



Playspace and Wheeled Sport Facility

Design and Construction Standards

The City of Edmonton

March 2020

MEMORANDUM

POURED-IN-PLACE RUBBER: RE-EVALUATION OF ITS VIABILITY AS AN APPROVED PLAYGROUND PROTECTIVE SURFACING

The purpose of this memo is to notify all current Contractors, Suppliers, Installers and Stakeholders of poured-in-place rubber that a re-evaluation of the product was started in 2015. This will include:

- CAN/CSA-Z614 compliance testing of existing poured-in-place rubber,
- A cost comparison analysis to other accessible protective surfaces,
- Supplier and/or Installer warranties,
- Conditions to new pre-qualified Suppliers and/or Installers,
- Upon completion, the outcome of this re-evaluation will be reflected in an updated and revised poured-in-place rubber standard.

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**PART A.
SCOPE OF STANDARD**

1.0 PREFACE

1.1 The City of Edmonton (COE) has developed a standard to address the planning, design and construction of children's playgrounds. This standard shall apply to all new playgrounds and those undergoing redevelopment or renovation.

1.2 The owner/operator supports a 'designed' approach to the development of play and natural learning spaces under its jurisdiction.

1.3 Establish a comprehensive 'program' from which to establish the design. As part of this process, input is to be sought from children, students, caregivers and associated staff.

1.4 Utilize a 'universal design' approach in the preparation of a site master plan which in turn complies with all applicable codes and regulations, and provides for a diverse range of settings and play opportunities.

1.5 Units of measure are converted from imperial measurements and are exact metric conversions. To parallel the CSA Z614 Standard, all measurements shall have a +2% variance allowance.

2.0 INTENT OF THE CITY OF EDMONTON STANDARD

2.1 The intent of this standard is to state the COE's interpretation of the Canadian Standards Association CAN/CSA Z614 Children's Playgrounds and Equipment and to outline supplemental standards. The standard identifies requirements intended to meet design objectives in a manner that promotes positive play experiences in a safe environment.

2.2 CAN/CSA Z614 Children's Playgrounds and Equipment (CSA) has been adopted as a minimum standard; The COE has clarified, modified and enhanced CSA standards in several specific areas to reflect past experience and accident report information.

2.3 In the event that the CSA technical committee on Children's Playgrounds and Equipment releases an updated version of CAN/CSA Z614, the updated version shall take precedence and replace the existing standard on the date of release. Playground designs that have not received final approval shall be evaluated and modified to comply with the new standard.

2.4 Exceptions to the standard may be reviewed upon submission of documentation in support of the requested change by the proponent. This information should provide examples of the proposed exception that can be either field inspected or reviewed through literature. The proponent is responsible to provide the documentation.

3.0 DEFINITIONS

3.1 Annex H – is a supplemental document approved for the CSA Z614 titled “Children’s Play and Equipment that are Accessible to Persons with Disabilities”. The document spells out a minimum requirement for Playground accessibility. It is written in mandatory language for where it is required as a policy.

3.2 CSA – is the abbreviation for Canadian Standards Association, a non-profit governing body of independent, autonomous organizations that work towards the further development and improvement of voluntary standardization in the national interest. CAN/CSA Z614 Children’s Playspaces and Equipment is the standard developed by the Technical Committee on Children’s Playgrounds and Equipment. In all cases, refer to the most recent version of the document.

3.3 Professional Judgment – refers to the ability of an individual with current knowledge, skill, or experience, or a combination of these characteristics, in the field of Playgrounds/Playground equipment design, use, or operations, which enables the person to form an opinion or make a decision, or both, concerning a matter within that area of expertise. (current CAN/CSA Z614 ‘definitions’).

3.4 Review Committee – consists of the Project Manager, Landscape Architect, and the Playground Supervisor for the project.

3.5 Measurement - Where both metric and imperial measurements are provided in a standard, the metric measurement shall be used.

3.6 COE - is the abbreviation for City of Edmonton.

**PART B.
SUPPLEMENT TO CAN/CSA – Z614:
APPLICATION OF CITY OF EDMONTON STANDARD**

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4.0 EQUIPMENT

4.1 BRIDGES

4.1.1 Bottom rung of metal rail and chain bridges shall not be installed higher than 304 mm above the surface.

4.2 CHAIN

4.2.1 Chain extending into concrete piles shall be a minimum of grade 40 steel and no less than 6 mm (1/4 inch) diameter. If the chain extends into pour-in-place it requires a sleeve and pivot mechanism.

4.2.2 To eliminate lacerations caused from peeling plastic and to allow inspection to determine the degree of wear, all metal chain shall be free from plastic or rubber coating.

4.3 CLIMBING WALLS

4.3.1 Grasping and standing points must be secured with at least two fasteners to prevent rotation.

4.3.2 Stand-alone climbing walls shall not exceed 2743 mm in height. Stand-alone climbing walls with last climbable surface 1829 mm and higher shall have a minimum 3000 mm fall zone. Stand-alone climbing walls with the last climbable surface lower than 1829 mm in height shall have a minimum 1829 mm fall zone.

4.3.3 Climbing walls shall only be linked or functionally linked with one another or with composite structure platforms. All other play elements surrounding a climbing wall within the composite structure shall require a minimum fall zone of 1829 mm.

4.3.4 Climbing walls that are functionally linked with one another shall be positioned no closer than 254 mm and no farther than 305 mm apart. Climbing walls positioned at distances greater than 305 mm from one another are not considered functionally linked and shall comply with standards specified in clause 4.3.2 above for stand-alone climbing walls.

4.3.5 Climbing walls that are functionally linked with composite structure platforms shall be positioned no closer than 254 mm and no farther than 305 mm apart.

4.3.6 The highest horizontal or stepping surface on climbing walls that are linked or functionally linked to composite structure platforms shall not exceed 305 mm above the platform it serves to access for tot structures and 457 mm above the platform it serves to access for senior structures.

4.3.7 The maximum height permitted for a composite structure platform that is linked or functionally linked to a climbing wall shall not exceed 1829 mm.

4.3.8 No rock climbing wall shall be positioned in a manner to function as a sole means to link or access platforms (bridging).

4.3.9 Standards described for climbing walls in clauses 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5 and 10.6 shall also apply to climbers.

4.3.9.1 Exception to 4.3.2: For rung ladders, flexible components and arch climbers, the stepping surface used for final access shall not be above the designated play surface it serves (CSA-Z614 Transition From Access to Platform).

4.3.10 To prevent injuries from striking lower internal components during a fall, multi-dimensional (spatial geometric) stand-alone and attached climbers shall not incorporate lower, inner horizontal elements that are constructed of metal rungs or chain. (Examples: Jungle gyms and castle towers).

4.3.11 'Fire Towers', 'Mine Shaft' climbers and similarly designed climbers that are constructed of metal rungs or chains and do not incorporate multi-dimensional internal components shall have a minimum internal fall zone of 1800 mm.

4.3.12 'Chimney' climbers and similarly designed climbers that are constructed of rope or cable shall be exempted from the minimum internal fall zone restriction specified in 4.3.2 above.

4.3.13 Multi-dimensional climbers incorporating internal rope or cable elements shall be reviewed on an individual basis prior to granting approval.

4.4 NATURAL FORM PLAY STRUCTURES (NEW 2020)

4.4.1 Structures shall comply with CSA-Z614.

4.4.1.1 Natural form play structures require the same fall zone protection and height restrictions as conventional playground equipment.

4.4.1.2 There shall be no sharp edges on wood or rock structures that would have naturally grown or occurred on the component. Sharp edges may include; log knot protrusions, splinters or brittle rock components.

4.4.1.3 Log, rock or other points of intersection must not contain entanglement or head entrapments.

4.4.1.3.1 Log connection points shall have a bushing separation to prevent entanglement.

4.4.1.4 Anchoring of standard equipment such as; logs and rocks shall be achieved.

4.4.1.4.1 Moveable pieces such as; logs, sticks or other comments are not permitted and must be anchored if they are part of the design.

