors: At exterior walls, provide door fabricated with thermal resistance value of not less than 4.0 deg F. x H x sq. ft./ British Thermal Units (BTU).

3.2.2 DOOR HARDWARE

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement
        ii. Standard Project Requirements
        iii. Specific Project Requirements
        iv. Reference documents
2. Summary Available documents
    a. This Section includes commercial door hardware for the following:
        i. Swinging doors.
        ii. Other doors to the extent required.
    b. Door hardware includes, but is not necessarily limited to, the following:
        i. Mechanical door hardware.
        ii. Electromechanical door hardware.
        iii. Automatic operators.
        iv. Cylinders specified for doors in other Sections.
        v. Weather-stripping
    c. Codes and References:
        i. ANSI A117.1 - Accessible and Usable Buildings and Structure.
        ii. International Code Council (ICC)/IBC - International Building Code.
        iii. NFPA 70 - National Electrical Code.
        iv. NFPA 80 - Fire Doors and Windows.
        v. NFPA 101 - Life Safety Code.
        vi. NFPA 105 - Installation of Smoke Door Assemblies.
        vii. UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
        viii. State Building Codes, Local Amendments.

Interior

3.2 Doors

d. Standards: All hardware specified herein must comply with the following industry standards:

i. ANSI/BHMA Certified Product Standards - A156 Series

ii. UL10C – Positive Pressure Fire Tests of Door Assemblies

3. Sustainability Requirements

a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.

4. Quality Assurance

a. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of Documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

b. Installer Qualifications: A minimum 3 years Documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

c. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Design-Builder and Owner.

5. Coordination

a. A. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

6. Scheduled Door Hardware

a. General: Provide door hardware for each door to comply with the Functional/Operational requirements for the rooms intended.

b. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are to be provided. Products are identified by using door hardware designations, as follows:

i. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements.

7. Cylinder and Keying
    a. General: Cylinder manufacturer to have minimum (10) years' experience designing secured master key systems and have on record a published security keying system policy.
    b. Keying System: Each type of lock and cylinders to be factory keyed.
        i. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
        i. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
        ii. New System: Key locks to a new key system as directed by the Owner.
8. Finishes
    a. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
    b. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
    c. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

3.2.3 OVERHEAD COILING DOORS

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement
        ii. Standard Project Requirements
        iii. Specific Project Requirements
        iv. Reference documents
2. Summary Available documents
    a. This Section includes overhead coiling doors.
3. Sustainability Requirements

Interior

3.2 Doors

a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.

4. Performance
   a. Structural Performance, Exterior Doors: Doors must be designed to resist anticipated wind, seismic, and impact loads.
   b. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
5. Door Materials and Construction
   a. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, in a continuous length for width of door without splices.
   b. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A 653/A 653M, with G90 (Z275) zinc coating
   c. Door Curtain Slats: Solid.
6. Accessories
   a. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats.
   b. Electric Door Operator.
   c. Locking: Provide three-point locking at base of door, with cylinder Master Keyed into facility keying system.
7. Hoods
   a. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head.
   b. Galvanized Steel: Nominal 0.028-inch- (0.71-mm-) thick, hot-dip galvanized-steel sheet with G90 (Z275) zinc coating, complying with ASTM A 653/A 653M.
8. Finish
   a. Powder coat, minimum 2.0 mil Dry Film Thickness (DFT).

3.3 Miscellaneous

3.3.1 MISCELLANEOUS WOOD BLOCKING

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement.
        ii. Standard Project Requirements.
        iii. Specific Project Requirements.
        iv. Reference documents.
        v. Available documents.
2. Summary
    a. Section Includes:
        i. Wood blocking.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Wood Products
    a. Lumber: DOT PS 20.
    b. Maximum Moisture Content of Lumber: 19 percent.
    c. Boards: Maximum Moisture Content 19 percent.
5. Fire-Retardant-Treated Materials
    a. Fire-Retardant-Treated Lumber and Plywood by Pressure Process:
        i. Flame spread index of 25 or less when tested according to ASTM E 84.
    b. Kiln-dry after treatment to a moisture content as follows:
        i. Lumber of 19 percent.
        ii. Plywood 15 percent.
6. Miscellaneous Lumber
    a. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber of any species.
    b. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber.

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Interior

3.3 Miscellaneous

c. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

7. Plywood Backing Panels
   a. Backing Panels: DOT PS 1, Exterior, C-C Plugged ire-retardant treated.
8. Fasteners
   a. Nails, Brads, and Staples: ASTM F 1667.
   b. Power-Driven Fasteners: NES NER-272.
   c. Wood Screws: ASME B18.6.1.
   d. Lag Bolts: ASME B18.2.1.
   e. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, lat washers.
   f. Expansion Anchors:
      i. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
      ii. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

3.3.2 METAL FABRICATIONS

1. Related documents
   a. The following documents apply to all required Work for the Project:
      i. The Design-Build Agreement.
      ii. Standard Project Requirements.
      iii. Specific Project Requirements.
      iv. Reference documents.
      v.
2. Summary Available documents
   a. Section includes:
      i. Miscellaneous steel framing and supports.
      ii. Shelf angles.
      iii. Loose bearing and leveling plates.

iv. Steel weld plates and angles.

v. Miscellaneous steel trim.

vi. Metal ladders and safety cages.

vii. Extruded-aluminum plank gratings, with hinged door.

viii. Loose steel lintels.

ix. Steel bollards.

x. Vehicle barriers.

3. Sustainability Requirements

   a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.

4. Performance Requirements

   a. Structural Performance: Gratings must withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

      i. Floors: Uniform load of 125 lbf/sq. ft. (6.00 kN/sq. m) or concentrated load of 2000 lbf (8.90 kN), whichever produces the greater stress.

      ii. Limit deflection to L/360 or 1/4 inch (6.4 mm), whichever is less.

   b. Seismic Performance: Provide gratings capable of withstanding the effects of earthquake motions.

5. Quality Assurance

   a. Welding Standards: Comply with applicable provisions of AWS D1.1 Structural Welding Code–Steel and AWS D1.3 Structural Welding Code–Sheet Steel.

      i. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and if pertinent, has undergone recertification.

6. Metals -General

   a. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

7. Ferrous Metals

   a. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

   b. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.

Interior

3.3 Miscellaneous

c. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

d. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

e. Steel Tubing: ASTM A 500, cold-formed steel tubing.

f. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

8. Aluminum

a. Aluminum, General: Provide alloy and temper recommended by aluminum producer for type of use indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.

b. Extruded Bars and Shapes: ASTM B 221/ASTM B 221M, alloys as follows:

i. 6061-T6 or 6063-T6, for bearing bars of gratings and shapes.

i. 6061-T1, for grating crossbars.

9. Fasteners

a. General: Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

b. Cast-in-Place Anchors in Concrete: Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27 cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153.

10. Extruded-Aluminum Plank Gratings

a. Provide extruded-aluminum plank gratings in type, size, and finish indicated or, if not indicated, as needed to support indicated loads.

i. Type: Extruded-aluminum planks approximately 6 inches (152 mm) wide with multiple flanges approximately 1.2 inches (30 mm) o.c., acting as bearing bars connected by a web that serves as a walking surface. Top surface has raised ribs to increase slip resistance.

ii. Depth: As required to comply with structural performance requirements.

iii. Finish: Mill finish, as fabricated.

b. Fabricate cutouts in grating sections as required for penetrations. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.

c. Hinged Panel: Fabricate with stainless steel hinges and hasp for padlock.

11. Grating Frames and Supports

a. Frames and Supports for Metal Gratings: Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.

i. Unless otherwise indicated, fabricate from same basic metal as gratings.

ii. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches (600 mm) o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches (32 mm) wide by 1/4 inch (6 mm) thick by 8 inches (200 mm) long.

b. Loose Steel Lintels: Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

i. Lintels in Exterior Walls: Hot-dip galvanized.

c. Shelf Angles: Fabricate shelf angles of sizes indicated and for attachment to framing. Fabricate with horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) on center.

i. Shelf Angles in Exterior Walls: Hot-dip galvanized.

ii. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

d. Loose Bearing and Leveling Plates: Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts.

e. Metal Ladders and Safety Cages: Comply with ANSI A14.3, unless otherwise indicated.

i. Elevator Pit Ladders: Comply with ASME A17.1.

ii. Space siderails (406 mm)18 inches (457 mm) apart, unless otherwise indicated.

iii. Steel Ladder Construction: Flat bar siderails, with 3/4-inch- (19-mm-) diameter steel bar rungs fitted in centerline of siderails, plug-welded, and ground smooth on outer rail faces. Provide nonslip surfaces on top of each rung.

Interior

3.3 Miscellaneous

iv. Aluminum Ladder Construction: Extruded channel or tube siderails, not less than 2-1/2 inches (64 mm) deep, 3/4 inch (19 mm) wide, and 1/8 inch (3.2 mm) thick; with extruded tube rungs, not less than 3/4 inch (19 mm) deep and not less than 1/8 inch (3.2 mm) thick, fitted into centerline of siderails and fastened by welding or with stainless-steel fasteners or brackets and aluminum rivets. Provide rungs with ribbed tread surfaces.

v. Fabricate ladder safety cages to comply with ANSI A14.3. Fabricate from same metal as ladders to which safety cages are attached and assemble by welding or riveting.

vi. Exterior Steel Ladders and Safety Cages: Hot-dip galvanized.

12. Steel Bollards
    a. Fabricate metal bollards from Schedule 40 steel pipe.
        i. Fill bollards with concrete.
        ii. Cap bollards with 1/4-inch- (6.4-mm-) thick steel plate.
13. Vehicle Barriers
    a. Configuration must be as required to redirect vehicle traffic that has “strayed” off the established lane.
    b. Vehicle Barriers must consist of “S” shaped impact section and I-beam supports at minimum six foot on center set into concrete substrate with non-metallic, non-shrink grout.
    c. All components, including bolts, rivets and fasteners, must be hot-dip galvanized steel.

3.3.3 METAL STAIRS

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement.
        ii. Standard Project Requirements.
        iii. Specific Project Requirements.
        iv. Reference documents.
        v. Available documents.

2. Summary
    a. Section includes mesh infill guardrails and railings, with wood cap, metal stairs, aluminum tube railings and handrails.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Performance Requirements
    a. Comply with the following minimum requirements for structural performance:
        i. Treads and Platforms of Steel Stairs: Capable of withstanding a uniform load of 100 lbs. per sq. ft. and a concentrated load of 300 lbs. per 4 sq. in., so located as to produce maximum stress conditions.
        ii. Handrails an
        iii. d Toprails of Guards: Capable of withstanding the following loads, when tested per ASTM E 935, and transferring these loads through the supports to the structure:
            1) Uniform load of 50 lbs. per linear ft. applied simultaneously in both vertical and horizontal directions.
            2) Concentrated load of 200 lbs. applied at any point in any direction.
            3) Have attachment devices and supports to transfer these loads to the structure.
            4) Uniform and concentrated loads above need not be assumed to act concurrently.
            5) Guards: Intermediate rails, balusters and panel fillers capable of withstanding a horizontal uniform load of 50 lbs. per sq. ft. of gross area of guard, including open areas of which they are a part. Load need not be assumed to be acting concurrently with uniform horizontal loads on toprails of railing assembly in determining stress on guard supporting members.
5. Quality Assurance
    a. Welding Standards: Comply with applicable provisions of AWS D1.1 Structural Welding Code–Steel and AWS D1.3 Structural Welding Code–Sheet Steel.
        i. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and if pertinent, has undergone recertification
6. Materials
    a. Concrete Fill:

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i. Concrete Materials and Properties: Comply with the requirements of Division 3 Section on concrete for normal weight, ready-mix concrete with minimum 28-day compressive strength of 2500 psi, minimum 440 lbs. cement per cu. yd., and maximum water/cement (W/C) ratio of 0.65, unless higher strengths are shown on the Drawings.

ii. Non-Slip Aggregate Finish: Factory-graded, packaged material containing fused aluminum oxide grits or crushed emery as abrasive aggregate; rust-proof and non-glazing; unaffected by freezing, moisture or cleaning materials, where shown on the Drawings.

b. Infill Mesh:

i. Stainless steel welded wire mesh infill panels must consist of Type 316 or 316 L stainless steel and be made up of 2-inch x 2 inch x 1/4 inch diameter welded wire mesh in 1/2 inch x 1-1/2 inch channel frames. The mesh must be punched thru predrilled holes in the frames and spot welded from the back sides.

c. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):

i. Species and Grade: Red oak or White maple, unless otherwise indicated.

ii. Maximum Moisture Content: 9 percent.

iii. Finger Jointing: Not allowed.

iv. Veneered Material: Not allowed.

v. Face Surface: Surfaced (smooth).

vi. Matching: Selected for compatible grain and color.

d. Steel Framed Stairs:

i. Construct stairs to conform to sizes and arrangements shown on the Drawings and join pieces together by welding unless otherwise shown. Furnish complete stair assemblies including, but not limited to metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates and other components necessary for the support of stairs and platforms, and as required to anchor and contain the stairs on the supporting structure.

ii. Stair Framing: Fabricate stringers of structural steel channels or plates, or a combination thereof, as shown. Furnish closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as shown. Bolt or weld headers to stringers, newels and framing members to stringers and headers; fabricate and join so that bolts, if used, do not appear on f i nish surfaces.

iii. Metal Pan Risers, Subtreads, and Subplatforms: Shape metal pans for risers and subtreads to conform to configuration shown. Furnish thicknesses of structural steel sheet for metal pans shown but not less than required to support the total design loading.

1) Form metal pans of cold-rolled carbon steel sheet unless otherwise shown.
2) Directly weld risers and subtreads to stringers. Locate welds on side of metal pans to be concealed by concrete ill.
3) Make allowance for ceramic tile finish, as specified in Division 9 Section "Ceramic Tiling."

e. Stair Railings and Handrails: Comply with requirements specified elsewhere in this Section for steel pipe railings and handrails, and as follows:
   i. Fabricate newels of steel tubing and furnish newel caps of gray-iron castings, as shown on the Drawings.
   ii. Railings may be bent at corners, rail returns and wall returns, instead of using prefabricated fittings.
   iii. Connect railing posts to stair framing by direct welding, unless otherwise shown.

f. Cast Treads and Nosings: Fabricate units of material, color, sizes and configurations as shown on the Drawings. If not shown, furnish cast-iron units with an integral abrasive finish. Lengths must be as required to accurately it each opening or conditions.
   i. Cast units with an integral abrasive grit consisting of aluminum oxide (corundum), silicon carbide or a combination of both.
   ii. Plain surface texture, except where fluted or cross-hatched surfaces are shown on the Contract Drawings.

7. Galvanizing
   a. Zinc coating by the hot-dip process for items shown or specified in this Section to be galvanized. Coating thickness must be as specified in the referenced standards.
      i. Rolled, pressed and forged iron and steel shapes, castings, plates, bars and strip 1/8-inch-thick and heavier, and assembled fabrications: ASTM A 123.
      ii. Iron and steel hardware: ASTM A 153.
8. Shop Painting
   a. Surface Preparation
      i. Prepare ferrous metal surfaces to comply with requirements of SSPC-SP 3.
   b. Apply shop primer to surfaces of metal stairs except those that are galvanized or shown on the Contract Drawings to be embedded in concrete or masonry. Comply with requirements of The Society of Protective Coatings (SSPC-PA) 1 for shop painting.
   c. Strip paint all edges, corners, crevices, bolts, welds and sharp edges.

Interior

3.3 Miscellaneous

d. Do not paint any stainless-steel items.

e. See Painting Section for paint system requirements.

3.4 Floor Finishes

3.4.1 CERAMIC TILE FLOORING

1. Summary
   a. Section includes: Ceramic floor tiles, waterproof membrane, crack isolation membrane, and metal edge strips.
2. Sustainability Requirements
   a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
   a. A. Installation: Comply with the following standard:
      i. 1. TCA's "Handbook for Ceramic Tile Installation"
      ii. 2. ANSI A108 Series "Specifications for Installation of Ceramic Tile".
   b. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
      i. Waterproof membrane.
      ii. Crack isolation membrane.
      iii. Metal edge strips.
4. Products

   a. General
      i. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions.
      ii. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108; ANSI A118 and ANSI A136.
   b. Waterproof Membrane
      i. General: Manufacturer's standard product that complies with ANSI A118.10
   c. Crack Isolation Membrane
      i. General: Manufacturer's standard product that complies with ANSI A118.12
   d. Setting Materials
      i. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
      ii. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
   e. Grout Materials

Interior

3.4 Floor Finishes

i. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate.

ii. Standard Cement Grout: ANSI A118.6.

f. Miscellaneous Materials

i. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic designed specifically for flooring applications exposed-edge material.

3.4.2 RESILIENT BASE

1. Summary
   a. This Section specifies the requirements for resilient bases.
2. Sustainability Requirements
   a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
   a. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical -products according to ASTM E 48 or NFPA 253 by a qualified testing agency.
      i. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq.
      ii. cm. Resilient Base Standard: ASTM F1861.
4. Products

a. Material Requirement: Type TV (vinyl, thermoplastic), Type TS (rubber, vulcanized thermoset), Type TP (rubber, thermoplastic), Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).

b. Manufacturing Method: Group I (solid, homogeneous).

c. Style: Cove (base with toe).

d. Minimum Thickness: 0.080 inch.

e. Height: 4 inches.

f. Lengths: Coils in manufacturer's standard length.

g. Outside Corners: Job formed or preformed.

h. Inside Corners: Job formed or preformed.

i. Finish: Matte.

3.4.3 RESILIENT TILE FLOORING

1. Summary
    a. Solid vinyl floor tile
2. Sustainability Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
    a. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
        i. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
4. Solid Vinyl Floor Tile
    a. Tile Standard: ASTM F 1700.
5. Installation Materials
    a. Trowelable Leveling and Patching Compounds.
    b. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions.
    c. Floor Polish.

3.4.4 VINYL SHEET FLOORING

1. Summary
    a. Section Includes:
        i. Vinyl sheet flooring.
2. Sustainability Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
    a. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
    b. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

Interior

3.4 Floor Finishes

4. Vinyl Sheet Flooring
    a. Product Standard: ASTM F 1913.
    b. Seamless-Installation Method: Heat welded
    c. Base: Manufacturer's standard integral.
5. Installation Materials
    a. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic- cement-based formulation provided or approved by resilient sheet flooring manufacturer.
    b. Adhesives: Manufacturer's two-part epoxy.

3.4.5 CARPET TILE

1. Summary
    a. Section includes modular carpet tile.
2. Sustainability Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.

3.4.6 ENTRANCE FLOOR GRILLES

1. Summary
    a. Section includes recessed floor grilles and frames with internal pipe connection for drainage.
2. Sustainability Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
    a. Structural Performance: Provide floor grilles and frames capable of withstanding the specified uniform floor load and a wheel load of 500 lb. (227 kg) per wheel.
4. Quality Assurance
    a. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Structure and ICC A117.1.
5. Products
    a. General: Provide manufacturer's standard floor-grille assemblies consisting of treads of type and profile required, interlocked or joined together by cross members, and with support legs (if any) and other components needed to produce a complete installation. Provide drain pans and drainage pipe connections.
6. Foot Grille
    a. Stainless-Steel Floor Grille: Type 304.
    b. Stainless-Steel Finish: No. 4.

Interior

3.4 Floor Finishes

7. Construction Features
    a. Grille sections must be easily removable for cleaning purposes.
    b. Frames:
        i. Provide manufacturer's standard frames of size and style for grille type, for permanent recessed installation in subfloor, complete with installation anchorages and accessories. Unless otherwise indicated, fabricate frame of same material and finish as grilles.

3.5 Wall Finishes

3.5.1 CERAMIC TILE WALLS

1. Summary
    a. Section Includes:
        i. Ceramic wall tiles.
2. Sustainability Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
    a. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types and composition.
    b. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108; ANSI A 118 and ANSI A 136.
4. Setting Materials
    a. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
    b. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
    c. Waterproofing Isolation Membrane:
        i. Sheet System TCNA F122-14 (on-ground concrete) and TCNA F122A-14 (above-ground concrete).
        ii. Composite sheet consisting of ASTM D5109, Type II, Grade I Chlorinated Polyethylene (CM) sheet reinforced on both sides with a non-woven polyester fiber.
        iii. Designed for use in wet areas as an isolation and positive waterproofing membranes for thin- set bonding of sheet to substrate and thin-set bonding of ceramic and porcelain tile or marble to sheet. Suited for both horizontal and vertical applications.
        iv. Conform to the following additional physical properties:

Interior

3.5 Wall Finishes

Property	Units	Results	Test Method
Hardness Shore A	Points	70-80	ASTM D2240 (10 Second Reading)
Shrinkage	Percent	5 Maximum	ASTM D1204
Brittleness		No crack remains flexible at temperature -37 deg C (-35 deg F)	ASTM D2497 13mm (1/2-inch) Mandrel Bend
Retention of Properties after Heat Aging	Percent of Original	80 Tensile 80 Breaking 80 Elongation	ASTM D3045 90 deg C (194 deg F) for 168 hours

Table 1

a) Manufacturer's standard sheet size with prefabricated or preformed inside and
b) outside corners. Sheet manufacturer's solvent welding liquid or xylene and edge sealant.

6. Grout Materials

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Functional Equipment & Specialties

4

Functional Equipment & Specialties

4.1 Functional Equipment

4.1.1 PARKING CONTROL EQUIPMENT

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement
        ii. Standard Project Requirements
        iii. Specific Project Requirements
        iv. Reference documents
2. Summary Available documents
    a. This Section includes a complete parking control system, consisting of – but not necessarily limited to - the following items: Cloud Based Computer System, dedicated computer workstation, complete with laser printer, VOIP Intercom System, gates, ticket dispensers, payment stations, and overhead height indicator.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Coordination
    a. Coordinate with Electrical and Security Specifications.
5. Performance Requirements
    a. Loading: Curtainwall must be designed to resist anticipated wind, seismic, and impact loads.
6. Quality Assurance
    a. Parking control system must be manufactured by a single manufacturer, with minimum five (5) years' experience providing systems of the size and complexity as that required for Work of this Contract.
    b. Installer Qualifications: Installer must have completed a minimum of three (3) systems of the size and complexity as that required for Work of this Contract, within the last five years.
    c. Codes and Standards: Follow New York City Department of Transportation Rules and Specifications and NYC Department of Transportation (DOT) Standard Construction Drawings and Specifications.
7. Parking System Components
    a. Office: Computer workstation must be located in a dedicated, furnished office, with transaction window, specified in other Sections of these Specifications.

b. Gates: All entrances and exits of the regulated lot will be equipped with gates capable of effectively blocking traffic when in the "Down" position. Gates must be activated by ticket dispensing machines at the entrances and by payment stations at the exits.

c. Ticket Dispensers: Situate dispensers at left side of incoming traffic lanes to facilitate customers taking their tickets without leaving their vehicles. Provide special override feature for lot attendants' and parking lot maintenance staff use only.

d. Payment Stations: These units must be located at elevator lobbies, as well as at curbside as a vehicle approaches the exit gates. Situate dispensers at left side of exiting traffic lanes to facilitate customers paying their parking fees without leaving their vehicles. Provide special override feature for use of lot attendants and parking lot maintenance staff.

e. Overhead Height Indicator: Provide 4-inch diameter, soft indicator bar at all vehicular entrances to the lot. Set with galvanized or stainless-steel hangers attached to structure above, using tamper-proof fasteners. Provide appropriate warning graphics.

i. Lettering, graphics, color and height must be in accordance with above referenced standards.

8. Installation

a. Installation: System components must be installed using stainless steel bolts and anchors, embedded in concrete floor constructions. Bolts must be either hidden or tamper-proof.

4.1.2 VEHICLE BARRIERS

1. Summary

a. This Section includes loading flush vehicle barriers.

2. Sustainability Requirements

a. Refer to Section 01 for Sustainable Design Requirements.

3. Coordination

a. Coordinate with Structural, Electrical, and Security Work.

4. Performance Requirements

a. Barrier must be capable of resisting a vehicle weighing up to 15,000 lbs.

5. Products

a. Vehicle barriers: Wedge type, designed for a shallow foundation.

Functional Equipment & Specialties

4.1 Functional Equipment

4.1.3 MISCELLANEOUS SECURITY PRODUCTS

1. Summary
    a. Section includes:
        i. Speak thru's
        ii. Transaction drawers
        iii. Package receivers
2. Speak Thru's
    a. Materials:
        i. 7-inch (178.5 mm) diameter; 0.093 inch (2.3 mm) thick perforated #3 stainless steel
        ii. Fasteners: 1/4-inch (6.375 mm) diameter stainless steel screws.
3. Transaction Drawers
    a. Materials:
        i. Steel Case: 0.053 inches (1.3 mm) thick steel with manufacturer's standard finish
        ii. Drawer and Tray: 0.053 inches (1.3 mm) thick stain steel.
        iii. Tracks and Release Handles: Manufacturer's standard.
        iv. Bottoms must be lined with Neoprene.
        v. Drawer size 18” wide, 29 inches long and 6 inches deep.
4. Package Receivers
    a. Materials:
        i. Steel Door: 0.053 inches (1.3 mm) thick steel with manufacturer's standard finish.
        ii. Mounting Flanges: 0.093 inch (2.3 mm) thick
        iii. Door Interlock System: Manufacturer's standard with automatic door closer.
        iv. Bottoms must be lined with Neoprene.

4.1.4 PARKING BUMPERS

1. Related documents

4.1 Functional Equipment

a. The following documents apply to all required Work for the Project:
   i. The Design-Build Agreement.
   ii. Standard Project Requirements.
   iii. Specific Project
   iv. Requirements. Reference
   v. documents.

2. Summary Available documents.

   a. General:
      i. This Section includes wheel stops.

3. Sustainability Requirements
   a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.

4. Wheel Stops
   a. Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete, 4000-psi (27.6-MPa) minimum compressive strength, 4-1/2 inches (115 mm) high by 9 inches (225 mm) wide by 72 inches (1800 mm) long. Provide chamfered corners, transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.
   b. Surface Appearance: Free of pockets, sand streaks, honeycombs, and other obvious defects. Corners must be uniform, straight, and sharp.
   c. Embedded Markings: Molded-in, yellow reflective markings, permanently inset in exposed surface.

5. Mounting Hardware
   a. Mounting Hardware: Galvanized-steel spike or dowel, 1/2-inch (13-mm) diameter, 10-inch (254-mm) minimum length.

6. Installation
   a. Install wheel stops in bed of adhesive before anchoring. Securely anchor wheel stops to pavement with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer. Recess head of hardware beneath top of wheel stop.

Functional Equipment & Specialties

4.1 Functional Equipment

4.1.5 SNOW BLOWERS

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement.
        ii. Standard Project Requirements.
        iii. Specific Project Requirements.
        iv. Reference documents.
        v. Available documents.
2. Summary
    a. General:
        i. This Section includes snow blower and accessories, for rooftop use.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Snow Blower Features
    a. Track drive, with adjustable auger height.
    b. Electric start.
    c. Power Steering: Trigger control power steering allows maneuverability in adverse conditions.
    d. Heavy-tread tires for extra good traction.
    e. LED headlight for easy operation when it's dark.
    f. Clears 28” wide, 1900 lb./min.
    g. Throws snow up to 56 feet
5. Accessories
    a. Provide with fitted cover.
6. Maintenance
    a. Provide training session for facility staff and provide printed maintenance manuals.

