3.6 c - Phenolic Core Toilet Compartments
   • Phenolic-core toilet enclosures - all restrooms
   • Phenolic-core urinal screens - all restrooms

3.6 d - Wire Mesh Partitions
   • Standard and heavy duty partitions, ceilings railing insert panels, and equipment barriers - CBP secondary.

3.6 e - Wall and door protection
   • Wall and column corners - 4'-00" high

3.6 g - Toilet, Bath, and Laundry Accessories
   • Standard commercial units.
   • Detention Toilet Accessories

3.6 h - Fire protection
   • Fire-protection cabinets
   • Recessed fire-protection cabinets in gypsum walls.
   • Security fire-protection cabinets
   • Portable fire extinguishers.

3.6 i - Metal lockers
   • CBP: standard double stack (36"h x 12"w x 18"d)
   • Cylinder locks.
   • Locker Benches.
   • CBP: changing bench(es)

3.7 Equipment

3.7 a - Parking Control Equipment
   • Power and data provision for 3 access control to be provided by Operator.

3.7 b - Detention Gun Lockers
   • Secure compartment for fire arms. - CBP Secondary.

3.7 c - Unit kitchens
   • Standard wood types and plastic-laminate.
   • Kitchen unit CBP; with lockable cabinets
   • Kitchen unit offices GPH
   • Kitchen unit Operations offices

3.7 d - Detention Gun Lockers
   • Rifle-rated Clearing Barrel Weapon cleaning room CBP

3.8 Furnishings
3.8 a - Manufactured wood-veneer-faced Casework
Attachment 1 of Appendix L

- Information desk in main lobby

3.8 b - Manufactured Plastic-Laminate-Clad Casework
- 40 Check-in counters on second floor
- CBP primary : 16 counters
- CBP secondary : podium
- Small kitchens
- Agriculture lab CBP

3.8 c - Entrance Floor Mats and frames
- Main entrance lobby
- Debarkation entrance
- Embarkation doors to the concourse
- Main entrance CBP
- Exit secondary CBP
- Exit Primary CBP

3.8 d - Audience seating
- Waiting area

3.9 Conveying Equipment
3.9 a - Machine Room-Less Electric Traction Passengers Elevators
- Main Lobby 3 elevators 5,000 lb (1 elevator with higher ceiling)
- Debarkation 2 elevators 5,000 lb

3.9 b - Escalators
- Main Lobby: 2 escalators 40" wide
- Debarkation: 2 escalators 40" wide
1 Structural Work Narrative

1.1 Applicable Codes

- ANSI/AISC 360-16: Specification for Structural Steel Buildings
- ACI 318-14: Building Code Requirements for Structural Concrete

1.2 Wind Loading Criteria

- Risk Category: III
- Basic Wind Speed: 180 MPH (Per PRBC 2018)
- Wind Exposure Category: D
- Methods of Analysis:
  - Main Wind Force Resisting System (MWFRS): Directional Procedure for building, building appurtenances and parapets.
  - Components and Claddings: Directional Procedure

1.3 Seismic Design Criteria

- Seismic Design Category: D
- Occupancy Category: III
- Seismic Importance Factor: 1.25
- Site Class: E (Building Period Limited to 0.5 s)
- 0.2 Second Spectral Response Coef. $S_S$: 1.0 g (Risk Targeted Max Considered Earthquake, MCE)
- 1.0 Second Spectral Response Coef. $S_T$: 0.397
- Site Coefficient, short period, $F_a$: 1.3
- Site Coefficient, long period, $F_L$: 2.4
- 0.2 Second Design Spectral Acceleration, $S_{DS}$: 0.86
- 1.0 Second Design Spectral Acceleration, $S_{DL}$: 0.64

- Lateral Force Resisting System²:
- Special Reinforced Concrete Shear Walls
- Shear Walls to be designed to take 100% of the seismic Load
- Moment Frames to be designed for Deflection Compatibility and detailed as Intermediate Moment Frames for additional ductility and Redundancy.
- Building Period Limited to 0.5 sec.

- Response Parameters:
  - Response Modification: $R = 5.0$
  - Overstrength Factor (Omega): $\Omega = 2.5$
  - Deflection Amplification Factor: $C_d = 5.0$

- Method of Analysis
  - Linear Static Equivalent Force Procedure
  - Linear Dynamic Response Spectrum Analysis.

- Precast Panels
  - Designed for deflection compatibilities as non-structural elements.

- Methods of Analysis
  - Linear Static (Equivalent Load Procedure)
  - Linear Dynamic (Modal Response Spectrum Analysis)

1.4 Material Definition:

1.4.1 Structural Steel

- WF Shapes (Columns and Beams): $F_y = 50$ ksi, $F_u = 65$ ksi (ASTM A992)
- Rectangular HSS: $F_y = 46$ ksi, $F_u = 58$ ksi (ASTM A500, Gr B)
- Round HSS: $F_y = 42$ ksi, $F_u = 58$ ksi (ASTM A500, Gr B)
- Other Steel Shapes, (unless noted otherwise): $F_y = 36$ ksi, $F_u = 58$ ksi (ASTM A36)

1.4.2 Concrete

- Normal Weight Concrete
- Compressive Strength of Concrete:
  - Exterior Walls and Curbs: $F'_c = 3$ ksi
  - Grade Slabs: $F'_c = 4$ ksi
  - Pre-Cast Piles: $F'_c = 5$ ksi
  - Pile Caps and Grade Beams: $F'_c = 4$ ksi
  - Mezzanine and Second Floor Slabs: $F'_c = 4$ ksi
1.4.3 Reinforcing Steel

- Specified Yielding Stress: \( F_y = 60 \text{ ksi} \)

1.4.4 Foundations

- 12" Round Precast Concrete Piles\(^3\)
- Allowable Axial Compressive Service Capacity: 80 Tons\(^2\)
- 25 Tons\(^3\)
- Allowable Axial Tension Service Capacity: ASTM D1143
- ASTM D3689
- ASTM D3966
- Applicable Load Tests: Pile Driver Analyzer (PDA)

1.4.5 Loading Criteria

- Roof
  - Roof Live Load: 30 PSF (Minimum as per PRBC 2018)
  - Roofing: 5 PSF
  - Superimposed Dead load: 15 PSF (Ceilings, MEP piping…)

- Second Floor Dead Loads
  - Partition dead Load: 40 PSF
    (Considers full height Gypsum partition walls and Floor finish. To be included in seismic mass)
  - Superimposed Dead Load: 15 PSF
    (Ceiling, MEP piping, Lighting…)

- Second Floor Live Loads
  - VIP Area (Assembly): 100 PSF
  - VIP Terrace: 100 PSF
  - Check in and Waiting Areas: 100 PSF
  - Lobbies and Corridors: 100 PSF

\(^2\) Based on recommendations by Geotechnical Engineer.
• Mezzanine Floor
  - Office Spaces: 50 PSF
  - Corridors: 100 PSF
  - MEP Room: 80 PSF
  (Includes Air Handling Units, Chillers and heavy equipment are on utility room on the exterior of the building)

• Ground Floor
  - Lobbies and Corridors: 100 PSF
  - Offices: 50 PSF
  - Bag Processing, laydown, staging and other assembly areas: 100 PSF
  - CBP areas: 100 PSF

• Seismic Weight:
  - Elements' self-weight, precast walls weight, superimposed dead and partition loads to be included in seismic weight.

1.4.6 Structural System description

1.4.6.1 Roof

Roof is composed of a composite deck resting on open web steel joist system. Composite deck is made of a Type B, gage 20 steel deck with 2 layers of 2-1/2" rigid insulation board and a single ply membrane roofing system. Live loads on roof will be reduced based on prescription contained in ASCE 7-16 and IBC 2018 standards.

1.4.6.1.1 Roof Components & Claddings Design for Wind Uplift

Deck, Open Web Joists, and beams will be designed for design wind pressures as component and claddings and specific fastening patterns will be specified for the different wind pressure roof zones.

1.4.6.1.2 Roof Diaphragm Design

Roof deck structure will be designed as a flexible diaphragm using fasteners/spot welds as the main shear transfer mechanism along with horizontal braces within the plane of the diaphragm as chords and collectors. Design of diaphragm will be performed using amplified seismic loads per code.
1.4.6.2 Second Floor

Second Floor system is composed of a composite deck resting on an Open Web Joist system which in turn rest on steel wide flange shaped girders. Deck is composed of a 5-1/2" normal weight concrete slab and Type B gage 20 corrugated metal deck. Additional bridging will be provided using angle shaped steel members.

1.4.6.3 Slab on Grade & Foundation System

Slab on grade will be an elevated reinforced concrete floor system composed of a uniform grid of grade beams connecting all the pile caps on both orthogonal axes. Grade beams and slab will be designed to act together.

Foundations are made of multiple pile groups under each column. Deep foundation design will be based on final recommendations from the geotechnical engineer. Driven Piles or drilled piles could be used. Both alternatives will be evaluated in coordination with the geotechnical engineer and the most cost-effective and functional alternative will be chosen.
1 Civil (Site External) Work Narrative

1.1 EARTHWORK

1.1.1 Clearing and grubbing
The removal of all loose debris and vegetation within 6 inches (0.15m) below the existing grade is contemplated. Grubbing will include the excavation and complete removal of trees stumps and all other plant life including root structures. All removed organic material will be disposed off-site.

1.1.2 General Earthwork
The grading for the development will be according to proposed elevations. Topographic survey and Proposed Grading drawings will be used as basis for the natural terrain elevation and for grading development.

1.1.3 Excavation cut and fill
Earth excavation will include new fill material where required and compacted as recommended on geotechnical report. All topsoil and earth cut material will not be used as backfill. The removed material can be temporarily stockpiled on-site on designated areas and then disposed off-site.

Earth excavation will include the removal and transportation of all excavated materials other than blasted or ripped rock, whether wet or dry, from the point of excavation to designated areas of disposal. Earth excavation is further classified as common excavation, trench excavation, and foundation excavation for structures as described in the following paragraphs.

- Common excavation is general site excavation and grading to the appropriate lines, grades and dimensions, including the removal of any unsuitable surface soil and contained plant life root structures at specified work areas, and the disposal of all unsuitable and surplus materials at prescribed locations.
- Trenching for underground piping, drain lines, duct banks, culverts and their appurtenant structures will conform to the following:
  - Excavations for trenches will conform to the depths and requirements specified on the drawings.
  - Underground piping, culverts and their appurtenant structures will be installed in open cut trenches.
  - Trench width will be sufficient to provide free working space for bedding and jointing operation and allow a thorough tamping of the bedding and backfill materials under and around the pipe or conduit.
Attachment 1 of Appendix L

- Trench width, at the bottom, will not be greater than the pipe's outside diameter plus 24 inches (0.60m).
- Sheeting, bracing and shoring or excavations with minimum sloped sides at (1.5:1) (horizontal: vertical) will be used for personnel safety and for the protection of the work in trenches where the depth exceeds 5 feet (1.52 m) in order to ensure stability of the excavation. Excavation operations must comply with the Occupational Safety and Health Administration's (OSHA) Excavation standards, 29 Code of Federal Regulations (CFR) Part 1926, Subpart P.
- Surplus and unsuitable materials will be transported to designated spoil areas.
- Foundation excavations will be kept free of water until either a seal slab or the foundation is placed, and the excavation backfilled.

1.1.4 Fill
Fill material will only be acceptable from outside sources. Restrictions in the use of specific types of fill are as follows:

- Only cohesionless material will be used where deposition is in water.
- Fill material shall be classified as AASHTO A-1-a, A-2-4 or better, as recommended by geotechnical engineer.
- Fill material will be free from roots or other organic material.
- Fill material will not contain rocks over 2 inches (0.06m) diameter in size when within 12 inches (0.30m) of culverts, underground piping or electrical ducts.

1.1.5 Fill Material Sources
Fill material will be obtained from suitable borrow sources from off-site borrow sources. The fill material will be screened, blended, or otherwise processed as necessary to conform to the gradation requirements of the desired material classification.

Placement of fill to the specified lines, grades and dimensions will be as follows:

- All fill will be placed in loose lifts not to exceed the maximum allowable thickness, 12 inches (0.30m) and compacted, or as indicated by the geotechnical engineer.
- Fill will not be placed against walls until the mortar or concrete has attained sufficient strength to support the load.
- Sufficient fill will be placed to allow for settlement where a lesser degree of applied compaction is required to avoid damage to buried piping or structures.
1.1.6 Backfill
Backfill is placement of fill adjacent to walls, structures or foundations, or over piping or other underground facilities, to the appropriate grades, generally the same grade as that of the surrounding area.

Two classifications of backfill apply to trenches, as follows:

- Initial backfill, which includes the placing of suitable soil, free of stones and foreign materials, in uniform compacted layers until a 12-inch (0.30-m) cover is obtained over the top of the pipe.