4.4.1.5 Rope ends shall be capped or melted and contain no sharp or unfinished ends.

4.4.2 Design Specifications:

4.4.2.1 Supplier shall provide vendors contact information for natural material used in the development.

4.4.2.2 In the case of damaged or vandalized components, one for one replacement is preferred and shall be procurable. In the case that one for one replacement is not possible, replacement with a similar component or entire removal will be considered as secondary options.

4.4.2.3 Careful selection of vegetation shall contain aspects such as; native species to the area, resilient to traffic and weather conditions and classified as low maintenance. Areas of vegetation shall avoid; invasive species, nettle, poison oak, hawthorn, rose and blackberry, snowberry, pacific yew, red elderberry or other berry type species.

4.4.2.4 Creative, new natural components or other innovative designs are encouraged; however, shall require further operational approval prior to selection.

4.4.4 Material specifications:

4.4.4.1 Material selection shall be rot and insect resistant.

4.4.4.2 Material shall be North American sourced. Other sources may be considered for review and require approval before material is selected.

4.4.4.2.1 Exception: Accoya is not North America sourced and can be used in development. Exceptions are made for; durable, long lasting and materials that have positive test results for the factors above.

4.4.4.3 Surfacing shall have a natural aesthetic; such as; engineered wood fibre that meet the CSA performance requirements. An approved Pour-In-Place surface material around rotating equipment remains from this standard.

4.4.4.4 Stainless steel shall be used for attachment hardware. All hardware shall have mating ends or threaded inserts to prevent sharp protrusions. Hardware such as; screws or nails that do not have an opposing end shall not be permitted.

4.5 OVERHEAD EQUIPMENT

4.5.1 All overhead equipment rungs shall be free from plastic or rubber coating.

4.6 PLATFORMS

4.6.1 The maximum senior deck height shall not exceed 2438 mm (See 4.6.2 for exception).

4.6.2 A deck higher than 2438 mm shall be permitted if:

4.6.2.1 All barricade panels shall be continuous from floor to roof.

4.6.2.2 The deck shall have a roof (roof shall comply with section 11.0).

4.6.3 The maximum tot deck height shall not exceed 1219 mm.

4.6.4 Spaces between adjacent platforms shall be closed off to prevent crawl through motion and entrapment. Protective infill panels (kick plates) shall be required between all upper and lower decks (Refer to CSA-Z614 for specifications).

4.6.5 Any equipment with uncontrolled motion cannot be attached to platforms that act as transfer stations or service other equipment (such as; track rides).

4.6.6 (NEW 2019) Functionally linked platforms (including; step pods) shall have a distance no less than 254 mm and no greater than 356 mm apart.

4.7 ROOFS - DESIGN GUIDELINES

4.7.1 Roof designs shall have no accessible hand holds or gripping points on the roof and no reachable ornamental features on top of the roof (flags, chimneys, banners, etc.).

4.7.2 Roof designs shall have no adjacent components/features located in close proximity to roofs that promote access to another roof.

4.7.3 Roofs shall overhang outside of the support posts to make them harder to climb.

4.7.4 Roofs shall have a minimum 30° slope.

4.7.5 Four 3-D enlargement views of all roofs are required along with measurements of the distance between the top of barrier railing and the bottom portion of the roof.

4.8 ROOFS - UNINTENDED USE AND ACCESS TO ROOF

4.8.1 Equipment design shall not encourage access to roof. Hazardous use is promoted when the upper surfaces of roofs become directly or indirectly accessible by the relative positioning of:

- Barrier panels.
- Climbers having rungs positioned higher than the adjoining deck.
- Any climbable component higher than the platform.

All efforts shall be made to identify and eliminate hazards during the design review process. The Review Committee shall use professional judgment to determine hazardous equipment relationships during design review. If the hazard becomes evident after the installation, the Review Committee shall use professional judgment to determine whether equipment relationships are hazardous. Identified hazards shall require modification, replacement or removal.

4.9 ROTATING EQUIPMENT

4.9.1 The COE has modified CSA standards for rotating equipment (see CSA definitions 'Rotating equipment'). COE standards apply to the full range of angled rotation between horizontal and vertical axis rotational equipment.

4.9.2 Vertical, semi-vertical (angled axis) rotational equipment intended for standing or sitting shall be considered on a trial basis.

4.9.3 Stand-alone vertical, semi-vertical (angled axis) rotational equipment intended for standing or sitting shall not be permitted unless the structural support is the axis (ex: spinner cups).

4.9.4 Upper body rotational equipment intended for grasping, having a diameter greater than 610 mm, shall require a minimum fall zone of 1.8 m and a no-encroachment zone.

4.9.5 Rotating equipment with a diameter of 1219 mm or greater shall be installed over a rubber protective surface that extends a minimum distance of 1.2 m beyond the edge of the apparatus.

4.9.6 Multi-overhead event upper body rotational grasping wheels less than 610 mm are exempt from the COE modifications listed above.

4.9.7 Rotating equipment axis must have a surfacing line indicated to meet CSA standard of 350 mm.

4.10 SAND AND WATER TABLES

4.10.1 Sand and water tables shall not be constructed of fiberglass material.

4.10.2 Sand and water tables must have grounding tabs, stainless steel studs or holes for grounding wires.

4.10.3 Sand and water tables grounding wires must be enclosed in conduit and be installed at a minimum depth of 51 mm (2 inches) below sub-base.

4.10.4 Sand and water tables must drain freely.

4.11 SLIDES

4.11.1 The maximum acceptable height for all starting platforms shall not exceed 2438 mm (See 4.11.2 and 4.11.3 for exceptions).

4.11.2 A deck higher than 2438 mm up to a maximum of 2743 mm shall be permitted if all of the following conditions are met;

4.11.2.1 The deck shall have a roof which complies with our standard.

4.11.2.2 All barricade panels shall be continuous from floor to roof (including slide entrance).

4.11.2.3 No opening shall exist between top of slide sidewall and deck vertical support. The sitting section shall have guardrails, handholds and a means of forcing the user to sit down (sit-down bar, hood, guardrail, etc.).

4.11.3 (NEW 2020) A deck higher than 2743 mm shall be permitted if all of the following conditions are met (in addition to 4.11.2 above);

4.11.3.1 Current CSA Z614 shall be maintained.

4.11.3.2 Engineering controls including; flanges or physical blockades shall be present to eliminate or deter climbing of slide or slide components.

4.11.3.3 Administration controls including; signage shall be present to eliminate or deter climbing of slide or slide components.

4.11.3.4 Designated play surfaces on, near or around elevated slide components shall not be present.

4.11.3.5 Fall protection surfacing must meet Head Impact Criteria and fall height requirements from the max slide height through supplier documentation.

4.11.3.6 All play apparatus points requiring regular inspection and maintenance by the owner/operator shall be at a height which is accessible through non-certification based inspection and repair methods. The height, without the requirement for a Fall Protection system, is 3.0 metres at foot level plus the average height of an individual (168 cm or 5 ft. 5 in.)

4.11.3.7 Slide shall be fully enclosed.

4.11.4 All above ground slides shall be stainless steel. To minimize solar heating of the sliding surface, slides shall be positioned with chutes facing between northwest and east locations.

4.11.5 All slides shall be designed and installed to eliminate all entanglements (See Playspace Equipment Standard, section 'Testing Methods').

4.11.6 (NEW 2019) Slide exit points shall be installed over a Pour-in-Place or wear matt rubber protective surface underneath loose fill surfacing. This shall extend a minimum distance of 1.2 m beyond the edge of the apparatus.