4.1 Functional Equipment

4.1.6 PHOTOVOLTAIC CANOPY

1. Related documents
   a. The following documents apply to all required Work for the Project:
      i. The Design-Build Agreement.
      i. i Standard Project Requirements.
      ii. Specific Project
      iv. Requirements. Reference
      v. documents.
2. Summary Available documents.

   a. General:
      i. This Section includes photovoltaic panels mounted either directly onto the rooftop utilizing a metal frame or mounted on a metal canopy structure, designed as part of a roof garden area.
         1) Metal framing and canopy structure must be hot-dip galvanized or Galvannealed steel, painted in the shop.
3. LEED Requirements
   a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements for LEED requirements.
4. Performance Requirements
   a. Loading: Design components to resist anticipated wind, seismic, and impact loads.
   b. Locate photovoltaic panels to receive a maximum possible amount of direct sunlight. Consider using a tracking system that more closely follows the path of the sun and optimizes throughput.
5. Quality Assurance
   a. Manufacturer's Qualifications: Provide photovoltaic systems that are produced by a single manufacturer with not less than five (5) years of experience in the fabrication of assemblies involving quantities and complexities at least equal to those required for the construction. Manufacturer must be capable of providing field service representation during construction.
   b. Installer's Qualifications: Installer must be an entity who is acceptable to the photovoltaic system manufacturer and has completed a minimum of five (5) projects of similar complexity, within the last five (5) years.

Functional Equipment & Specialties

4.1 Functional Equipment

c. Curtainwall must be installed by an entity that has not less than 5 years of experience in the installation of systems involving quantities and complexities at least equal to those required for this installation and is acceptable to the curtainwall manufacturer.

d. Welding Standards: Comply with applicable provisions of AWS D1.1 Structural Welding Code–Steel and AWS D1.3 Structural Welding Code–Sheet Steel.

i. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and if pertinent, has undergone recertification.

e. Ensure that the installation does not violate any zoning or other building code restrictions on the facility. Ensure that adequate access is provided and that the installation does not violate any other AHJ, including the Fire Department.

6. Warranties

a. Solar Photovoltaic Modules

i. Furnish the solar photovoltaic module manufacturer's warranty. The warranty must be a 25-year linear 80 percent (minimum) power warranty (at the end of the 25th year after purchase an actual minimum power output of 80 percent based on the nameplate rating must be achieved) and not less than 10-years for workmanship, materials, and manufacturing defects from the date of issuance of Certificate of Final Completion. The warranty must state that the malfunctioning solar photovoltaic module must be exchanged by the manufacturer and promptly shipped to the facility. The replacement solar module must be identical to, or an improvement upon, the original design of the malfunctioning solar module. Provide an extra eight (8) percent of spare modules in the event of necessary replacement of malfunctioning installed module.

b. Inverters

i. Furnish the inverter manufacturer's warranty. The warranty period must be 15 years (minimum) from the date of issuance of Certificate of Final Completion. The warranty must state that the malfunctioning inverter must be exchanged by the manufacturer and promptly shipped to the facility, and arrive in no more than ten days. The replacement inverter must be identical to, or an improvement upon, the original design of the malfunctioning inverter. Provide an extra eight (8) percent of spare inverters in the event of necessary replacement of malfunctioning installed inverters.

7. Materials

a. Metal Surfaces, General:

i. Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

4.1 Functional Equipment

i. Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

8. Ferrous Metals
   a. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
   b. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.
   c. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
   d. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
   e. Steel Tubing: ASTM A 500, cold-formed steel tubing.
   f. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.
9. Photovoltaic System Description
   a. A photovoltaic system, also PV system or solar power system, is a power system designed to supply usable solar power by means of photovoltaics. It consists of an arrangement of several components, including solar panels to absorb and convert sunlight into electricity, a solar inverter to convert the output from direct to alternating current, as well as mounting, cabling, and other electrical accessories to set up a working system.
   b. The system must be utility grid connected. Coordinate connection and start-up with the local electrical utility.
   c. Refer to Electrical Specifications for cables, conduit, and connections.
10. Fabrication
    a. Fabricate canopy and other support structure from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive photovoltaic panel arrays. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive electrical and accessory items.
11. Accessories
    a. Refer to other Electrical and Security, and Fire Protection Sections for various lighting, public address systems, cameras, and any other item required to be installed on canopy.
       i. General: Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

Functional Equipment & Specialties

4.1 Functional Equipment

ii. Fasteners must be tamper-proof.

12. Galvanizing
    a. Zinc coating by the hot-dip process for items shown or specified in this Section to be galvanized. Coating thickness must be as specified in the referenced standards.
        i. Rolled, pressed and forged iron and steel shapes, castings, plates, bars and strip 1/8-inch-thick and heavier, and assembled fabrications: ASTM A 123.
        ii. Iron and steel hardware: ASTM A 153.
13. Finish
    a. Thoroughly clean, pre-treat and prime surfaces of door assembly including fixed panels, trim, support, and closure pieces in shop for field-applied topcoat. See Exterior Steel Painting spec for more information.
14. Installation
    a. Provide Secure columns and posts into davits secured directly to steel structure below.
    b. Install steel structure following approved Shop Drawings prepared by a qualified Engineer.
    c. Ensure that the system installation does not affect the integrity of the roofing system or any plant material.
15. Maintenance
    a. Provide training session for facility staff and provide printed cleaning instructions and maintenance manuals.

4.2 Specialties

4.2.1 METAL STORAGE SHELVING

1. Summary
   a. This Section includes metal storage shelving.
2. Sustainability Requirements
   a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
   a. Design shelving to accommodate anticipated loading.
4. Products
   a. Lockers must be fabricated of painted hot-dip galvanized steel.
   b. Provide in configurations required to accommodate anticipated number of items to be stored and to ft special layouts.

4.2.2 TOILET ACCESSORIES

1. Related documents
   a. The following documents apply to all required Work for the Project:
      i. The Design-Build Agreement.
      ii. Standard Project Requirements.
      iii. Specific Project
      iv. Requirements. Reference
      v. documents.
2. Summary Available documents.

   a. General:
      i. This Section includes products for use in toilet and shower structure not used by people in custody and including the following:
         1) Washroom accessories:
         2) Underlavatory guards.
         3) Childcare accessories.

Functional Equipment & Specialties

4.2 Specialties

4) Custodial accessories.

b. Identify locations using room designations indicated on Room Data Sheets.

c. Identify products using designations indicated on Room Data Sheets, if possible.

d. Maintenance Data: Include in maintenance manuals.

e. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period. Warranty Period: Fifteen (15) years from date of Substantial Completion.

f. Materials: Primary material must be Stainless Steel, ASTM A666, Type 304, 0.0312-inch nominal thickness, unless otherwise indicated.

g. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

3. Sustainability Requirements

a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.

4. Quality Assurance

a. Accessibility: Comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and International Code Council/American National Standards Institute (ICC/ANSI) A117.1.

5. Washroom Accessories

a. Toilet Tissue (Roll) Dispenser:

i. 9” Twin Tissue Dispenser.

b. Paper Towel Dispenser:

i. Towel Dispenser, with auto-cut sheet cutting feature.

c. Liquid-Soap Dispenser:

i. Description: Designed for dispensing soap in liquid or lotion form. Provide in one (1) liter capacity.

d. Grab Bar:

i. Mounting: Flanges with exposed fasteners.

ii. Material: Stainless steel, 0.050 inch thick.

iii. Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.

iv. Outside Diameter: 1-1/4 inches.

v. Configuration and Length: As required.

e. Sanitary Napkin Dispenser

i. Type: Sanitary napkin and tampon.

ii. Mounting: Surface mounted.

iii. Capacity: As selected by Owner.

iv. Operation: As selected by Owner.

v. Lockset: Tumbler type with separate lock and key for coin box.

f. Sanitary-Napkin Disposal Unit:

i. Mounting: Surface mounted.

ii. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.

iii. Receptacle: Removable.

g. Mirror Unit:

i. Frame: Stainless steel, adjustable tilt.

ii. Corners: Welded and ground smooth.

iii. Integral Shelf: 5 inches deep.

iv. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

1) One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

2) Size: As required.

h. Underlavatory Guards

i. Underlavatory Guard:

ii. Description: Insulating pipe covering for supply and drain piping assemblies, that prevent direct contact with and burns from piping, and allow service access without removing coverings.

iii. Material and Finish: Antimicrobial, molded-plastic, white.

i. Childcare Accessories

i. Diaper-Changing Station:

Functional Equipment & Specialties

1) Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
2) Engineered to support a minimum of 250-lb static load when opened.
3) Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when in closed position.
4) Operation: By pneumatic shock-absorbing mechanism.
5) Material and Finish: High-Density Polyethylene (HDPE) with plastic-laminate insert in color selected by Architect, with replaceable insulated polystyrene tray liner and rounded plastic corners, exterior shell with rounded plastic corners; HDPE interior in manufacturer's standard color.
6) Liner Dispenser: Built in.

ii. Diaper-Pack Dispenser:

1) Mounting: Surface mounted.
2) Minimum Capacity: 100 diaper packs.
3) Coin Operation: Coin slot preset for one U.S. dollar, adjustable up in 25-cent increments.

j. Custodial Accessories

i. Utility Shelf:

1) Description: With exposed edges turned down not less than 1/2 inch and supported by two triangular brackets welded to shelf underside.
2) Thickness: Not less than nominal 0.05-inch- thick.

ii. Mop and Broom Holder:

1) Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
2) Length: 36 inches.
3) Hooks: Three.
4) Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
5) Material and Finish: Stainless steel, No. 4 finish (satin).
6) Shelf: Not less than nominal 0.05-inch- thick.
7) Rod: Approximately 1/4-inch- diameter stainless steel.

6. Material and Finish
    a. Stainless Steel: No. 4 finish (satin).

4.2.3 OFFICE FURNITURE

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build
        ii Agreement. Standard Project
        . Requirements. Specific
        iii Project Requirements.
        . i Reference documents.
        v. Available documents.
2. Summary

    a. General:
        i. This Section includes workstation, desk chair, guest chair, copier, and file cabinet.
3. Sustainability Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
4. Construction Features
    a. Provide fully functional furniture required by the Owner for office functions.
5. Accessories
    a. Provide chairs with casters.
6. Maintenance
    a. Provide training session for facility staff and provide printed maintenance manuals.

4.2.4 SIGNAGE

1. Summary
    a. This Section includes illuminated and non-illuminated panel signage to include the following sign types:

Functional Equipment & Specialties

i. Wall mounted signs
ii. Pylon signs (free standing signs).
iii. Post and panel signs.
iv. Ceiling mounted single face and double face signs.

b. Provide a facility Wayfinding System, consisting of illuminated, variable message signs throughout the facility.
c. See Electrical Specifications for more information.

2. Performance Requirements
   a. Loading: Pylon, post and panel, and suspended signs must be designed to resist anticipated wind, seismic, and impact loads.
3. Quality Assurance
   a. Ensure that entities performing signage fabrication and installation have ten (10) years documented experience in the fabrication and installation of signage involving complexities equal to or greater than those required for signage installation.
4. Metal Materials
   a. Aluminum Sheet: Alloy and temper recommended by the aluminum producer or finisher for the type of use and finish shown on the Drawings, and with not less than the strength and durability properties specified in ASTM B209 for alloy 6061-T6.
   b. Aluminum Extrusions: Alloy and temper recommended by the aluminum producer or finisher for the type of use and finish shown on the Drawings, and with not less than the strength and durability properties specified in ASTM B221 for alloy 6063-T5.
   c. Structural Steel and Miscellaneous Steel Framing and Supports: Sizes and shapes shown on Drawings or, if not shown, as required by structural calculations.
   d. Steel Bars and Tubing: ASTM A500, Grade B or ASTM A501, hot dipped galvanized finish.
5. Sign making Components
   a. Plastic Laminate: High-pressure laminate engraving stock with face and core plies in contrasting colors, scratch resistant, in thickness and color shown.

b. Cast Acrylic Sheet: Cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, ASTM D4802, classification category A-1, smooth finish, UV absorbing, in sizes and thicknesses indicated on Drawings, minimum flexural strength of 16,000 psi when tested in accordance with ASTM D790, minimum allowable continuous service temperature of 176 deg F, unless otherwise noted.
    i. At cutout acrylic lettering and graphics locations: Clear transparent and white translucent sheet of densities required to produce uniform brightness and minimum halation effects.
    ii. At silk screen graphics locations: White translucent sheet of density required to produce uniform brightness and minimum halation effects.
    iii. At color sheet graphics locations: Clear transparent facing sheet and white translucent backing sheet, same as sheets specified above for silk screen graphics locations.
    iv. Where "clear" sheet material is shown, furnish colorless sheet in matte finish.
    v. Where "opaque" sheet material is shown, furnish colored opaque acrylic sheet in colors and finishes shown or, if not shown, as selected by Project Manager Consultant (PMC) from the manufacturer's standards.
c. Colored Coatings for Cast Acrylic Sheet:
    i. Where silk screen graphics are shown on the Drawings: Colored coatings, including inks and paints for copy and background colors, must be as recommended by acrylic manufacturers for optimum adherence to acrylic surface and non-fading for application shown on the Drawings.
    ii. Where color sheet film graphics are shown on the Drawings: Photographic sheet graphics placed between two cast acrylic sheets (specified above). Photographic sheet graphics must be standard display material. Finished sheet must include a minimum 7.0 mil thick translucent base.
d. Polycarbonate Sheet:
    i. Clear, cast polycarbonate sheet with abrasion resisting coating both sides, in sizes, types and thicknesses shown on the Drawings.
    ii. Strength: Minimum flexural strength of 13,500 psi when tested in accordance with ASTM D790; Izod impact resistance of 16 lbf per inch when tested in accordance with ASTM D256.
    iii. Service Temperature: Maximum allowable continuous service temperature of 240 deg F.
    iv. Abrasion Resistance: Maximum 3 percent haze increase for 100 revolutions of a 500g Taber abraser when tested in accordance with ASTM D1044.

Functional Equipment & Specialties

4.2 Specialties

v. Light Transmittance: Minimum 84 percent light transmittance for 1/4-inch-thick clear sheet when tested in accordance with ASTM D1003.

e. Screen Printing Graphic Ink: Multi-color exterior use, flexible, chemical-, weather-and abrasion-resistant, designed for use with vinyl graphic film; supplied by film manufacturer

6. Internally Illuminated Signs

a. All work required to assemble and wire lighting systems for internally illuminated signs must be completed and tested in the factory. Field work must be limited to connection to primary electrical power source.

b. Internal housings and bases must be of aluminum sheets or bent plates in gages and thickness as shown on the Contract Drawings or, if not shown, as required by this Section.

c. Lamping and box design must be such that even, consistent illumination is achieved across the sign face from edge to edge. Hot or cold spots, shadows or ghosting are not acceptable.

d. Graphics display must use one of the following methods as shown on Contract Drawings:

i. Color sheet graphics as specified in this Section.

e. Wiring within the sign must be installed in accordance with the National Electrical Code and must be neatly arranged and supported.

f. Ballasts must be individually fused in an approved manner.

g. Wire terminals, taps and other electrical connectors must be of an approved swaged, clinched or positive clamping type. Plain soldered lugs with no means of mechanically holding the wire without solder are not permitted.

h. Lamps, ballasts and fuses must be arranged so that they are readily accessible for maintenance. Lamps and ballasts must comply with the requirements of Division Section 16510, Lighting Systems. Determine actual types, lengths and wattages required for individual and fully legible signs. Furnish suitable lamps for interior and exterior use as required for even illumination of messages.

i. Illuminated signs must be connected into the existing building circuitry. Install conductors from the existing junction boxes or relays to the service entrances in the signs in order to provide power to the lamps. Determine in the field the exact location of existing junction boxes or relays before making provisions for concealed service entrances in the signs. Make electrical fixture and power connections.

j. Illuminated signs must be furnished with vent holes protected with insect screening, and adequately light proofed.

k. Illuminated signs must be of weather-tight construction.

l. Furnish and install prop bar for ease in relamping.

m. Furnish and install a photocell-operated switch in an inconspicuous location, for the individual operation of each sign for maintenance purposes.

7. Accessories

a. Fasteners: Stainless steel, unless otherwise required. Do not use metals that are corrosive or incompatible with metals joined.

i. Types, gages and lengths to suit installation conditions.

ii. Concealed fasteners for interconnecting sheet metal fabrications and attachment to other construction.

b. Anchors and Inserts: Stainless steel, hidden when possible. Include inserts as required, to be set into substrate.

c. Mounting Tapes and Adhesives: Adhesives, as recommended by sign manufacturer, to suit installation conditions; "VHB" (Very High Bond) tape for mounting sign plaques, as manufactured by 3M Company, or approved equal.

d. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

e. Gaskets: Tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

f. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing minimum 94 percent zinc dust by weight, and complying with SSPC-Paint 20.

g. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.

8. Construction Features

a. Sign graphics and finish must be as indicated.

i. Wall Mounted Panel Signs: Fabricated Face panels must be a minimum of 1/8" thick porcelain enamel or directly embedded graphic pigment/coating on aluminum substrate. Finishes on all returns must match finish on face panel.

ii. Pylon Signs: Square, triangular, rectangular shaped in plan, or as shown, in the form of either a tower or slab. Fabricated of metal sheet or aluminum sandwich panels and steel framing, as shown on the Drawings. Face panels must be a minimum of 1/8" thick porcelain enamel or directly embedded graphic pigment/coating on aluminum substrate. Finishes on all returns must match finish on face panel.

Functional Equipment & Specialties

4.2 Specialties

iii. Post and Panel Signs: Double-sided sign construction with two face panels, fabricated core frame and overhead mounting structure. Face panels must be a minimum of 1/8" thick porcelain enamel or directly embedded graphic pigment/coating on aluminum substrate. Finishes on all returns must match finish on face panel.as shown on the Drawings.

iv. Room ID Plaques: Sign must be 3/8" thick single-core photopolymer panel and must include ADA compliant raised characters and Braille, as required. All returns must match finish on face.

v. Overhead Mounting Structure: Overhead hanging structure must be extruded stainless steel or painted aluminum posts to match architectural finishes from which the sign is hung. Hanging structure must be mechanically connected or welded to the core frame.

9. Fabrication

a. General: Fabricate to details shown on the Drawings and on the approved Shop Drawings, and must be first class workmanship in accordance with the best trade practices. Cutting, fabrication and assembly must be performed in the factory. Joints, corners, miters and splices must be accurately machined, filled, fitted and filed, rigidly framed together at joints and contact points, and painted smooth to give a monolithic appearance with imperceptible joints; there must be no visible connections. Mechanical fasteners must match color and finish of the sign where they occur. Exposed metal surfaces must be smooth with unblemished finish. The completed sign must be shipped to the job site as one complete unit.

b. Materials must be selected for their surface flatness, smoothness and freedom from surface blemishes wherever exposed to view in the finished unit. Exposed-to-view surfaces that exhibit pitting, seam marks, roller marks, "oil canning", stains, discolorations or other imperfections on the finished unit are not acceptable.

c. Surfaces must be covered with a protective cover non-deleterious to finish for protection until final installation or erection.

d. Field measurements must be taken prior to preparation of Shop Drawings and fabrication.

e. Where aluminum is fastened to steel or other dissimilar metal, or where aluminum is in contact with concrete or masonry, contact surface must be given a heavy coating of bituminous paint.

f. Form closures and trim members to profiles shown using the gage sheet metal shown. Furnish components required for support and installation of closures and trim. Fabricate closures and trim to tightly close with adjoining construction. Finish exposed edges of trim and closure strips. Joints exposed in final installation must not vary more than 1/32 inch in either width or alignment.

g. Locate fasteners to be concealed wherever possible, otherwise to be as inconspicuous as possible. Size fasteners to securely support the construction, and space to prevent buckling or waviness of the finished surface. Exposed fasteners must be countersunk and filled to match finish.

h. Drill and tap holes required for securing closures to other surfaces. Fasteners must be hidden from view or countersunk lush to surface.

i. Joints must have contiguous concealed support to hold meeting faces in lush alignment. Miter or cope trim members at corners to form tight joints.

j. Sandwich Panel Signs:

   i. Perimeter Frames: Extruded aluminum alloy 6063-T6, heliarc welded.

   ii. Panel Thickness: 1 inch, unless otherwise shown.

   iii. Finish: As specified in this Section.

   iv. Aluminum honeycomb laminate construction: Minimum tensile strength of 50 psi in accordance with ASTM C297 and ASTM C481.

   v. Adhesives: Thermosetting epoxy type. Bonding must be done in a heated lat platen press of sufficient size to contain the entire panel at one time with 10 psi over the entire platen area.

   vi. Adhesively bonded panels must have exterior faces of such flatness when measured at normal room temperature of 70 degrees to 80 degrees F that the maximum slope of the surface at any point, measured from the nominal plane of the surface, must not exceed 1.5 percent. Wave slope must be computed by measuring the distance between high points and placing a straight edge across these points to determine the depth of slope. Flatness of signs must be within a slope determination of 1 percent when checked in this manner.

   vii. For exterior signs, 1/8-inch diameter weep holes must be drilled in the cap and the perimeter frame at the bottom of each panel 3 inches in from either end, and in the center of each panel.

k. Aluminum Sheet on Plywood Signs: Form sign panels of aluminum sheet, adhesively attached to fire-retardant plywood backing, as required.

l. Provide machine-radius base for lag-mounted signs to suit post diameters.

m. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

n. Comply with ADA standards for signage accessibility for such items as characters, graphics, and Braille in compliance with ADA Chapter 7, par. 703 Signs.

o. Panel Signage: Fabricate signs using 0.125 inch thickness aluminum sheet, brake-formed, fully welded at joints and seams.

p. Pylon Signage: Fabricate 0.125 inch aluminum-sheet-clad cabinets as indicated; fully welded. Reinforce with aluminum angles and channels.

Functional Equipment & Specialties

4.2 Specialties

q. Support Posts: Fabricate from seamless 6063 Alloy aluminum, heat treated T6 temper, 0.156 inch minimum wall thickness, in lengths with fully welded trim as indicated. Provide attachment at base. Finish must be as specified.

10. Finishes

a. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

b. Steel Fabrications: Galvanize after fabrication. Provide minimum 1.25 oz/sq. ft galvanized coating. Field finish per requirements.

c. Exposed Signage Components and Cabinets:

d. High-Performance Organic Finish: Four-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers written instructions.

e. Concealed surfaces must receive one coat of the same primer as that specified for exposed surfaces.

Vertical Transportation

5

Vertical Transportation

5.1 Stairs and Ramps

5.1.1 PRECAST CONCRETE STAIRS

1. Summary
   a. Section Includes:
      i. Precast Concrete Stairs.
2. Performance Requirements
   a. Basic Function:
      i. Stair construction.
      ii. Stair railings.
   b. Amenity and Comfort: Comply with the New York City Building Code.
      i. Provide exterior stairs with risers of not more than 7 inches and treads sized so that twice the riser height plus the tread depth totals 24 to 25 inches.
      ii. Provide exterior stairs with maximum rise of not more than 12 ft between landings.
      iii. Provide walking surfaces of stairs, ramps, walkways, with a minimum static coefficient of friction of 0.60 measured in accordance with ASTM D 2047.
   c. Health and Safety:
      i. Comply with applicable provisions of New York City Building Code, ADAAG and ANSI A117.1 as applicable for stairs and handrails.
   d. Structure:
      i. Design Standards: Comply with ACI 318 and with design recommendations in Precast/Prestressed Concrete Institute Manual (PCI MNL) 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.
      ii. Capacity and Serviceability: Provide the capacities and serviceability limits of the stairs as required by the New York City Building Code (NYC BC 2014) and by any specific project requirements.
      iii. Design Loads: Design loads must satisfy the requirements of New York City (NYC) Building Code, and by any specific project requirements. The minimum recommended design loads are indicated below:
         1) Uniform Load: 100 lbf/sq. ft.
         2) Concentrated Load: 300 lbf applied on an area of 4 sq. in.
         3) Uniform and concentrated loads need not be assumed to act concurrently.

4) Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.

iv. Thermal Movements: Allow for in-plane thermal movements resulting from annual ambient temperature changes, which is recommended to range between minus 10 and plus 120 deg F.

e. Durability:

i. Stairs are expected to remain functional during the lifespan of the garage building.

3. Materials

a. Reinforcing Materials:

i. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

ii. Galvanized Reinforcing Bars: ASTM A615, Grade 60; ASTM A706, deformed bars, with ASTM A767, Class II zinc coating and chromate treatment.

b. Portland Cement:

i. ASTM C150/C150M, Type I or Type III, gray

c. Supplementary Cementitious Materials:

i. Fly Ash: ASTM C618, Class C or F, with maximum loss on ignition of 3 percent.

ii. Metakaolin: ASTM C618, Class N.

iii. Silica Fume: ASTM C1240, with optional chemical and physical requirement.

iv. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.

d. Normal-Weight Aggregates:

i. Except as modified by PCI MNL 116, ASTM C33, with coarse aggregates complying with Class 5S, Class 5M, Class 4S or Class 4M. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

e. Water:

i. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

4. Concrete Mixtures

a. If Supplementary Cementitious Materials are required, then prepare design mixtures for each type of precast concrete required considering the following guidelines:

i. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.

Vertical Transportation

5.1 Stairs and Ramps

ii. Limit use of fly ash to 20 percent replacement of Portland cement by weight and ground granulated blast-furnace slag to 20 percent of Portland cement by weight; metakaolin and silica fume to 10 percent of Portland cement by weight.

1) Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

2) Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C1218.

b. Normal Weight Concrete:

i. Compressive Strength (28 Days): 5000 psi

ii. Maximum Water-Cementitious Materials Ratio: 0.45

1) Water Absorption: For structural precast concrete with an architectural finish, limit water absorption to 6 percent by weight or 14 percent by volume, tested according to ASTM C642, except for boiling requirement.

5. Field Quality Control

a. Special Inspections:

i. Engage a qualified special inspector to perform any special inspections.

b. Testing Agency:

i. Engage an accredited independent testing agency.

6. Commercial Finishes

a. Commercial Grade: Faces must have 1, well-defined surfaces. Air holes, water marks, and color variations are permitted.

b. Standard Grade: Normal plant-run finish produced in molds that impart a smooth finish to concrete. Major or unsightly imperfections, honeycombs, or structural defects are not permitted. Limit joint offsets to 1/8 inch.

c. Apply roughened surface finish according to ACI 318 (ACI 318M) to precast concrete units that receive concrete topping after installation.

d. Architectural Form Liner must be considered for vertical surfaces to provide a sharp, clean and/or pattern on the surface.

7. Sustainability Requirements

a. Refer to Section 01 for Sustainable Design Requirements.

5.1 Stairs and Ramps

5.1.2 STAIR RAILINGS

1. Summary
    a. Section Includes
        i. Handrails and guardrails
2. Quality Assurance
    a. Welding Qualifications: Qualify procedures and personnel according to the following:
        i. AWS D1.1/D1.1M, “Structural Welding Code - Steel.”
        ii. AWS D1.3/D1.3M, “Structural Welding Code - Sheet Steel.”
3. Performance Requirements
    a. Structural Performance of Railings: Railings must withstand the effects of gravity loads and the following loads and stresses:
        i. Handrails and Top Rails of Guards:
            1) Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
            2) Concentrated load of 200 lbf (0.89 kN) applied in any direction.
            3) Uniform and concentrated loads need not be assumed to act concurrently.
        ii. Infill of Guards:
            1) Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
            2) Infill load and other loads need not be assumed to act concurrently.
    b. Sustainability Requirements
        i. Refer to Section 01 for Sustainable Design Requirements.
4. Metals

    a. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
    b. Bars: Hot-rolled, carbon steel complying with ASTM A29/A29M, Grade 1010.
    c. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
    d. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
    e. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, [either commercial steel, Type B, or] structural steel, Grade 25 (Grade 170), unless another grade is required by design loads; exposed.

Vertical Transportation

5.1 Stairs and Ramps

f. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, [either commercial steel, Type B, or] structural steel, Grade 30 (Grade 205), unless another grade is required by design loads.