- Final backfill, which includes the placing of fill in uniform compacted layers to completely fill the excavation.

Bedding material will be placed to provide uniform bearing and support for each section of the pipe or conduit along its length except where it is necessary to excavate for bell-holes and the proper sealing of joints. Bell-holes and depressions will be dug after the bedding has been placed.

Pipes and conduits will be placed on compacted bedding material. For pipe or conduit over 6 inches (0.15m) nominal diameter, the bedding surface will be shaped to fit the lower quadrant of the pipe or conduit.

1.1.7 Material Placement and Compaction
Fill will be placed in 12 inches (0.30m) maximum lifts (loose thickness) and compacted to 95-percent maximum modified density or as indicated by geotechnical engineer.

Bedding material will be placed in 12 inches (0.30m) maximum (loose thickness) lifts and compacted to 80-percent Proctor density or as indicated by geotechnical engineer.

For all materials compacted, the moisture content will be controlled between 3 percentage points below and 2 percentage points above the laboratory optimum water content during compaction.

1.1.8 Testing
Tests will be performed for every 250 cubic meters (327 cubic yards (c.y.)) of the material compacted in-situ.

The in-place density of the compacted soils will be as specified above. Each lift will be tested in a 40-meter (131 feet) by 40-meter (131 feet) grid system. At least one test will be made for each lift and whenever there is suspicion of a change in the quality of moisture control or the effectiveness of compaction.

Records in-place density tests results will be done prior to placing the next lift. Records will be detailed enough to identify lift and locate test point within 2-meters (6.5 feet). Areas not meeting compaction requirement according to the in-place density tests will be recompacted and retested.
1.2 DRAINAGE & STORM SEWER

1.2.1 Definitions
Storm Sewer System - that collects surface runoff and discharges it to either to an off-site storm sewer system or discharge at open sea after passing through a grease and sediment separator complying with EPA regulations.

Manholes - Inspection chambers - used in sewer mains at junction points to provide access for maintenance and inspection.

Catch Basins – Inlet- collection structure designed to catch excess rain and ground water from paved streets, parking lots, sidewalks, and roofs.

Grease and sediment separator – collection structure before each outfall which separates grease and sediment from the water, in order to comply with EPA regulations for discharge at the San Juan Bay.

1.2.2 Design Codes and Regulations
The sewer design shall comply with State and Federal regulations regarding the discharge of runoff into water bodies. Quantity and quality of runoff must be addressed. The following requirements, standards and regulations shall apply:

- LEED Certification Requirements: Rainwater management with Best Management Practices (BMP’s) such as retention ponds, bio swales and rainwater catchment for reuse. The bio-retention facilities incorporated into the site design are soil- and plant-based filtration systems that receive runoff from the developed site areas.
- PR Planning Board- Storm Sewer Design Standards (Junta de Planificación-Normas de Diseño para Sistemas de Alcantarillado Pluvial): Since the Project is less than 150 acres and considering the land use, the average rain frequency recurrence interval to be used is 25 years.

1.2.3 Pipes
Sewer piping material will be corrugated High Density Polyethylene (HDPE) Plastic Pipe with smooth interior and bell and spigot rubber gasket joint.

Selection criteria for pipe strength will be as follows:

- Minimum earth cover will be not less than 2 feet (0.60m) below finished grade.
- Superimposed wheel loads will include an allowance for impact. (Exceed AASHTO LRFD structural design requirements for earth and live loads.)
• Load factor, converting crushing strength of pipe to field supporting strength will be determined by the type of bedding selected.

• Pipe crushing strength will be determined by the three-edge-bearing method.

• A factor of safety of 1.5 will be used to establish safe supporting strength (design load) of pipe.

1.2.4 Manholes
Manholes will be located per the following:

• At Junctions

• At change in direction and/or slope.

• Manhole locations will not exceed intervals of 278 feet (85 m).

Materials for manholes and other drainage facilities will be:

• Construction shall be prefabricated concrete

• Covers and Frames: Cast Iron

Manholes will be sized for cleaning with a minimum inside diameter of 4 feet (1.22m) and a minimum height of 3 feet (0.91m).

1.2.5 Catch Basins
Catch basins will be located per the following:

• At low points

At runoff collection points

• At change in direction and/or slope.

• Materials for catch basins will be:

• Construction shall be prefabricated concrete

• Grates and Frames: Galvanized cast iron

Catch basins will be sized for cleaning with a minimum inside length and width of 4 feet (1.22m) and a minimum height of 3 feet (0.91m).

1.2.6 1.2.5 Best Management Practices (BMP's)
To comply with stormwater quality and quantity control, the following measures shall be implemented:

• Infiltration: Measures can include infiltration trenches, basins and dry wells that allow water to percolate from the surface into the soil below.

• Vegetated Swells and Natural Depressions: Vegetation, usually grass, lines the swell and removes sediments from runoff, allowing it to better infiltrate into subsurface soil.
• Modified catch basins to include a sump to collect sediments and an outlet hood to collect floating debris.
• Modified catch basins to include interior oil/grit/water separator baffles

1.2.7 Backflow prevention
The storm drainage systems will discharge thru openings on the apron wall into the San Juan Bay. In order to prevent backflow at outlets, check valves must be installed. It is recommended to install rubber or neoprene in-line check valves such as Red Valve Tidelflex Series 37G or similar.

1.2.8 Sewer testing and inspection
As required by the Puerto Rico Aqueducts and Sewers Authority (PRASA), sewer lines and appurtenances will be hydro-tested. The sewer lines may be tested by a dedicated CCTV inspection as an option, if required by the PRASA or Concession Company. System tests will be performed after completion and before backfilling of the sewer and appurtenances. Fill the line with water and establish a head above the top of the pipe equal to the level of the top of the lowest manhole or catch basin in the system. Allow suitable time for water absorption and then refill to the required test head and measure leakage loss over a timed test period.

1.3 SANITARY SEWER

1.3.1 Definitions
Sanitary Sewer System - that collects wastewater from its source to a point of treatment and disposal. The wastewater may be domestic sewage or industrial sewage. For this project the goal is to develop a gravity sewer system that will discharge into a public trunk sewer on State Road PR-1, (Muñoz Rivera Avenue). No sewage pumping/force line is expected unless required for a special purpose within the facilities below the proposed building floor elevations.

Manholes - Inspection chambers - used in sewer mains at junction points to provide access for maintenance and inspection.

1.3.2 Design Codes and Regulations
The potable water system shall be designed in accordance with:

• PR Aqueduct and Sewer Authority Design Regulations ("Normas de Diseño")
• 2018 PR Building Code
• 2018 International Plumbing Code
1.3.3 Pipes
Gravity Sewer piping material will be PVC SDR-35 (ASTM D3034) Plastic Pipe with smooth interior and bell and spigot rubber gasket joint.

Selection criteria for pipe strength will be as follows:

- Minimum earth cover will be not less than 2 feet (0.60m) below finished grade.
- Superimposed wheel loads will include an allowance for impact. (Exceed AASHTO LRFD structural design requirements for earth and live loads.)
- Load factor, converting crushing strength of pipe to field supporting strength will be determined by the type of bedding selected.
- Pipe crushing strength will be determined by the three-edge-bearing method.
- A factor of safety of 1.5 will be used to establish safe supporting strength (design load) of pipe.

1.3.4 Manholes
Manholes will be located per the following:

- At Junctions
- At change in direction and/or slope.
- Manhole locations will not exceed intervals of 278 feet (85 m).

Materials for manholes and other drainage facilities will be:

- Construction shall be prefabricated concrete
- Covers and Frames: Cast Iron

Manholes will be sized for cleaning with a minimum inside diameter of 4 feet (1.22m) and a minimum height of 3 feet (0.91m).

1.3.5 Sewer testing and inspection
Sewer lines and appurtenances will be hydro-tested. System tests will be performed after completion and before backfilling of the sewer and appurtenances. Fill the line with water and establish a head above the top of the pipe equal to the level of the top of the lowest manhole or catch basin in the system. Allow suitable time for water absorption and then refill to the required test head and measure leakage loss over a timed test period.
1.4 WATER DISTRIBUTION

1.4.1 Definitions
- Potable Water supply lines from public street main connection to storage tank and facilities. For this project the goal is to develop a water network that will be served from a new dedicated line with metering to be connected to an existing public main line on State Road PR-1, (Muñoz Rivera Avenue).
- Potable water supply connection with metering for cruise ships located on the apron.

1.4.2 Design Codes and Regulations
The potable water system shall be designed in accordance with:
- PR Aqueduct and Sewer Authority Design Regulations (“Normas de Diseño”)
- 2018 PR Building Code
- 2018 International Plumbing Code

1.4.3 Pipes
Pressure water piping material will be PVC DR 14 (AWWA C900), Pressure Class 305 psi, Plastic Pipe with smooth interior and bell and spigot rubber gasket joint.

Selection criteria for pipe strength will be as follows:
- Minimum earth cover will be not less than 2 feet (0.60 m) below finished grade.
- Superimposed wheel loads will include an allowance for impact. (Exceed AASHTO LRFD structural design requirements for earth and live loads.)

1.4.4 Valves
All water main valve shall be Gate valves type. Valves shall be epoxy coated iron-body, resilient wedge non-rising stem gate valves. The wedge shall be cast iron completely encapsulated in an elastomer covering with polymer guide bearing caps on each side.

The valves shall have a full diameter waterway with no grooves or recesses at the valve seat location. Flanges, where required, shall be 125 pound, full faced, drilled per ANSI B 16.1.

Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 200 psi and a minimum test pressure of 300 psi.

In-ground valves will be located in a valve box accessible to the operator for operation and maintenance.
1.4.5 Mechanical Joint (MJ) Fittings
All fittings shall be mechanical joint (MJ) type. All tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 24-inches in diameter shall be ductile iron compact fittings in conformance with AWWA C153. The minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi.

1.4.6 Fire Hydrants
All fire hydrants shall conform to the following:
- All fire hydrants shall be improved, dry barrel, 5114-inch compression Puerto Rico type valve, traffic model, painted yellow.
- Fire hydrants shall be equipped with two 2Y2-inch hose ports (NST), one 4Y2-inch pumper port (NST) with Storz adapter as specified, 112-inch pentagon nut, and barrel drains.

1.4.7 Storage Tanks
- Potable Water supply regulations from the PR Aqueduct and Sewer Authority requires the storage of ½ of the daily average demand for the facility. An above ground storage tank with a pump system shall be provided.
- Firefighting lines for the building require a dedicated storage tank and pumping system.

1.4.8 Installation and Testing
Pipe will be kept clean during laying operations by plugging or other approved method. Pipe will not be laid when it is raining or when trench is muddy, soft, or contains standing water.

Water pipe will not be laid closer than 3 meters (10 ft.) horizontally from sanitary sewer in parallel installations. Joints will not be located at cross-over closer to sanitary sewer than 3 meters (10 ft.) from cross-over point. In either case, water pipe will be above the elevation of adjacent sewer.

Newly laid piping or valved section will be subjected to inspected pressure test.
Exposed pipe, joints, fittings, and/or valves will be carefully examined during pressure test. Joints showing visible leakage will be tightened or remade. Cracked or defective pipe, fittings and valves will be replaced and retested.

1.4.9 Disinfection
System disinfection will be performed as follows: After testing, entire distribution system will be disinfected with 50mg/l chlorine solution. Isolate a maximum length
of 300 meters (or 1000 ft.) of piping from the rest of the system for disinfection. Thoroughly flush lines before introducing chlorine solution.

After a contact period of not less than 24 hours, flush system with clean water until residual chlorine content is not greater than 1 mg/l. Open and close all valves in lines being sterilized several times during contact period.

Samples for bacteriological analysis will be collected to check efficiency of disinfection procedures. Take minimum on one sample for each 300 meters (or 1000 ft.) of completed water main. Repeat disinfection process and sample collection if tests show that contamination persists.

