

SECTION 02 41 16
STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Examination of areas where demolition work will occur
- B. Demolition of designated structures and removal of materials from site.
- C. Protection
- D. General Requirements of demolition work
- E. Demolition by mechanical means
- F. Site restoration
- G. Repairs
- H. Disposal of demolish materials
- I. Cleaning.

1.2 RELATED SECTIONS

- A. Section 010100 – General Requirements / Scope of Work
- B. Section 013300 – Submittal Procedures
- C. Section 010400 – Quality Control
- D. Section 017419 – Construction and Vegetative Material Waste Management and Disposal
- E. Section 024113 – Selective Site Demolition
- F. Section 028213 – Asbestos Remediation
- G. Section 028300 – Lead Remediation
- H. Section 311100 – Cleaning and Grubbing

1.3 REFERENCES

- A. ANSI A10.6 - Safety Requirements for Demolition Operations.

- B. NFPA 241 – Safeguarding Construction Alteration, and Demolition Operations.
- C. NFPA 5000 – Building Construction and Safety Code.
- D. National Association of Demolition Contractors – Demolition Safety Manual
- E. OSHA 29 CFR 1926 - Construction Industry Subpart T: Demolition

1.4 DEFINITIONS

- A. Demolition: The process of wrecking or taking out any load-supporting structural member of a facility together with any related handling and disposal operations.
- B. Demolition Plan: The planned steps and processes for managing demolition activities and identifying the required sequencing activities and disposal mechanisms. Plan must be approved by Owner’s Authorized Representative prior to work beginning. Prepare a Demolition Plan and submit proposed salvage, demolition, and removal procedures for approval before work is started.
- C. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged.
- D. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Include fasteners or brackets needed for reattachment elsewhere

1.5 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor and shall be removed from Owner’s property.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - a. Carefully salvage in a manner to prevent damage and promptly return to Owner’s Authorized Representative.

1.6 SUBMITTALS

- A. Section 013300 – Submittal Procedures
- B. Qualification Data Demolition Firm: Company specializing in performing the Work with minimum 5 years documented experience. Company must have as part of their available resources a license Professional Engineer registered in Puerto Rico. Professional Engineer must be specialized in structures design and demolition with a minimum 10 years documented professional experience. Qualifications of a qualified refrigerant recovery technician must be provided.
- C. Proposed Protection Measures: Submit informational report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control.

- a. Shop Drawings: Indicate location and construction of barricades, fences, and temporary work.
 - b. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.
- D. Demolition Plan: Structural integrity and deterioration of any structural member and/or building component must be considered prior to identify the course of action in regards to asbestos containing material and lead based paint mitigation and demolition process. Must be prepared and certified by a Professional Engineer specialized in structures design and demolition with a minimum 10 years documented professional experience. Include the following, as minimum:
- a. Detailed sequence of demolition work per building/facility, with starting and ending dates for each activity, including procedures for careful removal and disposition of materials specified to be salvaged.
 - b. A detailed description of methods and equipment to be used for each operation and of the sequence of operations.
 - c. Coordination with other work in progress, including temporary interruption of utility services.
 - d. Procedures and work restrictions to mitigate dust, noise, vibration, and odors that may impact neighbors. Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
 - e. A disconnection schedule of utility services indicating shutoff and capping or re-routing of utility services.
 - f. Identification of components and materials to be salvaged for reuse or recycling.
 - g. Include tracking forms for all removed materials indicating type, quantities, condition, destination, and end use. Coordinate Demolition Plan with Waste Management Plan in accordance with Section 017419 - Construction Waste Management.
- E. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- F. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 - Photographic Record. Submit before the Work begins.
- G. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes, if any.
- H. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered

1.7 QUALITY ASSURANCE

- A. Section 014000 – Quality Requirements
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification

program

- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of Authorities Having Jurisdiction (AHJ).
- D. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241

1.8 PRE-DEMOLITION CONFERENCE

- A. Pre-demolition Conference: Conduct conference at Project site to comply with contractual requirements. Review methods and procedures related to demolition including, but not limited to, the following:
 - a. Inspect and discuss condition of construction to be demolished. Structural integrity and deterioration of any structural member and/or building component must be considered prior to identify the course of action in regard to asbestos containing material and lead based paint mitigation and demolition process
 - b. Review structural load limitations of existing structures.
 - c. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - d. Review and finalize protection requirements.
 - e. Review procedures for noise control and dust control.
 - f. Review procedures for protection of adjacent buildings, roads, and fences.
 - g. Review items to be salvaged and returned to Owner (if any).

1.9 WORK RESTRICTIONS

- A. Refer to Work Restrictions paragraph in Section 010100 General Requirements / Scope of Work.

1.10 PROJECT CONDITIONS

- A. Section 017300 – Execution and Closeout Requirements
- B. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- C. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 - a. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 - b. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings. a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- D. Owner assumes no responsibility for buildings and structures to be demolished.
 - a. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

- E. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - a. Hazardous materials will be removed by Owner before start of the Work.
 - b. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner's Authorized Representative. Hazardous materials will be removed by Owner under a separate contract.
- F. On-site storage or sale of removed items or materials is not permitted.