5. In-Fill Panels
   a. General: Galvanize all railings in Garage stair
   b. Expanded Metal: ASTM F 1267
   c. Woven-Wire Mesh: Intermediate-crimp, diamond or square.
   d. Perforated Metal: Cold-rolled steel sheet, ASTM A1008/A1008M, or hot-rolled steel sheet, ASTM A1011/A1011M
6. Finishes
   a. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
   b. Primer Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
   c. Paint: Finish
      i. Garage Railings: Waterborne High Performance Coating.
      ii. Community Center Railing: Waterborne acrylic latex
7. Photoluminescent Egress Path Markings
   a. Comply with the requirements of the New York City Building Code

5.1.3 PEDESTRIAN RAMPS

1. Summary
   a. Section Includes:
      i. Precast Concrete.
      ii. Cast-in-Place Concrete.
2. Performance Requirements
   a. Basic Function:
      i. Ramp construction.
      ii. Ramp railings.

b. Amenity and Comfort:

i. Accessible ramps must be provided per current accessibility requirements, including but not limited to the Americans with Disabilities (ADA) Act.

ii. All walks must be limited to a maximum longitudinal slope of 5 percent and a cross slope of 2 percent. Ramps serving pedestrian traffic must be limited to a maximum slope of 8.33 percent in conformance with ADA requirements and must have handrails.

iii. Ramps must be located entirely within the property line

iv. Level landings are required at the top and bottom of each run.

v. Landings must be designed to prevent the accumulation of water.

vi. Ramps and walkways must be constructed of non-slip surfaces with a minimum static coefficient of friction of 0.60 measured in accordance with ASTM D 2047.

c. Structure:

i. Design Standards: Comply with ACI 318-11.

ii. Capacity and Serviceability: Provide the capacities and serviceability limits of the ramps as required by the 2014 NYC Building Code and by any specific project requirements.

iii. Design Loads: Design loads must satisfy the requirements of 2014 NYC Building Code and any specific project requirements. The minimum recommended design loads are indicated below:

1) Uniform Live Load: 100 lbf/sq. ft.

2) Concentrated Live Load: 300 lbf applied on an area of 4 sq. in.

3) Uniform and concentrated loads need not be assumed to act concurrently.

4) Ramp Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.

5) Thermal Movements: Allow for in-plane thermal movements resulting from annual ambient temperature changes, which is recommended to range between minus 10 and plus 120 deg F.

d. Durability:

i. Ramps service life: same as building service life (Minimum of 50 years).

ii. Ramp enclosures through the horizontal floor assembly must have a minimum of 2-hour ire-resistance rating with opening protectives in accordance with 2104 NYC Building Code.

3. Materials

a. Reinforcing Materials:

Vertical Transportation

i. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

ii. Galvanized Reinforcing Bars: ASTM A615, Grade 60; ASTM A706, deformed bars, with ASTM A767, Class II zinc coating and chromate treatment.

b. Portland Cement:

i. ASTM C150/C150M, Type I or Type III, gray

c. Supplementary Cementitious Materials:

i. Fly Ash: ASTM C618, Class C or F, with maximum loss on ignition of 3 percent.

ii. Metakaolin: ASTM C618, Class N.

iii. Silica Fume: ASTM C1240, with optional chemical and physical requirement.

iv. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.

d. Normal-Weight Aggregates:

i. ASTM C33, with coarse aggregates complying with Class 5S, Class 5M, Class 4S or Class 4M. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

e. Water:

i. Potable; free from deleterious material that may affect color stability, setting, or strength of concrete.

4. Concrete Mixtures

a. If Supplementary Cementitious Materials are required, then prepare design mixtures for each type of concrete required considering the following guidelines:

i. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.

ii. Limit use of fly ash to 20 percent replacement of Portland cement by weight and ground granulated blast-furnace slag to 20 percent of Portland cement by weight; metakaolin and silica fume to 10 percent of Portland cement by weight.

iii. Design mixtures may be prepared by a qualified independent testing agency.

b. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318.

c. Normal Weight Concrete:

d. Compressive Strength (28 Days): 5,000 psi

e. Maximum Water-Cementitious Materials Ratio: 0.45

f. Water Absorption: For structural concrete with an architectural finish, limit water absorption to 6 percent by weight or 14 percent by volume, tested according to ASTM C642, except for boiling requirement.

5. Field Quality Control
   a. Special Inspections:
      i. Engage a qualified special inspector to perform any special inspections.
   b. Testing Agency:
      i. Engage an accredited independent testing agency.
6. Liquid Concrete Floor Treatment at Garage
   a. Penetrating Liquid Floor Sealer: Clear, chemically reactive, waterborne solution of inorganic siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces and offers the following concrete slab protection:
      i. Water repelling.
      ii. Protects against roads salts and deicing fluids.
      iii. Reduces staining including oil, gas, and other automotive fluids.
      iv. Mold and mildew resistance.
      v. Breathable, water based and low in VOC's.
      vi. Helps to prevent pitting, spalling, and surface cracks from water absorption.
7. LEED Requirements
   a. Refer to Section 01 for Sustainable Design Requirements.

5.1.4 VEHICULAR RAMPS

1. Summary
   a. Section Includes:
      i. Precast Concrete.
      ii. Cast-in-Place Concrete.
2. Performance Requirements
   a. Basic Function:

Vertical Transportation

i. Open parking garages employing a series of continuously rising floors or a series of interconnecting ramps between floors permitting the movement of vehicles under their own power from and to the street level.

ii. Ramps must be located entirely within the property line.

iii. Level landings are required at the top and bottom of each run.

iv. Landings must be designed to prevent the accumulation of water.

b. Structure:

i. Vehicular ramps are recommended to be constructed of precast concrete.

ii. Design Standards: Comply with ACI 318.

iii. Capacity and Serviceability: Provide the capacities and serviceability limits of the ramps as required by the 2014 NYC Building Code and by any specific project requirements.

1) Design Loads: Design loads must satisfy the requirements of NYC Building Code and any specific project requirements.

2) Ramp Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.

c. Thermal Movements: Allow for in-plane thermal movements resulting from annual ambient temperature changes, which is recommended to range between minus 10 and plus 120 deg F.

d. Durability:

i. Ramps service life: same as building service life (Minimum of 50 years).

ii. Ramp enclosures through the horizontal floor assembly must have a minimum of 2-hour fire-resistance rating with opening protectives in accordance with NYC Building Code.

3. Materials

a. Reinforcing Materials:

i. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

ii. Galvanized Reinforcing Bars: ASTM A615, Grade 60; ASTM A706, deformed bars with ASTM A767, Class II zinc coating and chromate treatment.

b. Portland Cement:

i. ASTM C150/C150M, Type I or Type III, gray

c. Supplementary Cementitious Materials:

i. Fly Ash: ASTM C618, Class C or F with maximum loss on ignition of 3 percent.

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ii. Metakaolin: ASTM C618, Class N.

iii. Silica Fume: ASTM C1240 with optional chemical and physical requirement.

iv. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.

d. Normal-Weight Aggregates:

i. ASTM C33 with coarse aggregates complying with Class 5S, Class 5M, Class 4S or Class 4M. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

e. Water:

i. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete.

4. Concrete Mixtures

a. If Supplementary Cementitious Materials are required, then prepare design mixtures for each type of concrete required considering the following guidelines:

i. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.

ii. Limit use of fly ash to 20 percent replacement of Portland cement by weight and ground granulated blast-furnace slag to 20 percent of Portland cement by weight; metakaolin and silica fume to 10 percent of Portland cement by weight.

iii. Design mixtures may be prepared by a qualified independent testing agency.

b. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318.

c. Normal Weight Concrete

d. Compressive Strength (28 Days): 5,000 psi.

e. Maximum Water-Cementitious Materials Ratio: 0.45.

f. Water Absorption: For structural concrete with an architectural finish, limit water absorption to 6 percent by weight or 14 percent by volume, tested according to ASTM C642, except for boiling requirement.

5. Field Quality Control

a. Special Inspections:

i. Engage a qualified special inspector to perform any special inspections.

b. Testing Agency:

Vertical Transportation

5.1 Stairs and Ramps

i. Engage an accredited independent testing agency.

6. Liquid Concrete Floor Treatment at Garage
   a. Penetrating Liquid Floor Sealer: Clear, chemically reactive, waterborne solution of inorganic siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces and offers the following concrete slab protection:
      i. Water repelling.
      ii. Protects against roads salts and de-icing fluids.
      iii. Reduces staining including oil, gas, and other automotive fluids.
      iv. Mold and mildew resistance.
      v. Breathable, water based and low in VOC's.
      vi. Helps to prevent pitting, spalling, and surface cracks from water absorption.
7. LEED Requirements
   a. Refer to Section 01 for Sustainable Design Requirements.

5.2 Vertical Transportation

5.2.1 ELECTRIC TRACTION ELEVATORS

1. Summary
    a. Passenger elevators.
2. Elevators
    a. Group Number
    b. Elevator Number(s)
    c. Machine Location: Machine room above hoistway preferred.
    d. Machine Type: Gearless traction preferred
    e. Rated Load: IBC-sized Stretcher capacity.
        i. Min. 3,500 lbs. (Hospital configuration);
        ii. Min. 4,000 lbs. (Standard configuration).
    f. Rated Speed: 350 fpm for rises exceeding 50 feet.
    g. Operation System: Single elevator or Group automatic, as applicable.
    h. Auxiliary Operations:
        i. Battery-powered automaticevacuation.
        ii. Earthquake Emergency Operation.
        iii. Automatic dispatching of loaded car.
        iv. Nuisance-call cancel.
        v. Distributed parking.
        vi. Automatic operation of lights and ventilation fans.
        vii. Independent service.
        viii. Inspection service.
        ix. Firefighters' Emergency Operation - Phase I and Phase II.
    i. Security Features: Key switch floor lockout.
    j. Dual car operating panels for center opening door configurations.
    k. Car Enclosures
        i. General: Steel framed cars with tamperproof equipment.

Vertical Transportation

1) Inside Height: Minimum 90 inches clear.
2) Doors: Stainless steel.
3) Door Sills: Nickel silver.
4) Handrails: Stainless steel.
5) Floor: Non-slip Epoxy.
6) Roller guides for all cabs.

ii. Parking Garage
1) Front Walls (Return Panels): Stainless Steel No. 4 finish (or equivalent).
2) Side and Rear Wall Panels: Stainless Steel No. 4 finish (or equivalent).
3) Ceiling: Stainless steel with LED lighting (or equivalent).

iii. Community Center
1) Front Walls (Return Panels): Stainless Steel No. 4 finish (or equivalent).
2) Side and Rear Wall Panels: Bronze panels with stainless steel framing (or equivalent).
3) Ceiling: Stainless steel with LED lighting and boundary lighting (or equivalent).

l. Hoistway Entrances: The following width and height dimensions are recommended options.
i. Width: 48 inches minimum.
ii. Height: 84 inches.
iii. Type: Single-speed center opening preferred.
iv. Frames: Stainless steel.
v. Doors and Transoms: Stainless steel.
vi. Sills: Nickel silver.

m. Car and Hall Fixtures: Tamper proof and weatherproof. Stainless steel

3. Traction Systems
a. Passenger Elevator Machines: Variable-voltage, variable-frequency ac type; with solid-state power converters.
b. Emergency braking system in compliance with ASME A17.1 section 2.19.
c. Regenerative drive system.
d. Standard T-section guide rails

e. Steel hoist and governor system ropes.

4. Signal Equipment
   a. Car Operating Panels: Swing-open panel.
   b. Hall Lanterns: Provided at all landings, including integral position indicator.
5. Warranty and Maintenance Service
   a. Elevator Work Warranty: 2 years.
   b. Full Maintenance Service: 2 years.

5.2.2 HYDRAULIC ELEVATORS

1. Summary
   a. Passenger elevators.
2. Elevators
   a. Group Number
   b. Elevator Number(s)
   c. Cylinder Type: Holeless, beside the car.
   d. Rated Load: IBC-sized stretcher capacity.
      i. Min. 3500 lbs. (Hospital configuration);
      ii. Min. 4000 lbs. (Standard configuration).
   e. Rated Speed: 150 fpm regardless of load or direction.
   f. Operation System: Group automatic.
   g. Auxiliary Operations:
      i. Power loss rescue feature. Emergency generator power operation provisions.
      ii. Earthquake Emergency Operation.
      iii. Automatic dispatching of loaded car.
      iv. Of-peak operation.
      v. Automatic operation of lights and ventilation fans.
      vi. Priority service.

Vertical Transportation

5.2 Vertical Transportation

vii. Independent service.
viii. Inspection service.
ix. Firefighters' Emergency Operation - Phase I and Phase II.

h. Security Features: Floor lock-offs.
i. Dual car operating panels for center opening door configurations.
j. Car Enclosures: Steel framed with non-removable wall panels.
i. Inside Height: Minimum 90 inches clear.
ii. Front Walls (Return Panels): Stainless steel No. 4 finish (or equivalent).
iii. Side and Rear Wall Panels: Bronze panels with stainless steel framing (or equivalent).
iv. Doors: Stainless steel (or equivalent).
v. Ceiling: Stainless steel with LED lighting and boundary lighting (or equivalent).
vi. Handrails: Stainless steel (or equivalent).
vii. Floor: Non-slip epoxy.
k. Hoistway Entrances: The following width and height dimensions are recommended options.
i. Width: 48 inches minimum.
ii. Height: 84 inches.
iii. Frames: Stainless steel.
iv. Doors and Transoms: Stainless steel (or equivalent).
v. Sills: Nickel silver.
l. Car and Hall Fixtures: Tamperproof and weatherproof. Stainless steel.

3. Systems and Components
a. Pump Units: Dry-type, mounted on oil tank in steel enclosure preferred.
i. Motor: Variable-voltage variable-frequency control, 120 starts per hour.
ii. Oil cooler provided.
b. Hydraulic Fluid: Manufacturer's standard.

4. Signal Equipment
a. Car-Control Stations: Swing-return type.

b. Firefighters' two-way telephone communication service.

5. Warranty and Maintenance Service

a. Elevator Work Warranty: 2 years.

b. Full Maintenance Service: 2 years.

Mechanical & Electrical

6

Mechanical & Electrical

6.1 Plumbing

6.1.1 PLUMBING SYSTEMS

1. Scope Summary
    a. This Section includes plumbing fixtures, materials, accessories and installation for the new garage facility and a future programmed Community Space to be served by Work specified herein. This Section includes Plumbing Specifications for the following:
        i. Plumbing Fixtures
        ii. Domestic Water Distribution
        iii. Sanitary Waste
        iv. Stormwater Drainage
        v. General Plumbing Requirements
    b. It is not the intent of this Section to specify all technical requirements nor to set forth those requirements adequately covered by the applicable codes and standards. Design-Builder must furnish high quality equipment, material and workmanship meeting the requirements of these specifications and standards.
    c. The plumbing system consists of all fixtures, potable cold and hot water piping and equipment, piping insulation, water heating equipment, sanitary waste and vent piping systems, and other specialty piping and equipment within 6 feet of the building. Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system.
    d. The Design-Builder must provide a domestic cold, hot and hot water re-circulating water distribution system without supply interruptions. Provide natural gas domestic water heater(s) with adequate capacity for serving fixtures. Provide in-line circulator for hot water re-circulating water distribution system. Provide service valves, unions, meters and gauges, and access panels sufficient for maintenance per the plumbing code and regulations. Provide ice-maker connector box for refrigerators. Perform a flow test to determine system requirements prior to system design.
    e. Piping Specialties: 1) Hammer Arrestors: Install Hammer Arrestors, also known as shock absorbers, on the cold and hot water distribution systems, where the action of quick operating valves could result in a water hammer condition. 2) Hose Bibs/Hydrants: Freeze proof wall hydrants must be provided every 200 feet around the perimeter of the station building. Provide hose bibs in mechanical rooms. Pressure reducing valves must be provided where water pressure is above 60 psi at the water service entry area. 3) Dielectric Fittings: Install dielectric fittings for pipe connections where there are dissimilar metals.
    f. Valves: General-Duty Valve Applications. Provide the following valve types:
        i. Shutoff Duty: Use bronze ball valves for piping NPS 3 and smaller. Use cast-iron gate valves with flanged ends for piping NPS 4 and larger.

ii. Throttling Duty: Use bronze ball valves or butterfly valves for piping NPS 3 and smaller. Use cast-iron globe or gate valves with flanged ends for piping NPS 4 and larger.

g. Hot-Water-Piping, Balancing Duty: Calibrated balancing valves

h. Drain Duty: Hose-end drain valves.

i. Provide sectional valve close to water main on each branch and riser serving plumbing fixtures or equipment. Use ball valves for piping NPS 3 and smaller. Use gate valves for piping NPS 4 and larger.

j. Provide shutoff valve on each water supply to equipment and on each water supply to

k. Plumbing fixtures without supply stops. Use ball valves for piping NPS 3 and smaller. Use

l. gate valves for piping NPS 4 and larger.

m. Provide drain valves for equipment, at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

n. Provide hose-end drain valves at low points in water mains, risers, and branches.

o. Provide calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop low.

p. Water Service: A Reduced Pressure Backflow Preventer must be provided for the incoming water service and on mechanical system water make-up lines. Shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, must be inside the building at the domestic water service. Provide cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through a foundation wall. Select number of interlocking rubber links required to make installation watertight.

q. Piping Insulation: Provide pipe insulation thickness as required by code and as noted. Provide minimum ½" thick insulation on cold water piping. Provide vapor retarder on all piping subject to water temperatures below 70 deg F. Provide heavy PVC fitting covers on all fittings. Provide insulation on all piping subject to condensation formation.

r. Plumbing Fixtures: Provide durable and efficient plumbing fixtures that operate smoothly and easily without leaks, stoppages or other malfunctions. Conform to code including accessibility requirements. All plumbing fixtures, where applicable, must be of a water saving design. All drainage piping must have adequate slope toward the collection points. Trap primers must be used as required by local codes and must be installed on lines with consideration to the frequency of operation. Exterior hose bibs must be key-type with freeze protection. All janitor and custodial rooms must have floor mounted mop basin with bucket holding supported spout and short flexible hose connection and rack for storing mops. Provide stainless steel wall guards where installed against gypsum wallboard construction. Provide all water supplies with key operated service valves.

6.1 Plumbing

s. Sanitary Drainage Systems: All floor/area drain piping must be sized based on the maximum expected flow loading with a generous allowance for fouling due to gravity flow velocities. Provide a floor drain at all equipment having a condensate drain, including air handling units with cooling coils and other mechanical equipment.

t. Service Pipe Installation: Provide cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through a foundation wall. Provide cleanouts in accordance with code.

u. Mechanical Rooms. Provide a minimum of one floor drain in each mechanical room. Provide additional floor drains where required to eliminate horizontal drainage piping from equipment exceeding 10 feet.

v. Sump pumps are to be provided in elevator pits with oil minder controls.

w. Rainwater Drainage: Provide drainage for disposal of rainwater and clear wastes, as required by the code. Provide drainage for outdoor areas that are completely surrounded by construction that prevents natural drainage (e.g. areaways) or that are so sloped as to result in accumulation of water or ponding. Provide drainage of interior areas where ground water may accumulate naturally, including sump pits and elevator pits. Prevent inadvertent ponding by protecting drain openings from clogging, using raised strainers with minimum height of 4 inches wherever possible and flat gratings in all other locations. Maintenance of Drainage: Pipes sloped at 1/8 inch per foot, minimum, downward in direction of flow.

x. Natural Gas Piping: Provide natural gas for use by Heating, Ventilation, & Air Conditioning (HVAC) and plumbing in accordance with code. Obtain natural gas pressures from the local gas utility provider. Provide pressure regulators accordingly. Coordinate required inlet pressure with equipment manufacturer and size gas piping accordingly per code.

2. Codes and Performance Standards

a. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only. The latest editions available on the date of Notice Inviting Proposals must be used.

i. New York City Building Code (NYC BC)
ii. New York City Plumbing Code (NYC PC)
iii. New York City Fuel Gas Code (NYC FGC)
iv. New York City Department of Environmental Protection (NYCDEP)
v. American Society of Mechanical Engineers (ASME)
vi. American Society of Testing Materials International (ASTM)
vii. American Water Works Association (AWWA)
viii. FM Global
ix. National Science Foundation
x. Underwriters Laboratory (UL)
xi. International Building Code (IBC)
xii. Safety and Health Regulations for Construction Occupational Safety and Health Standards (OSHA)

xiii. National Fire Protection Association (NFPA)
xiv. Life Safety Code (NFPA #101)
xv. American Gas Association (AGA)
xvi. New York City Energy Conservation Code (NYCECC)
xvii. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
xviii. American National Standards Institute (ANSI)
xix. American Society of Sanitary Engineering (ASSE).
xx. American Society of Plumbing Engineers (ASPE).
xxi. Plumbing and Drainage Institute Standards (PDI)
xxii. American with Disabilities Act (ADA)
xxiii. New York City Department of Buildings (NYC DOB)
xxiv. New York City Fire Department (FDNY).

3. Design Requirements

a. Construct using the following practices and procedures:

i. Install equipment to allow for service and maintenance, provide housekeeping pads to also allow for equipment drain and/or trap assembly.

ii. Maintain manufacturer's recommended clearances for all equipment.

iii. Provide inlet and outlet piping sized not smaller than sizes of equipment connections.

iv. Use check valves to maintain correct domestic water flow to and from equipment.

v. Anchor equipment to substrate.

vi. Install equipment so controls and devices for service are readily accessible.

b. Engage a factory-authorized service representative to train Agency's maintenance personnel to adjust, operate, and maintain commercial, gas-fired, storage, domestic-water heaters.

c. Plumbing Fixtures Requirements

i. Assemble fixtures, trim, fittings, and other components according to manufacturer's written instructions.

ii. For wall-hanging fixtures, install off-floor supports affixed to building substrate. Use carrier supports without waste fitting for fixtures with tubular waste piping; Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.

iii. Install dielectric fitting in supply piping to equipment if piping and equipment connections are made of different metals.

iv. Ground equipment according to project requirements and code.

v. Do not use: Vitreous-china fixtures other than standard ASME A112.192M.

vi. Do not use: Water closet flush valve tank trim other than standard ASSE 1037.

6.1 Plumbing

vii. Do not use Oil-fired water heaters.

viii. Do not use above ceiling mounted concealed equipment.

4. Submittals

   a. Product Data

   b. Shop Drawings: Submit fully dimensioned fabrication and erection drawings. Include details of clearances, arrangements, piece markings, reinforcing, weld plates and welding, inserts, anchors, connections, accessories, joints, openings, and other requirements.

   c. Samples

   d. Design Calculations

   e. Material Test reports

   f. Manufacturer's Qualifications Data

   g. Manufacturer's quality control procedures.

   h. Installer's Qualifications Data.

5. Quality Assurance

   a. Quality Standard for Water-Service Piping and Specialties for Domestic Water: NSF 61 Annex G and NSF 372.

   b. Quality Standards for Packaged Booster Pumps: UL 508, UL 508A, UL 778, and UL 1995.

   c. Drinking Water System Components: NSF 61 and NSF 372.

   d. Booster pumps listed and labeled as packaged pumping systems.

   e. Fuel Fired Domestic Water Heater: ASME Compliance: ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

   f. Performance Efficiency: ASHRAE/IES 90.1.

   g. Quality Standards for Sewage and Sump Pumps: HI 1.1-1.2, HI 1.3, HI 1.4, and UL 778.

   h. Quality Standard for Welded-Steel Reservoirs and Standpipes: AWWA D100, AWWA M42, and NFPA 22.

   i. Quality Standard for Bolted-Steel Reservoirs and Standpipes: D100, AWWA M42, and NFPA 22.

   j. Welding: ASME Boiler and Pressure Vessel Code: Section IX.

   k. Electrical Components, Devices, and Accessories: NFPA 70.

   l. Circulating Pumps: UL 778, HI 1.1-1.2, and HI 1.3.

m. Field Welding: AWS D1.1.

n. Manufacturer's Qualifications

o. Installer's Qualifications: Plumbing work must be performed by persons skilled in the trade involved and must be done in a manner consistent with normal industry standards.

p. Testing Agency Qualifications

6. Delivery, Storage and Handling

a. Delivery: Load, transport, and unload plumbing materials plumbing fixtures and assemblies by methods that will prevent damage to mixes and within prescribed times.

7. Products

8. Plumbing Fixtures

a. Fixtures will include the following:

b. Water Closets

i. Vitreous china.

ii. Wall mounted fixtures.

iii. Elongated bowl.

iv. Open seat.

v. Barrier-free.

c. Urinals

i. Vitreous china.

ii. Wall-mounted fixtures.

iii. Extended sides for privacy.

iv. Barrier-free.

d. Lavatories (Single User Bowl)

i. Vitreous china.

ii. Wall-hung fixtures.

iii. Self-rimming.

iv. Front overflow.

v. Barrier-free

6.1 Plumbing

e. Flush Valves
   i. Polished chrome plated finish.
   ii. Electronic proximity sensor, hardwired.
   iii. Non-hold-open manual override.
   iv. 24-hour automatic flush.
   v. High-pressure vacuum breaker.
   vi. Vandal-resistant construction.

f. Custodial Mop Receptor
   i. Precast terrazzo.
   ii. Floor-mounted fixtures.

g. Custodial Mop Receptor Faucet
   i. Extended spout with bucket hook.
   ii. Wrist blade handles
   iii. Vandal-resistant construction.
   iv. Wall mounted.

h. Water Tempering
   i. Factory fabricated thermostatic mixing valve (ASSE 1070).
   ii. Set to fail open to continue cold water flow.
   iii. Provide for all kitchen hand sinks, lavatories, showers, water cooler.

i. Utility Water Fixtures
   i. Interior Hose Bibbs
      1) Non-freeze.
      2) Integral vacuum breaker.
      3) Chrome plated backer plate.
      4) Vandal-resistant cap.
   ii. Exterior Wall Hydrants
      1) Box type non-freeze.

2) Integral vacuum breaker.
3) Flush face chrome plate finish, lockable
4) cover. Concealed hose connection.
5) Vandal-resistant construction.

9. Execution
10. Inspections

a. Verification of Existing Conditions
b. Provide inspections for: Welding work, Fittings, Leakage testing

11. Preparation

a. Surface Preparation: Thoroughly clean surfaces of adjoining construction of loose and foreign matter.

12. Installation

a. All materials and/or equipment must be installed per manufacturer's recommendations and instructions.
b. When temporary water is required, an approved backflow device must be used and testing reports from device must be sent to the plumbing foreman for verification.
c. Provide drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
d. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
e. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
f. Piping must not project beyond walls or steel lines nor must it hang below slabs more than prescribed by code or industry standard. Meet required clearances.
g. Offset piping where required to avoid interference with other work, to provide greater headroom or clearance, or to conceal pipe more readily. Offsets must be properly drained or trapped where necessary.
h. Provide swing joints and expansion bends wherever required to allow the piping to expand without undue stress to connections or equipment.
i. Exposed piping around fixtures or in other conspicuous places must not show tool marks at fittings.

6.1 Plumbing

j. Isolate pipe from the building construction to prevent transmission of vibration to the structure and to eliminate noise.

k. Install piping such that any equipment connected to piping may be removed by disconnecting two (2) flanges or unions and removing only one or two pipe sections. All equipment must have bolted or screwed flanges or unions at pipe connections.

l. Install fittings for changes in direction and branch connections. T-drill system for mechanically formed tee connections and couplings, and Victaulic hole cut piping system are not allowed.

m. Do not route piping through transformer vaults or above transformers, panelboards, or switchboards, including the required service space for this equipment, unless the piping is serving this equipment.

n. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

o. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

p. Install piping to permit valve servicing.

q. Install piping at indicated slopes.

r. Install piping free of sags and bends.

s. Install piping to allow application of insulation.

t. Eccentric reducing couplings must be provided in all cases where air or water pockets would otherwise occur due to a reduction in pipe size.

u. Cap and plug all openings in pipes during construction with suitable metal plugs or cap to keep out dirt and rubbish until equipment is connected.

v. Install drains, consisting of a tee fitting, NPS 3/4 full port-ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

w. Select system components with pressure rating equal to or greater than system operating pressure.

x. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

y. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements. Provide proper access to materials and equipment that require inspection, repair, service, or maintenance.

z. Minimum service access size for materials equipment/components above ceilings must be 24" square.

13. Piping Joint Construction

a. Join pipe and fittings according to the following requirements:

i. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

ii. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

iii. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1.

iv. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID.