1.5 ROADWAYS, PARKING LOTS, PATHWAYS AND OTHER PAVEMENTS

1.5.1 Roadway geometry codes and regulations
Roadway geometry including accesses, lanes and parking areas dimensions and layout shall comply with current regulations including:

- AASHTO Geometric Design of Highways and Streets (2018 Green Book)
- PR Highway and Transportation Authority Design Manual
- Regulation for the Public Roads Access Controls (PR Dept. of Public Works)
- American with Disabilities Act (ADA)

1.5.2 Pavement Structures
Roadway and parking lot structures will consist of:

- Asphalt pavement designed in accordance with the current AASHTO Guide for the Design of Pavement Structures (AASHTO Design Guide)

Loading areas will consist of:

- Rigid cement concrete pavement designed in accordance with the current AASHTO Guide for the Design of Pavement Structures (AASHTO Design Guide)

1.5.2.1 Asphalt Pavement (flexible)
The minimum requirements for asphalt pavements will be:

- Performance Criteria:
  - Initial Serviceability Index (P0)=4.2 (flexible pavement)
  - Terminal Serviceability Index (P1)=2.25 (commercial streets)
- Analysis Period: 20 yrs.
- Design Traffic: Equivalent Single Axle Loads (ESAL’s) to be determined by traffic study or analysis
- Reliability (R): 80% (local streets)
- Overall Standard Deviation (So): 0.45 (flexible pavement)
• Soil Strength: Resilient Modulus (MR) or CBR to be provided by geotechnical engineer
• Layer Coefficients:
  • Surface=0.44 (hot mix asphalt)
  • Base course=0.44 (hot mix asphalt)
  • Sub-base course=0.05 (soil-aggregate)
• Asphalt Surface course – 2” (0.05m) minimum surface course hot mix asphalt concrete, (subject to design)
• Asphalt Base course – 4” (0.10m) minimum base course hot mix asphalt concrete, (subject to design)
• Aggregate base course: 6” (0.15m) minimum, crushed stone, (subject to design)
• Sub-base course: subject to geotechnical recommendations

1.5.2.2 Cement Concrete Pavement (rigid)
The minimum requirements for concrete pavements will be:

• Performance Criteria:
  • Initial Serviceability Index (PI)=4.5 (rigid pavement)
  • Terminal Serviceability Index (PI)=2.25 (commercial streets)
• Analysis Period: 20 yrs.
• Design Traffic: Equivalent Single Axle Loads (ESAL’s) to be determined by traffic study or analysis
• Reliability (R): 80% (local streets)
• Overall Standard Deviation (σo): 0.35 (rigid pavement)
• Soil Strength: Resilient Modulus (MR) or CBR to be provided by geotechnical engineer
• Rigid pavement – 8” (0.20m) minimum thickness, (subject to design)
• Aggregate base course: 6” (0.15m) minimum, crushed stone, (subject to design)

1.5.3 Roadway grading
Grading of the roadway and related work will include the removal and/or satisfactory placement of all materials necessary for the construction and preparation of embankment, slopes, drainage works and connections to the required alignment, grade and cross-section shown on the drawings.

Embarkment, when necessary, will be constructed by depositing, shaping and compacting acceptable excavated materials in accordance with established lines and grades.

Subgrade preparation will be performed if the subgrade deteriorates due to weather, traffic, etc. between the completion of grading and start of surfacing.
The subgrade surface will be compacted to an average of 98% density with no test result less than 95% of Maximum Modified Proctor Dry Density (MMPDD) or according to recommendations by geotechnical engineer.

Sub-base course will consist of imported aggregate (conform to the standard) placed in layers upon a prepared surface, compacted and finished.

Asphalt concrete pavement will consist of crushed aggregates, blend sand material and asphalt cement, combined in a hot mix plant, placed and compacted on a prepared surface. The equipment utilized will produce an end product complying with the requirements of this narrative. The mixing plant will be calibrated to produce a uniform mixture in accordance with the job mix formula.

Aggregate and asphalt will be combined to produce a uniform mixture of specified gradation at an asphalt content in accordance with the approved job mix formula and in which all particles of aggregate are uniformly coated. The maximum mixing temperature for all grades of asphalt will be 155 °C (310 °F). Rollers will be reversible and self-propelled with compaction capability to match plant production rates. Asphalt mix will be placed only on dry surfaces in a single lift when the design compacted total thickness is 50 mm. All asphalt mix will be thoroughly compacted, and after final rolling, the finished surface of the mat will be free from segregation, waves, hairline cracks, and other obvious defects. Compaction will be completed within 24 hours of placement. After final rolling is complete, the finished mat will be cooled for a minimum period of 2 hours before opening the section to traffic.

The interlocking concrete blocks will be laid on a fine sand layer 30mm thick. Pre-cast or cast in place concrete curbs (150 x 250 x 1000 mm) will be installed for roads edging.

1.5.4 Pathway structures (sidewalks and pedestrian walkways)

Pathways structures will consist of:

- Portland cement concrete sidewalks
  - Ready mix concrete with a strength of 3,500 psi
  - Broom finish surface
  - Transverse dummy joints shall be constructed at a longitudinal spacing equal to the width of the walk but not over 5 feet apart; or to match adjoining walk.
  - Wire mesh reinforcing shall be placed 4 inches below the required finished grade
  - Minimum thickness:
    - 4 inches (0.10 m) - where there will be no vehicle loading
    - 5 inches (0.13 m) - where vehicle loading (such as maintenance vehicles) are expected
  - Aggregate base: 5 inches (0.13 m) minimum thickness
1.5.5 Pavement Marking and stripping
Pavement marking and stripping will be applied on all vehicular traffic areas

- All parking stalls will be lot markings will be a strip of white traffic paint 4 inches (0.10 m) width.
- All handicapped parking areas will be marked with blue traffic paint 4 inches (0.10 m) width complying with ADA requirements.
- All other markings such as direction arrows, lane lines and other markings as required will be painted according to the current Manual on Uniform Traffic Devices (FHWA-MUTCD) regulations (yellow or white traffic paint)
- Emergency fire lane (red traffic paint)

1.5.6 Signage
Roadway regulatory signs will be installed on all roadway and parking areas. Signs shall be in accordance with the current Manual on Uniform Traffic Devices (FHWA-MUTCD) regulations and the PR Department of Transportation and Public Works Standards.

Standard dimensions, sizes, symbols and colors will be used.

All signs will be made of aluminum sheets with reflectorizing film and attached to galvanized steel U-channel posts with theft deterrent bolts.

The steel posts will be secured in a concrete base.

1.5.7 Wheel Stops
All parking stalls will include the installation of a plastic or recycled rubber wheel stops 6 feet (1.83m) long.

1.5.8 Fences and Gates
All new perimeter fence will be provided on the apron. The perimeter fence will consist of a Perimeter fencing should also enclose the areas around cargo handling and storage facilities.

The fence shall have the following characteristics:
Chain link fence height: 7'-0" with barbed wire (3 wires)
Chain link fabric: 6 Gauge galvanized x 2" mesh
Posts: Galvanized HF40 tubing
Terminal Posts (End Corner): Gate’ Posts - 3" OD (2-7/8’ actual) for 7’ and 8’ High
Line Posts (Intermediate): 2-1/2" OD (2-3/8’ Actual) for 7’ and 8’ High
Top/Bottom Rail: 1-5/8” OD (1-5/8” Actual)
All vehicular access gates shall be also chain link fence type manual operated sliding gates.
1 Electrical Work Narrative

1.1 Applicable Codes and Standards
- NFPA 70 National Electrical Code 2020
- NFPA 70E Standard for Electrical Safety in the Workplace 2019
- NFPA 101 Life Safety Code 2018
- NFPA 780 Standard for the Installation of Lightning Protection System 2020
- International Building Code 2018
- Puerto Rico Building Code 2018
- Puerto Rico Electrical Power Authority (P.R.E.P.A.) Norms and Standards
- ASHRAE 90.1-2016

1.2 Scope of Work
The scope of work will include the design of the following system
- P.R.E.P.A. point of connection electrical requirements.
- Offsite underground primary feeders to point of connection.
- Transformer's substation, primary GIS switch and protection.
- 400 KW Stand-By Emergency generation WITH 800 Amps ATS to serve critical loads
  - The critical loads will include, around 20% of general lighting exit and emergency lights, UPS's for IT and Data Rooms, A/C Units for IT and CPB data rooms, Fire alarm systems, video surveillance and intrusion system, x-ray machines (7 each) , one escalator, two elevators and the Fire jockey pump.
  - Diesel tank with capacity for 48 hrs operation at 75% of load.
- Main distribution switchboards for normal and emergency loads.
- Distribution panelboards
- Receptacles and lighting panelboards.
- Power and Lighting Distribution
- Lightning Protection system
- Secondary electrical Feeders to Panelboard.
- Electrical feeders to mechanical equipment.
- Grounding Systems
- Power for general and dedicated receptacles and for lighting.
- Telecommunication site facilities
- Lighting control
• Fire alarm system
• CCTV system
• Intrusion Detection System
• Paging and Sound System
• Access control
• Data, video and telephone distribution

1.3 Primary Off Site requirements
Off Site electrical point of connection and requirements shall be determined by P.R.E.P.A. For this stage of the design criteria, it is considered FOUR sets of 3 - 1C-800 KCMI 46KV primary feeders in 8" PVC schedule 40 conduits from the substation area to a PREPA facilities located at the north of the terminal facilities and two 8" spare conduits.

1.4 HV and LV General Requirements
A detached electrical room will be provided at a location outside of the terminal for the protection of the transformer and the secondary main distribution systems.

The electrical room is divided in two separate spaces.

• Transformer’s Room for the 38 KV transformer described below:
  o Primary Voltage – 38KV delta
  o Secondary Voltage- 480/277V wye
  o Windings: aluminum
  o Capacity: 3000 KVA ONAN/ONAF
  o Oil Type: FR3

• Primary GIS breaker and Secondary Distribution Room for the following equipment:
  o Gas Insulated Indoor Switchgear 42 KV, 2000 KVBL consisting of a three section with: 42 KV, 200KV BIL, SF6 Gas Insulated Switchgear with 36 KV with a 1250 A., 40KA, 42 KV Vacuum Circuit Breaker with 36K lighting arresters and protection relays.
  o Battery bank for GIS operation.
  o GIS control panel
  o Main distribution Switchboard 4000 Amps.
  o Main Distribution Panel MDP-1
  o Main Distribution Panel MDP-2
  o MCC for Chiller and mechanical pumps, AHU’s, supply and exhaust fans and pumping stations at the electrical and mechanical yard area.
  o Emergency Main Distribution Panel EMDP
• Inside the cruise terminal 480/277V and 120/208V panel boards and dry type transformers are located across the building and the mechanical rooms for the connections of AHU’s, supply and exhaust fans, ceiling fans, FCU’s Split Units and any other mechanical equipment required for the facilities.

PRELIMINARY LOAD ANALYSIS

<table>
<thead>
<tr>
<th>AREA</th>
<th>QTY</th>
<th>SQFT</th>
<th>W/SQFT</th>
<th>LOAD KVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERMINAL</td>
<td>1</td>
<td>16100</td>
<td>25</td>
<td>4025</td>
</tr>
<tr>
<td>PARKING</td>
<td>1</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>CONCESSIONARIES</td>
<td>10</td>
<td>100</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>TOTAL LOAD CONNECTED</td>
<td></td>
<td></td>
<td></td>
<td>4070</td>
</tr>
</tbody>
</table>

DESIGN DEMAND FACTOR 75% 3053
DESIGN DIVERSITY FACTOR 1.15 2654

TOTAL LOAD WITH DEMAND AND DIVERSITY FACTOR 2654
TRANSFORMER CAPACITY 3000

The facilities transformer's Load calculation to be finalized at Design Development stage is based on a load of 25 W/SQFT for lighting/power.

1.6 Main distribution

1.6.1 Metering
One common primary side meter shall be provided for the Terminal Building Facilities to be located at the main electrical room.

1.6.2 Voltage
Lighting will be connected at 277V.
Large Motors will be connected at 480V.
Receptacles will be connected at 120V.

1.6.3 Cables
Primary cables shall be 46KV TRXLP.
Secondary cables shall be thermoplastic heat and water resistant nylon, 90°.
1.6.4 Feeders
Feeders will be copper cables.
Underground raceways shall be PVC schedule 40.
Exterior conduits shall be Rigid Galvanized steel.
Interior exposed conduit will be Rigid Galvanized steel conduit in accordance to NEC or as indicated.
Interior concealed conduit shall be EMT unless otherwise indicated.

1.6.5 Branch Circuit
The minimum size of conduit will be 3/4" diameter.
Branching distribution shall be done by means of Electric Metallic Conduit (EMT) unless otherwise indicated.
Conduits in floor slab in contact with earth shall be PVC schedule 40. Conduits inside concrete walls shall be PVC schedule 40.
Rigid Galvanized Conduits shall be installed bellow 8' from ceiling in areas subject to physical damage.