4.12 SWINGS

4.12.1 Senior swing belt seats and tot swing bucket seats shall not be located within the same bay.

4.12.2 Senior swing crossbar heights shall be between 2438 mm and 3048 mm above the protective surface.

4.12.3 Chain shall be a minimum of grade 40 steel with a corrosion-resistant coating and shall have a minimum gauge of 6.4 mm (1/4 inch). The working load limit shall be minimum 590 kg (1300 lbs.).

4.12.4 Installed senior swing seats under load shall be between 406 mm minimum and 508 mm maximum above the surface.

4.12.5 Tot bucket swing seats shall be between 610 mm and 762 mm above the protective surface. Tot swing crossbar heights shall be between 2134 mm and 2438 mm above protective surface.

4.12.6 Concrete footings shall be a minimum of 610 mm deep (measured from the bottom of the hole to the top of the clay surface, with vertical or angled-drilled holes and 305 mm in diameter. An anchoring bar shall be inserted through the vertical support at a minimum 305 mm depth.

4.12.7 For swings that incorporate two single vertical posts as structural supports, the concrete footings shall be a minimum 762 mm deep and 610 mm in diameter. An anchoring bar shall be inserted through the vertical support at a minimum 305 mm depth.

4.12.8 (NEW 2019) For swings that have loose fill protective surfacing, a poured-in-Place or rubber wear mat shall be installed 150 mm below the top of the loose fill material (EWF/sand). Each swing seat shall have a rubber wear area with a minimum width of 1.0 m, a minimum length of 1.6 m, and a minimum thickness of 75 mm. Bucket style swing seats for ages 18 months to 5 years are exempt.

4.13.0 TELESCOPES

4.13.1 Telescopes shall not have the ability to retain liquid.

4.14 ZIP LINES AND TRACKS

4.14.1 Zip lines - On trial since 2015 and will need to monitor safety fall zone. May require rubber surfacing or sub surfacing, wear mats, etc. Zip lines have been added to the prohibited list for 2019.

5.0 OTHER HAZARD CONTROLS

5.1 Above grade cross-structural bracing systems shall not be permitted in the COE. Footings cannot protrude above the sub-base. If a sub-base grade elevation change exists, the footing shall conform to grade.

5.2 Equipment attached to decking (chain ladders, slides, arch climbers, fire poles, etc.) shall be anchored in concrete. Pinning in clay is not acceptable. Ground bound ends shall be secured in concrete footings with a minimum depth of 610 mm and a minimum diameter of 152 mm. There shall be a minimum depth of 305 mm surfacing above the anchor.

5.3 Talk tube pipes and mounting clamps shall be buried below the top of the subgrade.

5.4 All mis-drilled holes on playground structures shall be filled with the appropriate material; such as a rivet or weld.

5.5 To prevent post-settlement of pour-in-place safety surfacing sub-base, any mis-drilled piling hole shall be filled in with clay and compacted level to sub-grade.

5.6 All threaded fasteners shall be secured with threadlocker or a type of locking nut.

6.0 OUTDOOR FITNESS EQUIPMENT

6.1 Outdoor fitness sites must meet Playground protective surfacing standards.

6.2 Outdoor fitness sites must include suitable drainage.

6.3 This equipment shall mirror the protective zone requirements for stationary equipment in CSA.

7.0 PROHIBITED PLAYGROUND EQUIPMENT

Types of prohibited equipment:

- Sand diggers
- Statues intended as art
 - Exception: Must be physically interactive, climbable and must meet CSA protective zones to be accepted.
- Tube see-saws
- Spring toys with chain
- Mesh decks and mesh in-filled components
- Poly/plastic bubble panels
- Pressure-treated wood
- Sectional rubber safety tiles
- Poly/plastic slides
- Roller slides
- Playground carpet protective surfacing
- Teeter-totters with automobile tires as shock-absorbing material
- Wire Zip Lines

8.0 PROTECTIVE SURFACES

8.1 Regardless of the type of protective surfacing, all playground footprints shall have compliant weeping tile that allows sub-drainage from the footprint to an approved outflow system.

- All weeping tile intersections shall have angles less than ninety degrees.

8.2 The following safety surfacing materials are approved for use:

- Engineered wood fiber

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- Poured-In-Place rubber
 - Solid colour change within a single pod is subject to approval but should be avoided. Coloured rubber mixed into the wear layer to provide a fleck is an acceptable use of colour variation.
 - Seamless application of rubber is strongly preferred. Butt joints are not acceptable at seams and must have a “keyed-type” joint.
- Sand
 - Sand cannot be used as a protective surfacing adjacent to other loose surfacing types and shall be contained within its own borders. Acceptable surface type is to use a uniform material.
- No change of surfacing within fall zones.
- A single type of surfacing is preferred to limit cross contamination of loose materials within each other or migration onto pour-in-place surfacing.
- Other alternative materials may be considered and shall be subject to the new product approval process.
- Drainage: all playground footprints shall have compliant weeping tile that allows sub-drainage from the footprint to an approved stormwater outflow system.

8.3 The minimum standard for depth of loose fill at installation shall be 356 mm. The minimum standard for depth of loose fill after settling shall be 305 mm.

9.0 SPRAY DECKS

9.1 No climbable structures.

9.2 No features designed for exiting into pools of water (ie. Water slides).

9.3 No Loose surfacing within 10 metres around spray decks.

9.4 A separate standards document will need to be established.

10.0 TESTING METHODS

10.1 See all testing methods in the current CAN/CSA-Z614.

10.2 Testing method for all playground safety surfacing shall refer to playground Safety surfacing impact testing protocol. The playground shall remain closed until all testing protocol has been implemented and compliance achieved.

11.0 WHEELED SPORT FACILITIES

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11.1 A wheeled Sports Facility include but not limited to; skate parks or bicycle circuits.

11.2 See Appendix E for details.

**PART C.
ADDITIONAL CONSTRUCTION STANDARDS**

12.0 ANNEX H

The COE expects developers and suppliers to be designing and building barrier free playgrounds. They are required to provide support and increasing opportunities for people of all abilities to grow and learn together through outdoor play. The framework for this is provided in annex H of the CSA Z614 standards.

The scope of this annex does not include the area surrounding or beyond the playground including, but not limited to, parking, washrooms, drinking fountains, and recreation facilities.

Note: For more information about accessible design beyond the playground see CSA B651.

13.0 TEST/TRIAL AND PROHIBITED EQUIPMENT

New equipment can be installed and test on a trial basis. See prohibited equipment list, section 7.0.

14.0 EQUIPMENT LAYOUT DESIGN APPROVAL PROCESS

The general process for approving equipment layout design plans shall be as follows:

- Site development plan to be confirmed and approved prior to finalization of equipment layout design. Fencing, lighting, walkways, washrooms, storage, emergency phone, trees, park furniture, trash units, etc. are amenity considerations for playspace facilities on a project-by-project basis accounting for location, surrounding and adjacent uses.
- Review committee will review the proposed equipment layout.
- Supplier will be contacted about equipment and/or layout concerns identified by the Review Committee and given the opportunity to give feedback and/or suggest alternate equipment or layout.
- Final equipment approval by the review committee and project can proceed to construction detail phase when all funding is in place.
- All design changes shall be solely communicated through the COE project manager for approval, prior to implementation.

