

Wayland Project Library Expansion

Scheme: New Building

September 19, 2016

SUBSTRUCTURE

FOUNDATIONS

Based on the recommendations of the Geotechnical Engineer about the soil properties at the site, the columns of the proposed structure would bear on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. With a recommended bearing capacity of the soil of 2.0 tons/sf, a typical interior footing would be 8 ft. – 0 in. x 8 ft. – 0 in. x 24 in. deep in the two-story areas. Typical exterior footings would be 7 ft. – 0 in. x 7 ft. – 0 in. x 24 in. deep in two-story areas. Footings supporting columns for double-story areas would be 8 ft. – 0 in. x 8 ft. – 0 in. x 24 in. deep. Footings at the braced frame locations would typically be 9 ft. – 0 in. x 9 ft. – 0 in. x 30 in. deep. The exterior foundation walls would be 14 in. to 16 in. thick, reinforced cast-in-place concrete walls on 24 in. to 36 in. wide continuous reinforced concrete strip footings around the perimeter of the building extending a minimum of 4 ft. – 0 in. below finished grade. It is possible that 2 ft. – 0 in. x 2 ft. – 0 in. reinforced concrete tie beams may be required, tying the foundation at braced frame locations. It is possible that foundation drains would be required at below-grade areas of the building. The basement walls will be 12 in. thick concrete walls supported on continuous concrete strip footings.

SLAB ON GRADE

Based on our assumption of the site conditions, the lowest level of the proposed building would be a 5 in. thick concrete slab-on-grade, reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12 in. of compacted granular structural fill.

It is possible that underslab drains would be required under the basement slab.

SHELL

SUPERSTRUCTURE

FLOOR CONSTRUCTION

Typical Floor Construction

A 4 - ½ in. normal weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 13 psf for the typical framing. At the long span structures, allow for 18 psf for the steel framing.

ROOF CONSTRUCTION

Typical Roof Construction

The typical roof construction would be galvanized, corrugated 1 - ½ in. deep, Type 'B' metal roof deck spanning between wide flanged steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported floor slab. The weight of the structural steel is estimated to be 13 psf for flat roof areas, 15 psf for sloping areas, and 18 psf for long span steel framing. Allow for structures associated with architectural features such as light monitors, skylights, cupolas, roof overhangs, etc.

Canopy Structures

Canopy structures would be supported on columns. Allow for 18 psf for the weight of the structures.

VERTICAL FRAMING ELEMENTS

Columns

Columns would be hollow structural steel columns. Typical columns would be HSS 8 x 8 columns and the columns at the double-story spaces would be HSS 12 x 12.

CMU Shafts

Egress stair and elevator shafts would be reinforced concrete masonry units. Typical thickness would be 8 in. nominal, supported on continuous foundation walls and strip footings similar to exterior wall construction.

Lateral Load Resisting System

The typical lateral load resisting system for the library would be comprised of concentric steel braced frames of hollow structural steel members.