1.7 Outlets
All receptacles outlets shall be 20 A-125 V duplex type Ivory Color with stainless steel plates.
Duplex ground fault receptacles to be provided in bathrooms, kitchen counters and at the building exterior.
Lighting switches will be 20 A - 277 V, single pole, 3 and 4 ways with stainless steel cover.
1.8 Lighting

For the interior of the Building the following illumination levels will be applied:

<table>
<thead>
<tr>
<th>Area</th>
<th>Minimum illumination levels (lux)</th>
<th>Area</th>
<th>Minimum illumination levels (lux)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Floor</strong></td>
<td></td>
<td><strong>Second Floor</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Embarkation &amp; Disembarkation</strong></td>
<td></td>
<td>Check in queuing area, security screening area and check in zone</td>
<td>200</td>
</tr>
<tr>
<td>Lobby and circulation</td>
<td>200</td>
<td>Check in counters</td>
<td>250 + task light</td>
</tr>
<tr>
<td>Elevators Lobby</td>
<td>200</td>
<td>Waiting areas</td>
<td>200</td>
</tr>
<tr>
<td>Offices</td>
<td>250 + task lighting</td>
<td>Duty Free and Food and Beverage Area</td>
<td>400</td>
</tr>
<tr>
<td>Baggage Laydown Area</td>
<td>200</td>
<td>Terrace</td>
<td>200</td>
</tr>
<tr>
<td>BOH Storage</td>
<td>150</td>
<td>Cruiselines rooms</td>
<td>150</td>
</tr>
<tr>
<td>Rest rooms</td>
<td>100</td>
<td>Corridor</td>
<td>150</td>
</tr>
<tr>
<td>Janitors</td>
<td>150</td>
<td>Debark Lobby</td>
<td>200</td>
</tr>
<tr>
<td><strong>Customs and Immigration</strong></td>
<td></td>
<td>Security Operations</td>
<td>250 + task light</td>
</tr>
<tr>
<td>Inmigration screening</td>
<td>200</td>
<td>Office Work stations</td>
<td>250 + task light</td>
</tr>
<tr>
<td>Inmigration inspectors desks</td>
<td>200</td>
<td>Corridor</td>
<td>150</td>
</tr>
<tr>
<td>Corridors</td>
<td>150</td>
<td>Copy room</td>
<td>250</td>
</tr>
<tr>
<td>Secondary exam Podium</td>
<td>200</td>
<td>Storage</td>
<td>150</td>
</tr>
<tr>
<td>Referal passenger waiting area</td>
<td>200</td>
<td>Breakroom</td>
<td>200</td>
</tr>
<tr>
<td>agricultural lab</td>
<td>250 + task Light</td>
<td>Restrooms</td>
<td>100</td>
</tr>
<tr>
<td>cashier Station</td>
<td>250 + task Light</td>
<td>Communication room</td>
<td>150</td>
</tr>
<tr>
<td>Public rest rooms</td>
<td>150</td>
<td>Janitor</td>
<td>150</td>
</tr>
<tr>
<td>Command center</td>
<td>250 + task Light</td>
<td>Entrance Stair and Disembark Stair</td>
<td>200</td>
</tr>
<tr>
<td>Detainee baggage storage</td>
<td>150</td>
<td>All other stairs</td>
<td>150</td>
</tr>
<tr>
<td>Hold, interview and search rooms</td>
<td>400</td>
<td>Escape Corridor</td>
<td>150</td>
</tr>
<tr>
<td>Weapons cleaning</td>
<td>250 + task Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secured Storage and file storage</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPB Corridor, supply storage and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>storage</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Officer's operational support work</td>
<td>250 + task Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Offices</td>
<td>250 + task Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakroom</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Rest Rooms</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Building Mechanical systems</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recycling &amp; refuse room, MEP room,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication, LAN/telecom and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>elevator computer room</td>
<td>150</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SJCT - Basis of Design
Vertical Circulation | 150
---|---

All luminaires shall be considered with integral light emitting diode (LED) lamps at 4000°K color. Illumination level for the parking area will be a minimum of 50 lux. Canopy and entrance area will be illuminated with a minimum of 10 fc.

The following lighting fixtures are considered in the project unless otherwise required by the Architects and/or owner:

<table>
<thead>
<tr>
<th>DESIGNATION</th>
<th>DESCRIPTION</th>
<th>MODEL</th>
<th>SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-1</td>
<td>4' UTILITY LED WRAPAROUND</td>
<td>WNLED</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-2</td>
<td>2'x2' CRUZE - TROFFER LED MODULE</td>
<td>22CZ</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-3</td>
<td>2'x4' CRUZE - TROFFER LED MODULE</td>
<td>24CZ</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-4</td>
<td>6' LED RECESSED NARROW, MEDIUM, OR WIDE BEAM DOWNLIGHT</td>
<td>LD68</td>
<td>PORTFOLIO</td>
</tr>
<tr>
<td>L-4A</td>
<td>6' LED RECESSED NARROW, MEDIUM, OR WIDE BEAM DOWNLIGHT</td>
<td>LD68</td>
<td>PORTFOLIO</td>
</tr>
<tr>
<td>L-5</td>
<td>2'x4' CRUZE - TROFFER LED MODULE</td>
<td>24CZ2</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-6</td>
<td>2'x4' FLUORESCENT CONFINEMENT OR CORRECTIONAL LAMP</td>
<td>FSR24</td>
<td>FAIL SAFE</td>
</tr>
<tr>
<td>L-7</td>
<td>18&quot;X14&quot; LED LINEAR HIGH BAY LUMINARY</td>
<td>VB6 LED</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-8</td>
<td>18&quot;X14&quot; LED LINEAR HIGH BAY LUMINAIRE</td>
<td>VB6 LED</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-9</td>
<td>8' LINEAR WAVESTREAM LED</td>
<td>WSL LED</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-10</td>
<td>18&quot; TT TOP TIER SOLID STATE LED</td>
<td>TT TOP TIER LED</td>
<td>MC GRAW-EDISON</td>
</tr>
<tr>
<td>L-11</td>
<td>4' SURFACE &amp; LED</td>
<td>SWLED</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-12D</td>
<td>DOUBLE LIGHT GLEON 1-10 LIGHT SQUARE SOLID STATE LED IN 40' POLE</td>
<td>GLEON-AF-10</td>
<td>MC GRAW-EDISON</td>
</tr>
<tr>
<td>L-13</td>
<td>SINGLE LIGHT GLEON 1-08 LIGHT SQUARE SOLID STATE LED IN 40' POLE</td>
<td>GLEON-AF-08</td>
<td>MC GRAW-EDISON</td>
</tr>
<tr>
<td>L-13D</td>
<td>DOUBLE LIGHT GLEON 1-08 LIGHT SQUARE SOLID STATE LED IN 40' POLE</td>
<td>GLEON-AF-08</td>
<td>MC GRAW-EDISON</td>
</tr>
<tr>
<td>L-14</td>
<td>LXS LUXESCAPE COLLECTION</td>
<td>LXS LUXESCAPE</td>
<td>INVUE</td>
</tr>
<tr>
<td>L-15</td>
<td>18&quot; TT TOP TIER SOLID STATE LED</td>
<td>TT TOP TIER LED</td>
<td>MC GRAW-EDISON</td>
</tr>
<tr>
<td>L-17</td>
<td>4' INDUSTRIAL LED</td>
<td>VAFORITITE LED</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-18.1</td>
<td>1-10 Light Squares - LED</td>
<td>GLEON-1A</td>
<td>MC GRAW-EDISON</td>
</tr>
<tr>
<td>L-19.3</td>
<td>8' INDUSTRIAL LED&quot;</td>
<td>VAFORITITE LED</td>
<td>METALUX</td>
</tr>
<tr>
<td>L-21</td>
<td>9&quot;X5&quot; HORIZONTAL EYELID LED</td>
<td>B95 LD4 LED</td>
<td>FAIL SAFE</td>
</tr>
</tbody>
</table>
1.9 Panelboard
Panelboards for 480/277V, dry type transformers and 208/120V panelboards for normal and emergency distribution will be provided at the first, mezzanine and second floor.

1.10 UPS
THREE UPSs (estimated) are considered for the project.

- Terminal operation UPS with a capacity of 30 KVA (estimated) for:
  - IT Server rooms
  - Security and access control
  - Communication room
  - CCTV
  - Fire alarm panel
- Custom and Border Patrol UPS with a capacity of 15 KVA
  - Lan/Telecomm (CBP IT Room)

It is assumed that individual computers will be provided with their own UPS.

1.11 Lightning Protection
Lightning protection will be provided with copper wires and lightning tips on roof in accordance to codes and standards and will be connected to the building grounding system. Master label will be required.

1.12 Grounding
A ground system will be provided in accordance to standards around each structure (main building, mechanical and electrical room). The system includes bare copper cables around the structures with grounding rods every 20’. The steel columns will be connected to the grounding mat. Ground bars shall be provided at the electrical rooms. The overall resistance shall be 5 ohms or less.

1.13 Emergency lighting
Emergency lights with emergency backup will be provided to comply with the means of egress. Exit lights shall be provided at each exit door and shall be provided with battery backup.

1.14 Data, Video and Telecommunication
Data and voice outlets shall be provided at the service counters and office spaces per Workstation list. A Cat 6 cables shall be installed for each telephone and data cable. Voice outlets will be provided for emergency and courtesy phones. Video outlets shall be provided to each monitor location. Fiber optics cables may be used upon required depending the maximum distances from the servers areas and telephone facilities to the outlets.
Patch panels for Cat 6 similar to Panduit DP-6 PLUS with spare capacity for future expansion will be provided as part of the facilities. Conduits shall run in EMT conduit and wire mesh type cable trays.

Site telecommunications design will include underground facilities for telephone and cable TV as per NETPR requirements going from the telecommunication

1.15 Access control
    The access control will be designed with intercom, proximity readers or keypads, emergency push bottom for egress and magnetic locks. All wiring shall be protected in EMT conduit unless otherwise indicated.

1.16 Sound and Paging system
    A digital sound and paging speaker system shall be provided with amplifiers to provide the facilities (A total of 40 speakers and one microphone). Wire will be installed in EMT conduits for protection.

1.17 CCTV
    An IP camera system will be provided for closed caption to the server room. Led type monitors and video storage will be provided at the security area.

1.18 Intrusion detection System
    An intrusion detection system for the protection of the building shall be included. The system will include access, exit doors and roll up doors sensors, glass sensors, key and/or magnetic pads.

1.19 Fire Alarm System
    Document included in Fire Detection BOD.
1 Fire Detection

1.1 Codes
Applicable codes and Standards to which the fire Alarm system must comply

The equipment and installation shall comply with the current provisions of the following codes and standards:

- Authority having jurisdiction (AHJ)
- NFPA 70 – National Electric Code 2020
- NFPA 72 – National Fire Alarm and Signaling Code 2019
- NFPA 90A – Standard for the installation of Air Conditioning Systems and ventilation 2018
- UL 268 – smoke detectors for fire protective signaling systems
- UL 521 heat protection for Fire protective Signaling Systems
- UL 464 Audible Signaling Appliances
- UL 38 Manually Actuated Signaling Boxes for Use with fire-Protecor Protective Signaling Systems
- UL 1971 – Signaling Devises for Hearing-Impaired
- UL 1981 – Power Supplies for Fire Protective Signaling Systems

1.2 Fire Detection System description
The functional addressable fire alarm system consists of a non-coded, UL Listed intelligent analog addressable fire alarm system with multiplexed signal transmission and utilizes independently addressed, input/output modules, and power supply(s). The system programing, as well as quantity and location of fire and notification of the building occupants even in this smoke free environment.

The system shall comply in respects with all the pertinent codes, rules, regulations and laws of the local Jurisdiction Having Authority (AJH). The System shall also comply in all respects with the requirements of the specification, manufacturer’s recommendations and Underwriters Laboratories (UL) Listings.

The system Shall Consist of:

- Fire Alarm Control Panel and annunciators located as shown in the drawings
- Manual Pull Stations located as shown in the drawings
• Area smoke detectors located as shown in the drawings
• Area heat detectors located as shown in the drawings
• Audible notification appliances located as shown in the drawings
• Synchronized visual notification appliances located as shown in the drawings
• Smoke beam detectors for high bay areas
• Duct smoke detectors
• Fire Risers Tamper and flow switches

1.2.1 Sequence of operations
On the alarm activation of any area smoke detector, heat detector, manual pull station, duct detector or flow switch the following functions shall automatically occur:

1.2.1.1 The internal audible device shall sound at the control panel and remote annunciator.
1.2.1.2 The LCD display shall indicate all applicable information associated with the alarm conditions including device type, device location and time/date.
1.2.1.3 All system activity/events shall be documented in system history
1.2.1.4 Any remote or local annunciator LCD/LED’s associated with the alarm shall be illuminated.
1.2.1.5 Activation of notification audible appliances.
1.2.1.6 Activation of visual strobes notification appliances.
1.2.1.7 Notification via telephone call or email to relevant personnel. In the event of a trouble, supervisory or alarm condition, these signals will be transmitted via Ethernet connection of DACT to an offsite central location, as determined by client.
1.2.1.8 Elevators recall
1.2.1.9 AHUs stop command

1.2.2 Computer components
The fire alarm control panel shall include the following features:

• Ability to download or upload site applications and system diagnostics remotely through an Ethernet connection, or DATC.
• Provide electronic addressing of analog/addressable devices. Rotary and dip switch addressing shall not be equal.
• Provide an operator interface display that shall include functions required to annunciate, command and control system functions.
• Provide and internal audible signal with different programmable patterns to distinguish between alarm, supervisory
• Provide system reports that provide detailed description of the status of the system parameters for corrective actions or for preventive maintenance programs. Reports shall be displayed by the operator interface of capable of being printed on a printer.
• Provide an authorized operator with the ability to operate or modify system functions like system time, date passwords, restart the system and clear control panel event history file.
• Provide an authorized operator to perform test functions withing the installed system.