- Playground equipment shall be constructed and installed according to specifications as shown on the approved design plan, notes and manufacturer's specifications. Equipment suppliers' plans shall include the following:
 - Project title/description
 - Equipment layout plan revision # and date of revision
 - Provide an itemized list of equipment installed
 - Listing/logo of each Equipment Supplier represented
 - Statement of CSA compliance
 - Specified protective surface zones around the equipment with no change of surfacing within entry
 - Specified no-encroachment zones
 - Heights of all decks/platforms, overhead apparatus and swing cross-bars
 - Built-in scale
 - 3-D drawings from all 4 angles
 - 3-D drawings of all roofs in Playground design
 - Roof heights showing distances from all climbable structures and components
 - Installation detail for roof design
 - Table specifying the number and type of ground level play components confirming accessible requirements according to Annex H
 - Age-specific designation for applicable equipment
 - PDF version of the AutoCAD drawing
 - AutoCAD drawing (.dwg)
 - Drawing in metric to scale
 - Drawing in 2D
 - All drawing layers turned on that are required for use by COE (ie: play apparatus, fall zones, labels, pour in place layout, piles)
 - Cross-references associated with the drawing
 - Blocks associated with the drawing
 - Equipment drawn in the Playground pod
 - Equipment labeled
 - Pile layout for all equipment
 - Fall height chart
 - PDF highlighting the piles the installer would like staked by Survey
 - CSA conformance disclaimer

15.0 IDENTIFICATION AND CORRECTION OF DEFICIENCIES

The inspectors are authorized to identify and prioritize deficiencies by applying The Canadian Standards Association standard (CSA), The COE playground standard and their professional judgment in order to identify hazardous conditions and maintenance concerns.

Deficiencies shall be documented on the “City of Edmonton – Playground Construction Inspection Report”. In determining or clarifying a deficiency and its severity, the inspectors are authorized to:

- Assign class hazard criteria to prioritize correction deadlines.
- Quote references from, or provide an interpretation of CSA and the COE playgrounds standards manuals.
- Document deficiencies in cases where no written standard currently exists.

The review committee shall make every effort to identify and correct hazards and maintenance concerns on the plan prior to the installation. They shall use their professional judgment to determine deficiencies pertaining to equipment relationships that encourage hazardous use on plans and as-built composite structures.

All equipment deficiencies shall be corrected by the supplier and approved by the review committee.

16.0 EQUIPMENT HAZARD CLASSIFICATION

The Inspectors shall assign class hazard criteria* to indicate the nature and priority of repairs:

EQUIPMENT HAZARD CLASS	CRITERIA*	NATURE OF CORRECTION	CORRECTION TIMELINE upon issuance of the inspection report
CLASS 'A'	Any condition which has the potential to be life threatening or can cause severe, permanent injury.	Equipment shall be removed, modified or replaced	(AMEND 2019) The playground will not be opened until deficiencies completed.
CLASS 'B'	Any condition which has the potential to cause serious but non-disabling injury.	Equipment shall be removed, modified or replaced	(AMEND 2019) The playground will not be opened until deficiencies completed.
CLASS 'C' Equipment hazards and all construction-related deficiencies	Any condition which can cause slight injury, or may not have caused injury but does not meet current standards.	Equipment may be removed, modified, replaced, or be placed on a one year trial and monitored, or require no action or follow-up	14 working days or as negotiated

*Hazard priority ranking classification adapted from The International Loss Control Institute. Currently published in The Consumer Product Safety Commission (C.P.S.C.) Playground Audit Guide.

**PART D.
RESPONSIBILITIES OF THE SUPPLIER / CONTRACTOR**

17.0 RESPONSIBILITIES OF THE SUPPLIER / CONTRACTOR

The supplier shall provide a CPSI certified installer for playground equipment. The certified installer shall be on site at all times during the installation of the playground equipment.

The playground site shall not be opened until all deficiencies are corrected and the CCC is issued. Only the COE playground inspector shall collaborate with the project manager to remove the security fencing, if appropriate for the stage of the site development.

The supplier is responsible to provide the COE with a fully stocked maintenance kit and a manufacturer's installation / maintenance manual upon the completion of each playground installation before the playground will be opened. These will include detailed specifications for each component.

The project manager or contractor shall provide a timeline charter to the team leaders before construction begins.

18.0 CONSTRUCTION SPECIFICATIONS

The security fencing shall be 1829 mm. Each panel shall be attached to adjacent panels with fastening brackets similar in design to the example shown in the pictures below. The minimum size of fastening hardware shall be 9/16" nut and 3/8" bolt.



- Clay footings are not allowed. Alternatives for large footings are concrete or soil cement.
- Refer to Landscape Design and Construction Standards for vegetation requirements around playgrounds. Reasonable judgement must be used to avoid deciduous plants near playground surfacing. There shall not be any plant material within equipment no encroachment zones.

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19.0 WARRANTY REPLACEMENT WORK AND MAXIMUM REPLACEMENT TIMES

Approved COE suppliers shall ensure that replacement parts are available within the CCC warranty period. The time is as follows:

TYPE OF EQUIPMENT	TIMELINES
Fasteners & Bolts	5 working days or as negotiated (AMEND 2019)
Common Wear & Tear Components Moving and Swivel Components	7 working days or as negotiated (AMEND 2019)
Cables, Ropes & Connectors	14 working days or as negotiated (AMEND 2019)
Technical or Electronic Replacement Parts	7 working days or as negotiated (AMEND 2019)
Manufactured Structural Components	Within 6 weeks or as negotiated (AMEND 2019)

20.0 PROTECTIVE SURFACING INSTALLATION AND SPECIFICATION

20.1 Poured-In-Place Rubber Surfacing

20.1.1 Summary

- A) Section includes: poured-in-place resilient playground safety surfacing
- B) Related work: playground equipment installation, sub-surface preparation, storm drainage, security fencing, and similar work shall be provided by the general contractor or other assigned party.
- C) At the time of sign off to surfacing contractor, the surfacing contractor accepts the like and kind of the base preparation as suitable to the base applied.

20.1.2 References

- A) CAN/CSA-Z614 & ASTM F1292-04: Standard Specifications for Impact Attenuation of surface systems under and around Playground equipment.
- B) ASTM 2157: Running Track Standard.
- C) ASTM D2859: Standard Test method for flammability of finished textile floor covering materials as per ASTM 2157.
- D) ASTM 1951: Standard specification for determination of Accessibility of surface systems under and around Playground equipment.

20.1.3 Description of System

- A) Product: poured-in-place protective safety surfacing or approved equal.
- B) Description: A dual density, resilient impact attenuating safety surfacing system that is mixed, troweled and compacted on site to form a resilient seamless surface. Surface system shall consist of an impact layer and a wear layer consisting of recycled tire crumb, chips, or thread, blended with a polyurethane binder throughout the entire depth of surfacing.
- C) Materials: The surfacing contractor shall be responsible for all labor, materials, tools, equipment and applicable taxes to perform work and services required for the installation of the protective surfacing.
 - i) Impact Layer: binder to rubber ratio range (by weight) for impact layer shall be within 12-15% unless otherwise specified. Variations to this specification may be considered but will require pre-approval by the COE. Impact layer shall be installed to thickness sufficient to the impact attenuation requirements as determined by the designated play surface or a location otherwise specified in CAN/CSA-Z614 and the protective surfacing beneath it (see CSA 'Elevated Platforms).

ii) Wear Course: Shall be manufactured using a mixture of EPDM rubber granules or approved alternate and polyurethane binder mixed at a ratio range of 21-23% binder to rubber (by weight) unless otherwise specified. Variations to this specification may be considered but will require pre-approval by the COE. Wear course shall be installed to a minimum thickness of 12 mm.

iii) Colours: EPDM colored crumb shall be used unless otherwise specified. Color shall not be obtained by way of pigmented binder unless specified or pre-approval is obtained. Colored rubber shall be colorfast and UV resistant. Colours may applied as one solid color, as a combination of variegated speckles or as specified by design.