14. Piping Connections

a. Pipe sizes indicated must be carried full size to equipment served. Any change of size to match equipment connection must be made within one foot of the equipment. At temperature control valves with sizes smaller than connected lines, reduction must be made immediately adjacent to valves.

15. Equipment Installation - Common Requirements

a. Install equipment to allow maximum possible headroom unless specific mounting heights

b. are not indicated.

c. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

d. Install Plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

e. Install equipment to allow right of way for piping installed at required slope.

16. Concrete Bases

a. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

i. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit. Install dowel rods to connect concrete base to concrete floor.

ii. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.

iii. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.

iv. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded. Install anchor bolts to elevations required for proper attachment to supported equipment. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

6.1 Plumbing

17. Erection of Metal Supports and Anchorages

    a. Cut, it, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor Plumbing materials and equipment.

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

6.2.1 HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

1. Scope Summary
   a. This Section includes HVAC mechanical equipment, materials, accessories and installation for the new garage facility and a future programmed Community Space to be served by Work specified herein. This Section includes HVAC Specifications for the following:
      i. Variable Air Volume (VAV) Gas Fired, D/X-Roof Top Units with enthalpy wheel (Energy recovery units).
      ii. D/X-Split systems
      iii. Parking garage Ventilation fans and miscellaneous fans for electrical, mechanical, toilets etc.
      iv. Ductwork
      v. Air devices
      vi. BMS system w/ BACnet open protocol.
   b. Building HVAC systems must be as described in this Scoping document. Alternative systems may be considered only if they are proven to be more life-cycle cost-effective, meet all requirements in this Scoping document. In all cases, the selection of the systems to be used must be in accordance with the requirements in other applicable paragraphs in this Scoping document.
   c. It is not the intent of this Section to specify all technical requirements nor to set forth those requirements adequately covered by the applicable codes and standards. Contractor must furnish high quality equipment, material and workmanship meeting the requirements of these specifications and standards.
   d. The mechanical systems (HVAC systems) must be designed to minimize their impact on the natural and physical environment through energy efficiency and optimization of resources. The mechanical systems must be designed to ensure continual operation. Standby capacity and redundancy must be included in the system design, as required elsewhere in this document. Water, glycol, and all other fluids used in mechanical systems must be treated to prevent corrosion, algae growth, build up of deposits, disease, and bacteria, and to prolong equipment life. Mechanical systems must have vibration isolation to minimize noise and vibration through the structure or other components of the building. Mechanical systems must comply with the applicable sections of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), NFPA and all local codes. All pipes, ducts, and fittings must be insulated as required by ASHRAE-90.1.
   e. HVAC systems provided for the site must include the requirements stated herein, and the requirements indicated elsewhere in this document. All requirements indicated in the document must be reflected in the design calculations, plans, and specifications. HVAC systems must be provided for all spaces including storage rooms, IT rooms, and janitor's closets in the buildings except for the mechanical and electrical rooms, which are only ventilated.

f. All materials and equipment must be the standard catalogued products of manufacturers regularly engaged in the production of such materials and equipment and must be the manufacturers' latest standard design. Equipment must comply with the requirements of the following:

   i. Underwriters Laboratories, Inc. (UL)

   ii. American Gas Association (AGA)

   iii. Air Conditioning and Refrigeration Institute (ARI)

   iv. American Society for Testing and Materials (ASTM)

   v. National Electric Manufacturers Association (NEMA)

   vi. American National Standards Institute (ANSI)

   vii. Other national trade associations as applicable

   viii. All equipment selections and layouts must observe the manufacturers' recommended clearances and code clearances.

2. Codes and Performance Standards

   a. Material, equipment and systems installed will meet all pertinent requirements of the latest national and local codes, regulations and ordinances having jurisdiction as listed below:

      i. The City of New York Building Code (NYCBC)

      ii. The City of New York Mechanical Code (NYCMC)

      iii. The City of New York Fuel Gas Code (NYCFGC)

      iv. The City of New York Energy Conservation Code (NYCECC)

      v. ASHRAE handbooks and standards, including 61.1 and 90.1

      vi. National Fire Protection Association (NFPA)

      vii. National Electrical Code (NEC)

      viii. New Yprk City Electrical Code (NYCEC)

      ix. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)

      x. United States Green Building Council (USGBC) LEED-NC Reference Guide for Green Building Design and Construction.

      xi. New York City Fire Code

      xii. City of New York Local Codes and Regulations

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

3. Design Requirements

   a. Heat gain and loss calculations must be in accordance with the current edition of the ASHRAE Handbook of Fundamentals. The load calculations must be in accordance with ASHRAE non-residential Cooling and Heating Load Calculations. Calculations must be performed on a room-by-room basis. Peak sensible and total loads must include 100 percent of the personnel, ventilation, lighting, and equipment loads. Load calculations must include the design parameters for site location listed in section 4.2.6. The cooling equipment must be selected based on whether it satisfies the sensible, latent, and total calculated loads. Heating load calculations must not use lighting or internal loads for supplementing the heating system. The heating and cooling load input and output must be submitted.

   b. Calculations must be performed using a computer program conforming to ASHRAE 90.1 Appendix G requirements.

   c. The following equipment heat gain requirements are for the cooling and ventilation parameters that must be included in the mechanical HVAC load calculations unless otherwise indicated.

      i. Internal heat gains must not be used for determining the building heating loads.

      ii. Infiltration load of 0.3 air changes per hour must be used in the perimeter spaces, up to

         1) 15 feet from outside wall. Heat gain loads that are from mechanical heat-generating equipment and electrical

         2) heat-generating equipment (i.e., Uninterruptible Power Supply [UPS], inverters,

         3) generators, electrical panels, transformers) installed in spaces being cooled.

      iii. Equipment loads must be based on actual heat rejection data from equipment manufacturers. When data are unavailable, the following sensible heat gain must be used:

         1) Office Equipment Sensible Heat Gain: 2 watts per square foot (watts/ft^2)

         2) For electrical and communications rooms, the contractor must provide heat-load calculations coordinated with the IT/Communications manager and the electrical engineer.

         3) The lighting load (100 percent to space) must be as specified by the electrical engineer (maximum demand).

   d. Ventilation Requirements

      i. ASHRAE 62.1-2016 Ventilation for Acceptable Indoor Air Quality must be followed (except as modified herein). Ventilation air (outside air) must be supplied to the occupants through mechanical means via air-handling units.

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

ii. Minimum outside air volumes must be determined by outside air measurement devices to modulate the outside air damper, return air fan, and exhaust air damper to guarantee a minimum outside air volume. For variable-volume air-handling units, the minimum outside air volume must be controlled as the unit operates down to minimum heating supply airflow. Ventilation systems must be designed to be capable of providing the required rate to the "breathing zones" (as defined by ASHRAE) of the occupied areas during both full- and partial-load conditions.

iii. Exhaust ducts in the buildings must be under negative pressure so that no noxious or harmful fumes can enter the spaces or return-air plenums.

iv. The air-handling units must have automatic controls that must enable the fan systems to operate whenever a room/space/zone is occupied. Minimum outside air flow must be supplied under any load condition. Due to the varying occupancies, densities, and loads, a demand control ventilation scheme must be used to dynamically reset the outdoor air volumes based on carbon dioxide (CO_2) concentrations.

v. The surfaces of air-handling devices (non-sheet metal) must be constructed of materials that inhibit mold growth and erosion, in accordance with UL 181 and American Society for Testing and Materials (ASTM) C1338.

vi. Outside air intakes must be located as follows:

1) 10 feet from lot line and building on the same lot. Distance from public way or street must be from centerline of street or public way.

2) 10 feet for Mechanical and gravity outdoor air intakes openings, from any hazardous or noxious containment source such vents, exhaust, cooling towers and loading docks.

3) 30 feet from combustible walls and operable openings into buildings which are in the direction of the hazardous exhaust conveying noxious, toxic, explosive or flammable vapors and fumes.

4) In addition, the outside air inlets must be provided with bird screens and designed to prevent rain entrainment and intrusion.

5) Local exhaust fans must be provided to extract pollutants, heat, and particles, including but not limited to the toilet exhaust fans.

vii. A minimum of Minimum Efficiency Reporting Value (MERV) 8 pre-filters and MERV 13 final filters must be used in all air-handling units.

viii. Air-conditioning unit drain pans must be constructed of 304 stainless steel and sloped at least 0.125 inch per foot towards the drain outlet. The drain outlet must be sized to handle the expected condensate and must be sealed. The pan must be sized and placed under the coils to account for carryover.

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

ix. Finned-tube coils must be spaced with at least 18 inches between components for cleaning, and with no more than a 0.75-inch water column (w.c.) pressure drop at 500 feet per minute (fpm).

x. All air-handling units and air-distribution devices must be installed in such a manner as to allow access for manufacturers' recommended maintenance and cleaning clearances. Panels must be provided in equipment to access components, including—but not limited to—plenums, coils, fans, air monitoring devices, filters, humidifiers, and drain pans.

xi. Minimum Ventilation Rates in the Breathing Zone

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6.2 Heating, Ventilation, and Air Conditioning (HVAC)

Room/Area	Rate	Remarks
Recreation/Activity Rooms	6 ACH	
Office Areas	17 cfm / person	
Lobbies, Entry Vestibules	11 cfm / person	
Conference Rooms	7.5 cfm / person	
Training/Meeting Rooms	6 cfm / person	
Storage, File Rooms	0.5 cfm / ft2	Minimum, not based on the storage of chemicals
Corridors	0.06 cfm / ft2	
Electrical Rooms	0.06 cfm / ft2	
Shipping and Receiving	0.12 cfm / ft2	
Elevator Machine Rooms	0.12 cfm / ft2	
Locker Rooms	1 cfm / ft2	Minimum exhaust
Janitor's Closet	10 ACH	Exhaust at rate greater of ACH or 1 cfm / ft2
Kitchens	0.70 cfm / ft2	Minimum exhaust
Toilet Rooms/Showers	10 ACH	Greater of ACH or 70 cfm / water closet or urinal

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

f. Site Location and Criteria
   i. ASHRAE 90.1 Climate Zone: 4
g. HVAC Design Parameters
   i. Outdoor Design Temperatures
      1) Outside Summer: 89 degrees Fahrenheit (°F) dry bulb (DB); 74°F mean coincident wet bulb (MCWB) (1 percent) (for Cooling Tower selection, use 73°F wet bulb [WB])
      2) Outside Winter: 10°F DB
   ii. Maximum U-Values (Btu/hr-ft2]°F)
      1) Mass Walls: 0.123 (R7.6 cubic inches [ci])
      2) Steel Frame Walls: 0.084 (R3.8 ci and R13)
      3) Roof: 0.048 (R20 ci) insulation above deck
      4) 0.027 (R 38.0) other
      5) Fenestration: 0.65 non-metal
      6) 0.60 metal frame (solar heat gain coefficient [SHGC] = 0.25 or better)
      7) The U-values listed above are entire assembly values. Lower U-values may be required and must be provided to meet energy requirements. Assembly U-value calculations must be in accordance with ASHRAE 90.1 Normative Appendix A.
   iii. Indoor Design Temperatures
      1) All rooms must be air-conditioned to meet the indoor temperature and humidity requirements stated in the room data sheets.
      2) Office areas (unless otherwise indicated) must be 75°F (summer night setback temperature of 81°F).
      3) Communications, IT, and data center rooms must be 72°F+/-5F, 45 to 55 percent relative humidity (RH).
      4) Mechanical and Electrical rooms must have ventilation only.

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

5. HVAC Equipment
    a. Cooling and Heating Systems
        i. Community space HVAC:
            1) Provide packaged rooftop air conditioning units sized per code. Each RTU will have DX cooling, gas fired heating, energy recovery wheel, supply and exhaust fans.
            2) Air will be distributed to the zones via terminal boxes. Each terminal box will have hot water reheat.
            3) Community Space Ventilation will be based on multipurpose assembly with a density of 120 people/1000 sf.
            4) Demand controlled ventilation must be provided as required by codes and standards.
            5) Toilet exhaust will be provided at minimum 50 cfm per fixture.
        ii. Elevator machine room.
            1) Elevator machine room will be provided with DX cooling unit
        iii. Below ground enclosed parking garage floors:
            1) Each enclosed garage level will be provided with mechanical exhaust fans with variable air volume.
            2) Each floor will be continuously ventilated at least 0.1 cfm/sf.
            3) Ventilation fan must have a minimum capacity of 1 cfm/sf available for CO activation.
            4) Automatic ventilation based on CO monitoring will be provided.
        iv. Above ground parking garage floors
            1) Natural ventilation will be provided via screen wall on perimeter.
    b. Air-Handling System Equipment and Accessories
        i. Occupied spaces must be air-conditioned and heated via variable air volume (VAV) air-handling units. Air-handling units must be located on the roof. Conditioned air must be distributed through the building's rooms via insulated, medium-pressure supply and low-pressure return duct-work routed in the ceiling plenum. VAV boxes with hot-water reheat coils must be provided for exterior-zoned spaces and constant volume boxes, as required.

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

ii. HVAC systems in the administrative and support areas must be designed to provide positive pressure in the building spaces. Ventilation (outside) air requirements must be in accordance with ASHRAE 62.1–2016. A demand control ventilation strategy must be provided to reduce energy. The pressure classifications of duct-work must be shown on the drawings, using the convention described in the SMACNA HVAC Systems Duct Design Manual. Building pressure sensor/transmitters must be used to control the dampers of air-handling equipment to maintain the required building pressure.

iii. IT, security electronics, and data rooms must be provided with HVAC for continuous operation. Floor- mounted, chilled water (or direct-expansion split-system computer room units with outdoor condensing units) A/C units and humidifiers to maintain 40 to 70 percent relative humidity in these spaces must be provided.

iv. Mechanical and electrical rooms must be ventilated. Mechanical rooms containing chillers must be designed to comply with ASHRAE 15 and New York City Mechanical Code ventilation and refrigerant monitoring requirements.

v. The occupied areas must be served by air-handling units with VAV terminal units serving individual building zones. Air-handling systems and controls for these spaces must maintain the space temperature to within 2°F of the set point. All VAV terminal units serving exterior zones must be provided with a supplementary heating coil. CO2 sensors must be provided in densely occupied spaces with an occupant density greater than 25 people per 1,000 ft2, as defined by indoor environmental quality (IEQ) Credit 1 in LEED.

vi. The air-handling unit air distribution systems must use single-outlet VAV terminal units with reheat coils. The heating coil must be a hot-water type, and hot-water piping must be equipped with two- or three-way modulating control valves, supply and return line isolation valves, calibrated balance valves, strainers, and temperature and pressure plugs. Heating coils in terminal units must be sized to produce a minimum heating supply air temperature of 85°F, based on the required heating air flow quantity calculated for each unit. All VAV terminal units must be pressure-independent units. Insulation must be provided for each VAV terminal unit to prevent condensation on the outside of the units. Access doors in ductwork must be provided to allow access to VAV reheat coil and controls.

vii. Split-system direct expansion air-conditioning units must only be used to cool small, remote rooms that require 24/7 operation. The units must be indoor evaporator units with outdoor heat pumps or condensing units with factory controls.

viii. Duct System Design and Layout

1) A ducted return air system must be provided for systems serving spaces with secure wall penetrations or sensitive sound areas, while a plenum return may be used in the remainder of the building. In spaces with a plenum return, all materials in the ceiling plenum must have a flame-spread index not exceeding 25 and a smoke-developed index not exceeding 50, as described in NFPA 90A. Ductwork locations must be coordinated with all disciplines. All supply, return, intake, and exhaust ductwork must be constructed of galvanized sheet metal. All duct fittings (including elbows, tees, and offsets) must be constructed of rigid sheet metal. Non-metallic flexible duct run-outs to air distribution devices must be insulated and limited to 5 feet in total length. Flexible duct must only be used on straight runs of ducts (horizontal or vertical) and must not be installed with elbows or with offsets greater than 1/2 duct diameter.

2) The duct distribution system must be designed to be efficient, easily balanced, and accessible. Maximum air velocities in the medium pressure ducts (1½ inches w.c. or greater) must not exceed 2,000 fpm. Maximum air velocities in the low-pressure ducts less than 1½ inches w.c. must not exceed 1,000 fpm. Duct risers between floors must be limited to mechanical chases. The duct layout must be designed to include a minimum of 2 feet straight rigid sheet metal duct ahead of the inlet connections to VAV terminal units.

ix. Noise Analysis: The Contractor/Engineer must use the Room Control Mark II Method from the 2015 ASHRAE HVAC Applications Handbook, Chapter 48. The Room Criteria (per the Room Control Mark II Method detailed in the 2015 ASHRAE HVAC Applications Handbook, Chapter 48) must be as indicated in the Room Data Sheets.

c. Ventilation and Exhaust System Designed Equipment

i. The building must be provided with outside air ventilation in accordance with ASHRAE 62.1 – 2016, based on occupancy and/or type of space. Air distribution systems must be designed to ensure that minimum outside air requirements are constantly provided to the building during heating and cooling seasons. Infiltration must not be considered as supplementing the ventilation requirement. Outside air intake to air handling equipment must be increased as necessary to offset exhaust air flow rates to maintain building pressurization requirements.

ii. Exhaust vents must not be located near outdoor air intakes to prevent short-circuiting of exhaust air. Minimum exhaust rates must be provided in accordance with ASHRAE 62.1.

iii. Exhaust/relief vents must be provided for air relief and must be located to prevent short-circuiting of the relief air into the outside air intake louvers. Relief/exhaust vents must be coordinated with the location of outside air louvers.

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iv. Louvers must be constructed of extruded aluminum and must have an anodized factory finish as required to match the architectural features of the building. All louvers must have a nominal wall thickness of 0.125 inch minimum. Combustion air louvers must be provided and sized in accordance with NFPA 54. All louvers must be sized to limit the free area velocities to a maximum of 1,000 fpm exhaust and 500 fpm air intake. Louver sizes must be coordinated with architectural and structural disciplines. All louvers must use bird screens. Bird screens must be constructed of flattened aluminum or galvanized steel and must have a nominal thickness of 0.05 inch minimum.

v. Balancing dampers must be furnished with accessible operating mechanisms. Where operators occur in finished portions of the building, operators must be chromium plated with all exposed edges rounded. Manual volume control dampers must be provided with locking-type quadrant operators. Dampers must be 2 gauges heavier than the duct in which they are installed. Unless otherwise indicated, multi-leaf dampers must be opposed-blade-type dampers, with a maximum blade width of 12 inches. Access doors or panels must be provided for all concealed damper operators and locking set screws. Unless otherwise indicated, the locking-type quadrant operators for dampers, when installed on ducts to be thermally insulated, must be provided with stand-off mounting brackets, bases, or adapters to provide clearance between the duct surface and the operator not less than the thickness of the insulation. Volume dampers must be provided on all supply ducts to diffusers, outside air, return, and exhaust ducts to ensure proper balancing and mixing within the system. Dampers integral with registers or diffusers must not be considered volume dampers for the purpose of balancing. Visual markings applied to the outside of the duct insulation must be provided to identify damper locations.

vi. A filter system must hall be located in the air-handling equipment. Construction/temporary filters must be provided in all air-handling equipment being installed. Final filters must not be installed until all testing, balancing, commissioning, and cleaning of the buildings and the HVAC equipment has been completed in accordance with the requirements in the specifications. In addition, a 1-year supply of replacement filters for all air-handling systems must be provided and turned over to the owner prior to the beneficial occupancy date. A 1-year supply must consist of a minimum of three changes of MERV 8 pre-filters, and two changes of all MERV 13 final filters.

    1) Pre-filters must be provided for air-handling units, including but not limited to fan coils and VAV air handling units. Pleated throwaway-type filters, 2 inches thick (minimum), must be provided for air handling equipment, and must have a minimum MERV rating of 8, in accordance with ASHRAE 52.2.

2) Final filters must be provided for air-handling units (excluding fan coil units and ductless mini-split system units) installed for the project. High-efficiency filters must be provided for the air-handling equipment, and must have a MERV rating of 13, in accordance with ASHRAE 52.2.

vii. Fire dampers must be provided at all fire-rated penetrations requiring a fire damper. Fire dampers must be curtain-type dampers for 1 hr rated walls and fire smoke dampers for walls rated 2 hr and above. Curtain type fire dampers must be installed with damper blades out of the air stream. The leakage rating must meet Class 1 requirement. Dampers must be dynamic rated for the maximum air velocity and pressure differential to which they must be subjected. Dampers must meet the requirements of UL 555. The damper assembly must be easily and fully accessible for service. Where dampers are installed in inaccessible locations, rated access doors or panels must be provided. Fire/smoke dampers rated for UL 555S must be installed as required. All fire/smoke dampers must be connected to the fire alarm system and fully integrated into the smoke control system.

d. Air-distribution devices must be factory fabricated of steel, corrosion-resistant steel, or aluminum, and must distribute the specified quantity of air evenly over the intended space without causing noticeable drafts, air movement faster than 50 fpm in occupied zones, or dead spots anywhere in the conditioned area.

i. Access panels/doors must be provided and sized as required for valves, fan coils, dampers, ire dampers, ire/smoke dampers, and all devices requiring maintenance, cleaning, repair, and access to the HVAC system. The minimum size of access panels must be 24 inches by 24 inches, and the access panels must be coordinated with the architectural ceiling plan.

e. Piping, air handlers, pumps, storage tanks, and other applicable HVAC equipment must be insulated. Outside air and supply air ducts must be insulated. Where provided, return air ducts must be insulated except when located in fully conditioned spaces. The use of flexible cellular insulation conforming to ASTM C 534 or ASTM D 1056 is prohibited. Insulation applied to chilled water and heating-water piping must include a vapor barrier. Insulation applied to piping located outside of buildings or underground in a concrete trench must be cellular glass conforming to ASTM C 552, Type II, and Type III, and the insulation must be installed with the manufacturer's recommended factory-applied jacket.

f. HVAC Control Systems

i. The Contractor must furnish, engineer, commission, and install a fully integrated building automation system (BAS), incorporating DDC for EMCS. All equipment must be capable of being operated both locally and remotely via a Wide Area Network (WAN) connection. The system must include all required computer software and hardware, controllers, sensors, transmission equipment, system workstations, local panels, conduit, wire, installation, engineering, database and setup, supervision, commissioning, acceptance testing, training, and warranty service.

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

ii. Control drawings must include schematics, ladder diagrams, and sequence of operation for all HVAC equipment. The BAS must include all application software and equipment to implement the project control strategies. Application software must be provided for each system as recorded on the BMS points list. The system must be capable of monitoring and overriding from the central BMS computer and must be designed to be completely stand-alone in the event of a communications failure via the UPS. All wiring must be labeled and terminated as required in the specification. Controls must be integrated with the fire alarm control system so that automatic shutdown of all air-handling units supplying over 2,000 cfm must occur upon any fire alarm condition.

1) Protocol: The system must use BACnet as its native protocol. All materials and equipment used must be standard components, regularly manufactured and not custom designed especially for this project.

iii. At a minimum, the following systems must be provided with the indicated control points for monitoring and control of the HVAC systems installed:

1) General: Outside air temperature, humidity, carbon dioxide.

2) Air-Handling Units: Supply/return fan status; fan start/stop; outside air flow rate; filter status; cooling and heating control valve status and control; discharge air temperature; freeze status; outside, return and relief damper status and control; return air temperature; preheat coil discharge air temperature; mixed air temperature; supply air static pressure; night setback temperature; supply/return duct smoke detector status; VFD status; air CO2 concentrations.

3) VAV Terminal Units: Supply air flow rate; VAV box damper status and control; reheat coil status and control; VAV box supply air temperature; space temperature.

4) Exhaust/Supply Fan Units: Fan start/stop/status.

5) Advanced Utility Metering: The Contractor/Engineer must provide building metering for natural gas, domestic water, and electricity. Meters must be the advanced (smart) type, and output from both gas and water meters must be integrated into the BAS. The Contractor must provide all the equipment necessary for a complete, working system that will interface with the building's smart meters into the BAS.

iv. Digital room thermostats/sensors must be provided at all locations. Units must fully interface with the building DDC controls and equipment. Units must be provided with a digital display (liquid crystal display [LCD]), keypad, and occupant set point adjustment functions. Units must have the following display functions (at a minimum):

1) Time (Occupied/Unoccupied)
2) Zone Temperature
3) Heating Set Point
4) Cooling Set Point.

g. Direct Digital Control System Tests:

i. Personnel, equipment, instrumentation, and supplies must be provided as necessary to perform site testing, adjusting, calibration, and commissioning. The tests must not be conducted during scheduled seasonal of periods of heating and cooling systems. Wiring must be tested for continuity and for ground, open, and short circuits. Ground rods installed by the Contractor must be tested as specified in IEEE Standard 142. Written approval of the specific site-testing procedures must be obtained prior to any test. Written notification of any planned site testing, commissioning, or tuning must be given at least 14 calendar days prior to any test.

ii. The HVAC control system must be tuned after all air-system and hydronic-system balancing has been completed, minimum damper positions set, and a report issued.

iii. Instrumentation and controls must be calibrated and the specified accuracy must be verified using test equipment with calibration traceable to National Institute of Standards and Technology (NIST) standards. Mechanical control devices must be adjusted to operate as specified. Control parameters and logic (virtual) points, including control loop set points, gain constants, and integral constraints, must be adjusted before the system is placed online. Control system commissioning must be performed for each HVAC system. The report describing the results of functional tests, diagnostics, and calibrations, including written certification, must state that the installed complete system has been calibrated and tested, and is ready to begin performance verification testing. The report must also include a copy of the approved performance verification test procedure.

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iv. The performance verification test procedures must provide a step-by-step explanation of the actions and expected results to demonstrate that the control systems perform in accordance with the sequences of operation. The test must not be started until after receipt of written permission by the owner, based on the Contractor's written certification of successful completion of site testing and training.

v. The endurance test must demonstrate the specified overall system reliability requirement of the completed system. The endurance test must not occur until the owner notifies the Contractor in writing that the performance verification test is satisfactorily completed. The owner may terminate the testing at any time if the system fails to perform as specified. Upon successful completion of the endurance test, the Contractor must deliver test reports and other Documentation, as specified, to the owner prior to acceptance of the system.

vi. Testing, adjusting, and balancing must be in accordance with the National Environmental Balancing Bureau (NEBB) Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems or the Associated Air Balance Council (AABC) National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems. The HVAC systems must be tested, adjusted, and balanced until measured air and water flow rates are within +10 percent to -0 percent of the design flow rates as specified or indicated on the contract documents.

vii. Commissioning of HVAC systems and controls must be in accordance with the Commissioning of HVAC Systems Guide Specification and LEED-NC requirements.

1) List of equipment to be commissioned, must include, but must not be limited to the following:

a) Energy recovery, gas fired air handling units with D/X cooling coils, Enthalpy wheel, supply/ exhaust fans, dampers, air flow stations, Carbon dioxide monitoring system and economizer system.

b) Variable air volume (VAV) boxes with hot water heating coils.

c) Low and Medium pressure duct-work including room balancing.

d) Parking garage exhaust fans and system.

e) Miscellaneous exhaust fans.

f) CO monitoring system for parking garage.

g) Split-system air handling units and duct-work.

h) Controls for all systems including Building Management system Integration.

6.3 Power

1. Summary
    a. Section Includes:
        i. Electrical Service and Distribution.
        ii. Facility Grounding.
        iii. Basic Materials and Methods.
        iv. Branch Wiring System.
        v. Grounding and Bonding.
2. LEED Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.
3. Performance Requirements
    a. The following Reference, Codes and Standards most current editions published shall be applied:
        i. AA – Aluminum Association
        ii. ADA – Americans with Disabilities Act
        iii. ANSI – American National Standards Institute
        iv. AEIC – Association of Edison Illuminating Companies
        v. ASTM – American Society of Testing and Materials
        vi. NEC – National Electrical Code with NYC Amendments (NYC EC)
        vii. IEEE – Institute of Electrical and Electronic Engineers
        viii. ICEA – Insulated Cable Engineers Association
        ix. NEMA – National Electrical Manufacturers Association
        x. NFPA – National Fire Protection Association
        xi. UL – Underwriters Laboratories
        xii. IESNA – Illumination Engineering Society of North America
        xiii. NYC OSHA
        xiv. NYC Building Code
        xv. New York City Fire Code
        xvi. NYCECC – New York City Energy Conservation Code
        xvii. ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers
        xviii. NECA – National Electrical Contractors Association

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xix. Refer to Section 02 for additional Structural Design Requirements.