The circuit requirements are the following:

• Signaling line circuits for intelligent Analog Addressable loop
  - Class B (style 4) Class A (style 7)
• Notification Appliance Circuits:
  - Class B (style Y) Class A (style Z)
  - Maximum Circuit loading to 2.5 amps for notification appliances circuits
• Activation of alarm notification appliances, elevator recall, and other functions shall occur within 3 seconds after the activation of an initiating device

Power as follows:

• Primary power 24 v dc obtained from 120-v service and power supply module. Initiating devices, notifications devices, signaling lines, trouble signals, shall be powered by nominal 24-v dc source.
• Secondary Power: the system comes standard with secondary power supply, which provides 24 hour supervisory and 5 minutes of alarm with batteries automatic battery charger and automatic transfer switch.
• Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

1.2.3 Initiating devises components
Manual pull station will comply with UL38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color, shall show visible indication of operation; and shall be mounted on a recessed outlet box. If indicated as surface mounted. Provide manufacturers surface back box.

Double action mechanism requiring two action to initiate the alarm, pull-lever type, with integral addressable module arranged to communicate manual station status (normal, alarm or trouble) to fire-alarm control unit.

The manual pull station will have an intelligent module integral of the unit
Station reset key operated switch shall match the control panel key.
Manual pull Stations that initiated an alarm condition by opening unit are not acceptable.

Manual pull station will be located within 60 inches from the exit doorways from the building, with no two adjacent manual pull stations being further than 200 ft from each other, measured horizontally along the floor.

Manual pull stations located in detention rooms will have a vandal proof covers installed.

Provide analog/addressable ionization smoke detectors at any locations shown in the drawings. The system shall have the ability to uniquely set the sensibility and alarm verification values of each detector of the circuit.

Non-volatile memory: permanently stores serial number, and type device. Automatically updates historic information including operation hours, last maintenance date, number of alarms, and troubles, time of last alarm and analog signal patterns for each sensing element just before last alarm.

Digital filters remove signal patterns that are not typical of fires.

The system shall have an environmental compensation algorithm. The detector's sensing element reference point shall automatically adjust, compensating background environmental conditions such as dust, temperature and pressure.

Vandal proof smoke detectors will be installed in detention rooms.

Provide fixed temperature heat detectors at the locations shown in the drawings. They shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process the alarm.

The integral processor shall determine if an alarm condition exists and initiate and alarm based on the analysis of the data.

Systems using central intelligence for alarm decisions shall not be acceptable.

The heat detector shall have a nominal alarm point rate of 135°F (57°C).

All appliances shall be of the same manufacturer as the Fire alarm Control Panel specified to ensure absolute compatibility between the appliances and the control panels, and to ensure that the application of the appliances is done in accordance with the single manufacturer's instructions.
Written proof of their compatibility for the purpose intended. Such proof shall be in the form of the documentation from all manufacturers which clearly states that their equipment (as Submitted) are 100% compatible with each other for the purposes Intended. All Appliances shall be UL Listed Fire Protective Service and shall be UL 1971.

1.2.4 Signal Devices Components
Provide low wall mount horn/strobes at the locations shown in the drawings.

The horn/strobe shall provide and audible output of 95 dBA at 10 ft when measured in reverberation room per UL-64.

Strobes shall provide synchronized flash outputs. The strobe output shall be determined as required by its specific location and application from a family 15cd, 30cd, 60dc and 110cd devices.

The horn shall have a selectable steady or synchronized temporal output. In and out screw terminals shall be provided wiring.

Vandal proof smoke horn/strobe appliances will be installed in detention rooms.

1.2.5 System Installation
Comply with NFPA72 for installation fire alarm equipment.

- Smoke detector Spacing:
  - Comply with NFPA72" Smoke-Sensing Fire Detectors" Section in the Initiating Devices" Chapter, for smoke detector spacing.
  - Comply with NFPA72" Heat-Sensing Fire Detectors" Section in the Initiating Devices" Chapter, for heat detector spacing.
  - Smooth Ceiling spacing shall not exceed 30 ft.
  - Spacing detector for irregular areas, irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A (or Appendix B) in NFPA 72.
  - Lighting Fixtures: locate detectors not closer than 12 inches from any part of a light fixture.
- Notification Appliance Devices: Install between 80 to 96 inches on the wall.
- Fire-Alarm control unit: surfaces mounted, with tops of cabinets not more that 72 inches above the finished floor.
All devices shall be installed with flush finished on the wall and ceiling surfaces.

1.2.6 System commissioning

Upon Completion of installation of the system, the system shall be tested and commissioned by factory certify contractor with customer representative and AHJ.

Training of the Operator and maintenance personnel to adjust, operate, and maintain fire-alarm system shall be performed by contractor's factory certified technician.
1 Air Conditioning and Ventilation Narrative

1.1.1 Applicable Codes and Standards
- Puerto Rico Building Code 2018
- NFPA Standard No. 90A-2018 – Installation of Air Conditioning and Ventilation Systems

1.1.2 Design Criteria
1.1.2.1 Outdoor Design Conditions
The outdoor conditions shall be based on ASHRAE Handboock Fundamentals - 2013 – (Climatic Design Conditions)

Outdoor Conditions:
- Dry Bulb (DB) Temperature = 91°F
- Wet Bulb (WB) Temperature = 77.7°F

1.1.2.2 Indoor Design Conditions
The HVAC system for the project will be designed in accordance with the standards and guidelines. The guidelines will be followed at a minimum and additional conditions will be followed to meet code requirements.

The room design parameters are as follows:

Entrance – Lobby – Offices – Primary/Custom Processing – Hold Rm’s areas:

1. Dry bulb temperature 72.5°F to 78.0°F
2. Relative humidity 40% to 60%
3. People Sensible/Latent Heat 230/120 Btu/Hr
Secondary Exam Podium – Referral Passenger Waiting areas

1. Dry bulb temperature 71.5°F to 77°F
2. Relative humidity 40% to 60%
4. People Sensible/Latent Heat 230/120 Btu/Hr

Mechanical - Electrical - Communication areas

1. Dry bulb temperature 82.0°F to 88.0°F

1.1.2.3 SYSTEMS DESCRIPTION

AHU-100, 200 (17,000 CFM Nominal Capacity) Serves the 2nd Floor Embark Waiting Areas

AHU-300, 400 (20,850 CFM Nominal Capacity) Serves the 2nd Floor Embark Areas (Queueing Area, Security Screen Zone & Check-In Zone)

AHU-500 (15,100 CFM Nominal Capacity) Serves the 1st Custom Border Protection (CBP Primary)

AHU-600 (8,500 CFM Nominal Capacity) Serves the Global Port Holdings @ Mezzanine

AHU-700 (4,700 CFM Nominal Capacity) Serves the 2nd Floor Security Port Operation

AHU-800 (9,000 CFM Nominal Capacity) Serves the 1st Custom Border Protection (CBP Secondary)

AHU-900 (3,000 CFM Nominal Capacity) Serves the 1st Floor Crew Area

AHU-1000 (17,400 CFM Nominal Capacity) Serves the 1st Floor Lobby Area

AHU-1100 (18,500 CFM Nominal Capacity) Serves the 2nd Floor Star Class Lobby/Waiting Area

The Bag Laydown Areas will be forced ventilated with exhaust fans discharging at the south wall. Fresh air intake will be provided by means of intake louvers at the terminal north wall. Air recirculation will be provided by roof fans.

The units will have the following components and controls:

- Mixing box section with return and outside air connections.
- Pre-filters section with MERV 8 (ASHRAE 25-30% eff.) filters and secondary filter bank section with MERV 11 (ASHRAE 60-65% eff.) filters.
- Chilled water cooling and dehumidification coil with two-way modulating control valve.
- Supply fan with variable frequency drive to constantly deliver the required airflow quantity.
- Supply and return duct smoke detectors to de-energize the AHU supply fan motors, alarm the BAS, and alert the fire alarm system upon detection of smoke in the air stream.
- Supply and return air flow measuring stations to monitor the main supply and return air streams.

The AHU-100 thru 1,100 sequence of operation is as follows:

- The control panel will receive the signal of an electronic temperature transmitter located in the unit cooling coil discharge to position the coil chilled water pneumatic control valve to maintain a constant leaving temperature. An additional electronic temperature transmitter located in the upstream side of the cooling coil will monitor the condition.
- Differential pressure gages/switch will indicate each filter bank air pressure drop at the unit local panel door face. The control panel will receive the signal from the switch to alarm when setting is reached.
- Smoke detectors located on the air handling unit supply and return ducts will be interlocked with the unit supply fan in order to stop the fan operation if smoke is sensed. The smoke detector will send a digital signal to the DDC panel and to the fire alarm system.
- The unit supply fan will be under the control of the system time scheduling program. Digital and analog signals from the unit variable frequency drives will be sent to the control panel to monitor the fans status.
- A static pressure transmitter located on the air handling unit main supply duct will monitor the pressure to adjust the unit supply fan variable frequency drive to maintain a constant supply pressure.
- Door interlock switches located on the air handling unit supply fan doors will be interlocked with the unit fan in order to stop the fan operation if door is opened.
- The DDC panel will receive the signal of electronic flow transmitters sensing the signal of the airflow measuring stations located on the air handling unit supply and return ducts to monitor the air flow.
- Whenever the temperature or humidity are below or above the set limits alarm signals in the DDC panel will indicate alarm conditions.

It is estimated that the new units load will be about 360 tons of refrigeration. All the air handling units will be housed in a mechanical equipment mezzanine to be built between column lines 5-7, B-C and between column lines 14-16, A-B. The units will be factory assembled, double wall, custom type with coil section; fan section(s); the appropriate filter(s) and access sections.

All Non-Air Conditioned areas such as toilets, bathrooms, washrooms, janitor, storage room will be provided with mechanical air extraction including: ductwork / air side equipment like grilles, dampers, fire dampers / extract fans. The air compensation is through door gaps or opened windows.
All ducts and plenums shall be constructed of galvanized sheet metal of
gauges and reinforced as per SMACNA requirements of the SMACNA "HVAC
Duct Construction Standards - metal and flexible - 2006" and ductmate
proprietary duct connection systems; those constructed using ductmate shall
be in accordance with manufacturer guidelines. Ducts construction shall be
using G-60 or better galvanized steel (ASTM A653) LFQ (Lock Forming Quality)
with chemical treatment. Longitudinal seams shall be pittsburgh lock l-1
sealed with duct sealant 3m #800 or approved equal. Transverse joints shall
be as per SMACNA standards gauges and reinforcement shall be for the
operating pressures or for 2" w.g. neg, or pos, whichever is higher. Cross break
all rectangular ducts larger than 12" in, larger dimension, for stiffening access
doors shall be provided for service of dampers or other equipment.

Air distribution ductwork concealed above ceilings will be insulated
galvanized steel construction with aluminum or stainless steel air devices.
Exposed ceiling at public areas will be with fabric ductwork with the
applicable suspension system.

2 Chilled Water Narrative

2.1.1 Applicable Codes and Standards
- Puerto Rico Building Code 2018
- International Building Code – 2018 edition, as amended by the
  Commonwealth of Puerto Rico
- International Mechanical Code – 2018 edition, promulgated by the
  International Code Council, Inc. and as amended by the
  Commonwealth of Puerto Rico.
- ASME Code for Building Services B31.9

2.1.2 SYSTEMS DESCRIPTION

The chilled water for the building will supplied from a new centralized chilled
water plant with a dedicated set of primary pumps that will circulate the
chilled water across the chiller units. A dedicated set of secondary chilled
water pumps that take suction from the primary loop will be provided to
serve the loads of the Air Handling Units (AHUs) located in the building.
The entire chilled water production equipment including chiller, pumps,
auxiliary equipment such as compression tank and air separator will be
enclosed in a separated building, the required air cooled cooling towers will
be located at the roof of this building.
2.1.2.1 Chiller 1 & 2 (CH-1 and CH-2) - Trane model RTHD, 266 Tons nominal capacity, equipped with Variable Frequency Drive (VFD, Voltage @ 460, 3 Phase, 60 Hz.