20.1.4 Quality Assurance

- A) CAN/CSA-Z614 & ASTM F1292: Gmax less than 200; HIC less than 1000 within 3 temperature laboratory tests (standard lab test temperature is -1 C). Field testing will be conducted within temp range of -5 C and +49 C in a clean condition.
- B) The fall height around elevated platforms shall be measured from the protective surfacing to 724 mm above the elevated platform when intended for children 18 months to 5 years old and 950 mm above the elevated platform when intended for children 5 to 12 years old. The fall height of an elevated platform that is totally enclosed by protective barriers that meet the roof shall be the height of the elevated platform.
- C) In the case of inclement weather, the sub-base contractor shall be responsible for ensuring that reasonable steps have been taken to protect the sub-base area from the undesirable weather elements. In cases where heavy rainfall or other threatening environmental conditions persist, compaction retesting may be required prior to the installation of the impact layer or wear course surfacing.
- D) In keeping with the need for ambient temperatures required for installation, poured-in-place rubber surfacing shall not be installed when temperatures fall below 10 degrees Celsius. Exceptions may be granted upon special request and approval by the COE, in which case necessary heating and hoarding may be required. Rubber surfacing installed outside the specified conditions must still comply with the specified warranty conditions required of this agreement.
- E) Scope of warranty will meet or exceed the specified requirements referenced in warranty.

20.1.5 Submittals

- A) Surfacing contractor shall supply a materials list of items proposed for identified project.

- B) Surfacing contractor shall supply manufactures specifications and other related test data needed to prove compliance with specified requirements.
- C) Verification samples showing product color and texture will be provided prior to installation.
- D) Surfacing contractor shall supply recommended maintenance and repair procedures to Owner operator.
- E) Surfacing contractor shall supply certificate of qualifications of surfacing installer.
- F) Surfacing contractor shall supply MSDS & product data sheets for all component materials supplied.
- G) Warranty documents shall be supplied in writing to all parties delineating specific terms and conditions for all applicable warranty items.

20.1.6 Supplied

- A) Construction drawings with sufficient detail will be provided to the surfacing contractor as part of the scope of work tender package.
- B) Sub-Base preparation and specific installation requirements shall be supplied to the surfacing contractor prior to installation by way of the tender package or as directed by the landscape architect.

20.1.7 Installation

- A) Refer to published sub-base, drainage, and installation requirements as specified in defined scope of work detail supplied by project tender and landscape architect.
- B) Areas and conditions within the defined scope of work shall be examined prior to commencement and officially signed off by the general contractor, landscape architect, surfacing contractor and project manager as suitable to proceed.
- C) Conditions detrimental to timely and proper completion of the work must be corrected prior to proceeding with installation. Installation shall not proceed until unsatisfactory conditions are corrected.
- D) In areas where surfacing contractor requires thicker protective surfacing (following sub-base sign off), the surfacing contractor shall be responsible for modifying the sub base accordingly.

20.1.8 Sub Base Preparation

- A) Compacted Aggregate:

- 150 mm minimum, minus 20-25 crushed gravel base spec, with < 5% fines, compacted to 95% or better standard proctor density.
- Shall maintain a planarity of plus minus 6 mm over 3 m in any direction unless otherwise specified.
- When protective surfacing is applied after equipment installation it is difficult to obtain the required compaction standard. Hand tamping may be required in areas difficult to access. In such cases, compaction around the existing post or support structure shall be tampered with a hand block in 50 mm lifts, adding moisture (dampen) as each lift is applied.
- NOTE: Any compacted clay beneath crushed gravel base spec shall require confirmed compaction to 98% or better standard proctor density.

B) Concrete/Asphalt (as per COE specification standards):

- Concrete 120 mm minimum thickness; Asphalt 75 mm minimum thickness
- Slope as specified on drawings supplied
- Light broom finish
- Must be new or if old concrete, appropriately cleaned to ensure proper adhesion
- Asphalt must be at least two weeks old and washed down once prior to application of base mat material

C) Edges: (Refer to manufacturers edge details)

- Concrete retainer as specified on drawings supplied
- Sloping edge 30% degree minimum
- Keyway, 50 mm width, 100 mm depth

D) Protection:

- Site shall be protected from unintended walking on installed surfacing until 100% cure is obtained, unless otherwise agreed to and a sign off inspection has occurred with surfacing contractor and COE. Cure time will vary depending on temperature and humidity.

NB. Generally that is achieved within 36-48 hours. Product will cure faster when the temperature outside is warm and humid and much slower when cold and dry.

20.1.9 Proof of Competence

- A) Bidder shall submit proof of competence and ability to carry out work as per submittal references and certificate of qualifications of installer

20.1.10 Contractor Pre-Qualification

20.1.10.1 Reference list

- A) A minimum of three years of direct experience installing pour in place rubber surfacing, including a list of projects completed within that time frame.

- B) List shall include names of project representatives & respective phone numbers.

20.1.10.2 Assurance

- A) Supply bid security issued by a reliable surety company in the amount 10% (minimum) of the entire bid amount.
- B) All bidders must be prepared to submit a performance bond for their work.

20.1.10.3 Insurance

- A) General liability of not less than \$2,000,000 per occurrence for personal injury and/or property damage.
- B) Standard Automobile Liability of not less than \$2,000,000 per accident for bodily injury and/or property damage.

20.1.10.4 Warranty

- A) Materials & Workmanship - protective surfacing supplier shall provide a minimum 3 year warranty on materials & workmanship.
- B) Performance Criteria - Protective Surfacing installed must meet the performance criteria of less than 200 Gmax and less than 1000 HIC when tested according to ASTM F1292. Test results performed on the installed protective surfacing using a Triax2000 instrument (conforming to the technical requirements of ASTM F1292-99) between 10 to 25 days after the installation will be required and must confirm the Gmax of less than 200 and HIC of less than 1000.
- C) An independent 3rd party will conduct the Triax test. The COE will arrange for the on site field test within 10 to 25 days after installation. At the discretion of the COE, additional follow up test(s) may be conducted prior to the issuing of the Final Acceptance Certificate (FAC). The FAC will occur 1 years after the issuance of the Construction Completion Certificate (CCC). If a follow up test is applied, the performance criteria required shall comply to the current CAN/CSA-Z614 standard in effect at the time of installation.

20.2 PLAYGROUND SAND

20.2.1 Scope

Supply and delivery of sand to be used for playground construction.

20.2.2 General

20.2.2.1 Sand shall be uniform, natural and coarse and conform to the specifications in this section.

20.2.2.2 Sand shall be free from vegetation, clay balls or other extraneous material.

20.2.2.3 All sand shall be washed and conform to the sieve analysis shown below.

20.2.2.4 Sand shall contain no more than 2% of lightweight pieces floating on a liquid of specific gravity 2.0.

20.2.2.5 The allowable moisture content shall be 4% based on the dry weight of sand. If the moisture content is higher than the weight of water in excess of 4% shall be computed and deducted from the total weight of sand supplied.

20.2.3 Selection

20.2.3.1 The source of the sand must be submitted with the tender and approved by the project manager before the commencement of operations.

20.2.3.2 The contractor shall use reasonable care in the selection of material from a pit so as to produce a uniform product.

20.2.4 Sieve Analysis

20.2.4.1 When tested by means of laboratory sieves, the sand shall meet the following grading requirements and be uniformly graded between the limits:

<u>Sieve Size (mm)</u>		<u>% Passing by Mass</u>
1.25 mm	(No. 16)	85 - 100
0.8 mm	(No. 20)	48 - 70
0.315 mm	(No. 50)	2 - 30
0.16 mm	(No. 100)	0 - 6
0.063 mm	(No. 200)	0 - 1

20.2.4.2 Sieve analysis and sample for the sand shall be provided with the tender. Samples shall be approximately 2 to 3 kilograms contained in plastic lined jute bags. The type of material bagged shall be clearly identified.

20.2.5 Delivery, Storage and Handling

20.2.5.1 One grading test shall be taken for every 300 tonnes of sand produced.

20.2.5.2 Sand Delivered to a Stockpile

When sand is to be delivered from the screening/washing plant to a stockpile the average grading of the first eight consecutive sieve tests shall confirm to the specified grading band. If they do not, then the production process shall be adjusted so that average grading of the first eight tests and the subsequent eight consecutive tests confirms to the specifications. If this does not happen then the sand produced should not be transported to the stockpile.