4. Electrical Service and Distribution
   a. Basic Function:
      i. Service and Distribution – After determining the electrical load requirements for the new building, provide a new distribution system. Coordinate new service voltage level and location with Con Edison. New service distribution voltage shall be at a level appropriate to minimize voltage drop throughout the site distribution. Distribution shall be underground. Provide step down transformers to the appropriate voltage for the building equipment being served, and provide electrical power for all equipment circuits, lighting circuits, receptacle circuits; low voltage systems, and electrical control systems that must operate in the building.
      ii. Emergency Service and Distribution – In addition to normal utility, provide any similar distribution system served from any diesel generator system source.
      iii. Main Electrical Equipment Location –Switchboard, distribution boards, distribution transformers, and some panelboards should be located in close proximity in the main electrical room for ease of installation and to provide a centralized location for the main electrical distribution system equipment for ease of operation and future maintenance.
      iv. Panelboard Location – Panelboards shall be located in zones around the facility to provide localized power distribution within each zone and to minimize the overall installation cost.
      v. Compliance – Service and Distribution system installation shall be designed in accordance with NYC Electrical Code requirements and installed in accordance with ANSI/NECA installation standards.
   b. Amenity and Comfort:
      i. Sound and Noise:
         1) Do not locate transformers near sound sensitive areas.
         2) Provide transformers with noise generation less than the sound levels listed in IEEE Standard 241, latest edition.
      ii. Appearance:
         1) Outside the building – All outdoor conduit and wiring between buildings, pad mount transformers and equipment must be concealed or buried.
         2) Do not locate switchboards; transformers; distribution boards, or panelboards in corridors, hallways, or public spaces.
         3) Conceal electrical conduit in walls and behind ceilings in occupied spaces.

c. Health and Safety:
    i. Protection from Breakage – Locate service and distribution equipment in closets and electrical rooms.
    ii. Protection from Intrusion – Protect electrical distribution equipment from unauthorized access and vandalism.
    iii. No water, mechanical equipment, or drainage systems shall be routed through or over any electrical rooms.
    iv. All equipment shall be designed to minimize arc flash and bear permanent arc flash warning labels.
d. Structural:
    i. Seismic Design – Provide service and distribution elements with flexible joints where differential movement is anticipated.
    ii. All equipment shall be anchored and seismically braced per the most stringent applicable codes and design shall bear the approval stamp by a licensed structural engineer.
    iii. Refer to Section 02 for additional Structural Design Requirements.
e. Durability:
    i. Impact Resistance – The equipment designed and installed shall have heavy gauge metal housing or industrial grade enclosure.
    ii. Environmental Protection – Indoor equipment shall have NEMA 1 housing and outdoor equipment shall have NEMA 3R housing.
f. Operation and Maintenance:
    i. Capacity:
        1) Building Switchboards and switchgear—Shall be sized to power all building loads plus minimum 30% spare capacity.
        2) Interior Distribution Transformer—Shall be sized to power all building 208 volt and 120 volt loads plus minimum 20% spare capacity.
        3) Branch Circuit Panelboards and Distribution Boards— Shall be sized in accordance with NYC Electrical Code requirements to power all related building loads plus minimum 20% spare capacity.
        4) Substantiation:
            a) Proposal: Identification of building service voltages, service ampere rating, and major equipment.

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b) Design Development: Provide single line diagram showing transformer, feeder and equipment sizes, interrupting ratings, and size circuit breaker protective devices.

c) Design Development: Confirm required electrical equipment and electrical room sizes, with clearances in accordance with NYC Electrical Code requirements and functionally suitable for operation and maintenance.

d) Construction documents: Single line diagram and calculations.

e) Construction: Documentation of Equipment characteristics and ratings, and overall installation test reports.

f) Closeout: For each panelboard, balance current on each phase conductor within 5%.

ii. Ease of Use: Provide centrally located wire way routing from the electrical room to minimize branch wiring runs.

iii. Ease of Maintenance and Repair:

1) Select electrical equipment, which is segmented into modules or standard components, wherever possible and applicable, to ease replacement of failed components.

2) Wherever equipment is located in cabinets or enclosures provide doors or removable panels sized to allow easy removal and replacement.

g. Adaptability:

i. Provide space for the addition of another transformer or switchboard.

ii. Power Consumption and Efficiency:

1) The design and installation shall comply with the requirements of IEEE Standard 739.

2) The design will comply with requirements of ASHRAE 90.1.

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5. 208V Secondary Transformers
    a. Transformers: Use general purpose; oil;-insulated K-13 rated transformers. Insulating liquid shall be less flammable, edible-seed-oil based with a fire point of not less than 300 degrees C when tested in accordance with ASTM D 92. Liquid shall be biodegradable and nontoxic.
6. Building Switchboards
    a. 480/277V and 208/120V switchboards shall be provided with metering cabinets for each main. 480/277V and 208/120V switchboards shall be provided with Transient Voltage Surge Suppression (TVSS) for each main. 480/277V and 208/120V switchboards shall be provided with customer metering for each main, and customer metering shall be an integral part of the Electrical Power and Control Monitoring System (PCMS).

b. Busbars: Use copper.

c. Provide sufficient number of overcurrent devices to serve the active loads and 20% minimum spare devices for future loads as required by the DOT.

7. Motor Control Centers

a. Busbars: Use copper.

b. Overcurrent Protectors: Use Motor circuit protectors (MCP).

c. Enclosed within motor control centers or individually mounted. Generally, NEMA Type 1 enclosure.

d. Components:

i. Terminals: Copper.

ii. Overload protection: In each phase leg and coordinated with indicated motor horsepower, with reset button in enclosure.

iii. Control components, as required for the load served.

8. Panelboards

a. Circuit breaker type, rating as required with plated copper or aluminum buses.

b. Bus bars: Hard drawn copper, minimum 98% conductivity, silver plated joints. Option for alloy aluminum, 55% conductivity, tin plated joints.

c. Provide sufficient number of poles to serve the active loads and minimum 20% spare poles for future loads as required by the owner.

d. Provide main breakers in each panelboard unless fed by another panel located in the same room.

9. Raceways

a. Raceways; complete with boxes, fittings and accessories:

i. Rigid steel conduit; full weight pipe, galvanized, threaded, minimum diameter 3/4 inch, except as noted or required for wiring.

ii. Aluminum conduit; full weight pipe, threaded, minimum 3/4 inch, except as noted or required for wiring.

iii. Electrical metallic tubing (EMT); thin wall pipe, galvanized, threadless, minimum diameter 3/4 inch except as noted or required for wiring.

iv. Polyvinylchloride conduit (PVC):

1) Power, concrete encased; Schedule 40.

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1) Communications and signal, direct burial; Type "DB".
2) Communications and signal, concrete encased; Type "EB".

v. Flexible steel or aluminum conduit; continuous single strip, galvanized for steel, minimum diameter 3/4 inch as noted or required for wiring. PVC covered for liquid-tight.

vi. Metal clad cable (Type MC); factory assembly of THWN insulated conductors with separate ground conductor and continuous flexible metallic watertight tape sheath. Sheath not permitted as ground conductor.

vii. Wireways; complete with all fittings and accessories.

viii. Surface metal raceways; complete with all fittings and accessories.

b. Sleeves required for:

i. Exterior non-membrane waterproofed walls.

ii. Exterior membrane waterproof walls, floors and roofs.

iii. Exterior non-membrane waterproof roofs.

iv. Interior membrane waterproof floors.

c. Secondary Service and Distribution Feeders:

i. Conduits:

1) Below Grade: Schedule 80 PVC conduit.
2) Exterior, Exposed: GRS conduit.
3) Interior, Exposed: Only allowed in Electrical Room or Telecom Room; use GRS.
4) Interior, Concealed: GRS conduit or EMT.
5) Flexible conduit allowed for motor and transformer connections, and for lighting whips (sealtite for exterior and standard for interior).

10. Boxes

a. Outlet boxes of size to accept devices and wiring.

b. Manholes and handholes, precast concrete, 4500 psi after 28 days, of required size to accept wiring.

11. Conductors
    a. 600 volt wire and cable, complete with accessories; sizes AWG, except as noted conductors; sizes as required in accordance with the following:
        i. Solid annealed copper for sizes No. 12 and smaller and stranded copper for sizes No. 10 and larger.
        ii. For power: Minimum size No. 12.
            1) Control signal or alarm: Minimum size No. 14 or as accepted.
        iii. Insulation:
            1) Type THHN/THWN-2: Feeders and branch circuits, generally throughout, except where not permitted by applicable codes or as otherwise specified.
            2) Type TW: Insulated ground conductors.
            3) Color coding for each phase and voltage level.
    b. Cable supports in risers; clamping device with insulation wedges to adequately support cables.
    c. Tags:
        i. Flameproof; in accessible locations.

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6.3 Power

ii. Feeders: Indicate number, size, phase and points of origin and terminations. Control or alarm: Indicate type of controls or alarm and points of origin and terminations.

d. Terminations, splices and taps:

i. Cable lugs and connectors: Compatible metal with conductor to match cables with marking indicating size and type.

12. Disconnect Switches

a. Fused or non-fused as required by the load served interrupting capacity at the point of connection and in accordance with code requirements. Voltage: 250 volts rated on 120/208 volt circuits and 600 volts rated on 277/480 volt circuits.

b. Horsepower rated for motor loads.

13. Circuit Breakers

a. Power or molded case type in accordance with the load and protective device coordination requirements and the interrupting capacity at the point of connection.

14. Devices

a. Local Wall Switches:

i. Heavy duty, toggle, specification grade for indoor use. Outdoors: In weatherproof box.

b. Insertion Receptacles:

i. Duplex convenience; specification grade.

ii. Single, specification grade.

iii. Ground fault interrupter receptacles: Self protecting type, duplex convenience.

iv. Outdoors: Weatherproof rated, ground fault interrupter receptacles in weatherproof boxes and covers.

v. Isolated ground recptacles for IT, Communication, and Security Systems

15. Inserts and Supports

a. Maximum Loading: 75% of rating.

b. Grouped Lines and Services: Supported by trapeze hangers of bolted angle or channels or other approved means and methods.

c. Raceway Supports from Building Construction: Beam clamps, channels, brackets, rods, or other acceptable means.

d. Cable Only Supports: "J" hooks, clamps, hangers or other acceptable means.

e. Where building construction is inadequate, provide additional acceptable framing.

16. Communication and Security Conduit System
    a. Telephone raceway system consisting of:
        i. Conduit.
        ii. Pull boxes.
        iii. Terminal strip cabinets.
        iv. Terminal boards.
        v. Outlets.
        vi. Sleeves.
        vii. Nylon pull wire.
    b. Components:
        i. Terminal boards: Fireproof plywood.
        ii. Terminal strip cabinets.
    c. Wall outlets.
    d. Isolated ground receptacles.
17. Nameplates
    a. Permanently secured. Inscription; indicating equipment, designation, source and voltage. Nameplates provided for:
        i. Disconnect switches.
        ii. Circuit breakers.
        iii. Switchboards.
        iv. Panelboards.
        v. Transformers.
        vi. Cabinets.
        vii. Motor controllers.
        viii. Motor Control Centers.
18. Lightning Protection System

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6.3 Power

a. Provide UL96/96A Master Label lightning protection system on each building. Design shall be prepared by a UL Master Label installed. Provide UL Master Label Certificate and building-mounted UL Master Label nameplate as evidence the system has been designed and installed as a UL Master Label System. System shall be in accordance with NFPA 780.

19. Facility Grounding

a. Basic Function:

i. Provide and install grounding system as required.

ii. Compliance—System installation shall be designed in accordance with NYC Electrical Code requirements, IEEE 142 Green Book and all applicable codes.

b. Health and Safety:

i. Protection from Breakage – Locate grounding bus bars in closets and electrical rooms. Locate ground wells away from pedestrian and vehicular traffic.

ii. Protection from Intrusion – Protect grounding equipment from unauthorized access and vandalism.

c. Durability:

i. Each electrode shall terminate within a concrete yard box.

ii. Permanent ground enhancement material (GEM) shall be installed at each ground rod to improve grounding effectiveness.

iii. Parallel grounding rods shall be connected together with recognized fittings and grounding conductors in galvanized rigid steel conduit, buried not less than 12 inches below finish grade.

d. Adaptability:

i. Anticipate space requirements for additional parallel grounding rods in case needed to attain a maximum of 25 ohms resistance.

e. Quality Assurance:

i. Provide the services of an approved independent testing laboratory to test grounding resistance of "made" electrodes, ground rods, bonding of building steel, water pipes, gas pipes and other utility piping. Tests shall be performed in the presence of the Inspector.

1) Visually and mechanically examine ground system connections for completeness and adequacy.

1) Perform fall of potential tests on each ground rod or ground electrode where suitable locations are available per IEEE Standard No. 81, Section 8.2.1.2. Where suitable locations are not available, measurements will be referenced to a known dead earth or reference ground.

20. Perform the two point method test per IEEE No. 81, Section 8.2.1.1 to determine ground resistance between ground rod and building steel, and utility piping – such as water, gas and panelboard grounds. Metal railings at building entrances and at handicapped ramps shall also be tested.
21. Products
    a. Made Electrodes:
        i. Use copper-clad steel ground rods, minimum 3/4 inch diameter by 10 feet long.
    b. Yard Box:
        i. Furnished yard boxes shall be precast concrete and shall be approximately 14 inches wide by 19 inches long by 12 inches deep or larger, if necessary to obtain required clearances. Boxes shall be furnished with bolt-down, checkered, cast iron covers and cast iron frames cast into boxes. Yard boxes shall be Jensen Precast, Oldcastle Precast, Western Precast, Kistner, or equal.
    c. Permanent ground enhancement material (GEM):
        i. Provide GEM by Erico Electrical Products, Loresco Powerset, Tessco Ultrafl or equal, installed at each ground rod to improve grounding effectiveness. Install in accordance with manufacture's installation instructions.
    d. Grounding bus bar:
22. Branch Wiring System
    a. Basic Function:
        i. Power: Provide adequate electrical power to all building equipment, lighting and power outlets from panelboards and distribution boards through a safe and efficient distribution system.
        ii. Ensure that the distribution system delivers power to the locations where it is needed for lighting, wiring devices, equipment, and appliances, based on the project program, and Scoping Documents (plans, Design Guidelines, and performance specifications), designed and constructed in accordance with applicable codes and standards, as follows:
        iii. Branch circuits comprise the following elements:
            1) Branch circuit breakers.

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2) Conductors and cable from panel boards to fixtures, wiring devices, and mechanical equipment.

3) Raceways and boxes.

4) Wiring devices, including, but not limited to, receptacles and plates, wall switches, wall dimmers, remote control switching devices, wall plates, etc.

iv. Where branch circuits are integral with equipment systems defined by another discipline, the installation will meet the operational requirements of the other discipline in addition to the electrical code and installation requirements.

v. In addition to the requirements of this section, the design and construction will comply with all applicable requirements of the Service and Distribution section, and the facility program.

b. Amenity and Comfort:

i. Accessibility: The design and construction will comply with ADA Accessibility Guidelines including the following locations: Where ADA accessibility is required, mount devices no higher than 54 inches or 48 inches, as applicable, and not less than 15 inches, above the finished floor.

ii. Convenience: Provide interior convenience receptacles at intervals no greater than 10 feet along the base of all wall areas unless stated otherwise.

iii. In parking garage, provide weather and vandal proof maintenance recptacles as required.

c. Health and Safety:

i. Tested Materials.

ii. Provide branch circuit panelboards, devices, installation materials, boxes, wireways, wiring and plates in compliance with code with UL listing or labeled, and are ULC listed or labeled or are WH listed or labeled, where applicable.

iii. Provide equipment and installation materials that have their flame spread and smoke developed ratings printed on them.

d. Operations and Maintenance:

i. Capacity: Provide branch circuit wiring with sufficient capacity to accommodate future growth and renovation without major rewiring.

ii. All Circuits including lighting circuits, receptacle circuits, appliance circuits, and equipment circuits shall limit design loads to 75% of capacity permitted by code.

23. Methods of Construction
    a. Field Tests:
        i. Provide required labor, materials equipment and connections to perform tests, document results and submit them, as required for review. Repair or replace all defective work.
        ii. Tests on 600 Volt Wire and Cable:
            1) Perform the following test prior to connecting the equipment:
                a) Continuity tests for all branch circuits and feeders including control circuits under electrical work. All wiring shall be tested free from short circuits and grounds.
            2)
        iii. Tests on Low Voltage Distribution Equipment: Open and close switching devices under load.
        iv. Tests on Motor Controllers: Verify operation of controllers and open and close controllers and load break switches under load. Test for proper rotation of motors.
        v. Certified, written test report of circuit breaker and ground fault relay settings for selective coordination, by independent testing company.
            1)
24. Grounding and Bonding
    a. Basic Function:
        i. Work covered by this Section shall consist of furnishing labor, equipment, supplies, materials, and testing unless otherwise specified, and in performing the following operations recognized as necessary for the installation, termination, and labeling of grounding and bonding infrastructure as described on the Drawings and/or required by these specifications. The electrical contractor is responsible for installing the telecommunications grounding system from the TMGB to the TGB in the telecom room spaces. The telecom contractor is responsible for all grounding requirements within in the telecom rooms including cable tray, racks, copper cable, etc.
        ii. Related Elements:
            1) Pathways for Communication Systems.
            2) Telecommunications Rooms and Spaces.
        iii. Submittals:
            1) Product Data: Provide manufacturer cut-sheets with unit(s) being proposed highlighted to clearly identify the unit/part number to be reviewed. Manufacturer part numbers listed in this section are suggestions only but provide the baseline of what is acceptable for the project.

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2) Shop Drawings: Provide shop drawings showing logical grounding system with specific part numbers called out for all work to be performed within MPOE/MCR/MDF/IDF and data Center from TGB to all grounding points within telecom space. Typical diagram to be submitted for representative IDF for the site.

iv. Glossary:

1) TBC (Telecommunications Bonding Conductor) – The bonding conductor installed from the building's grounding electrode system to the TMGB. This bonding conductor shall be sized the same as the TBB.

2) BC (Bonding Conductor) – Typical bonding conductor installed from any telecommunications grounding bus bar (TMGB or TGB) to telecommunications equipment and/or raceway.

3) TBB (Telecommunications Bonding Backbone) – Continuous bonding conductor installed from the TMGB to the furthest telecommunications room. All TGBs shall attach to the TBB.

4) TMGB (Telecommunications Main Grounding Busbar) – The main telecommunications grounding bar located where the Outside Plant cables enter the telecommunications room.

1. Summary
    a. Section Includes:
        i. Interior Lighting
        ii. Exterior Lighting
        iii. Emergency Lighting
        iv. Lighting Control
2. LEED Requirements
    a. Refer to Section 01 for Sustainable Design Requirements.
3. Interior Lighting
    a. Provide lighting for all interior spaces that is adequate in quality and distribution for the performance of tasks typical for the type of space and the characteristics of the intended population, regardless of the availability of natural light.
    b. Interior lighting comprises the following elements:
        i. Luminaires for general illumination.
        ii. Accent lighting.
        iii. Emergency lighting.
        iv. Illuminated exit signs.
    c. Light Sources: Provide LEDs with efficacy in accordance with NYC Energy Conservation Code.
    d. Minimize the quantity of different lamp types to facilitate maintenance and stocking.

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6.4 ElectricLighting

e. Design in accordance with requirements of all NFPA standards that apply to the occupancy, application, and design.

f. Emergency Lighting:

   i. In addition to generator power, lighting in all corridors, stairwells, elevator lobbies, and common areas shall be provided with emergency battery backup. Loss of one (1) battery pack shall not render an area to be in total darkness.

   ii. All exit lights shall be provided with battery backup.

   iii. Provide emergency lighting that complies with code..

g. Operation and Maintenance:

   i. Power Consumption and Efficiency: Comply with requirements of the Basis of Design.

   ii. Ease of Maintenance: Provide luminaries that do not collect dirt rapidly and are readily cleanable.

iii. Allowance for Change and Expansion: Provide spare capacity in power distribution system for lighting for a minimum 20%.

h. Products:

i. Fixtures furnished shall be products of manufacturers with 10 years minimum history in the industry.

ii. Provide indirect lighting for all office and administration areas.

iii. All fixtures shall be LED type.

i. Lighting System Installation:

i. Comply with ANSI/NECA Installation standards.

ii. Interior Lighting: Cut of at windows and walls.

4. Exterior Lighting

a. Provide lighting for exterior spaces, as required by the project program, that is adequate in quantity, quality, and distribution for the performance of tasks typical for the type of outdoor space and the characteristics of the intended user population.

b. Exterior area lighting comprises the following elements: Exterior luminaires, poles, standards, or other means of mounting the luminaires, power supply, and controls.

c. Where exterior area lighting is integral with elements defined within another element group, the construction will meet the requirements of both element groups.

d. Lighting will be designed in accordance with IESNA (IES) recommendations and the Electrical Systems Design Guidelines.

e. Provide maintained average illuminance values for exterior spaces that are based on the primary visual tasks to be accommodated and are not less than those in the Electrical Systems Basis of Design.

f. Substantiation:

i. Design Development: Overall exterior lighting scheme, including types of luminaires and lamps.

ii. Construction documents: Calculations of illumination levels and uniformity ratios for representative exterior areas, prepared by a registered electrical engineer.

iii. Construction: Measurements of illumination levels and uniformity ratios for representative exterior areas, with a report setting forth results after correcting for maintenance factors keyed to luminaire design and lamp types.

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g. Light Quality:
   i. Glare Minimization: Provide exterior area lighting that minimizes the incidence of discomfort glare and avoids disability glare under all normal conditions of use, in accordance with IESNA recommendations.
   ii. Color: Provide light sources throughout project that render automobile colors and human coloring with reasonable accuracy.
   iii. Color: Provide light sources throughout project with Color Rendering Index (CRI) of no less than 80.
   iv. Construction: Measurement of actual installation in accordance with procedures referenced in ANSI/IESNA.

h. Appearance of Lighting Installation:
   i. Provide exterior area lighting that is compatible with overall project appearance and coordinated with site layout and building organization.
      1) Luminaire Mounting:
         a) Installation on poles, wall mounting brackets, pendants, architectural fixtures, etc.
         b) Maximum mounting height of 25 feet on poles.
         c) Style compatible with building design.
         d) Material and finish compatible with exterior building elements.
      2) Luminaire Design:
         a) Light distribution by direct methods.
         b) Optical control by reflectors or refractors. Material and finish of housing to be compatible with mounting.

i. Lighting Cutoff:

   i. Configure exterior area lighting to avoid spill light on adjacent property and streets.
   ii. Configure exterior area lighting to minimize illumination of building facade and building windows.

j. Design in accordance with requirements of all NFPA standards that apply to the occupancy, application, and design.

k. Emergency Lighting:

i. Provide backup lighting for egress and exiting during periods of normal power interruption as required by code.

ii. Provide emergency lighting that complies with code. In addition to signs and means of egress lighting, provide emergency illumination of not less than one (1) footcandle for a minimum of 1.5 hour in primary spaces.

l. Lighting Control:

i. Level of control of lighting appropriate to exterior area and DOT requirements for energy conservation.

ii. Provide daylight sensing controls; on-off switches; programmable timing; and lighting control system.

m. Structural:

i. Provide mounting system for exterior area lighting that is compliant with the NYC Building Code

ii. Substantiation

1) Construction documents:

a) Manufacturer's standard strength data as published in product literature.

b) Strength calculations for representative installations to be prepared by a registered structural engineer.

n. Durability:

i. Expected Service Life Span: Provide a system which will last a minimum of fifteen (15) years in service without major repairs and will be viable for the life of the building.

ii. Vandal Resistance:

1) Parts not easily removed without the use of special tools.

2) Luminaires mounted at a minimum height of 10 feet above grade.

iii. Enhancements might include:

1) Lenses to be made of tempered glass; high impact acrylic; polyacrylate; or polycarbonate.

2) Metal gratings for protection of optical assemblies.

iv. Substantiation:

1) Proposal: Identification of proven-in-use assemblies of the same type, for inspection by Owner.

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6.4 Electric Lighting

a) Preliminary Design: Identification of proven-in-use assemblies of the same type, for inspection by Owner.

b) Design Development: Identification of actual products to be used.

o. Operation and Maintenance:

i. Maintenance Efficiency: Provide luminaires that do not collect dirt rapidly and are readily cleanable.

ii. Luminaire Categories: Provide luminaires of IESNA Category I; II; V; for minimum dirt accumulation and LDD factors.

iii. Ease of Re-lamping: Provide luminaires designed for easy re-lamping without special tools or equipment.

iv. Provide Pull Box near each light pole.

p. Exterior Lighting System Installation:

i. Comply with ANSI/NECA Lighting Installation standards.

6.5.1 FIRE ALARM

1. Summary
    a. Fire detection and alarm
2. Performance Requirements
    a. Basic Function:
        i. Fire alarm and emergency voice communication systems must meet current requirements of the New York City Fire Code and New York City Building Code, in addition to NFPA 72 and electrical codes applicable in New York City.
        ii. All fire alarm and emergency voice communication systems must be the same manufacturer.
        iii. Duct mounted detectors must be located to facilitate access and maintenance.
        iv. Training and certification of maintenance must be provided by the fire alarm system vendor.

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6.5 Fire Alarm

i. Cabling:

1) Base Requirement: All cabling must be as recommended by the equipment manufacturer.

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6.5 Telecommunications

6.5.1 WIRELESS PUBLIC SAFETY EMERGENCY COMMUNICATIONS SYSTEMS

1. Related documents
    a. The following documents apply to all required Work for the Project:
        i. The Design-Build Agreement.
        ii. Standard Project Requirements.
        iii. Specific Project Requirements.
        iv. Reference documents.
        v. Available documents.
2. Summary
    a. General:
        i. This Section includes Blue Lite Emergency Phones and Call Boxes.
3. LEED Requirements
    a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements for LEED requirements.
4. Installation
    a. Secure units in a prominent location, one per floor.
    b. Coordinate installation with Electrical and Security Specifications.
5. Maintenance
    a. Provide training session for facility staff and provide printed maintenance manuals.

6.5.2 TELECOMMUNICATIONS

1. Summary
    a. Section Includes:
        i. Fiber Optic Cables
        ii. Copper Cables

2. Performance
    a. The following standards must be applied
        i. Building Code of the City of New York
        ii. International Telecommunications Union (ITU)
            1) T G.651-Characteristics of a 50/125um multimode graded index optical fiber cable.
            2) T G.652-Characteristics of a single-mode optical fiber and cable.
            3) T G.653-Characteristics of a dispersion-shifted single-mode optical fiber and cable.
            4) T G.654-Characteristics of a cut-off shifted-mode optical fiber and cable.
        iii. National Fire Protection Association (NFPA)
            1) NFPA 70 National Electrical Code
            2) NFPA 130 National Electrical Code
        iv. International Electrical Testing Association (NETA)
            1) Acceptance Testing Specifications, Section 7.25.
        v. Telecommunications Industry Association (TIA) / Electronics Industries Alliance (EIA)
            1) 455-25C-FOTP-25 Impact Testing of Optical Fiber Cables.
            2) 455-26A-FOTP-26 Crush Resistance of Fiber Optic Interconnecting Devices.
            3) 455-33A-FOTP-33 Fiber Optic Cable Tensile Loading and Bending Test.
            4) 455-41A-FOTP-41 Compressive Loading Resistance of Fiber Optic Cables.
            5) 455-98A-FOTP-98 Fiber Optic Cable External Freezing Test.
            6) 455-14A-OFSTP-14 Fiber Optic Cable Cyclic Flexing Test.
            7) 526-14A-OFSTP-14 Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.
            8) 232-F – Interface Between Data Terminal Equipment and Data Circuit Termination Equipment Employing Serial Binary Data Interchange
            9) 310-D – Cabinets, Racks, Panels an Associated Equipment
            10) 485-A – Standard for Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems
            11) 606 – Administration Standard for the Telecommunications Infrastructure of Commercial Buildings

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6.6 Telecommunications

12) 607 – Commercial Building, Grounding and Bonding Requirements for Telecommunications
13) 568-C.3-Optical Fiber Cabling Components Standard.
14) 598-C-Optical Fiber Cable Color Coding.
15) 604-Fiber Optic Cabling Intermateability Standard (FOCIS).
16) 606-A-Administration Standard for Commercial Telecommunications Infrastructure.
17) 607-A-Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.

vi. Underwriters Laboratories Inc.
1) UL 1651-Standard for Safety for Optical Fiber Cable.
2) UL 2024-Optical Fiber Cable Raceway.

vii. International Organization for Standardization (ISO)
1) 9001 – Quality Systems – Model for Quality Assurance in Design/Development, Production, Installation and Servicing

b. General Performance: Horizontal cabling systems must comply with transmission standards in TIA/EIA-568, when tested according to test procedures of this standard.

c. All cable installation, including all components of the copper optical fiber optic cable system must be manufactured and installed with the requirements of NFPA 70.