2.1.2.1.1 Evaporator Conditions:
- Evaporator Flow = 530 Gpm (450 Gpm minimum)
- Evaporator Fluid Entering Temperature = 55°F
- Evaporator Fluid Leaving Temperature = 42°F
- Evaporator Delta T = 12°F

2.1.2.1.2 Primary Chilled Water Pumps – three primary pumps for recirculation at the chiller primary loop, 2 (ea) for normal operation + 1 (ea) for spare will be provided, these will be connected at the available Voltage @ 460, 3 Phase, 60 Hz. The design flow capacity will be 530 Gpm, and the expected Horsepower capacity is 7.5 Hp. The final selection and capacity will be refined during the Design Development phase.

2.1.2.1.3 Secondary Chilled Water Pumps – three secondary pumps for recirculation at the Air Handling Units (AHUs), 2 (ea) for normal operation + 1 (ea) for spare will be provided, these will be connected at the available Voltage @ 460, 3 Phase, 60 Hz. The design flow capacity will be 530 Gpm, and the expected Horsepower capacity is 7.5 Hp. The final selection and capacity will be refined during the Design Development phase.

2.1.2.1.4 Chilled Water Piping - New chilled water piping distribution will be provided from the proposed new chiller building to the Air Handling Units (AHUs) located at the mechanical mezzanines. A temperature rise of 12 deg. across the cooling coils based on the system's average supply temperature of 43°F and return temperature of 55°F will be the basis of air handling unit performance selection. The piping will run underground from the mechanical utilities room to the terminal building; from that point on, it will run hanged from the structure up to both AHU mechanical spaces.

Chilled Water Piping Outline Specifications:

<table>
<thead>
<tr>
<th>Piping Materials of Construction:</th>
<th>Carbon steel Sch. 40 ERW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Joint Construction</td>
<td>2&quot; and smaller threaded; larger butt welded</td>
</tr>
<tr>
<td>Valves</td>
<td>2&quot; and smaller ball type, bronze 3-piece, full port, threaded 150#; 3&quot; and larger butterfly type, cast iron</td>
</tr>
</tbody>
</table>
A building management system (BMS) will be provided to support the new HVAC and mechanical systems. It will be electronic DDC type controls, with electrical control at terminal devices. It will control and monitor the systems, provide alarm, status, and start/stop.

3 Cooling Tower Water Narrative

3.1.1 Applicable Codes and Standards
- Puerto Rico Building Code 2018
- ASME Code for Building Services B31.9

3.1.2 SYSTEMS DESCRIPTION

The cooling towers will provide the condenser side water for the centralized chilled water plant with two (2) dedicated sets of pumps that will circulate the condenser water across the chiller units. Also a corrosion-biocide injection system along with a recirculating filtration system for the basin of the towers will be provided.

3.1.3 Cooling Towers 1 & 2 (CT-1 and CT-2) – Ryowo Induced Draft Cross Flow Vertical Discharge Type, 250 Tons nominal capacity (ea)

3.1.3.1 Condenser Conditions:
- Condenser Flow = 750 Gpm (375 Gpm minimum)
- Condenser Fluid Entering Temperature = 95°F
- Condenser Fluid Leaving Temperature = 85°F
- Ambient Wet Bulb Temperature = 81°F
- Evaporator Delta T = 10°F

3.1.3.2 Condenser Water Pumps – four (4) in total (two 2 (ea) for each tower) pumps for recirculation at the condenser loop, for normal operation will be provided; these will be connected at the available Voltage @ 460, 3 Phase, 60 Hz. The design flow capacity will be 750 Gpm, and the expected Horsepower capacity is 15 Hp. The final selection and capacity will be refined during the Design Development phase.

3.1.3.3 Cooling Tower Water Piping - New piping distribution will be provided from the proposed new chiller building to the Cooling Tower (CT’s) located at the roof of the mechanical equipment room A temperature rise of 10 deg. across the cooling tower based on the system’s average supply temperature of 95°F and return temperature of 85°F will be the basis of towers unit performance selection.
Cooling Tower Water Piping Outline Specifications:

<table>
<thead>
<tr>
<th>Piping Materials of Construction:</th>
<th>Carbon steel Sch. 40 ERW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Joint Construction</td>
<td>2&quot; and smaller threaded; larger butt welded</td>
</tr>
<tr>
<td>Valves</td>
<td>2&quot; and smaller ball type, bronze 3-piece, full port, threaded 150#; 3&quot; and larger butterfly type, cast iron body, aluminum disc, 200#</td>
</tr>
<tr>
<td>Insulation</td>
<td>Polysicyanurate (Polyurethane)</td>
</tr>
</tbody>
</table>

A schematic of the proposed system is shown below
4 Plumbing Narrative

4.1.1 Applicable Codes and Standards
- Puerto Rico Building Code 2018

4.1.2 Domestic Water

The extent of the works required due to the project implementation is to provide the required plumbing utilities for the proposed bathroom, janitor rooms, kitchenettes and hose stations; no additional process related usages have been defined so far.

New tie-ins, are required to the existing public potable water line at the road at the front of the project. The size of this tie-in is yet to be determined but it is estimated to be not less that 6 (six) inches in diameter. This new tie-in will also serve the fire protection water reservoir tank and if required new water meters for future concessionaries at the project site. Both connection, for the fire and domestic service will have independent water meters. Hose bibs with a lockable access doors will be located along the exterior walls separated at approximately 50-75 ft. for maintenance purposes, also hose bibs will be provided at the toilet rooms. The shower rooms will be provided with in-line water heaters.

Also, potable water service will be provided for make-up/pressurization of the new chilled water system and hose bibs for air handling units cleanup; these to be provided at the mechanical equipment area. Back flow prevention devices will be used to protect from cross contamination as required by code.
Potable Water Piping Outline Specifications:

<table>
<thead>
<tr>
<th>Piping Materials of Construction</th>
<th>Seamless copper tubing type L hard temper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Joint Construction</td>
<td>Wrought copper, solder type</td>
</tr>
<tr>
<td>Valves</td>
<td>2&quot; and smaller ball type, bronze 3-piece, full port, threaded 150#; 3&quot; and 4&quot; ball type, carbon steel, flanged ends, Class 150</td>
</tr>
</tbody>
</table>

4.1.3 Sanitary Water

The extent of the works required due to the project implementation is to provide the required sanitary utilities for the proposed bathroom, janitor rooms, kitchenettes, hose stations and Air Handling Units (AHUs) condensate disposal; no additional process related usages have been defined so far.

New sinks drains and floor drains, to collect AHU's condensate drip at the mechanical equipment area (1 per AHU), will be provided; these will be connected to the existing drainage lines within the building. Cleanouts will be located at the beginning of each line, each 50 ft of linear run, at each change of direction and at each waste stack. The sanitary vents will be extended up to the roof of the building.

The required potable water supply for the vessel has been estimated at 1,000 tons (265,000 gals) to be served in 11 hours, for this it will be required to make a consult to PRASA (Puerto Rico Aqueduct & Sewage Authority) to get their recommendations, determination and eventually approval if there is availability of that water volume and pressure requirements to serve the vessel.

The final sanitary discharge connection point will be as determined by the Puerto Rico Aqueduct & Sewer Authority (PRASA) but it is mostly to be at the existing sewer trunk at the front of the project. It is understood that the discharge will be by gravity, but this will be based on the final building elevation, site grading, and pipe slope and connection point existing elevation. If the existing connection point existing elevation doesn't suffice the design intent, then a lift station will be required.

4.1.4 Piping

a. Drainage and ventilation piping will be PVC with DWV type fittings
b. Potable Cold and Hot Water piping will be copper type "L".
4.1.5 Fixtures

a. General common areas fixtures will be wall mounted ceramic type
b. Holding rooms plumbing fixtures will be vandal proof, stainless steel fabrication institutional type fixtures.
c. Level operating fixtures such as lavatories will be single level, shower room level will be of single valve thermostatic type

5 Fire Protection Narrative

5.1.1 Applicable Codes and Standards

- Puerto Rico Building Code 2018
- NFPA 13 Standard for the Installation of Sprinkler Systems

A wet type overhead sprinkler system will be provided to serve the project areas; the new system will be fed from a new 6” fire main adjacent to the project at ground level.

The new wet type overhead sprinkler system will consist of mains, branch lines, sprinklers, pipe supports and earthquake bracing; it will be provided to serve all areas.

Upright type sprinklers will be provided for exposed roof structure areas and pendent type for areas with hung ceiling.

Fire hose stations consisting of 1½”, 100 ft. long fire hose with associated rack and panel will also be provided connected to the new mains.
The new sprinkler systems will be hydraulically calculated and sized to deliver the required design density as per the following table:

### 5.1.2 Fire Protection Design Criteria:

<table>
<thead>
<tr>
<th>Area</th>
<th>Sprinkler Occupancy hazard Classification</th>
<th>Sprinkler Density</th>
<th>Sprinkler Type</th>
<th>5.1.2.1 Fire Hose Allowance</th>
<th>Residual Pressure</th>
<th>Seismic Restraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Area</td>
<td>Ordinary Hazard Group 2</td>
<td>0.20 gpm/ft²</td>
<td>Upright</td>
<td>500 gpm</td>
<td>7 psi</td>
<td>Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>over 1,500 ft²</td>
<td>½” office</td>
<td></td>
<td>minimum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(minimum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The new overhead sprinkler piping system will be carbon steel, black, seamless, ASTM A-53 or electric-resistance welded, ASTM A-135 as per NFPA. Pipes will be joined using malleable iron, split bolted mechanical clamps for pipe’s groove ends. Automatic sprinklers shall be standard spray-type, UL listed upright or pendant, brass except below suspended ceiling that will be chrome.

The fire protection system will be serviced by a new 100,000 gallons fire water storage tank and one 1,500 GPM at 125PSI diesel engine driven fire pump.

The exterior underground fire main is in a loop type distribution configuration. Each building’s fire riser is connected to the loop with provisions for isolation using post indicating valves or riser control valves. Post indicating valves are also along the loop for isolation purposes when system impairments occur.
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I. INTRODUCTION

SLS Consulting, Inc. (SLS) has prepared this Fire Protection/Life Safety Narrative report for the San Juan Cruise Terminal project that is, the Piers 11-12 Project - Cruise Pier Building referred to in Section 7 of this Schedule 13 (herein referred to as the "San Juan Cruise Terminal Project") located in San Juan, Puerto Rico. The Fire Protection/Life Safety Narrative report is intended to address the following major requirements as they relate to the proposed project:

Construction Type;

Means of Egress (e.g., occupant loading, number of exits, egress capacity, etc.);

Fire Protection Systems (e.g., sprinkler protection, fire alarm, smoke control, firefighter communication, etc.);

Means of Egress Lighting and Markings;

Emergency Power Requirements;

It is noted that this report is not intended to be "all inclusive" of fire protection/life safety requirements, but rather is intended to address major code compliance requirements. This Fire Protection/Life Safety Narrative report has been prepared based on the architectural drawings dated July 1, 2019 and discussions with the project team regarding fire protection/life safety systems. This Narrative is intended to serve as a design validation tool and will be updated as the project design progresses to final design.

A. Project Description

The proposed San Juan Cruise Terminal project will be a mixed-used building composed of 2 stories in addition to a mezzanine between the Ground and Second Floors. The building has a primary use of Assembly (Group A-3) along with secondary occupancies such as Business (Group B) and Low Hazard Storage (Group S-2). It contains queuing areas, bag screening, CBP Primary CBP Secondary Lobby, debark core, and bag processing/baggage claim on the Ground Floor. The Mezzanine is mostly used for offices and mechanical rooms. The Second Floor has a VIP lounge, VIP terrace, security operations, security queuing, check in, waiting area, cruise line support and debark lobby.

The building will be protected throughout by automatic sprinklers designed in accordance with NFPA 13, Standard for the Installation of Sprinklers and an emergency voice alarm communication system designed in accordance with NFPA 72, National Fire Alarm Code and Signaling Code.
B. Applicable Codes

The major applicable codes for the project include, but are not limited to, the following:

**Building Code**

**Fire Prevention/Life Safety Code**

**Electrical Code**
- NFPA 70: National Electrical Code® (NEC), 2017 Edition

**Mechanical Code**
- IMC: International Mechanical Code, 2018 Edition

**Plumbing Code**

**Major NFPA Standards**
- NFPA 10: Standard for Portable Fire Extinguishers, 2018 Edition
II. FIRE PROTECTION AND LIFE SAFETY CONCEPTS

A. Occupancy Classifications

The San Juan Cruise Terminal Project is designed as a mixed-use facility. As such, there will be several occupancies and uses within the building, as summarized by the table below.