20.2.5.3 Sand Delivered Directly to Site

- When sand is not be delivered from the screening/washing plant to site, then the average grading of any three consecutive tests shall conform to the specified grading band.
- The contractor should be prepared to deliver to site or sites indicated within the COE upon receipt of 48 hours notice.
- Sand may be inspected and tested at any time during the contract period as directed by the project manager. If the material does not conform to the specification, then it may be rejected and delivery refused.
- Non-compliant sand already delivered to site shall be removed by the contractor at the contractor's expense within 24 hours. If the sand is not removed within the

designated time frame, then it will be removed by others and the cost of the removal charged to the contractor. Supply and delivery costs for rejected sand will not be paid.

- Random sampling will be submitted for testing.

20.2.5.4 Truck Size and Capacity

- The capacity and type of the truck the contractor proposes to use to deliver sand shall be submitted to the project manager for approval prior to the start of the contract.
- The use of semi-trailer type units may be restricted when hauling sand to certain sites.
- Trucks may be measured for size during the contract as determined by the project manager. Trucks falling outside of the previously approved limits shall be removed from service immediately.

20.2.5.5 Load Limits

- The loading of trucks will be subject to the COE Traffic Bylaw No. 5590.
- In addition, the project manager may further limit the loading of trucks to prevent spillage of material or damage to public thoroughfares.

20.3 ENGINEERED WOOD FIBRE (EWF)

20.3.1 Scope

- Notwithstanding other mulch that may be supplied to COE, engineered wood fibre (EWF) is very specific to playground safety surfacing. The following specifications shall be adhered to for EWF when supplied to COE for playground construction tenders.
- The supply and delivery of EWF for playground safety surfacing and accessibility during a playground construction project must adhere to the following specifications.

20.3.2 General

20.3.2.1 EWF shall be uniform and natural in composition and conform to these specifications as well as any manufacturer specifications of the supplier.

20.3.2.2 EWF shall be free from vegetation or other extraneous material. The fibre should come mainly from deciduous trees and not contain such items as; bark, twigs or coniferous needles.

20.3.2.3 All EWF shall be clean, free from prohibited materials (peat moss, manure, raw compost, paper products, plastics, rubbers, gelatinous sprays, plywood or other lumber containing chemical adhesives or wood preservatives) and must conform to the sieve analysis shown below.

20.3.2.4 EWF shall be of high quality; free from diseases, molds, fungi and insect infestations. All organic fibre shall be free of inorganic materials (metal, glass, rock and other foreign materials).

20.3.2.5 EWF shall contain no more than 2% of dust floating on a liquid of specific gravity.

20.3.2.6 The allowable moisture content shall be no more than 2%.

20.3.3 Selection

20.3.3.1 The source of the EWF must be submitted with the tender and approved by the project manager before the commencement of operations (please see approved supplier listing prior to bid submission).

20.3.3.2 Substitutions during the construction season will not be allowed unless the new supplier meets the requirements and has filled out a new supplier application.

20.3.3.3 The contractor shall use reasonable care in the selection of material as to produce a uniform product, so that it will meet the following sieve analysis.

20.3.4 Sieve Analysis

20.3.4.1 When tested by means of laboratory sieves, the EWF shall meet the following grading requirements and be uniformly graded between the limits:

	<u>Minimum</u>	<u>Maximum</u>	<u>Total</u>
3/4"	99%	100%	100%
3/8"	75%	100%	86%
No. 16	0	15	12

20.3.4.2 Samples for the EWF shall be provided with the tender. Samples shall be approximately 2 to 3 kilograms contained in plastic lined jute bags. The type of material bagged shall be clearly identified.

20.3.5 Delivery, Storage and Handling

20.3.5.1 EWF Delivered to a Stockpile

When EWF is to be delivered from the mill to a stockpile the average grading of the first eight consecutive sieve tests shall conform to the specified grading band. If they do not, then the production process shall be adjusted so that average grading of the first eight tests and the subsequent eight consecutive tests conforms to the specifications. If this does not happen then the EWF produced should not be transported to the stockpile.

20.3.5.2 EWF Delivered Directly to Site

- When EWF is to be delivered from the mill, the average grading of any three consecutive tests shall conform to the appropriate sieve analysis prior to shipping from the mill. This analysis must be provided to project manager early in the spring of each construction season before any release to site.
- The contractor should be prepared to deliver to site or sites indicated within the COE upon receipt of 72 hours notice.

- EWF may be inspected and tested at any time during the contract period as directed by the project manager. If the material does not conform to the specification then it may be rejected and delivery refused.
- Non-compliant EWF already delivered to site shall be removed by the supplier at the supplier's expense within 24 hours. If the EWF is not removed within the designated time frame, then it will be removed by others and the cost of the removal charged to the supplier. Supply and delivery costs for rejected EWF will not be paid.

20.3.5.3 Truck Size and Capacity

- The capacity and type of the truck's the contractor proposes to use to deliver EWF shall be submitted to the project manager for approval prior to the start of the contract (A standard tandem 1 ton dump type truck or equivalent is deemed appropriate).
- The use of semi-trailer type units may be restricted when hauling EWF to certain sites.
- Trucks may be measured for size during the contract as determined by the project manager. Trucks falling outside of the previously approved limits shall be removed from service immediately.

20.3.5.4 Load Limits

- The loading of trucks will be subject to the COE Traffic Bylaw, No 5590.
- In addition, the project manager may further limit the loading of trucks to prevent spillage of material or damage to public thoroughfares.

20.3.5.5 Base Preparation for EWF Material

Preparing base for EWF product must be done in accordance with the manufacturer's specifications for their product as it may affect warranty.

20.3.5.6 Spreading, Topping and Tamping of Material

Contractor or supplier shall spread fibre evenly throughout the footprint in tamped lifts of 150 mm to an overall settled depth of 305 mm. To ensure the settled depth, the fibre shall be topped up to a minimum of 50 mm above the top of the curbing.

**APPENDIX E:
SPECIFICATION FOR WHEELED SPORTS FACILITIES**

- 1** Foreword
- 2** Scope
- 3** Referenced Standards
- 4** Terms and Definitions
- 5** Dimensions
- 6** Designs
- 7** Materials
- 8** Surfacing and Surrounding Areas
- 9** Ancillary

1. Foreword

This COE wheeled sports facilities guideline applies to facilities for skateboarding, in-line skating, roller skating and BMX riding, installed in unsupervised areas. Where supervision is available or where access is controlled different considerations may apply. These facilities generally include manufactured items such as; rails, ramps and pipes on which a wheeled device such as a skateboard or other roller sports equipment can be used.

The guideline specifies safety requirements to protect users and third parties from unforeseen hazards when using the equipment as intended. Requirements are specified for the equipment and recommendations are given for site location.

The guideline does not apply to competition or commercially operated facilities, though many aspects covered by the document may be relevant to such facilities.

The specification includes requirements relating to materials, dimensions and construction of equipment, but specific designs are not given for ramps as these may vary with the type of facility and use.

Compliance with these guidelines is required for all facilities located on city land. The COE requires that all skatepark product suppliers must comply with the skatepark product supplier pre-approval process as specified by the COE project manager.

2. Scope

This Guideline specifies requirements for facilities for skateboarding, in-line skating, roller skating and BMX riding, installed in unsupervised areas. These facilities include manufactured items such as rails, ramps and pipes on which a wheeled device such as a skateboard or other roller sports equipment can be used.

It applies to ramps, general riding surfaces and to permanent and temporary street course equipment.

It does not apply to competition facilities or to commercially operated facilities.

3. Referenced Standards

The following standards contain provisions referenced in this text.