3. Materials

a. Fiber Optic Cables

i. Optical fiber cables must be factory-fabricated, single channel, low-loss, glass, graded index type. The number of fibers and optical requirements

ii. Each fiber must be distinguishable by means of a continuous color code, continuous numbering, continuous lettering, or a combination of methods.

iii. Multimode, 62.5/125-micrometer, nonconductive, optical fiber cable.

iv. General Purpose, Nonconductive: Type OFN or OFNG

v. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.

vi. Riser Rated, Nonconductive: Type OFNR, complying with UL 1666.

vii. General Purpose, Conductive: Type OFC or OFCG

viii. Conductive cable must be steel armored type.

ix. Jacket Color: Orange for 62.5/125-micrometer cable.

x. Cable cordage jacket, fiber, unit, and group color must be according to TIA-598-C.

xi. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

xii. Quick-connect, simplex and duplex, Type SC connectors. Insertion loss not more than 0.50 dB.

b. Copper cables

i. All network copper cables must be Category 6 unshielded twisted pair plenum rated and properly terminated and tested on Category 6 patch panels and jacks.

ii. Control Cable - The multi-conductor communication control cable must be constructed of unshielded multiple insulated conductors of No. 16 to 24 AWG stranded tinned copper wires in accordance with ASTM B8 and B33. All conductors must be UL listed.

c. All designs and installations must meet or exceed the applicable requirements of the NEC, UL, and manufacturer's requirements.

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6.7 Not Used

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6.8 Fire Protection Systems

6.8.1 FIRE PROTECTION

1. Scope Summary
    a. This Section includes fire protection requirements, materials, equipment, accessories and installation for the new garage facility and a future programmed Community Center to be served by Work specified herein. This Section includes Fire Protection Performance Specifications for the following:
        i. Fire Pumps
        ii. Sprinkler System
        iii. Standpipe System
        iv. Fire Protection Specialties
    b. It is not the intent of this Section to specify all technical requirements nor to set forth those requirements adequately covered by the applicable codes and standards. Design-Builder (DB) must furnish high quality equipment, material and workmanship meeting the requirements of these specifications and standards.
    c. The fire protection system consists of all wet and dry fire sprinkler and fire standpipe piping, equipment, and other specialty devices for a complete fire protection system. Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system.
    d. The Design-Builder must provide a complete fire pump system sized for the building and site specific requirements. Provide a wet-pipe sprinkler system as required and calculated for the building occupancy and demand. Provide a dry-pipe sprinkler system as needed and calculated for the building occupancy and demand. Provide a complete fire standpipe system meeting all applicable codes. Perform a hydrant flow test to determine system requirements prior to system design.
2. Codes and Performance Standards
    a. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only. The latest editions available on the date of Notice Inviting Proposals must be used.
        i. National Fire Protection Association (NFPA)
        ii. Life Safety Code (NFPA #101)
        iii. American Society of Mechanical Engineers (ASME)
        iv. ASTM International (ASTM)
        v. FM Global
        vi. National Science Foundation

6.8 Fire Protection Systems

vii. Underwriters Laboratory (UL)
viii. Safety and Health Regulations for Construction Occupational Safety and Health Standards (OSHA)
ix. New York City Building Code (NYC BC)
x. New York City Building Code (NYC BC) Appendix Q
xi. New York City Department of Buildings (NYC DOB)
xii. New York City Department of Enviromental Protection (NYC DEP)
xiii. New York City Fire Code (NYC FC)
xiv. New York Fire Department Code and Rules (FDNY Rules)
xv. New York City Local Laws & Bulletins

3. Design Requirements
   a. Construct using the following practices and procedures:
      i. Install equipment to allow for service and maintenance, provide housekeeping pads to also allow for equipment drain and/or trap assembly.
      ii. Maintain manufacturer's recommended clearances for all equipment.
      iii. Provide inlet and outlet piping sized not smaller than sizes of equipment connections.
      iv. Valves on the fire protection system are to be supervised as per codes and requirements.
      v. Anchor equipment to substrate.
      vi. Install equipment so controls and devices for service are readily accessible.
   b. Engage a factory-authorized service representative to train Agency's maintenance personnel to adjust, operate, and maintain the fire protection system.
4. Submittals
   a. Product Data
   b. Shop Drawings: Submit fully dimensioned fabrication and erection drawings. Include details of clearances, arrangements, piece markings, reinforcing, weld plates and welding, inserts, anchors, connections, accessories, joints, openings, and other requirements.
   c. Samples
   d. Hydrant Flow Test
   e. Hydraulic Calculations
   f. Material Test reports
   g. Manufacturer's Qualifications Data
   h. Manufacturer's quality control procedures.

i. Installer's Qualifications Data.

5. Quality Assurance
   a. AWS D1.1/D1.1M.
   b. 2015 ASME Boiler and Pressure Vessel Code, Section IX.
   c. Standards: NFPA 13, 20, 24, 30, 70, and UL 448, 1004A.
   d. NYC Appendix Q modifications.
   e. Electrical Components, Devices, and Accessories: NYC Electrical Code.
   f. Manufacturer's Qualifications
   g. Installer's Qualifications: Fire protection work must be performed by persons skilled in the trade involved and must be done in a manner consistent with normal industry standards.
   h. Testing Agency Qualifications
6. Delivery, Storage and Handling
   a. Delivery: Load, transport, and unload Fire protection materials and equipment by methods that will prevent damage to mixes and within prescribed times.

6.8.2 FIRE PUMPS

1. Performance
   a. General Requirements
      i. DB must size pumps in order to meet the system demand determined by hydraulic models.
      ii. In-Line Fire Pumps
   b. Pump:
      i. Standard: UL 448, for in-line pumps for fire service.
      ii. Casing: Radially split case, cast iron with ASME B16.1 pipe-flange connections.
      iii. Impeller: Cast bronze, statically and dynamically balanced, and keyed to shaft.
      iv. Wear Rings: Replaceable bronze.
      v. Shaft and Sleeve: Steel shaft with bronze sleeve.
      vi. Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.

vii. Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.

viii. Mounting: Pump and driver shaft is vertical, with motor and pump and pump on base.

ix. Coupling: None or rigid

c. Driver:

i. Standard: UL 1004A

ii. Type: Electric motor; NEMA MG 1, polyphase Design B.

iii. Horizontally Mounted, Single-Stage, Split-Case Fire Pumps

d. Pump:

i. Standard: UL 448, for split-case pumps for fire service.

ii. Casing: Axially split case, cast iron with ASME B16.1 pipe-flange connections.

iii. Impeller: Cast bronze, statically and dynamically balanced, and keyed to shaft.

iv. Wear Rings: Replaceable bronze.

v. Shaft and Sleeve: Steel shaft with bronze sleeve.

vi. Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.

vii. Seals: Stuing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.

viii. Mounting: Pump and driver shafts are horizontal, with pump and driver on same base.

ix. Coupling: Flexible and capable of absorbing torsional vibration and shaft misalignment. Include metal coupling guard.

e. Driver:

i. Standard: UL 1004A

ii. Type: Electric motor; NEMA MG 1, polyphase Design B.

iii. Regenerative-Turbine, Pressure-Maintenance Pumps

iv. Description: Factory-assembled and -tested, close-coupled, single-stage, regenerative-turbine centrifugal pump as defined in HI 1.1-1.2 and HI 1.3; with pump and motor mounted horizontally.

f. Pump Construction:

i. Pump Head: Cast iron, for surface discharge, with flange, except connections maybe threaded in sizes in which flanges are not available.

ii. Casing: Radially split, cast iron, with threaded inlet and outlet.

iii. Impeller: Bronze, balanced, and keyed to shaft.

iv. Pump Shaft: Stainless steel with deflector.

v. Shaft Sleeve: Bronze.

vi. Seal: Mechanical type with spring-loaded rotating head.

vii. Motor: Single speed with permanently lubricated ball bearings. Comply with requirements for fire suppression equipment.

viii. Power Cord: Factory-connected to motor for field connection to controller and at least 10 feet long.

ix. Nameplate: Permanently attached to pump and indicating capacity and characteristics.

x. Vertical-turbine, pressure-Maintenance Pumps

xi. Description: Factory-assembled and -tested, vertical, multistage, open-line-shaft turbine pump as defined in HI 2.1-2.2 and HI 2.3; with pump motor mounted above pump head.

g. Motors:

i. Standard: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors.

ii. Motor Sizes: Large enough so driven load will not require motor to operate in service factor range above 1.0.

iii. Electric Motor Driven Fire Pump Controller

iv. Standard: Comply with NFPA 20

v. Alarm Supervision: Indicate pump running, circuit breaker open, power failure, and phase reversal.

vi. Where multiple pumps are provided, indicate area or zone served by each pump controller.

vii. Rating: The controller must have the same horsepower, voltage, phase, and frequency rating as the motor.

h. Automatic Transfer Switch:

i. Standard: Comply with NFPA 20.

ii. Provide in NEMA rated enclosure mechanically attached to full service fire pump controller.

iii. Where multiple pumps are provided, indicate area or zone served by each pump controller.

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i. Flow Meter:
   i. Standard: Comply with NFPA 20.
   ii. Provide closed low meter loop around fire pump for testing hydraulic performance.

j. Fire Pump Accessories and Specialties:
   i. Automatic Air-Release Valves: Comply with NFPA 20 for installation in fire-pump casing.
   ii. Circulation Relief Valves: UL 1478, brass, spring loaded; for installation in pump discharge piping.
   iii. Relief Valves: Description: UL 1478, bronze or cast iron, spring loaded; for installation in fire-suppression water-supply piping.
   iv. Inlet Fitting: Eccentric tapered reducer at pump suction inlet.
   v. Outlet Fitting: Concentric tapered reducer at pump discharge outlet.
   vi. Discharge Cone: Closed or open type.
   vii. Hose Valve Manifold Assembly:
   viii. Standard: Comply with requirements in NFPA 20.
   ix. Header Pipe: ASTM A 53/A 53M, Schedule 40, galvanized steel with ends threaded according to ASME B1.20.1.
   x. Header Pipe Fittings: ASME B16.4, galvanized cast-iron threaded fittings.
   xi. Automatic Drain Valve: UL 1726.

k. Manifold:
   i. Test Connections: Comply with UL 405 except provide outlets without clappers instead of inlets.
   ii. Body: Flush type, brass or ductile iron, with number of outlets required by NFPA 20.
   iii. Nipples: ASTM A 53/A 53M, Schedule 40, galvanized-steel pipe with ends threaded according to ASME B1.20.1.
   iv. Adapters and Caps with Chain: Brass or bronze, with outlet threaded according to NFPA 1963 and matching local fire-department threads.
   v. Escutcheon Plate: Brass or bronze; rectangular.
   vi. Hose Valves: UL 668, bronze, with outlet threaded according to NFPA 1963 and matching local fire-department threads.
   vii. Exposed Parts Finish: Polished Rough brass, chrome plated.
   viii. Escutcheon Plate Marking: Equivalent to “FIRE PUMP TEST.”

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6.8.3 SPRINKLER

1. Performance
   a. Basic Function:
      i. The DB must provide a fire sprinkler system including but not limited to wet-pipe, dry-pipe, and pre-action systems for all code required spaces in order to protect life and property.

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      1) Determine minimum water supply requirements for each sprinkler system using the hydraulic calculation method defined by NFPA 13 (latest edition).
      2) Substantiation:
         a) Preliminary Design: Identification of water source.
         b) Design Development: Water supply for sprinkler systems shown on the drawings.
         c) Construction: Tests of each sprinkler system in accordance with the requirements of the design standard.
   b. Durability:
      i. Expected Service Life Span: Provide a sprinkler system which must be viable for the life of building when maintained as specified in NFPA 25 (latest edition).
      ii. Substantiation:
         1) Preliminary Design: Identification of the system type to be installed.
      iii. Corrosion Resistance: The construction must use corrosion resistant materials; ferrous metal is not considered corrosion resistant unless it is hot dipped galvanized, chrome plated, or coated with rust inhibitive paint.
      iv. Vandalism: The construction must provide systems which are tamper-resistant.
   c. Quality Assurance
      i. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
         1) Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.
   d. Operation and Maintenance:
      i. Provide sprinkler system maintenance in accordance with NFPA 25 (latest edition).

ii. Spare Sprinkler Heads: Provide additional sprinkler heads as required by code to service the system.

iii. Ease of Use: The construction must provide easy access to and working clearances around system components.

iv. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

e. Substantiation:

i. Preliminary Design: System layout indicating operator interface locations.

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ii. Design Development: System equipment locations indicated on the drawings and manufacturer's product data indicating products to be used.

2. Products

a. Steel Pipe and Fittings:

i. Black-Steel Pipe: ASTM A53/A53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.

ii. Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.

iii. Uncoated-Steel Couplings: ASTM A 865/A 865M, threaded.

iv. Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.

v. Malleable- or Ductile-Iron Unions: UL 860.

vi. Cast-Iron Flanges: ASME 16.1, Class 125.

vii. Grooved-Joint, Steel-Pipe Appurtenances:

viii. Pressure Rating: 175-psig minimum.

ix. Uncoated, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting, with dimensions matching steel pipe.

x. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

b. Exposed-Type Fire-Department Connection:

i. Standard: UL 405.

ii. Type: Exposed, projecting, for wall mounting.

iii. Pressure Rating: 175 psig minimum.

iv. Body Material: Corrosion-resistant metal.

v. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.

vi. Caps: Brass, lugged type, with gasket and chain.

vii. Escutcheon Plate: Round, brass, wall type.

viii. Outlet: Back, with pipe threads.

ix. Number of Inlets: Four.

x. Escutcheon Plate Marking: Similar to "AUTO SPKR & STANDPIPE".

xi. Finish: Polished chrome plated.

c. Flush-Type Fire-Department Connection:

i. Standard: UL 405.

ii. Type: Flush, for wall mounting.

iii. Pressure Rating: 175 psig (1200 kPa) minimum.

iv. Body Material: Corrosion-resistant metal.

v. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.

vi. Caps: Brass, lugged type, with gasket and chain.

vii. Escutcheon Plate: Rectangular, brass, wall type.

viii. Outlet: With pipe threads.

ix. Body Style: Horizontal, Square, or Vertical.

x. Number of Inlets: Four.

xi. Outlet Location: Back, Bottom, Left side, Right side, or Top.

xii. Escutcheon Plate Marking: Similar to "AUTO SPKR & STANDPIPE."

xiii. Finish: Polished chrome plated.

d. Specialty Valves:

i. Listed in UL's "Fire Protection Equipment Directory" or FM Global "Approval Guide."

ii. Specialty Valves Pressure Rating: 175-psig minimum.

iii. Body Material: Cast or ductile iron.

iv. Size: Same as connected piping.

v. End Connections: Flanged or grooved.

vi. Alarm Valves:

1) Standard: UL 193.

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1) Design: For horizontal or vertical installation.
2) Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, retarding chamber and ill-line attachment with strainer.
3) Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.
4) Drip Cup Assembly: Pipe drain with check valve to main drain piping.

vii. Automatic (Ball Drip) Drain Valves:

1) Standard: UL 1726.
2) Pressure Rating: 175-psig minimum.
3) Type: Automatic draining, ball check.
4) Size: NPS 3/4.
5) End Connections: Threaded

e. Sprinkler Piping Specialties:

i. Flow Detection and Test Assemblies:

1) Standard: UL's "Fire Protection Equipment Directory" or FM Global "Approval Guide."
2) Pressure Rating: 175-psig minimum.
3) Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
4) Size: Same as connected piping.
5) Inlet and Outlet: Threaded or grooved

ii. Branch Line Testers:

1) Standard: UL 199.
2) Pressure Rating: 175 psig minimum.
3) Body Material: Brass.
4) Size: Same as connected piping.
5) Inlet: Threaded.
6) Drain Outlet: Threaded and capped.
7) Branch Outlet: Threaded, for sprinkler.

iii. Escutcheons:

1) One-Piece, Cast-Brass Type: With polished, chrome-plated and rough-brass finish and setscrew fastener.
2) One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
3) One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

iv. Floor Plates:

1) One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

v. Sprinkler Inspector's Test Fittings:

1) Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
2) Pressure Rating: 175-psig minimum.
3) Body Material: Cast- or ductile-iron housing with sight glass.
4) Size: Same as connected piping.
5) Inlet and Outlet: Threaded.

vi. Flexible Sprinkler Hose Fittings:

1) Standard: UL 1474.
2) Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
3) Pressure Rating: 175-psig minimum.
4) Size: Same as connected piping, for sprinkler.

f. Sprinklers:

i. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."

6.8.4 STANDPIPE

1. Performance

a. Basic Function:

i. Provide a standpipe and hose system to protect life and property; the building and its

ii. Standpipes must include:

1) Pipes, fittings, and specialties.
2) Fire-protection specialty valves.
3) Hose connections.
4) Alarm devices.

5) Pressure gages.

iii. System Class and Type to meet codes and requirements of the authority having jurisdiction.

iv. Standpipe Design and Installation: Provide a standpipe system as required by code and NFPA 14 as modified by Appendix Q. Elements that deliver adequate supplies of water to locations in the building for manual fire-fighting.

6.8 Fire Protection Systems

v. Where standpipe and hose system elements also must function as elements defined within another element group, the construction must meet the requirements of both element groups.

b. Amenity and Comfort:

i. Accessibility:

1) Provide fire department connections as required by code and the local authority having jurisdiction.

2) Provide clearances around system components for service and use.

3) Hazards: The construction must provide systems which minimize risk of injury and damage to property.

ii. Appearance:

1) Hose Cabinets: solid metal door panel; and glass window in the door; and a fire extinguisher.

2) Valves: Brass finish.

3) Fire Department Connections: Brass finish.

4) Convenience: The construction must provide fire department connections for each standpipe as required by code on the exterior of the building; near curb.

5) Water Use: The construction must provide a permanent water supply for standpipes as required by code.

6) Substantiation:

a) Preliminary Design: Fire protection areas identified.

b) Design Development: Fire protection zones indicated on the drawings with riser locations identified.

c) Construction: Functional performance testing in accordance with code.

iii. Standard-Pressure, Fire-Suppression Standpipe System Component: Listed for 175-psig minimum working pressure.

iv. Fire-suppression standpipe design must be approved by authorities having jurisdiction.

1) Minimum residual pressure at each hose-connection outlet is as follows:

a) NPS 1-1/2 Hose Connections 65 psig.

b) NPS 2-1/2 Hose Connections 100 psig.

c. Health and Safety:

i. Fire Source: Provide system materials which do not contribute to the spread of the ire; which do not burn or release smoke when in direct contact with the ire.

ii. Fire Spread: The construction must provide a standpipe system to assist firefighters in preventing the spread of fire.

iii. Substantiation:

1) Preliminary Design: Identification of locations of each standpipe.

2) Development: Indication of standpipe locations on the drawings.

3) Construction: Tests of each standpipe system.

iv. Water Source: The construction must provide water supply as required by NFPA 14.

v. Substantiation:

1) Preliminary Design: Identification of water source.

2) Design Development: Water supply for each standpipe on the drawings.

3) Construction: Tests of each standpipe system.

d. Durability:

i. Expected Service Life Span: Provide standpipes and hose systems which must be viable for the life of building.

ii. Substantiation:

1) Preliminary Design: Identification of the system type to be installed.

iii. Ease of Use: The construction must provide easy access to and working clearances around system components.

iv. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

v. Quality Assurance

1) Installer Qualifications:

a) Installer's responsibilities include designing, fabricating, and installing fire-suppression standpipes and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of ire-hydrant flow test.

b) Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

c) NFPA Standards: Fire-suppression standpipe equipment, specialties, accessories, installation, and testing must comply with NFPA 14.

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e. Operation and Maintenance:

i. The construction must provide standpipe and hose system maintenance in accordance with NFPA 25.

ii. Ease of Use: The construction must provide standpipe and hose systems which comply with the acceptance requirements of NFPA 14 (latest edition) and must provide easy access to and working clearances around system components.

iii. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

iv. Substantiation:

1) Preliminary Design: System layout indicating operator interface locations.

2) Design Development: System equipment locations indicated on the drawings and manufacturer's product data indicating products to be used.

2. Products

a. Black Steel Pipe and Associated Fittings

i. ASTM A 53/A 53M, Type E, Grade B; with factory- or field-formed ends to accommodate joining method.

ii. Uncoated, Steel Couplings: ASTM A 865/A 865M, threaded.

iii. Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.

iv. Malleable- or Ductile-Iron Unions: UL 860.

v. Cast-Iron Flanges: ASME B16.1, Class 125.

vi. Grooved-Joint, Steel-Pipe Appurtenances:

1) Pressure rating: 175 psig minimum

2) Uncoated, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.

3) Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

b. Piping Joining Materials:

i. Pipe-Flange Gasket Materials: AWWA C110, rubber, lat face, 1/8 inch (3.2 mm) thick or ASME B16.21, nonmetallic and asbestos free.

1) Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.

2) Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.

ii. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

iii. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

c. Specialty Valves:

i. General Requirements:

1) Standard: UL's "Fire Protection Equipment Directory" listing or FM Global's "Approval Guide."

2) Pressure Rating: 175 psig minimum.

3) Body Material: Cast or ductile iron.

4) Size: Same as connected piping.

5) End Connections: Flanged or grooved.

ii. Alarm Valves:

1) Standard: UL 193.

2) Design: For horizontal or vertical installation.

3) Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, retarding chamber, and ill-line attachment with strainer.

4) Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.

5) Drip Cup Assembly: Pipe drain with check valve to main drain piping.

iii. Pressure-reducing Valves:

1) UL 668 hose valve, with integral UL 1468 reducing device.

2) Pressure Rating: 300 psig minimum.

3) Material: Brass or bronze.

4) Inlet: Female pipe threads.

5) Outlet: Threaded with or without adapter having male hose threads.

6) Pattern: Angle or gate.

7) Finish: Polished chrome-plated

iv. Automatic (Ball Drip) Drain Valves:

1) Standard: UL 1726.

2) Pressure Rating: 175 psig minimum.
3) Type: Automatic draining, ball check.
4) Size: NPS 3/4.
5) End Connections: Threaded.

d. Hose Connections:
   i. Nonadjustable-Valve Hose Connections:
      1) Standard: UL 668 hose valve for connecting re hose.
      2) Pressure Rating: 300 psig minimum.
      3) Material: Brass or bronze.
      4) Size: NPS 1-1/2, as indicated.
      5) Inlet: Female pipe threads.
      6) Outlet: Male hose threads with lugged cap, gasket, and chain. Include hose valve threads according to NFPA 1963 and matching local fire-department threads.
      7) Pattern: Angle
      8) Finish: Polished chrome-plate

e. Alarm Devices:
   i. Alarm-device types must match piping equipment connections.
   ii. Water-Motor-Operated Alarm:
      1) Standard: UL 753.
      2) Type: Mechanically operated, with pelton wheel.
      3) Alarm Gong: Cast aluminum with red-enamel factory finish.
      4) Size: 10-inch diameter.
      5) Components: Shaft length, bearings, and sleeve to suit wall construction.
      6) Inlet: NPS 3/4.
      7) Outlet: NPS 1 drain connection.
   iii. Electrically Operated Alarm Bell:
      1) Standard: UL 464.
      2) Type: Vibrating, metal alarm bell.

3) Size: 10-inch diameter.

4) Finish: Red-enamel factory finish, suitable for outdoor use.

iv. Water-Flow Indicators:

1) Standard: UL 346.

2) Water-Flow Detector: Electrically supervised.

3) Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent 0 signals and tamperproof cover that sends signal if removed.

4) Type: Paddle operated.

5) Pressure Rating: 250 psig.

6) Design Installation: Horizontal or vertical.

v. Pressure Switches:

1) Standard: UL 346.

2) Type: Electrically supervised water-flow switch with retard feature.

3) Components: Single-pole, double-throw switch with normally closed contacts.

4) Design Operation: Rising pressure signals water flow.

vi. Valve Supervisory Switches:

1) Standard: UL 346.

2) Type: Electrically supervised.

3) Components: Single-pole, double-throw switch with normally closed contacts.

4) Design: Signals that controlled valve is in other than fully open position.

vii. Indicator-post Supervisory Switches:

1) Standard: UL 346

2) Type: Electrically supervised.

3) Components: Single-pole, double-throw switch with normally closed contacts.

4) Design: Signals that controlled indicator-post valve is in other than fully open position.

f. Pressure Gages:
   i. Standard: UL 393.
   ii. Dial Size: 3-1/2- to 4-1/2-inch diameter.
   iii. Pressure Gage Range: Zero to 250 psig minimum.
   iv. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.
   v. Air System Piping Gage: Include retard feature and "AIR" or "AIR/WATER" label on dial face.

6.8.5 FIRE PROTECTION SPECIALTIES

1. Performance
   a. Basic Function:
      i. Provide fire protection specialties to protect life and property; the building and its occupants in all new building areas.
      ii. System Class and Type to meet codes and requirements of the Fire Department having jurisdiction.
      iii. Fire protection specialties must include portable fire extinguishers, Fire protection cabinets for portable fire extinguishers, fire hose valves, fire hoses, and racks, and accessories required for a complete installation.
      iv. Where standpipe and hose system elements also must function as elements defined within another element group, the construction must meet the requirements of both element groups.
   b. Amenity and Comfort:
      i. Accessibility:
         1) Provide fire hose cabinets and accessories as required by code and the local Fire Department Having Jurisdiction.
         2) Provide clearances around system components for service and use.
      ii. Hazards: The construction must provide systems which minimize risk of injury and damage to property and people.
      iii. Appearance:
         1) Hose Cabinets: Solid metal door panel; and glass window in the door; and a fire extinguisher.
         2) Valves: Brass finish.

iv. Convenience: The construction must provide fire department connections for each standpipe as required by code on the exterior of the building; near curb.

v. Water Use: The construction must provide a permanent water supply for hose cabinets as required by code.

c. Health and Safety:

i. Path of Egress: Provide systems which safeguard path of egress.

ii. Fire Source: Provide system materials which do not contribute to the spread of the re; which do not burn or release smoke when in direct contact with the fire.

iii. Fire Spread: The construction must provide fire extinguishing cabinet system to assist firefighters in preventing the spread of fire.

iv. Substantiation:

1) Preliminary Design: Identification of locations of each

2) cabinet. Construction: Tests of each extinguishing

d. Durability: cabinet.

i. Expected Service Life Span: Provide hose cabinets and hose systems which must be viable for the life of building.

1) Substantiation:

a) Preliminary Design: Identification of the system type to be installed.

b) Design Development: Identification of similar cabinets and hose systems in use in an existing facility for 25 years and consisting of components from the same manufacturer.

ii. Ease of Use: The construction must provide easy access to and working clearances around system components.

iii. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

e. Operation and Maintenance:

i. The construction must provide cabinets and hose system maintenance in accordance with NFPA 25.

ii. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

1) Substantiation:

a) Preliminary Design: System layout indicating operator interface locations.