<table>
<thead>
<tr>
<th>Occupancy Group Classifications (IBC)</th>
<th>Occupancy Classifications (NFPA 101)</th>
<th>Specific Use / Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Group A-3, Assembly occupancies (IBC §303.4)</td>
<td>Assembly (Chapter 12)</td>
<td>Waiting Areas, Baggage Claim, Queuing Areas, Terrace, CBP Primary, CPB Secondary, Lobby</td>
</tr>
<tr>
<td>Use Group B, Business occupancies (IBC §304.1)</td>
<td>Business (Chapter 38)</td>
<td>Offices</td>
</tr>
<tr>
<td>Use Group S-2, Low Hazard Storage occupancies (IBC §311.3)</td>
<td>Storage (Chapter 42)</td>
<td>General Storage and M/E/P, Data, IT, BOH</td>
</tr>
</tbody>
</table>

B. Building Classification Approach & Mixed-Use Approach

As stated above, the San Juan Cruise Terminal project will consist of multiple occupancies. The design approach is Non-Separated Mixed-Use Occupancy in accordance with IBC Section 508.3. Therefore, fire rated separation is not required between the occupancies.
C. Construction Type

i. Fire-Resistance Rating Based on Building Elements (IBC Table 601)

Due to the proposed occupancies classifications, building height, and number of stories in the San Juan Cruise Terminal project, the construction type for the building must be Type IB Construction in accordance with IBC Tables 504.3, 504.4 and 506.2. The fire resistance rating requirements shown below for Type IB Construction are obtained from Table 601 of IBC. This construction type also meets Type II(222) per NFPA 101 Table 12.1.6.

Table 2: Fire-Resistance Ratings of Building Elements (Hours)

<table>
<thead>
<tr>
<th>Building Element</th>
<th>Type IB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Structural Frame</td>
<td>2(^1)</td>
</tr>
<tr>
<td>Bearing Walls</td>
<td></td>
</tr>
<tr>
<td>Exterior(^6,6)</td>
<td>2</td>
</tr>
<tr>
<td>Interior</td>
<td>2(^1)</td>
</tr>
<tr>
<td>Nonbearing Walls and Partitions</td>
<td></td>
</tr>
<tr>
<td>Exterior</td>
<td>(Table 602)</td>
</tr>
<tr>
<td>Interior(^4)</td>
<td>0</td>
</tr>
<tr>
<td>Floor Construction and Secondary Members</td>
<td>2</td>
</tr>
<tr>
<td>Roof Construction and Secondary Members</td>
<td>1(^2,3)</td>
</tr>
</tbody>
</table>

1Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

2Except in Group F-I, I, M and S-1 occupancies, fire protection of primary structural members shall not be required, including protection of roof framing and decking where part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

3In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.

4Not less than the fire-resistance rating required by other sections of the IBC.

5Not less than required by Table 602 of the IBC based on the fire separation distances (FSDs).

6Not less than the rating as referenced in IBC Section 704.10

ii. Exterior Wall Ratings and Allowable Openings (IBC Table 602 and Table 705.8)

The fire separation distance (FSD) is the distance measured from the building face to the closest interior lot line; centerline of a street, an alley or public way; or to an imaginary line between two buildings on the lot. The distance shall be measured at right angles from the face of the wall.

Table 3, below, illustrates the exterior wall ratings and allowable openings based on the FSD and occupancy for Type IB construction.
Table 3: Type IB Exterior Wall\(^1\)\(^2\) Ratings and Allowable Openings

<table>
<thead>
<tr>
<th>Fire Separation Distance = X (feet)</th>
<th>Allowable Opening Area</th>
<th>Fire-Resistance Rating (Group A, B, S-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X &lt; 3</td>
<td>Not Permitted</td>
<td>1 hour</td>
</tr>
<tr>
<td>3 ≤ X &lt; 5</td>
<td>15%</td>
<td>1 hour</td>
</tr>
<tr>
<td>5 ≤ X &lt; 10</td>
<td>25%</td>
<td>1 hour</td>
</tr>
<tr>
<td>10 ≤ X &lt; 15</td>
<td>45%</td>
<td>1 hour</td>
</tr>
<tr>
<td>15 ≤ X &lt; 20</td>
<td>75%</td>
<td>1 hour</td>
</tr>
<tr>
<td>X ≥ 20</td>
<td>No Limit</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^1\)Where Table 705.8 permits nonbearing exterior walls with unlimited area of unprotected openings, the required fire-resistance rating for the exterior walls is 0 hours.

\(^2\)Nonbearing.

Table 4: Exterior Wall Ratings & Openings Limitations (> 30 Feet)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Allowed/Required Exterior Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Classification</td>
<td>Type IB</td>
</tr>
<tr>
<td>Occupancy Classifications</td>
<td>A-3, B, S-2</td>
</tr>
<tr>
<td>Fire Separation Distance</td>
<td>&gt; 30 Feet</td>
</tr>
<tr>
<td>Exterior Wall Fire Resistance Rating (IBC Table 602)</td>
<td>No Requirements</td>
</tr>
<tr>
<td>Exterior Wall Opening Protection (IBC Table 705.8)</td>
<td>No Limitations</td>
</tr>
</tbody>
</table>

Table 5: Exterior Wall Ratings & Opening Limitations (10 ≤ Feet X < 30 Feet)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Allowed/Required North Exterior Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Classification</td>
<td>Type IB</td>
</tr>
<tr>
<td>Occupancy Classifications</td>
<td>A-3, B, S-2</td>
</tr>
<tr>
<td>Fire Separation Distance</td>
<td>10 Feet ≤ X &lt; 30 Feet</td>
</tr>
<tr>
<td>Exterior Wall Fire Resistance Rating (IBC Table 602)</td>
<td>1 hour</td>
</tr>
</tbody>
</table>
| Exterior Wall Opening Protection (IBC Table 705.8)                         | 10 Ft. to less than 15 Ft. = 45% Openings  
15 Ft. to less than 20 Ft. = 75% Openings  
20 Ft. to less than 30 Ft. = No limitations |
Table 6: Exterior Wall Ratings & Opening Limitations (5 ≤ Feet X < 10 Feet)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Allowed/Required North Exterior Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Classification</td>
<td>Type IB</td>
</tr>
<tr>
<td>Occupancy Classifications</td>
<td>A-3, B, S-2</td>
</tr>
<tr>
<td>Fire Separation Distance</td>
<td>5 Feet ≤ X &lt; 10 Feet</td>
</tr>
<tr>
<td>Exterior Wall Fire Resistance Rating (IBC Table 602)</td>
<td>1 hour</td>
</tr>
<tr>
<td>Exterior Wall Opening Protection (IBC Table 705.8)</td>
<td>5 Ft. to less than 10 Ft. = 25% Openings</td>
</tr>
</tbody>
</table>

Table 7: Exterior Wall Ratings & Opening Limitations (X < 5 Feet)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Allowed/Required North Exterior Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Classification</td>
<td>Type IB</td>
</tr>
<tr>
<td>Occupancy Classifications</td>
<td>A-3, B, S-2</td>
</tr>
<tr>
<td>Fire Separation Distance</td>
<td>X &lt; 5 Feet</td>
</tr>
<tr>
<td>Exterior Wall Fire Resistance Rating (IBC Table 602)</td>
<td>1 hour</td>
</tr>
<tr>
<td>Exterior Wall Opening Protection (IBC Table 705.8)</td>
<td>Less than 3 Ft. = Not permitted 3 Ft. to less than 5 Ft. = 15% Openings</td>
</tr>
</tbody>
</table>
D. Fire Separation Requirements

The following table indicates the spaces within the San Juan Cruise Terminal project where fire resistance rated separations should be provided. This includes incidental accessory occupancies.

Table 8: Required Fire-Resistance Rated Spaces

<table>
<thead>
<tr>
<th>Spaces</th>
<th>Required Rating</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information technology equipment - Critical</td>
<td>1-hour fire barriers</td>
<td>NFPA 75 §5.1.3</td>
</tr>
<tr>
<td>Fire Alarm equipment</td>
<td>2-hour fire barriers</td>
<td>NFPA 72 Chapter 12</td>
</tr>
<tr>
<td>Electrical Rooms with dry-type Transformers &gt; 112.5 kVA</td>
<td>2-hour fire barriers(*)</td>
<td>NFPA 70 §450.21</td>
</tr>
<tr>
<td>Transformer Vaults (oil-insulated)</td>
<td>3-hour fire barriers</td>
<td>NFPA 70 §450.42</td>
</tr>
<tr>
<td>Mechanical Shafts</td>
<td>2-hour fire/smoke barriers</td>
<td>IBC §713.4 &amp; NFPA 101 §8.6.5</td>
</tr>
<tr>
<td>Stair Shafts2,4</td>
<td>2-hour fire/smoke barriers</td>
<td>IBC §1023.3 &amp; NFPA 101 §7.1.3.2</td>
</tr>
<tr>
<td>Trash Collection Rooms</td>
<td>Smoketight</td>
<td>IBC T-509</td>
</tr>
<tr>
<td>Emergency Switchgear Room</td>
<td>2-hour fire barriers</td>
<td>NFPA 110 §7.2.1.1</td>
</tr>
<tr>
<td>Fire Pump Room</td>
<td>1-hour fire barriers</td>
<td>NFPA 20 §5.12.1.1 &amp; IBC §913.2.1</td>
</tr>
<tr>
<td>Elevator Machine Rooms and Shafts2,4</td>
<td>2-hours fire barriers</td>
<td>IBC §713</td>
</tr>
<tr>
<td>Generator rooms (inside bldgs.)3</td>
<td>2-hours fire barriers</td>
<td>NFPA 110 §7.2.1.1</td>
</tr>
</tbody>
</table>

Note 1: Fire Barriers are rated walls that are continuous from floor slab to slab above. Fire partitions are rated walls that are continuous from floor to underside of the rated floor/ceiling assembly.
Note 2: All smoke control equipment [e.g., fans, VFDs, etc.] associated with stair and elevator pressurization is required to be enclosed in dedicated two (2) hour fire rated enclosures.
Note 3: Per NFPA 110, Section 7.1.1.4 Generators outside or on roof need lightning protection designed and installed in accordance with NFPA 780, Standard for the Installation of Lightning Protection Systems.
Note 4: In accordance with IBC 713.4, the shaft enclosure rating must not be less than the floor rating for the construction type.
(*) Code requires 1-hour, however 2-hours recommended by SLS to meet survivability requirements for cabling/equipment associated with FA or BDA systems.

For Assembly occupancies, NFPA 101 Section 12.3.2 states that rooms containing high-pressure boilers, large transformers, or other service equipment subject to explosion shall not be located directly under or abutting required exits.

i. Fire Separation Marking

Each new fire wall, fire barrier, fire partition, smoke barrier, smoke partition, or any other new wall required to have protected openings shall be permanently identified with signs or stenciling above any decorative ceiling and in concealed spaces with the wording, “FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS”. Such signs or stenciling shall be in 3-inch high letters, 3/8-inch stroke, and no more than 15 feet on
center. This requirement is mandated by both NFPA 101, Section 8.3.2.2.5 and IBC Section 703.7.

ii. Fire Barriers

Fire barriers shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and be securely attached. Shafts, interior exit stairways, and ramps that do not extend to the underside of the roof sheathing, deck or slab of the building shall be permitted to be enclosed at the top with construction of the same fire-resistance rating as the topmost floor penetrated by the shaft, but not less than the fire-resistance rating required for the shaft enclosure.

In accordance with IBC Section 707.5.1, the supporting construction for a fire barrier shall be rated at least as much as the fire barrier it is supporting.

Openings in a fire barrier shall be protected in accordance with IBC Section 716 of IBC and NFPA 101 Section 8.3. Openings shall be limited to a maximum aggregate width of 25% of the length of the wall, and the maximum area of any single opening shall not exceed 156 sq.ft.

