1.0 GENERAL

1.1 Co-ordination Requirements

.1 Coordinate requirements with UBC Building Operations, through the UBC Properties Trust or Project Services Project Manager.

.2 All proposed systems must be reviewed and signed off by UBC Building Operations. The Facilities Transition Team is to be contacted for assistance with coordination of review prior to tendering.

1.2 Description

.1 The design, supply and installation of fall protection systems for maintenance personnel (particularly when parapets are less in height than required for guards), and for window washing equipment and personnel.

.2 Meet all requirements of the Province of British Columbia Industrial Health and Safety Regulations pursuant to WorkSafe BC.

.3 Be responsible for determining the location and types of anchorages required to provide a complete system.

.4 Special consideration shall be applied to equipment installation locations in atria and other unique interior locations. It is preferred that all building systems and equipment that require periodic maintenance are located in areas that do not require fall protection.

1.3 Performance Standards

.1 Province of British Columbia Industrial Health and Safety Regulations pursuant to WorkSafe BC.


.3 Engineer to design a complete fall protection system to prevent a worker from falling according to WorkSafe BC requirements.

1.4 Quality Control and Assurance

.1 Submittals

.1 Shop Drawings

.1 A Professional Engineer’s seal, signature and a statement assuring code compliance must appear on each shop drawing.

.2 At completion, submit as-built drawings and 2 copies of a reduced plastic laminated as-built shop drawing showing anchor locations and detailed fall protection plan clearly depicting the intent and usage of each component and overall system, to be supplied to the UBC Project Manager for posting near roof entrances.
.2 Quality Assurance

.1 Work to be carried out by a company specializing in the type of safety equipment required.

.2 All components to be designed and certified by a professional engineer registered in the Province of British Columbia.

.3 Roofing penetrations to conform to Roofing Contractors Association of BC (RCABC) standards.

.4 Follow manufacturers and roofing inspector’s recommendations.

.3 Quality Control

.1 Design Engineer to carry out site reviews and submit a Letters of Assurance certifying that the anchors meet the performance requirements of CSA Z91M.

2.0 MATERIAL and DESIGN REQUIREMENTS

2.1 Prescriptive Requirements

.1 All miscellaneous metal work shall have the minimum standards described in Section 05500.

.2 All roofing work and roof repair work shall be in accordance with Section 07500 - Membrane Roofing.

.3 Components

.1 Cast-in-place material: stainless steel type 304.

.2 Exposed anchor surfaces and exposed structural components: stainless steel type 304.

.3 Rotating heads are not allowed on campus, as they make safety inspections more difficult.

.4 Adhesive and expansion shield anchors are not be used due to load testing inspection requirements.

.5 Anchors must be certified that they meet the performance requirements of CSA Z91M.

.6 No adhesive or expansion shield anchoring of anchors.

2.2. UBC Guidelines for Rooftop “Fall Protection System” Design

.1 Overview

.1 UBC requires that all new buildings, major renovations, and roof replacement projects be reviewed with UBC Building Operations to determine if required to incorporate the design of a permanent, engineered, fall protection system. The system shall incorporate the use of rust resistant (e.g. galvanized metal), railing anchors, horizontal life lines, signage, etc.
.2 The lead design consultant is responsible for the functional requirements of the system design. The “Fall Protection System” design is more than a rooftop anchor installation design.

.2 Buildings or Rooftop Surfaces less than 10 feet above Grade

.1 Fall protection design is not typically required unless the hazard of falling is greater than the hazard of impacting a flat surface. Consideration must be given to what periodic maintenance is required to be performed while on these surfaces to ensure that safe access is achievable using ladders, et.al.

.3 Buildings or Surfaces greater than 10 feet but less than 25 feet above Grade

.1 A fall protection system design is required for use by employees for the purpose of fall restraint and fall arrest. Design for window cleaning is only required on buildings where access is not practical from the ground via extension poles or a mobile lift.

.4 Buildings or Surfaces greater than 25 feet above Grade

.1 A fall protection system design is required for use by employees for the purpose of fall restraint, fall arrest, and window cleaning via a bosun’s chair. Attachment mechanisms for swing stage or other roof supported maintenance equipment should only be designed if specifically required for the project; like a high-rise building. A wall stabilization anchoring system is to be provided to prevent the working platform from dangerously swaying in the wind while suspended, where required by code or deemed necessary due to the combination of building accessibility, building height and wind speeds.

.5 Fall Protection System Designs Shall Include:

.1 Adherence to WorkSafe BC guidelines and regulations required.

.2 Adherence to applicable latest building code required.

.3 Signed and sealed by a Professional Engineer registered in the province of BC.

.4 Window cleaning anchor design must allow for separate anchors for the person (safety line) and the suspension equipment (bosun’s chairs, swing stages etc.) (suspension line).

.5 Drawing(s) indicating the anchoring locations and instructions for use regarding angles and tie off locations. Indicate ground areas requiring pedestrian protection while suspension equipment (bosun’s chairs, swing stages etc.) is being used for maintenance, areas over doorways, etc. The drawing shall be printed on a durable medium and mounted at each rooftop access location and fall protection access location inside of buildings.

.6 The drawings shall include instructions on any protection requirements for the building parapet walls and/or flashings to ensure that the ropes do not damage the building components and the building components do not damage the ropes.

.7 Imposed loads on the parapet walls shall be identified on the drawings and the information provided to the project lead designer, usually the Architect, to ensure that parapets are designed accordingly.
.8 The designer must ensure that rooftop mounted equipment, ducting, skylights, piping, vent stacks, etc. are *taken into account* and do not impact the operation of the system. Modify the design as required to ensure that the system is fully functional once the building is occupied.

.9 Areas of the roof that are accessible to the general public shall use guardrails *that are side-mounted to the parapet or guardrail-height insulated parapets* to ensure protection against falls. *This is because the general public* will not have the training or equipment required for using the roof anchor system.

.10 An annual inspection checklist indicating each anchor shall be developed. Every anchor on the roof shall be uniquely identified, and the checklist will correspond to these identifiers. The checklist shall be prepared on 8.5" x 11" sheets. A copy of the checklist will be left in a mounted pouch at the entrance of the fall protection area for review by personnel accessing the fall protection area.

.11 Anchor design and load rating drawings shall be provided for each type of anchor in the system.

.12 Anchor fastening details must be provided for each type of fastening. The fastener load ratings must be indicated.

.13 Anchor manufacturer’s shop drawings, installation instructions, and inspection / testing requirements.

.14 *Provide a comprehensive and detailed description of anchor inspections needed* to allow anchors and fastening mechanisms to be inspected by third party personnel. *This information is to be included within the O&M manual.*

.15 *Provide a copy of all components of the anchor system and design* in a three-ring binder complete with a stamped and sealed cover letter *and system certification* from the Professional Engineer. The binder shall include shop drawings, anchor detail drawings, fastener detail drawings and specifications, inspection instructions and checklists, instructions on the proper use and limitations of the system and testing requirements and frequency. *This binder is to be provided to the general Contractor and UBC Project Manager for inclusion into the O&M manual.*

.6 Commissioning

.1 Roof anchor designer/manufacturer to provide a comprehensive seminar to UBC’s maintenance staff and Contractor personnel, on the purpose and nature of the tie-back and lifeline anchoring system.

***END OF SECTION***