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2. Products
    a. Portable Fire Extinguishers:
        i. Provide fire extinguishers in locations indicated or where required by regulations, complying with requirements of governing authorities. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer.
            1) Multipurpose Dry Chemical Type: UL rated 2A:10:B:C, 5 lb. nominal capacity, in enameled steel container.
            2) Multipurpose Dry Chemical Type: UL rated 4A:60 B:C, 10 lb. nominal capacity, in enameled steel container.
        ii. Fire Protection Cabinets: Standard cabinets designed to hold up to 20 lb. of dry chemical extinguisher, or to hold fire hose, valve, rack, and 20 lb. extinguisher.
        iii. Coordinate cabinet dimensions with size of contents.
        iv. Cabinet Construction: Provide steel box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style specified. Weld joints and grind smooth. Miter and weld perimeter door frames.
            1) Cabinet Metal: Stainless steel sheet, No. 304.
        v. Cabinet Trim Style: Single-piece, trim less, with corners mitered, welded, and ground smooth.
            1) Provide recessed flange, of same material as box, attached to box to act as plaster stop.
        vi. Cabinet Mounting: Suitable for the following mounting conditions:
            1) Surface: Cabinet box surface mounted on walls to suit style of trim indicated.
            2) Semi recessed: Cabinet box partially recessed in walls of shallow depth to suit style of trim indicated.
            3) Recessed.
        vii. Door Style: Flush opaque panel, frameless, with no exposed hinges.
        viii. Identification: Identify bracket mounted extinguishers with "FIRE EXTINGUISHER" in red letter decals applied to wall surface.
        ix. Door Hardware: Provide door operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or exposed or concealed door pull and friction latch.
        x. Provide concealed or continuous type hinge permitting door to open 180 degrees.
        xi. Fire Rated Cabinets: Listed and labeled to meet requirements of ASTM E814 for ire resistance rating of wall where it is installed.

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7.1 Site Preparation

7.1.1 SITE PREPARATION

1. Summary
    a. Section Includes:
        i. Rough grading the Site.
        ii. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses.
        iii. Excavating and backfilling for buildings and structures.
        iv. Drainage course for concrete slabs-on-grade.
        v. Subbase course for concrete walks and pavements.
        vi. Subbase course and base course for asphalt paving.
        vii. Subsurface drainage backfill for walls and trenches.
        viii. Excavating and backfilling for utilities.
        ix. Excavating well hole to accommodate elevator-cylinder assembly.
        x. Excavation: Unclassified.
2. Performance
    a. Meet requirements of compaction per NYC Building Code.
    b. Remove unsuitable material as required.
    c. Dewater in accordance with 1.1.D Dewatering.
3. Materials
    a. Where the entire ill or backfill is above the water table, material conforming to the requirements for I-10 designation may be used in lieu of I-12 designation except under foundations, and utilities.
    b. Use material excavated at construction site if it satisfies above requirements.
    c. Geotextiles: Subsurface drainage geotextile and separation geotextile.
    d. Controlled Low-Strength Material: Low density, conventional weight concrete.
    e. Warning Tape: Detectable, polyethylene film.

4. Field Quality Control
    a. Special Inspector and Testing Agency: Owner engaged.
        i. Testing Agency will perform Quality Assurance testing on delivered field samples of material submitted from each source. Gradation and maximum density will be determined in accordance with ASTM D 422 and Procedure C of ASTM D 1557, respectively.
        ii. When performing Quality Assurance testing, the Testing Agency will determine the density of compacted ill or backfill by in-place density tests or from undisturbed samples cut from the compacted ill or backfill as required.
        iii. To evaluate whether material has been compacted to specified density the Testing Agency will compare results of in-place density tests with results of control tests on material of the same designation using Procedure C of ASTM D 1557.
        iv. If ill or backfill have not been sufficiently compacted as determined by in-place density tests, the compaction effort shall be continued, and moisture content shall be adjusted as necessary until the specified compaction is obtained.

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7.2 Site Paving, Structures, and Landscaping

7.2.1 ASPHALT PAVING

1. Summary
    a. Section includes:
        i. Removal of existing asphalt concrete paving
        ii. Removal of existing asphalt concrete paving
        iii. Installation of new subbase and asphalt concrete paving
        iv. Installation of new subbase and asphalt concrete paving
2. Performance Requirements
    a. LEED
        i. Refer to Articles in General Project Requirements titled: Construction Waste Management and Sustainability Requirements for LEED requirements.
    b. Regulatory Agencies
        i. All work must comply with NYCDOT regulations and design requirements and the NYC Department of Building Code.
3. Materials and Fabrication
    a. Asphalt Materials: Generally, retain “Asphalt Binder” or “Asphalt Cement” Subparagraph below. Use of performance-graded asphalt binders has generally replaced asphalt cement.
        i. Asphalt Binder: ASTM D6373 or AASHTO M 320, performance graded.
        ii. Asphalt Cement: ASTM D3381/D3381M, viscosity graded and ASTM D946/D946M, penetration graded.
        iii. Prime Coat: Cutback asphalt or Asphalt emulsion.
        iv. Tack Coat: Emulsified asphalt.
        v. Fog Seal: Emulsified asphalt.
    b. Auxiliary Materials:
        i. Recycled Materials: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material
        ii. Herbicide.
        iii. Paving Geotextile: Nonwoven polypropylene.

c. Mixes:
    i. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20 percent or more than 25 percent by weight.
        1) Surface Course Limit: No more than 10 percent by weight.
d. Asphalt Mixes: In accordance with NYCDOT specifications
    i. Base Course: as indicated on plans
    ii. Binder Course: as indicated on plans
    iii. Surface Course: as indicated on plans
e. Emulsified-Asphalt Slurry: ASTM D3910, Type 1,2 or 3.

4. Installation
    a. Cold Milling: as indicated on plans
    b. Patching Hot-Mix Asphalt Pavement: Base mix as indicated on plans
    c. Patching Portland Cement Concrete Pavement with Hot-Mix Asphalt:
        i. Cracked slabs broken and rolled.
        ii. Rocking slabs stabilized with pumped asphalt.
        iii. Badly cracked pavement excavated and filled with base mix for full thickness of patch or partially filled with base mix and covered with surface layer.
    d. Repairs to Existing Pavements: Leveling course, Cracks and joints filled.
    e. Hot-Mix Asphalt Paving:
        i. Subgrade proof-rolled for full-depth, hot-mix asphalt.
        ii. Herbicide applied.
        iii. Apply tack coat prior to placing each course and/or lift of asphalt.
        iv. Base Course: as indicated on plans
        v. Binder Course: as indicated on plans
        vi. Surface Course: as indicated on plans
    f. Asphalt curbs.
    g. Asphalt Traffic-Calming Devices: Speed bumps
    h. Surface Treatment: Slurry seal.

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7.2 Site Paving, Structures, and Landscaping

5. Field Quality Control
    a. Testing Agency: Owner engaged.

7.2.2 CONCRETE PAVING

1. Summary
    a. A. Section includes:
        i. Removal and installation of existing concrete paving
        ii. Removal and installation of concrete curbs
        iii. Removal and installation of concrete sidewalks
        iv. Removal and installation of concrete driveways
2. Performance Requirements
    a. SUSTAINABILITY
        i. Refer to Articles in General Project Requirements titled: Construction Waste Management and Sustainability Requirements.
    b. REGULATORY AGENCIES
        i. All work must comply with NYCDOT regulations and design requirements and the NYC Department of Building Code.
3. Materials and Fabrication
    a. See Landscaping/Streetscape Specifications for other streetscape materials of construction.
    b. Concrete, General: ACI 301M.
    c. Reinforcement:
        i. Welded-Wire Reinforcement: Epoxy-coated, Deformed steel.
        ii. Reinforcing Bars: Epoxy-coated deformed steel.
        iii. Steel bar mats.
        iv. Epoxy-coated deformed steel. Joint Dowel Bars:
    d. Concrete:
        i. Portland Cement Replacement: Use fly ash, slag cement, and silica fume to reduce portland cement by 40 percent.

ii. Portland Cement: Gray or White
iii. Fly ash.
iv. Slag cement.
v. Blended cement.
vi. Normal-weight aggregate.
vii. Air-entraining admixture.
viii. Color pigment.
ix. Compressive Strength: 4,000 psi at 28 days.

e. Detectable Warnings: NYCDOT detectable warning strips for pedestrian ramps

4. Finishing and Curing
   a. Finishes: as directed by the Landscape Architect
   b. Cure concrete by moisture curing, moisture-retaining-cover curing or curing compound
5. Field Quality Control
   a. Testing: By Owner-engaged agency

7.2.3 PAVEMENT MARKINGS

1. Summary
   a. Section includes:
      i. Paint and thermoplastic reflectorized pavement markings for below grade parking garage, vehicular circulation and street repair work as required.
2. Performance Requirements
   a. SUSTAINABILITY
      i. Refer to Section 01 for Sustainable Design Requirements.
   b. REGULATORY AGENCIES
      i. All work must comply with NYCDOT regulations and design requirements and the NYC Department of Building Code.
3. Materials and Fabrication
   a. Paint and thermoplastic pavement reflectorized markings per NYCDOT and Building department requirements. Asphalt paving or concrete surfaces aged 30 days before marking.

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7.2 Site Paving, Structures, and Landscaping

b. Graphic symbols and lettering made with stencils.

7.2.4 PEDESTRIAN PAVEMENT

1. Performance
   a. A. Basic Function:
      i. Element includes but is not limited to:
         1) Walkway Design Parameters
            a) Maximum walkway slopes.
            b) Americans with Disabilities Act (ADA) compliance requirements.
            c) Jointing.
            d) Material requirements.
      ii. General Requirements:
         1) Provide complete planning and design for the construction of pedestrian pathway system through development. Sidewalks must be set to the proper cross-section, lines, grades and jointing patterns. System must consider and have accessible connections to existing and proposed pathways, bicycle paths and pedestrian bridges.
         2) Access that are to remain in use must be provided at all times.
      iii. Walkway Design Parameters:
         1) All walks must be limited to a maximum longitudinal slope of 5% and a cross slope of 2%. Ramps serving pedestrian traffic must be limited to a maximum slope of 8.33% and must have handrails, in conformance with ADA requirements.
         2) Accessible ramps must be provided per current accessibility requirements, including but not limited to the ADA requirements.
         3) Design and indicate an accessible route connecting the existing site, parking, and gathering spaces.
         4) Walkways must be designed as required per the Geotechnical Report requirements.
      iv. The Design and Construction of the Proposed Pedestrian Pathways must:
         1) Promote the use of bicycles and foot traffic.
         2) Incorporate existing pathways that are to remain.

1) Meet accessibility standards.
2) Provide for temporary pedestrian routing during construction.

2. Products

a. Materials for Walkways:

i. Follow in accordance to products described under the following DOT Specifications per the NYC DOT Street Design Manual Guidelines.

1) Concrete Pavements: Section 4.13.

2) Unit Paving: Sections 3.04 and 6.06.

3) Stone Paving: Section 6.04.

4) Stone Cobbles: Section 2.06 and 6.06.

5) Permeable Paving for Unit Paving and Concrete to follow the design standards as described in guidelines in the NYC DOT Street Design Manual.

3. Methods of Construction

a. Regulatory Requirements:

i. Methods of Construction must conform to the DOT Standard Specifications.

b. Provide walking surfaces of stairs, ramps, and walkways with a minimum static coefficient of friction of 0.60, when tested in accordance with ASTM D 2047.

c. Conflict in Requirements:

i. Where conflicts exist between reference specifications, the most restrictive specifications will apply.

7.2.5 MANUFACTURED METAL SECURITY BOLLARDS

1. Related documents

a. The following documents apply to all required Work for the Project:

i. The Design-Build Agreement.

ii. Standard Project Requirements.

iii. Specific Project Requirements.

iv. Reference documents.

v. Available documents.

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2. Summary

a. Section includes exterior metal security bollards/barriers for high security applications, generally located at building entrances and exits and including regular and retractable types.

3. Sustainability Requirements

a. Refer to Articles of General Project Requirements titled: Construction Waste Management and Sustainability Requirements.

4. Performance Requirements

a. Barriers must be K4/L2 Crash Test Certified (M30/P2 Equivalent).

b. Loading: Barrier must be designed to resist anticipated wind, seismic, and impact loads.

5. Quality Assurance

a. Manufacturer's Qualifications: Provide barrier systems that are produced by a single manufacturer with not less than 10 years of experience in the fabrication of assemblies involving quantities and complexities at least equal to those required for the construction. Manufacturer must be capable of providing field service representation during construction.

b. Installer's Qualifications: Barrier must be installed by an entity that has not less than 5 years of experience in the installation of systems involving quantities and complexities at least equal to those required for this installation and is acceptable to the barrier manufacturer.

6. Products

a. Bollards consist of retractable or non-retractable 12 -3/4 inch (323 mm) or smaller diameter, round tubular columns with full guard height as required by City standard.

b. Retractable Bollards: Below ground assembly consists of a square outer casing complete with cable and drainage duct outlets and an inner bollard of heavy steel cylindrical tube and an aesthetic polymer sleeve capable of being raised above ground into the up position.

i. When retracted the bollards are flush with the finished roadway.

ii. Control: Contains all relays, timers and other devices necessary for all the operations of the system as defined. Locate control equipment above ground within the main control cabinet.

iii. Control Cabinet: Must be sized to house all control circuits, hydraulic pump(s) and other devices for operation of system. Provide control panel with a side access panel to manual override and main power supply isolator.

1) Stainless Steel finish.

iv. Hydraulic Unit: sized as required.

v. Provide Barrier Position Sensor and weatherproof HPU enclosure

c. Bollard Finish:

i. Stainless Steel Sleeve.

d. Security Programming: Integrated into overall facility security System.

7.2.6 LANDSCAPING

1. Performance

a. Basic Function:

i. Provide all labor, tools, equipment, materials, and transportation and perform all operations necessary and incidental to proper execution and completion of all planting work to include soil preparation, fine grading, plantings of trees, shrubs, ground covers and vines.

b. Amenity and Comfort:

i. The Design-Builder must warrant that all trees, shrubs, and vines planted under this project will be healthy and in flourishing condition of active growth two (2) years from date of Final Acceptance.

c. Health and Safety:

i. Perform work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work and provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting, and installing materials.

ii. Existing Utilities:

1) Check existing utility drawings for existing utility locations. The Design-Builder to verify all existing utilities prior to construction.

2) Water supply must be tested and operational prior to planting.

3) Repair or replace existing improvements which are not designated for removal which are damaged or removed as a result of the DB operations.

iii. Observation and Inspection:

1) Observation of site agronomic soil at critical stages of work.

a) Observation for approval of landscape finish grading and soil preparation before installation of plant material.

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b) During this observation the City Engineer/ Owner's Authorized Representative may request that samples of the prepared soil be analyzed by an approved laboratory to assure its compliance with these Specifications.

iv. Soil, Plant and general items for inspection: The Design-Builder is to adhere to NYC City codes, standards and guidelines at the minimum. Provide testing for initial selection of material, during the installation for verification of quality and post installation for maintenance. Provide testing of soils for every 500 cubic yards of processed soil imported or from accepted stockpile after rough grading is complete. Provide post installation of soil tests from a minimum of four (4) locations or one (1) test for every 10,000 square feet of planted area, whichever is greater.

v. City Engineer / Owner's Authorized Representative must have the right to make periodic inspections prior to final inspection to NYC City codes, standards and guidelines. Should plant materials, installation procedures, or other conditions be observed that are not in accordance with the contract drawings or specifications, the City Engineer/ Owner's Authorized Representative must direct the DB to correct, by repair and /or replacement, as appropriate. The City Engineer/ Owner's Authorized Representative will be the sole judge of the conditions of quality and acceptability and will direct all corrections by the Design-Builder. All rejected materials must be immediately removed from the site and replaced with specified materials, at no additional cost to the Owner.

2. Products

a. Materials:

i. Soils: The Design-Builder must obtain an agricultural suitability analysis report of the existing and proposed topsoil from an accredited soils laboratory who is SSSA (Soil Science Society of America) certified. All testing costs are at the Design-Builder's cost. All testing by laboratory will be made in accordance to Association of American Plant Food Control Officials (AAPFCO) methods for testing and labeling. Testing of existing, stockpile and import soils are to be evaluated to include, but not limited to the analysis of the following:

1) Soil Texture.
2) Permeability Rate.
3) Fertility Rate.
4) pH.
5) Salinity.
6) Chloride.

7) Boron.

8) SAR (Sodium Adsorption Ratio).

9) Organic Content.

10) Nutrient Levels including, but not limited to, major nutrients such as: nitrate-nitrogen (N), extractable phosphorus (P), potassium (K).

11) Aluminum and Heavy Metals.

ii. Selection of soil type to be material of quality to provide vigorous plant growth and have a texture meeting USDA classification of Sandy Loam to Sandy Clay Loam.

iii. Selection of biofiltration soil mix to meet NYC DOT and DPR specifications.

iv. Structural soil may be used to increase soil volume in limited areas for tree planting if soil cells are not feasible as an alternative. Structural soils are to be custom blended and made from graded rock, soil, polymers, and hydrogels. The basis of structural soil formulation is based on engineered soil development by Cornell University and sold under the name of CU-Soil.

v. Submit soil analysis report and recommendations for approval of the City Engineer / Owner's Authorized Representative prior to amending existing or imported topsoil.

1) Amendment materials selected for use are to be best practices with emphasis on organic and natural materials. The use of chemical created amendments are to be discouraged.

b. Plant Materials:

i. Plant material must be nursery-grown in accordance with good horticultural practices from certified nurseries qualified to grow nursery stock. Plant material source must come from climatic conditions similar to those of project for at least two years unless otherwise specifically authorized by the Owner's Authorized Representative in writing.

1) All plant material to be grown and sized in accordance to ANSI Z60.1 Standards.

2) All trees must be symmetrical, tightly knit, so trained or favored in development and appearance as to be superior in form, number of branches, compactness, and symmetry.

3) All plant material must be grown and delivered by container and ball and burlap. The delivery of plant material by bare root is not allowed.

4) All plant material are to follow Nomenclature Standards as follows:

a) Standardized Plant names of the American Joint Committee on Horticulture Nomenclature.

b) Hortus Third, Bailey Hortorium, Cornell Owner (1976).

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ii. Plants must be sound, healthy, vigorous, well-branched and densely foliated when in leaf. They must be free of physical damage or adverse conditions which would prevent thriving growth.

iii. All plant materials must comply with Federal and State laws requiring inspection for plant disease and pest infestation. Inspection certificates required by law must accompany each shipment of plants. Plants are to be free of disease, insect pests, eggs, or larvae, and must have healthy, well-developed root systems.

iv. Delivery of sizes of material to be provided as minimum sizes:

1) Street trees: As identified in DOT and NYC DPR standards.

2) Site trees:

a) Shade trees: 3 1/2 inch caliper minimum.

b) Flowering trees: 50 gallon minimum.

3) Groundcovers: 1 gallon minimum.

4) Small shrub: 3 gallon minimum.

5) Large shrub: 5 gallon minimum.

v. Planting Accessories:

1) Tree stakes, tree tie, root barriers, guying materials, bark mulch for top dressing: Tree must be secured with tree ties per NYC City DOT and DPR standards.

2) Soil cells: Structural reinforcing framing system specifically designed to suspend pavements and allow the installation of uncompacted loamy soils for plant growth. The basis of design is to follow a system of products developed by Deeproot Systems sold as Silva Cell or an approved equal system.

3. Methods of Construction

a. Preparation:

i. After approximate finished grades have been established, soil must be conditioned and fertilized as recommended by the agronomic soils report. Soil should be slightly damp, but not muddy during rototilling.

ii. Construction debris must be removed at the time of planting, the top 12 inches of all soil designated to be planting areas must be free of stones, stumps, earth clods, or other deleterious matter 1 inch in diameter or larger, and must be free from all plastic, wire, plaster, obvious foreign matter or similar objects that would be a hindrance to planting or maintenance. The top 12 inches of soil must be free of all stones, stumps or other deleterious matter 3 inches diameter or larger.

iii. Perform weed removal if live perennial weeds exist, applied by an approved licensed pest control advisor and applicator per City Standards.

iv. Soil is to be prepared per agronomic Soils report.

v. Soil is to be uncompacted in planting areas after grading and paving operations are completed.

b. Installation:

i. Perform actual planting only when weather and soil conditions are suitable and will not be detrimental to the plant material.

1) Soil volume for tree planting for streetscape improvements to be in accordance to DOT and Parks Department for streetscape plantings.

2) Soil volume for trees planted within project site boundaries provide uncompacted planting soil equal to 1 cubic feet to 3 cubic feet of soil for every 1 square feet of projected mature tree canopy diameter.

3) Soil depth for planting zones to be equal to the following:

a) Trees 3 to 4 feet depth.

b) Shrubs and groundcover 2 feet depth.

c) Groundcover 1 to 1.5 feet depth.

d) Lawn 1 foot depth.

4) All planting beds and tree growth zones must be compacted no greater than 80% relative compaction.

ii. Plants are to be installed per City Standards.

iii. Plants are to be fertilized at regular intervals per City Standards and per manufacturer's recommendations. Fertilizers must be applied by a licensed professional. The Design-Builder must confirm qualifications.

iv. Plants must not be pruned before delivery.

1) Trees must stand erect without support. Trees which have damaged or crooked leaders, or multiple leaders, unless specified, will be rejected.

2) Trees with abrasions of the bark, sun-scalds, disfiguring knots, or fresh cuts of limbs over 3/4 inch which have not completely callused, will be rejected.

3) Field pruning of trees to follow standards in accordance to ANSI Z133.1-2000.

v. Tree Care Standards: ANSI A300 - Standards for Tree Care Operations.

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vi. Watering of Plants:

1) Keep planted areas moist during the planting and establishment period. Provide whatever system is necessary to provide adequate water during the planting and establishment period without causing erosion detrimental to the planting area. Water plants immediately after planting.

c. Cleaning:

i. After all planting operations have been completed; remove all trash, excess soil, empty plant containers and rubbish from the property.

7.3 Temporary Stormwater Pollution Control

7.3.1 TEMPORARY STORM WATER POLLUTION CONTROL

1. Summary
    a. Section includes:
        i. Installation of temporary soil erosion and sedimentation control devices
2. Performance Requirements
    a. LEED
        i. Refer to Section 01 for Sustainable Design Requirements.

    b. Regulatory Agencies
        i. All work shall comply with NYCDEP and NYSDEC regulations and design requirements and the NYC Department of Building Code.
    c. Informational Submittals
        i. NYSDEC Stormwater Pollution Prevention Plan (SWPPP) and Notice of Intent: Within 15 days of date established for initiation of the Work, submit completed SWPPP and Notice of Intent.
        ii. If applicable, EPA authorization under the EPA's "2017 Construction General Permit (CGP)."
        iii. Stormwater Pollution Prevention Plan (SWPPP) Training Log: For each individual performing Work under the SWPPP.
        iv. Inspection reports.
        v. Obtaining Long Island Well Permit if dewatering is required.
3. Materials and Fabrication
    a. Temporary Stormwater Pollution Controls
        i. Provide temporary stormwater pollution controls as required by the SWPPP.
            1) Devices include but not limited to:
                a) Hay bales / fabric logs
                b) Silt fences
                c) Catch basin infiltration screens
                d) Desilting devices
        ii. Soil Erosion/Sedimentation Control – SWPPP/NOI/MS4

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7.3 Temporary Stormwater Pollution Control

1) Since we are disturbing more than 1-ac of ground surface a NYSDEC Storm Water Pollution Prevention Plan and Notice of Intent documents need to be prepared by the Design Builder and approved prior to start of work.
2) These documents will denote limits of work and specific devices which should be installed and maintained by the contractor or the Design Builder during construction.
3) An MS4 permit will also be needed and accepted prior to start of construction and approved by NYCDEP.
4) Provide temporary drainage plans during construction and staging plans.

7.4 Stormwater Conveyance

7.4.1 STORMWATER CONVEYANCE

1. Performance Requirements
2. Materials and Fabrication
    a. Piping
        i. All stormwater conveyance, piping and components shall be incompliance with NYCDEP and NYS Building Code specifications and requirements.
        ii. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: Extra-Heavy, Service class. Complies with NSF certification
        iii. Ductile-iron, push-on and mechanical joint pressure pipe and push-on mechanical-joint standard fittings.
        iv. Corrugated-Polyethylene pipe and fittings. HS-20 loading
        v. Concrete Pipe and Fittings: Reinforced concrete sewer pipe and fittings.
    b. Components
        i. Cleanouts: Cast iron
        ii. Encasement for Piping: HDPE film.
        iii. Manholes: precast or cast-in-place concrete
        iv. Resilient pipe connectors.
        v. Cast iron manhole frames and covers.
        vi. Catch Basins: precast or cast-in-place concrete.
        vii. Ductile and cast-iron frames covers and grates.
        viii. Stormwater Detention Structures: HDPE, HS-20 loading, Cast-in-place concrete with ductile and cast-iron manhole frames and covers.

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7.5 Planting Irrigation

7.5.1 PLANTING IRRIGATION

1. Performance
    a. Basic Function:
        i. Provide complete installation of the automatic irrigation system for both on grade and on structure using the materials and installation practices depicted within these scoping documents and in accordance with all applicable codes and municipal or governmental requirements.
        ii. Work includes a fully functioning irrigation system consisting of furnishing transportation, labor, materials, equipment, and incidental services necessary to construct an irrigation system and future using water services available to the project including, domestic and reclaimed water.
        iii. The Design-Builder's bid shall include all materials and services referenced in the project drawings and these specifications, and shall be responsible for review and completion of all these specification instructions, City Standards when applicable as required herein. The Design-Builder shall confirm all applicable standards prior to construction for all areas including Right of Way areas within the project limits of work and all on structure landscape areas.
        iv. Irrigation shall be prepared to utilize irrigation industry design standards, calculations, and criteria, including but not limited to the following: precipitation rates, flow rates, head spacing, and coverage, nozzle size and defined water window time frame. The Design-Builder shall be responsible for ensuring the installation of a complete and operating automatic irrigation system that meets or exceeds the design intent, standards, and parameters required by the Design-Builder project drawings and specifications.
    b. Amenity and Comfort:
        i. Existing Utilities:
            1) Exercise care in excavating and working near existing utilities. The Design-Builder shall be responsible for damages to utilities that are caused by Design/Builder's operations or neglect. Check existing utility drawings for existing utility locations. The Design-Builder to verify all existing utilities before beginning construction.
        ii. Repair or replace existing improvements not designated for removal, which are damaged or removed as a result of the Design-Builder's operations. When a portion of a sprinkler system must be removed, the remaining lines shall be capped. Repairs and replacements shall be at least equal to existing improvements and shall match them in finish and dimension.
        iii. Costs for protecting, removing, and restoring existing improvements shall be included in the Design-Builder's bid.

c. Health and Safety:

i. Services and Coordination:

1) Water and Power Service: Service connection points shall be as shown on Design-Builder project drawings unless otherwise directed by the utility company. Reclaimed water connection shall be taken into account when locating main irrigation equipment on site for an easy change over from potable water to the reclaimed water connection.

2) Permit and Fees: The Design-Builder shall obtain and pay for any and all permits and all inspections required by permits.

3) Coordination: Coordinate the irrigation installation with other Sub-contractors including paving, utilities, site backfilling, landscape grading and landscape work.

ii. Ordinances and Regulations: All local and state laws, rules, codes, guidelines and regulations governing or relating to any portion of this work are hereby incorporated into and made part of these specifications.

iii. Inspections: Notify the Owner's Authorized Representative as required by NYC City Codes, Standards, and Guidelines.

iv. Water harvested from operations of site and building operations such as stormwater runoff, condensate, or other harvesting options to be clean and suitable for irrigation use. The Design-Builder in development of an on-site water harvest and irrigation system to include all necessary equipment for a particle and trash filtration, sterilization of water for both biological and chemical contaminants.