- Single opening limit of 156 sq.ft. does not apply, where adjoining floors are protected by an automatic sprinkler system.
- Single opening limit of 156 sq.ft. does not apply, where the opening protective is a fire door serving exit stairs, exit ramps, exit access stairs, or exit access ramps.
- Single opening limit of 156 sq.ft. does not apply, where the opening protective has been tested in accordance with ASTM E 119 or UL 263. The fire resistance rating of the opening must be equal to or more than the fire resistance rating of the wall.
- The 25% limit of the fire barrier does not apply, where the opening protective is a fire door serving exit stairs, exit ramps, exit access stairs, or exit access ramps.
- The 25% limit of the fire barrier does not apply, where the opening protective has been tested in accordance with ASTM E 119 or UL 263.

iii. Fire Partitions

Fire partitions shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above, or to the fire-resistance-rated floor/ceiling or roof/ceiling assembly above and must be securely attached.
iv. Horizontal Assemblies

In accordance with IBC Section 711.2.4, horizontal assemblies and supporting structures require 2-hour fire-resistance rating as the building is Type IIB construction. The roof construction and supporting assemblies are required to be 1-hour fire-resistance rated.

v. Opening Protection

All openings and penetrations on fire/smoke rated walls described above must be protected in accordance with IBC Chapter 7, Fire and Smoke Protection Features, NFPA 101, Chapter 8, Features of Fire Protection.

vi. Penetrations

The following sections of this report are applicable to penetrations through fire barriers, fire partitions, and horizontal assemblies.

a. Through Penetrations

Penetrations shall be installed as tested in an approved fire-resistance-rated assembly, or in an approved penetration firestop system tested in accordance with ASTM E814 or UL 1479. Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space between the penetrating item and the fire-resistance-rated wall is permitted to be protected via the following two scenarios:

- Holes with a maximum 6 in. diameter and 144 in² area are permitted to be protected with grout or mortar.
- The material used to protect the opening must pass ASTM E 119 or UL 263 test conditions.

b. Membrane Penetrations in Fire-Resistance-Rated Walls

Membrane penetrations must comply with IBC Section 714.4.2. Where walls or partitions are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

c. Horizontal Assemblies

Penetrations of a fire-resistance-rated floor, ceiling assembly, or ceiling membrane must comply with IBC Sections 714.5.1. through 714.5.4

Through penetrations must be installed as tested in the approved fire-resistance-rated assembly, or they must be protected by an approved through-penetration firestop system installed and tested in accordance with ASTM E814 or UL 1479 with
an F rating/T rating of not less than 1 hour but not less than the required rating of the floor penetrated.

Penetrations of nonfire-resistance-rated floor or floor/ceiling assemblies or the ceiling membrane of a nonfire-resistance-rated roof/ceiling assembly shall meet the requirements of IBC Section 713 or shall comply with Section 714.6.1 or 714.6.2.

- Noncombustible penetrating items, connecting not more than five stories are permitted, provided that the annular space is filled to resist the free passage of flame and the products of combustion with an approved noncombustible material or with a fill, void or cavity material that is tested and classified for use in through-penetration firestop systems.

- Penetrating items that connect not more than two stories are permitted, provided that the annular space is filled with an approved material to resist the free passage of flame and the products of combustion.

E. Vertical Opening Code Compliance Approach

Several vertical openings anticipated within the San Juan Cruise Terminal project are protected by fire-resistance rated construction in accordance with NFPA 101 Section 8.6 and IBC Section 712.

i. Shafts

Shaft enclosures in the project must be designed in compliance with IBC Section 713. The shaft enclosures shall have a fire resistance rating of not less than 2 hours and not less than the floor assembly penetrated but need not exceed 2 hours. The construction shall be as fire barriers in accordance with IBC Section 707.

ii. Elevators

Per IBC Section 3006.2, elevator hoistway door openings must be protected where the elevator hoistway connects more than three stories, is required to be located in a shaft enclosure.

NOTE: The Terminal Building is less than three (3) stories, therefore, the lobbies are not required. However, elevators used as part of the accessible means of egress may still require the lobby as indicated in the Accessibility Section of this report.
iii. Escalators

There are two (2) escalator groups (1A/1B and 2A/2B) creating vertical openings in the building. These openings must be protected in accordance with IBC Section 712 and NFPA 101 Section 8.6.9.7.

Per IBC 712.1.3.1, the escalators shall be protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13 where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the escalator. This is limited to openings that do not connect more than four stories in a Group A building. The sprinkler protection around the vertical opening must comply with NFPA 13. Draft stops (18-inch deep) shall be located immediately adjacent to the opening made of noncombustible material that will stay in place before and during sprinkler operation. In addition, sprinkler heads are spaced 6 feet apart and placed 6-12 inches from drafts top on side away from opening.

Another option is to protect the vertical opening by approved shutters at every penetrated floor shall be permitted. The shutters shall be of noncombustible construction and have a fire-resistance rating of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with IBC §907.3.1 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release there from (IBC 712.1.3.2).

iv. Atrium

If there is an atrium, it must comply with IBC Section 404 and NFPA 101 Section 8.6.7.

- The atrium requirements in IBC and NFPA 101 are as follows:
  - The atrium must be separated from the adjacent spaces by fire barriers with not less than a 1-hour fire resistance rating. Any number of levels shall be permitted to open directly to the atrium without enclosure based on a smoke control engineering analysis.
  - Glass walls and inoperable windows shall be permitted in lieu of the fire barriers where all the following are met:
     - Automatic sprinklers are spaced on both sides of the glass wall at 6 ft intervals.
     - The sprinklers are located between 4 inches to 12 inches away from the glass.
     - The glass wall is of tempered, wired, or laminated glass held in place by a gasket framing system to deflect without breaking the glass before sprinklers operate.
     - The sprinkler heads are not required on the atrium side of the glass wall where there is no walkway or other floor area on the atrium side above
main floor level.
  o Doors in the glass walls are of glass or other material that resists the passage of smoke.
  o Doors in the glass walls are self-closing or automatic-closing upon detection of smoke.
  o The glass is continuous vertically, without horizontal mullions, window treatments, or other obstructions that would interfere with the wetting of the entire glass surface.

- Access to exits is permitted to be within the atrium. Exit discharge is permitted to be within the atrium.
- The occupancy within the atrium meets the specification for classification as low or ordinary hazard contents.
- The entire building is protected by approved, supervised automatic sprinkler system.
- An engineering analysis is performed that demonstrates that the building is designed to keep the smoke layer 6 ft. above the highest floor level of exit access open to the atrium for a period of 20 minutes or 1.5 times the calculated egress time, whichever is greater.
- The smoke control system described above is activated by sprinkler system and manual controls accessible to the fire department.
- Smoke control system is required and shall be connected to standby power
- The interior finish of walls and ceiling of the atrium shall not be less than Class B with no reduction in class for sprinkler protection. (IBC)
- In floors above the lowest level, the portion of exit access travel distance within the atrium space shall be not greater than 200 feet. (IBC)
v. Convenience Openings

"Convenience openings" in accordance with all criteria in NFPA 101 Section 8.6.9.1 and IBC 712.1.9 are provided in the following table.

Table 9: IBC and NFPA 101 Convenience Opening Requirements

<table>
<thead>
<tr>
<th>IBC Section 712.1.9 Summary of Requirements/Analysis</th>
<th>NFPA 101 Section 8.6.9.1 Summary of Requirements/Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Does not connect more than two (2) stories.</td>
<td>(1) Such openings shall connect not more than two adjacent stories (one floor pierced only).</td>
</tr>
<tr>
<td>(2) Does not penetrate a horizontal assembly that separates fire areas or smoke barriers that separate smoke compartments.</td>
<td>(2) Such openings shall be separated from unprotected vertical openings serving other floors by a barrier complying with 8.6.5.</td>
</tr>
<tr>
<td>(3) Is not concealed within the construction of a wall or a floor/ceiling assembly.</td>
<td>(3) Such openings shall be separated from corridors.</td>
</tr>
<tr>
<td>(4) Is not open to a corridor in Group I and R occupancies.</td>
<td>(4) Such openings shall be separated from other fire or smoke compartments on the same floor.</td>
</tr>
<tr>
<td>(5) Is not open to a corridor on non-sprinklered floors.</td>
<td>(5) Convenience opening shall be separated from the corridor referenced in 8.6.9.1(3) by a smoke partition, unless Chapters 11 through 43 require the corridor to have a fire resistance rating.</td>
</tr>
<tr>
<td>(6) Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.</td>
<td>(6) Such opening shall not serve as a required means of egress.</td>
</tr>
</tbody>
</table>

A convenience stair is permitted in Assembly occupancies per NFPA 101 Section 12.3.1(4) if all the following are met (NFPA 101 Section 8.6.9.2):

(1) The convenience stair shall not serve as a means of egress.

(2) The building is protected throughout with an approved supervised automatic sprinkler system.

(3) The convenience stair openings are protected with the protection of vertical openings per NFPA 13.
The floor opening shall not exceed twice the horizontal projected area of the stairway.

Such openings shall not connect more than 4 contiguous stories.

F. Interior Finish Requirements

Interior finishes within the San Juan Cruise Terminal project are designed to comply with the requirements of the IBC and NFPA 101. The major interior finish requirements for the project are summarized in the table below (IBC Table 803.13 and NFPA 101 Table A.10.2.2). The sprinkler system reduction allowed by code has been applied.

<table>
<thead>
<tr>
<th>Occupancy Classifications</th>
<th>Floor Finish Requirement</th>
<th>Interior Wall and Ceiling Finish Requirements (IBC and NFPA 101)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly</td>
<td>Exits: Class II</td>
<td>Exit Enclosure: Class B</td>
</tr>
<tr>
<td></td>
<td>Corridors: Class II</td>
<td>Corridors &amp; Exit access stairs: Class B</td>
</tr>
<tr>
<td></td>
<td>Spaces not separated</td>
<td>Rooms &amp; Enclosed Spaces: Class C</td>
</tr>
<tr>
<td></td>
<td>from corridor: Class II</td>
<td>Lobbies: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assembly Rooms: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screens: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Note 1</td>
</tr>
<tr>
<td>Business</td>
<td>Exits: Class I or II</td>
<td>Exit Enclosure: Class B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Corridors &amp; Exit access stairs: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rooms &amp; Enclosed Spaces: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other Spaces: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Note 2</td>
</tr>
<tr>
<td>Storage</td>
<td>Exit: Class II</td>
<td>Exit Enclosure: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Corridors &amp; Exit access stairs: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rooms &amp; Enclosed Spaces: Class C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other Spaces: Class C</td>
</tr>
</tbody>
</table>

Note 1: The ratings shown are from IBC, which has the most stringent requirements

Note 2: The ratings shown are from NFPA 101, which has the most stringent requirements

- All combustible materials used as interior wall, ceiling, and floor finishes must have proper documentation indicating that the finishes comply with the requirements above.
- It is recommended that the design for unique or custom interior finishes (e.g., wood finishes, textile wall coverings, foam finishes, material applied to fire doors, etc.) within the project be identified early in the design/construction process. Interior finishes consisting of unique materials or assembly of different materials will have to be tested by a nationally recognized laboratory.
• Interior wall and ceiling trim and incidental finishes must be identified by the project team and must be included for assessment. Interior floor trim material used as wall base or decorative border would also be included and tested as a wall finish or floor finish.

• Interior wall and ceiling finishes are normally tested as a single layer on noncombustible substrate. If the material is installed in any other manner, then the assembly of all materials must be tested in accordance with the standards above.

• Wood interior finish (e.g., millwork, wood lockers, etc.) must be tested as an assembly of all the components exactly how it will be installed including the adhesives, lacquers, glazings, etc.

• It is noted that normally the authority having jurisdiction will not accept the application of a flame-retardant treatment or coating in order to achieve the proper rating for new interior finishes.

• Depending on the occupancy classification, the furnishings in common areas, such as upholstered furniture, must also be evaluated before the furniture is installed in the facility.

• The fire department may require a Third (3rd) Party Evaluation of the interior finishes to ascertain compliance with above rating.
G. General Means of Egress Requirements

i. Maximum Allowable Travel Distances:

As a building protected throughout by automatic sprinklers, the following maximum allowable travel distances are applicable to the San Juan Cruise Terminal project as required by IBC Table 1006.2.1, IBC Table 1017.2, IBC Section 1020.4, and NFPA 101 Table A.7.6.

<table>
<thead>
<tr>
<th>Occupancy Group Classifications (IBC)</th>
<th>Occupancy Classifications (NFPA 101)</th>
<th>Distances</th>
</tr>
</thead>
</table>
| Use Group A, Assembly occupancies      | Assembly                             | Max Travel Distance: 250 feet  
Max Dead End Distance: 20 feet  
Max Common Path Distance: 20/75 feet |
| Use Group B, Business occupancies      | Business                             | Max Travel Distance: 300 feet  
Max Dead End Distance: 50 feet  
Max Common Path Distance: 100 feet |
| Use Group S-2, Low Hazard Storage occupancies | Storage - Low               | Max Travel Distance  
• Storage: 400 feet (IBC)  
Max Dead End Distance  
• Storage: 50 feet (IBC)  
Max Common Path Distance  
• Storage: 100 feet (IBC) |

*Assembly use spaces with an occupant load of 50 or more, shall have its common path of travel distance limited at 20-feet. If the occupant load is less than 50, then the common path of travel distance shall be limited at 75-feet.

ii. Number of Required Exits Per Floor

Each floor of the building is provided with the following minimum number of exits as required by IBC Section 1006.2.1.1 and NFPA 101 Section 7.4.1.2.

<table>
<thead>
<tr>
<th>Floor Occupant Load</th>
<th>Number of Exits Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-500 occupants</td>
<td>2 Exits</td>
</tr>
<tr>
<td>501-1,000 occupants</td>
<td>3 Exits</td>
</tr>
<tr>
<td>&gt;1,000 occupants</td>
<td>4 Exits</td>
</tr>
</tbody>
</table>