ASTM Test Method D2583-95 Standard Test Method for Indentation, Hardness of Rigid Plastics by means of a Barcol Impressor

City of Edmonton Design & Construction Standards Construction Specifications

Canadian General Standards Board CAN/CGSB-12.12-M90

Plastic Safety Glazing Sheets

CSA-Z614

Canadian Playground Safety Standard.

F08.66.03 Z9571Z American Standards and Testing Materials Standard Guide for Public Use Skate Park.

4. Terms and definitions

For the purposes of this document, the following definitions apply.

Barrier

Infilled panel designed to stop the user from falling.

Commercially Operated Facility

Facilities which are constantly supervised by the operator and may include an admission fee.

Competition Facility

Facilities which are accessible for the duration of a competition under the supervision of the event organizer.

Coping

Circular tube or bar which is firmly attached to the top of a transition or a ramp.

Depth (of a platform)

Dimension in the same direction as the transition to the platform.

Facility

Area dedicated to the use of skateboards, roller skates, BMX cycles or other roller sports activities comprises of a constructed riding surface including; ramps and other structures.

2020 Playspaces and Wheeled Sport Facility Design and Construction Standard

Flat

Horizontal part of the riding surface usually between transitions.

Flat Bank

Structure incorporating one or more constant riding surfaces and a platform.

Free-Fall Height

Perpendicular distance between one surface and a lower adjacent surface.

Grind Rail

Curb or rail along which it is possible to grind or slide.

Half-Pipe

Pipe consisting of two platforms separated by two opposite transitions and a lower flat section.

Jump Ramp

Ramp without a barrier, guardrail or platform.

NOTE: Jump ramps are sometimes known as “wedge ramps”.

Platform

Flat surface at the top of a ramp and/or transition.

Professional Judgment

Where an interpretation is necessary, COE safety inspector use professional judgement to ensure that there is compliance to the Standard.

Quarter Pipe

Pipe consisting of a single transition surmounted by a platform.

Ramp

Structure incorporating one or more transitions and/or straight profiles.

Riding Surface

Surface on which wheels are intended to be used.

Run-Up

Space which is required for safe wheeled access to a structure.

Run-Out

Space which is required for safe wheeled exit from a structure.

Safety Area

Area around a structure or facility necessary for its safe use.

Spine Ramp

Ramp incorporating two opposite transitions forming a ridge.

Street course Equipment

Items other than half-pipes which may be used for wheeled sports.

Structure

Constructed feature forming a riding surface.

Transition

Connection of curved profile between two levels of a riding surface.

Wall Ramp

Ramp leading to a vertical surface.

5. Dimensions**General**

If a wheeled sports facility is provided for use in conjunction with a playground, it shall be clearly separated from the general play area by a space at least 25 m wide and/or by a physical barrier at least 1200 mm high.

No free-fall height from a platform shall exceed 1000 mm unless barriers are provided. No ramp shall rise to a height of more than 2000 mm. Exceptions may be granted for competitions.

Accessible metal edges shall be rounded off with a minimum radius of 3 mm.

Where ramps abut run-up surfaces, the change in levels between the run-up surface and the ramp shall not exceed 5 mm.

NOTE: A maximum change in levels of 3 mm is preferred

Coping Ramp

- A coping ramp is a skateboarding facility with a coping to enable tricks to be performed along the edge.
- The radius shall be minimum 1800 mm.

- The coping ramp shall be provided with a platform. This platform shall be minimum 900 mm deep. At the top end of the transition, there shall be coping along the entire width of the ramp.
- If the ramp is greater than 1000 mm in height, then crash barriers are required for the platform area of the ramp.
- With an overall height greater than 1000 mm, the dimensions of the platform, barrier and skateboarding surfaces width and radius shall correspond to the respective dimensions of the mini-pipe (see Table 1).

Flat banks

- Flat banks shall not exceed 3000 mm in height and should be at least 1200 mm wide.
- Flat banks higher than 1000 mm shall have barriers.

Grind Rail/ Curb

- The height of the grind rail shall be at least 150 mm measured from the riding surface.
- The grind rail shall be at least 50 mm wide.
- If the height of the grind rail exceeds 600 mm, the space between the underside of the rail and the ground shall be filled. The width of the infill shall not exceed the width or diameter of the rail.
- A curb simulates the edge of a pavement and makes it possible, for example, to skateboard along it.
- The curb shall be a minimum of 150 mm and a maximum of 1000 mm high.
- The curb shall be 40 mm minimum width.
- One or two pipes may be installed on the curb.

Mini Pipes

- A mini pipe is a skateboarding facility comprising of two adjacent transitions connected by a flat, the radii of which do not reach vertical. The ends of the mini-pipe are formed by platforms.

The following types are allowed:

Type 1: Track without barrier or profile edge

Type 2: Track with profile edge

Type 3: Track with barrier

- The radius of mini pipe shall be a minimum 1800 mm or at least 1 to 2 times the height.
- A height h of a maximum 2000 mm is permissible. Up to a platform height of 1250 mm, a minimum width of 2400 mm shall be complied with. If this height is more than 1250 mm, the minimum width is 3600 mm. If a mini-pipe is provided with a barrier, its width shall be minimum 5000 mm.
- The platform shall be fitted with crash barriers depending on the free fall height. The length of the platforms shall be a minimum 1200 mm and a maximum 1500 mm.
- The length of the flat shall not be less than the radius.

Table 1: Dimensions of a Mini-Pipe

Type	Height h	Width b
1 and 2	$\leq 1\ 250$	$\geq 2\ 400$
1 and 2	$\geq 1\ 250$	$\geq 3\ 600$
3	$< > 1\ 250$	$\geq 5\ 000$

Half-pipes

- The width of a half-pipe shall be at least 2400 mm.

NOTE: Greater heights may require increased widths.

- Platforms shall extend over the full width of the half-pipe. If the height of the platform is 1200 mm or less the platform shall have a depth of at least 900 mm. If the height of the platform is greater than 1200 mm the platform shall have a minimum depth of at least 1200 mm to a maximum 1500 mm. Platforms should be provided with crash barriers of minimum 1000 mm height.
- It shall only be possible to reach the platforms via the riding surface.
- If the transition reaches vertical height of the vertical section of a half-pipe shall not exceed 450 mm. The vertical section shall be fitted with coping along its entire upper edge.

NOTE: The half-pipe should be constructed in a way that does not facilitate climbing. Exceptions may be granted for competitions.

- The radius of a half pipe shall be a minimum 2400 mm and a maximum 3000 mm.
- The length of the flat shall not be less than the radius.

Table 2: Dimensions of a Half-Pipe

Type	Height h	Width b
1 and 2	≤ 1 250	≥ 2 400
1 and 2	≥ 1 250	≥ 3 600
3	< > 1250	≥ 5 000

Jump Ramps

- The upper edge of a jump ramp shall be rounded off with a minimum radius of 3 mm and may be 40 mm to 100 mm wide.
- A jump ramp shall be at least 150 mm high and no more than 1000 mm high. The ramp shall be at least 200 mm wide.
- The radius shall be a minimum of 1800 mm.

Quarter pipes

- The quarter pipe shall be provided with a platform. If the height of the quarter pipe is 1200 mm or less, the platform shall have a depth of at least 900 mm. If the height of the quarter pipe is greater than 1 200 mm, the platform shall have a depth of at least 1200 mm.
- The minimum width of a quarter pipe shall be 1 200 mm.

NOTE: Greater heights may require increased widths.

Spine Ramps

- The height of a free-standing spine ramp shall not exceed 1500 mm. The maximum overall height of a spine ramp shall be 2000 mm.
- A spine ramp shall have two copings at its apex.
- The width of a spine ramp shall be at least 1200 mm.

NOTE: Greater heights may require increased widths (Refer to Table 3).