1) The quality of the water to follow the most stringent measures health code addressing the biological and chemical allowances without damaging plant material and irrigation system. Analysis of water is to assess the following:

a) Volatile Organic Compounds (VOC)

b) Semi-volatile Organic Compounds (SVOCs)

c) Multi-Range Total Petroleum Hydrocarbon (TPH)

d) Heavy Metals

e) Petroleum Products

f) Herbicides

g) Pesticides

h) Organic Acids

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7.5 Planting Irrigation

i) Total Coliform and E. Coli

j) Heterotrophic Bacteria

k) pH, pHc, ECw, TDS, SAR and Adjusted SAR, Hardness

l) Cations (Sodium [Na], Calcium [Ca], Magnesium [Mg], Potassium [K], Ammonium [NH_4], Ammoniacal nitrogen [NH_4-N])

m) Anions (Chlorine [Cl], Sulphate [SO_4], Bicarbonate [HCO_3], Carbonate [CO_3], Nitrate [NO_3], Nitrate nitrogen [NO_3-N], Phosphorus [PO_4-P])

n) Copper [Cu], Zinc [Zn], Manganese {Mn], Iron [Fe], Boron [B], Molybdenum [Mo]. Aluminum [Al]

2. Producs

a. Materials (not complete list):

i. If all of the NYC City, Codes, Standards, Guidelines, and Basis of Design for project are met, manufacturers of irrigation components with acceptable equipment model, series, size, and designation, shall be submitted for approval by Owner's Authorized Representative.

ii. All irrigation equipment shall be for use with a reclaimed water system for planting locations suitable for reclaimed water use. In locations where urban farming water quality assessment and testing is to be done on water to assure suitability. All reclaimed water services Color and signs per code. No mar-flex is to be used.

iii. Pipes, Tubes, and Fittings:

1) Copper Tubes: Complying to ASTM B88, Type L and M for soft and hard copper. Copper piping is for all exposed pipe above grade and not protected from sunlight and is to be insulated for extreme temperature conditions. Copper pipe to be used for irrigation water services that run through building and are part of the internal plumbing of building. Installation to follow in accordance to building plumbing code.

2) PVC: Complying to ASTM D 1785. Fittings complying to ASTM D 2466 for socket and threaded. PVC piping for installation below grade installation.

3) PVC Pressure Rated: Complying to ASTM 2241, PVC 1120 compound. Fittings complying to ASTM D 2467. PVC piping for installation for below grade installation.

4) Piping Joining Materials

a) Metal, Pipe-Flange Bolts and Nuts: Complying to ASME B18.2.1.

b) Brazing Filler Metals: Complying to AWS A5.8/A5.8M.

c) Solder Filler Metals: Complying to ASTM B32.

d) Solvent Cements for Joining PVC Piping: Complying to ASTM D2564.

iv. Manual Valves:

1) Curb Valves: Complying to AWWA C800. Pressure rating matching design pressure of irrigation system. Body material brass or bronze with ball or ground-key plug. End connections matching piping.

2) Curb-Valve Casing: Similar to AWWA M44 for cast-iron valve casing or City Standard.

3) Brass or Bronze Ball Valves: Complying to MSS SP-110.

v. Pressure-Reducing Valves

1) Water Regulators: Standard ASSE 1003 Bronze.

2) Water Control Valves: Pilot-operation diaphragm-type, single-seated main water control valve. Complying to AWWA C550 or FDA approved product.

vi. Master Remote Control Valve: Master remote control valve shall be constructed of brass and have brass drain cock for manual operation and include an associated decoder.

vii. Automatic Control Valves: Pressure regulating with ball valve upstream of the valve brass flow stem and manual bleed petcock. Valve to include decoder connection, and solenoid for 24V. Control valve shall be installed with appropriate decoder.

viii. Automatic Drain Valves: Spring loaded-ball type corrosion-resistant construction.

ix. Boxes for Automatic Control Valves:

1) On Grade Conditions: Polymer-Concrete Boxes and Covers. Installation in locations adjacent to plazas and high pedestrian traffic.

2) On Structure Conditions: Plastic Boxes.

x. Irrigation Water Delivery Devices:

1) Sprinklers: Designed for uniform coverage of designated area. Construction of ABS and corrosion resistant metals. Function pop-up, gear-driven rotary.

2) Drip System. Corrosion resistant plastic housing, with FIPT/MIPT connections with removable stainless steel screen and integral flush valve with house threads. Includes pressure regulator, end flush valve and air/vacuum relief valve.

Total Site Construction

7.5 Planting Irrigation

xi. Controller, electrical supply and controller enclosure: if no guideline exists that is current and appropriate the baseline shall be a quality commercial controller, a smart controller with full weather sensing system (with an active subscription), soil moisture, ETO (potential evapotranspiration) controlled for hydrozone adjustments and the capability to monitor flow rates of the irrigation system. Controller enclosure placed outside shall be constructed of stainless steel and UL and NEMA Listed and is secured by approved latch and lock system.

xii. Backflow: The irrigation system shall be equipped with a proper UPC approved backflow prevention device in accordance with local code for either irrigation system service by domestic or reclaimed water service.

xiii. Control Wiring (Two-Wire Path):

1) Wiring Type: Twisted pair, solid core, color coded black/white with each conductor in a polyethylene jacket suitable for direct burial. Wire selection compatible for complete system with controller and valve decoders.

2) Wiring installed within building structure to installed within conduit in accordance to electrical code.

3) Controller Charts: Charts shall be turned over to the Owner's Authorized Representative at the conclusion of the project.

a) Show the areas controlled by the controller valve sequence. Make the chart legible. The chart shall be a black digital bond print with a different color that shall indicate the area of coverage for each station. When completed and approved, hermetically seal the chart between two (2) pieces of plastic, each piece being a minimum of 10 mils.

xiv. Miscellaneous Components:

1) Booster Pumps: Self-regulating pump system to provide uniform pressure of irrigation system. Equipment to meet plumbing and electrical code. Equipment to be protected in enclosed facility either within building or designated exterior location. Exterior enclosure shall be constructed from stainless steel and is UL listed and is secured by approved latch and lock system.

2) The Design-Builder in development of a site water harvest and irrigation system to include all necessary infrastructure for the purification of water for irrigation use. Equipment is to remove particles and trash, and provide sterilization for biological and chemical contaminants within the harvested water. Equipment to be located near water source and sized to adequately process the amount of irrigation water needed for the project. Equipment to be UL listed and be protected in an enclosed facility within the building or designated exterior location.

3. Methods of Construction
   a. Installation:
      i. Coordinate Product Delivery, Storage, and Handling: Permission to store materials on site shall be obtained from the Owner's Authorized Representative. Install irrigation components in accordance with the manufacturer's written recommendations and reference specifications.
      ii. Irrigation system shall be designed and installed with consideration for differing plant types, topography, sun, shade, and wind, etc.
      iii. Trench excavating and backfill, and inspection of trenches shall be per NYC City Codes, standards and guidelines.
      iv. Install a complete automatic irrigation control system. Control system to be certified by the manufacturer. Submit certification to the Owner's Authorized Representative.
      v. Quick coupling valves are to be located every 80 to 100 feet along the irrigation mainline or per NYC City codes, standards and guidelines.
      vi. The irrigation system once installed and shall not spray water on structures, walks, and roadways at any time. Adjust and balance each section or unit with section control valves fully open to obtain uniform and adequate coverage.
         1) Irrigation System Testing per NYC City codes, standards and guidelines.
         2) Final Inspection and Operational test prior to Acceptance per NYC City Codes, Standards and Guidelines.
      vii. Make repairs, replacements, and adjustments until equipment, electrical work, controls, and instrumentation are functioning as specified. Inspection for final acceptance of the irrigation system shall occur together with inspection for final acceptance of plantings at end of the plant establishment period as specified in LANDSCAPING. Items deemed not acceptable by the Owner's Authorized Representative shall be reworked to the satisfaction of the Owner's Authorized Representative.
      viii. Cleanup shall be made as each portion of the work progresses. Remove refuse and excess dirt from the site. Walks and paving shall be broom swept or washed down daily, and damage done on the work of others shall be repaired to the satisfaction of the Owner's Authorized Representative.

Total Site Construction

7.6 Site Furnishings

7.6.1 SITE FURNISHINGS

1. Performance
    a. Basic Function:
        i. Provide furnishings and install all exterior site furniture including related work.
    b. Amenity and Comfort:
        i. Products must meet applicable design codes, standards, health and safety standards as required by the NYC City.
        ii. City standards for site furnishing shall take precedence in all project landscape areas, within right-of-way (ROW) streetscape areas. If a standard does not exist or is not appropriate for project application, the information below must be used as a baseline for selection.
    c. Health and Safety:
        i. All site benches and trash receptacles must be appropriate for all users including persons with disabilities per Americans with Disabilities Act Accessibility Guidelines (ADAAG).
    d. Security:
        i. If site furnishings are used as part of the physical security such as vehicular barriers, the locations and design of such components shall have to be coordinated with appropriate physical security performance requirements as designated in the security plans. In the absence of any specific performance criteria, these vehicular barriers shall satisfy M50/P1 crash rating as defined by ASTM F2656. Alternatively, the Design-Build team might elect to undertake vector analyses to determine the maximum attainable speed based on site constraints including topology and geometry. The vector analyses shall consider a 7.5-ton single unit truck with different attack trajectories.
2. Products
    a. Materials:
        i. The Design-Builder must use high quality, durable, and vandal-resistant materials for site furnishings. The materials selected for site furnishings is to have finishes and colors that are part of the overall design theme, approved by Owner's Authorized Representative, and are appropriate for use and compliant to security requirements. The materials in the fabrication of the site furnishing to include the following:
            1) Precast concrete for full fabricated elements or for veneers
            2) Architecture poured-in-place concrete
            3) 316 Stainless Steel

4) Metal products with high performance and scratch resistant coatings
5) Granite and similar hard stones for full fabricated elements or for veneers
6) Reclaimed wood

ii. The use of GFRC, all wood fabrication, untreated metal products, composite lumber products are not acceptable.

b. Site Furnishing Types:

i. Benches: All benches must include bolt down/mounting accessories.

ii. Trash Receptacles: The trash receptacles are to include removable trash inserts, ash/trash combination lids and bolt down/mounting accessories. Recycling and compost receptacles shall be furnished per City requirements.

iii. Planters: The Design-Builder must provide planters that are adequately sized for proposed planting and can be provided as fixed (permanent) modular units per NYC DOT standards or constructed planter. Planters must include all necessary blockouts for irrigation and drainage.

iv. Bicycle Racks: Style and type to be compliant to City standards and match other approved site elements and architectural elements approved for this project, as approved by Owner's Authorized Representative.

v. Bollards must be either illuminated or non-illuminated based on design program for lighting and security. If the bollards are used for security purposes, they are to meet performance requirements as outlined in security plans and specifications.

3. METHODS OF CONSTRUCTION - NOT USED

7.6.2 MANUFACTURED METAL SECURITY BOLLARDS

1. Summary
   a. Section includes exterior metal security bollards/barriers.
2. Performance Requirements
   a. Barrier shall be K4/L2 Crash Test Certified (M30/P2 Equivalent).
   b. Loading: Barrier must be designed to resist anticipated wind, seismic, and impact loads.
3. Quality Assurance

Total Site Construction

7.6 Site Furnishings

a. Manufacturer's Qualifications: Provide barrier systems that are produced by a single manufacturer with not less than 10 years of experience in the fabrication of assemblies involving quantities and complexities at least equal to those required for the construction. Manufacturer shall be capable of providing field service representation during construction.

b. Installer's Qualifications: Barrier must be installed by an entity that has not less than 5 years of experience in the installation of systems involving quantities and complexities at least equal to those required for this installation and is acceptable to the barrier manufacturer.

7.7 Landscape Maintenance

7.7.1 LANDSCAPE MAINTENANCE

1. Performance
    a. Basic Function:
        i. This element describes the requirement to maintain the landscape in an attractive condition as specified for a period of two (2) years.
        ii. Continuously maintain planted areas involved in this project during the progress of the work and during the maintenance period until Final Acceptance of the work by the Owner's Authorized Representative. Qualifications: Work force - the Design-Builder shall be experienced in landscape maintenance and shall have received an education in ornamental horticulture.
    b. Operation and Maintenance:
        i. Warranty: The Design-Builder shall warrant that all plant material will be healthy and in flourishing condition of active growth one (1) year from date of Final Acceptance after the two (2) year maintenance period.
2. Products
    a. Materials:
        i. Materials used shall either conform to the planting or shall otherwise be acceptable to the Owner's Authorized Representative.
        ii. The Owner's Authorized Representative shall be given monthly record of all herbicides, insecticides, and disease control chemicals used.
        iii. Top dress fertilizer shall be determined by the soils analysis provided by the Design-Builder and shall be mixed by a commercial fertilizer supplier.
3. Methods of Construction
    a. Start of Maintenance Period:
        i. Do not start the maintenance period until construction, planting, and irrigation for the entire Project are complete.
        ii. Make a written request to the Owner's Authorized Representative for review after all planting operations have been completed per contract Documents. Such review is for the purpose of establishing the two (2) year maintenance period.
        iii. Progress Reviews: Normal progress reviews shall be requested by the Design-Builder from the Owner's Authorized Representative.

Total Site Construction

7.7 Landscape Maintenance

iv. Final Acceptance: Landscape areas will be accepted by the Owner's Authorized Representative upon satisfactory completion of all work, including the maintenance period, but exclusive of replacement of plant materials under the warranty period.

v. Improper maintenance or possible poor condition of any planting at the termination of the scheduled maintenance period may cause postponement of the final completion date of the project. Continue maintenance until work is acceptable.

7.8 Vegetated Roof Assembly

7.8.1 VEGETATED ROOF ASSEMBLY

1. Performance
    a. Basic Function:
        i. Provide vegetated roof planting system to be installed on building roofs including related work. Vegetated roof systems include but are not limited to the following roof planting systems for Queens Garage:
            1) Extensive Vegetated Green Roof
            2) Urban Farming Planters
    b. Amenity and Comfort:
        i. Products shall meet applicable design codes, standards, health, and safety standards as required by New York City.
        ii. City Standards for vegetated roof buildup and performance take precedence. If standards do not exist or are not appropriate for project application, the information below shall be used as a baseline for selection.
        iii. The Design-Builder shall warrant that all trees, shrubs, groundcovers, ornamental grasses, and vines planted under this project will be healthy and in flourishing condition of active growth one (1) year from date of Final Acceptance. All other vegetated roof components are to be included under full system warranty of building waterproofing system.
    c. Health and Safety:
        i. Perform work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work and provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting and installing materials.
        ii. The Design-Builder is to coordinate the installation of vegetated roof components with other building installations including but not limited to waterproofing, utility services and drainage.
        iii. Observation and Inspection:
            1) Observation of planting soils at critical stages of work.
                a) Observation for approval of landscape finish grades and soil preparation before the installation of planting and irrigation.
                b) Testing of soils to verify delivered material meets weight loads and percolation rates.

Total Site Construction

7.8 Vegetated Roof Assembly

c) During this observation, the Owner's Authorized Representative may request that samples of prepared soil be analyzed by an approved laboratory to assure its compliance with these Specifications.

iv. Owner's Authorized Representative shall have the right to make periodic inspections prior to final inspection to NYC City codes, standards, and guidelines. Should plant materials, installation procedures, or other conditions be observed that are not in accordance with the contract drawings or specifications, the Engineer/ Owner's Authorized Representative shall direct the Design-Builder to correct by repair and/or replacement as appropriate. The Owner's Authorized Representative shall be the sole judge of the conditions of quality and acceptability and will direct all corrections by the Design-Builder. All rejected materials shall be immediately removed from the site and replaced with specified materials, at no additional cost to the Owner.

d. Standards:

i. ANSI/SPRI VF-1 - External Fire Design Standard for Vegetative Roofs.

ii. ANSI/SPRI RP-14 - Wind Design Standards for Vegetative Roofs.

iii. ASTM E2400-06 Standard Guide for Selection, Installation, and Maintenance of Plants for Green Roof Systems.

2. Products

a. Materials:

i. Vegetated Roof System Descriptions:

1) Extensive Roof: Vegetated roof system integral to building envelope inaccessible to public, utilizing custom drainage composites, lightweight planting soils, irrigation and plant materials.

a) Soil Depth: 6 inches.

2) Farmer/Agricultural Farming: On structure planting system for growing vegetables or approved urban horticultural planting. Areas are to be accessible for use by public or as determined by DOT. Planting system will require custom drainage composites, lightweight planting soils specifically blended for vegetable or designated plant material farming, controlled irrigation system.

a) Soil Depth: 18 inches minimum.

ii. System Components General:

1) Provide components of the assemblies for vegetated roofs under a single vendor or approved system provided multiple vendors for various components and will be accepted under a full system warranty.

iii. Drainage Composites:

1) Drainage systems including drain boards, water retention systems for both horizontal and horizontal applications are to be consistent to building waterproofing system.

a) Protection and rootbarriers to control root damage to roof system waterproofing. High performance and is part of the waterproofing manufacturers products for greenroof systems.

b) Drainage composites to be used are not to impede drainage of planting assemblies and are to be integrated waterproofing and building drainage structures.

c) Custom drainage composites that are proposed as part of the storm water harvesting or management to be adequately designed to performance requirements as determined in stormwater management strategies by the Design-Builder.

d) Selected composites to control the hydration of all planting soils.

iv. Manufactured Soils:

1) The Design-Builder to contract the development of lightweight soils from a company who specializes in the development of soils for vegetated roofs. The project will use a single blender for all soils for use on the project.

a) The Design-Builder shall obtain lightweight-engineered planting soils suitable for each type of planting condition. Soils are to be engineered to weight restrictions associated to structural loads of building.

i) ASTM E 2399: Maximum Media Density. Weight as coordinated with structural engineer for live and dead loads.

b) Soils to be engineered to manage permeable rates for storm water management.

i) ASTM E 2399: Maximum Media Water-Retention. Percent volume as determined for good plant health and stormwater retention for stormwater management.

ii) ASTM E 2399: Water Permeability. Allowable rate suitable for good plant health and stormwater management.

c) Soils should be preblended with appropriate nutrients for plant growth before delivery to site.

i) ASTM F 1647: Organic Material Content. Suitable for good plant health.

Total Site Construction

7.8 Vegetated Roof Assembly

ii) Chemical Properties: Blended for good plant health and address suitable levels associated for but not limited to the analysis of the following:

(1) pH.

(2) Nitrogen.

(3) Phosphorous.

(4) Potassium.

(5) SAR.

(6) Boron.

(1) Aluminum and Heavy Metals.

v. Irrigation:

1) Follow in accordance to requirements under specification for PLANTING IRRIGATION.

vi. Plant Materials:

1) Follow in accordance to requirements under specification for LANDSCAPING.

vii. Accessories:

1) Soil Retainers: Roof assembly manufacturer's proven products suitable for use. Made from stainless steel metal with drainage opening.

2) Flashings: Flashing system to secure vertical drainage profiles in place and protect waterproofing. Made of stainless-steel metal.

3) Stainless Steel Access Boxes: Manufacturer or custom fabricated metal inspection and access panels/chambers for use to inspect roof drains and building utilities.

4) Stainless Steel Maintenance Edging and Surfaces. Gravel/Ballast or rooftop pavers.

3. Methods of construction

a. Preparation

i. Perform installation of vegetated roof assemblies once site is acceptable and conditions of installation are suitable.

1) Confirm that all planter walls, curbs and support systems and complete and are waterproofed.

2) Confirm that the waterproofing assembly is watertight. Provide verification of inspection and testing prior to continuation of installation of vegetated assemblies. Confirm that the area for installation of planting has been flood tested in accordance to ASTM D 5957.

3) Confirm area is clean and no debris that can compromise installation of the system.

4) Install components when weather conditions are optimal for installation.

b. Installation

i. Protection Course: Installation of waterproofing and protection assemblies in accordance to manufacturers specifications.

ii. Vegetated Roof Assemblies: Install all aspects of assembly in accordance to manufacturer's specifications and requirements including:

1) Install of drainage composites and associated green roof water retention and moisture control systems.

2) Access boxes set to the finish grades of planting.

3) Flashings / Soil Retainers.

4) Soils.

5) Irrigation.

iii. Planting Operations: Installation of planting material shall follow in accordance to specification LANDSCAPING with the following modification.

1) Perform actual planting once soil and irrigation is firmly installed and set to finish grade.

2) Install plants in accordance to manufacturer's requirements and to any specific requirements per NYC City and DPR Standards.

3) All plants are to be cleaned, pruned and prepared before delivery to roof structure for installation to minimize debris removal.

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AUGUST 2020

VOLUME 3 / PART B

Project Schedule

Queens Garage & Community Space

QN NYC Borough-Based Detention centers Program

A DESIGN-BUILD PROGRAM

PIN: 8502020 CR 0040 P-42 P

NYC DDC Department of Design and Construction

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Table of Contents

Introduction

1.1 Project Schedule

Development of the overall Project Site is contractually structured and scheduled to be performed in three Design-Build Phases. The first phase involves the present Contract to capture a portion of the existing municipal parking lot in order to construct a new municipal Parking Garage and Community Space. This Contract will be followed by two subsequent Design-Build Contracts, respectively, to dismantle the existing Queens Detention Center and then Design- Build a new Queens Detention Facility.

Acquisition of the remainder of the Municipal Parking Facility being used for public parking on this block during construction of the Parking Garage and Community Space is essential in order to construct the new Detention Facility, since this Parking Facility lies within the footprint of the new structure.

Under this Contract, the Design-Builder will be allowed a not-to-exceed total of 595 Consecutive Calendar Days (CCDs) from the date of issuance of a Notice to Proceed to the date of Substantial Completion of the Design-Build of the new Parking Garage Facility and Community Space. It is essential that the Design-Builder apply its expertise and innovative techniques in the development of a Design-Build approach that meets or is less than this 595 CCD Contract duration, thereby mitigating the potential for delays to the subsequent Design-Build efforts on this site while optimizing the availability of public parking throughout the construction process.

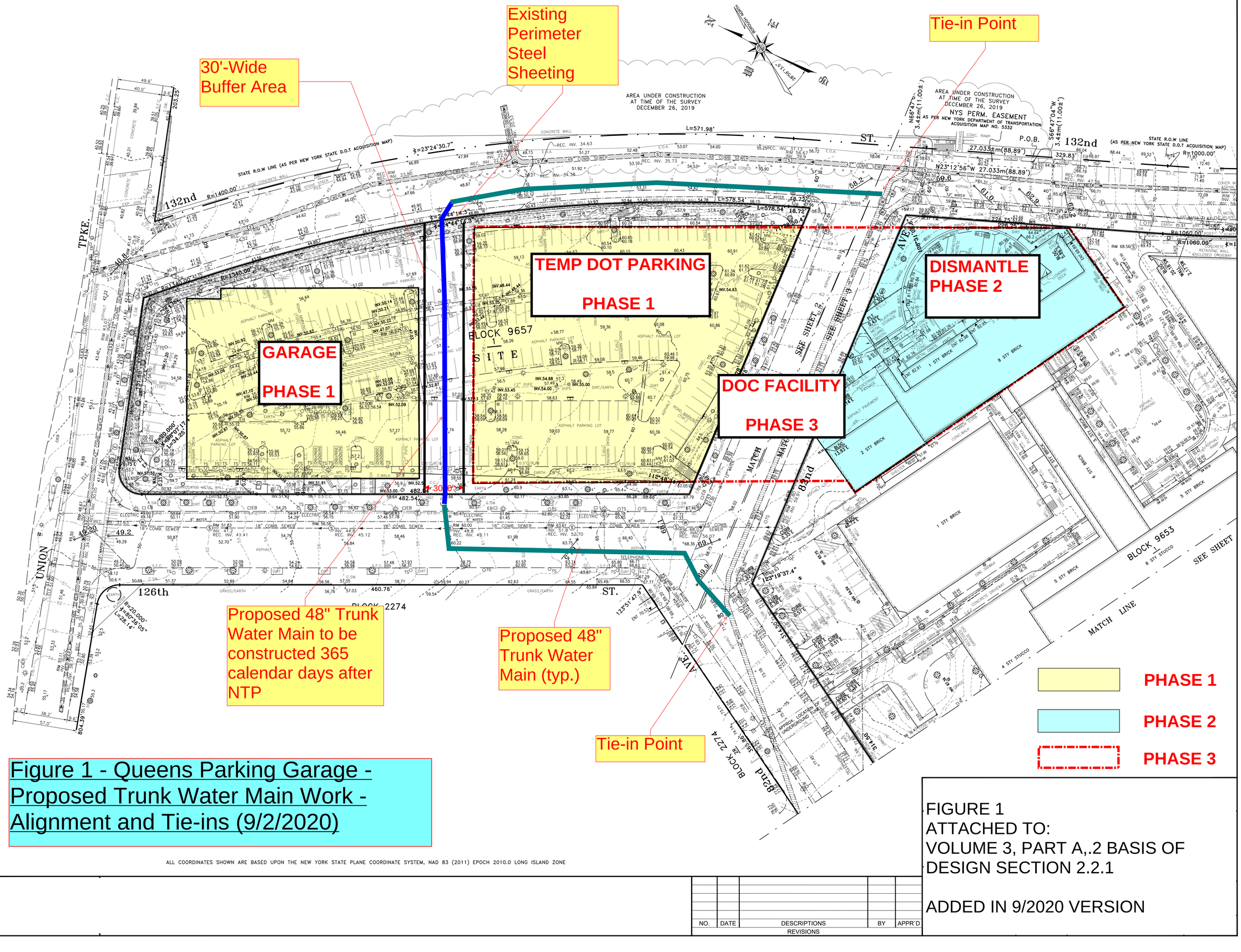

Figure 1 - Queens Parking Garage - Proposed Trunk Water Main Work - Alignment and Tie-ins (9/2/2020)

ALL COORDINATES SHOWN ARE BASED UPON THE NEW YORK STATE PLANE COORDINATE SYSTEM, NAD 83 (2011) EPOCH 2010.0 LONG ISLAND ZONE

NO.	DATE	DESCRIPTIONS	BY	APPR'D
		REVISIONS		

FIGURE 1
ATTACHED TO:
VOLUME 3, PART A,.2 BASIS OF DESIGN SECTION 2.2.1

ADDED IN 9/2020 VERSION

Addendum to the Specific Project Requirements

A. References in the Specific Project Requirements to a quantity of "two" elevators to service the community space portion of the Project, including in Article 2.2.2(3)(d) of Part A, Section 2, are deemed deleted solely with respect to the quantity of elevators in the community space and not with respect to other technical and performance or other requirements for such equipment and transportation. The quantity of elevators provided in the DB Proposal Commitments will govern as the minimum quantity required by the Project Requirements for the community space.
B. References in the Specific Project Requirements to "natural gas" service being required to service the garage and community space are deemed deleted, including in Article 6.3(6) of Part A, Section 2, and Articles 6.1(1)(d), 6.1(1)(x) and 6.2(5)(f)(iii)(5) of Part A, Section 3. The Design-Builder will provide electrical service for the same as otherwise required by the Project Requirements, the NYC Building Code and the DB Proposal Commitments.
C. The Specific Project Requirements are modified as follows:
    a. The Design-Builder will design and construct the Project to provide the City a pathway to increase the electrical service capacity to the community space in the future such that the community space may support a commercial kitchen in the future, at the City's option. Design-Builder's Work includes designing and constructing the Project to include:
        i. space in the electrical service room for a new or expanded switchboard;
        ii. empty conduits and additional points of entry from the Con Edison vaults;
        iii. coordination with Con Edison on the appropriate vault size; and
        iv. empty conduits from the electrical service room to the ground floor of the community space sufficient to support a future commercial kitchen.
    b. Upgrades to the electrical capacity are anticipated to be performed by Other Contractors and are not included in the Project Requirements or Design-Builder Proposal Commitments for the Project).