1.11 COORDINATION

- A. Coordinate demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied buildings.

PART 2 - PRODUCTS

2.1 MATERIALS - SOIL

- A. Satisfactory Soils: Comply with requirements in Section 312 00 - Earth Moving

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations. Comply with Section 013233 - Photographic Record.
- D. Structural integrity and deterioration of any structural member and/or building component must be considered prior to identify the course of action in regards to asbestos containing material and lead based paint mitigation and demolition process. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

- A. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.
- B. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving

buildings and structures to be demolished.

- a. Arrange to shut off indicated utilities with utility companies.
 - b. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - c. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- C. Existing Utilities: See plumbing and electrical Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- D. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
- a. Strengthen or add new supports when required during progress of demolition.
- E. Salvaged Items: Comply with the following:
- a. Clean salvaged items of dirt and demolition debris.
 - b. Pack or crate items after cleaning Identify contents of containers.
 - c. Store items in a secure area until delivery to Owner's Authorized Representative.
 - d. Transport items to storage area designated by Owner's Authorized Representative.
 - e. Protect items from damage during transport and storage.

3.3 PROTECTION

- A. Existing Facilities: Protect adjacent parking spaces, trees, fences, gates, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
- a. Strengthen or add new supports when required during progress of demolition.
- C. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
- a. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner's Authorized Representative and authorities having jurisdiction.
 - b. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
 - i. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated by Owner's Authorized Representative.
- a. Protect adjacent buildings and facilities from damage due to demolition activities.

- b. Protect existing site improvements, appurtenances, and landscaping to remain.
 - c. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - d. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - e. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 - f. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 - g. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.4 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings/facilities and site improvements completely, as indicated on Reference Drawings, Section 010100 – General Requirements / Scope of Work, Specifications and Demolition Plan.
- B. Use methods required to complete the Work within limitations of governing regulations and as follows:
- a. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 - b. Maintain fire watch during and for at least two (2) hours after flame cutting operations.
 - 3. Maintain adequate ventilation when using cutting torches.
 - c. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- I. Engineering Surveys: During demolition, perform engineering surveys to detect hazards that may result from building demolition activities. Contractor must ensure surveys are performed by qualified personnel under the supervision of a Professional Engineer registered in Puerto Rico. A minimum 10 years documented professional experience in construction and demolition projects.
- C. Cease operations immediately if adjacent structures appear to be in danger and/or considerations included as part of the approved Demolition Plan are not in agreement with building/facility and site conditions. Notify (Architect/Engineer or Owner's Authorized Representative) and make sure safety provisions are maintained. Prior to resume operations Contractor must request and perform on the same day of the event an inspection and evaluation by a Professional Engineer specialized in structures. A written report must be issued by the Professional Engineer no later than the day after the inspection and evaluation. Report must indicate building condition and necessary actions to be implemented to allow work to continue. Corrective measures to be implemented must be inspected, evaluated, and approved by the Professional Engineer prior Architect and Owner's Authorized Representative grants approval to continue with the demolition works.
- D. Conduct operations with minimum interference to any type of access. Maintain egress and

access free from obstructions at all times.

- E. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - a. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 - b. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as flooding, and pollution.
- F. Explosives: Use of explosives is not permitted.

3.5 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - a. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Salvage: Items to be removed and salvaged are indicated on Reference Drawings (if any).
- D. Remove existing structures indicated to be removed to below grade level
 - a. Below-Grade Construction: Demolish foundations and other below-grade construction that are within footprint of existing construction and extending 5 feet outside footprint indicated. Abandon and cap below-grade construction outside this area.
 - b. Remove below-grade construction, including basements, foundation walls, and footings, completely ~~to at least 4 feet below grade~~.
 - c. Fill below-grade construction voids flush with grade as per Section 312000 - Earth Moving.
- E. Existing Utilities: Connected to existing structures to be demolished must be removed and capped. Cut utilities flush with grade. Cap with same materials and size as the existing utility.
- F. Existing Utilities: Demolish existing utilities and below-grade utility structures that are within 5 feet outside footprint of structures to be demolished.
 - a. Fill abandoned utility structures with satisfactory soil materials according to backfill requirements in Section 312000 - Earth Moving.
 - b. Piping: Disconnect piping at unions, flanges, valves, or fittings.
 - c. Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.
- G. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.

- a. Piping: Disconnect piping at unions, flanges, valves, or fittings.
- b. Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.

3.6 SITE RESTORATION

- A. Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition in areas occupied by structures to be demolished until all demolition in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.
 - a. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with materials according to backfill requirements in Section 312000 - Earth Moving.
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.7 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and legally dispose of them in an EPA approved landfill acceptable to Authorities Having Jurisdiction (AHJ).
 - a. Do not allow demolished materials to accumulate on-site.
 - b. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.
- B. See Section 017419-Construction and Vegetative Waste Management and Disposal for recycling of demolition
- C. Showing for sale or selling materials and equipment on site is prohibited.
- D. Do not burn demolished materials.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
 - a. Clean roadways of debris caused by debris transport

END OF SECTION