Table 3: Dimension of a Spine Ramp

Overall Height <i>h</i>	Width <i>b</i>
≤ 1000	≥ 1200
$> 1000 \leq 1250$	≥ 2400
$> 1250 \leq \text{max. } 1500$	≥ 3600

Wall ramps

- A wall ramp is a skateboarding facility which gives way to a vertical wall. The wall against which the ramp stands shall be vertical and smooth. The total height of the wall shall be at least twice the overall height of the ramp measured at the end that abuts the wall. The ramp shall be securely attached to the wall.
- The width of the ramp shall be a minimum 2400 mm.
- The overall height of the ramp shall correspond to the radius of the transition.
- The radius shall be a minimum of 1500 mm to a maximum 2000 mm.

6. Design

Calculation

The strength, load bearing capacity and stability of the platforms and riding surfaces shall be calculated in accordance with CSA-Z614. The calculation for riding surfaces shall be based on a loading of two users per 1 m length. These calculations shall be documented.

Stability

Ramps and other structures shall be secured by their dead weight or by non-removable ground anchors.

Riding surface

The riding surface shall be cambered or inclined to permit drainage.

There shall be no projections, other than copings, exceeding the thickness of the material and not exceeding 3 m on, to or within the riding surface, including joints between transitions and flats, but excluding expansion joints.

The gap between surfaces at expansion joints shall not exceed 5 mm.

NOTE: A maximum gap of 3 mm is preferable.

Asphalt used for riding surfaces shall conform to The COE Standard Construction Specifications # 400 - # 440. 'Sandy half' mix is recommended.

Barriers

Barriers shall be fitted where there is a free-fall height greater than 1000 mm on quarter-pipes, half-pipes and flat banks.

NOTE: Where street course platforms have a free-fall height greater than 1200 mm, a barrier is required.

Barriers shall be at least 1000 mm high. No opening within a barrier shall have a dimension greater than 100 mm.

NOTE: Barriers should be constructed in a way that does not facilitate climbing.

Barriers shall be able to sustain a loading of 2L, where L is the loading requirement specified in CSA -Z614.

NOTE: The doubling of the loading specified in CSA-Z614 allows a dynamic element for collisions at speed.

There shall be a horizontal gap of 150 mm to 400 mm between the coping of a quarter-pipe, half-pipe or flat bank and the end of the barrier that extends along the depth of the platform.

Safety Areas

NOTE 1: The safety areas may overlap if the equipment forms a continuous course unless otherwise specified.

NOTE 2: Safety areas are not intended for use by spectators. Spectator areas designed into a facility can be considered and will be reviewed as non-encroachment zones on an individual design basis.

General

Safety areas shall be clear of obstacles. Safety areas may overlap.

Bank and Jump Ramps

The width of the safety area around jump ramps shall be at least 2000 mm at the sides and at least 3000 mm minimum to 5000 mm maximum (for maximum allowable height) behind.

NOTE: Consideration should be given to increasing this distance in proportion to the height of the ramp up to the maximum allowable height.

Spine Ramps and Coping Ramps

The width of the safety area around both spine ramps and coping ramps shall be at least 2000 mm at the sides and at each end.

NOTE: Consideration should be given to increasing this distance in proportion to the height of the ramp.

Wall Ramps

The safety area for a wall ramp shall be at least 5000 mm long in front of the ramp and at least 2000 mm wide at each side.

NOTE: Consideration should be given to increasing these dimensions in proportion to the height of the ramp.

Quarter-Pipes, Half-Pipes and Flat Banks with a height of less than 1900 mm

Quarter-pipes, half-pipes and flat banks where the height from the base level to the platform is less than 1900 mm shall be provided with a safety area on both sides, except on a side which is placed against a smooth-surfaced wall. This safety area shall be at least 2000 mm deep.

A safety area shall extend for at least 3000 mm from the front of the pipe, unless the area has means to restrict access.

Quarter-Pipes, Half-Pipes and Flat Banks with a height equal to or greater than 1900 mm

Pipes where the height of the curved section is equal to or greater than 1900 mm shall have a safety area at least 3000 mm deep on each side.

A safety area shall extend for 3000 mm from the front of the pipe, unless the area has means to restrict access.

Copings and Profile Edges

Copings shall project from the platform or riding surface by no more than 12 mm.

The diameter of coping shall be at least 40 mm and no more than 80 mm. The wall thickness of any tubing shall be at least 3 mm.

The ends of the coping shall be sealed.

If two copings are used, they shall be arrayed in parallel. If the distance between two copings is greater than 8 mm, the space between the axial dimension of the pipes shall be designed to be sealed.

Profile Edge

Can be provided along the entire length of the skateboarding surface.

The height of the profile edge above the skateboarding surface and width shall be 45 mm +/- 5 mm.

If a pipe is not used as a profile edge, the side surface of the respective profile edge construction shall not deviate from the vertical by more than 10.

Entrapment

The entrapment requirements of F08.66.03 Z9571Z shall apply throughout the facility (including ancillary items).

Fixings

Fixings shall conform to CSA-Z614.

NOTE: All structures and parts thereof for the equipment should be fixed in a manner which minimizes the possibility of unauthorized removal.

7. Materials

Flammability

Materials used should be fire-retardant (or have some degree of fire retardancy). Documentation indicating fire retardancy is required.

Metal - Documentation re: toxicity is required

- Metal parts shall be protected against corrosion.
- Additional protection should be considered where atmospheric pollution is prevalent. Metals that produce toxic oxides which scale or flake shall be protected by a non-toxic coating.

Synthetics

When components made of glass-reinforced plastics are tested in accordance with CAN/CGSB-12.12-M90, the layer beneath the gel coat of the glass-reinforced plastics shall not become exposed.

When tested in accordance with ASTM Test Method D2583-95, the resin of the glass-reinforced plastic shall achieve the Barcol hardness quoted by the manufacturer.

The performance of synthetic materials with respect to embrittlement on exposure to ultraviolet light shall be documented.

Documentation shall be obtained from the manufacturer concerning the expected service life of any component made from synthetic material.

Concrete

The concrete mix for concrete castings shall be specified in accordance with COE Standard Construction Specifications # 200 - # 220.

NOTE: Engineering calculations for structural integrity of precast concrete components should be available on request.

Concrete used for riding surfaces shall be specified in accordance with COE Standard Construction Specifications #200-#220 and shall cure to a characteristic compressive strength of at least 50 N/mm² at 28 days, tested in accordance with COE Design & Construction Standards.

Steel reinforcement shall be placed to meet the design calculations, and shall be covered by concrete in accordance with COE Design & Construction Standards, Construction Specifications #200 - #220.

Concrete for foundations shall cure to characteristic compressive strength of at least 30 N/mm² at 28 days, tested in accordance with COE Design & Construction Standards, Construction Specifications # 200 - # 220.

The grading of in-ground structures shall conform to COE Design & Construction Standards, Construction Specifications, Section 02310 for in-ground work and Section 03055 for riding surfaces.

Dangerous Substances

Confirmation shall be obtained from the relevant suppliers that no substance known to adversely affect health is present in the equipment or facility.

NOTE: Examples of such substances are asbestos, lead, formaldehyde, coal tar oils, carbolineums and polychlorinated biphenyls (PCBs).

8. Surface of Surrounding Areas

The surface shall be of a bound uniform material. Loose material, e.g. sand, shall not be used. Riding surfaces and surrounding surfaces shall be free-draining.

NOTE: Grass areas should be maintained in good condition. The provision of footpaths to ramps sited on grass is recommended.

9. Ancillary

Fencing, lighting, walkways, washrooms, storage, emergency phone, trees, park furniture, trash units, etc. are amenity considerations for wheeled sport facilities on a project-by-project basis accounting for location, surrounding, and adjacent uses.

Tagging or graffiti of wheeled sport facilities will be reviewed as acceptable on a project-by-project basis or specified areas will be identified for graffiti use by the project design. Maintenance practices regarding tagging should be considered.

End of Document